



VISUAL INFORMATION SYSTEMS



Solar Powered Trailer Mounted Directional Arrow Board Operation and Maintenance Manual

Version 1.2.1



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BARTCO Traffic Equipment Pty. Ltd.

7 Westside Ave, Port Melbourne, VIC 3207, Australia.

Phone: +61 3 9646 8580 / 1300 306 106

Website: www.bartco.com.au

Email: service@bartco.com.au

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1. INTRODUCTION

The Bartco Trailer Mounted Directional Arrow Board, provides the absolute ultimate in innovative design and performance. From the heavy-duty structural steel trailer to the user-friendly computer control system, the Bartco Arrow Board is designed and built to provide years of trouble-free service with minimal care and maintenance. Bartco's philosophy of designed-in quality assures that your new equipment will perform to your expectations now and into the future.

We recommend that you read this entire manual carefully and clarify any misunderstandings you may have prior to operating the equipment. Our personnel are always available to assist you with any questions you may have regarding the operation, programming, maintenance, or repair. Remember, safety through knowledge works for everyone! Make sure that you and your operators are familiar with any tools or equipment before they attempt to use them.

RULES FOR SAFE OPERATION

The Bartco Trailer Mounted Directional Arrow Board was designed and manufactured to be as safe and easy to use as possible. However, as with any piece of equipment, it is of paramount importance that operating personnel be completely familiar with the unit and are properly trained in safe deployment and operating procedures. Make certain that any persons transporting or operating the Arrow Board have thoroughly read and understand the Safe Operating Procedures as listed in this manual.

SAFE OPERATING PROCEDURE CHECKLIST

The operating procedures located in this manual, should be used anytime the Bartco Arrow Board is transported or placed into service. These procedures help to ensure that proper operating procedures are followed and that certain items pertinent to the safe operation of the equipment are not overlooked.

- CAUTIONS & WARNINGS -

WARNING! DO NOT ATTEMPT TO OPERATE THIS EQUIPMENT UNTIL YOU HAVE READ THOROUGHLY AND COMPLETELY UNDERSTAND ALL OPERATING INSTRUCTIONS AND PRECAUTIONS CONTAINED IN THIS MANUAL. FAILURE TO COMPLY CAN RESULT IN PERSONAL INJURY AND/OR PROPERTY DAMAGE

SETUP & OPERATION

Directional Arrow Boards are primarily intended to supplement other traffic control devices in giving advice to motorists that they are required to alter their intended route or direction of travel. The primary use of the arrow board is in a lane closure situation. You should consult with the local council/roads authority before placing Arrow boards or any other traffic control devices. Proper placement of Directional Arrow Boards are essential to their effectiveness.

TRANSPORTING, SETTING UP AND TAKING DOWN SIGN

A safety check should be performed on the message sign before transporting the unit over the road.

TRANSPORTING THE SIGN



The Maximum towing speed recommended for this portable Arrow Board is 80 km/h.

CAUTION: Before Transporting the unit, make sure:

- Sign is not operational
- Sign is fully lowered into the transport support bar
- Solar Panels are fully lowered (if applicable)
- All outrigger jacks are raised secured and wound up fully

STEP 1

Close and lock all battery compartments and computer console.

STEP 2

Using the Outrigger Jacks, raise trailer coupling to appropriate level and attach to appropriately sized ball.

STEP 3

Retract all 4 Outrigger Jacks, Unpin and raise into Transport Position - Secure pins in place.

STEP 4

Connect Safety chains to towing vehicle

STEP 5

Attach trailer light connector to towing vehicle. Make sure all lights are operating correctly

STEP 6

Inspect the trailer and check brake fluid level and tyre pressures.

In situations where the work site is a significant distance away, stop periodically and check the integrity of the coupler and safety chains and for any excess heat build up in the tyres and wheel bearings.

SETTING UP SIGN AND TRAILER

Upon arriving at the work site, first check the immediate area for any overhead power lines or obstructions. Also, check the surrounding area for any tall buildings, trees, or other obstructions nearby that might shade the solar array during part of the day and interfere with the proper operation of the solar electric charging system. Many times, just moving the unit a few metres can make the difference between getting an adequate supply of sunlight to maintain the charge level of the battery bank.

Once the appropriate site has been selected, the unit can be positioned and set up for operation. Engage the hand/brake (if fitted) prior to disconnecting the coupler from the tow vehicle hitch.

Locate the trailer so that the trailer is parallel to the direction of traffic flow.

STEP 1

Position the Trailer and level it using the four adjustable Outrigger Jacks. Note: The trailer must be level with 5° to equally distribute load between the four jacks.

STEP 2

Loosen the rotation brake by pulling the handle outwards

STEP 3

Using the Mast Raise/Lower switch (Located in the main console) Raise the sign to desired height. NOTE: Once sign is raised above main console, it can be rotated 360 degrees.



NOTE: To avoid rapid drains upon the battery bank, avoid excessive raising & lowering of the sign.

STEP 4

Rotate Sign to desired final position facing the traffic and Lock Rotation Brake



Fig 1.0-Levelling Jack



Fig 1.2-Levelling Jack Angled for greater stability



Fig 2.0-Retractable draw bar



Fig 2.1-Retracted for smaller footprint

MAIN CONTROL OPERATION AND PROGRAMMING

POWERING THE SIGN

When the main power switch, located on the control console panel, is switched on, the arrow board does not display any sequence, this is designed so that when the arrow board is setup, and then switched on the wrong sequence cannot be displayed to the motorist, thus increasing the risk of accident.

To Power The sign (on and off), press the  button the control console

RAISING AND LOWERING THE SIGN

For easier operation and Occupational Health and Safety Reasons, your sign may be equipped with an electro hydraulic lift.

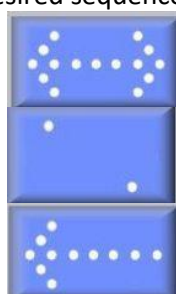
Raising and lowering the sign is undertaken with the  button



Note: Check the locking mechanism position prior to raising and lowering

STARTING A NEW SEQUENCE

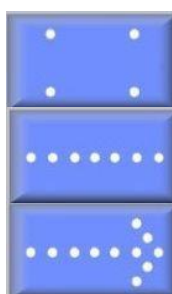
The arrow board sequencing buttons are very self-explanatory, simply press the desired button for your desired sequence.



Double Arrow

Alternate Light Warning

Left Arrow



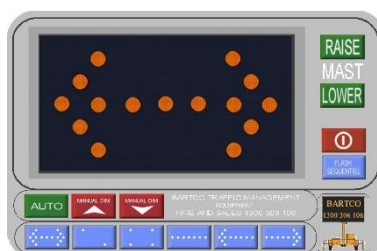
Four corner light warning

Bar Light Warning

Right Arrow

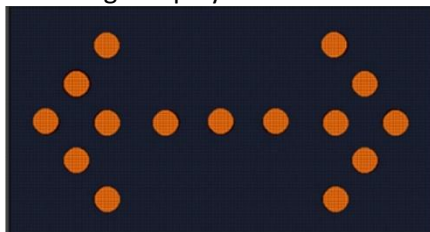
FLASHING OR SEQUENTIAL

Switching between Flash or Sequential Mode can be made through the  button.



CORRESPONDING LANTERN DISPLAY

To ensure that you have the correct sequence displayed on your arrow board, the main Controller has a corresponding lantern display panel. E.g when the Left Arrow button is selected this will be displayed on the console and the main sign display.



LANTERN DIMMING

Your arrow board is designed to suit all outside light conditions. A light sensor fitted to the main console will determine whether the ambient light will require the lanterns to be automatically dimmed or brightened. For the majority of your sign applications this will suffice.

Simply select the  button to activate this feature

The lantern brightness can also be adjusted manually by selecting the Buttons (Up for brighter, Down for dimmer)



Note: Just as having the lights too dull in the day time can be a hazard, having the lights too Bright at night can also cause problems to motorists. It is always a good idea if possible to drive passed the arrow board and see it from the motorists point of view.



Fig 3.0-ArrowController

2. MAINTENANCE

The Bartco Arrow Board is designed and manufactured to provide years of trouble free service, while demanding a minimum amount of care and maintenance. Aside from keeping the lanterns and the solar array clean and free from debris, your unit will consume very little of your equipment maintenance resources.

CLEANING

The solar panels used in the solar array have a tempered glass upper surface and can be cleaned using the same techniques as those employed in cleaning the sign display. In the event that the solar array becomes covered with snow or ice, the excess residue should be removed as soon as possible. It is not necessary, nor desirable, to aggressively scrape frozen snow or ice accumulation from the panels.

General overall cleaning of the entire unit is recommended as a part of the routine maintenance schedule to optimise the performance and life expectancy of the message sign. A mild detergent and plenty of water is all that should be required to remove accumulated dust and road film. Avoid using strong alkali or abrasive cleaning compounds. They are not necessary and may damage the finish.

LUBRICATION

Although, under typical operating conditions, very little lubrication service is required, it is still an important aspect of maintaining trouble free operation and minimising rust and corrosion problems. The sign panel lifting mechanism employs a hydraulic system.

The "dolly" wheel and stabilising jacks should be lubricated regularly. Apply a small amount of chain lube at the hole located at the top of the swivel jack outer tube to lubricate the internal screw mechanism. Lubricating these and other pivot points not only ensures that these mechanisms remain free and easy to operate, but also that rust and corrosion are kept to a minimum.

The trailer axle wheel bearings should be cleaned and repacked with a good grade of lithium-based bearing grease at least once a year, more frequently if the trailer is used heavily, particularly in excessively dusty environments or if the axle has been submerged in water. Remove the dust cap from the axle hub, remove and discard the cotter key, and remove the castle head nut. Remove the wheel and hub from the axle spindle, being careful to prevent the bearings from falling and becoming contaminated with dirt. Clean the old grease from the bearings, hub and spindle. Repack with clean wheel bearing grease and reassemble. Always replace the cotter key with a new one to ensure secure retention of the spindle nut.

BATTERIES

When servicing the batteries, as with any lead acid type battery, there are a few precautions that should be observed:

- i. Never expose the area over and around an open battery compartment to a spark or open flame. Lead acid type batteries produce hydrogen gas during a recharge cycle and an accumulation of the gas exposed to a spark or flame could result in an explosion! Since hydrogen gas is much lighter than air and dissipates very quickly, the only area of concern is immediately above and around the battery compartment.
- ii. Always exercise extreme care when using metal tools around the battery terminals. The batteries used in your sign have an extremely large energy storage capacity and can generate several thousand Amperes of current if the terminals are shorted out by a metal tool. This high current will cause the tool to heat up very quickly and possibly spray molten metal at the point of contact. The battery bank operates at a very low voltage level, specifically 12 volts, which is not high enough to present any danger of electrical shock. However, the battery bank's ability to generate very high current necessitates the exercising of extreme caution when working around the battery terminals.
- iii. The electrolyte used in lead acid batteries, whether liquid or gel, is highly corrosive and can cause skin irritation and burns. Use caution, whenever batteries are being serviced or replaced, to avoid spillage or case damage. If any of the electrolyte comes into contact with skin or clothing, remove it immediately by flushing with plenty of clean water.



Gloves and safety goggles should be worn anytime service or repair work is being performed on the batteries or electrical terminals!

The batteries, in general, require very little care and maintenance. The most important aspect of optimising the service life of the batteries is fluid level maintenance. The electrolyte level must always be maintained at a level above the plates inside the battery. If the electrolyte level drops below the tops of the plates, the portion of the plates that have been exposed will be permanently damaged. The electrolyte level is very easily maintained by simply adding distilled water as needed.

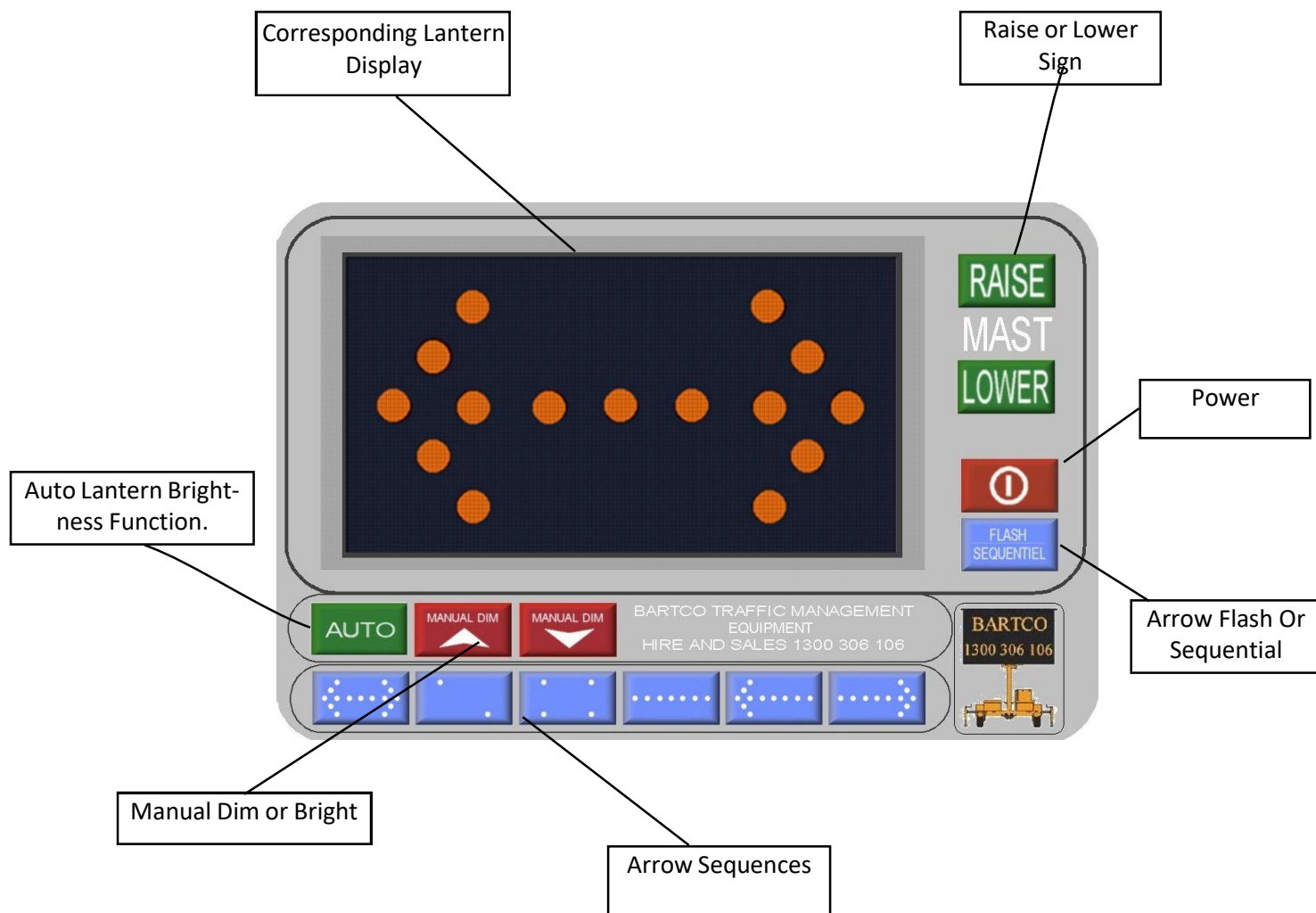
Simply remove the vent caps from each cell of the battery, check the level of the fluid, and add Distilled water, if necessary, to bring the electrolyte level up to the indicator ring located in the opening. A battery water dispenser, available at most auto parts stores, will expedite and simplify the process.

Battery fluid level should be checked every three to four months in temperate climates and every 30 days in very warm climates. Remember!, if the fluid level is not maintained, the useful life of the batteries will be dramatically shortened!

The only other maintenance items that should be performed on the batteries can be completed at the same time that the electrolyte level is being checked. Make sure that the fasteners holding the cables on the battery terminals are tight and that any fluid or residue build up on the tops of the batteries is removed. Use a damp cloth or sponge to wipe off any build up. This will help prevent corrosion of the terminals and the battery compartment and minimize breakdowns due to loose or corroded electrical terminals.

3. PROGRAMMING

QUICK REFERENCE GUIDE



4. WARRANTY STATEMENT

- i. Bartco warrants that each product sold will be free from defects in material and workmanship for a period of two years from date of supply, subject to the conditions and restrictions contained herein.
- ii. BARTCO further warrants all parts furnished under this warranty for a period which expires upon termination of the warranty onto which these parts were installed. All parts furnished outside of the warranty are warranted for a period of thirty days from supply date.
- iii. This warranty does not apply to a product that has not been installed or maintained in accordance with BARTCO'S instructions, been subjected to damage in an accident, abused or neglected during operation, repaired or modified by persons not approved by BARTCO, or failed to have normal maintenance.
- iv. BARTCO'S responsibility in respect to warranty claims is limited solely to repair or replacement, our option, of product found by BARTCO to be defective. BARTCO does not pay for labour charges, transportation charges or any incidental or consequential damages connected with removal of a product deemed to be defective or with installation or replacement of repaired product. Further, BARTCO 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 BARTCO, whether claim is made in contract or tort or under any warranty or in negligence or otherwise.
- v. BARTCO reserves the right to make changes in its products without incurring any obligations to incorporate such improvements in any products previously sold or in service.
- vi. The terms and conditions of this warranty cannot be altered without the written approval of BARTCO.
- vii. This warranty does not apply to any product which has not been paid for according to the terms under which the product has been invoiced. In addition, BARTCO will not honour any warranty claim from a customer whose account is not current according to BARTCO'S payment terms.
- viii. BARTCO does not warrant batteries, lighting elements, and electrical ballast and items considered to be expendables in the text of operating the equipment.
- ix. 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.