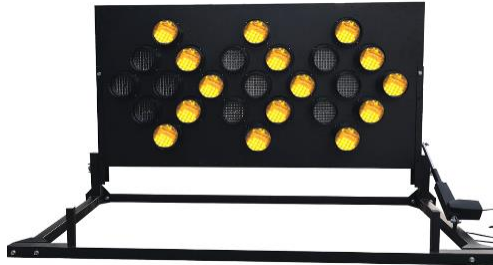


ARROW BOARD ASSEMBLY & OPERATING MANUAL

Traffic Safety Warehouse Arrow Boards are available in a selection of sizes for truck/trailer mount, or non-mounted models for either trucks or trailers.

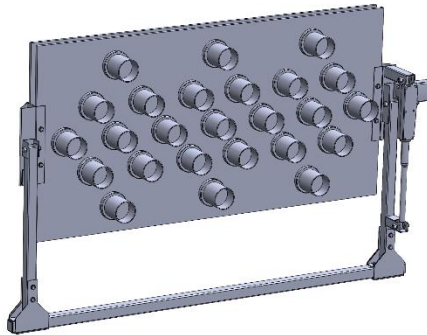
LM Series

Low Mount Frame with 90° Power-Tilt



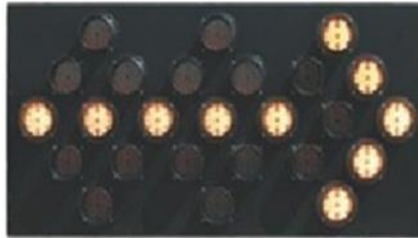
HM Series

High Mount Frame with 90° Power-Tilt



NM Series

No Mounting Kit



TSW Model #	Dimensions	Weight	Lighting	Mounting/Actuator Options
SAB-HM-3060-25P36	30 x 60"	72 lbs.	PAR36 - 25 bulbs	High Mount with power actuator
SAB-LM-3060-25P36	30 x 60"	72 lbs.	PAR36 - 25 bulbs	Low Mount with power actuator
SAB-LM-3672-25P46	36 x 72"	100 lbs.	PAR46 - 25 bulbs	Low Mount with power actuator
SAB-NM-3060-25P36	30 x 60"	49 lbs.	PAR36 - 25 bulbs	No Mount (may be Truck Mounted) – no actuator
SAB-NM-4896-25P46	48 x 96"	112 lbs.	PAR46 - 25 bulbs	No Mount (may be Truck or Trailer Mounted) – no actuator

FEATURES

- Easy to operate and maintain
- High output bright amber LEDs
- Lamps and hoods are easily replaced.
- Light display patterns may be selected with automatic dimming (all models).
- Wired into the truck’s power system with a controller box located inside the vehicle cab
- Controller box outputs include short circuit protection, helping to prevent blown transistors.
- Fuses can be replaced.
- Power system has reverse polarity protection to protect controller unit.
- Durable powder coat finish resists harsh weather conditions
- Meets MUTCD standards

SPECIFICATIONS

1. **DISPLAY:**

- 1.1. The outer frame is constructed of an aluminum channel, 3” x 1” x 1/8” thick. Two interior channels add strength and prevent distortion of front and back panels. All channel joints are welded.
- 1.2. Front and rear panels are constructed of aluminum sheet, 5052-H32, .079” (2.0mm) thick. Panels are riveted and screwed to the frame and the interior channels.
- 1.3. Oven-baked, flat black powder coat finish ensures durability and protects from corrosion.
- 1.4. Display light specifications:

Board Dimensions	Lamp	Light Output	Meets MUTCD Standards
30” x 60”	PAR 36 LED lamp 4 ½” diameter	Max brightness 650 cd	Type B
36” x 72”	PAR 46 LED lamp 5 ¾” diameter	Max brightness 850 cd	Type B
48” x 96”	PAR 46 LED lamp 5 ¾” diameter	Max brightness 850 cd	Type C

1.5. **LEDs:**

- Reverse polarity protection
- AllnGaP II (aluminum indium gallium phosphide) technology, T-1¾ size
- Amber color: 588 to 590 nm
- Forward voltage: 2.0 to 2.1Vdc @ 20mA
- Operating Temperature: -22 to 18oF (-30 to 85oC)
- Fully waterproof, sealed unit
- Acrylic lens

- Each lamp has an integrated lens that enhances brightness and angularity of each LED while reducing power consumption.
- Beam angle horizontal: 16.8 degrees, +/-8.4 degrees
- Beam angle vertical: 9.5 degrees, +/-4.75 degrees
- High-impact ABS plastic visor
- Four keyed slots enable visors to be removed from display panel without removing screws.
- Complete with rubber seal
- Visibility of at least 1 mile for PAR 46 and .75 miles for PAR 36

2. **ELECTRONICS:**

- 2.1. All electronics are located inside the control box and inside the arrow board.
- 2.2. Operating temperature is -40 to 176°F
- 2.3. Flash rate is 50 to 60 per minute for all display patterns.
- 2.4. Positive power is applied to lamps only when lit. Negative is chassis grounded.
- 2.5. Each fuse driver is current protected.
- 2.6. Reverse-polarity protection protects the controller if battery cables are connected backward (may happen after servicing).
- 2.7. The low voltage disconnect circuit engages when the battery voltage drops to 11.2 VDC, shutting down power to protect the batteries from full discharge.

3. **POWER SUPPLY:**

- 3.1. The vehicle's alternator system powers the arrow board display, charges the controller box, and power-operated actuator, which raises and lowers the arrow board.
- 3.2. Load: Typical: 8.4A @ 13.6 VDC. Maximum: arrow board only 5.0A @ 13.6 VDC. Board and optional power-operated tilt-frame BA @ 13.6 VDC.
- 3.3. Voltage: Minimum: 11.0 VDC. Maximum: 18.0 VDC

4. **WI-FI CONTROLLER BOX:**

- 4.1. Control Box
 - 4.1.1. Allows operator to send power to board, activate actuator, and select an arrow or other shape in flashing or sequential patterns. Signal is sent by Wi-Fi to the board from control box.
 - 4.1.2. Made of polycarbonate-ABS plastic
 - 4.1.3. Size: 6.2" W x 3.5" H x 2.4" D
 - 4.1.4. Power for control box is from rechargeable lithium ion batteries inside of the control box. The batteries are charged by a plugin adapter that goes into the side of the box and plugs into the cigarette plug 12-volt power point in the cab. A red warning light on the face plate of the controller advises when the batteries need charging. Once charged, the controller box does not need to be plugged in to function, as the Wi-Fi communication range is 50 feet.
 - 4.1.5. Install inside vehicle cab under dashboard or on floor with supplied adjustable mounting bracket. The bracket allows for adjustment of vertical and horizontal angle of control box.

4.1.6. Control box is removable for easy exchange and servicing. Can also be used outside of the cab for changing of legend on the board. Range is approximately 50 feet.
















4.1.7. Powering on the control box **does not send power to the board or actuator**. It only turns on the control box. To turn power on to the board and raise with actuator, press and hold the actuator “up” button for 3 seconds. To turn the power off on the board and lower it, push and hold for 3 seconds the actuator “down” button.

4.2. Control panel function changes:

4.2.1. To select the desired function on the controller box display, first raise the board and turn board power and lights on. Press and hold the “send” button for 3 seconds and the controller will send the message to the board to change to this display. To change the display repeat this process to send the new display to the board. The Wi-Fi- controller box works by only sending a signal to the board 1 time and locks that function in until you make a change and send a new function for it to display. You can power off the controller and the function on the board will still display until you power back up the controller and follow 4.1.7 and 4.2.1 again.

4.2.2. LED indicator lights will display when the power to the arrow board display is turned on, when the batteries are low, and when you change the function prior to sending the signal to change the display. Once you push “send the data,” LED indicator light will stop displaying.

4.3. Display Patterns:

ARROW BOARD DISPLAY PATTERNS							
Flashing Patterns			Sequential Patterns				
Mode	Pulse 1		Mode	Pulse 1	Pulse 2	Pulse 3	
1-2		Flashing arrow left or right	6-7				Sequential stem arrow left or right
3		Flashing double arrow	8-9				Sequential arrow left or right
4		Flashing corner caution	10-11				Sequential chevron arrow left or right
5		Flashing caution bar	12				Alternating diamonds

ALL 25 LIGHT MODELS – Display any of following patterns

Flashing arrow, left or right	11 lights total 5 lights form arrowhead 6 lights form stem
Flashing double arrow	15 lights total 5 lights form each arrowhead 5 lights form stem
Flashing four-corner warning	4 lights total 1 light at each corner
Flashing caution bar warning	7 lights form horizontal bar across center of display panel
Sequencing stem arrow, left or right	11 lights total 5 lights form arrowhead 6 lights form full stem 1 st pulse: 2 far stem lights 2 nd pulse: 5 far stem lights 3 rd pulse: full arrow shape 4 th pulse: blank display
Sequencing walking arrow, left or right	11 lights total 5 lights form arrowhead 6 lights form full stem 1 st pulse: 2 far stem lights with arrowhead 2 nd pulse: 5 far stem lights with arrowhead 3 rd pulse: full arrow shape 4 th pulse: blank display
Sequencing chevron arrows, left or right	15 lights total 5 lights form each arrowhead 1 st pulse: 1 far arrowhead 2 nd pulse: 2 far arrowheads 3 rd pulse: 3 arrowheads 4 th pulse: blank display
Alternating diamonds	18 lights total 9 lights form each diamond 1 st pulse: 1 diamond shape on left 2 nd pulse: 1 diamond shape on right

5. Auto-Dimming

- 5.1. Auto dimming is standard on all TSW Arrow Board models and is required per MUTCD. A photocell detects ambient light. Photocell is located on arrow board display panel frame on bottom. The controller adjusts the brightness of the LEDs, dimming display brightness in darkness and increasing to full brightness in daylight.

6. Replacement Lamps & Hoods:

- 6.1. Replacement lamps and hoods can be replaced within minutes with a Phillips screwdriver.

Lamps:

Part #SAB-PAR36
Part #SAB-PAR46

Hoods:

Part #SAB-LC36
Part #SAB-LC46



ASSEMBLY/INSTALLATION INSTRUCTIONS

ELECTRICAL/ELECTRONIC DEVICE
Potential Shock Hazard

Please read and follow all instructions shipped with this product and the warnings that follow. These instructions are for installing the system on a mobile vehicle. The installer is required to have a good working knowledge of vehicle electrical systems and the ability to work safely on such systems.

Do not attempt this installation unless you have been properly trained in the maintenance and troubleshooting of vehicle electrical systems.

Before drilling into any vehicle structure, be sure that each side of the surface is free of anything that might be damaged.

Failure to follow these safety precautions may result in property damage, serious injury, or death to you, to passengers, or to others.

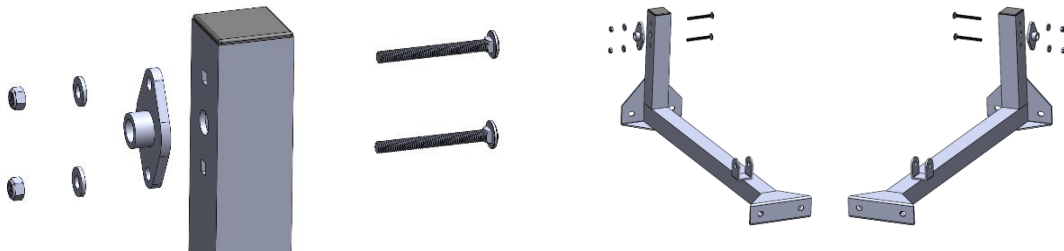
A NOTE ON POLARITY:

Our LED arrow boards work on negative polarity due to the way in which the LEDs need to flash. This means the board must have a solid ground for the negative to the frame of the vehicle with no paint or powder coat between the contacts. **DO NOT ground the board to the battery negative. You should also install a 15-amp fuse on the positive side of the battery to protect the circuitry.**

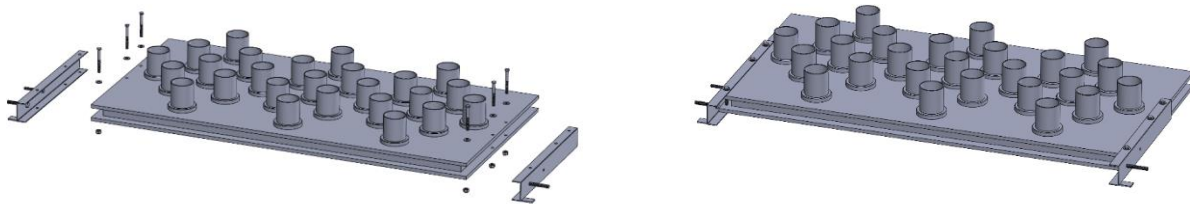
LOW MOUNT ARROW BOARD ASSEMBLY

The following instructions are for LOW MOUNT arrow boards. If you are installing a HIGH MOUNT ARROW BOARD, skip to that section.

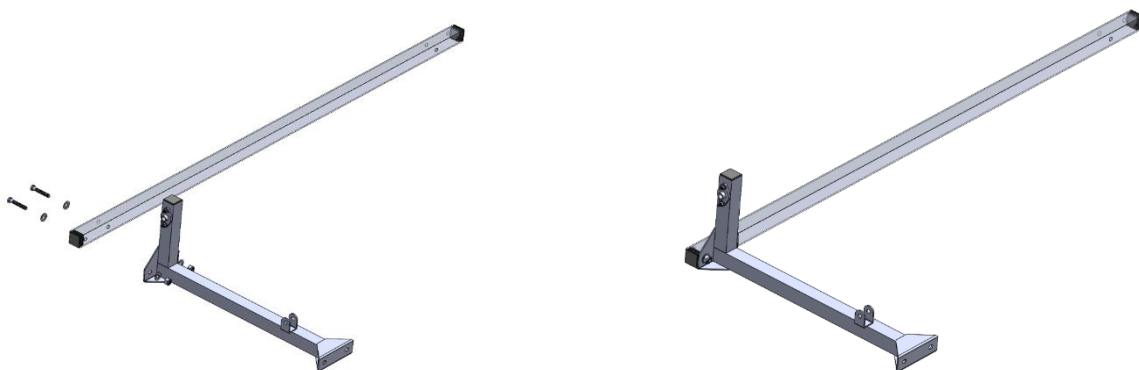
1. Install the bearings on right and left “L” brackets, using the supplied carriage bolts, washers, and lock nuts as pictured below.



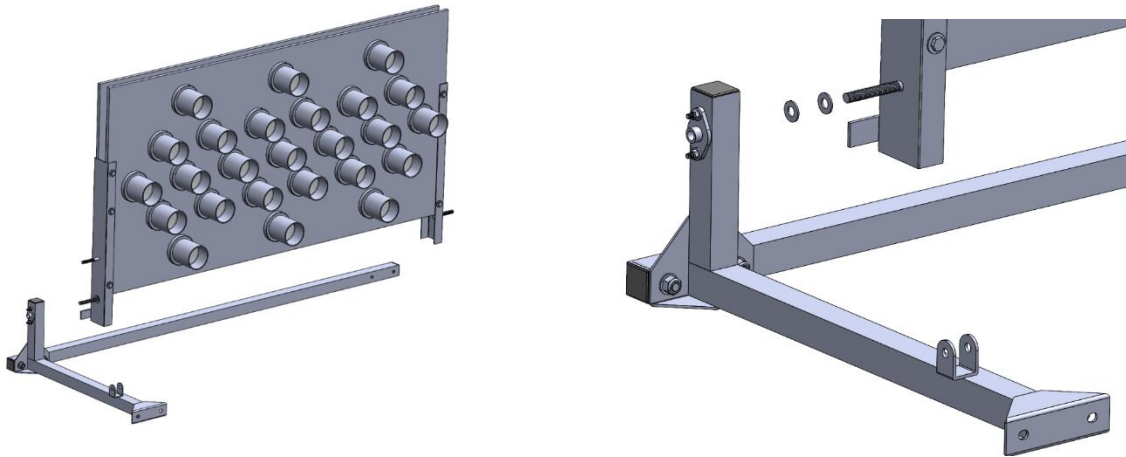
2. Install the left and right U channel brackets onto the arrow board using supplied long bolts, washers on both sides, and lock nuts. Make sure the tab on bottom is on the back side of the board . This is a safety stop to prevent board from falling forward into a windshield.



3. Assemble the left hand “L” bracket onto the back and front bar (front bar has the upright posts) using supplied bolts, washers, and lock nuts. Leave loose at this stage.



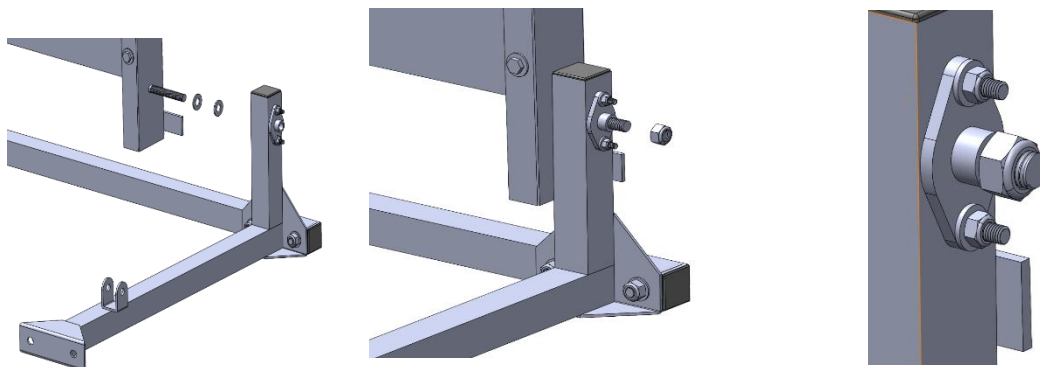
4. Slip the arrow board assembly onto the left “L” bracket, using two washers between the arrow board bracket and the “L” bracket to make room for rotation of the board.



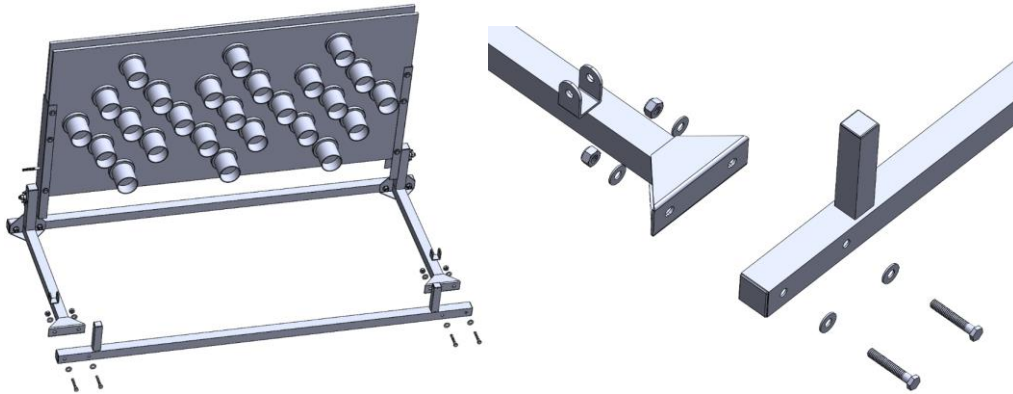
5. Install the lock nut. Do not fully tighten at this stage.



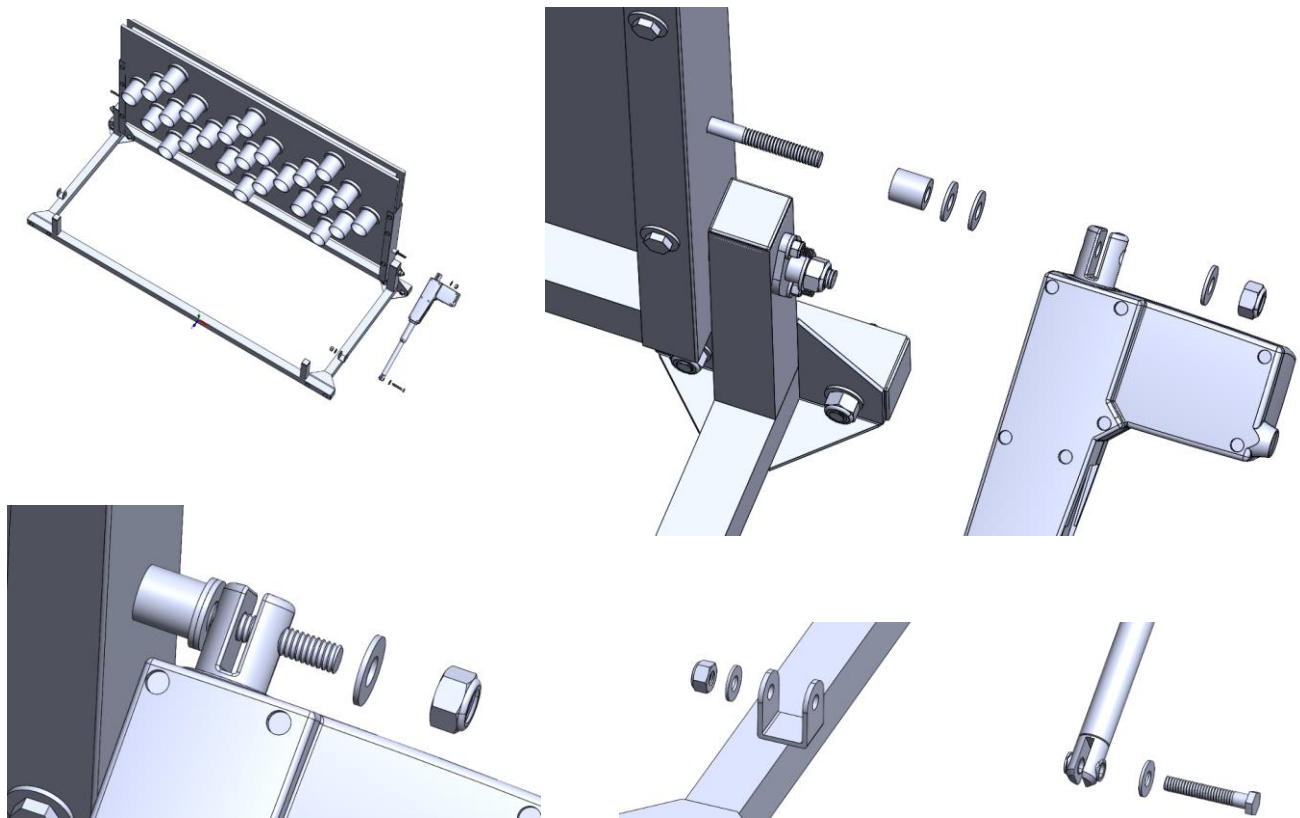
6. Bolt in the right side “L” bracket, same as the left side bracket, and tighten all bolts, making sure the arrow board moves freely with no binding.

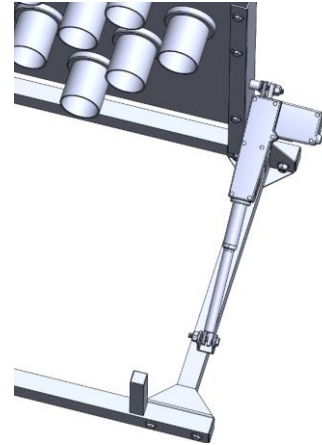
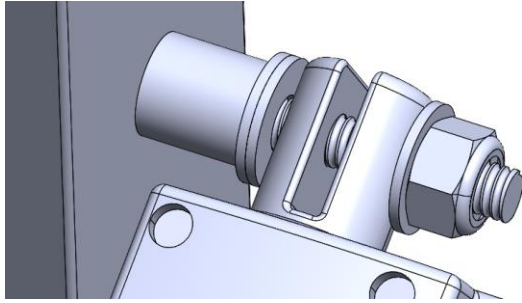


7. Connect the front bar to right and left “L” brackets and leave bolts loose. The front bar has the stopper bars on it that you can mount strobe lights (not included) onto the ends.

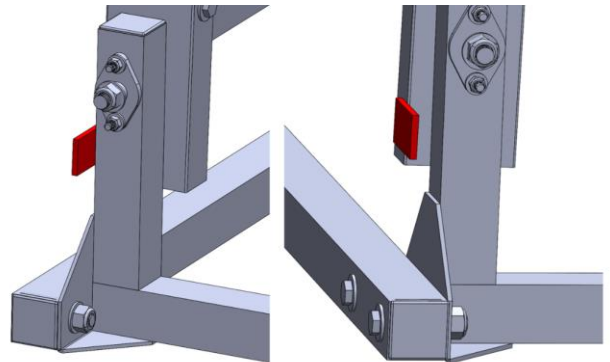
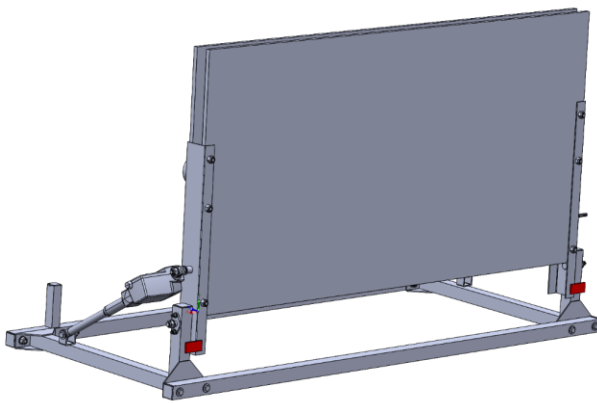


8. Install the actuator using the black spacer to move it to correct position so does not bind. Do not over tighten the bolts so it can move freely. Actuator **must install upside down** to prevent any water getting into the unit. Do not overtighten the nuts and bolts so it moves freely with no binding. Can be mounted to right or left side of the board.





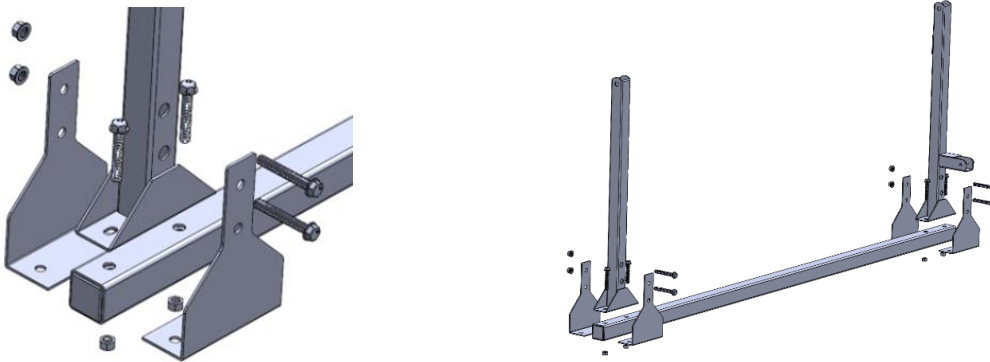
9. Safety note: the red tabs on the back of the board are for preventing the board from flipping over and hitting the windshield in the event of the actuator breaking and or catching on something. Please make sure they are on the back of the board as per these diagrams.



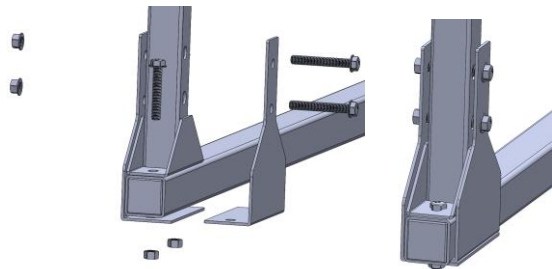
HIGH MOUNT ARROW BOARD ASSEMBLY

The following instructions are for HIGH MOUNT arrow boards. If you are installing a LOW MOUNT ARROW BOARD, skip to that section (above).

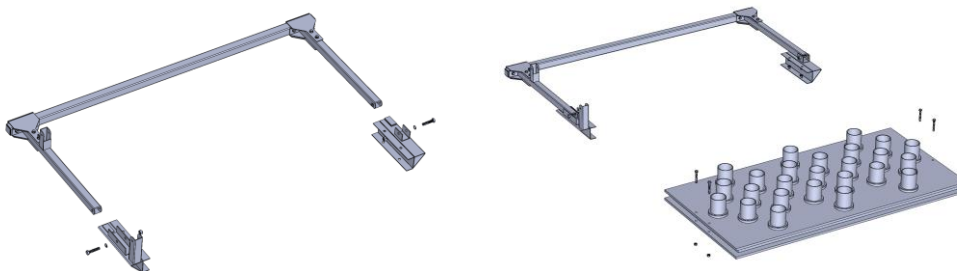
1. Using bolts, washers and lock nuts supplied, attach the upright posts to the long bar supplied.



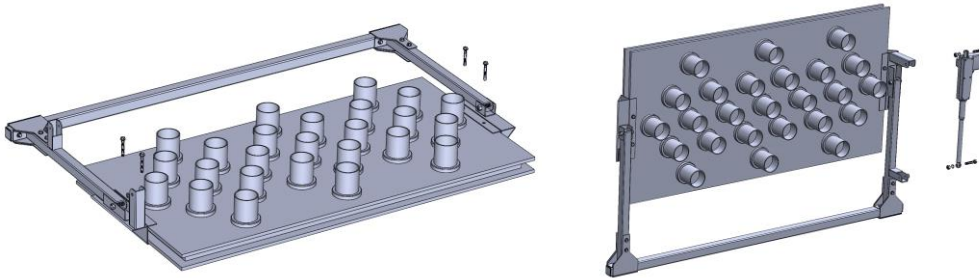
2. As you assemble, you will need to overlap and line up the 2 reinforcing plate holes (see label on the parts). Fully tighten these bolts and torque all bolts to min of 110 ft. lbs.



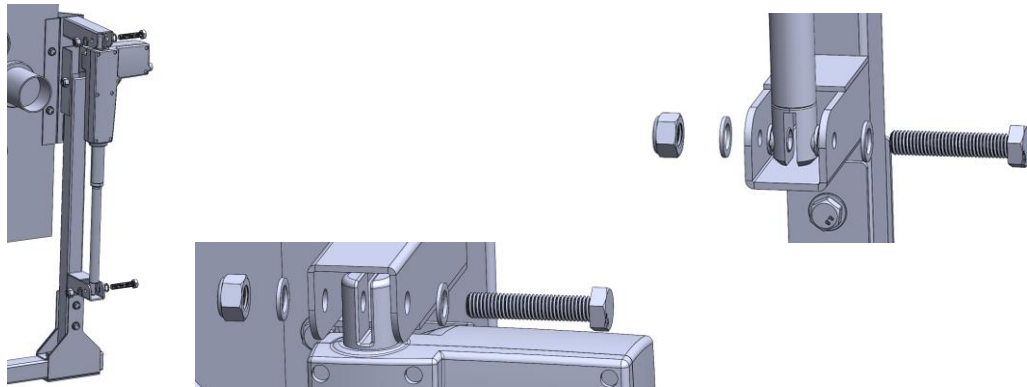
3. Install the board brackets as pictured using the grade 8 bolts, nuts, and washers as supplied. Do not over-tighten, as these brackets are the pivot connection for the board to tilt and must move freely. If needed, add some grease on the bolts for easy movement.



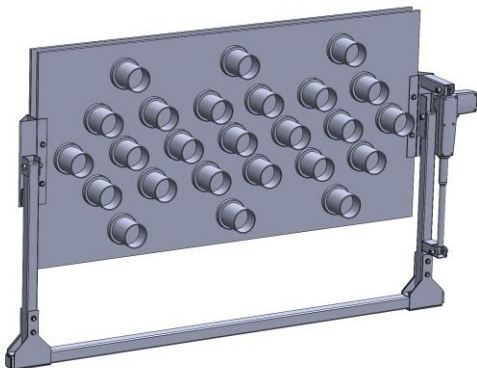
- Once brackets are attached, slip the board into place as pictured, and using bolts, washers, and nuts supplied to attach the board to the brackets. The right-side bracket must be installed on the same side as the upright post as pictured.



- Attach the actuator as shown. The motor must be installed on top, with the motor sticking out on the right side. Only tighten these bolts and nuts so they hold the actuator in place. It must move freely and not bind. Some grease can be added to these points.



- Your high-mount board is now ready to install. We recommend using a qualified welding shop to bolt and weld the assembly to a cab safety guard system, which should also be bolted securely to the vehicle. Angle supports can be used for added strength.



ARROW BOARD INSTALLATION SUGGESTIONS

Please note - it is advised that a qualified installer do the installation for aftermarket 12-volt equipment on vehicles so that you do not void your warranty and/or cause damage to the vehicle and/or board circuitry.

1. Install two angle iron brackets to position the board over the vehicle's cab (minimum 2" x 2" x 3/16") approximately 40-48" apart and three or more inches off the truck cab's roof.
2. Install the board on the angle iron brackets securely using bolts (minimum 3/8" x 4.5" with nylon lock nuts) or weld to the brackets on all sides.
3. Connect the power to the board. Do this by connecting the positive to the battery positive or vehicle 12-volt power point. Ground **MUST** be connected to the vehicle chassis on bare metal. An inline 15-amp fuse is recommended.
4. Secure all loose and excess cables to the frame using nylon tie straps, making sure no wires will get pinched.
5. Turn control box power on and test that the board powers up and the actuator raises the board. Test all display functions to make sure board is functioning 100% prior to putting into service.

ONE-YEAR MANUFACTURER'S WARRANTY

This product is warranted against defects and flaws in materials or workmanship for one year from the date of shipment from Traffic Safety Warehouse. Should service be required, contact Traffic Safety Warehouse customer service at (847) 996-1018. Traffic Safety Warehouse will assess whether it is a warranty issue, and if full a replacement or replacement parts are required. Traffic Safety Warehouse reserves the right to supply parts from stock to repair faulty parts or parts under warranty. All products requiring warranty service shall be returned within one year of the date of shipment. Exclusions from this warranty are the finish, light bulbs, light hoods, and damage caused by improper installation or use. Traffic Safety Warehouse and manufacturer assume no liability for costs incurred to remove or reinstall the product or for lost revenue due to equipment downtime.

Important Notice:

DO NOT ground the board to the battery negative. You should also install a 15-amp fuse on the positive side of the battery to protect the circuitry. Failure to adhere to these instructions, particularly regarding the negative polarity requirement, may result in malfunction or damage to the arrow board and void the warranty. Always follow manufacturer guidelines and consult a qualified technician if uncertain about any installation or operational procedures.

TROUBLESHOOTING GUIDE

General Note:

Our LED arrow boards work on negative polarity due to the way in which the LEDs need to flash. This means the board must have a solid ground for the negative to the frame of the vehicle with no paint or powder coat between the contacts. DO NOT ground the board to the battery negative. You should also install a 15-amp fuse on the positive side of the battery to protect the circuitry.

My controller box will not power on:

1. Make sure the batteries in the controller are fully charged with the charging cord inserted fully into the vehicle's cigarette lighter outlet. If your charger cord is equipped with a button on the back, this must be pushed in, and the red light should be on to signify power to the unit.
2. If the battery is getting low, a red warning light will display on the controller. Charge the unit to allow the controller to work properly.
3. If it is still not powering on, remove the top cover on the controller (lift the corners of the thin cover), and using a Phillips screwdriver, remove the cover. Check that the connections from the batteries to the PCB board are intact. If they have come loose, reconnect them.
4. If the above does not resolve your issues, please contact customer service.

My controller box powers on and can be changed on the screen, but the board does not power up and raise:

1. To power up, turn on the controller and then hold down the Actuator “P” button for 3 seconds. This starts the power to the board and will raise the board up.
2. The range of the controller is limited. Be sure to keep within 30-40 feet of the board. If the controller is installed further away or there is excess metal blocking the signal, move the controller box closer to the unit.
3. Check to make sure the board has proper voltage going to the board and a proper ground as noted. This should be done by a qualified automotive electrician. If the board has the correct power and is properly grounded:
 - Visually check to make sure the kill switch is not pushed in on the bottom of the board. If the switch is pushed in, this will not allow power to go to the board. The switch needs to be out to operate.
 - If the fuse is blown, replace it with a 15-amp fuse.
 - If excess corrosion is present with the switch and or fuse, it is advisable to bypass these or replace both parts.
4. If the above is done and the board will still not power up from the controller, it could be an issue with the motherboard, which will need to be replaced.
 - Remove the back cover on the board. It is a square 10” x 10” panel with screws around it.
 - Look for any broken wires or ones that have come loose. Check to make sure all plugs going to the motherboard are tight. If any have come loose or are broken, reconnect or use solder to secure.
 - Check for excessive corrosion and/or blown capacitors (small black barrel-shaped part). If capacitors are blown, the motherboard will need to be replaced. Please contact customer service.

Replacing the Motherboard:

1. When replacing the motherboard, please disconnect the positive side of the power to the board prior to removing or working on the motherboard.
2. Carefully undo 1 plug at a time and put the plug into the new motherboard so no plugs are in the incorrect slot.
3. Prior to putting the new motherboard onto the aluminum panel, double-check that the connections are all good and test the functions on the board. Once confirmed working, install the new motherboard on the panel and put the panel back in place with the screws.