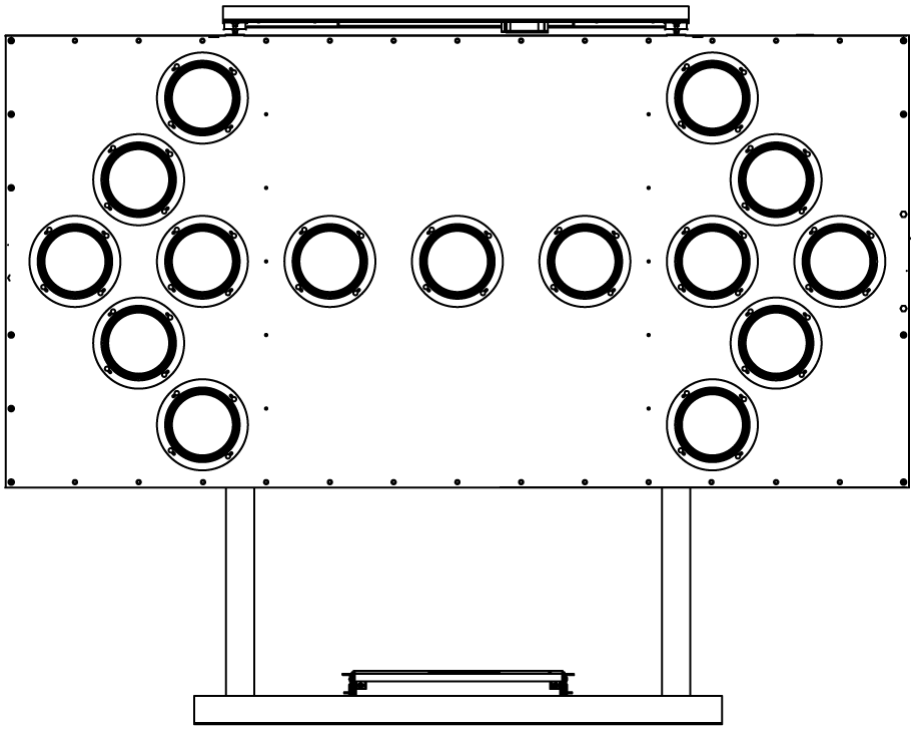
W|ECO® RIGID-SKID ARROW BOARDS

MODEL WS1S
PRODUCT SPECIFICATIONS | JULY 2018



1. DESCRIPTION

1.1. Description

Arrow boards direct traffic by flashing a brightly lit arrow pattern on a large, highly visible display panel. Wanco® Skid-Mounted Arrow Boards can be affixed to a truck bed or any rigid footing. The rigid skid remains upright, displaying the arrow board in a fixed position at all times.

Wanco Rigid-Skid Arrow Boards are self-powered, requiring no wiring to an external power supply. The control panel may be installed inside the truck cab or outside on the arrow board frame. Arrows and other patterns are selected by the user.

Wanco skid-mounted arrow boards feature W|ECO® technology, a highly efficient power system. With Wanco's exclusive LED lamps and small, eco-friendly batteries, W|ECO arrow boards are extremely energy-efficient without sacrificing performance. Power is provided by batteries, which are charged by an automated solar charging system. With sufficient sunlight, W|ECO arrow boards can run indefinitely without intervention.

1.2. Models

1.2.1. WS1SB8-LSA — Fixed-mount arrow-board with 15-light display panel

1.2.2. WS1SB8-LSAC — Fixed-mount arrow -board with 25-light display panel

2. FEATURES

2.1. Operation

- High-output amber LEDs
- Selection of arrow and other display patterns
- Easy to operate and maintain
- Controller can be located inside truck cab
- Control box outputs have short-circuit protection, helping prevent blown transistors
- Arrow display has automatic dimming
- Meets MUTCD

2.2. Power system

- Energy-efficient operation results in long run times
- Solar panels charge batteries automatically without intervention
- Charging system shuts down when batteries are fully charged, preventing damage
- Unique system allows battery charging with solar panels or commercial power
- Power system includes reverse polarity protection and low-voltage disconnect circuit
- Controller has resettable fuses
- Solar charging system features solid state voltage regulator with charge indicator

2.3. Maintenance

- Sealed batteries are 100% maintenance-free
- Durable powder-coat finish resists the elements
- Lamps and visors are easily replaced

2.4.	Environmental	• Consumes 80% less power than traditional solar arrow boards • Small batteries have 80% less lead content • Sealed batteries will not leak or spill • Decreased charging time saves energy and downtime • Manufacturing process emits near-zero VOCs • Nearly every component can be recycled
2.5.	Application	Common applications include: • Roadwork zones • Road striping convoys • Road sweeping convoys • Pothole repairs • Crash cushion (TMA) trucks

3. DISPLAY

3.1.	Display panel	
3.1.1.	Description	Weather-resistant cabinet provides a rigid platform for LED lamps
3.1.2.	Size	48" x 96" x 3" (122 x 244 x 8cm)
3.1.3.	Construction	Outer frame constructed of aluminum channel, 3" x 1" x 1/8" thick. Two interior channels add strength and prevent distortion of front and rear panels. All channel joints are welded. Front and rear panels constructed of aluminum sheet, 5052-H32, 0.062" (1.575mm) thick. Panels are riveted and screwed to frame and interior channels.
3.1.4.	Finish	Oven-baked, flat-black (10% gloss), powder-coat finish ensures durability and corrosion protection. Panel assembly is high-pressure phosphate-washed prior to finish coat.
3.1.5.	Wiring	Weatherproof wiring between solar panel, control box, and display panel is P-clamped to trailer frame
3.2.	Front lights	
3.2.1.	Description	Display lights are laid out across the front face of the display panel. The layout allows for a variety of arrows and other patterns to appear depending on which lights are lit. The desired pattern is selected by the operator, using the arrow board controls.
3.2.2.	Type	PAR 46 LED lamp, 5¾" (14.5cm) dia.
3.2.3.	Wattage	<1.0W per lamp
3.2.4.	Voltage	8.0Vdc
3.2.5.	Light output	1425 lux per lamp

3.2.6.	Reverse-polarity protection	Protects lamps if control box wiring is connected backwards (which sometimes happens after servicing)	
3.2.7.	LEDs	Technology	AlInGaP II (aluminum indium gallium phosphide) technology, T-1¾ size
		Color range	Amber, 590 to 593 nm
		Forward voltage	2.0 to 2.1Vdc @ 20mA
		Temperature limits	Operating temperature, –22 to 185°F (–30 to 85°C)
3.2.8.	Lens	Function	Each lamp has an integrated hex lens that enhances the brightness and angularity of each LED while reducing power consumption
		Material	Acrylic
		Beam angle	Horizontal: 16.8 degrees, ±8.4 degrees Vertical: 9.5 degrees, ± 4.75 degrees Angle determined by 10% of peak candle power (certified by independent testing laboratory)
3.2.9.	Visor	Function	Each lamp is shrouded by a visor that enhances visibility by shading the lamp and preventing glare
		Material	High-impact ABS plastic
		Mounting	Four keyed slots enable visor to be removed from the display panel without removing screws
3.2.10.	Visibility	At least 1 mile (1.6km)	
3.2.11.	Angularity	26.8 degrees @ 105 ft. (32m) 54.0 degrees @ 49 ft. (15m) Total viewing area	
3.2.12.	Auto-dimming	A photocell detects ambient light; the controller adjusts the brightness of the LEDs accordingly, dimming display brightness in darkness, increasing to full brightness in daylight	
		Photocell location determined by control box location:	
		Interior control box	Photocell located on bottom of arrow board display, facing downward
		Exterior control box	Photocell located inside control box, facing downward
3.2.13.	Replacement	Lamps can be replaced in less than two minutes. The only tool needed is a Philips screwdriver.	

3.3.	Rear lights		
3.3.1.	Description		Two indicator lights on the back of the display panel suggest the current arrow board function to an operator located behind the arrow board by flashing a corresponding pattern
3.3.2.	Type		Sealed 2-diode LED light, surface-mount, 2½" x ¾" (6.6 x 1.9cm) lens See "Options and Optional Equipment" for rear light options
3.3.3.	Wattage		0.9W
3.3.4.	Voltage		8.0Vdc
3.4.	Standards		Meets requirements for minimum size, legibility, and number of elements per MUTCD, December 2009 ed., §6F.61, ¶05, Temporary Traffic Control Zone Devices: Arrow Boards Meets specs for MUTCD Type C

4. CONTROLLER

4.1.	Function		Allows operator to choose an arrow or other display pattern. Keeps the batteries fully charged while protecting them from deep discharge and overcharging. Maintains display flash-rate and controls automatic dimming.
4.2.	Control box		User-specified location determines control box type: Interior (truck cab) mount for permanent skid installations (best for tamper resistance) Exterior (skid frame) mount for temporary skid installations (best for portability)
4.2.1.	Interior mount	Location	User-installed under dashboard inside truck cab
		Enclosure	Aluminum sheet construction, brushed aluminum finish
		Wiring	30-foot cable with wiring harness and locking collar; hard-wired inside battery box, user-connected to back of control box after routing from battery box to inside truck cab See "Options and Optional Equipment" for cable length options
4.2.2.	Exterior mount	Location	Factory-installed on right (passenger-side) upright of skid frame. Can be installed remotely from frame if specified prior to order. See "Options and Optional Equipment" for cable length options
		Enclosure	Aluminum sheet construction, brushed aluminum finish Hinged weatherproof cover with slam-latch Hole in cover accepts customer-supplied padlock

	Cable protection	Molded plastic cover attached to back of control box, protects external wiring connections and can be removed for access to connectors; all wiring has quick-connect plugs
4.2.3.	Serviceability	Entire control box is removable for easy exchange and factory servicing
4.3.	Control panel	
4.3.1.	Display switch	Toggle switch for turning arrow board display on and off
4.3.2.	Display pattern selection	Rotary switch; operator simply points the switch at the desired display pattern, which is silkscreened onto the front of the control panel
4.3.3.	LED indicators	Indicates the following status conditions: Low voltage (battery charging required) Low battery voltage detected, power shutdown occurred Solar charging system is charging batteries Batteries are fully charged
4.4.	Display patterns	
4.4.1.	All models	All arrow boards can display any of the following 7 patterns (for samples, see Exhibit A):

Flashing arrow, left or right	10 lights total 5 lights form arrowhead 5 lights form stem
Flashing double arrow	13 lights total 5 lights form each arrowhead 3 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	10 lights total 5 lights form arrowhead 5 lights form full stem 1st pulse: 2 far stem lights 2nd pulse: 5 far stem lights 3rd pulse: full arrow shape 4th pulse: blank display

4.4.2.	25-light models	In addition to the 7 patterns described above, 25-light arrow boards can also display any of the following 5 patterns (for samples, see Exhibit A):	
		Sequencing walking arrow, left or right	10 lights total 5 lights form arrowhead 5 lights form full stem 1st pulse: 2 far stem lights with arrowhead 2nd pulse: 3 far stem lights with arrowhead 3rd pulse: full arrow shape 4th pulse: blank display
		Sequencing chevron arrows, left or right	15 lights total 5 lights form each arrowhead 1st pulse: 1 far arrowhead 2nd pulse: 2 far arrowheads 3rd pulse: 3 arrowheads 4th pulse: blank display
		Alternating diamonds	16 lights total 8 lights form each diamond 1st pulse: 1 diamond shape on left 2nd pulse: 1 diamond shape on right
4.5.	Electronics		
4.5.1.	Location	Inside control box	
4.5.2.	Temperature limits	Operating temperature: –40 to 176°F (–40 to 80°C)	
4.5.3.	Flash rate	30 to 40 per minute, all display patterns	
4.5.4.	Positive drive circuit	Positive power applied to lamps only when lit Negative is chassis grounded	
4.5.5.	Fuse protection	Dual PTC resettable fuses	
4.5.6.	Reverse-polarity protection	Protects the controller if battery cables are connected backwards (which sometimes happens after servicing)	
4.5.7.	Low-voltage disconnect	Low-voltage-disconnect circuit engages when battery voltage drops to 11.2Vdc, shutting down power to protect batteries from full discharge	

5. SKID FRAME

5.1.	Construction	All welded structural steel
5.2.	Uprights	Two uprights support display panel
5.3.	Mounting	Four mounting brackets welded to bottom of frame, each includes a through-hole for attaching to truck bed or rigid footing
5.4.	Finish	
5.4.1.	Prewash	Assemblies are run through a five-stage, high-pressure phosphate-wash prior to finish coat
5.4.2.	Coating	Frame is coated with oven-baked, black powder-coat finish to ensure durability and corrosion protection See “Options and Optional Equipment” for color options
5.4.3.	Salt spray resistance	1000 hours (ASTM Method B117) with <⅛" (<3.18mm) creep from scribe
5.4.4.	Q.U.V. exposure	500 hours QUV-B (ASTM Method D4587-05) >75% gloss retention

6. POWER SYSTEM

6.1.	Description	Electronics powered by batteries, which are charged automatically with integrated solar charging system
6.2.	Battery box	
6.2.1.	Function	Holds batteries and optional remote charger
6.2.2.	Construction	Riveted all-steel construction, cover is bolted in place Removable panel on side of battery box provides access to optional remote charger All parts powder-coated before assembly
6.2.3.	Mounting	Bolted to base of skid
6.3.	Batteries	
6.3.1.	Type	Leak- and spill-proof valve-regulated lead acid (VRLA) See “Options and Optional Equipment” for battery options
6.3.2.	Features	100% maintenance-free Sealed and spill-proof Faster recharge and greater freeze resistance than conventional batteries Smaller and lighter-weight than conventional batteries Contains 80% less lead when compared to conventional batteries

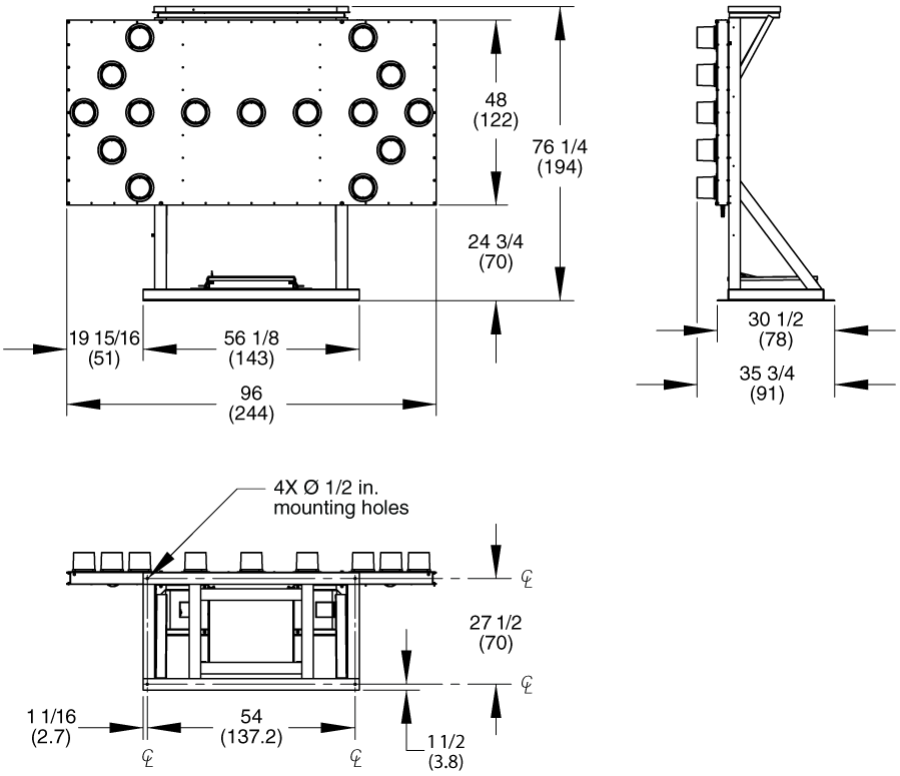
6.3.3.	Quantity	Two
6.3.4.	Voltage	12Vdc each
6.3.5.	Weight	12.5 lbs. (6kg) each
6.3.6.	Capacity	36 Ah total @ 12Vdc
6.4.	Solar	
6.4.1.	Panels	One high-efficiency multi-crystal photovoltaic solar module
6.4.2.	Location	Above display panel, no shadowing effect on any skid component
6.4.3.	Power output	50W See “Options and Optional Equipment” for solar options
6.4.4.	Current	2.89A max. system current 3.22A open short-circuit current
6.4.5.	Voltage	17.3Vdc max. 21.6Vdc open short-circuit voltage
6.4.6.	Regulation	Solar panels regulated by arrow board controller
6.4.7.	Security	Solar panel bolted to mounting frame with security screws and special security nut

7. DIMENSIONS & WEIGHT

7.1. Dimensions

7.1.1. Skid

inches (cm)



7.2. Weight — Approx. 320 lbs. (145kg)

8. OPTIONS AND OPTIONAL EQUIPMENT

8.1. Power

8.1.1. Additional batteries — For geographic locations with less solar charging potential or colder weather, and for applications that require year-round charging, add batteries for greater capacity

Options	One additional VRLA 12Vdc battery in standard battery box, 18Ah additional capacity
	Two additional VRLA 12Vdc batteries in large battery box, 36Ah additional capacity
	Three additional VRLA 12Vdc batteries in large battery box, 54Ah additional capacity
Large flat battery box	Large, flat battery box is required when the arrow board has more than three W|ECO batteries; replaces standard battery box
	Bolted to base of skid
	Riveted all-steel construction, cover is bolted in place
	All parts powder-coated before assembly

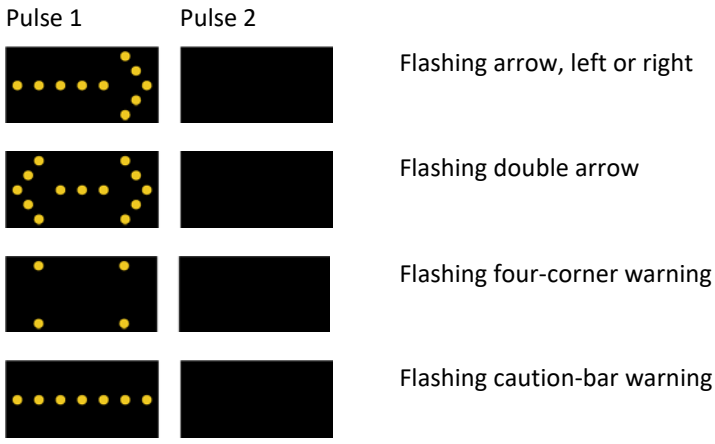
8.1.2. Deep-cycle batteries — Replace W|ECO batteries with deep-cycle batteries. Requires replacing standard battery box with larger box.

Options	Two Group 24 deep-cycle 6Vdc batteries, wired in parallel and series for a 12-volt system, 315Ah total capacity
	Four Group 24 deep-cycle 6Vdc batteries, wired in parallel and series for a 12-volt system, 630Ah total capacity
Weight	Approx. 60 lbs. (26kg) each
Deck-mounted tall battery box	Replaces standard battery box
	Riveted all-steel construction
	Bolted to base of skid
	All parts powder-coated before assembly
	Divider panel inside box separates batteries from charger
	Louvers provide ventilation
	Latches on hinged cover can accept user-supplied padlocks

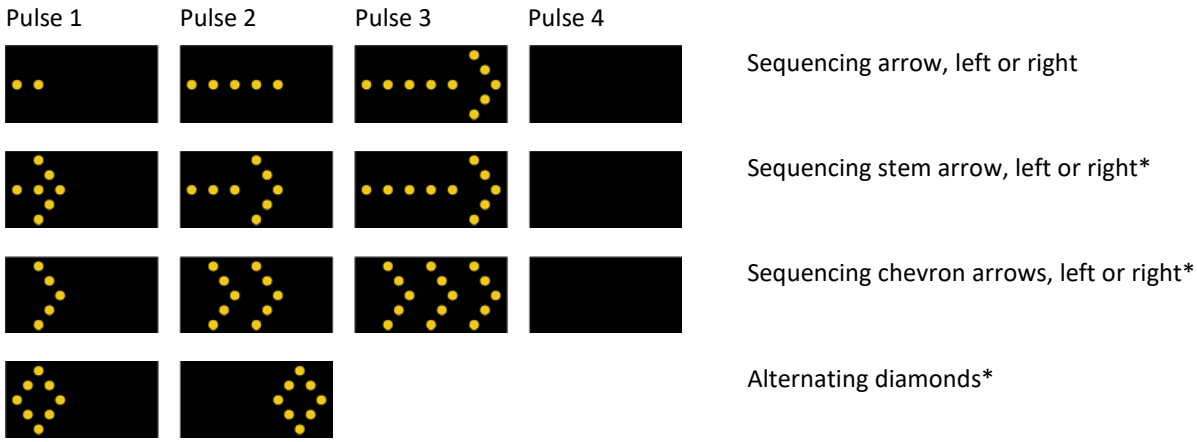
8.1.3.	Remote charger	Function	Plugs into a standard commercial power source to recharge batteries if battery voltage drops due to lack of sun for automated solar charging system
		Type	12-volt battery charger
		Location	Inside battery box
		Smart charger	Three-stage smart-charging circuit keeps batteries fully charged, and will not overcharge batteries, which helps to ensure the longest possible battery life
		Output capacity	2A
		Output voltage	14.4Vdc nominal 13.0Vdc nominal float voltage
		Input voltage	90 to 132Vac, standard two-prong plug
		Frequency	50 to 60 Hz
8.1.4.	Solar	For geographic locations with smaller solar charging potential, and for applications that require a year-round charging system, additional solar power is available Options include 85W, 100W solar arrays; contact factory for details	
8.2.	**Cable length**	Custom cable lengths are available for mounting control box remotely from skid; contact factory for details	
8.3.	**Finish color**	Specify power-coat color and, if applicable, color scheme	
8.4.	**Manual dimming**	Substitute control box with manual dimming control for standard control box	
8.5.	**Rear lights**	Replace standard rear lamps with PAR 36 LED lamps, 4.5" (11.5cm) dia.	

EXHIBIT A: DISPLAY PATTERNS

Flashing patterns



Sequential patterns



**Available only on 25-light arrow board models*