carmanah®

TOTAL
AIRFIELD LIGHTING
SOLUTIONS

CARMANAH TECHNOLOGIES

Since its founding in 1996, Carmanah has become one of the most trusted names in solar technology, delivering reliable and cost-effective solar powered products and systems for industrial applications worldwide. Carmanah provides solutions for marine navigation, airfield ground lighting, aviation obstruction, roadway illumination, parking lot lighting and on-grid and off-grid power generation. To date, Carmanah's products have been successfully deployed in over 400,000 installations in 110 countries with proven performance in conditions ranging from desert heat to arctic cold. Carmanah brands include Go Power! and recently acquired companies, Sol and Sabik.

CARMANAH AIRFIELD

Carmanah is an industry leader in the design and manufacture of solar airfield lighting equipment. We have installed more solar airfields worldwide than any other company. For over 15 years, our durable and reliable products have exceeded airfield industry standards including FAA and ICAO. Our products are manufactured in the USA and Canada, and are covered by an industry-leading 3-year warranty.

WHY CHOOSE CARMANAH AIRFIELD LIGHTS?

EASY INSTALL

- No trenching or specialized install crew required
- No high-voltage concerns; minimal or no cabling

SIMPLE OPERATION

- Solid state, low-maintenance and rugged
- Optional wireless control

COMPLIANT

- ICAO, FAA, ISO, FCC, CE, ANATEL, TC compliance
- Certified by globally recognized independent test agencies

LOWER COST THAN TRADITIONAL SYSTEMS

- Thrives where the grid is poor
- Cost-effective to modify and upgrade airfield
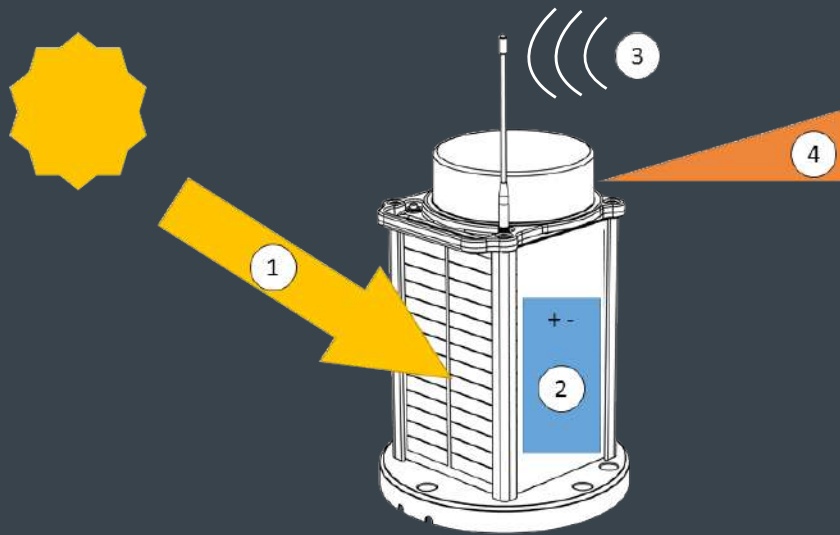- No vault, no CCRs, no tower required

RAPID DEPLOYMENT

- Emergency or portable airfields
- Permanent and temporary installations

GREEN TECHNOLOGY

- Clean energy and no emissions
- Uses sunlight to recharge batteries

HOW SOLAR WORKS

1 Solar panel collects energy from the sun

2 Battery stores energy

3 Wireless signal received or light detects dark

4 LEDs turn on by consuming battery energy

BENEFITS OF SOLAR AIRFIELD LIGHTING

NO COUNTERPOISE OR GROUNDING

NO GLASS LENS

NO BULBS

NO ISOLATION TRANSFORMERS

NO BASE CANS

NO CABLE CONDUITS
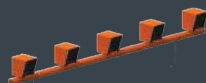
NO HIGH VOLTAGES

NO CCRS

NO VAULT

YES TO AIRFIELD SIMPLICITY!
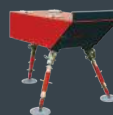
AIRPORTS

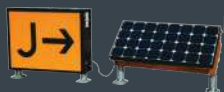Approach Lighting
System (ALS)

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PAPI

Page 10

Signs

Page 14

Wind Cone

Apron And
Taxiway
Edge Lights

Page 8

Page 12
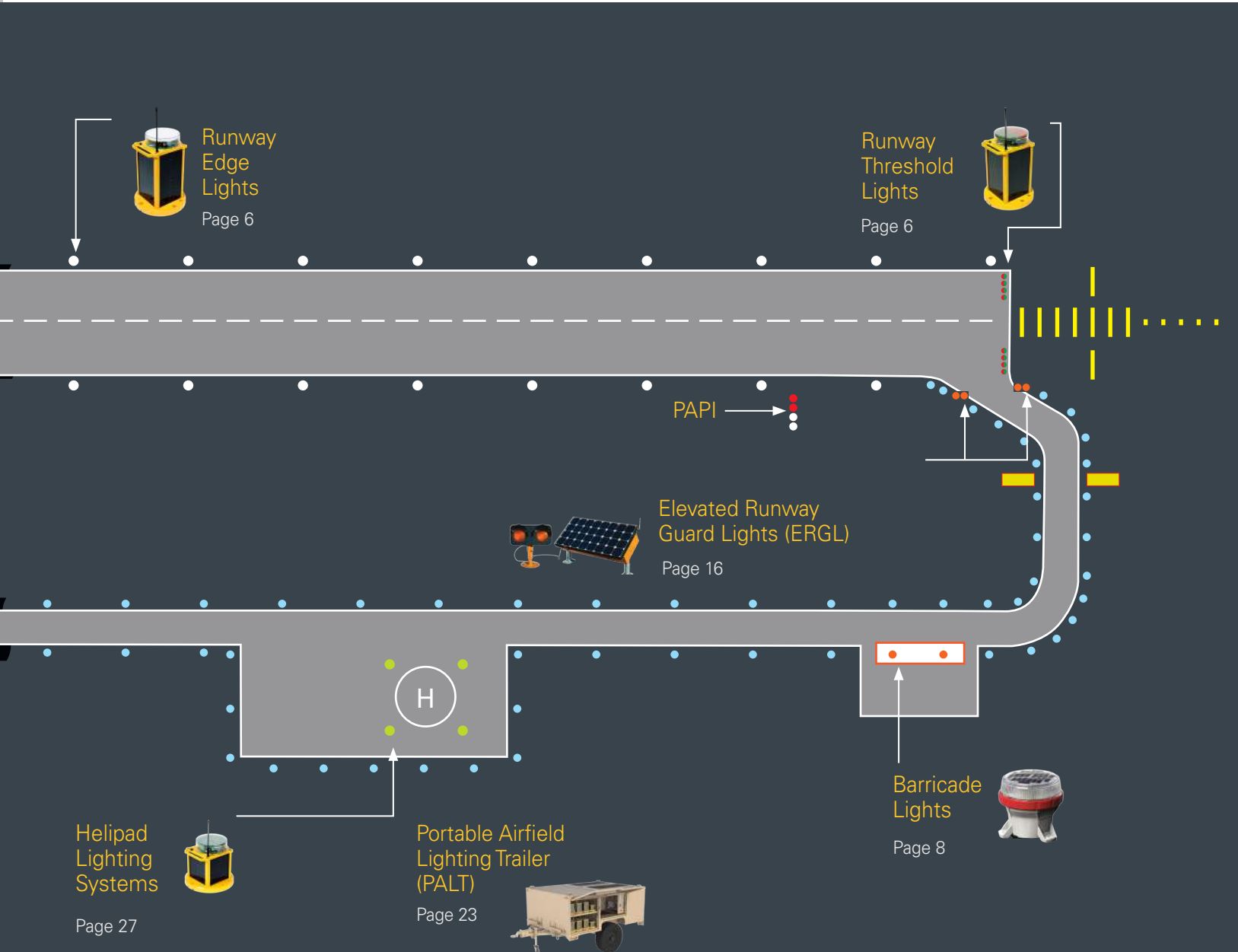
Wireless
Control

Page 20
and 22

PROVEN, RELIABLE SOLAR AIRFIELD LIGHTING

Our cable-free products are ideal for both temporary and permanent deployments including:

• General Aviation and Regional Airports
• International Airports
• Military Bases
• Helipads

All products are configured to meet your specific requirements including: optics, power (battery and solar), exterior finish and our secure wireless control.

Runway Edge Lights
Page 6

Runway Threshold Lights
Page 6

PAPI

Elevated Runway Guard Lights (ERGL)
Page 16

Barricade Lights
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Helipad Lighting Systems
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Portable Airfield Lighting Trailer (PALT)
Page 23

H

A704

SOLAR RUNWAY LIGHT

Meets traditional airfield requirements in an easy-to-install, low maintenance package.

- 250 cd, 500 cd, and 750 cd models available
- ICAO and FAA compliant
- Third party certified
- Long-lasting batteries
- Available in three battery sizes

Compact - 250 cd max

Standard - 500 cd max
Large - 750 cd max

Applications

Medium-intensity runway edge & threshold (MIRL)

Simple approach lighting

NVG operations

Emergency or temporary lighting

Advanced Design

- Improved optical efficiency with latest LEDs
- High-efficiency monocrystalline solar panels
- Reduced standby power consumption
- Multiple battery sizes for best value-for-performance

Easy Installation

Limited crew, no trenching, no airfield interruptions. Just place the A704 and it emits light dusk-to-dawn while maintaining its battery. Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away.

Low Maintenance

The A704 integrates solar panels, battery, electronics, and LED light source into a compact, stand-alone unit requiring minimal maintenance for 7 years.

Reliable

The Energy Management System (EMS) monitors all operations to provide consistent output in the harshest environments. Testing to ICAO, FAA and MIL specifications ensures high performance for many years.

Trusted

With thousands of installations worldwide, Carmanah solar LED lights operate year-round at over 500 airports and military bases.
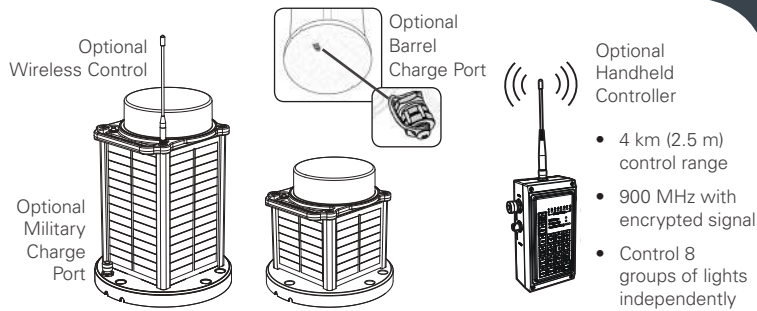
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Optional
Wireless Control

Optional
Barrel
Charge Port

Optional
Handheld
Controller

Optional
Military
Charge
Port

• 4 km (2.5 m) control range
• 900 MHz with encrypted signal
• Control 8 groups of lights independently

A704
SOLAR RUNWAY LIGHT

SPECIFICATIONS

Optical	Max output of 250 cd, 500 cd, or 750 cd*
	High-power LEDs meet IES LM-80 lumen maintenance, ensuring consistent photometrics for life of product
	ICAO, SAE25050 (FAA), and FAA EB 67 compliant chromaticity
	NVG-compatible infrared (IR) LEDs
	Steady-on and flash
Energy Collection	High-efficiency cells with blocking diodes
	Maximum power point tracking with temperature compensation (MPPT-TC) for optimal energy collection in all solar conditions
Energy Storage	Pure-lead VRLA AGM battery with manufacturer operating range -65 to 80 °C (-85 to 176 °F)
	On-board battery status
	Designed for 5+ year battery life; Replaceable and recyclable
	Optional port for battery charging and cabled operation
Energy Management System (EMS)	Intelligent, microprocessor EMS
	On-board diagnostics and datalogger
	Push button interface for local control
	Autonomous (dusk to dawn), Temporary, and Emergency Modes
Automatic Light Control (ALC)	ALC adjusts output intensity in response to unusually low amounts of sunlight to ensure continued operation
Construction	Premium, UV-resistant polycarbonate lens
	Powder coated aluminum and polycarbonate chassis with integrated handle
	Waterproof, vented battery compartment
Temperature	-30 to 50 °C (-22 to 122 °F) Optimal
	-40 to 80 °C (-40 to 176 °F) Maximum
Wind & Ice Loading	644 kph (400 mph) wind; 0.03 psi (22 kg/m²) ice
Shock & Vibration	MIL-STD-202G and MIL-STD-810G
Ingress	EN 60529 IP 67 immersion
	MIL-STD-202G immersion & damp heat cycling
	MIL-STD-810G rain & salt fog
Compliance	ICAO MIRL (Annex 14, Vol. 1, 5.3.9.9)
	FAA L-861 MIRL (AC 150/5345-46, EB67)
	FAA L-861E & L-861SE MIRL (AC 150/5345-46, EB67)
	FAA L-860 LIRL (AC 150/5345-46, EB67)
	FAA L-863 Portable (AC 150/5345-50)

WEIGHTS AND DIMENSIONS

COMPACT - 250 CD MAX*		STANDARD - 500 CD MAX*	
Weight	4.9 kg (11 lb)	Weight	6.7 kg (15 lb)
Battery (60X)	4.2V, 15 Ahr	Battery (96E)	4.2V, 24 Ahr

LARGE - 750 CD MAX*	
Weight	10.5 kg (23 lb)
Battery (200BC)	4.2V, 50 Ahr

13.4in [340mm]
8.4in [214mm]
1.0in [25mm]

17.5in [445mm]
12.5in [319mm]
1.0in [25mm]

∅ 7.87in 200mm BOLT CIRCLE
∅ 9.25in 235mm
∅ 0.62in 15.7mm 6 HOLES
3 HOLE MOUNTING
4 HOLE MOUNTING
5.60in 141mm

CONFIGURATION

MODEL	COLOUR ▼	SIZE - MAX OUTPUT ▼	CONTROL ▼	CHARGE PORT ▼
A704	WHITE / IR (WW) WHITE /YELLOW / IR (WY) RED / GREEN / IR (RG) GREEN / IR (GG) YELLOW / IR (YY) RED / IR (RR)	COMPACT - 250 CD MAX* STANDARD - 500 CD MAX* LARGE - 750 CD MAX*	NON-WIRELESS (NA) WIRELESS (RF)	NONE (NA) CHARGE PORT (CP) MILITARY CHARGE PORT (MP)

Example: A704-WW-250-RF-NA

Specifications subject to local environmental conditions.
Specifications may be subject to change.
US and International patents apply. Other patents pending.
"Carmanah" and Carmanah logo are trademarks of Carmanah Technologies Corp.
*Achieved using white LEDs; other colours may vary.

CE   RoHS   Pb

A650
SOLAR TAXIWAY AND BARRICADE LIGHT

Meets traditional airfield requirements for taxiways and general purpose marking.

- ICAO and FAA compliant
- Greater than 10 cd of intensity
- Dusk-to-dawn or on-demand operation
- NVG compatible IR LEDs available

Applications

Taxiway and apron edge

Construction, barricades and fences

Temporary or permanent markings

Helipads

Hazard marking

Compliant Output
FAA L-861T and ICAO Annex 14. The A650 Wireless Blue is compliant with the requirements of ICAO Annex 14, Volume 1, Sixth Edition (2013).

Easy Installation and Relocation
No specialized work crew required. Lights are immediately operational with limited air traffic disruption. The A650 can be quickly relocated for temporary or emergency applications.

Self-contained and Low Maintenance
All components are incorporated within a compact, stand-alone unit. The A650 features a replaceable battery pack that extends the service life beyond five years, reducing the total cost of ownership and resulting in significant cost savings.

Unprecedented Reliability
Energy Management System (EMS) monitors and adapts the brightness to environmental conditions for consistent operation and long life under the toughest conditions.

Designed and Tested to Tough Industrial Standards
MIL-STD-202G Humidity, Immersion, Vibration, Shock; MIL-STD-810G: Solar Radiation, Salt Fog; EN 60945: ESD, EMI, EMC; IP68; L70. The A650 is acceptable for barricade and construction applications at Commercial Part 139 Airports under FAA Advisory Circular AC 150/5370-2E.

User Friendly
Easy configuration and programming options including: on-board user interface, infrared remote and device manager software through USB connection or optional wireless control system offering secure 900 MHz.
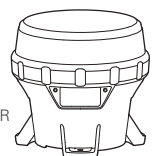
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A650

SOLAR TAXIWAY AND BARRICADE LIGHT

OPTIONAL INFRARED PROGRAMMER

NON-WIRELESS A650

WIRELESS A650

OPTIONAL HANDHELD CONTROLLER

- 4 km (2.5 m) control range
- 900 MHz with encrypted signal
- Control 8 groups of lights independently

SPECIFICATIONS

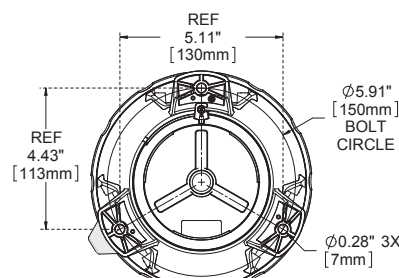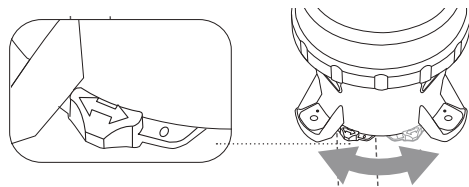|	
Solar Panel	High-efficiency cells with bypass and blocking diode function Maximum power point tracking (MPPT) for optimal energy collection
Battery	Tool-less, replaceable and recyclable best-in-class battery pack with extreme temperature range Battery status feedback of Good, Charge or Bad (Replace)
Light Source	High power LED Colour-specific temperature corrected LED drivers provide consistent intensity under all operating conditions
Intensity	Greater than 10 cd intensity, steady-on (see photometric plots)
Flash Patterns	256+ (non-wireless)
	Steady-on mode and flash patterns (wireless)
Construction	Premium grade UV resistant, polycarbonate/polysiloxane co-polymer body and lens material Double O-ring sealing with waterproof vent
Colours	Blue, Red, Yellow, Green and White ICAO and SAE25050 (FAA) compliant chromaticity NVG-compatible infrared (IR) LEDs (wireless only)
Operating Temperature	-43 to 51 °C (-45 to 124 °F) ambient temperature The A650 will function up to 190 °F (88 °C) internal and surface temperatures
Storage Temperature	-43 to 80 °C (-45 to 176 °F)
Colour Indicator	Yes, FAA Eng. Brief 67 compliant
Weight	1.6 kg (3.5 lb)
Wind Loading	644 kph (400 mph)
Automatic Light Control (ALC)	When enabled, ALC will dynamically reduce brightness in response to unusually low amounts of sunlight to ensure continued operation
Radio Receiver	900 MHz ISM (wireless)
Range	Up to 4 km (2.5 m) (wireless)

DIMENSIONS

SIDE VIEW	BOTTOM VIEW

Ø6.93" [176mm]

6.65" [170mm]

0.45" [11mm]
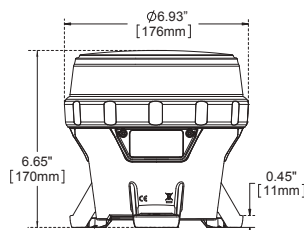
Total height including wireless antenna is 10.9" (276 mm)

REF 5.11" [130mm]

REF 4.43" [113mm]

Ø5.91" [150mm] BOLT CIRCLE

Ø0.28" 3X [7mm]

Also available with 7⁷/₈" (200 mm) bolt circle adapter

SWITCHED VIEW*

PHOTOMETRICS

A650 NON-WIRELESS

Legend:
- A650G
- A650Y
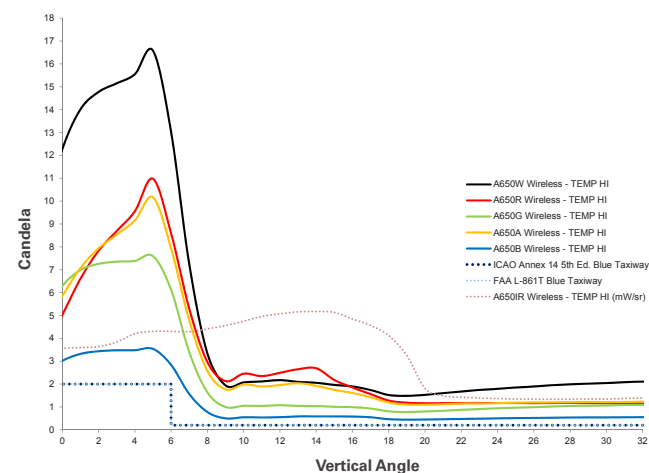- A650W
- A650R
- A650B
- ICAO Annex 14 5th Ed. Blue Taxiway
- FAA L-861T Blue Taxiway
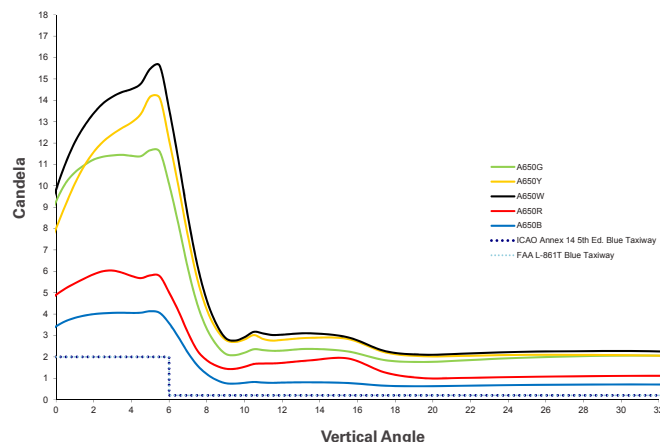
Note: Intensity dependent on location. Based on equatorial location of 12-hour night duration and steady-on (001) flash code.

A650 WIRELESS

Legend:
- A650W Wireless - TEMP HI
- A650R Wireless - TEMP HI
- A650G Wireless - TEMP HI
- A650A Wireless - TEMP HI
- A650B Wireless - TEMP HI
- ICAO Annex 14 5th Ed. Blue Taxiway
- FAA L-861T Blue Taxiway
- A650IR Wireless - TEMP HI (mW/sr)

CONFIGURATION

MODEL	OUTPUT ▼	SWITCH ▼	CONTROL ▼
A650	RED GREEN WHITE YELLOW BLUE	NON-SWITCHED SWITCHED*	NON-WIRELESS WIRELESS*

*A650 Wireless version must have switch.

PAPI
PRECISION APPROACH PATH INDICATOR

The LED PAPI is the most advanced on the market and has the widest range of configurations:

- Visible and IR output
- Portable and permanent
- ICAO / FAA / STANAG Compliant
- Several power options

Applications

Permanent airfields

Temporary airfields

Emergency airfields

Military & NVG operations

Advanced Optics

The PAPI and the Abbreviated PAPI (APAPI) use patented, LED-based optics to achieve the lowest power consumption, highest intensity and sharpest white/red transition. It exceeds ICAO / FAA / STANAG requirements to provide a clear approach path to the aviator.

Easy Installation

The PAPI works equally well in permanent or temporary locations. Permanent mounting is easy with standard frangible mounting. Temporary deployment is fast with retractable legs and a lightweight, compact form factor.

Power Supply Versatility

The low power consumption of the PAPI makes it mate well with several available power supplies:

- Solar kit
- Generator kit
- Battery kit
- AC only

Controllable

Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away. There is also 3 and 5-step, wired control and local control available.

Trusted

Deployed around the globe, from military to civilian airfields and from the Middle East to the Arctic Circle, the PAPI has proven it is robust. LED keypad and LED indicators designed for use with gloves. Removable, replaceable antenna.
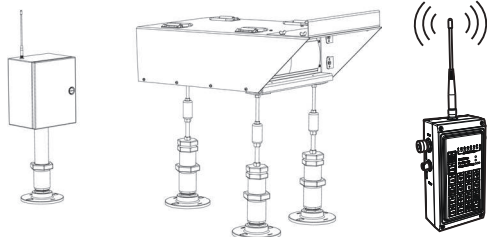
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Web: www.amrome.com

CONTROL BOX   LIGHT HOUSING ASSEMBLY (LHA)   OPTIONAL HANDHELD CONTROLLER

- 4 km (2.5 m) control range
- 900 MHz with encrypted signal
- Control 8 groups of lights independently

PAPI
## PRECISION APPROACH PATH INDICATOR

SPECIFICATIONS

Optical	High-power LEDs with proper heat management ensure consistent photometrics for life of product
	NVG-compatible infrared (IR) LEDs
	FAA L-880/881 & E-3007 (2 & 4 LHA) compliant
	ICAO Annex 14 PAPI (2 & 4 LHA) & APAPI (2 LHA) compliant
	STANAG 3316 PAPI (2 & 4 LHA) & APAPI (2 LHA) compliant
	UFC 3-535-01 (4 LHA) compliant
	Ultra-low, 55W / LHA power consumption make solar possible
Power Options	Solar kit: Solar panels and mounting, batteries and enclosures; air transportable container; AC input for backup
	Generator kit: Gas or diesel generator; AC input for backup
	Battery kit: Batteries & enclosures; AC input for backup
	AC only: 100 – 240 VAC 50/60 Hz; 3 and 5-step current input
Control Options	Non-Wireless: AC input of 3 and 5-step current; local control
	Wireless: 4 km (2.5 m) control range with optional Handheld Controller; local control
Construction	Powder coated aluminum chassis with integrated handles
	Aviation orange standard, yellow and other colors available
	Stainless steel and anodized aluminum hardware
	Integrated digital level
	Optical glass lens
Temperature	-40 to 60°C (-40 to 140°F) ambient
Wind Loading	161 kph (100 mph)
Ingress	NEMA 4 & EN 60529 IP 55
LHA Weight	12.7 kg (28 lbs)

DIMENSIONS
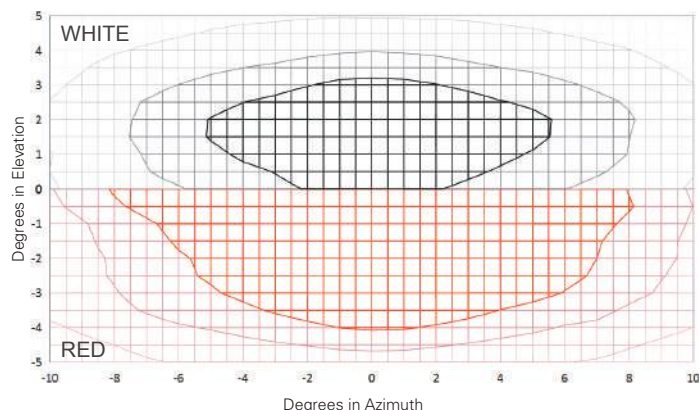
PERMANENT
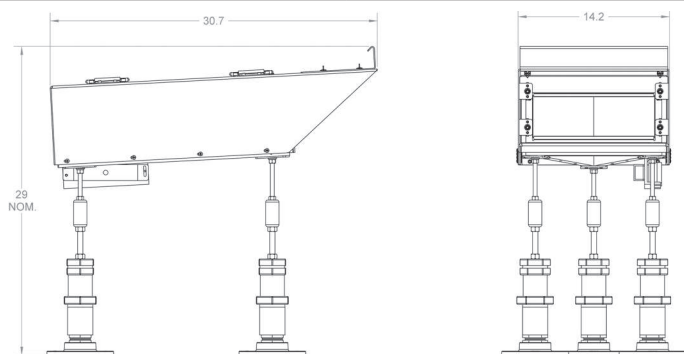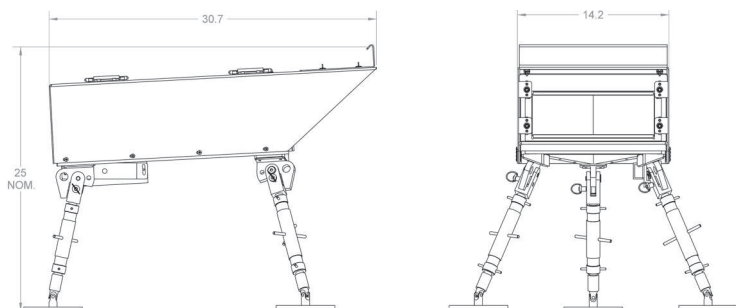
PORTABLE

US and International patents apply. Other patents pending.
"Carmanah" and Carmanah logo are trademarks of Carmanah Technologies Corp.

PHOTOMETRICS

PAPI ISOCANDELA

WHITE (cd)	RED (cd)
☐ 0 - 10000	☐ 0 - 5000
☐ 10000 - 20000	☐ 5000 - 10000
☐ 20000 - 30000	☐ 10000 - 15000
☐ 30000+	☐ 15000+

CONFIGURATION

MODEL	SIZE ▼	MOUNTING ▼	OUTPUT ▼	POWER ▼	CONTROL ▼
PAPI	ABBREVIATED 2 LHA STANDARD 2 LHA STANDARD 4 LHA	PERMANENT PORTABLE	VISIBLE VISIBLE / IR	SOLAR KIT GENERATOR KIT BATTERY KIT AC	NON-WIRELESS WIRELESS WIRED, STYLE B

Options: carrying case, tactical battery pack, tilt switch (for FAA), low temperature arctic kit, custom chassis color

All Carmanah products are manufactured in facilities that are certified to ISO quality standards.
Specifications subject to local environmental conditions.
Specifications may be subject to change.
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Document: AVIA_PAPI _Spec_Sheet_RevD.indd

carmanah®

WIND CONE
SOLAR ILLUMINATED SYSTEM

Cost-effective, low-maintenance solution for improving safety at temporary, permanent and emergency airports and heliports.

• Internally LED illuminated
• Powered by a robust
  Solar Power Supply (SPS)
• Designed to meet L-806(L) or
  L-807(L) FAA AC 150/5345-27
• Compliant with ICAO Annex 14,
  Volume 1, 6th Edition

Easy Installation and Relocation
No specialized work crews required. Limited air traffic disruption and functions immediately upon installation. Optional Handheld Controller allows for wireless operation including mode changes for enhanced visibility in poor weather conditions up to 4 km (2.5 m) away.

Rugged, Weatherproof Design
Sealed bearings for precision vaning and true wind direction in all types of weather and wind conditions. Additional bearing covers provided for protection against dirt and moisture. Water-repellent and color-fast nylon sock is resistant to rot and mildew. Standard orange or white/orange sock.

Reliable Performance
The SPS provides power to the wind cone in a simple to install package. Nominal 10 day autonomy (operation without solar charging) ensures consistent performance with a minimum 5 year battery service life.

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- 4 km (2.5 m) control range
- 900 MHz with encrypted signal
- Control 8 groups of lights independently

OPTIONAL HANDHELD CONTROLLER

WIND CONE
SOLAR ILLUMINATED SYSTEM

SPECIFICATIONS

MODELS

L-806	Frangible, 8 foot windsock, unlit or internally lit
L-807	Non-frangible, size 1 or size 2 windsock, unlit or internally lit with centre hinge

OPERATING CONDITIONS

Temperature	-45 to +55 °C (-49 to +131 °F)
Humidity	0 - 100%

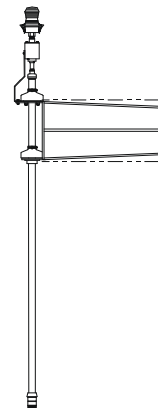### SOLAR POWER SUPPLY (SPS)

|	
Installed Weight	50 watts (2 batteries) - 39 kg (86 lb) 135 watts (2 batteries) - 121.6 kg (268 lb)
Shipping Weight	50 watts - 129 kg (285 lb) 135 watts - 179 kg (395 lb)
Installed Dimensions	Height: 940-1400 mm (37-55 in) Width: 840 or 1500 mm (33 of 59 in)
Operating Temperature	-40 to +55 °C (-40 to +131 °F)
Storage Temperature	-40 to +55 °C (-40 to +131 °F)
Chassis	Weather and corrosion-resistant construction of steel and powder coated aluminum
Mounting	Frangible couplings and floor flange mounts
Wind loading	193 kph (120 mph) min. for 135W installed at 65° tilt
Tilt	25° - 65° in 10° steps
Diagnostics	On-board feedback indicators for: battery and system status
Certifications	CE, FCC

BATTERY

Power	2x 12 VDC 100 Ahr Standard
Type	Replaceable and recyclable, absorbent glass mat (AGM) SLA. Standard with one battery
Charger	Temperature-compensated, maximum power point tracking (TC-MPPT)

PV PANEL

Power	50, 135 W
Type	High-efficiency polycrystalline, IEC 61215
Lifetime	12 years at 90% output

L-806
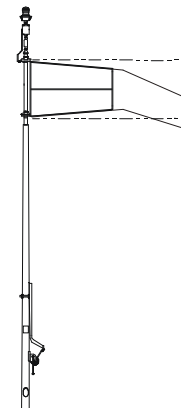
L-807

DIMENSIONS - INTERNALLY LIT WIND CONES

WIND CONE	OVERALL HEIGHT
L-806	3099 mm (122 in)
L-807 size 1	6248 mm (246 in)
L-807 size 2	6706 mm (264 in)

Installation
The Wind Cone should be installed according to FAA AC 150/5340-30. The Solar Power Supply (SPS) should be installed on a level concrete pad between a minimum of 12 feet and a maximum 15 feet from the wind cone.

Operation
The operation of the Wind Cone is entirely dependent on the direction and relative velocity of the surface wind. Movement of the wind through the open throat of the cage and into the sock causes the tail to inflate. The tail of the inflated sock indicates true wind direction for velocities as low as three knots through a 360° circle about the vertical shaft.

CONFIGURATION

MODEL	TYPE ▼	ILLUMINATION ▼	SOCK ▼	CONTROL ▼	OPTIONS ▼
WIND CONE	L-806 - FRANGIBLE L-807 - SIZE 1, HINGED L-807 - SIZE 2, HINGED	UNLIT INTERNALLY LIT	ORANGE WHITE/ORANGE	NON-WIRELESS WIRELESS	FLOOR FLANGE

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SIGNS
SOLAR AIRFIELD SIGNS

Carmanah solar LED airfield signs are a simple solution for airfields that experience difficulties with grid access or for those that require a quick, minimally disruptive addition to an existing airfield.

- Includes an L-858Y, L-858R, L-858L, or L-858B solar-powered sign and a Solar Engine Power Supply (SEPS).

- SEPS incorporates the latest technology in solar technology, hardware and software to provide a reliable and sustainable power source

- High quality LED light source virtually eliminates runway shutdowns, reduces re-lamping expenses and on-going maintenance costs

- Battery life: 5+ years

- Easy installation and relocation: no specialized work crews required

- Limited air traffic disruption and functions immediately upon installation

- Optional Handheld Controller allows for remote, wireless operation including mode changes for enhanced visibility in poor weather conditions

- Engineered for reliable performance, the Energy Management System (EMS) monitors and adapts the brightness to environmental conditions for consistent operation and long life under the tough conditions

- Minimum autonomy (operation without solar charging) 7+ days - scalable to meet requirements up to 40 days

Compliance with Standards

FAA: Designed to meet L-858Y, L-858R, L-858L and L-858B AC 150/5345-44 (Current Edition) and the FAA Engineering Brief No. 67 "Light Sources other than Incandescent and Xenon for Airport Lighting and Obstruction Lighting Fixtures."

CE: Complies with the requirements of the EMC Directive 2004/108/EC

ICAO: Please inquire about ICAO compliant options

Construction

Corrosion-resistant sign construction requires minimal maintenance:
- Aluminum housing
- Acrylic sign legend panels
- Stainless steel hardware Retroreflective sheeting

Installation

Each sign is furnished complete with mounting flanges for installation on a concrete pad, which is the recommended method of installation. Contact Carmanah for more information on sign installation hardware.

The Solar Engine Power Supply (SEPS) should be installed on a level concrete pad within 20 feet of the solar sign.

For a temporary application, the wiring between the SEPS and the sign can be above ground. Both the sign and SEPS contain side conduits for cabling access.

MODELS AVAILABLE

TYPE	PURPOSE	LEGEND COLOR	BACKGROUND COLOR
L-858Y	Direction, Destination & Boundary	1490 mm (58.6 in)	Yellow
L-858R	Mandatory Sign	1820 mm (71.6 in)	Red
L-858L	Runway/Taxiway Location	Yellow	Black
L-858B	Runway Distance Remaining	White	Black

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OPERATING CONDITIONS

Temperature: -40 °C to +55 °C (-40 °F to +131 °F)

Humidity: 0 to 100%

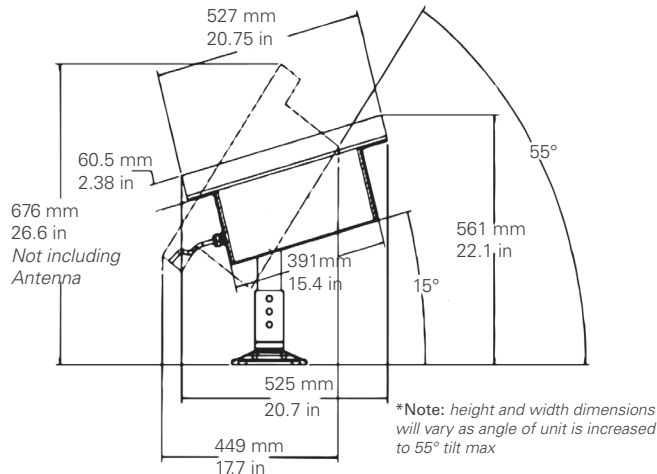Wind: Mode 2 signs withstand wind velocities up to 225 mph

Sign Dimensions

SIGN HEIGHTS

TYPE	SIGN SIZE NO.	SIGN FACE HEIGHT	LEGEND HEIGHT	OVERALL MOUNTING HEIGHT
L-858Y/R/L	1 1	457 mm 18 in	305 mm 12 in	755 mm 29.7 in
L-858Y/R/L	2 2	610 mm 24 in	381 mm 15 in	908 mm 35.7 in
L-858Y/R/L	3 3	762 mm 30 in	457 mm 18 in	106 mm 41.7 in
L-858B	4 4	1220 mm 48 in	1016 mm 40 in	1478 mm 58.2 in
L-858B	5 5	762 mm 30 in	635 mm 25 in	1060 mm 41.7 in

SIGN LENGTHS

SIZE NO.	1 MODULE	2 MODULE
1	750 mm (29.4 in)	1490 mm (58.6 in)
2	910 mm (35.9 in)	1820 mm (71.6 in)
3	1080 mm (42.4 in)	2150 mm (84.6 in)
4	1220 mm (47.9 in)	N/A
5	1080 mm (42.4 in)	N/A

Note: Sign depth is 238.5 mm (9.39 in).

SEPS DIMENSIONS

527 mm / 20.75 in

60.5 mm / 2.38 in

676 mm / 26.6 in / *Not including Antenna*

391 mm / 15.4 in

561 mm / 22.1 in

55°

15°

525 mm / 20.7 in

449 mm / 17.7 in

Note: height and width dimensions will vary as angle of unit is increased to 55° tilt max

PACKAGING DATA
Signs are shipped with frangible couplings, and floor flanges–ready for installation

DESCRIPTION	GROSS WEIGHT[1] KG (LB)	DIMENSIONS (MM)	CARTON (IN)
Size 1, Module 1 Size 1, Module 2	21 (46) 35 (78)	870 x 864 x 330 870 x 1600 x 330	34 x 34 x 13 34 x 63 x 13
Size 2, Module 1 Size 2, Module 2	32 (71) 47 (104)	1020 x 1020 x 330 1020 x 1930 x 330	40 x 40 x 13 40 x 76 x 13
Size 3, Module 1 Size 3, Module 2	37 (81) 60 (131)	1170 x 1170 x 330 1170 x 2260 x 330	46 x 46 x 13 46 x 89 x 13
Size 4, Module 1	54 (120)	1580 x 1320 x 330	62 x 52 x 13
Size 5, Module 1	39 (85)	1170 x 1170 x 330	46 x 46 x 13

[1] Estimated weight

Specifications subject to local environmental conditions.
Specifications may be subject to change.
US and International patents apply. Other patents pending.
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Additional Equipment Data

SOLAR ENGINE POWER SUPPLY (SEPS)

Installed Weight	59.8 kg (132 lb)
Shipping Weight	Box 1 (SEPS) - 34.4 kg (76 lb) Box 2 (battery) - 30.8 kg (68 lb)
Installed Dimensions*	759 H x 1089 W x 441 D mm 29.9 H x 42.9 W x 17.4 D in *with wireless antenna at 55° tilt

Shipping Dimensions

Box 1 (SEPS)	647 H x 1191 W x 355.6 D mm (25.5 H x 46.9 W x 14.0 D in)
Box 2 (Battery)	210 H x 332 W x 188 D mm (8.3 H x 13.1 W x 7.4 D in)

Temperature

Operating: Storage:	-30 °C to +50 °C (-22 °F to +122 °F) -40 °C to +80 °C (-40 °F to +176 °F)
Type	Replaceable and recyclable, absorbent glass mat (AGM) SLA. Standard with one battery.
Lifetime	4,000 cycles to 20% depth of discharge at +20°C (+68 °F)
Charger	Temperature-compensated, maximum power point tracking (TC-MPPT)

LED DRIVER

Channel A:	18 – 38 VDC from 0.3 – 1.4 A and 5 – 100% duty cycle, constant current
Channel B:	18 – 38 VDC from 0.3 – 1.4 A and 5 – 100% duty cycle, constant current
Automatic Light Control (ALC)	ALC dynamically reduces brightness in response to unusually low amounts of sunlight to ensure continued autonomous operation. Available on Channels A and B.
Control, Autonomous Mode	Dusk-to-dawn, steady on
Load Cabling	6.7 m (22 ft) cable can exit onto the surface or down into a ground pot

PV PANEL

Power	95 W
Type	High Efficiency Monocrystalline, IEC 61215
Lifetime	10 years at 90% output

WIRELESS`

Range	4 km (2.5 m)
Frequency	900 MHz ISM Band, FHSS
Encryption	256-bit AES
Control, On-demand Mode	- Seamless integration with existing Carmanah wireless solar products - Up to 8 independent groups - Flash Mode, Emergency Mode, Autonomous Mode - On-demand Temporary Mode (High, Medium, Low) - Configuration Mode, ARCAL

ERGL
SOLAR ELEVATED RUNWAY GUARD LIGHT

Carmanah's Solar Elevated Runway Guard Light (ERGL) provides a distinctive warning to pilots that they are approaching a runway holding position and are about to enter an active runway. The ERGL has a high intensity LED light source and is powered by our industry leading solar engine power supply (SEPS).

- Provides 24-hour unidirectional marking at runway and taxiway intersections

- Installs in minutes and can be relocated just as quickly

- Includes LED lights, frangible column and tether

- Fixture flash-rate is controlled from an intelligent lighting control system module located in the SEPS; alternating flashes, 45-50 per minute

- Can be aimed both vertically and horizontally and has an adjustable Light Beam: 0° to 20° vertically; ±20° horizontally

- Significant reduction of maintenance costs and re-lamping expenses through long-lasting LED technology - average LED life of 56,000 hours under high-intensity conditions and more than 100,000 hours under actual operating conditions

- Engineered for reliable performance, the Energy Management System (EMS) monitors and adapts brightness to environmental conditions for consistent operation and long life under tough conditions

- Autonomy (operation without solar charging) 7+ days - scalable to meet requirements up to 40 days

- Battery life: 5+ years

SEPS Models

The ERGL is available in two SEPS models: Standard and Wireless. With the standard SEPS, the unit will activate automatically between dawn and dusk with pre-set illumination. The wirelessly controlled SEPS allows the unit to be activated remotely via a handheld controller.

Fixture Construction

The ERGL fixture is fabricated from corrosion-resistant materials and all exterior surfaces are painted aviation yellow for added protection and visibility. Includes high-strength ERGL base plate. The two ERGL light sources are surrounded by a black face plate and independent visors to reduce the amount of incident sunlight, thereby maximizing the contrast during the LED ON/ OFF cycle.

Installation

ERGL systems are typically installed in pairs with one unit on either side of the taxiway holding position.The ERGL should be installed according to FAA AC 150/5340-30.The SEPS should be installed on a level concrete pad within 20 feet of the ERGL. For a temporary application, the wiring between the SEPS and the ERGL can be above ground. Both the ERGL and SEPS contain side conduits for cabling access.

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ERGL
SOLAR ELEVATED RUNWAY GUARD LIGHT

OPERATING CONDITIONS

Temperature	-40 °C to +55 °C (-40 °F to +131 °F)
Humidity	0 to 100%
Wind	Withstands wind velocities up to 480 kph (300 mph)

SOLAR ENGINE POWER SUPPLY (SEPS)

Installed weight	59.8 kg (132 lb)
Shipping weight	Box 1 (SEPS) - 34.4 kg (76 lb) Box 2 (battery) - 30.8 kg (68 lb)
Installed dimensions*	759 H x 1089 W x 441 D mm 29.9 H x 42.9 W x 17.4 D in * with wireless antenna at 55° tilt
Shipping dimensions	
Box 1 (SEPS)	647 H x 1191 W x 356 D mm 25.5 H x 46.9 W x 14.0 D in
Box 2 (battery)	210 H x 332 W x 188 D mm 8.3 H x 13.1 W x 7.4 D in
Temperature	
Operating: Storage:	-30 to +50 °C (-22 to +122 °F) -40 to +80 °C (-40 to +176 °F)
Chassis	Weather and corrosion-resistant construction of stainless steel and powder coated aluminum
Mounting	Frangible couplings and floor flange mounts
Wind loading	480 kph (300 mph) min. installed at 55° tilt
Tilt	15°, 35°, 55°
Diagnostics	On-board feedback indicators for: Battery Status, System Status, Battery Reverse Polarity, and Solar Panel Reverse Polarity
Certifications	ROHS, WEEE, CE, FCC

BATTERY

Power	12 VDC 105 A-hr at C/100 discharge rate
Type	Replaceable and recyclable, absorbent glass mat (AGM) SLA.
Lifetime	4,000 cycles to 20% depth of discharge at +20°C (+68°F)
Charger	Temperature-compensated, maximum power point tracking (TC-MPPT)

LED DRIVER

Channels	2 independent channels
Channel A:	18 – 38 VDC from 0.3 – 1.4 A and 5 – 100 % duty cycle, constant current
Channel B:	18 – 38 VDC from 0.3 – 1.4 A and 5 – 100 % duty cycle, constant current
Automatic Light Control (ALC)	ALC dynamically reduces brightness in response to unusually low amounts of sunlight to ensure continued autonomous operation. Available on Channels A and B.
Control, Autonomous Mode	Dusk-to-dawn flashing or 24-hour flashing
Load Cabling	6.7 m (22 ft) cable can exit onto the surface or down into a ground pot

PV PANEL

Power	95 W
Type 61215	High Efficiency Monocrystalline, IEC
Lifetime	10 years at 90% output

WIRELESS

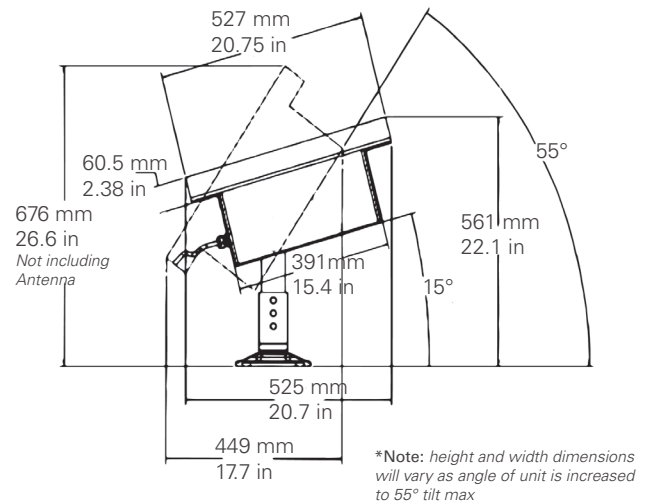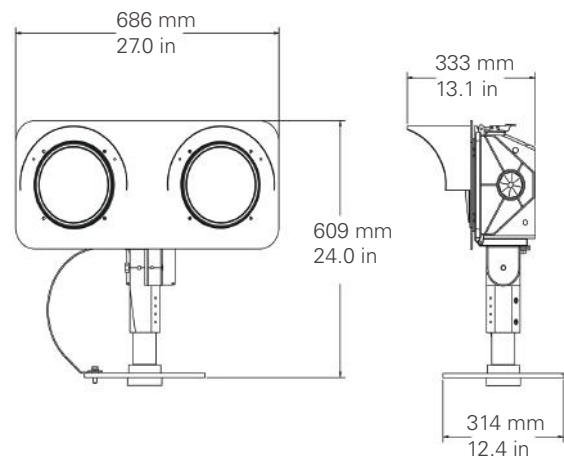|	
Range	4 km (2.5 m)
Frequency	900 MHz ISM Band, FHSS
Encryption	256-bit AES
Control, On-demand Mode	- Seamless integration with existing Carmanah wireless solar products - Up to 8 independent groups. - Flash Mode, Emergency Mode, Autonomous Mode - On-demand Temporary Mode (High, Medium, and Low), Configuration Mode, ARCAL

FIG. 1. SEPS DIMENSIONS

*Note: height and width dimensions will vary as angle of unit is increased to 55° tilt max

FIG. 2. ERGL DIMENSIONS

Specifications subject to local environmental conditions.
Specifications may be subject to change.
US and International patents apply. Other patents pending.
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ALS
SOLAR APPROACH LIGHTING SYSTEM

Carmanah's flexible, solar-powered Approach Lighting System (ALS) provides visual information on runway alignment, height perception, roll guidance and horizontal references:

• FAA, ICAO and UFC photometric compliant

• Ideal for permanent, temporary, emergency and military airfields

• Easy to install, configure and maintain

When landing aircraft, an ALS is critical during the transition from instrument flight (IFR) to visual flight (VFR). Our ALS features:

• Advanced LED optics with no high voltage cables or bulb changes

• Designed for portable or fixed applications

• Visible and optional Infrared (IR) operating modes

• Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away

• Optional control tower intergration and ARCAL

• Solar, AC or battery powered options

Our ALS is compliant with international standards for approach lighting systems and accommodates a wide variety of layouts including:

• ICAO Simple ALS

• FAA Medium Intensity Approach Lighting (MALSR)

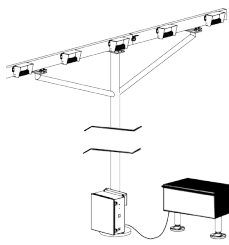SEQUENCED FLASHING LIGHT (SFL)

STEADY-BURNING LIGHT (SBL)

STEADY-BURNING LIGHT (SBL) BARRETTE

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STEADY-BURNING LIGHT BARRETTE

SOLAR ENGINE

OPTIONAL HANDHELD CONTROLLER

- 4 km (2.5 m) control range
- 900 MHz with encrypted signal
- Control 8 groups of lights independently

ALS
SOLAR APPROACH LIGHTING SYSTEM
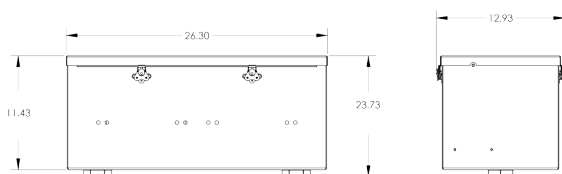
SPECIFICATIONS

Optical	High-power LEDs with efficient heat management ensure consistent photometrics for life of product. Steady-Burning Light (SBL): +10,000 cd Sequenced Flashing Light (SFL): +100,000 cd with 5.5 ms flash
	NVG-compatible infrared (IR) LEDs
	FAA MALSR compliant, FAA-E-2980
	ICAO Annex 14 compliant
	UFC 3-535-01 MALSR compliant
	Up to 5 stepped intensities: 100%, 20%, 4%, 0.8%, 0.16% or custom
Power Options	Solar kit: Solar panels and mounting, batteries and enclosures; AC input for backup
	Generator kit: Gas or diesel generator; AC input for backup
	Battery kit: Batteries & enclosures; AC input for backup
	AC only: 100 - 240 VAC 50/60 Hz; 3 and 5-step current input
Control Options	Non-Wireless: Multi step current control
	Wireless: 4 km (2.5 m) control range with optional Handheld Controller; local control
Construction	Powder coated aluminum chassis
	Aviation orange standard, yellow and other colors available
	Stainless steel and anodized aluminum hardware
Temperature	-31- to 131 °F (-35 to 55 °C)
Wind Loading	300 mph (134 m/s)
Ingress (Battery Box)	NEMA 4 & EN 60529 IP 55

DIMENSIONS

STEADY BURNING BARRETTE
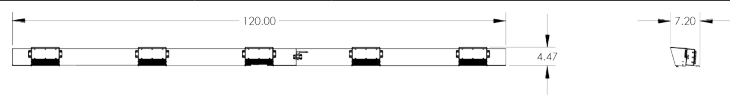
BATTERY BOX

SOLAR SYSTEM
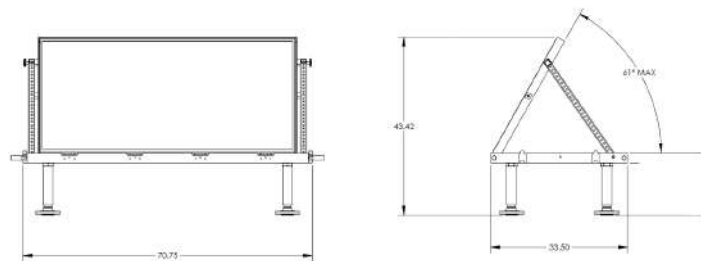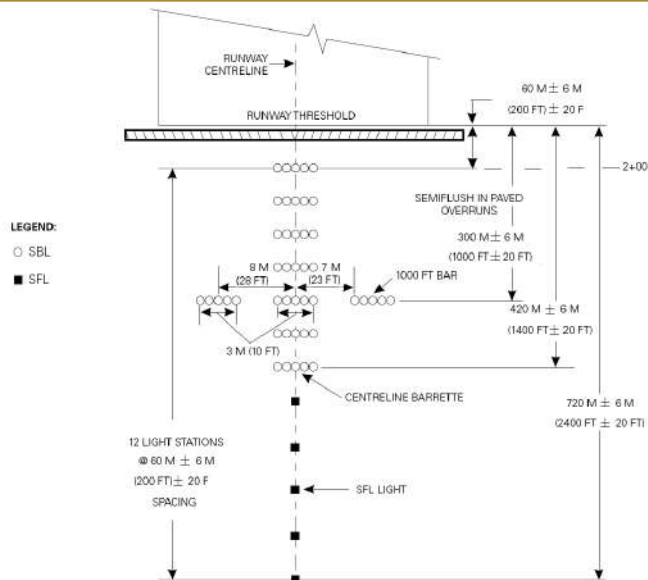
FAA MALSR SYSTEM

ICAO SIMPLE APPROACH LIGHTING SYSTEM
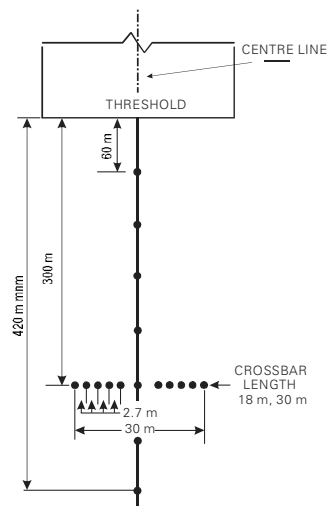
CONFIGURATION

MODEL	LAYOUT TYPE ▼	MOUNTING ▼	OUTPUT ▼	POWER ▼	CONTROL ▼
ALS	FAA MALSR UFC MALSR ICAO SIMPLE CUSTOM	PERMANENT PORTABLE	VISIBLE VISIBLE / IR	SOLAR KIT GENERATOR KIT BATTERY KIT AC	NON-WIRELESS WIRELESS

All Carmanah products are manufactured in facilities that are certified to ISO quality standards.

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HHC
HANDHELD CONTROLLER

Wirelessly control Carmanah's solar airfield lighting system from up to 4 km (2.5 m) away. Features include:

- Instantaneous control of an unlimited number of airfield products
- Individual communication with each light
- Separately control up to 8 groups of lights
- Uninterrupted, secure, MIL-grade encryption

Wireless Control
Enables remote operation of an airfield lighting system including mode changes for enhanced visibility in poor weather conditions or blackout or infrared (NVG) modes in response to immediate threat.

Multiple Configuration Options
Secure, password-protected communications where one or more controllers can be keyed to a system of lights.

Versatile Interface
Contains a radio modem, supporting electronics and external serial interface. It also supports an interface suitable for connecting to an off-the-shelf, standalone aviation band VHF receiver (ARCAL) to facilitate pilot-controlled lighting operation.

Rugged, Weatherproof Design
Tested to Condition B, Method 104A of MIL-STD-202F for moisture resistance. Reliable operations in temperatures ranging from -40 to 60 °C (-40 to 140 °F). Weatherproof back-lit LED keypad and LED indicators designed for use with gloves. Removable, replaceable antenna.
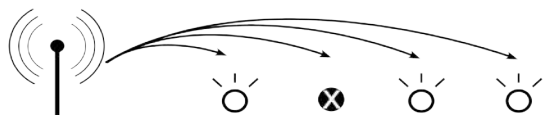
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How Carmanah's Wireless Control Works

Point-to-multipoint wireless system communicates with each light individually so that if one light goes out, the system still functions.

HHC
HANDHELD CONTROLLER

SPECIFICATIONS	
Control Range	Up to 4 km (2.5 m)
Individual Groups	1 - 8
Frequency	900 MHz ISM point-to-multipoint; others available, please inquire
Encryption	Up to 256 bit AES encryption
Control Tower Integration	Via included RS-232 connector
Pilot Activated Lighting	Via included ARCAL connector
Password Protection	User and Admin modes
Operation	12 hrs of continuous use on single charge (1 operation / min.)
	1250 hrs of storage on a single charge
Modes	Visible, IR (NVG), flashing, steady on, standby, off, autonomous, temporary, emergency, diagnose
Antenna	Removable antenna included
	External antenna options
Battery	Lithium-ion, long cycle life
	3.75 V, 6.8 Ahr
	Battery status indicators
	Universal battery charger included
Construction	Powder coated aluminum
	Backlit, waterproof, silicone keypad
Operating Temperature	-40 to 60 °C (-40 to 140 °F)
Storage Temperature	-40 to 60 °C (-40 to 140 °F)
Weight	1.4 kg (3 lb)
Ingress	Waterproof, vented battery compartment
	MIL-STD-202, Method 104A for immersion
Compliance	FCC, ANATEL
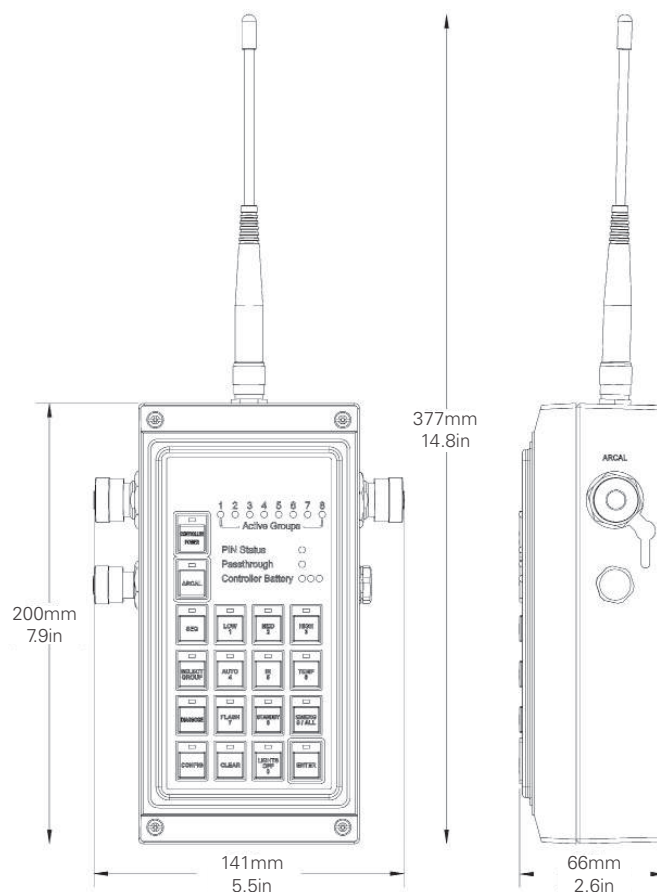
377mm
14.8in

200mm
7.9in

ARCAL

141mm
5.5in

66mm
2.6in

All Carmanah products are manufactured in facilities that are certified to ISO quality standards.

Carmanah Technologies Corp. | carmanahairports.com | 1.250.380.0052 | airports@carmanah.com

ARCAL
DIGITAL RADIO CONTROL

Allows pilots to activate and manage the intensity of airfield lights on approach. Ideal for unmanned airfields and control towers.

Compliance with Standards

FAA: L-854 AC 150/5345-49 (Current Edition)
ETL Certified
ICAO: Aerodrome Design Manual, Part 5 para. 3.4.6
FCC: 47 CFR, Part 15:2007 (Class A)
Canada: TP 312 - Aerodromes Standards and Recommended Practices

The Carmanah ARCAL system provides air-to-ground (Type I) radio control of Carmanah solar airfield products. Pilots can remotely activate and change intensities of our products by simply keying the microphone button of their standard VHF communication transmitter.

Airport operators benefit from maximum runway usage while minimizing energy expenditure and increasing the performance capabilities of our solar airfield products.

- Designed for outdoor, unattended all-weather operation

- Eliminates costly trenching and installation of control lines to remote facilities

- No special airborne equipment or adapters required

- Lights are activated remotely from the air and remain on at the selected intensity for a period of 15 minutes. Additional timer settings of 1, 30, 45 and 60 minutes are available

- Receiver may be programmed to operate on any frequency in the specified VHF range between 118.0 to 136.0 MHz

- Selectable decoder enable/disable prevents multiple relay operation during normal daytime operations

- Optional Remote Maintenance Module (RMM) available

- Configurable to Type J or Type K ARCAL via DIP switch selection (Canada)

SPECIFICATIONS	
Receiver	Single-conversion superheterodyne design. Adjustable sensitivity from 1 to 30 microvolts permitting a control range of 1.6 to 32 km (1 to 20 miles).
Commands	Three intensity settings controlled by a series of 3, 5 or 7 microphone button clicks from the pilot

Power	Input Voltage Maximum VA
	   12 VDC 11[1]
	   120 VAC 15[2]
	   240 VAC 18[2]
	[1]Typical standby power is 4 VA at 12 VDC for calculating solar power autonomy.
	[2]120 or 240 VAC, ±10%,
	
	Output: 3 A relay contact rating, 0 to 3 amps

Frequency	118.0 to 136.0 MHz VHF. Digital control electronics allow operating frequency to be easily reprogrammed by the user.
Construction	Nema 4 (indoor/outdoor) enclosure
	Built-in speaker with volume control
	Omnidirectional ground-plane antenna with an additional 50 feet of cable for remote mounting
Operating Temperature	-55 to 55 °C (-67 to 131 °F)
Humidity	0 to 100%
Altitude	0 to 2000 m (0 to 6,600 ft)
Dimensions	305 x 254 x 203 mm (12 x 10 x 8 in)
Weight	9.5 kg (21 lbs)

CONFIGURATION		
MODEL	**POWER ▼**	**ANTENNA ▼**
ARCAL	12 VDC 120 VAC 240 VAC	TOP MOUNT REMOTE MOUNT

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PALT
PORTABLE AIRFIELD LIGHTING TRAILER

Install airfield lighting in minutes with the PALT Portable Airfield Lighting Trailer system.

- Stores and charges 130+ lights for a complete 4000 m runway

- Configurable from 500 - 4000 m runway

- Air transportable and towable to expedite airfield light installation

- Integrated AC and solar charging system ensures airfield lights are always ready

Applications

The PALT combines our rugged cable and transportation trailer product line with our trusted A704, A650, and PAPI solar airfield lights. Our system is ideal for:

- Military, police, airport operators
- Night vision goggle (NVG) and covert operations
- Humanitarian, disaster, and medevac situations

Compliant and Self-contained

Airfield lights are a critical navigation aid for pilots and ours are:

- ICAO and FAA compliant
- Solar-powered = no cabling or civil works required
- Self-contained, integrated, and sealed against water and dust to greater than IP68

Proven in Austere Environments

Used worldwide in military environments for over fifteen years, our airfield lights exceed operational requirements:

- Lightweight, compact, and designed for portability with integrated handles, aviation yellow or olive drab chassis, and military charge ports
- Wirelessly controlled up to 4 km with military-grade encryption
- High efficiency, LED optics
- Third-party tested for performance

The system is easily configured to transport, charge, and control these products:

Runway Edge Lights

Apron and Taxiway Edge Lights

Wireless Control
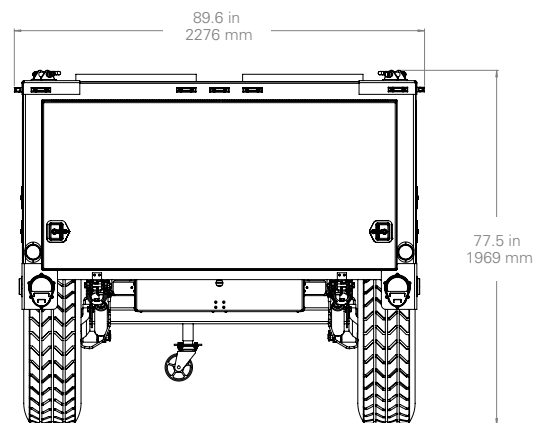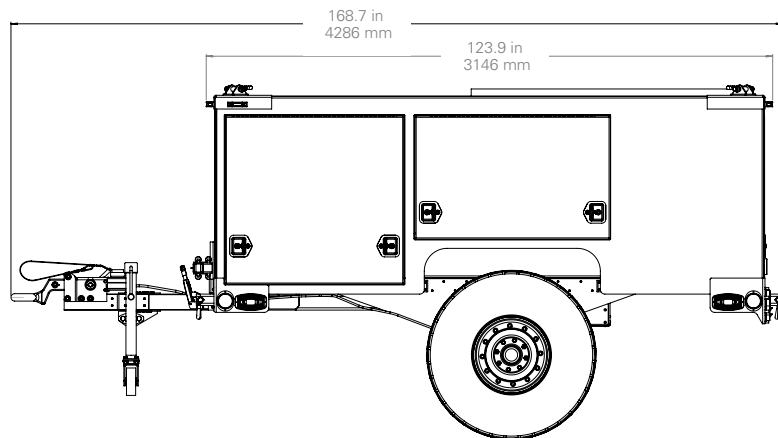
Runway Threshold Lights

PAPI

ARCAL

Handheld Controller

- 4 km (2.5 mi) control range
- 900 MHz with encrypted signal
- Control 8 groups of lights independently

PALT
PORTABLE AIRFIELD LIGHTING TRAILER

168.7 in / 4286 mm
123.9 in / 3146 mm

89.6 in / 2276 mm
77.5 in / 1969 mm

TRAILER SPECIFICATIONS

The PALT utilizes a recognized platform with these key features:

Features	Light Tactical Trailer (LTT) chassis matches the performance of US military HMMWV and NATO requirements
	Air transportable with lifting points
	Fits in standard cargo container
	Front and rear stabilization bars easily deploy during use
	Changeable tongue for ball-mount, pintle hook, or lunette ring towing
	Hydraulic brakes, operating and blackout lights
	Rugged off-road suspension, wheels, and run-flat tires
	Chromoly steel and aircraft aluminum chassis
Dimensions	4286 mm (169 in) total length, 2276 mm (90 in) width, 1969 mm (78 in) height, 1840 mm (72.5 in) track width
	1905 kg (4200 lb) max. weight
	410 mm (16 in) min. ground clearance

To this versatile platform, we add a comprehensive Go Power! industrial-grade solar charging system. Recharge via the sun or any AC outlet with:

Solar System	Large 4x AGM battery bank to recharge the airfield lights' batteries during storage
	320 W solar panel array recharges the battery bank when no AC power is available
	75A battery charger recharges the battery bank quickly when connected to AC power
Electrical	Integrated user readout including battery status, voltage, LVD
	NEMA electrical box with circuit breakers for easy maintenance

Simply open the easy-access doors, disconnect charge port, remove A704 solar airfield light, and place on the ground to assemble your airfield.

AIRFIELD LIGHTING SPECIFICATIONS

Features	FAA and ICAO compliant lighting
	A704 white and white/yellow runway edge lights (quantity depends on runway length) + 12x A704 red/green threshold lights + optional A704-VL blue taxiway lights
	Visible and NVG-compatible infrared (IR) output
	Wireless control from up to 4 km (2.5 miles) away
	-40 to 80 °C (-40 to 176 °F) max. operating temperature

CONFIGURATION

MODEL	RUNWAY LENGTH ▼	CHASSIS ▼	OPTIONS ▼
PALT	500 M 1000 M 2000 M 3000 M 4000 M OTHERS AVAILABLE	DESERT TAN OLIVE DRAB AVIATION YELLOW WHITE OTHERS AVAILABLE	PERMANENT LIGHTING MOUNTS TAXIWAY LIGHTS PAPI SYSTEMS PILOT-ACTIVATED ARCAL

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HELIPADS

Solar helipad lighting systems are a dependable alternative to generator or grid-powered lighting for ground, rooftop, offshore, temporary or remote heliports. Carmanah provides customized systems for the world's toughest environments.

Carmanah's configurable and compliant solar-powered helipad lighting products include:

- FATO – Final Approach and Take Off
- TLOF – Touchdown and Lift Off
- Landing Direction Lights

- Taxiway Lights
- HAPI – Helicopter Approach Path Indicator
- Wind Cones

A704-VL
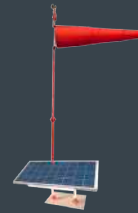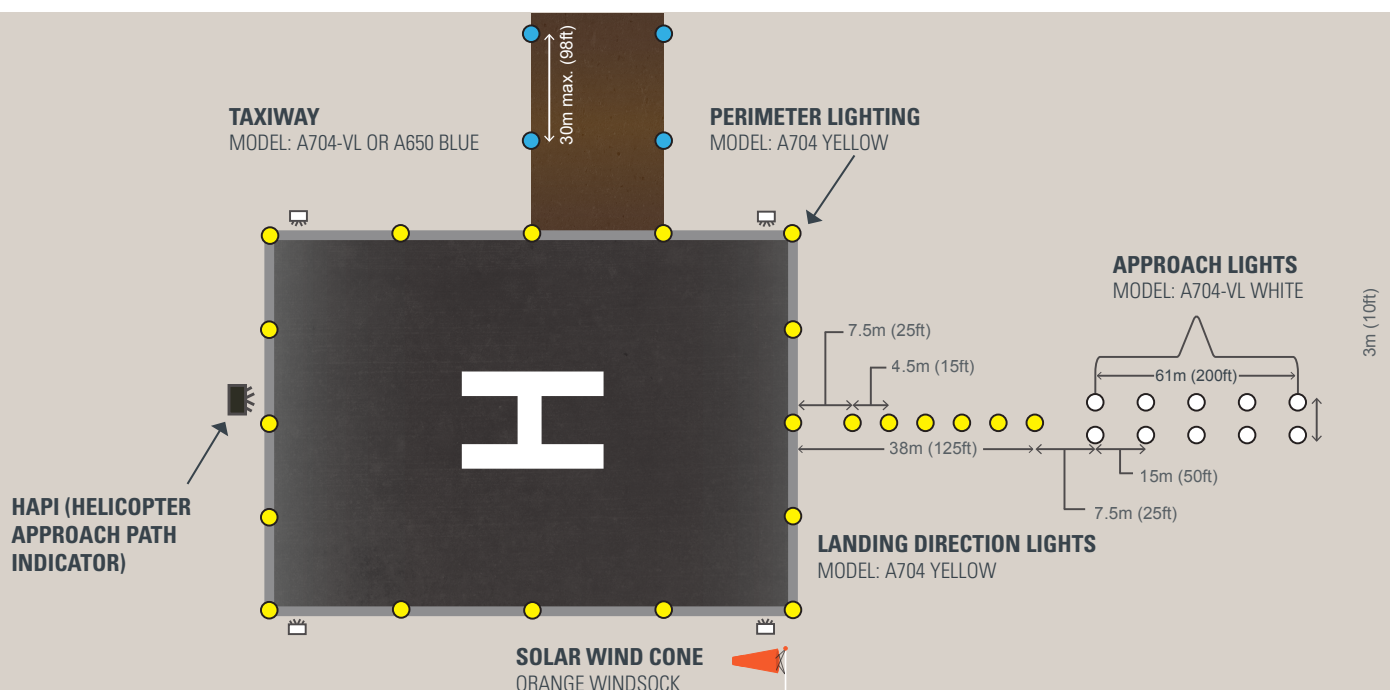21 cm (8.4 in)
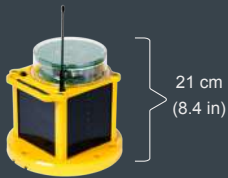
Page 27

A650
17 cm (6.7 in)

Page 8

HAPI

Page 30

SOLAR WIND CONE

Page 12

MILITARY COMPLIANT PRODUCT MAP
SOLAR HELIPAD LIGHTING

TAXIWAY
MODEL: A704-VL OR A650 BLUE

30m max. (98ft)

PERIMETER LIGHTING
MODEL: A704 YELLOW

APPROACH LIGHTS
MODEL: A704-VL WHITE

3m (10ft)

7.5m (25ft)

4.5m (15ft)

61m (200ft)

38m (125ft)

15m (50ft)

7.5m (25ft)

HAPI (HELICOPTER APPROACH PATH INDICATOR)

LANDING DIRECTION LIGHTS
MODEL: A704 YELLOW

SOLAR WIND CONE
ORANGE WINDSOCK

ICAO COMPLIANT PRODUCT MAP
SOLAR HELIPAD LIGHTING

TAXIWAY
MODEL: A704-VL OR A650 BLUE

FATO (FINAL APPROACH AND TAKE OFF)
MODEL: A704-VL WHITE

AIMING POINT LIGHT
MODEL: A704-VL WHITE

5m max. (16 ft)

9m (30ft)

1.5-3m (5-10ft)

APPROACH LIGHTS
MODEL: A704-VL WHITE

18m (59ft)

30m (98ft)

90m (295ft)

120m (394ft)

**HAPI
(HELICOPTER
APPROACH PATH
INDICATOR)**

FLIGHT PATH ALIGNMENT
MODEL: A704-VL WHITE

TLOF (TOUCHDOWN AND LIFT OFF)
MODEL: A704-VL GREEN

SOLAR WIND CONE
ORANGE/WHITE WINDSOCK

FAA COMPLIANT PRODUCT MAP
SOLAR HELIPAD LIGHTING

**FATO (FINAL APPROACH
AND TAKE OFF)**
MODEL: A704-VL GREEN

TAXIWAY
MODEL: A704-VL OR A650 BLUE

15m (50ft)

**HAPI (HELICOPTER
APPROACH PATH
INDICATOR)**

7.6m max. (25ft)

6-18m (20-60ft)

LANDING DIRECTION LIGHTS
MODEL: A704-VL GREEN

3m (10ft)

1.5-3m (5-10ft)

5m (16.4ft)

18.4m (60ft)

FLIGHT PATH ALIGNMENT
MODEL: A704-VL GREEN

**TLOF (TOUCHDOWN
AND LIFT OFF)**
MODEL: A704-VL GREEN

SOLAR WIND CONE
ORANGE WINDSOCK

carmanah®

A704-VL
SOLAR HELIPAD LIGHT

Meets traditional helipad requirements in an easy-to-install, low maintenance package.

- •ICAO and FAA compliant
- •Third party tested
- •Proven technology platform
- •Available in three solar engine sizes

Applications

Helipads

Touchdown and Lift-off area (TLOF)

Final Approach and Take-off area (FATO)

Taxiway lighting

NVG operations

Emergency operations

Advanced Design

- Improved optical efficiency with latest LEDs
- Up to 25% more power with high-efficiency solar panels
- Reduced standby power consumption
- Multiple solar engine sizes for best value-for-performance

Easy Installation

Limited crew, no trenching, no helipad interruptions. Just place the A704-VL and it emits light dusk-to-dawn while maintaining its battery. Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away.

Low Maintenance

The A704-VL integrates solar panels, battery, electronics, and LED light source into a compact, stand-alone unit requiring minimal maintenance. The replaceable battery extends service life well beyond 5 years.

Reliable

The Energy Management System (EMS) monitors all operations to provide consistent output in the harshest environments. Testing to ICAO, FAA and MIL specifications ensures high performance for many years.

Trusted

With thousands of installations worldwide, Carmanah solar LED lights operate year-round at permanent airfields and temporary military installations.
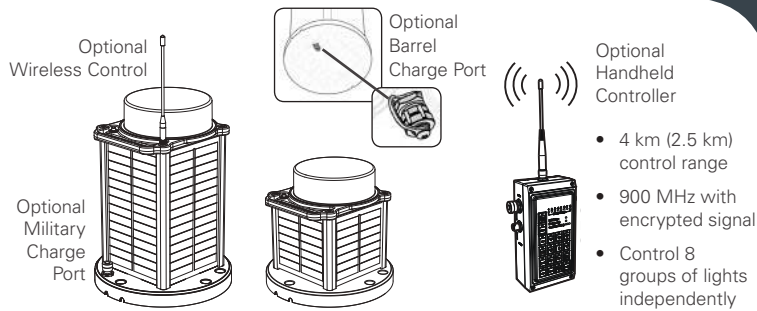
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Web: www.amrome.com

Optional Wireless Control

Optional Military Charge Port

Optional Barrel Charge Port

Optional Handheld Controller

- 4 km (2.5 km) control range
- 900 MHz with encrypted signal
- Control 8 groups of lights independently

A704-VL
SOLAR HELIPAD LIGHT

SPECIFICATIONS

Optical	High-power LEDs meet IES LM-80 lumen maintenance, ensuring consistent photometrics for life of product
	ICAO, SAE25050 (FAA), and FAA EB 67 compliant chromaticity
	NVG-compatible infrared (IR) LEDs
	Steady-on and flash
Energy Collection	High-efficiency cells with blocking diodes
	Maximum power point tracking with temperature compensation (MPPT-TC) for optimal energy collection in all solar conditions
Energy Storage	Pure-lead VRLA AGM battery with manufacturer operating range -65 to 80 °C (-85 to 176 °F)
	On-board battery status
	Designed for 5+ year battery life; Replaceable and recyclable
	Optional port for battery charging and cabled operation
Energy Management System (EMS)	Intelligent, microprocessor EMS
	On-board diagnostics and datalogger
	Push button interface for local control
	Autonomous, temporary, and emergency modes
Automatic Light Control (ALC)	ALC adjusts output intensity in response to unusually low amounts of sunlight to ensure continued operation
Construction	Premium, UV-resistant polycarbonate lens
	Powder coated aluminum and polycarbonate chassis with integrated handle
	Waterproof, vented battery compartment
Temperature	-30 to 50 °C (-22 to 122 °F) Optimal
	-40 to 80 °C (-40 to 176 °F) Maximum
Wind & Ice Loading	644 kph (400 mph) wind; 0.03 psi (22 kg/m²) ice
Shock & Vibration	MIL-STD-202G and MIL-STD-810G
Ingress	EN 60529 IP 67 immersion
	MIL-STD-202G immersion & damp heat cycling
	MIL-STD-810G rain & salt fog
Compliance	CE compliant (non-wireless model only)

DIMENSIONS AND WEIGHTS

STANDARD		COMPACT	
Weight	6.7 kg (15 lb)	Weight	4.9 kg (11 lb)
Battery (96E)	4.2V, 24 Ahr	Battery (60X)	4.2V, 15 Ahr

LARGE	
Weight	10.5 kg (23 lb)
Battery (200BC)	4.2V, 50 Ahr
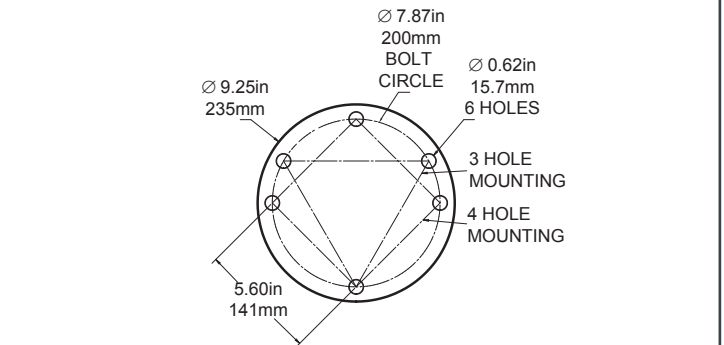
CONFIGURATION

MODEL	OUTPUT ▼	SOLAR ENGINE ▼	CHASSIS ▼	CONTROL ▼	CHARGE PORT ▼
A704-VL	WHITE / IR BLUE / IR GREEN / IR	COMPACT STANDARD LARGE	YELLOW OLIVE DRAB	NON-WIRELESS WIRELESS	NONE CHARGE PORT MILITARY CHARGE PORT

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A704-VL
SOLAR HELIPAD LIGHT

THIRD PARTY VALIDATION: PHOTOMETRIC COMPLIANCE

Refer to table below for additional details.

[1] ICAO FATO (Annex 14, Vol. 1, 5.3.7.4)
ICAO FATO (Annex 14, Vol. 2, Appendix 1)

[2] FAA L- 861T (AC No. 150/5345-46D, EB67)
ICAO (Annex 14, Vol. 1, 5.3.18.8)

[3] FAA L-860HR (EB 87D, EB67D)
ICAO TLOF (Annex 14, Vol. 1, 5.3.9.20)
ICAO TLOF (Annex 14, Vol. 2, Appendix 1)

[4] FAA L-810 vertical divergence; 850 - 890 nm peak

PEAK INTENSITY

	Auto Low (cd)	Auto Medium (cd)	Auto High (cd)	Temp Low (cd)	Temp Medium (cd)	Temp High (cd)
FATO (ICAO) [1]	4	10	18	27	83	266
Taxiway and Apron Edge [2]	3	7	10	13	16	19
TLOF (ICAO & FAA) & FATO (FAA) [3]	7	14	27	43	113	288
NVG Operations (mW/sr) [4]	16	34	80	16	34	80
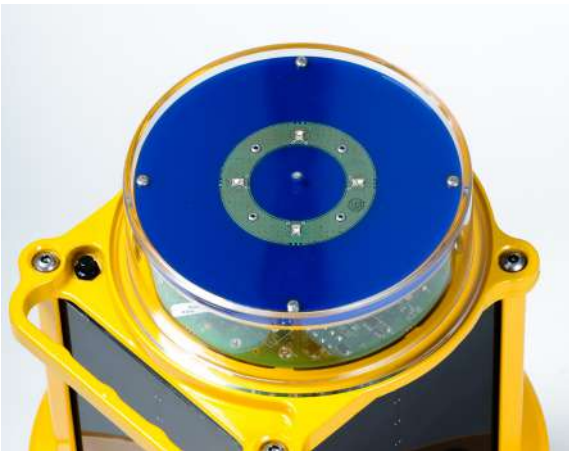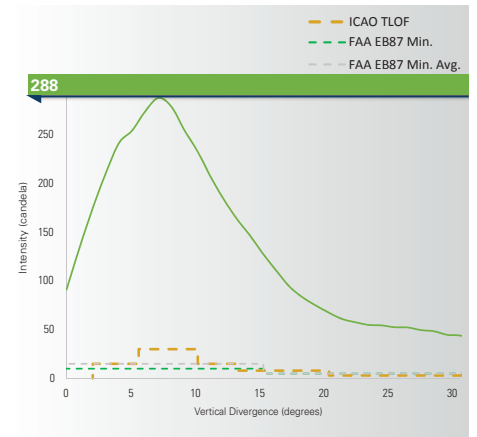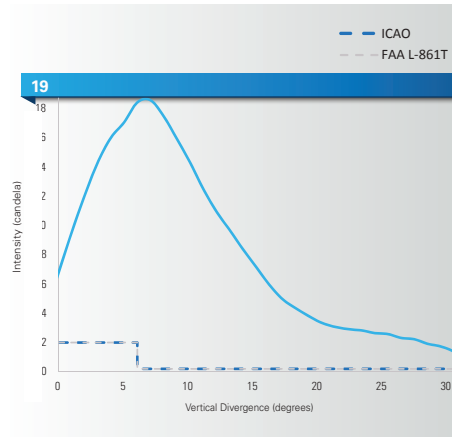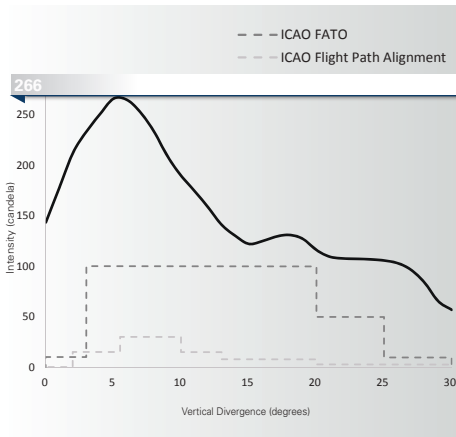
A704-VL Top of Lens

A704-VL Compact Models

Specifications subject to local environmental conditions.
Specifications may be subject to change.
US and International patents apply. Other patents pending.
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Document: AVIA_A704-VL Spec Sheet_Rev_B.indd

HAPI
HELICOPTER APPROACH PATH INDICATOR

The LED HAPI is the most advanced on the market and has the widest range of configurations:

- Visible and IR output
- Portable and permanent
- ICAO / FAA / STANAG Compliant
- Several power options

Applications

Permanent helipads

Temporary helipads

Emergency helipads

Hospital helipads

Remote helipads

Military & NVG operations

Advanced Optics

The HAPI uses patented, LED-based optics to achieve the lowest power consumption, highest intensity and sharpest green/red transition. It exceeds ICAO / FAA / STANAG requirements to provide a clear approach path to the aviator.

Easy Installation

The HAPI works equally well in permanent or temporary locations. Permanent mounting is easy with standard frangible mounting. Temporary deployment is fast with retractable legs and a lightweight, compact form factor.

Power Supply Versatility

The low power consumption of the HAPI makes it mate well with several available power supplies:

- Solar kit
- Generator kit
- Battery kit
- AC only

Controllable

Optional wireless control provides on-demand operation from up to 4 km (2.5 m) away. There is also 3 and 5-step, wired control and local control available.

Trusted

Deployed around the globe, from military to civilian airfields and from the Middle East to the Arctic Circle, the HAPI has proven it is robust. LED keypad and LED indicators designed for use with gloves. Removable, replaceable antenna.
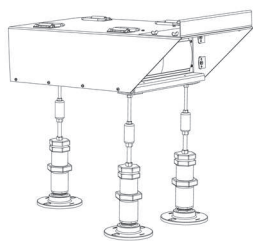
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HAPI

OPTIONAL HANDHELD CONTROLLER

- 4 km (2.5 m) control range
- 900 MHz with encrypted signal
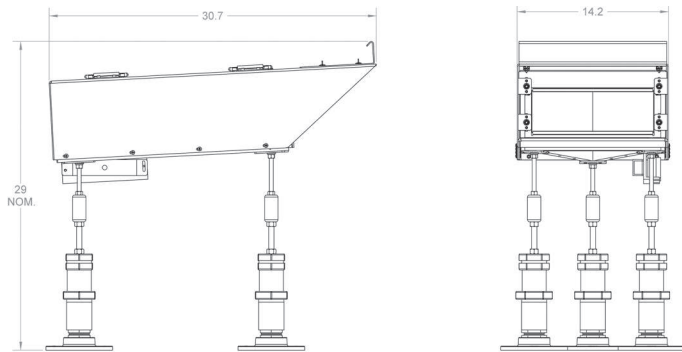- Control 8 groups of lights independently

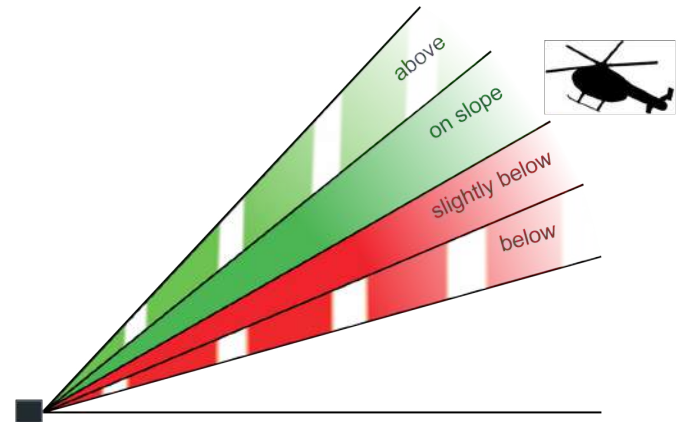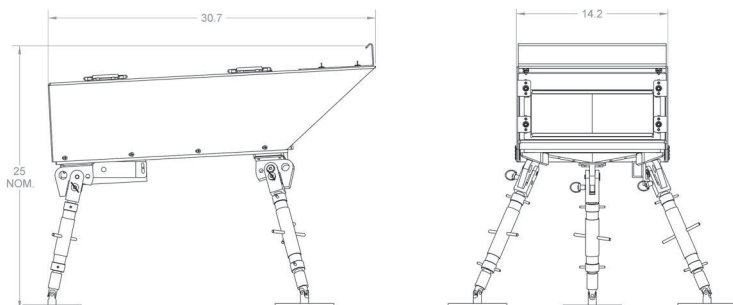# HAPI
HELICOPTER APPROACH PATH INDICATOR

SPECIFICATIONS

Optical	High-power LEDs with proper heat management ensure consistent photometrics for life of product
	NVG-compatible infrared (IR) LEDs
	FAA A C 150/5390-2C HAPI compliant
	ICAO Annex 14, Volume 2 HAPI compliant
	STANAG HAPI compliant
	Ultra-low power consumption make solar possible
Power Options	Solar kit: Solar panels and mounting, batteries and enclosures; air transportable container; AC input for backup
	Generator kit: Gas or diesel generator; AC input for backup
	Battery kit: Batteries & enclosures; AC input for backup
	AC only: 100 – 240 VAC 50/60 Hz; 3 and 5-step current input
Control Options	Non-Wireless: AC input of 3 and 5-step current; local control
	Wireless: 4 km (2.5 m) control range with optional Handheld Controller; local control
Construction	Powder coated aluminum chassis
	Aviation orange standard, yellow and other colors available
	Stainless steel and anodized aluminum hardware
	Integrated digital level
	Optical glass lens
Temperature	-35 to 55 °C (-31 to 131 °F) ambient
Wind Loading	161 kph (100 mph)
Ingress	NEMA 4 & EN 60529 IP 55

SIDE VIEW HAPI

DIMENSIONS

PERMANENT

PORTABLE

CONFIGURATION

MODEL	MOUNTING ▼	OUTPUT ▼	POWER ▼	CONTROL ▼
HAPI	PERMANENT PORTABLE	VISIBLE VISIBLE / IR	SOLAR KIT GENERATOR KIT BATTERY KIT AC	NON-WIRELESS WIRELESS

Options: carrying case, tactical battery pack, tilt switch (for FAA), low temperature arctic kit, custom chassis color

Specifications subject to local environmental conditions.
Specifications may be subject to change.
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Document: AVIA_HAPI _Spec_Sheet_RevA.indd

US and International patents apply. Other patents pending.
"Carmanah" and Carmanah logo are trademarks of Carmanah Technologies Corp.

Carmanah's A704 Series Airfield Lights come with a range of accessories including durable mounting hardware, frangible couplings, and a selection of replacement parts.

MOUNTING HARDWARE

REF.	PART NO.	DESCRIPTION
1	64559	16 x 16" rubber mat and hardware
2A	71757	Standard bolt kit, 700 series (4x stainless steel bolts)
2B	71884	Security bolt kit, 700 series (2x bolts, not including keys)
-	53288	Security bolt kit, bolt key/driver bit
-	53289	Security bolt kit, nut key/driver bit
3A	65714	Standard mounting plate (18" installed height)
-	65717	Extended mounting plate (26" installed height)
3B	74239	Helipad mounting bracket
4	65711	Frangible coupling, 1.5" pipe x 2 thread
5	50144	Floor flange, 2" thread
6	46397	Anchor bolt kit
7A	38925	2" hub stake - 15" long
7B	38964	2" hub stake - 30" long
-	Inquire	Grass guard kit

BATTERY/CHARGER

| REF.	PART NO.	DESCRIPTION
-	72890	Battery kit, A704 Compact
-	72891	Battery kit, A704 Standard
-	72892	Battery kit, A704 Large
-	74314	Battery charger, A704 with military charge port, 100-240 VAC, 50/60 Hz
-	69885	Battery charger, A704 battery pack and barrel charge port, 100-240 VAC, 50/60 Hz

OPTICS

REF.	PART NO.	DESCRIPTION
-	74690	Optical shield, 180 degree, several models
-	Inquire	Head kit, several models

MISCELLANEOUS PARTS

REF.	PART NO.	DESCRIPTION
8	40865	A704 series bird deterrent
9	56150	Replacement antenna
10	48473	Handheld Controller (see pg. 3 for additional wireless control options)
-	48984	Installation tool kit with 5/32" security bit for head/battery changes and small socket set

A704 SERIES MOUNTING HARDWARE OPTIONS
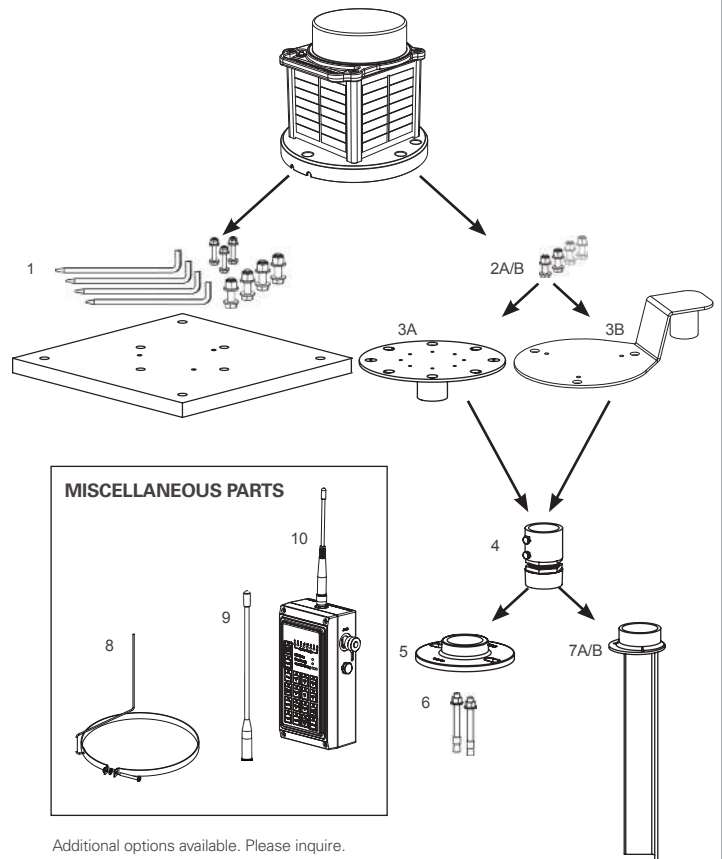
MISCELLANEOUS PARTS

Additional options available. Please inquire.

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Carmanah's A650 Series taxiway and apron edge lights include several mounting options and a variety of additional accessories and replacement parts.

MOUNTING HARDWARE

REF.	PART NO.	DESCRIPTION
1	64559*	Mat kit and hardware
2	61869*	Fence mounting kit with hardware
3A	38334*	Standard bolt kit, A650 series (3x stainless steel bolts)
3B	56578	Security bolt kit, A650 series
-	53284	Security bolt kit, driver
-	53285	Security bolt kit, socket
4A	66699*	Standard mounting plate (14" installed height)
4B	69752*	Extended mounting plate (24" installed height)
5	65711*	Frangible coupling, 1.5" pipe x 2 thread
6	50144*	Floor flange, 2" thread
7	46397*	Anchor bolt kit
8A	38925*	2" hub stake - 15" long
8B	38964*	2" hub stake - 30" long
-	61870	Stake mounting kit, soft ground
-	51925	Standard mounting plate, 1" pipe
-	50145	Frangible coupling, 1" pipe x 2" thread
-	61867*	Magnet mounting kit (3x magnets, nuts & washers)
-	61876	Magnetic sign mount

BATTERY/CHARGER

REF.	PART NO.	DESCRIPTION
-	72835	Battery kit, A650 series
-	59188	Charger: A650, 100-240 VAC 50/60 Hz

OPTICS

REF.	PART NO.	DESCRIPTION
-	Inquire	Optical shield, 180 degree, several models

MISCELLANEOUS PARTS

REF.	PART NO.	DESCRIPTION
9	57003	Bird deterrent, A650 series
10	56150	Replacement antenna
11	48473	Handheld Controller (see pg. 3 for additional wireless options)
-	57392	Bottom cover replacement kit (with switch)
-	57393	Bottom cover replacement kit (without switch)
-	59198	Bottom cover access tool
-	48984	Installation tool kit with 5/32" security bit for head/battery changes and small socket set

A650 SERIES MOUNTING HARDWARE OPTIONS
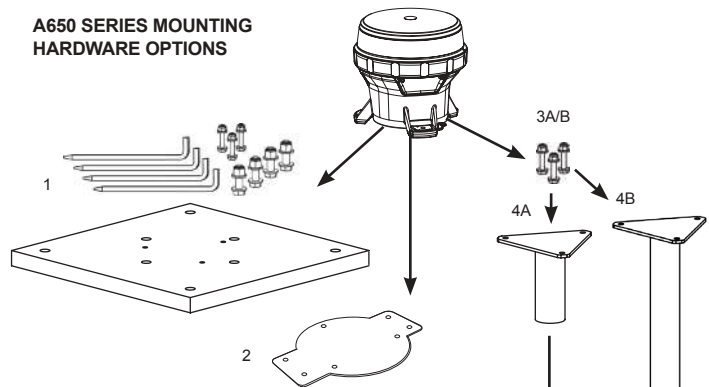
MISCELLANEOUS PARTS
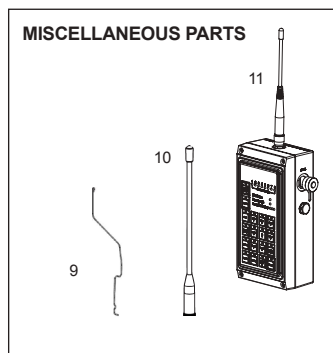
Additional options available. Please inquire.

*OL2A SERIES PRODUCTS

Accessories marked with an asterisk (*) are suitable for use with the OL2A obstruction light. For additional information, please contact obstruction@carmanah.com.

ACCESSORIES
ADDITIONAL AIRFIELD LIGHTING PRODUCTS

Additional accessories are available on request for all other Carmanah airfield lighting products.

AIRFIELD WIRELESS CONTROL SYSTEMS	
PART NO.	**DESCRIPTION**
48473	Handheld Controller
68066	Handheld Controller battery kit, Lith-ion 3.75V 5300mAh, for controllers manufactured in 2012 and later
68067	Handheld Controller battery kit, Lith-ion 3.75V 5300mAh, for controlelrs manufactured in 2011 and earlier
48176	Handheld Controller, hard shell carry case
69899	Infrared Programmer: A650
70373	L-854 ARCAL integration kit for handheld controller
Inquire	L-854 ARCAL radio control, multiple options
Inquire	Rugged laptop and monitoring software

SOLAR ENGINE POWER SUPPLY	
PART NO.	**DESCRIPTION**
SEPS NW	For non-wireless control of Carmanah ERGL, Wind Cone or Sign
SEPS W	For wireless control of Carmanah ERGL, Wind Cone or Sign
32303	SEPS W replacement antenna
SEPS PAPI	Please inquire

CUSTOM TRAILERS	
PART NO	**DESCRIPTION**
Trailer 1	Custom trailer with charging
Trailer 2	Custom trailer without charging
Trailer 3	Custom cable trailer

If you require a part that is not included on this accessories sheet including ERGL, Wind Cone or Sign mounting accessories or replacement parts, please contact info@carmanah.com for support.

PIONEERS IN SOLAR AIRFIELD GROUND LIGHTING
CONTINUING TO LEAD THROUGH INNOVATION

601|1999
A702|2004
carmanah®
A704*|2014 A704-VL|2015
A601|2004 A704-5|2005
A650|2011 wireless
A703|2012
A704-5 v2|2007
A650|2009 A704-H|2012

With more than 300 site installations, Carmanah is the most widely installed solution in the solar airfield industry. Our products are deployed at Military Bases, International and Domestic Airports, Helipads and Private Airfields in Africa, Asia, Australia, Europe, North America and South America.

Carmanah Airfield Installations

- Afghanistan
- Algeria
- Angola
- Aruba
- Ascension Island
- Australia
- Bahamas
- Bahrain
- Barbados
- Bonaire
- Brazil
- Canada
- Chad
- Chile
- China
- Colombia
- Costa Rica
- Croatia
- Cyprus
- Djibouti
- Dominican Republic

- Ecuador
- Equatorial Guinea
- France
- Greece
- Guyana
- India
- Iraq
- Ireland
- Italy
- Japan
- Jordan
- Kuwait
- Malaysia
- Micronesia
- New Zealand
- Nicaragua
- Nigeria
- Panama
- Peru
- Qatar
- Saba

- Saint Maarten
- Singapore
- South Africa
- Spain
- Sri Lanka
- St. Eustatius
- Switzerland
- Taiwan
- Tanzania
- Thailand
- Trinidad
- Turkey
- Turks & Caicos
- Uganda
- United Arab Emirates
- United Kingdom
- United States
- Uruguay
- Venezuela
- Zambia

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