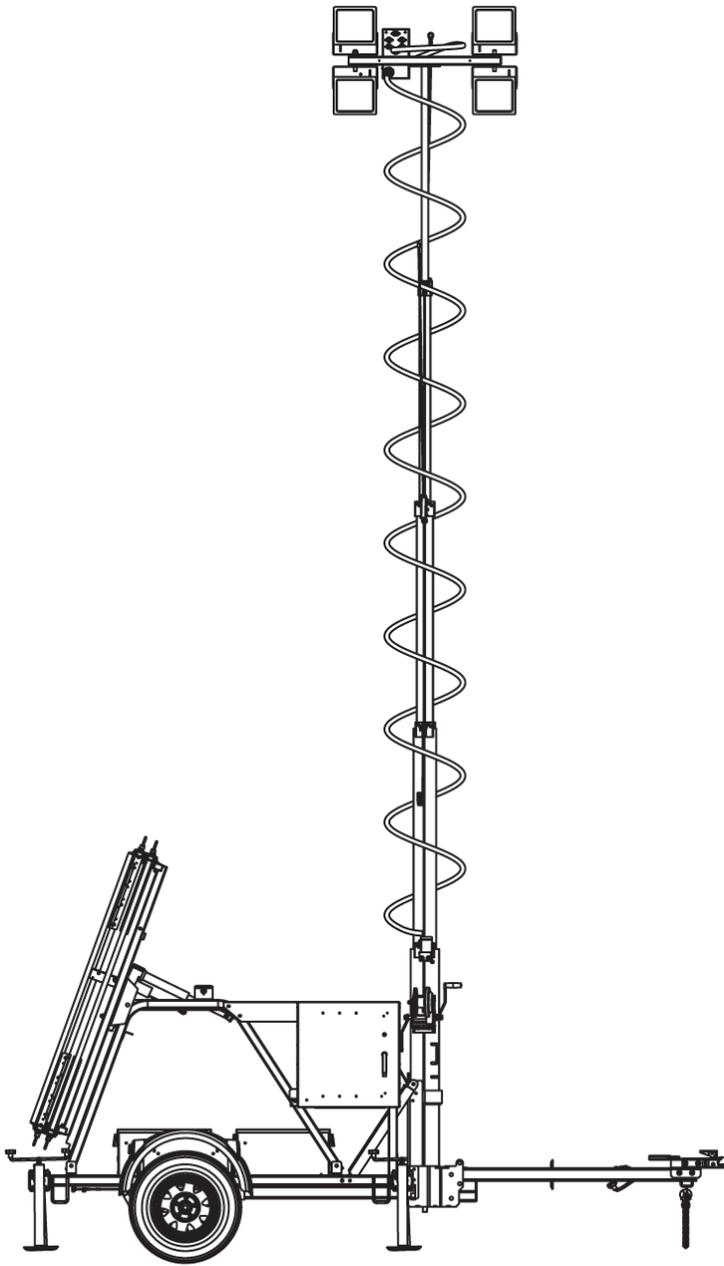




WSD-1034
2 2024

PROGRAMMABLE SOLAR LIGHT TOWERS

MODEL WLTS-MM
PRODUCT SPECIFICATIONS | FEBRUARY 2024



1. SYSTEM

- 1.1. Description
- Wanco® Programmable Solar Light Towers provide LED lighting on a versatile platform. Unique features include ultra-bright LED lighting, a highly efficient power system, and variable programmability for autonomous operation.
- Four high-efficiency, high-output, dimmable light fixtures top a telescoping tower. Lights can be aimed individually without tools, and operate at any height. The vertical tower rotates nearly 360 degrees without lowering the lights. A winch and cables raise and lower the tower smoothly and easily.
- Power is provided by batteries, which are charged by an automated solar charging system. The state-of-the-art solar power system uses the latest technology to ensure the greatest possible charging capacity and longest run times. The solar panel array tilts from horizontal to nearly vertical to optimize charging year-round.
- The control system uses a touchscreen interface for manual and automatic on/off control of the lights. Advanced programming options include individual light control, and flexible scheduling by time, day, and calendar date. Manual control is achieved with a single button on the main screen. Multilevel password protection can be enabled or disabled.
- 1.2. Models
- 1.2.1. WLTS-MM-800 Programmable solar light tower with 800-watt solar array, 400 amp-hour battery bank
- 1.2.2. WLTS-MM-1600 Programmable solar light tower with 1600-watt solar array, 800 amp-hour battery bank
- 1.3. Temperature limits
- | | |
|-----------|----------------------------|
| Operating | –40 to 122°F (–40 to 50°C) |
| Storage | –40 to 158°F (–40 to 70°C) |

2. FEATURES

- 2.1. Setup
- Portable trailer is easy to tow and deploy
 - Four leveling jacks provide stability
 - Tilting drawbar folds up for smaller footprint for storage and when deployed
 - Light fixtures tilt and rotate independently and hold their position without tools
 - Single winch raises and lowers the tower smoothly and easily
 - Dual electric actuators tilt solar array to any angle from horizontal to nearly vertical
 - Telescoping tower rotates nearly 360 degrees, reducing the need to move the trailer
 - Lights operate at any height
- 2.2. Operation
- Full-color touchscreen controller with high-resolution display
 - Control four LED light fixtures individually or all together
 - Turn lights on or off with a single button
 - Programmable automatic on/off with brightness control and time-day-date schedule
 - Weather-resistant control box cover has lockable three-point latch
 - Smart digital battery monitor for viewing the most useful power information
 - Bluetooth® power management app for mobile devices

- 2.3. Power system
 - Battery powered and solar charging
 - Energy-efficient operation with ultra-fast MPPT solar charging
 - Solar panels charge batteries automatically without intervention
 - Charging system varies power input as needed to keep batteries fully charged, preventing damage and prolonging battery life
 - Power system allows battery charging with solar panels or commercial power
 - Low-voltage-disconnect circuit shuts down power if battery voltage drops below setpoint, preventing damage to batteries and electronics
 - Maintenance-free AGM batteries require no access
 - Battery box cover is bolted closed to deter tampering
 - Control panel includes master power switch for power shutoff during servicing

- 2.4. Maintenance
 - All-welded structural steel frame ensures durability and long life
 - Durable powder-coat finish resists the elements
 - Standard trailer tires
 - Bolt-on fenders can be replaced if damaged
 - LED taillights

- 2.5. Application

Common applications include:

 - Parking lots
 - Special events
 - Construction sites
 - Material staging areas
 - Freight yards
 - Security operations/checkpoints

3. LIGHTS

- 3.1. Description

Four high-efficiency dimmable LED light fixtures
- 3.2. Standards

IP67
 IEC protection: Safety Class I
 CE certified
 EU RoHS compliant
- 3.3. Luminous flux

	100% brightness	50% brightness
800 model	23,232 lumens per fixture 92,928 total lumens	12,818 lumens per fixture 51,272 total lumens
1600 model	32,045 lumens per fixture 128,180 total lumens	16,022 lumens per fixture 64,088 total lumens
- 3.4. Light color

5000K
- 3.5. Field angle

60 degrees

3.6. Photometrics

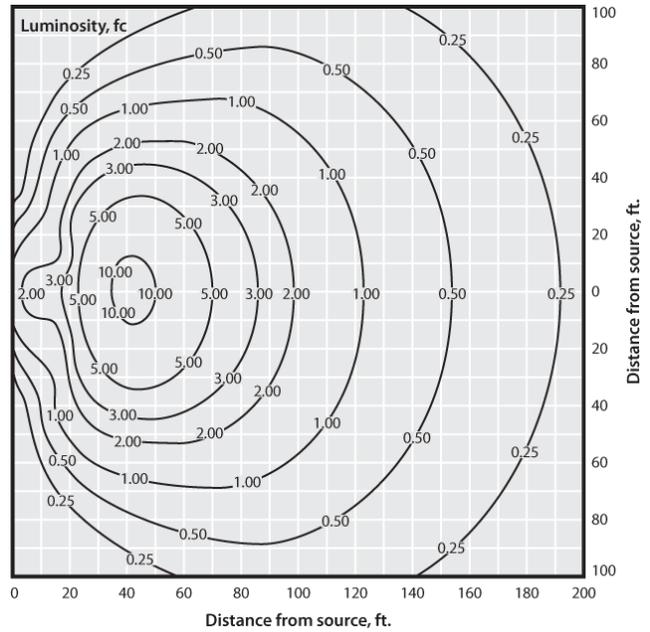
3.6.1. Coverage area Total coverage at 0.5 foot-candles or greater with lights at 100% brightness and fixtures tilted 15° down from vertical:

800 model 21,325 sq ft (1980m²)
 0.4895 acres

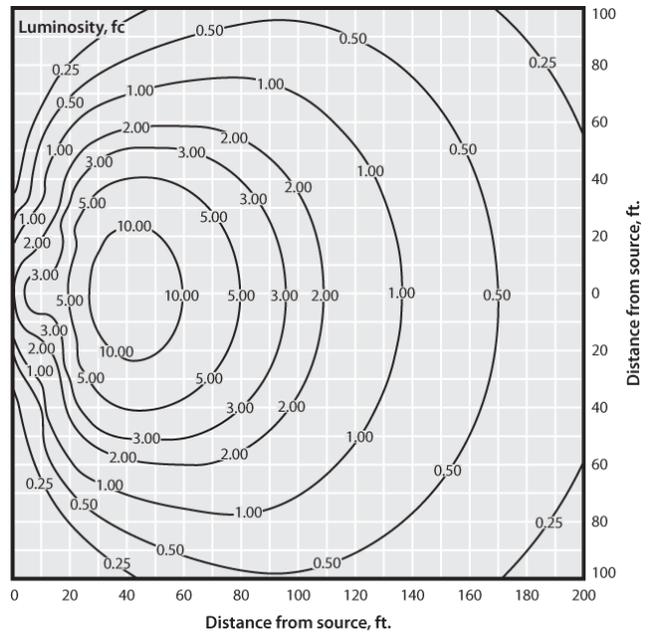
1600 model 26,510 sq ft (2460m²)
 0.6086 acres

3.6.2. Isolines

800 model



1600 model



3.7.	LED lifetime	50,000 hours	
3.8.	Power draw	800 model	160W @100% brightness
		1600 model	200W @100% brightness
3.9.	Input voltage	24Vdc	
3.10.	Input current	800 model	6.7A max.
		1600 model	8.3A max.
3.11.	Polarity protection	Reverse voltage up to 45 Vdc	
3.12.	Temperature limits	Operating	-40 to 122°F (-40 to 50°C)
		Storage	-40 to 158°F (-40 to 70°C)
3.13.	Fixture material	Black aluminum housing	
		Clear polycarbonate lens	
3.14.	Fixture size	800 model	9.5 x 8.7 x 3.9 in. (240 x 220 x 98 mm), W x H x D
		1600 model	9.5 x 10.4 x 3.9 in. (240 x 265 x 98 mm), W x H x D
3.15.	Mounting brackets	Each light fixture installed on a swivel bracket	
		Bracket allows light to rotated and tilted without tools; friction and tensioning hold lights in place	
3.16.	Weight	11.0 lb (5.0kg)	

4. CONTROL SYSTEM

4.1.	Control box		
4.1.1.	Function	Weatherproof control box contains system electronics	
4.1.2.	Location	Securely fastened to uprights behind tower on right side of trailer	
4.1.3.	Size	24 x 25 x 10 in (610 x 635 x 254 mm), W x H x D	
4.1.4.	Material	12 ga 5052-H32 aluminum sheet	
4.1.5.	Door	Hinged door panel with rotating handle and three-point latch	
		Door is hinged on the right and opens fully; a telescoping prop-slide holds door open	
		Handle can be locked with user-supplied padlock for added security	
4.1.6.	Finish	Control box and door are coated with oven-baked, equipment-white powder-coat finish to ensure durability and corrosion protection. Assemblies are run through a five-stage, high-pressure phosphate-wash prior to application of the finish coat.	

- 4.2. Control panel
 - 4.2.1. Touchscreen
 - Function Control and monitor lights and system settings
 - Display
 - Full color, backlit 7-inch display
 - Capacitive touch panel
 - 800 x 480 pixels, W x H
 - Display automatically shuts off after 10 minutes of inactivity; screen timeout delay is configurable
 - Interface Graphical interface, operated with virtual buttons on the touchscreen display, provides control of lights and various system settings
 - 4.2.2. Battery monitor
 - Smart digital battery monitor with LCD display provides:
 - Battery voltage
 - Current and power to batteries (solar charging)
 - Current and power from batteries (power draw)
 - Amp-hours consumed
 - Battery state of charge/SoC (remaining power)
 - Approximate battery time remaining with lights on
 - Built-in Bluetooth for enhanced local monitoring
 - See “Options and Optional Equipment” for remote power monitoring options
 - 4.2.3. Power disconnect
 - Master power switch disconnects battery and solar charging, for use during servicing
 - 4.2.4. Serviceability
 - Hinged control panel folds down for access to connections and electronics
 - Two plunger panel latches easily fasten or release panel; a rubber bumper supports panel when down
- 4.3. Compass
 - Removable compass stored on interior of door for use when positioning trailer to optimize solar charging
 - Compass attached to door with lanyard
- 4.4. PC boards
 - 4.4.1. Coating
 - 100% coated with military-spec, low-VOC, silicone conformal coating to provide long-term protection against moisture and other atmospheric contaminants. Resists corrosion and shorts due to high humidity.
 - 4.4.2. Temperature limits
 - Operating -40 to 176°F (-40 to 80°C)
 - Storage -40 to 185°F (-40°C to 85°C)
 - 4.4.3. Humidity limits
 - Conformal coating rated to 95% relative humidity

- 4.5. Solar charger
 - 4.5.1. Description Smart maximum power point tracking (MPPT) solar controller regulates solar charging
 - 4.5.2. Features
 - Ultra-fast MPPT
 - Optimizes solar energy harvest and battery charging even with partial solar shading
 - Exceptional conversion efficiency exceeds 98%
 - Improves energy harvest up to 30% over PWM charge controllers
 - Automatic battery voltage recognition
 - Built-in Bluetooth for enhanced local monitoring
 - External battery voltage, temperature and current sensing via Bluetooth
 - 4.5.3. Current
 - 800 model 35A rated charge current
 - 1600 model 70A rated charge current
 - 4.5.4. Voltage 150Vdc max. PV open circuit voltage
 - 4.5.5. Protection
 - Over-temperature protection and power derating when temperature is high
 - PV short circuit and PV reverse polarity protection
 - PV reverse current protection
 - Three high-current circuit breakers protect solar and charging system in lieu of fuses, installed on DIN rail behind control panel
- 4.6. Programmability
 - Use the touchscreen controller for controlling the lights with virtual buttons and keyboards, providing:
 - Individual and linked light control
 - Manual on/off control
 - Automatic on/off by ambient light, time of day, motion detection
 - Manual and automatic dimming from 10% to 100% of full brightness
 - Advanced day and date scheduling
 - Control system configuration

- 4.6.1. Main screen
- Shows current date, time, and controller software version
 - Clearly displays current and next (future) status of each light including on/off state, brightness, and on/off control mode: timer, sensor, or manual
 - Displays quick-select button for switching all lights off if any are on, or all lights on from dusk to dawn at 50% brightness; quick-select button can be enabled or disabled (hidden) in settings
 - Displays active alarms and warnings if any; alert symbol is green with no alerts and orange with active alerts; pressing the symbol accesses the Alarms and Warnings screen
 - Displays buttons for accessing system information and settings
 - Displays button for system login (password entry); password protection can be enabled or disabled in settings
- 4.6.2. Light settings
- Light settings screen clearly displays current light settings alongside buttons for changing and programming on/off functions
 - Link or unlink lights for setting operation conditions for all lights at once, one at a time, or in any combination
 - Manually switch lights on and off
 - Manually control light brightness
 - Create, view, enable, and disable programs for automatic on/off operation
 - Save or cancel all changes to light settings
 - Reset light settings to factory default
- 4.6.3. Programs and scheduling
- Three separate programs can be independently configured, activated, deactivated, and cleared
 - Programs use internal real-time calendar and clock with DST control
 - Independent on and off settings for each light or any combination of lights
 - Set each program to run on specific calendar dates, or from a selected start date until a selected end date, or with no specified dates
 - Set programs to run one or more days of the week in any combination; each day can be selected independently
 - Set multiple programs to run simultaneously; failsafe protection keeps lights on when active programs conflict

- 4.6.4. Lights on options Programs include user-selected triggers to switch lights on automatically, including:
- Dusk Lights on at dusk based on ambient light detected by system photocell sensor
 - Time of day Lights on at user-specified time of day based on control system internal clock
 - Sunset Lights on at sunset or user-selected number of minutes before sunset; variable sunset time of day is calculated using control system location
 - Delay after dusk Lights on at user-selected number of minutes after dusk based on ambient light detected by system photocell sensor
 - Motion Lights on when motion detected by user-installed motion sensor device
- 4.6.5. Lights off options Programs include user-selected triggers to switch lights off automatically, including:
- Dawn Lights off at dawn based on ambient light detected by system photocell sensor
 - Time of day Lights off at user-specified time of day based on control system internal clock
 - Delay after dusk Lights off at user-selected number of hours after dusk based on ambient light detected by system photocell sensor
- 4.6.6. Information screen Includes buttons for viewing:
- Alarms and warnings
 - System time and date
 - System location
 - System IDs and versions
 - System photocell and temperature values
- 4.6.7. System settings
- Devices Provides access to user-configurable settings for auxiliary devices and touchscreen controller
Provides access for user to allow/disallow remote control of lights (remote on/off control only)
 - Time and date Provides access to set and change system time and date
Includes automatic or manual Daylight Saving Time switching with built-in time zone selection

Location	Provides access to set or override system location by entering GPS coordinates or by choosing a city (North American cities only) When the control system is equipped with a compatible GPS modem, system location is automatically set but can be overridden by user settings
Communications	Provides access modem settings
Passwords	Provides access to enable/disable password protection When enabled, two levels of system control: basic controls including light settings, and full access to all system functions
Low-voltage disconnect	Provides service access for managing low-voltage-disconnect threshold values

5. TRAILER

- 5.1. Frame
 - 5.1.1. Construction All welded structural steel
 - 5.1.2. Tie-downs One on each corner of frame
 - 5.1.3. Forklift pockets Heavy duty all-welded forklift guides located at front of trailer

Forking requires drawbar to be folded up
 - 5.1.4. Hoist rings Three lifting rings allow for three-point crane hoisting
 - 5.1.5. Finish Oven-baked, black powder-coat finish, applied prior to assembly to ensure durability and corrosion protection. Assemblies are bead-blasted and then run through a five-stage, high-pressure phosphate wash prior to finish coat.
- 5.2. Fenders Round, full wheel coverage, bolted to trailer frame, removable and replaceable
- 5.3. Axle assembly 3500 lb (1588kg) capacity, 5 on 4.5" B.C. idler hub
- 5.4. Springs Double-eye leaf springs
- 5.5. Tires ST205/75D15 steel-belted trailer tires
- 5.6. Drawbar
 - 5.6.1. Construction Hinged on bracket welded under trailer frame. Folds up for shipping and storage when needed. Secures up or down with a single locking pin.
 - 5.6.2. Material 3" (7.62cm) square steel tubing, 3/16" (0.476cm) wall
 - 5.6.3. Jack Swivel jack with heavy-duty caster wheel, 2000 lb (907kg) capacity, welded-tube mount with retention pin

- 5.6.4. Tow hitch
Standard 2-inch ball coupler tow-hitch, SAE Class 2, 3500 lb (1588kg) capacity. Bolts to drawbar, removable and replaceable.
See "Options and Optional Equipment" for tow-hitch options.
- 5.6.5. Tow chains
Two high-test proof coil chain assemblies with "latching" clevis slip hooks for towing. Chains attached to tongue with quick-link connectors.

Material diameter	0.406" (10.3mm)
Working load limit	5400 lb (2450kg)
Breaking force	16,200 lb (72kN)
- 5.7. Stabilizer jacks
Four swivel jacks, each with spring-loaded lock pin and 2000 lb (907kg) capacity, mounted with snap-rings at corners of trailer frame
- 5.8. Wiring
 - 5.8.1. Description
Wiring to connect tow vehicle and trailer for trailer taillights is installed inside drawbar with pigtails and connectors at both ends; no crimping required
 - 5.8.2. Trailer plug
A sealed, molded, 4-square connector plugs into harness under trailer
 - 5.8.3. Tow-vehicle plug
Two-piece assembly with 4-flat molded connector on harness plugs into tow vehicle
Meets SAE J1239
See "Options and Optional Equipment" for tow-vehicle plug options
 - 5.8.4. Protection
All trailer wiring encased in UV protective sleeve, and attached with P-clamps riveted to trailer frame; no exposed wires
- 5.9. Taillights
Two oval-shaped, sealed, LED, combination stop, turn and taillights integrated with fenders
- 5.10. License plate
Lighted license plate holder is mounted to rear of trailer frame
- 5.11. Reflectors
Red and white conspicuity tape in critical areas
- 5.12. Tower assembly
 - 5.12.1. Function
Lights are raised and lowered on a telescoping vertical tower
 - 5.12.2. Tower construction
Five sections, four square steel tubing and one round section, each with a successively smaller circumference, telescope inside the adjacent section below it. Each section is supported by a single cable that loops under it inside the next larger tower section.
Nylon guide blocks keep the sections tight, eliminating the need for greasing the tower and preventing dirt from building up on the inner tower section. Dirt would cause performance problems and maintenance issues.
 - 5.12.3. Swivel base
A steel tubular weldment is bolted to the trailer frame. The bottom tower section rotates on a thrust bearing and washers inside the swivel base, reducing rotating friction.

- 5.12.4. Lights crossbar Crossbar supports four light fixtures during operation and transport
- 5.12.5. Finish All tower sections are treated for corrosion resistance
- 5.12.6. Height At fully deployed height, 24.5 ft (7.97m) from ground to top of tower
See "Options and Optional Equipment" for taller tower option
- 5.12.7. Wiring Electrical cable for lights enclosed in durable, coiled Nycoil® cable conduit attached to tower; extends with raised tower and returns fully to coil when tower is telescoped down
- 5.12.8. Winch assembly Function Hand-operated winch raises and lowers tower
Capacity 1500 lb (680kg)
Brake Safety friction-brake prevents tower from falling should operator lose grip on winch handle
Cable 1/4" (6.35mm) diameter galvanized aircraft cable
- 5.12.9. Rotation Tower assembly rotates by hand, pivoting nearly 360 degrees; tower includes handle for gripping while rotating
- 5.12.10. Tower lock Single tension-lock secures tower rotation

6. **POWER SYSTEM**

- 6.1. Description Lights powered by batteries, which are charged automatically with integrated solar charging system
See "Options and Optional Equipment" for power system options
- 6.2. Battery box
 - 6.2.1. Function Holds batteries, power shunts, and battery charger
 - 6.2.2. Construction Riveted all-steel construction, cover is bolted in place
Four vents with filters provide ventilation
Covered inlet receptacle on back of battery box for AC charger
 - 6.2.3. Finish Cabinet panels are coated with oven-baked, white powder-coat finish, applied prior to assembly to ensure durability and corrosion protection. Parts are run through a five-stage, high-pressure phosphate wash prior to application of the finish coat.
 - 6.2.4. Location Centered between fenders, bolted to trailer frame

6.3. Batteries

- | | | |
|--------|------------------------------|---|
| 6.3.1. | Description | 4D AGM batteries, wired in parallel and series for a 24-volt system |
| | | 800 model Four batteries in one battery box |
| | | 1600 model Eight batteries in two battery boxes |
| 6.3.2. | Features | 100% maintenance-free
Sealed and spill-proof
Faster recharge and greater freeze resistance than conventional batteries |
| 6.3.3. | Voltage | 12Vdc each |
| 6.3.4. | Weight | 120 lb (54.4kg) each |
| 6.3.5. | Capacity | 800 model 400 Ah total

Approximate run time, batteries only (no solar charge):
Lights at 50% brightness, 25 hours
Lights at 100% brightness, 10 hours |
| | | 1600 model 800 Ah total

Approximate run time, batteries only (no solar charge):
Lights at 50% brightness, 35 hours
Lights at 100% brightness, 13 hours |
| 6.3.6. | Voltage monitoring | Power shunt calculates remaining power capacity to provide accurate battery-bank state of charge (SoC)

Monitors power going into the battery bank from solar and AC charging, power drawn from the battery bank by the lights, and battery temperature using a temperature sensor inside the battery box

See "Options and Optional Equipment" for remote power monitoring options |
| 6.3.7. | Low-voltage disconnect (LVD) | To protect batteries from full discharge, the LVD system automatically shuts down power when battery voltage drops to preset level, and re-engages power when battery charge returns to optimum

Lights pulse on and off as a visible notification of LVD shutdown; duration of pulsing is configurable |
| 6.4. | Remote charger | |
| 6.4.1. | Function | Plugs into a standard AC power source to manually recharge batteries

A single charger is configured to charge all batteries |
| 6.4.2. | Type | 24-volt 3-stage smart battery charger |

6.4.3.	Location	Inside battery box, mounted to side panel on opposite side of divider from batteries Covered inlet receptacle on back of battery box for connecting to power without accessing battery box interior	
6.4.4.	Output capacity	50A	
6.4.5.	Output voltage	26 to 33 Vdc	
6.4.6.	Input voltage	108 to 132Vac, standard NEMA 5-15P three-prong plug	
6.4.7.	Input current	14A max.	
6.4.8.	Input receptacle	Standard NEMA 5-15R 15A receptacle with ground	
6.4.9.	Cooling	Automatic fan cooling	
6.4.10.	Protection	Reverse polarity protection, automotive style replaceable fuses	
6.5.	Solar		
6.5.1.	Panels	High-efficiency monocrystalline photovoltaic modules with half-cut heterojunction bifacial cell technology	
		800 model	Two fixed-position panels mounted to tilt-frame
		1600 model	Two fixed-position panels mounted to tilt-frame Two sliding panels mounted to tilt-frame below fixed-position panels
6.5.2.	Panel slides (1600 model only)	Panels slide in and out manually in rigid, low-friction channels Channel assemblies have no moving parts to wear or fail Mechanical stops ensure panels cannot extend out of channels Each panel is secured with dual locking pins when fully extended or contracted	
6.5.3.	Tilt-frame	Solar array installed on tilt-frame above battery box/boxes. Entire solar array can be tilted using dual electric actuators, controlled with momentary switch on control panel. The angle range is 0 to 70 degrees up from horizontal. Optimal charging results from tilting solar array depending on the season; 0 degrees or horizontal with sun overhead during summer months, then angled up (latitude plus 15 degrees) with sun lower in the sky during winter months.	
6.5.4.	Power output	800 model	800W
		1600 model	1600W

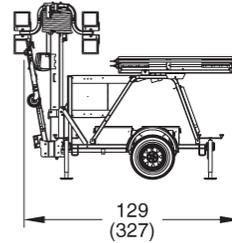
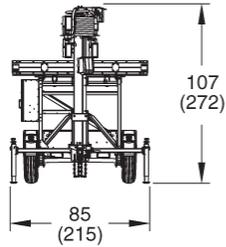
6.5.5. Current	800 model	9.5A max. system current 10.3@24V open short-circuit current
	1600 model	19A max. system current 20.6@24V open short-circuit current
6.5.6. Voltage		84.0Vdc max. system voltage 97.6Vdc open short-circuit voltage
6.5.7. Efficiency		21.6%
6.5.8. Regulation		Solar power input regulated by control system
6.5.9. Security		Solar panels attached to frame with security screws

7. DIMENSIONS & WEIGHT

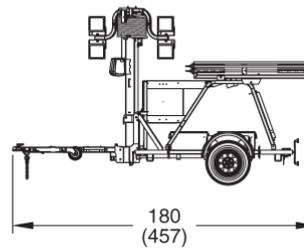
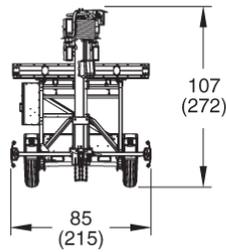
7.1. Dimensions

*inches
(cm)*

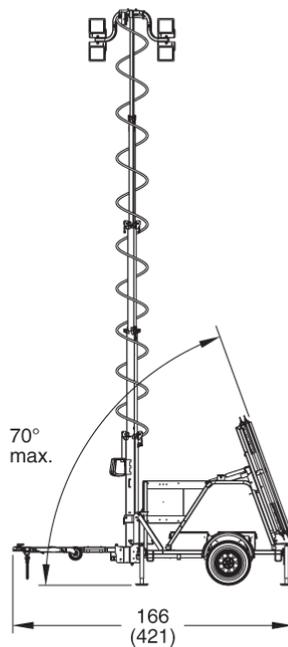
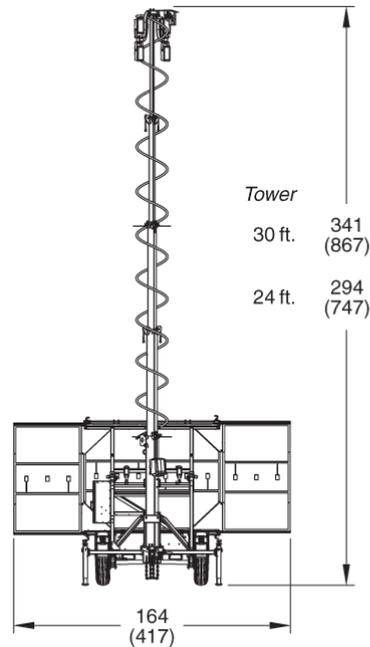
Storage position



Travel position



Deployed



7.2. Weight

800 model Approx. 2100 lbs. (953 kg)

1600 model Approx. 2900 lbs. (1315 kg)

8. OPTIONS AND OPTIONAL EQUIPMENT

8.1. Transport options

- 8.1.1. Tow hitch Lunette ring for pintle hook, 3" ID x 1 5/8" cross-section replaces standard ball hitch
- 8.1.2. Tow-vehicle plug Many types of plugs available, prewired at the factory; contact factory for details
- 8.1.3. Spare tire Spare tire/wheel and carrier installed on solar support frame
- 8.1.4. Wheel chocks Two rubber chocks with carry basket installed on solar support frame

8.2. Functional options

- 8.2.1. Tower 30 ft (9.1m) tower replaces standard tower

At fully deployed height, 28 ft 5 in (8.67m) from ground to top of tower

Power-operated winch replaces manual winch for raising and lowering tower

Adds momentary switch to control panel for up/down operation; Includes manual winch handle for use in the event of system power failure
- 8.2.2. Flashing beacon Flashing blue presence light at top of tower increases awareness of light tower

Can be powered on or off with light tower controller

8.3. Power system

- 8.3.1. Hybrid power Adds backup power to 1600 model by replacing second battery box with diesel genset

Diesel engine automatically charges batteries when they reach a set state of charge level, extending run time and autonomous operation

Eco-friendly features include sound-attenuated engine enclosure and exhaust, and integrated fluid containment

Includes Deluxe power management package described below

Specifications for this option are provided in a separate document

- 8.3.2. Deluxe power management**
- Provides real-time power performance information for monitoring, managing, and optimizing the power system
 - Cloud-based service provides remote power management online via internet browser, 5-year cellular service plan included
 - Web-based portal provides remote on/off control of lights with real-time feedback, and remote power management via internet and cellular connection
 - Mobile app provides enhanced local power management via Bluetooth when within range of light tower
 - Interactive touchscreen interface on control panel allows local power management (replaces standard battery monitor)
 - View live and historical data
 - View actual GPS location of light tower and real-time weather conditions
 - Set alerts and alarms to portal and user email accounts
- 8.3.3. Basic power management**
- Provides snapshot view of the same power data and performance history as the Deluxe package
 - Cloud-based service provides remote power management online via internet browser, 5-year cellular service plan included
 - System connects briefly and uploads data at 15-minute intervals (live data not available)
 - Mobile app provides remote power management within Bluetooth range of light tower
 - View recent and historical data (live data not available)
 - View approximate light tower location based on GPS of nearest cell towers
- 8.4. Asset tracker**
- Wanco Asset Tracker provides location tracking information and more, viewed remotely using Wanco Fleet Manager
 - Includes Wanco Fleet Manager, a web-based service for managing Wanco equipment
 - View GPS location (longitude and latitude) and geofencing on interactive Google map
 - View equipment battery voltage, including voltage history
 - View location history—hourly updates, up to 50 locations
 - Get email or text notifications for low voltage and geofence violations