

WW400

Vehicle Detection, Warning and Alert System Data Sheet



An intelligent system that uses a combination of radar and HD video camera technologies to accurately detect, record and send alerts of wrong-way incidents, while triggering high-intensity flashing lights to warn drivers:

- ✓ Thoroughly tested for reliability and accuracy: field-tested to **99.96%** accuracy out of **124,000** events
- ✓ Configurable radar and video settings to meet requirements of each ramp or roadway
- ✓ Highest LED intensity output in the industry
- ✓ Cellular and Ethernet connectivity options for remotely programming and monitoring from a distance
- ✓ Scalable design: multiple signs can be added with synchronized flashing
- ✓ Customizable video package and alerts

Wrong-way vehicle detection systems are up to **80% effective in stopping wrong-way drivers***.

Superior Detection and Alert Technology

The system monitors highway ramps 24 hours a day for traffic traveling in the wrong direction without interfering with other traffic detection systems.

Dual technology allows for increased accuracy of detecting wrong-way events. The WW400 utilizes two types of detectors—a single radar unit and two high-definition cameras—to ensure the accuracy of a wrong-way event. When the radar unit detects a wrong-way vehicle, the system simultaneously triggers the LED warning beacons or signs and activates the cameras and video analytics.

The system uses advanced image-processing algorithms to process the video and confirm whether the vehicle self-corrected or continued traveling the wrong way, and sends alerts accordingly to the traffic management center (TMC).

This intelligent system provides a higher level of accuracy during the day, night and all weather conditions.

Alert Notification

Whether the wrong-way vehicle self-corrects or continues, the WW400 compiles an event package containing a configurable sequence of images and other data. The data is then transmitted to the TMC.

Configurable Setup and Monitoring

Users can configure the size, placement and quantity of the detection zones. Cellular and Ethernet connectivity options can be used for programming and monitoring and an included application programming interface (API) allows system integration with traffic management software.



**WW400D
Detector Unit**

**WW400S
Warning Sign Unit**



**MUTCD
compliant**



**Buy America
compliant**



**3-year limited
warranty**



**Solar-sized for
every location**

Nevada DOT, [Wrong Way Driver System](#), preliminary research press release.

WW400

Vehicle Detection, Warning and Alert System Data Sheet

1.844.412.8395 | traffic@carmanah.com | carmanah.com



1 DETECT

Radar unit detects an incoming wrong-way vehicle.

2 WARN

Flashing warning lights activated.

3 CAPTURE & CONFIRM

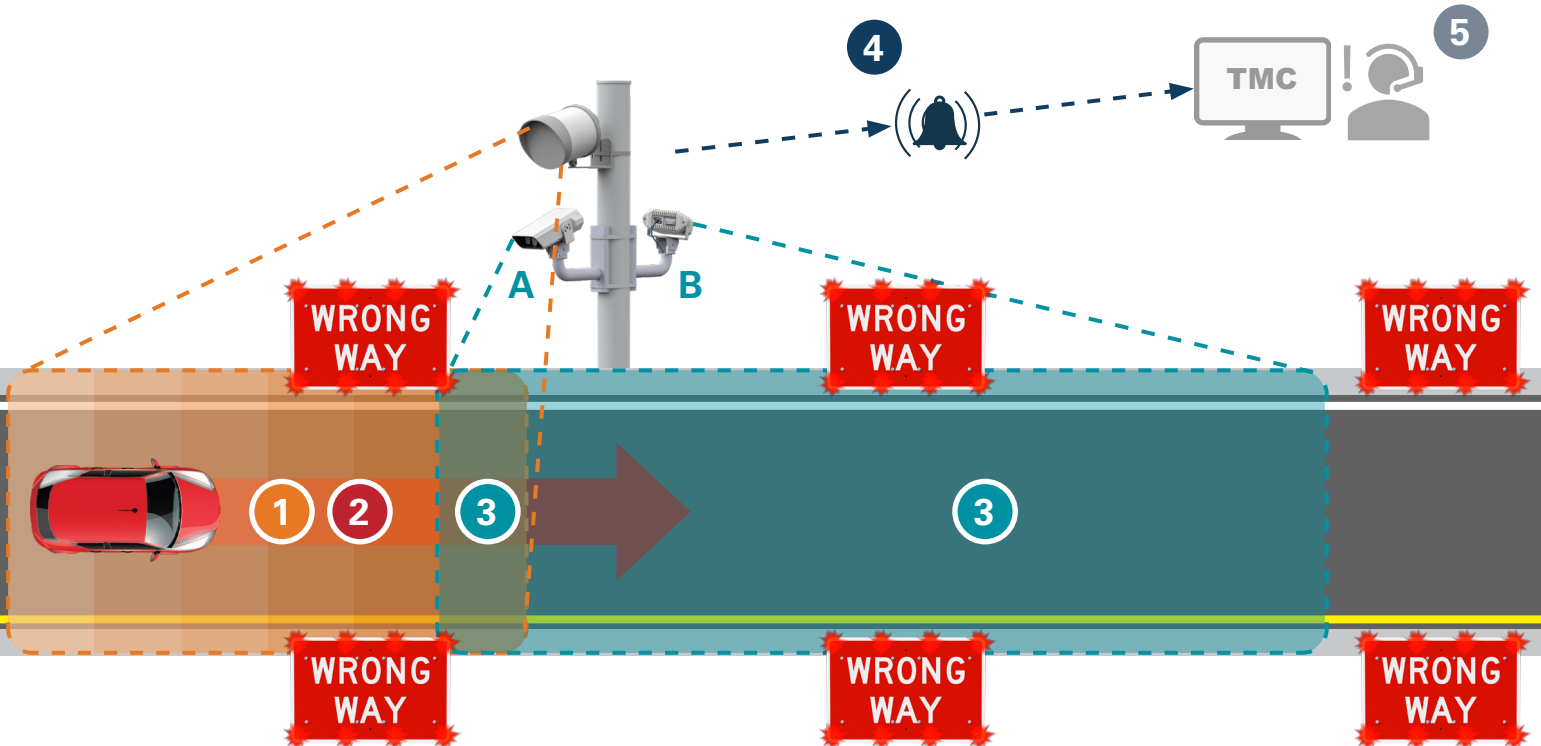
Video analytics confirm whether the vehicle stopped or continued to travel in the wrong direction.

4 ALERT

Event package sent and alerts triggered.

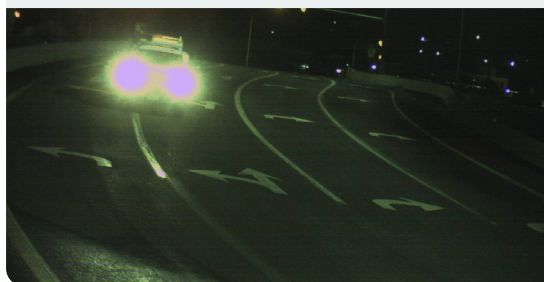
5 REVIEW

Human reviews event and responds.



Configurable Setup

The WW400 supports setup and configuration of detection zones. Users can configure detection zone size, placement and quantity, as well as set up cut-off boundaries to avoid the detection of non-wrong-way vehicles.



Alerts and Monitoring

The WW400 sends an alert comprised of a configurable sequence of IR and color images, video and other associated data. Users can also remotely monitor system performance and wrong-way event data such as frequency, time periods and more.



WW400D Detector Unit

Vehicle Detection, Warning and Alert System Data Sheet

1.844.412.8395 | traffic@carmanah.com | carmanah.com



WW400D DETECTOR SPECIFICATIONS

Detection	24 GHz radar unit detects wrong-way vehicle
	High-definition cameras use on-board analytics to confirm radar unit reading
	Radar and cameras monitor all ramp lanes including shoulders
	Radar and infrared camera technology for accurate detection at night and in adverse weather conditions
	Meets NEMA TS2-2016, 6.5.2.17 requirements for vehicle presence detection system performance
Notifications	Multiple, progressive radar detection zones
	600 ft (183 m) effective range
Connectivity	Dual technology confirmation dramatically reduces false-positive alerts
	Sends a notification evidence package containing a sequence of images, color and infrared video and an .xml file with other event data
	User-configurable time segments before and after wrong-way driver event Example configuration: 10 seconds before and after wrong-way event
Detection Controller	Included API for integration into existing traffic management software
	Supports local and remote programming
Power Draw	Dry contact closure and on-board radio triggers warning unit lights to flash
	Controls multiple warning sign units
Power System	Quad-core ARM processor
	Linux operating system
Cabinet Construction	Non-volatile memory storage
	Restarts autonomously after power interruption
Environmental	4 Ethernet ports, 1000 baseT
	2 X 802.3af PoE ports, 1 X 24 V (non-standard)
Warranty	1.55 A @ 24 VDC power use
	< 40 W
Warranty	Solar or AC-powered
	Weatherproof, gasketed enclosure with vents for ambient air transfer (NEMA 3R)
Warranty	Lockable, hinged door with #2 lock
	Optional padlockable latch
Warranty	Corrosion-resistant aluminum with stainless steel hardware
	Prewired to minimize installation time
Warranty	-40 to 140° F (-40 to 60° C) system and battery operating temperature
	3-year limited warranty

HIGH-DEFINITION CAMERA SPECIFICATIONS

Video and Image Capture	1.0 GHz quad-core ARM processor
	1920x1080 video resolution 30 frames per second (FPS) H.264 video compression
Dimensions	Camera integrates color and infrared sensors
	Near-infrared illuminator LEDs allow for nighttime images and recording without an external illuminator
Dimensions	8.3" L x 4.8" W x 2.0" H (211 mm x 121 mm x 51 mm)

RADAR SPECIFICATIONS

Radar	7 selectable frequency channels at 24 - 24.25 GHz
	Beam angle: Azimuth ±15 degrees out to 600 ft
	Operates with FSK-4 mode
Dimensions	FCC 15.107 and 15.109 Class A radiated and conducted emissions compliance
	FCC part 15 low-power radar device
Dimensions	10.5" L x 8.5" W x 7" H (267 mm x 216 mm x 178 mm)

Specifications subject to local environmental conditions, and may be subject to change.

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

"Carmanah" and Carmanah logo are trademarks of Carmanah Technologies Corp.

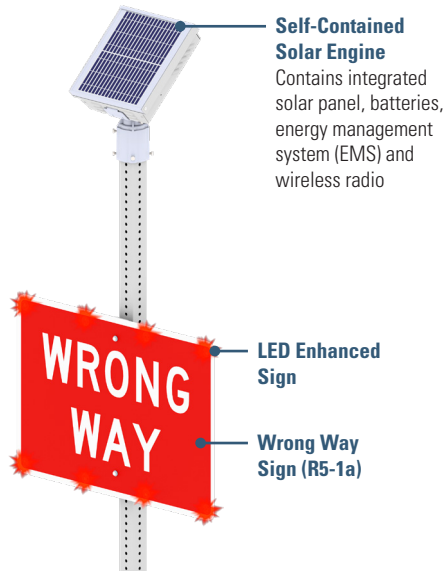
© 2022, Carmanah Technologies Corp.

Document: Carmanah_DATA_WW400_RevC

WW400S Warning Sign Unit

Vehicle Detection, Warning and Alert System Data Sheet

1.844.412.8395 | traffic@carmanah.com | carmanah.com



Self-Contained Solar Engine
Contains integrated solar panel, batteries, energy management system (EMS) and wireless radio

LED Enhanced Sign

Wrong Way Sign (R5-1a)

SOLAR ENGINE MOUNTING

2.0" - 2.5" Perforated Square Pole Mount 2.38" - 2.88" Diameter Round Pole Mount 3.5" - 4.5" Diameter Round Pole Mount Side Pole Mount



SOLAR ENGINES



Compact, 15w integrated solar engine

Large, 30w integrated solar engine

Cabinet-based, 20w, 50w, and 80w solar and AC systems

LED ENHANCED WRONG WAY SIGN

R5-1a



36" x 24"
(914 mm x 610 mm)



42" x 30"
(1067 mm x 762 mm)

MUTCD Chapter 2B compliant, R5-1a layout
3M Diamond Grade DG3 retroreflective sheeting, 4092 red
8 red LEDs
36" and 42" sign sizes

On-Board User Interface (OBUi)	Adjustable system settings with auto-scrolling LED display on our latest EMS
	System test, status, and fault detection: battery, solar, button, beacon, radio, day/night
	Flash patterns: RFB (WW+S), RFB1 (WW+S legacy), RFB2 (WSDOT), 0.5 sec. alternating (MUTCD), 0.5 sec. unison (MUTCD), 0.5 sec. x3 alternating (MUTCD), 0.1 sec. unison, 0.25 sec. unison, 0.1 sec. x3 quick flashes unison, 0.1 sec. x3 quick flashes alternating, steady on
	Input: momentary for pushbutton activation, normally open switch, normally closed switch; dusk-to-dawn operation
	Flash duration: 5 sec. to 1 hr.
	Radio settings: enable/disable, selectable channel from 1 to 14
Connectivity	Output: enabled when flashing daytime and nighttime, or nighttime only
	Activation counts and data reporting via OBUi or optional USB connection
	Encrypted, wireless radio with 2.4 GHz mesh technology
	User-selectable multiple channels to group different signs and ensure a robust wireless signal
Energy Collection	Instantaneous wireless activation: <150 ms
	Wireless range: 1000 ft (305 m)
	Integrated, vandal-resistant antenna
Energy Storage	High-efficiency solar panel
	45-degree tilt for optimal energy collection
	Maximum Power Point Tracking with Temperature Compensation (MPPT-TC) battery charger for optimal energy collection in all solar and battery conditions
Solar Engine Construction	Replaceable, recyclable, sealed, maintenance-free, best-in-class AGM batteries offer the widest temperature range and longest life
	Battery design life: +5 yrs.
	Tool-less battery change with quick connect terminals and strapping for easy installation
Environmental	Weatherproof, gasketed enclosure with vents for ambient air transfer (NEMA 3R)
	Lockable, hinged enclosure for access to on-board user interface and batteries
	Corrosion-resistant aluminum with stainless steel hardware
	Raw aluminum finish or yellow, black, or green powder coated
Warranty	Prewired to minimize installation time
	High-efficiency optics and EMS = the most compact, lightweight system
Warranty	-40 to 165° F (-40 to 74° C) system operating temperature
	-40 to 140° F (-40 to 60° C) battery operating temperature
Warranty	3-year limited warranty

LED Enhanced Sign	MUTCD compliant: 2009 MUTCD, Chapter 2A, 2B, 2C, and 7B Signs
	High-power LEDs in waterproof housings
	Aluminum channels protect wiring; includes junction box

Specifications subject to local environmental conditions, and may be subject to change.

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

"Carmanah" and Carmanah logo are trademarks of Carmanah Technologies Corp.

© 2022, Carmanah Technologies Corp.

Document: Carmanah_DATA_WW400_RevC