



DESCRIPTION

The TC-CK1-WWD **INTERSECTOR™** is a microwave-based motion sensor used for wrong-way detection. The unit interfaces with alert systems or other hardware, and outputs signals when vehicles are moving through user-defined zones. Zones are created using an X-Y coordinate system, and operation is verified and optimized using a laptop with an established web browser (Google Chrome, FireFox, Microsoft Internet Explorer and Edge) as part of the installation process.

The TC-CK1-WWD allows users to create up to 8 detection zones and assign vehicle motion in these zones to up to 8 outputs. These outputs can be used by an external system or hardware to activate an alert system, such as flashing lights, etc. Detection zones can be created to a maximum distance of 600 feet from the sensor.

The TCIB-UNI interface board is available to assist in the setup and installation of the sensor.

BENEFITS

The TC-CK1-WWD brings the advantages of microwave radar detection together with motion-tracking capabilities in an easy-to-understand visual image. The TC-CK1-WWD offers these advantages when compared to cameras or loops:

- Detection not affected by weather*
- Immune to sunrise/sunset or post-rain glare
- Not susceptible to in-road breakage
- Multiple lanes covered by a single unit
- Easily installs to corner pole & signal mast arm
- Surge protection provided in detector
- Successfully detects bicycles/motorcycles/vehicles
- Significant cost savings when compared to advance detection loops
- No privacy concerns

The TC-CK1-WWD allows users to:

- Graphically track vehicles as they approach the intersection
- Easily set up detection zones to provide programmable inputs to a control cabinet
- Verify that the system is functioning correctly and troubleshoot

*up to 2 in/hour of rain

TC-CK1-WWDv042020

SENSOR SPECIFICATIONS**PHYSICAL:**

- ☑ Size: 10.5x8.5x7 (LxWxH)
- ☑ Weight: 5 pounds
- ☑ Color: White body with gray endcaps
- ☑ Universal Mounting Bracket included

OPERATING:

- ☑ Temperature range: -40°C to +85°C
- ☑ Power requirements: Powered from TCIB-UNI over Ethernet cable

RADAR:

- ☑ Seven selectable frequency channels at 24 GHz
- ☑ Beam angle: Azimuth ± 15 degrees out to 600'
- ☑ Elevation: 12 degrees
- ☑ Operates with FSK-4 mode

PERFORMANCE:

- ☑ Track multiple moving and stationary vehicles
- ☑ Tracking of X and Y location of each vehicle
- ☑ Updates 20 times per second
- ☑ Speed of each vehicle is shown for reference
- ☑ Motion detection—60 feet minimum to 600 feet maximum
- ☑ Mounting height 14 to 20 feet*—Mounting outside this range may reduce performance (See Installation Table)
- ☑ Mounting location—corner signal pole, or on mast arm no further than 10 feet from signal pole—Maximum ± 15 degrees offset from traffic direction—Mounting outside this range may reduce performance
- ☑ Ethernet interface with power supplied over the Ethernet (POE)—Maximum distance 300'—For longer distances, consult factory
- ☑ Eight programmable independent zones
- ☑ Eight Opto-isolated outputs
- ☑ Grid tracking with live interactive zones
- ☑ Simulation mode for demonstration

- ☑ Provides histograms to verify setup of zones
- ☑ Selectable standard (English) or metric units
- ☑ User-defined delay and extension time for each zone
- ☑ Operational from cold start in 20 seconds—Full performance in 1 minute
- ☑ Automatically recovers from power failure
- ☑ FCC and IC approved
- ☑ IP addressable for remote set-up and monitoring
- ☑ Optional bicycle-only setting for detection zones
- ☑ Surge protection provided in detector

* If the TC-CK1-WWD is mounted over active roadway, make sure bottom of sensor has adequate clearance for state and local requirements.

The TC-CK1-WWD is a forward-looking motion zone radar detection system. It has high reliability of an above ground, non-intrusive radar detection. TC-CK1-WWD interfaces to MS Sedco TCIB-UNI, a standard rack detector interface card. TC-CK1-WWD can track individual vehicles by lane across a wide range of temperature and climate conditions.

TABLE 1: TC-CK1-WWD Performance: Detection Performance

| Parameter | Value | Unit |
|---|----------------------------|------------------------|
| Max Range for Pedestrian | 160 | Feet |
| Max Range for Passenger Car | 600 | Feet |
| Min Range | 50 | Feet |
| Number of Detection Lanes: >100 ft | 4 | Lanes |
| Number of Detection Lanes: 80-100 ft | 3 | Lanes |
| Number of Detection Lanes: 60-80 ft | 2 | Lanes |
| Radar Field of View: Azimuth | ±15 | Degrees |
| Max Offset Angle | ±15 | Degrees |
| Range Accuracy | Typical < ±2.5% or < ±2 ft | Greater of |
| Radar Channels | 7 | Unique Channels |
| Motion Detection Range | 60 to 600 | Feet |
| Typical Mounting Height | Typical 14 to 20 | Feet |
| Mounting Location | Rigid Location | Metal Pole or Mast Arm |
| Tilt Angle: Detection Start = 60-100 ft. | -6 | Degrees |
| Tilt Angle: Detection Start = 100-120 ft. | -4 | Degrees |
| Tilt Angle: Detection Start = 120-160 ft. | -2 | Degrees |
| Tilt Angle: Detection Start < 160 ft. | 0 | Degrees |
| Radar Field of View: Elevation | 12 | Degrees |
| Radar Speed Range | ± (0.2 to 150) | Miles-Per-Hour |
| Radar Speed Accuracy | Typical < ±2 MPH or ±2% | Greater of |
| Radar Update Rate | <50 | Milli-Seconds |
| Tracking Initialization Time | <0.5 | Seconds |
| New Object Validation Distance | 60 | Feet, Minimum |

FIGURE 1: TC-CK1-WWD Installation Example

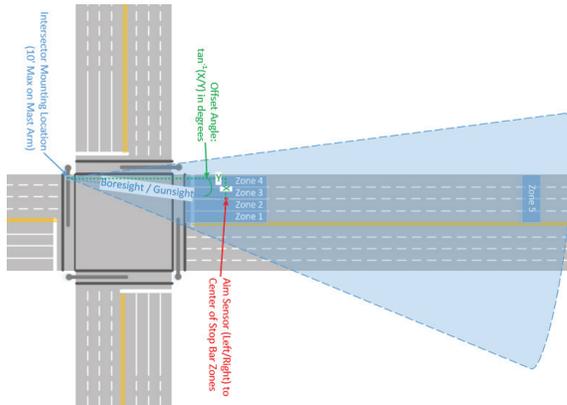


FIGURE 2: Recommended TC-CK1-WWD Mounting Location Depiction

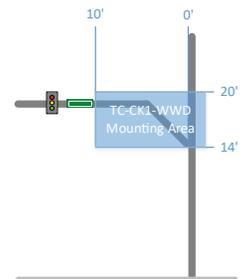


FIGURE 3: TC-CK1-WWD Tilt and Elevation Angle

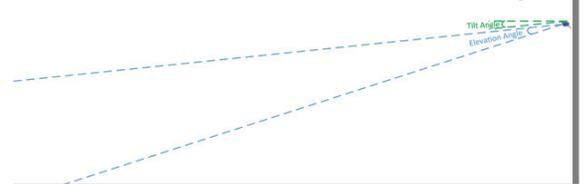


FIGURE 4: Rain Intensity Factor Correlated to Rainfall Rate

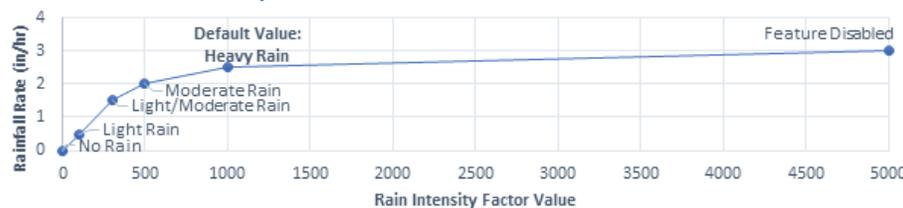


TABLE 2: TC-CK1-WWD Performance: Available Software Features

| Parameter | Value | Unit |
|--|---------------------------|--|
| Simultaneous Tracked Objects | Up to 64 | Objects |
| Simultaneous Displayed Objects | Up to 32 | Objects |
| Adjustable Zones | 8 | Per TC-CK1-WWD |
| Outputs | Up to 8 | With Secondary Card |
| Counts | Loop from 0 to 65,535 | By Zone |
| Adjustable Min and Max Speed Bins | Adjustable 0 to ±150 MPH | By Zone |
| Direction of Detection | Approach or Depart | Movement Relative to Sensor |
| Number System | Metric and English | Units |
| Web Interface | Chrome, IE, Edge, Firefox | Browsers (latest version) |
| Simulate Car Length | Point / Extend | By Zone |
| Adjustable Rain Threshold | Yes | From mist to extremely heavy |
| Adjustable Bike Classification Sensitivity | Yes | Adjustable Car / Bike decision threshold |
| Product Software Upgradable | Yes | Via Bootloader program |

TABLE 3: TC-CK1-WWD Performance: Environmental Performance

| Parameter | Value | Unit |
|-------------------|------------|----------------------|
| NEMA TS2 2003 | Pass | Appropriate sections |
| Temperature | -40 to +85 | Degrees C |
| Shock | 10 | G's |
| Vibration | ±0.5 | G's |
| IP Rating | 54 | |
| Conformal Coating | Yes | |

TABLE 5: TC-CK1-WWD Performance: General Parameters

| Parameter | Value | Unit |
|---------------------------------|------------------|--|
| Interface | 100Base-T | Ethernet with power |
| IP Address | Yes | Configurable |
| MAC Address | Yes | Set at factory |
| Power Requirements: TC-CK1 Only | 6.4 | Watts |
| Power Requirements: System | 8.8 | Watts |
| Input Voltage Requirements | 24 | Volts - DC, Power over Ethernet |
| Preventative Maintenance | None required | When installed |
| Radio Frequency | 24.000 to 24.250 | GHz |
| Max Transmit Power (EIRP) | 20 | dBm |
| Startup Time | 1 | Minute |
| Regulatory | FCC and IC | FCC part 15.245 Canadian Standards: - RSS-210 |

TABLE 6: RF Channel to Radio Frequency Map

| RF Channel | Frequency (GHz) |
|------------|-----------------|
| 1 | 24.0810 |
| 2 | 24.0935 |
| 3 | 24.1060 |
| 4 | 24.1185 |
| 5 | 24.1310 |
| 6 | 24.1435 |
| 7 | 24.1560 |

TABLE 7: Tilt Angle Matrix

| Mount Height | 60 | 70 | 80 | 90 | 100 | 110+ |
|--------------|-----|-----|-----|-----|-----|------|
| 14' | -6° | -3° | -1° | 0° | 0° | 0° |
| 15' | -7° | -4° | -1° | 0° | 0° | 0° |
| 16' | -8° | -5° | -2° | -1° | 0° | 0° |
| 17' | -9° | -6° | -3° | -1° | 0° | 0° |
| 18' | N/A | -7° | -4° | -3° | 0° | 0° |
| 19' | N/A | -8° | -5° | -3° | -1° | 0° |
| 20' | N/A | -8° | -6° | -3° | -2° | 0° |

TABLE 8: Maximum Range Matrix

| Mount Height | 60 | 70 | 80 | 90 | 100 | 110+ |
|--------------|------|------|------|------|------|------|
| 14' | 133' | 267' | 600' | 600' | 600' | 600' |
| 15' | 122' | 215' | 600' | 600' | 600' | 600' |
| 16' | 114' | 183' | 458' | 600' | 600' | 600' |
| 17' | 107' | 162' | 324' | 600' | 600' | 600' |
| 18' | N/A | 147' | 257' | 515' | 600' | 600' |
| 19' | N/A | 135' | 217' | 363' | 600' | 600' |
| 20' | N/A | 142' | 190' | 382' | 573' | 600' |