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ELECTRICALS & ELECTRONICS
An ISO 9001:2015 Certified

PRODUCT MANUAL INSTALLATION INSTRUCTIONS

PROXIMITYN WARNING SYSTEM

Proximity Warning System (PWS) – Advanced Collision Avoidance for Industrial Vehicles

Revolutionizing Safety with 77GHz Microwave Radar Technology

The Proximity Warning System (PWS) is a next-generation 77GHz Radar-Based Safety System designed for mining, construction, logistics, and heavy industrial applications. This system provides real-time obstacle detection, smart alerts, and compliance with **DGMS Circular No. 6 of 2020 & IS: 16479** standards to prevent collisions and enhance operator awareness.

Using state-of-the-art millimeter-wave (MMW) radar technology, PWS ensures high-precision detection of static and moving objects, including humans, vehicles, and infrastructure, even in low-visibility conditions such as dust, fog, and darkness.

Why Choose Proximity Warning System (PWS)?

- **Next-Generation Radar Technology:**
- Unlike optical-based sensors, PWS is unaffected by lighting conditions, providing superior reliability in low-visibility environments.
- The 77GHz microwave radar penetrates dust, fog, and harsh weather conditions, ensuring uninterrupted detection.

- **Precision Object Detection & Warning System:**
- Real-time distance measurement with high accuracy.
- Adjustable detection range ensures adaptability for different vehicle sizes and operational requirements.
- Instant alerts for critical object proximity, reducing the chances of accidental collisions.

- **Self-Diagnosis & Intelligent Operation:**
- The system automatically performs self-diagnostics when activated, ensuring optimal performance before every operation.
- Intelligent alerting system differentiates between high-risk and low-risk objects, preventing false alarms.

- **Advanced Digital Display System:**
- The high-visibility in-cabin display provides real-time obstacle distance feedback to the driver.
- Minimal operator distraction, enabling faster and more effective decision-making.

- **Robust & Easy-to-Install Design:**
- Quick installation with minimal calibration ensures easy integration into existing vehicle fleets.
- Adjustable sensor mounting bracket allows for customized positioning based on vehicle height and configuration.

- **Energy-Efficient & Low Maintenance:**
- Designed to operate with minimal power consumption while delivering high-performance obstacle detection.
- No moving parts, ensuring low maintenance and longer operational lifespan.

1. Ideal Use Cases

- Heavy-Duty Dumpers & Loaders in Mining & Quarrying
- Excavators, Dozers, and Cranes in Construction Sites
- Large Agricultural Machinery for Field Operations
- Warehouse & Logistics Vehicles for Material Handling Safety
- Forklifts & Heavy Transport Trucks in Ports & Warehouses

1. Key Features & Technical Specifications

Detection Capabilities

✓ 77GHz Millimeter-Wave Radar for Enhanced Safety

- Precise object detection in harsh mining environments.
- Radar penetrates dust, fog, rain, and darkness, ensuring uninterrupted performance.
- No interference from sunlight or lighting conditions, unlike optical-based systems.

✓ Static & Moving Object Detection

- Detects humans, vehicles, and obstacles within configurable proximity zones.
- Auto-adjusting detection range based on vehicle speed & operational conditions.

✓ Front & Rear Detection for Complete Safety

- Front Detection Zone:
  - Width = Dumper width + 0.5 meters on both sides
  - Length = Maximum stopping distance (As per IS: 16479)
- Rear Detection Zone:
  - Width = Dumper width + 0.5 meters on both sides
  - Length = Equal to or greater than dumper length

DGMS Circular Compliance (Circular No. 06 of 2020, Dhanbad, dated 27.02.2020)

Clause 14.1.3 – Detection & Warning

The system detects static and moving objects, human beings and light vehicles within the virtual target area and provides configurable audio-visual warning to the operator for the specified range.

Clause 14.1.6 – Rear Virtual Target Area

For rear movement, the virtual target area width is equal to vehicle width + 0.5 m on both sides and length is equal to or greater than the vehicle length. The area is aligned with the vehicle centre line and referenced to the rear axle centre line.

Clause 14.1.7 – Restricted Detection, Alerts & Logging

Detection is restricted within the virtual target area along the vehicle pathway. Intelligent alerts show obstacle position (left / centre / right) with auto-cut audio alarms to reduce nuisance. Warning events are recorded with time (and GPS location where available) for at least the immediate past 96 deployment operating hours.

Clause 14.1.8 – Type Tests at Govt / NABL Lab

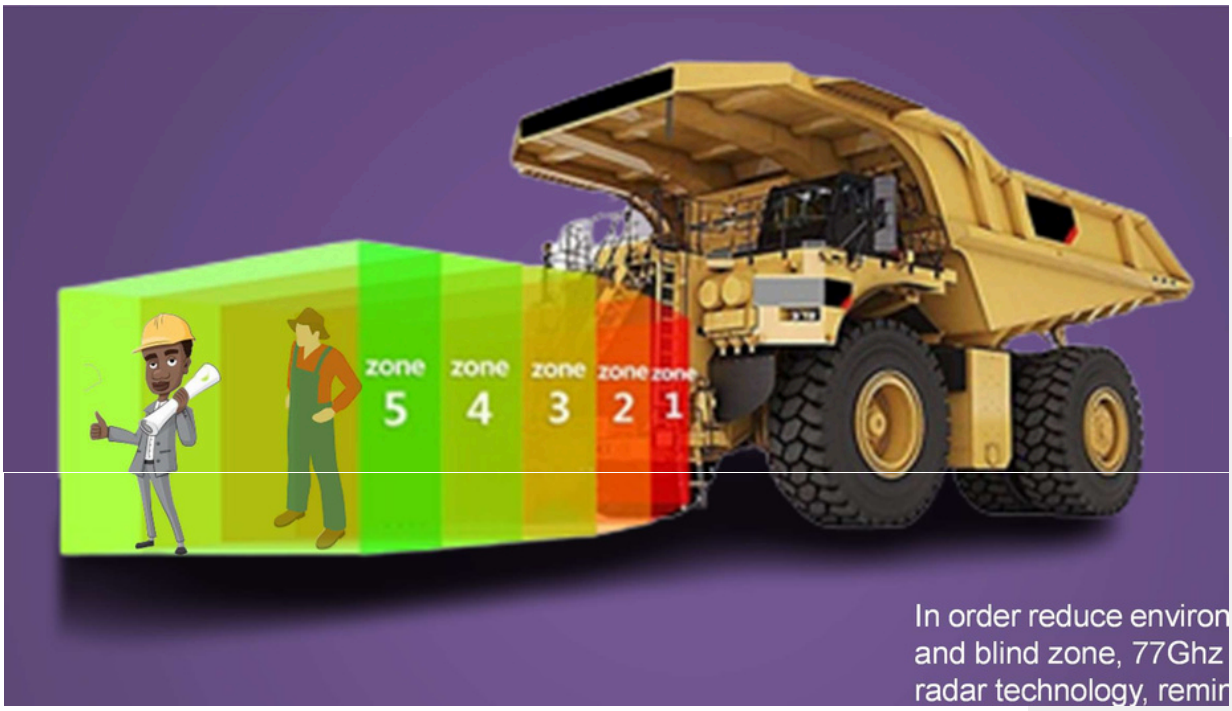
Model RPWD-UEE022 / RPW-UEE-022 Proximity Warning Device has been type-tested at NABL-accredited laboratories Vardhamana Testing Laboratory, Greater Noida (Reports VTL/TR/2025/02/091 and VTL/TR/2024/08/108 – rapid temperature cycling & environmental tests as per IS 9000 and IEC 60068-2-14, and vibration as per JSS 55555) and Nextron International Lab Pvt. Ltd., Delhi (Report NEXT-20240814-06 – sinusoidal vibration as per IEC 60068-2-6). In addition, RF parameters have been evaluated by Planet Electro Labs and Equipment Type Approval has been granted by WPC Wing, DoT, Govt. of India under ETA-SD-20250604675 dated 10.06.2025.

Intelligent Alerting System

✓ Smart Obstacle Positioning Alerts
- Indicates object location (Left, Center, or Right) in relation to the vehicle's path.
- Prevents blind spot accidents by guiding operators on potential hazards.

✓ Auto-Cut Alert System to Reduce Operator Distraction
- Prevents continuous alarm noise, ensuring that only relevant alerts are triggered.
- Alerts only when obstacles are detected within a defined safety zone.

✓ Adjustable Alert Sensitivity
- Configurable sensitivity levels to match vehicle size & operational needs.
- Dynamic range adjustment based on vehicle speed.



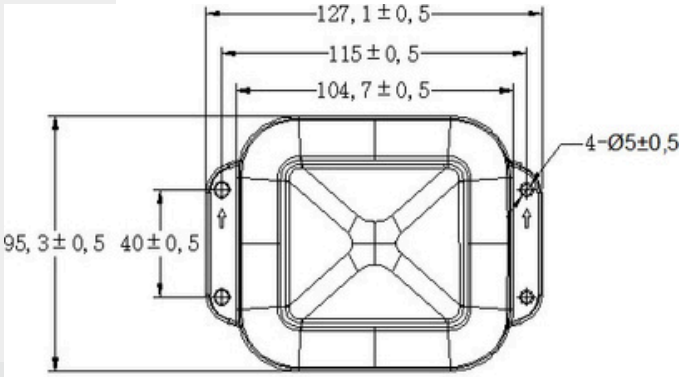
In order reduce environment affection and blind zone, 77Ghz microwave radar technology, remind the drivers by visible and audible warning. It helps drivers to reduce accident caused by blind zone.

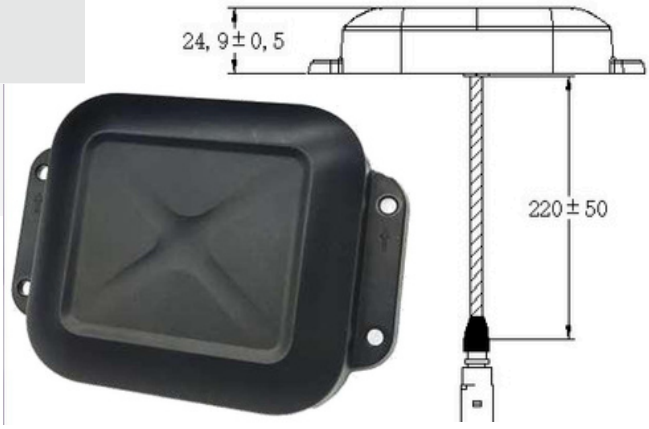
Part 01

Microwave sensor-radar

Qty 01

Name of Part Microwave sensor





Appearance and size Unit : MM

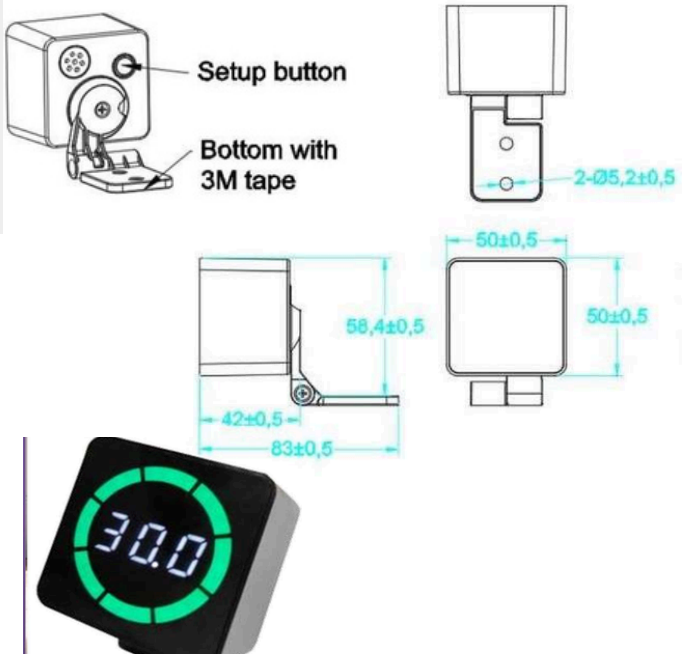
Specification Part 01

Mic rowave Radar / Sensor

Specification	***Details***
Detection Technology	**77GHz Millimeter-Wave Radar**
Detection Range	**Configurable, up to 30m+**
Target Objects	**Static & moving obstacles (Humans, Vehicles, Structures)**
Detection Zones	**Front & Rear (Adjustable / fixed width & length)**
Virtual Target Area (Front)	**Width = Vehicle width + 0.5m on both sides**
Virtual Target Area (Rear)	**Width = Vehicle width + 0.5m on both sides**
Front sensor detection range	**30m to 40m dynamic with speed**
Back sensor detection range	**12m fixed**
Audio-Visual Alerts	**Smart Alerts (Left-Center-Right Indication, Auto-Cut System)**
Data Logging	**Time & Location Stamp with GPS Integration**
Self-Diagnosis	**Yes (Automated on startup)**
Operating Voltage	**12V - 30V DC**
Power Consumption	**Low power consumption**
Weather Resistance	**Dustproof, Waterproof (IP66 Rated)**
Installation	**Plug-and-Play, Adjustable Mounting Brackets**

Part 02

Display Unit



Specification Part 02

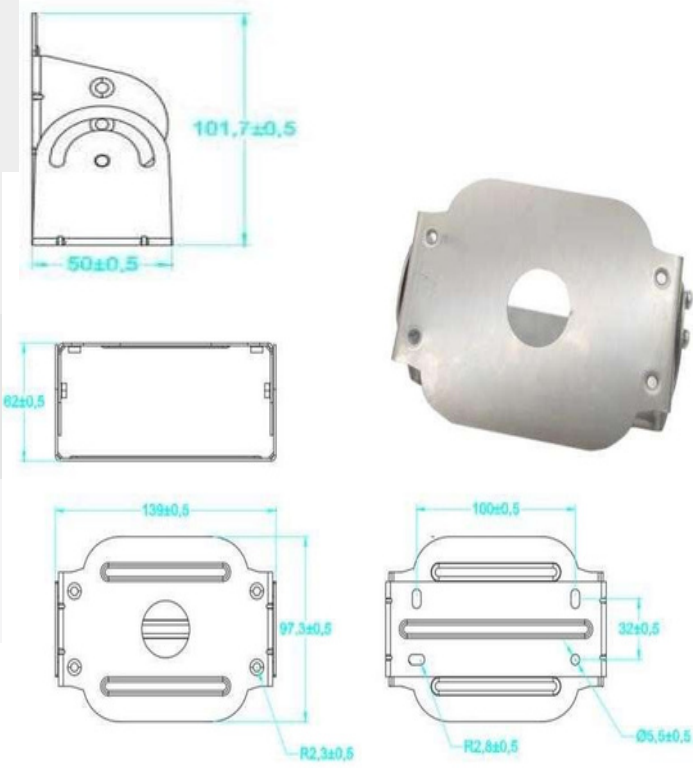
Digital Display

ITEM	Parameter
Rated working voltage（V）	12V
Operating voltage range（V）	9-16V
Working current	＜300mA@12V
Operating temperature range（℃）	-40 ~ 80
Storage temperature range（℃）	-40 ~ 85
Volume	≥80dB@12V/10cm

Part 03

Sensor installation bracket

Qty 01



Installation instruction

Microwave

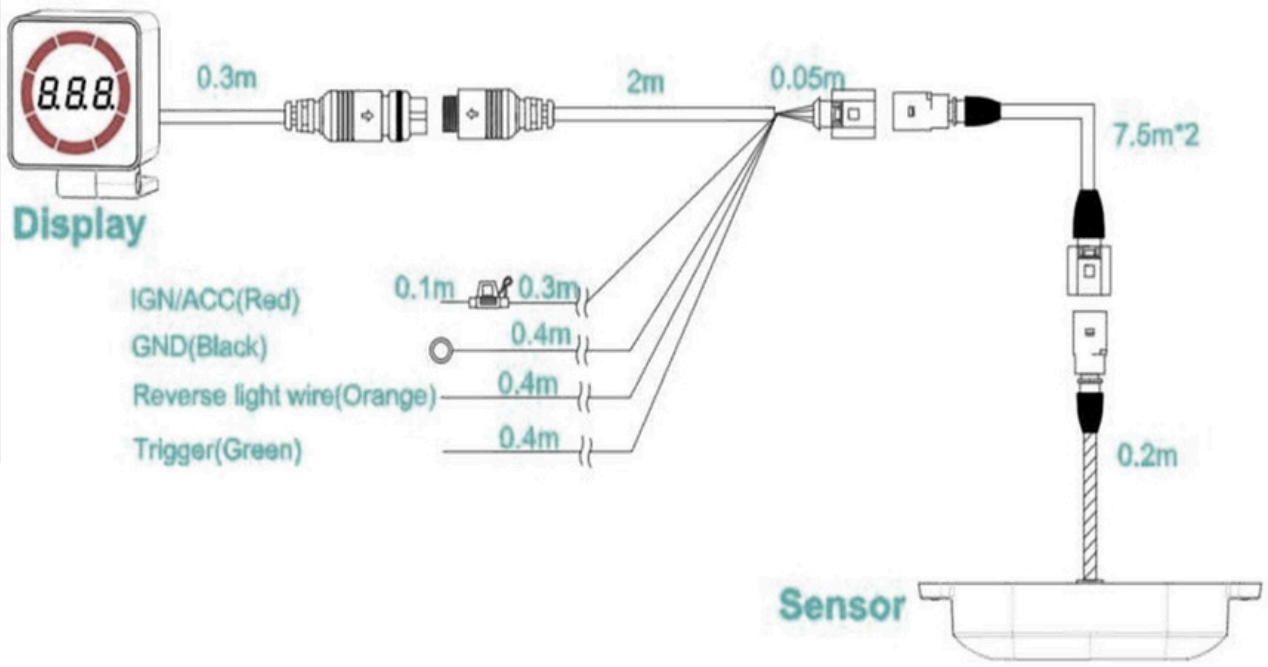
Radar/Sensor

Adjust the installation angle, Accordance to the Vehicle Height.

Display Unit

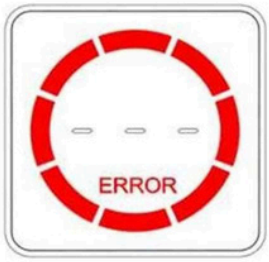
Shows the Distance of the Obstacles.

Wiring Diagram



Self- diagnosis

When the system Ignis on and the reverse gear is engaged in the system starts self-diagnosis, the result showed

No.	Self-diagnosis result	LED bar	Buzzer built-in
1	Pass		Beep once
2	Fail		Beep twice

Basic function

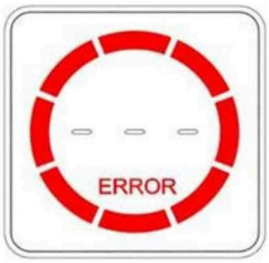
After self-diagnosis, the object distance information will be showed on the display, the information as shown

Note: The warning sections showed above when the detection distance was set to10mt.

Item No.	Object distance	Distance showing	Color bar showing	Beep frequency
1	No detection	— —	No. showing	No beep
2	8.1 - 10.0m	8.1-10.0	Green LED bar 	1Hz-8Hz Stepless warning beep
3	6.1 - 8.0m	6.1 - 8.0	Yellowish green LED bar 	
4	4.1 - 6.0m	4.1 - 6.0	Yellow LED bar 	
5	2.1 - 4.0m	2.1 - 4.0	Orange LED bar 	
6	1.26-2.0m	1.26-2.0	Red LED bar 	
7	≤1.25m	-P-		Constant beep

Self- diagnosis

When the system Ignis on and the reverse gear is engaged in the system starts self-diagnosis, the result showed

No.	Self-diagnosis result	LED bar	Buzzer built-in
1	Pass		Beep once
2	Fail		Beep twice

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