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“SafeAlert” Proximity Warning System for HEMM

FMCW RADAR Technology Based

Our “SafeAlert” Proximity Warning System (PWS) works on the radio frequency at 2.4 GHz, to detect the moving and stationary objects in virtual sensing range. As per DGMS requirements, it gives both audio as well as visual indicator to alert the Dumper operator when it detects object in the sensing range of the RADAR sensor (**RA**dio **D**etection **A**nd **R**anging). This Radar sensor works on Frequency **M**odulated **C**ontinuous **W**ave (FMCW) technology and detects stationary as well as moving objects.

“SafeAlert” PWS provides continuous monitoring of the obstruction in the virtual target area and in the blind spot and alerts the dumper operator. The system gives the visual indication which increases in intensity as the object comes closer to the operator. Also the audible tone beeps per second increases as an object becomes closer. Nearer the object, sound alert will give more beeps/sec.

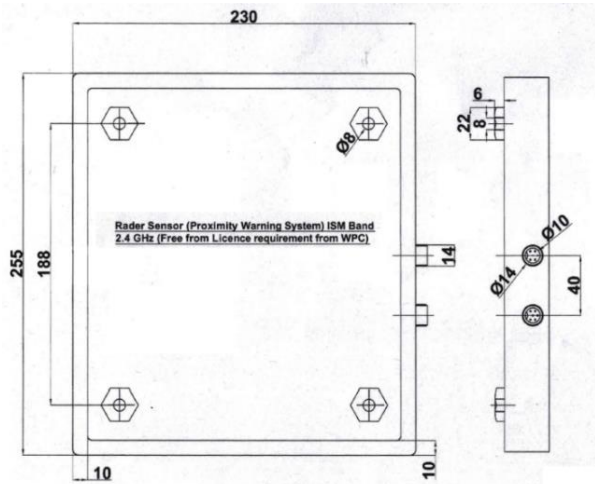
Our “SafeAlert” Proximity Warning System for HEMM consists of three components,

- 1) Controller with display Model - AG-PWR-XXRR
- 2) External Radar sensor(s) Model - AG-RAD-101 (environmentally sealed)
- 3) Cable system to connect the sensor(s) and the controller Model AG-HAR-XXRR

In one controller with display model - AG-PWR-XXRR, can connect maximum up to two RADAR sensor(s) Model - AG-RAD-101. (more than two sensors is under R&D)
(XX = 01 or 02 is the number of RADAR sensors, RR= 10 m, 15 m or 20 meters. is the sensing Range).

The three detection ranges in our RADAR sensor, which is from 0 to 10m, 0 to 15m, 0 to 20 meters. Our sensor covers more than 60% area of detection in a virtual target area of Dumper.

Radar Based Proximity Warning System using AG-RAD-101 Sensor		
Model Number	Number of Sensors	Range in meters
AG-PWS-0110	1	10
AG-PWS-0210	2	10
AG-PWS-0115	1	15
AG-PWS-0215	2	15
AG-PWS-0120	1	20
AG-PWS-0220	2	20
<i>Higher range and more number of sensors is under development</i>		



Virtual Target area in front and rear of the Dumper:

- a. Width of the virtual target area is same as the width of the dumper
- b. Length of the Virtual Target area of Blind spot distance with a uni-directional tolerance of (\pm) 1 meter
- c. One of the edges that represents the width of the Virtual Target area will pass through the inner edge / rear axle of the bumper.
- d. The centerline of the virtual target area and the machine centerline will coincide.

Wireless Planning and Co-ordination Wing (WPC), a government of India, authority to issue the licence and approvals to use Radio Frequency in India. WPC has given **Equipment Type Approval (ETA)** for our RADAR type proximity warning system sensor Model - AG-RAD-101, which operates at 2.4 GHz frequency. For the use of this frequency no license is required from WPC. Refer to G.S.R. 45(E) Dated 28th January 2005.

Advantage of Proximity Warning System “SafeAlert” Radar Frequency Modulated Continuous Wave technology:

1. **DGMS requirement** : It gives audio and visual indicator of obstruction in the virtual target area to the operator. Fulfills all the requirements of DGMS. Helps to prevent collisions.
2. **Very Rugged** : As the Radar sensor is made from polycarbonate and mild steel material. The environmental effect is negligible. Designed for outdoor in mining dusty/rainy condition environments.
3. **Operating Voltage** : 12V to 28V DC supply for Controller and Display Module.
4. **Detection Type** : Stationary as well as moving obstructions. Object detection includes hard and soft target objects.
5. **Sensing Range** : 0 to 10m, 0 to 15m, 0 to 20 meters.
6. **WPC ETA approval.** : Equipment Type Approval (ETA) for “SafeAlert” system is granted by WPC so no need to take further approval for the frequency by the user.
7. **Operating Temperature** : 0°C to 70°C.
8. **EMI suitability** : Acoustic and electrical noise resistance. Real-time auto calibration and noise rejection for every ranging cycle.
9. **Reliability** : Reliable and stable range data, Quality narrow beam characteristics. Very low power consumption. Excellent for multiple sensors. Sensor reports the range reading directly due to in-built processor. No calibration requirement.
10. **Mounting** : Easy mounting, Extra Compact Housing.

Description:

The Radar sensor module (AG-RAD-101) provides very short to long-range detection and ranging, in an extra compact, robust Polycarbonate and mild steel housing, designed to resist water intrusion. This sensor has a serial / pulse-width output along with real-time auto calibration for changing conditions (temperature, voltage or electrical noise) ensuring reception of the most reliable (in air) ranging data for every reading taken. The low power operation detects objects in sensor range up to 20 meters and provides range information with 4 LEDs. Audio alert is also provided; audio sound alert varies with the sensing distance. The interface output format is: pulse-width/serial output.

Radar Sensor Module Specifications (AG-RAD-101):

- Sensing Range : 0 to 10m, 0 to 15m, 0 to 20 meters.
 - Operating Frequency : 2.4 GHz – 2.4835 GHz License free band in India.
 - WPC ETA approval no. : 2997/16-RLO (WR), Dated 29/01/2016
 - RADAR Technology : **F**requency **M**odulated **C**ontinuous **W**ave (FMCW) technology, this detects stationary as well as moving objects.
 - Number of Sensors : 1 to 2 depending on the Vehicle. (3 & 4 Under R&D)
 - EIRP power : < 1 Watt (< 30 dBm).
 - Min. Receive Sensitivity : -75 dB.
 - Beam width / height : 80°/ 40°.
 - Operating Temperature : 0°C to 70°C.
 - Noise cancellation : Adaptive
 - Patch Antenna : 10 dB (+/- 1 dB)
 - Housing Material : Polycarbonate and mild steel
- Designed as per mining / industrial conditions. Can be used in heavy dusty, muddy, humid and rainy conditions.
 - Separate sensor and display module (multiple sensors can be connected to display module).
 - Micro-controller present in each sensor. This provides better calibration and communication with display module.
 - Single cable interface makes it easy to connect in field.
 - Easy mounting.

Product Description