WideBand PreView [tm] Operating Manual/Installation Guide

Product Description

The WideBand PreView [tm] is a solid-state, pulsed radar object detection system designed to alert vehicle operators to obstacles. The system detects both moving and stationary objects in a pre-defined coverage area and reports the distance of the closest object via visual range indicators and an audible signal to a vehicle operator. The WideBand PreView [tm] system is designed to supplement other safety practices and is not to be the sole method of collision avoidance.

The WideBand PreView [tm] consists of three major components: an environmentally sealed sensor, an operator display mounted in the cab of the vehicle, and a recommended external back up warning alarm. The WideBand PreView [tm] system does not require cleaning and is not effected by harsh weather conditions, including temperature extremes, rain, sleet, snow, or fog.

The WideBand PreView [tm] system comes in three different models:

WPV 2020	Twenty (20) foot detection range
WPV 2015	Fifteen (15) foot detection range
WPV 2010	Ten (10) foot detection range

Sensor/Antenna Description

The antenna assembly transmits and receives low power 6.5GHz radar signals. It then processes the returned signals to determine if an object has reflected any energy back to the

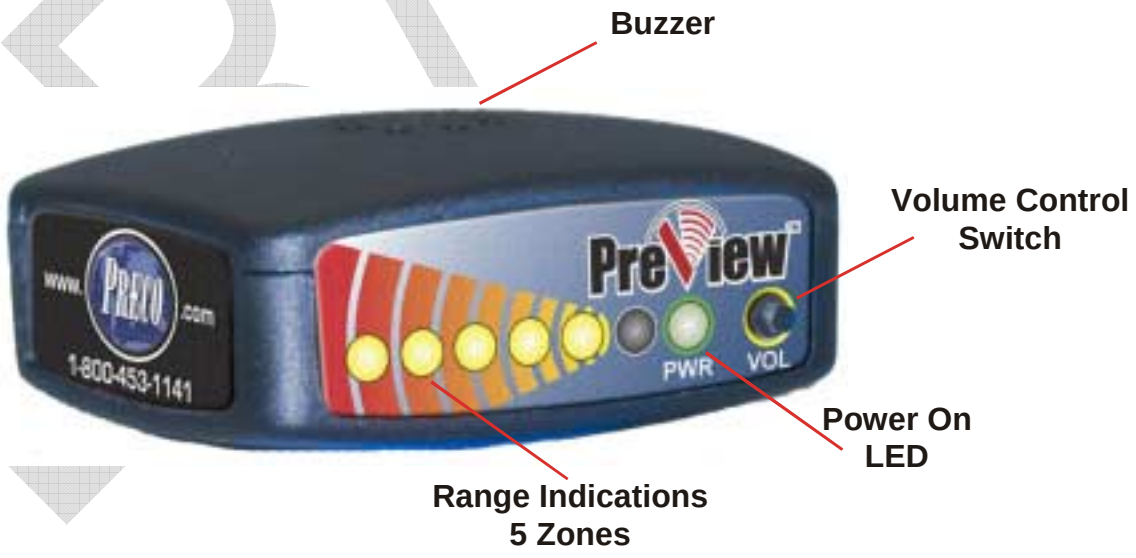
sensor and reports this to the operator display. The sensor is designed to process and report detections within ½ of a second allowing the vehicle operator to quickly respond to any object within the detection zone. All connections to a vehicle are accomplished at the sensor. Power is obtained from the vehicle reverse lights and a relay contact is provided for operating a back up alarm. The connection to the display unit is through a watertight connector eliminating any potential problems with pin corrosion. Power to the operator display is provided through the sensor interface to the display. The sensor RF output is pulse modulated so that it will not interfere with similar devices.

Operator Display Description

The operator display provides the vehicle operator with both visual and audible indications of a detected object. Range to the detected object is provided with five LED's. Each LED represents 1/5th of the total range. Example: For the WB2015, each LED represents 3 feet. The display unit also contains a buzzer to provide an audible alert that will increase in rate as an object becomes closer, providing the operator with another cue that an object is being detected.

The operator display continuously monitors communication from the WideBand PreView^{tm} sensor and in the event of a system failure or malfunction will notify the operator with a fault indication

A buzzer volume control switch is provided on the front panel of the display allowing the vehicle operator the ability to adjust the buzzer volume to four different levels.



Item	Description
Power On LED	Illuminates continuously after power is applied to the system. The power will change from green to red if a system malfunction occurs.
Range Indications	Illuminate to give operator a relative distance measurement to the closet detected object. LED's operate from the left to the right, with the closer an object the more LED's illuminated.
Buzzer	Sounds audible tones to alert operator of obstacles. The buzzer tone rate will increase as the vehicle gets closer to an object.
Volume Control Switch	This momentary push button switch allows four different buzzer volume levels to be.

Table 1. Operator Display Description

Object Detection Capability

The WideBand PreView [tm] system can detect most objects within the detection zone. However, there are some instances where objects can go undetected. Obstacle size, shape, and composition are all factors determining if, when and where an object is detected. The PreView [tm] system operates by transmitting a pulse of very low power electromagnetic energy. Any energy that strikes an object reflects a certain amount of this energy back to the PreView [tm] sensor. This returned energy is measured to determine an object's distance.

The amount of energy returned is based on a few factors:

Size – a larger object usually reflects more energy than a smaller object.

Distance – the farther away an object is, the less energy is returned.

Composition – a metal object reflects more energy than a non-metallic object. A metallic object at the edge of the zone will be detected, where a wood object may not.

Scattering – a solid object reflects more energy that a non-solid object such as wood, gravel, bushes, etc.

Angle – an object perpendicular to the sensor will reflect more energy than an object at an angle. See below for a detailed explanation.

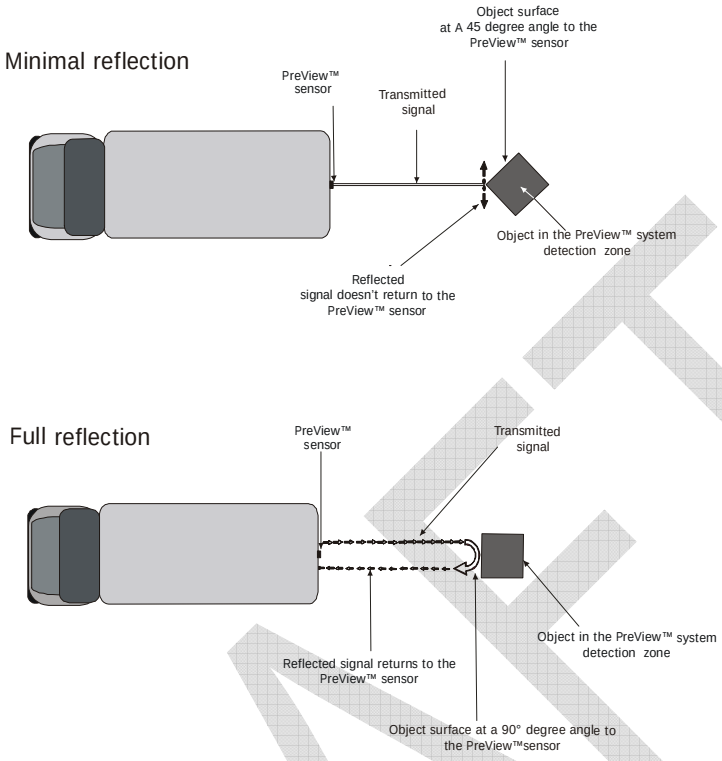


Figure 1. Object Reflection

SENSOR SPECIFICATIONS (Typical)

Transmitter:	Pulsed RF transmitter at 6.5GHz operating under FCC Part 15.250
Electronics:	Solid state
Connector:	Conxall 72x1-8PG series
Sealing:	Encapsulated to protect from dust and moisture to IP67.
Housing Material:	Polycarbonate radome
Dimensions:	4.125”H x 4.950"W x 1.75"D (10.5cm x 12.7cm x 4.4cm)
Weight:	1.5 lb. (0.68 kg)
Operating Temperature:	-40^{o}F to +185^{o}F (-40^{o}C to +85^{o}C)
Vibration:	25G RMS all three axes
Shock:	25G all three axes
Mounting:	Four 0.22" (5.6mm) diameter holes on 4.25” horizontal centers, and 2.00” vertical centers. Unit is supplied with #10 stainless steel screws for mounting purposes.

DISPLAY SPECIFICATIONS (Typical)

Housing Material:	Polycarbonate/ABS alloy
Dimensions:	1.00”H x 2.25"W x 2.00"D (2.5cm x 5.7cm x 5.1cm)
Weight:	0.25 lb. (0.11 kg)
Mounting:	User dependent

ELECTRICAL SPECIFICATIONS

Input Voltage:	9-33VDC, over voltage protected to 150V
Input current:	0.2 amp maximum, inrush current limited to 1A
Polarity:	Negative ground, Polarity protected
Power Connection:	Two 20 awg wires, connect to reverse circuit
Auxiliary Output:	Single 20 awg wire, +150V tolerant Active State: switched to ground, over current protected to 1 amp sink maximum. Inactive State: high impedance (1 volt through 5000 ohms).

OPERATING CHARACTERISTICS

Maximum Range:	20 feet (6m)
Programmable Ranges:	10, 15, and 20 feet (3, 4.5, and 6m)
Warning Ranges:	5 zones divided into programmed range
Minimum Resolution:	1 foot

COMMUNICATION

Physical Layer:	CAN 2.0B, 250 KB/s
Protocol Layer:	SAE J1939 Extended
Data Update Rate:	75 ms

MAINTENANCE
Daily: Follow test and maintenance procedure.

REGULATORY COMPLIANCE
Compliant with FCC Part 15.250 (5925-7250MHz).
FCC ID: OXZWBPV2006

PRODUCT MANUFACTURED IN THE USA

FCC STATEMENT
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

***Warning*: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.**

INSTALLATION INSTRUCTIONS

Before You Start

Prior to installing the WideBand PreView[tm] Object Detection System take time to familiarize yourself with the installation instructions, theory of operation, and system components. Check the contents of the shipping package and verify the following items are included:

- Antenna Sensor (1)
- Display Unit (1)
- Interconnect Cable (1)
- User Manual/Operating Instructions
- Sensor Stainless Steel Mounting Hardware
  - (4) 1-1/4" x 10-24 Bolts
  - (4) Hex Locking Nuts
  - (4) Flat Washers
- Display Mounting Hardware
  - Mounting Bracket
  - (2) #4-40 Lock Nuts

Sensor/Antenna Location

The WideBand PreView[tm] sensor mounting location is key to proper system operation. Ideally the sensor should be mounted on the rear center of the vehicle at roughly 36" (1M) +/- 12" (0.3M) above the ground. The sensor face should be perpendicular to the ground. Select a location that will provide some protection from impact and debris while allowing an unobstructed view of the target hazard area.

Important!

Before the WideBand PreView[tm] system is permanently installed to the vehicle, verify that the selected sensor mounting location provides a clear detection zone. Temporarily attach the sensor in the proposed mounting location, apply power to the system, and verifying that nothing is being detected.

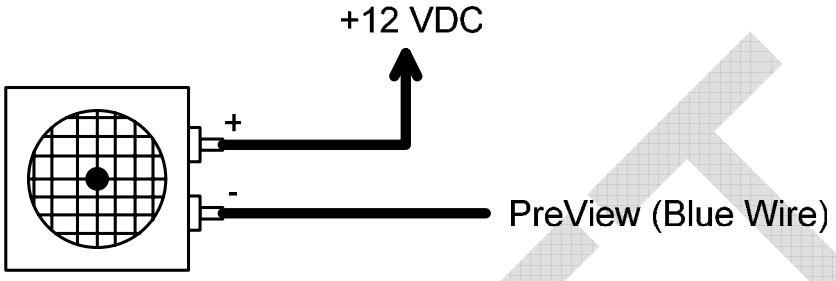
Sensor/Antenna Mounting

1. Select the appropriate sensor mounting location.
2. Using the sensors' mounting holes as a template, scribe position marks through the holes. Drill 1/4" (6mm) holes centered at the marks.
3. Secure the sensor to the vehicle with the four supplied 10-24 UNC button head screws, washers and nuts or equivalent. Apply a maximum torque of 22 inch pounds when securing the sensor.

Sensor Power Connection

Locate the vehicles reverse light power wire and connect to the red wire on the sensor harness using 18AWG wire. Connect the black wire of the sensor harness to vehicle ground.

Back Up Alarm Electrical Connection
The WideBand PreView[tm] sensor provides an auxiliary output that can be used to activate an external back up alarm. The WideBand PreView[tm] system activates this output whenever an object is detected. This output is switched to ground when active. Connect the blue wire on the interconnect harness as shown below if a back up alarm is desired.



NOTE:
The PreView[tm] sensor does not provide power for back up alarm use.

Display Unit Installation
The display unit should be mounted where the vehicle operator can easily view it while backing. The ideal location for this is on the dash positioned by either windshield pillar. This will allow the operator view of the display while also looking out one of the side mirrors.

The WideBand PreView[tm] display unit comes equipped with a mounting bracket and hardware. If desired, the display unit can be mounted to the display bracket with the supplied hardware. This bracket can then be mounted in the vehicle cab as desired.

Cable Installation
The interconnect cable between the sensor and display is 25 feet (7.6M) in length. If the distance between the sensor and display is greater than 25 feet, contact Preco for additional cable extensions.

Routing of the cable should start at the sensor since the display end comes equipped with a grommet to allow sealing the entry point into the cab. Allow for a small service loop in the cable at the sensor and secure the cable every few feet (~1M) with tie wraps. When ready to enter the cab, drill a 9/16" (14mm) hole and feed the display connector through. Once the connector is through, the grommet can then be pulled into the hole until snug. The remaining length of cable is then routed to the display unit and the connectors are latched together. Care should be taken to not route the cable next to heat sources such as the engine and exhausts and areas that may see abrasion or rock damage.

Initial System Power Up and Test
Once the sensor and display are installed, wired, and connected, power should be applied to test correct system operation. Upon power up, the display will go through its self-test by illuminating all LED's and sounding the buzzer. When the system is operating correctly in an open field with no obstructions, the green power LED will be the only light illuminated. If all the detection (yellow) LED's are lit, check for any obstruction which may be detected by the

sensor. If possible move the sensor so it is not detecting the object(s). If it is not possible to relocate the sensor, then consult the factory.

If for some reason the system is malfunctioning, all of the LED's (yellow and green) will be flashing and the buzzer will be sounding. Refer to the Error Indications and Troubleshooting sections below to determine the error and solution.

Once the system has been installed, the detection zone should be tested. Testing is accomplished by using two individuals. One individual is engages the parking brake, depresses the vehicle brake, and places the vehicle in reverse. The other individual then walks through the detection zone noting where the display buzzer or the back up alarm activates. By moving about the rear of the vehicle and noting when the display or back up alarm activate, an accurate detection zone can be mapped.

COMMON INSTALLATION PROBLEMS AND TROUBLESHOOTING

- **TBD**

MANUFACTURER LIMITED WARRANTY AND LIMITATION OF LIABILITY

Manufacturer warrants that on the Date of Purchase this Product will conform to Manufacturer's published specifications for the product, which are available from Manufacturer on request, and Manufacturer warrants that the product is free from defects in materials and workmanship. This Limited Warranty extends for twelve (12) months from the date of manufacture. Manufacturer will, at its option, repair or replace any product found by Manufacturer to be defective and subject to this Limited Warranty.

This Limited Warranty does not apply to parts or products that are misused; abused; modified; damaged by accident, fire or other hazard; improperly installed or operated; or not maintained in accordance with the maintenance procedures set forth in Manufacturer's Installation and Operating Instructions.

To obtain warranty service, you must ship the product(s) to the specified Manufacturer location within thirty (30) days from expiration of the warranty period. You must fill out the warranty claim form and include the form with the product. You must prepay shipping charges and use the original shipping container or equivalent. Return shipping charges within the United States, Canada, and Puerto Rico, will be paid by Manufacturer. This Limited Warranty will apply only to a product purchased and located in the United States, Canada, or Puerto Rico.

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Any oral statements or representations about the product, which may have been made by salesmen or Manufacturer representatives, do not constitute warranties. This Limited Warranty may not be amended, modified or enlarged, except by a written agreement signed by an authorized official of Manufacturer that expressly refers to this Limited Warranty.

PREVIEW [tm] DAILY MAINTENANCE

Detach this page and place with daily operator maintenance procedures

Safety Message to Operators of Vehicles with PreView [tm] Systems

1. The PreView [tm] system is intended as an Object Detection System and should not be relied upon as your first line of defense for the safe operation of the vehicle. It should be used in conjunction with established safety programs and procedures to augment the safe operation of the vehicle, ground personnel, and adjacent property. Should the system become inoperative, it could jeopardize the safety or lives of those who depend on the system for safety.
2. Testing and inspection of the system in accordance with these instructions and record of the results should be listed on the daily maintenance report. The units on operating vehicles must be tested each day prior to the vehicle's operation. Results of this test must be recorded in the maintenance log.
3. People operating this equipment **MUST** check for proper operation at the beginning of every shift or safety inspection period.
4. People's lives depend on the proper installation of this product in conformance with these instructions. It is necessary to read, understand and follow all instructions shipped with the product.
5. Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.
6. The PreView [tm] Object Detection System is intended for commercial use. Proper installation of a back-up aid requires a good understanding of truck electrical systems and procedures, along with proficiency in the installation.
7. Store these instructions in a safe place and refer to them when maintaining and/or reinstalling the product.

Testing and Maintenance

NOTE: A walk around test shall be performed every day to verify proper function of the system and to familiarize the operator with the zone of detection. More frequent inspections should be performed when:

The vehicle is operating in a particularly dirty or harsh environment.

The operator has reason to suspect the system has been damaged.

This test should be performed with two people, one who remains in the cab (the operator), and one who walks through the sensor field to the rear of the vehicle (the assistant).

1. Clean the sensor face of any accumulation of dirt, mud, snow, ice, or debris.
2. Visually inspect the attached wiring and cable and verify that they are properly secured, not chafing or dangling free where they could become snagged and damaged. Inspect the Radar Sensor and Operator Display Module and verify that they are securely attached to the vehicle.
3. Set the park brakes, start the vehicle, depress and hold the vehicle brake and place the vehicle in reverse.
4. Verify the green “POWER” light is illuminated on the in-cab display.
5. The area to the rear of the vehicle should be clear of obstacles for a distance of 8 meters. If the display shows any indicator other than the green light then there are objects to the rear of the vehicle that will interfere with the test. Move the vehicle to a clear area and proceed.
6. The assistant should move to just behind the rear corner of the vehicle in sight of the operator's mirrors. He should then walk toward the centerline of the vehicle parallel to the rear, noting when the external backup alarm activates, signifying the sensor has detected him. Upon hearing the backup alarm the operator should verify all the display LED’s are lit and the audible alarm is quickly pulsing. Note: If an external backup alarm is not connected, the operator will notice a detection only by the display LED’s and buzzer operation and communicate the detection or lack of detection to the assistant as the assistant moves through the area to the rear of the vehicle.
7. The assistant should continue walking through the area at the rear of the vehicle noting the area that detection occurs.
8. Now walk from the center of the rear of the vehicle straight back, away from the vehicle. When the alarm quits sounding the detection limit has been reached.
9. Move halfway back and remain still for a few seconds, the alarm should continue to sound, demonstrating the system’s ability to detect a still object.
10. The assistant should walk the complete rear of the vehicle noting the detection edges of the entire coverage area.
11. After the test the assistant needs to communicate to the operator the details on the detection zone.

For Questions call 1-800-453-1141 between 7:00 AM and 5:00 PM Mountain WideBand Time