

PRECOTM
ELECTRONICS

Wireless PreView®
WorkSight®
WWS7220
Sensor Operating Manual



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.

NOTE: This equipment has been tested and found to comply with the limits of a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference.

PATENTS

Patented under one or more of the following U.S. Patents:

5345471, 5523760, 5457394, 5465094, 5512834, 5521600, 5682164, 5630216, 5510800, 5661490, 5609059, 5774091, 5757320, 5581256, 5832772, 5519400, 5767953, 5767627, 5589838, 5563605, 5661385, 5517198, 5610611, 5883591, 5805110, 5754144, 7088284, and 7215278.

Other patents have been applied for.

TRADEMARKS

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Product Description

The Wireless WorkSight® PreView® is a solid-state, pulsed radar object detection system designed to alert vehicle operators to the presence of obstacles. The system detects both moving and stationary objects in a pre-defined coverage area and reports this information to the PreView Wireless Display WD7102.



Figure 1. Wireless WorkSight® PreView®

The Wireless WorkSight PreView sensor does not require cleaning and is not affected by harsh weather conditions, including temperature extremes, rain, sleet, snow, or fog. The Wireless WorkSight PreView Model WWS7220 has a detection range that is adjustable from ten to twenty feet (three to six meters).



Sensor Description

The sensor transmits and receives low power 5.8GHz 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. Power is typically obtained from the machine reverse lights. The communication to the display unit is wireless, eliminating the need to run a cable to the cab of the machine.

The WorkSight PreView sensor has a continuous Built In Self Test which notifies the operator of sensor failure within a fraction of a second.



Object Detection Capability

The PreView® system is designed to supplement other safety practices and/or devices, it is not to be the sole method of collision avoidance. The machine operator is always the first line of defense when safely operating a vehicle.

The Wireless WorkSight PreView system can detect most objects within the detection zone. However, there are some instances where objects can go undetected. Obstacle size, shape, relative location, and composition are all factors determining if, when and where an object is detected. The PreView 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 sensor. If the returned energy is of sufficient magnitude, it is used to indicate object presence and determine the object's distance. While the PreView system can resolve multiple objects, only the object closest to the vehicle is reported to the operator display since it represents the most significant collision threat.

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

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

Composition – a metal object typically reflects more energy than a non-metallic object. A metallic object at the edge of the maximum detection zone might be detected, whereas a wood object may not.

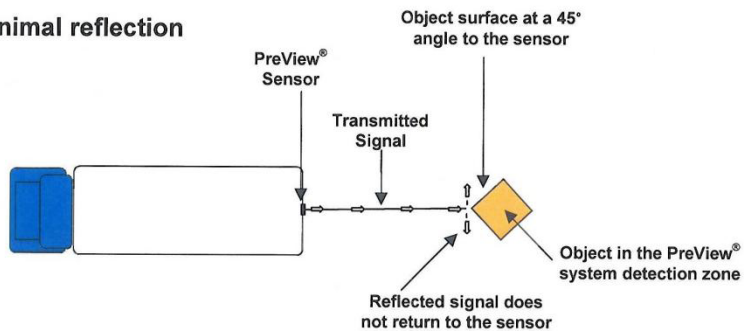
Scattering – a solid object reflects more energy than a non-solid object such as tree branches, gravel, bushes, etc.

Shape – complex shapes cause energy to be returned in a very non-uniform way. Very small variations or movement can change detection status.

Angle – an object flat side perpendicular to the sensor will reflect more energy than an object at an angle. See Figure 1 for an example of how angle can affect return energy.



Minimal reflection



Full reflection

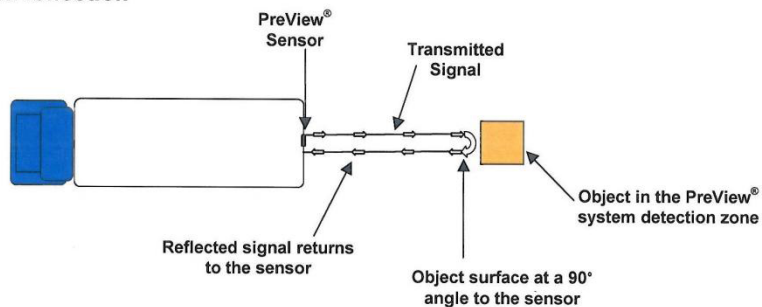


Figure 2. Object Reflection



Installation Instructions

Before you Start

Prior to installing the Wireless WorkSight PreView sensor, 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:

- Sensor (1)
- Sensor Interconnect Cable (1)
- User Manual/Operating Instructions and drill template
- Sensor Stainless Steel Mounting Hardware
 - 1-1/4" x 10-24 Bolts, Hex Locking Nuts, and Washers (4)

Sensor Location

The Wireless WorkSight PreView sensor mounting location is integral 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 with the "PreView" graphic opening upward. 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 Wireless WorkSight PreView sensor is permanently installed to the vehicle, verify that the selected mounting location provides a clear detection zone. Temporarily attach the sensor in the proposed mounting location, apply power to the system, and verify that nothing is being detected.

Sensor Mounting

1. Select the appropriate sensor mounting location.
2. The correct mounting configuration is with the sensor's text in normal reading position.
3. Using the drill template, scribe position marks through the holes. Drill 1/4" (6mm) holes centered at the marks.
4. A 1-1/2" diameter clearance hole is required for the sensor connector and mating cable connector.
5. 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

Though the sensor communicates wirelessly to the display unit, it still requires a wired connection to provide power and ground. Locate the vehicle's reverse light power wire and connect to the red wire on the sensor harness using 18AWG wire minimum. Connect the black wire of the sensor harness to vehicle ground.

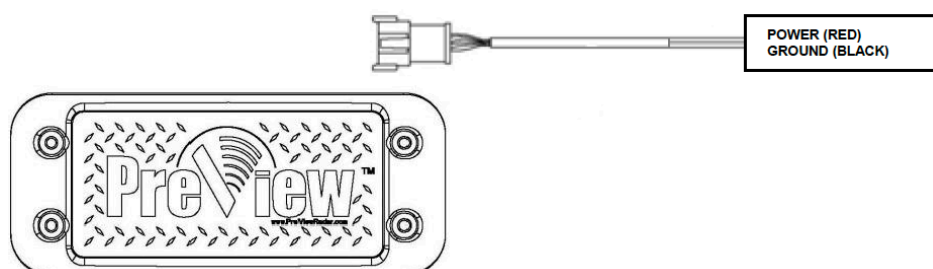


Figure 3. Sensor Power Connection

Initial System Power Up and Test

Once the sensor and WD7102 wireless display are installed, wired, configured, and connected, power should be applied to test correct system operation by energizing the machine and placing it into reverse. Follow the instructions in the display manual (3700076_) to properly configure the display and connect it to the sensor. When the system is operating correctly in an open field with no obstructions, the display should be showing the "Clear" screen. If the display is indicating a detection and there is no object in the machine's vicinity, check for any objects on the machine 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 Preco Customer Service.

If for some reason the display is showing the "Not In Reverse" or "Sensor Not Communicating" screen when the machine is in reverse, verify the display is configured correctly see the display manual (3700076_). If the display is configured correctly and the Troubleshooting section has been reviewed, please contact Preco Electronics.

Once the system has been installed, the detection zone should be tested. This test should be performed with two people, one who remains in the cab (the operator), and one who walks through the sensor field at the rear of the vehicle (the assistant). The operator engages the parking brake, depresses the machine brake, and places the machine in reverse. The assistant then walks through the detection zone while the operator in the vehicle cab notes where the display indicates a detection. By moving about the rear of the machine and noting when the display indicates a detection, an accurate detection zone can be mapped.



PreView® Daily Maintenance

Detach this page and place with daily operator maintenance procedures.

Safety Message to Operators of Vehicles with PreView Systems

1. The PreView 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 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 at 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 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 display is powered up and not indicating a detection.
5. The area to the rear of the vehicle should be clear of obstacles for a distance of 8 meters. If the display is indicating a detection, then there are objects to the rear of the machine that will interfere with the test. Move the machine to a clear area and proceed.
1. The assistant should move to just behind the rear corner of the machine in sight of the operator's mirrors. He should then walk toward the centerline of the machine parallel to the rear, while the operator notes when the display indicates a detection.



Troubleshooting

Display cannot find or connect to the wireless sensor:

- Verify that DC power (9-33V) is applied to the sensor.
- Sensor may be out of range. Contact Preco Electronics for assistance.

“Not In Reverse” message is present, but machine is in reverse:

- Verify display and sensor are configured properly.
- For installation method A (see the display manual), verify reverse connection has 9-33V present.
- For installation method B (see the display manual), verify sensor is powered and communicating.

“Connection To Sensor Failed!” message is present:

- Verify display and sensor are configured properly (see the display manual).
- Verify sensor is powered and communicating (see the display manual).

There is a constant detection even if there is no object in the machines vicinity:

- Check for any objects on the machine that the sensor may be detecting. Relocate the sensor so it does not see these objects.
- If the detection is showing up in Zone 4 or 5, the sensor may be detecting the ground. In an open field, either move the sensor up higher or slightly angle the sensor upward 5 to 10 degrees. The minimum recommended mounting height is 24 inches.



Specifications

SENSOR SPECIFICATIONS (Typical)

Transmitter:	Pulsed RF transmitter at 5.8GHz operating under FCC Part 15.249
Electronics:	Solid state
Connector:	Deutsch DT06-08SA-E008
Sealing:	Encapsulated to protect from dust and moisture, designed to meet IP67.
Housing Material:	Polycarbonate radome
Dimensions:	4.4"H x 10.5"W x 1.4"D (11.2cm x 26.7cm x 3.6cm)
Weight:	2.3 lb. (1.04 kg)
Operating Temperature:	-40°F to +185°F (-40°C to +85°C)
Vibration:	25G RMS all three axes
Shock:	25G all three axes
Mounting:	Four 0.25" (6.4mm) diameter holes on 8.54" horizontal centers and 2.00" vertical centers. Unit is supplied with #10 SS screws for mounting purposes. Recommended torque is 22 inch-lbs.

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 to 150V
Power Connection:	Two 20 AWG wires, connect to reverse signal lamp 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

OPERATING CHARACTERISTICS

Detection Range:	User Adjustable from 10-20 FT (3-6M)
Warning Ranges:	User Adjustable

COMMUNICATION

Wireless	ZigBee 2.4GHz, IEEE 802.15.4 compliant DSSS baseband
Data Update Rate	125mS

MAINTENANCE

Daily: Follow test and maintenance procedure.

REGULATORY COMPLIANCE

Compliant with FCC Part 15.249 & FCC part 15.247
FCC ID: OXZWWWS72XX

PRODUCT MANUFACTURED IN THE USA



Warranty Information

MANUFACTURER STANDARD 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 for sensor extends for sixty (60) months from the date of shipment. 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. To obtain warranty service you must call Preco Customer Service at 866-977-7326 or 208-323-1000, or fax your request to 208-323-1034. Customer Service will issue warranty authorization and further instructions. You must prepay shipping charges and use the original shipping container or equivalent.

EXCLUSION OF OTHER WARRANTIES: MANUFACTURER MAKES NO OTHER WARRANTIES, EXPRESSED, IMPLIED OR STATUTORY. THE IMPLIED WARRANTIES FOR MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY EXCLUDED AND SHALL NOT APPLY TO THE PRODUCT. BUYER'S SOLE AND EXCLUSIVE REMEDY IN CONTRACT, TORT OR UNDER ANY OTHER THEORY AGAINST MANUFACTURER RESPECTING THE PRODUCT AND ITS USE SHALL BE THE REPLACEMENT OR REPAIR OF THE PRODUCT AS DESCRIBED ABOVE.

LIMITATION OF LIABILITY: IN THE EVENT OF LIABILITY FOR DAMAGES ARISING OUT OF THIS LIMITED WARRANTY OR ANY OTHER CLAIM RELATED TO MANUFACTURER'S PRODUCTS, MANUFACTURER'S LIABILITY FOR DAMAGES SHALL BE LIMITED TO THE AMOUNT PAID FOR THE PRODUCT AT THE TIME OF ORIGINAL PURCHASE. IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR LOST PROFITS, THE COST OF SUBSTITUTE EQUIPMENT OR LABOR, PROPERTY DAMAGE, OR OTHER SPECIAL, CONSEQUENTIAL OR INCIDENTAL DAMAGES BASED UPON ANY CLAIM FOR BREACH OF CONTRACT, NEGLIGENCE OR OTHER CLAIM, EVEN IF MANUFACTURER OR A MANUFACTURER'S REPRESENTATIVE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Manufacturer shall have no further obligation or liability with respect to the product or its sale, operation and use, and Manufacturer neither assumes nor authorizes the assumption of any other obligation or liability in connection with such product.

This Limited Warranty gives you specific legal rights, and you may also have other legal rights, which vary, from state to state. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you.

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® Configuration Options

Custom System Configurations – Thanks to the advanced engineering by the Preco Engineers, the technology behind PreView Sensors can easily integrate or control your vehicles existing or new safety systems.



