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# **PreView<sup>®</sup> WorkSight for Waste**

**Rear Loader**

**Application WSW6020RL**

**Operating Manual**

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## 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

The names of actual companies and products mentioned herein may be the trademarks of their respective owners. Any rights not expressly granted herein are reserved.

# Product Description

PreView® 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 major components of The PreView® system consists of: an environmentally sealed sensor, an operator display, and two harness assemblies.

Although the PreView® system performs well in harsh environments (high temperature, fog, rain, snow, etc) it is still recommended that the sensor face be cleaned periodically as you would your vehicle lights.

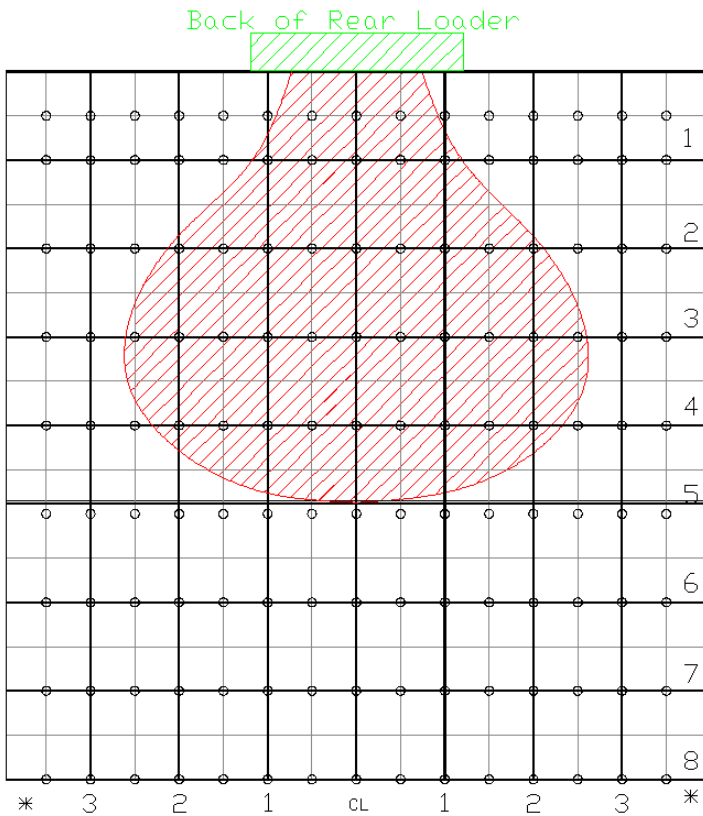
## Sensor Description

The antenna assembly 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.

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

An object's ability to reflect the sensor's transmitted energy back to the sensor determines how far away and/or at what angle extremes the object will be seen within the sensors field of view. The illustration below shows the typical area of detection for a rear loader.

### APPROXIMATE PATTERN



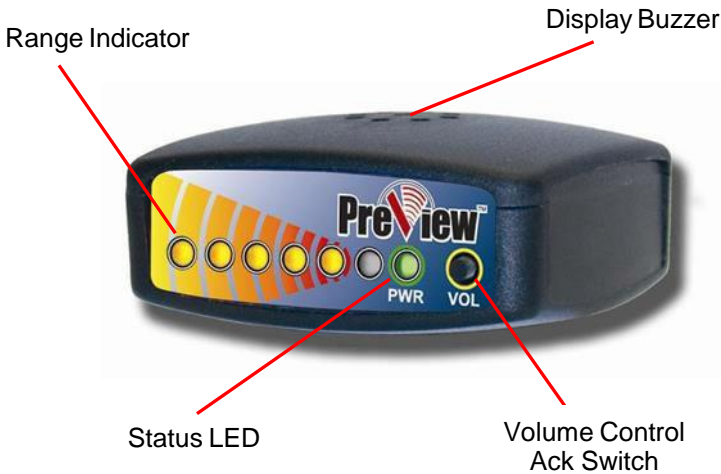
\* DIMENSIONS MEASURED IN METERS.

Sensor centrally mounted on top of hopper.

## Operator Display Unit Description

The operator display provides the vehicle operator with a visual indication of a detected object. 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.

If the sensor detects an object approximately 20 feet away, the first LED on the operator display will illuminate and begin beeping. The LEDs will progressively illuminate and the beep will increase in rate as the vehicle continues to approach the object. Once the vehicle is approximately 3 feet away or less from an object, all five LED indicators will be illuminated.



## Operator Display Unit Functions

Item	Description
Status LED	Illuminates green continuously after power is applied to the system. The status will change from green to red if a system malfunction occurs.
Yellow Range Indicators	Illuminate to give operator a relative distance measurement to the closest detected object. LED's operate from the left to right, with a closer object resulting in more LED's illuminated.
Buzzer	Sounds audible tones to alert operator of obstacles. The speaker pulse rate will increase as the vehicle gets closer to an object.
Volume Control	The volume button is disabled for Waste applications and is set to the loudest setting by default.

## Object Detection Capability

The PreView® WorkSight® system is a blind spot collision warning system designed to supplement other safety practices and/or devices. The machine operator is always the first line of defense when safely operating a vehicle.

The PreView® WorkSight® 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.

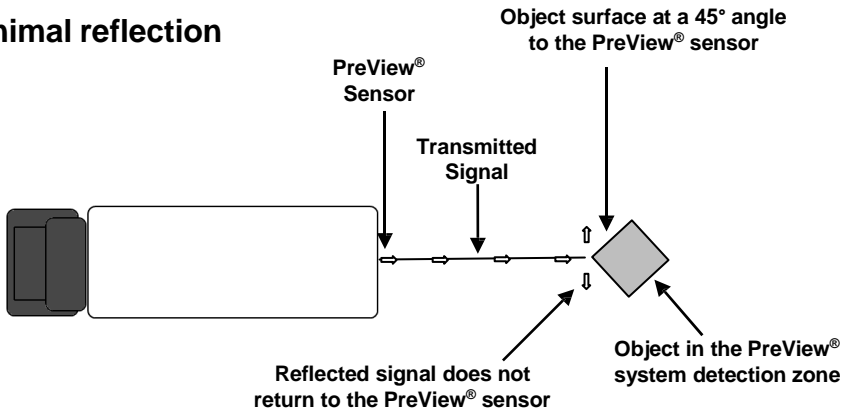
Composition – a metal object typically reflects more energy than a non-metallic object. A metallic object at the edge of the maximum detection zone might be detected, whereas a wood object may not.

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 below for an example of how angle can affect return energy.

## Minimal reflection



## Full reflection

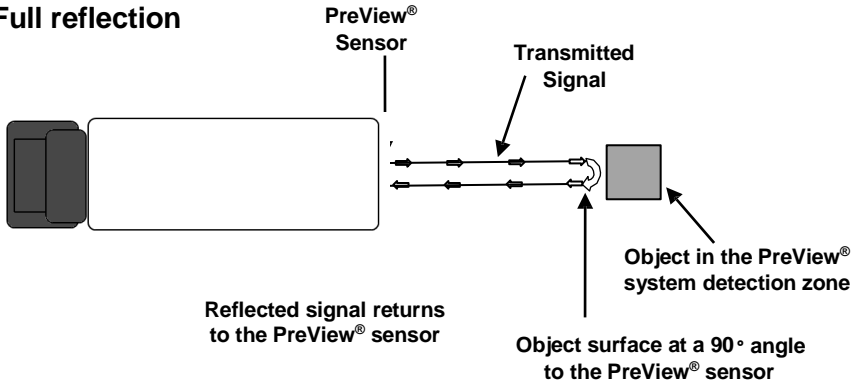


Figure 1. Object Reflection

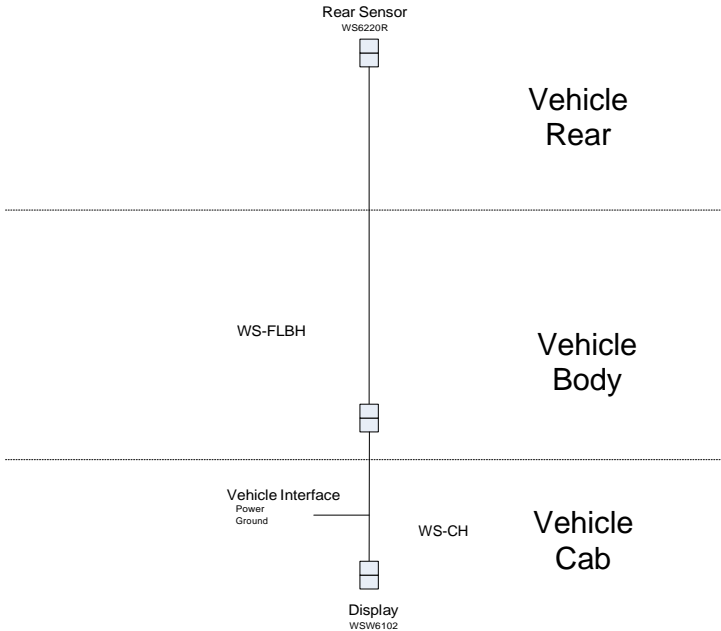


# Installation Instructions

## Before You Start

Prior to installing the PreView® 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:

- Sensor (1)
- Display Unit (1)
- Body Harness (1)
- Cab Harness (1)
- User Manual/Operating Instructions
- Sensor Adjustable Mounting Bracket (1)
- Sensor Debris Guard (1)
- Sensor Stainless Steel Mounting Hardware
  - (4) 1-1/4" x 10-24 Bolts
  - (4) Hex Locking Nuts
  - (4) Flat Washers
- Display Hardware Kit
  - Mounting Bracket-Dashboard
  - Mounting Hardware



## Sensor Location

The PreView® sensor mounting location is key to proper system operation. Ideally, the sensor should be mounted centrally on the top of the hopper. The sensor face should be angled slightly toward the ground to provide the optimal detection pattern.

### Important!

Before the PreView® 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 verify that nothing is being detected. If an object is being detected try reducing the downward angle of the sensor. Under no circumstance should the sensor be aimed upward.

## Sensor Debris Guard Installation

The Sensor Debris Guard is necessary to prevent any damage from occurring to the sensor when the rear loader is loading dumpsters. The guard is designed to be installed using existing hardware on the vehicle. Remove the centermost bolt and the first bolts to the left and right of the centermost bolt (three total) that hold the truck sheet metal to top of the hopper. Align the Debris Guard over these three holes and re-install the bolts.

## Sensor Installation

1. The bracket and sensor must be installed just behind the Debris Guard.
2. The sensor must be mounted with **“PreView®”** in readable orientation.
3. Secure the sensor mounting bracket to the vehicle.
4. Secure the sensor to the mounting bracket with the supplied mounting hardware. Apply a maximum torque of 22 in-lbs. when securing the sensor to the bracket. Additional mounting torque can damage the sensor.

The images below show a typical installation (your mounting bracket may vary):



## Sensor Harness

After the sensor has been mounted, route the body harness cable to the sensor. The cable has been intentionally made longer than necessary to accommodate many different truck bodies. Use a 1.5" hole bit to cut a hole in the top of the hopper just behind the sensor. Route the cable through this hole and down through the hopper toward the front of the truck. Locate and follow the existing truck cables to route the cable on top of the hopper. Following the path of the existing wiring harnesses, route the cable to the front of the vehicle. At this point the cable must be routed inside the cab. The cab must be lifted to the forward position in order to reveal the cable pass through under the dashboard. Insert the cable through the pass through until approximately eighteen inches of cable has been inserted through the opening. Once the cable has been inserted, tie off and secure any loose cabling and return the cab to the down position.

## Display Unit Installation

Once the main harness has been routed through the pass through under the dashboard and the cab lowered, it is time to install the display module. Insert the display cable through the hole on the dash board where the display will be located. Plug the display cable into the main cable inside the dashboard. Power for the Preview® system is obtained by connecting the power and ground wires on the display harness to reverse power and ground terminals located in the console or underneath the driver's side seat. The terminals should be labeled. The red wire goes to "reverse" and black wire to "ground". Use ring terminals.

The display unit should be mounted in the cab where it can be easily viewed by the operator while backing up. A dash mount bracket is provided. This will allow the operator to view the display while also looking at the monitor and side mirror.

The display unit adapter harness should be taken into consideration when selecting a routing location to the display. Since the connection between the display and sensor harness adapter is not watertight, it should be routed in such a manner so it is not exposed to the outside environment.

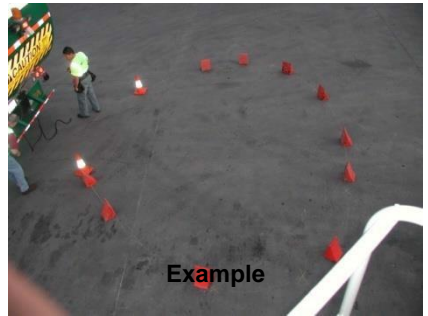
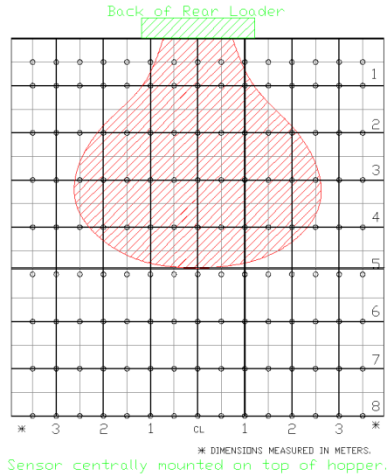
## Initial System Power Up

Once the PreView® system is installed, power should be applied to test correct system operation. The vehicle must be started and placed in reverse. Upon power-up, the display will go through a self-test and illuminate all the LEDs. When the system is operating properly in an open field with no obstructions, the green power LED will be the only light illuminated. If any or all of the yellow detection LEDs are lit, check for any objects which may be detected by the sensor. If necessary, change the angle on the sensor until it is not detecting any object(s) on the vehicle. Consult PRECO Electronics® Customer Service if the sensor cannot be adjusted enough to prevent constant detection.

If for some reason the system is malfunctioning, all of the yellow LED's will be flashing, the status LED will turn from green to red, and the buzzer will make a short stutter sound. Refer to the Error Indications and Troubleshooting sections below to determine the error and solution.

# Functional Test of the System

- Before testing the system, make sure that the sensors have a clear field of view. The recommended area is 20 ft. (6.5m) wide by 25 ft. (8m) deep from the rear of the vehicle. This is most important when testing indoors, because the system may detect walls, posts, etc.
- Park the vehicle on a level surface. Block the wheels and keep the parking brake applied at all times.
- Power up the PreView® system by turning the vehicle's ignition to on and placing the vehicle's transmission in reverse.
- Verify the green LED on the display unit is illuminated and the system indicates NO objects are detected (All yellow LEDs off). If the display indicates an object is being detected make sure the area around the sensor is clear and that the sensor is mounted appropriately. In some cases it may be necessary to move the vehicle to a clear area.
- Have an assistant test the detection area of the target by holding a metallic plate with a minimum size of 10" x 10" (25mm x 25mm) 10 feet (3m) in front of each sensor. Keeping the target aimed directly at the sensor move 6 feet (2m) to the right and 6 feet (2m) to the left, verifying that the sensor detects the target in all three locations.
- Have the assistant move the target at least 25 feet (8m) out from the sensor. Now walk slowly toward the sensor with the target held out front and note where the detection first occurs. Verify that this is approximately 20 feet (6.5m) from the sensor.



# Troubleshooting

Display Status LED is not illuminated.

- Verify that DC power (9-33V) is applied to the sensor.
- Verify that the cable between the sensor and display is connected.

Display Status LED is RED.

- Check connection between display and sensor.

**All the display LED's are illuminated when sensor is mounted.**

- Verify the sensor is pointing outward from the vehicle in an open area with no obstructions. This may require removing the mounting screws and lifting the sensor out away from the rear of the vehicle. If the display LED's are not active when moved away from the vehicle, but are active when mounted, then the sensors mounting position will have to be moved or the sensor angle will need to be adjusted.

**Sensor is detecting the ground, indicated by a few of the display LED's being lit.**

- In an open field, angle the sensor upward 3 to 5 degrees.

# 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, do not operate the vehicle without taking adequate remedial action 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 to the rear of the vehicle (the assistant).

1. Clean the black sensor surface 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 25 feet (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. The vehicle operator notes when a detection occurs by the display LEDs and buzzer operation and communicates 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 display quits sounding the detection limit has been reached.
9. The assistant should walk the complete rear of the vehicle noting the detection edges of the entire coverage area.
10. After the test, the assistant needs to communicate to the operator the details on the detection zone.

For questions, call +1.844.787.2327 toll free in the USA. Call +1.208.323.1000 or send a fax request to +1.208.323.1034 for outside the USA, or submit an online request at [www.precos.com/contact-us/](http://www.precos.com/contact-us/)

A safety specialist will respond within 24 hours.

# Sensor Specifications (Typical)

Transmitter:	Pulsed RF transmitter at 5.8GHz operating under FCC Part 15.249
Electronics:	Solid state
Connector:	Deutsch DT06-08SB-CE01
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.

## 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 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:	20 feet (6m)
Warning Ranges:	5 zones

## COMMUNICATION

Physical Layer:	CAN 2.0B, 250 KB/s
Protocol Layer:	SAE J1939 Extended
Data Update Rate:	70 ms

## MAINTENANCE

Daily: Follow test and maintenance procedure.

## REGULATORY COMPLIANCE

Compliant with FCC Part 15.249 (5725-5875MHz).	
FCC ID:	OXZWZPV2009
'CE' 'E' mark	E11 10R-045418

## PRODUCT MANUFACTURED IN THE USA



# Warranty Information

## 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 for the sensor and in-cab display 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, call PRECO Electronics® Customer Service at +1.866.977.7236 or +1.208.323.1000, or fax your request to +1.208.323.1034. 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:

PreView® Plus Camera/Monitor System – Ultimate safety and object detection system configurable with up to 4 cameras and 24 sensors.

PreView® Safety Alert System (SAS) – The PreView® radar sensor detects an object in the blind spot. Once the object is detected, PreView® triggers the SAS back-up alarm to either increase the sound of the alarm OR change the beep rate to alert pedestrians outside of the vehicle of the danger (depending on the alarm chosen).

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



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