

Heavy Duty Rearsense™ Operating Manual/Installation Guide

Product Description

The Heavy Duty Rearsense™ 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 Rearsense™ system is designed to supplement other safety practices and is not to be the sole method of collision avoidance.

The Heavy Duty Rearsense™ 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 Heavy Duty Rearsense™ system does not require cleaning and is not effected by harsh weather conditions, including temperature extremes, rain, sleet, snow, or fog.



Sensor/Antenna Description

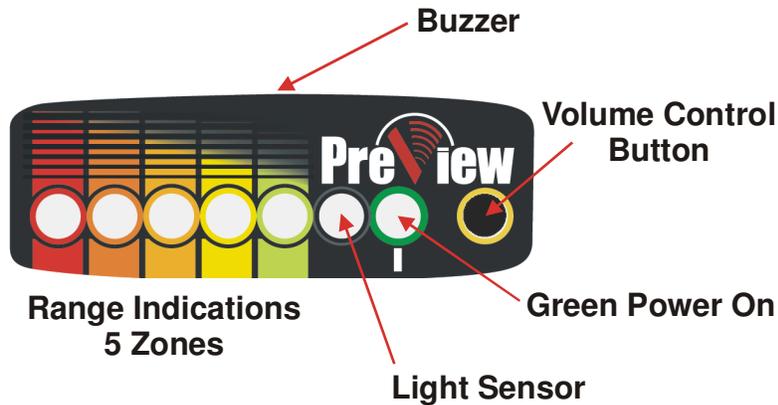
The antenna assembly transmits and receives low power 5.8GHz radar signals. It then processes the returned signals to determine if an object has reflected any energy back to the sensor and reports this to the operator display. The sensor is designed to process and report detections within 2/10ths of 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. Keyed battery power, a reverse input and, if desired, a back up alarm output, are provided at the sensor cable. 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, in fact, multiple sensors may be used on the same vehicle.

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 in a relative format with each LED representing approximately 1/5th of the total range. The display unit also contains a buzzer to provide an audible alert. The buzzer audible rate will increase 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 Rearsense[™] sensor and in the event of a system failure or malfunction will notify the operator with a fault message. See Operator Display Error Indications below for further detail on fault messages.

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 three different levels.



Item	Description
Green Power ON	Illuminates continuously after power is applied to the system. The power ON LED will blink quickly 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 right to the left, with the closer an object the more LED's illuminated. Also used for error codes.
Buzzer	Sounds audible tones to alert operator of obstacles. The buzzer tone rate will increase as the vehicle gets closer to an object.
Light Sensor	Senses the ambient light and dims the LED's in low light operation.
Volume Control Switch	This momentary push button switch allows three different buzzer volume levels to be selected as well as providing the capability of turning off the buzzer.

Table 1. Operator Display Description

Object Detection Capability

The Heavy Duty Rearsense[™] 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

Rearsense™ 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 Rearsense™ 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 than 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.

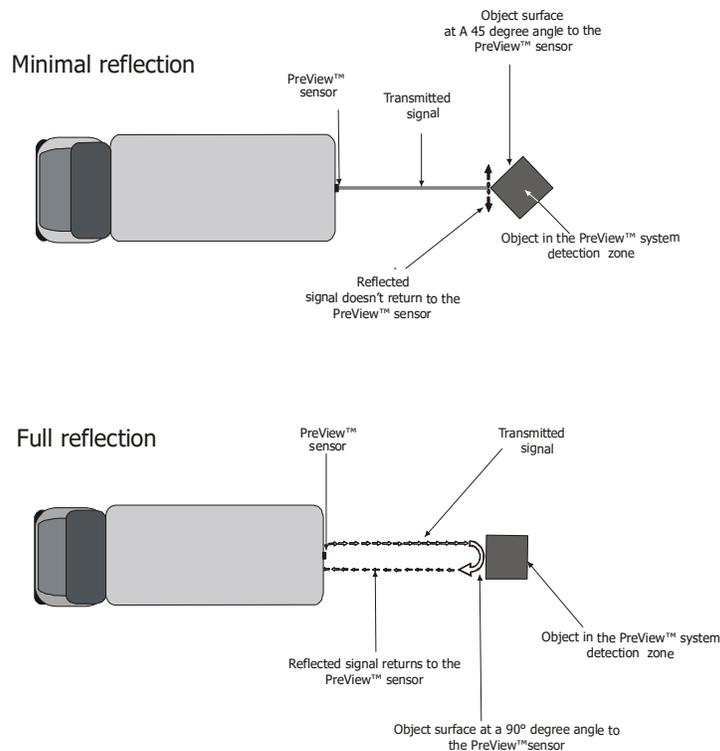


Figure 1. Object Reflection

Detection Patterns

The Heavy Duty Rearsense™ system is supplied in 26 feet (8 meter), 15 feet (4.5 meter) and 10 feet (3 meter) versions. But, various ranges between 8 to 26 feet can be obtained by programming the sensor. In addition to the different ranges, programming the sensor can also change the detection pattern width. Consult the factory for the different detection zone options.

Typical detection patterns for the standard ranges are shown below. Note that these zones are approximate and will vary depending on the shape and composition of the object. Once the system is mounted to the vehicle, the detection pattern should be verified.

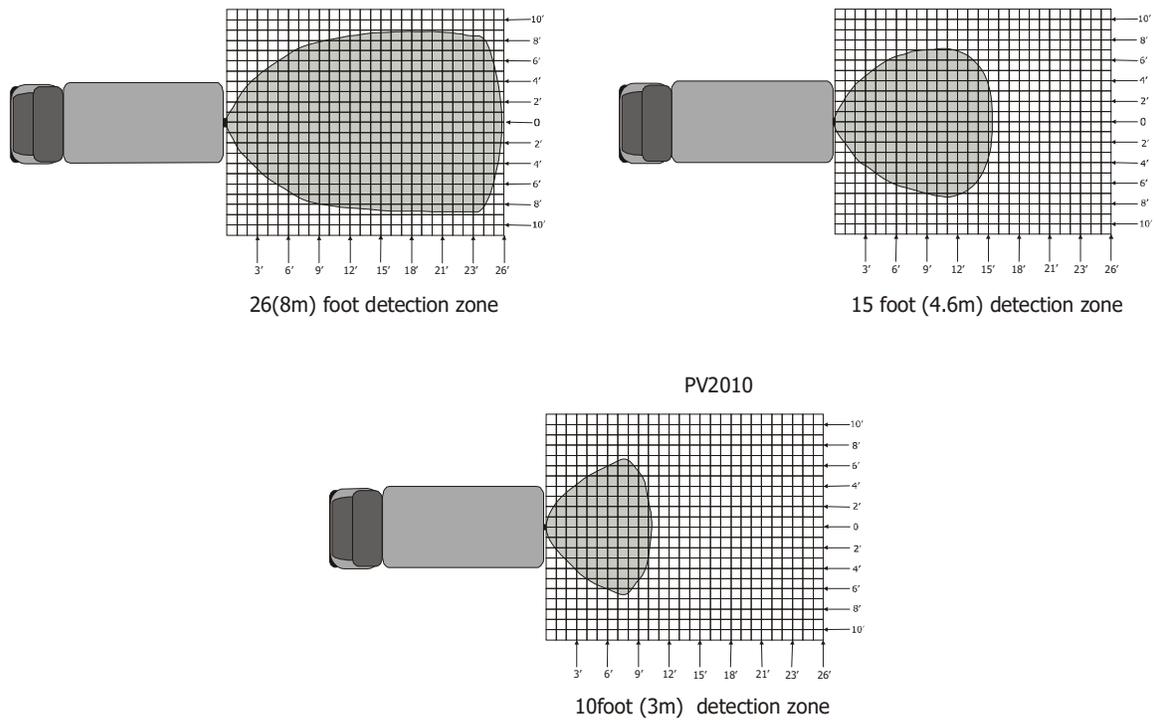


Figure 2. Typical Detection Patterns

SPECIFICATIONS (Typical)

Sensor: Pulsed RF Transmitter at 5.8GHz.

Electronics: Solid state

Sealing: Encapsulated to protect from dust, moisture and vibration.

Housing Material:

 Radar sensor: Polycarbonate radome, Aluminum back plate

 Operator display: Polycarbonate/ABS alloy

Dimensions:

 Radar Sensor: 7.56"H x 7.35"W x 2.39"D (19.2cm x 18.7cm x 6.0cm)

 Operator display: 1.00"H x 2.25"W x 2.00"D (2.5cm x 5.7cm x 5.1cm)

Weight:

 Radar Sensor: 2.35 lb. (1.06 kg)

 Operator display: 0.25 lb. (0.11 kg)

Mounting:

 Radar Sensor: Four 0.328" (8.3mm) diameter holes on 6.50" horizontal centers, and 5.00" vertical centers.

Operator Display Unit: User dependent

Operating Temperature: All units: -40°F to +185°F (-40°C to +85°C)

ELECTRICAL SPECIFICATIONS

Minimum voltage: 9.8 volts DC

Maximum voltage: 33.0 volts DC

System voltages: 12 and 24 volt systems interchangeable

Input current: 0.25 amp average for Rearsense™ system alone.

 Back-up alarm current is an additional 1 amp max.

 Recommend fusing at 0.5 amp, 2 amps if a backup alarm is used.

Polarity: Negative ground or positive ground, polarity protected

Power Connection: Two 18 AWG wires

MAINTENANCE

Daily: Follow test and maintenance procedure.

REGULATORY COMPLIANCE

Compliant with FCC Part 15.249 (5725-5875MHz).

FCC ID: OXZPV2000A

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.**

***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.**

INSTALLATION INSTRUCTIONS

Before you Start

Prior to installing the Rearsense™ Object Detection System take time to familiarize yourself with the installation instructions, theory of operation, and Rearsense™ 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 Mounting Hardware
 - (4) 1 ½" x ¼" Bolts
 - (4) Hex Locking Nuts
 - (4) Flat Washers
- Display Mounting Hardware
 - Mounting Bracket
 - (2) #4-40 Lock Nuts
- Operator Warning Dash Decal and Bumper Decal

Sensor/Antenna Location

The Rearsense™ sensor mounting location is key to correct operation of the system. 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 should be level with the back mounting plate vertical. Select a location that will provide some protection from impact and debris while allowing an unobstructed view of the target hazard area. Prior to permanently attaching the sensor it is a good idea to temporarily affix the sensor, attach the display unit with the interconnect cable and verify the detection pattern shape.

In many instances, the sensor must be mounted either higher or lower than the recommended 36" (1M) height. To compensate for this, the sensor can be angled up or down depending on the height required. If the required mounting position is approximately 2 feet (0.6M) from the ground the sensor should be angled up 5 degrees. Mounting close to the ground will cause nuisance alarms due to detection of the ground. If the required mounting position is approximately 4 feet (1.2M) from the ground the sensor should be angled down 5 degrees.

In other instances, it is not possible to mount a sensor in the exact center of the vehicle. It too can be adjusted by angling the sensor towards the vehicle center in 2.5 degree increments for approximately every 2 feet (0.6M) off of center. This adjustment in the mounting angle will affect the shape of the detection zone and the end user should verify the zone conforms to their requirements.

Preco offers two convenient mounting brackets with 2.5 and 5 degree angles to allow for multiple mounting scenarios.

Important!

Before the Rearsense™ system is installed verify the selected mounting location provides a clear detection zone. This can be done by powering up the system with the sensor in the proposed location and verifying that nothing is being detected.

Sensor/Antenna Mounting

1. Selecting the appropriate sensor mounting location.
2. The sensor must be mounted with the cable exit either on the bottom (preferred) or top.
3. Using either the sensors' or brackets' mounting holes as a template, scribe position marks through the holes. Drill 9/32" (7mm) holes centered at the marks.
4. Secure the sensor to the vehicle with the four supplied 1/4-20 UNC bolts, washers and nuts or equivalent. Apply a maximum torque of 40-50 inch pounds when securing the sensor.

Sensor Electrical Connections

There are two requirements for the Rearsense™ system to operate correctly, DC power between 10 and 33 volts and a reverse signal. Power should be obtained from a switched or keyed source to prevent the battery from discharging when the vehicle is not in operation. A reverse indication is required to activate the display buzzer and LED's when an object is detected. This reverse signal must become active at +12/24VDC when the reverse gear is engaged.

Important!

ALL CONNECTIONS TO THE REARSENSE™ SENSOR SHOULD BE MADE WITH THE POWER OFF!

1. Use 18AWG wire (minimum) and an in-line 2 amp fuse (not supplied) to connect power to the sensor. The positive (+12/24V) is applied to the red wire located on the 3-wire breakout of the sensor cable and the negative or ground is the black wire. The in-line fuse should be used on the positive connection.
2. If the vehicle's reverse indication is a positive signal, connect the blue wire directly to this source using 18AWG wire. A good source for the reverse indication is either the reverse lights or the positive connection to an external back up alarm. Hint: If it is desired that the Rearsense™ system always operate independent of the vehicle gear, the reverse input can be connected directly to the keyed power source.
3. If switching a ground connection creates the reverse indication, as is the case for most heavy construction equipment, an external relay is required to supply a positive voltage to the sensor. See the wiring diagram for a schematic of this solution.

NOTE: If it's desired that the HD Rearsense™ system operate continuously rather than in reverse only, directly connect the reverse input (blue wire) to a positive voltage (+12/24V).

Back Up Alarm Electrical Connections

The Rearsense™ sensor provides an output to activate an external back up alarm when an object has been detected. If desired, the Rearsense™ system can control this back up alarm or it can be left to operate whenever the vehicle is in reverse. The 2 wire breakout is used to connect to the back up alarm. The orange wire is the positive connection and the white wire is

the ground connection. The decision tree that follows below describes what must be done when connecting to an external back up alarm.

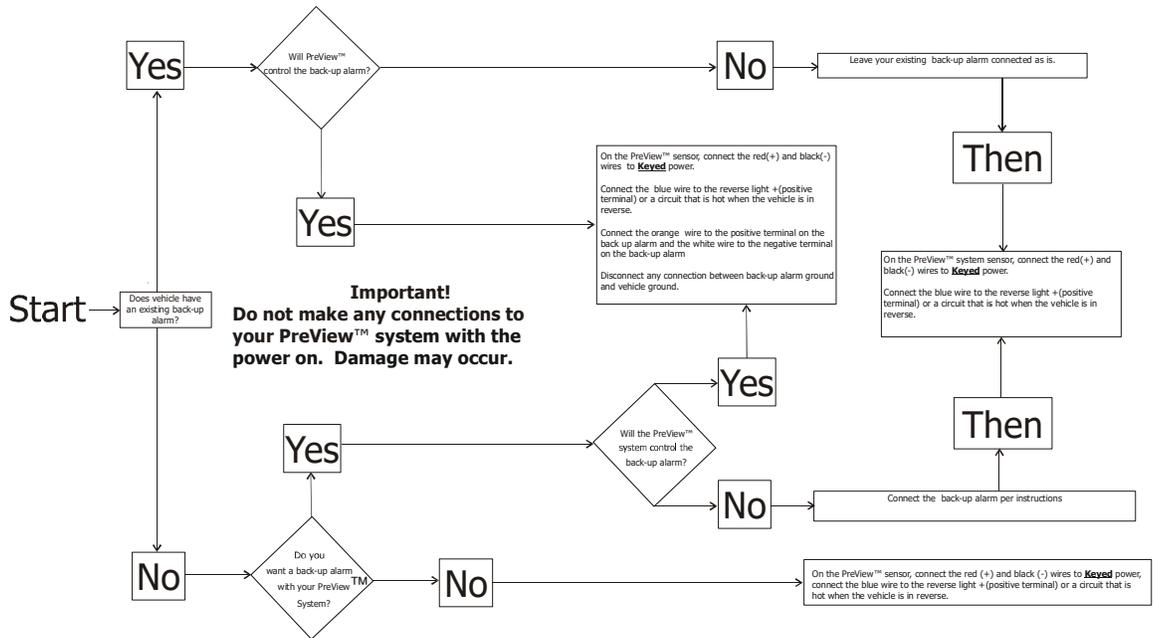


Figure 3. Back Up Alarm Installation Decision Tree

If the back up alarm is not used, then the orange and white wires should be tied away and stowed to prevent accidental shorting.

NOTE: Care must be taken when connecting to an external back up alarm being controlled by the Rearsense™ system. Power must NOT be applied to the Rearsense™ sensor while making the back up alarm connections. Failure to do this could result in damage to the sensor.

Important!

DO NOT CONNECT THE BACK UP ALARM NEGATIVE (WHITE WIRE) TO VEHICLE GROUND, ONLY TO THE BACK UP ALARM NEGATIVE TERMINAL. IF THE EXISTING BACK UP ALARM NEGATIVE CONNECTION IS MADE TO CHASSIS GROUND, DISCONNECT PRIOR TO REARSENSE CONNECTION AND POWER APPLICATION.

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 by either windshield pillar. This will allow the operator view of the display while also looking out one of the side mirrors.

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

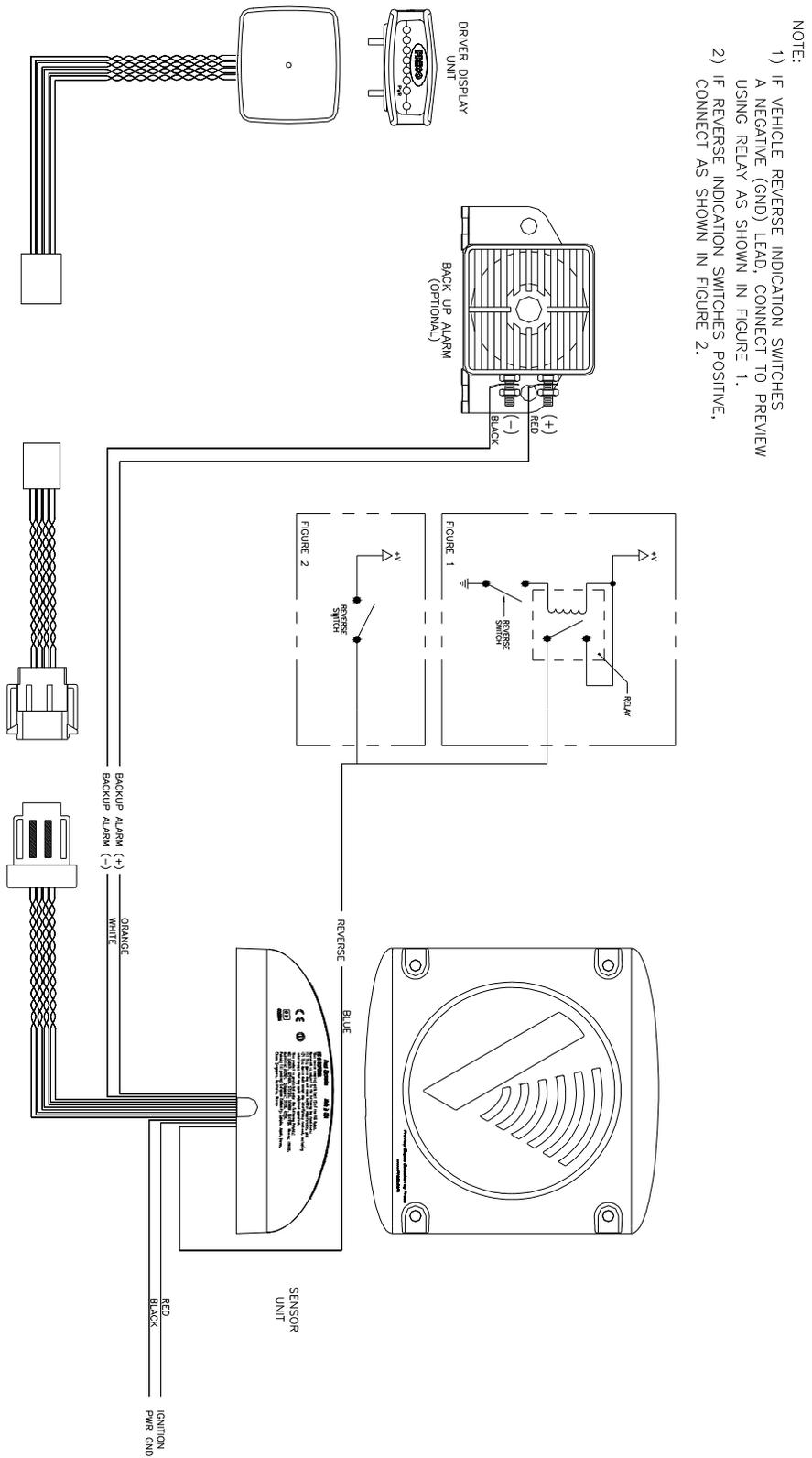
The Rearsense™ display unit comes equipped with a mounting bracket and hardware. If desired, the display unit can be mounted to the display bracket with the supplied hardware. This bracket can then be mounted in the vehicle cab as desired.

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. Once the sensor has been installed, the cable to the display must be routed from the vehicle rear to the cab.

This is perhaps one of the more difficult portions of the installation and some thought should be put into it prior to commencing. Care should be taken to not route the cable next to heat sources such as engines and exhausts and areas that may see abrasion or rock damage.

Routing of the cable should start at the sensor end since the display end comes equipped with a grommet for 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 fitted together with the connector latch engaged.



NOTE:

- 1) IF VEHICLE REVERSE INDICATION SWITCHES A NEGATIVE (GND) LEAD, CONNECT TO PREVIEW USING RELAY AS SHOWN IN FIGURE 1.
- 2) IF REVERSE INDICATION SWITCHES POSITIVE, CONNECT AS SHOWN IN FIGURE 2.

Figure 4. System Level Schematic

Initial System Power Up and Test

Once the sensor and display are installed, wired, and connected, power should be applied to verify correct system operation. Upon power up, the display will go through its self-test by illuminating all LED's and sounding the buzzer. The LED's will sequentially go out and the buzzer will cease sounding after two seconds. 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. It may be possible to ignore the obstruction.

If for some reason the system is malfunctioning, one or more of the yellow LED's 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 engages the parking 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.

Operator Display Error Indications

Since the Heavy Duty Rearsense[™] system can utilize multiple sensors, an advanced error reporting system is necessary to both alert the operator and assist a technician in troubleshooting any problems. The operator display LED's will provide a flashing error code detailing which sensor is malfunctioning and a description of the malfunction. An error is signified by the green LED flashing, the buzzer sounding at its fastest rate, and one or more yellow LED's blinking. The number and sequence of the yellow LED's defines the error type.

To determine which error is occurring the first step is to note which display yellow LED's are flashing. The position of this flashing LED(s) provides the identification of the failed sensor. It is a binary number based on the LED position from the display right. If the first yellow LED from the right is flashing, then this is sensor number 1, if the second LED is flashing, this indicates sensor number 2, and if the first and second LED's are flashing this indicates sensor number 3. In single sensor configurations, the sensor identification is always set to the factory default of one.

Once the sensor identification number is known, then the number of flashes is used to determine the error code. The error code flash sequence consists of a number of quick flashes separated by a short off time. Once the number of flashes is known use the table below to determine the error code. Consult the Troubleshooting section in the manual for possible solutions.

Flashing Sequence	Reason
1 on, 1 off	Sensor Error – Contact Factory
2 on, 1 off	Sensor Error – Contact Factory
3 on, 1 off	No communication between sensor and display
4 on, 1 off	Incorrect configuration between sensor and display

Table 2. Display Error Codes

In the figure below, the green power ON LED is flashing continuously and first two yellow LED's are flashing three times with a short off time in between. From the description above, this indicates sensor number three is having a communication problem with the display unit. Possible causes may be that sensor number three does not have power applied or a disconnected cable between sensor three and the display unit.



Error indicating sensor
#3 has a problem

Figure 5. Example Display Error Code

Calibration/Close in Object Detection Elimination

A major improvement in the Rearsense™ Object Detection System has been the addition of a feature that allows close-in objects to be ignored. Many vehicle installations require the Rearsense™ sensor to be mounted where a portion of the vehicle is constantly being detected and reported as close in detection. Examples of this may be a recessed mounting location, tires, or bumper.

If the optimum sensor mounting position results in all the display LED's being lit, the most probable cause may be due to a close in detection. A calibration should then be performed to null this obstruction from the detection zone. The PrecoNet™ Service Tool is connected to the sensor and with a clear detection zone, the calibration feature is enabled. Once the calibration is completed in approximately 10 seconds, the system should be powered down and connected back to the display. Power up the system and verify that the displays LED's indicate no detection. A person walking behind the vehicle noting the detection edge should now verify the detection zone. The calibration may alter the close in detection zone. Further details on this feature are provided in the PrecoNet™ Service Tool User Instructions. Please consult the factory for details on the PrecoNet™ Service Tool.

COMMON INSTALLATION PROBLEMS AND TROUBLESHOOTING

Display power ON green LED is not illuminated.

- Verify that keyed DC power is applied to the sensor (+12V to red wire and ground to black wire).
- Verify that the cable between the sensor and display is connected.

Display continuously flashes 3 times (indicates a communication failure with the sensor).

- Check connection between display and sensor.
- If sensor had just been connected to the service tool, cycle power to sensor after connecting to display.
- If the system has multiple sensors, verify that 'Y' interconnect cable is correctly installed with the connector with the gray molding connecting to the sensor that is farthest away from the display.

Display continuously flashes 4 times (indicates a configuration error between display and sensor).

- Using the PrecoNettm service tool, verify the identifications and type match between the display and sensor. Example: sensor ID =1, type = rear, and at the display the sensor ID = 1 and type = rear. See the service tool user manual for further details.

The display LED's operate correctly but the buzzer does not sound when an object is detected.

- Verify that the sensor reverse input (blue wire) is connected to the vehicle's reverse indication. This input should become active (+12V) when the vehicle is in reverse.
- Change the display configuration so the buzzer operates while in reverse gear. See the service tool user manual for further details.

The display LED's operate while the vehicle is in both reverse and forward gears.

- Change the display configuration so LED's only operate while in reverse gear. See the service tool user manual for further details.

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 either a special bracket must be used to move the sensor away from the obstruction or a calibration must be performed. See the service tool user manual for further details on how to perform a calibration.

Back up alarm does not operate when connected to the Rearsensetm sensor.

- Verify that the sensor reverse input (blue wire) is connected to the vehicle's reverse indication.
- Verify that the sensor's orange wire is connected to the back up alarm positive (+) input and the white wire is connected to the back up alarm negative (-) input.
- Disconnect all other back up alarm connections to the vehicle.

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

- In an open field, either move the sensor up higher or slightly angle the sensor upward 2 to 5 degrees. The minimum recommended mounting height is 30 inches. Contact Preco for an angle bracket if one is required.

Cable between display and sensor is too short.

- Contact Preco for an extension cable. This cable is placed between the sensor and display cable and comes in 5', 10', 15' and 25' increments.

Back up alarm sounds 2 to 3 times every time vehicle is placed in reverse.

- This is the default operating mode, if desired this can be changed. The display configuration is changed by setting the buzzer mode to "Reverse and Detect" rather than "Reverse Announce/Detect". See the service tool user manual for further details.

Detection pattern seems wider when a vehicle is detected rather than a person.

- This is normal since any vehicle presents a larger radar cross section than a person. If desired, modify the configuration by either shortening the range or going to a narrower pattern.

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.

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.

REARSENSE™ DAILY MAINTENANCE

Detach this page and place with daily operator maintenance procedures

Safety Message to Operators of Vehicles with Rearsense™ Systems

1. The Rearsense™ 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 Rearsense™ 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. Start the vehicle, set the park brakes, 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 the rear of the vehicle and to the side so that he is in sight of the operator's mirrors. He should begin ½ meter (20") to the rear of the rearmost part of the vehicle. As the assistant walks towards the centerline of the vehicle parallel to the rear, the external backup alarm will activate, 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 where detection started and stopped to the rear of the vehicle.

For Questions call +64-21-447151 between 7:00 AM and 5:00 PM