

BENDIX[™] BLINDSPOTTER[®] SIDE OBJECT DETECTION SYSTEM

DESCRIPTION

The Bendix[™] BlindSpotter[®] side object detection system is an aid to help professional drivers with vehicle blind-spots, by alerting them to large metallic objects within the range of the radar sensor(s) mounted on the side(s) of the vehicle.



FIGURE 1 - BENDIX[™] BLINDSPOTTER[®] RADAR SENSOR AND IN-CAB OPERATOR DISPLAY UNIT (ODU)

Used in conjunction with rear view mirrors and other instrumentation to maintain safe operation of the vehicle, the radar sensor(s) provide an approximate ten foot by fifteen foot detection zone. *See Figure 2.*

The Bendix BlindSpotter side object detection system can be installed on one or both sides of the vehicle. The system is comprised of up to four radar sensor(s) — located on one side of a vehicle along with a driver display unit, located on the windshield pillar on that side — to warn the driver when an object is detected.

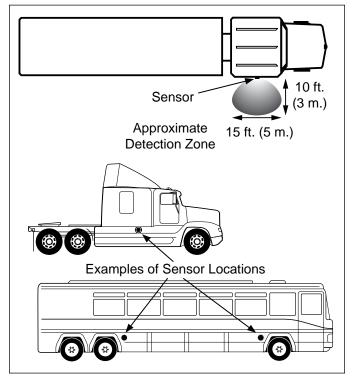


FIGURE 2 - BENDIX[™] BLINDSPOTTER[®] RADAR SENSOR DETECTION ZONE AND EXAMPLE LOCATIONS

4
6
7
7
8
9
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The driver is always responsible for the control and safe operation of the vehicle at all times. The Bendix[™] BlindSpotter[®] Radar system does not replace the need for a skilled, alert professional driver, reacting appropriately and in a timely manner, and using safe driving practices.



Any audible and/or visual alert by the system means that a vehicle has been detected by the Bendix BlindSpotter system and the driver must immediately act to potentially avoid, or lessen the severity of, a collision.

Improper use of the Bendix BlindSpotter system could lead to a serious accident. Read this entire Service Data Sheet before operating the Bendix BlindSpotter system. Pay particular attention to the safety messages below. This guide should be used in conjunction with proper training.

Limitations of Collision Warning Systems

The Bendix BlindSpotter side collision warning system is intended solely as an aid for an alert and conscientious professional driver. It is not to be used or relied upon to operate a vehicle. The system should be used in conjunction with rear view mirrors and other instrumentation to maintain safe operation of the vehicle, ground personnel, and adjacent property. A vehicle equipped with the Bendix BlindSpotter system should be operated in the same safe manner as if the system were not installed. The system is not a substitute for normal safe driving procedures. It will not compensate for any driver impairment, such as drugs, alcohol, or fatigue. Should the system become inoperative, it could jeopardize the safety or lives of those who depend on the system for safety.



The system will not sense objects if the sensor view is obstructed. Therefore, do not place objects in front of the system sensor. Remove heavy buildups of mud, dirt, ice, and other materials.

Proper installation and placement is critical to correct operation of the system.

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 (see the "Testing System Operation" section) prior to the vehicle's operation. Results of this test must be recorded in the maintenance log. People operating this equipment MUST check for proper operation at the beginning of every shift or safety inspection period.

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.

Failure to follow all safety precautions and instructions may result in property damage, serious injury, or death.

The Bendix BlindSpotter system is intended for commercial use. Proper installation of this system requires a good understanding of truck electrical systems and procedures, along with proficiency in the installation.

Store these instructions in a safe place and refer to them when maintaining and/or reinstalling the product.

Some of the tests in this manual require the technician to use a test meter to measure the voltage and resistance of the vehicle's electrical circuits. If it becomes necessary to temporarily connect the test meter leads to wire harness terminals, be sure to:

- Never insert anything, including test lead probes, into the vehicle harness connector terminals, as this can distort or damage the wire terminals.
- Never pierce the wire insulation to test circuits, as this can result in damaged wires and wire corrosion.
- (When making resistance checks on circuits...) Make sure the vehicle ignition is off to prevent damage to test equipment and vehicle components.

Consult the vehicle operator's manual for any applicable details regarding the use and operation of this system.

Federal Communications Commission

This device complies with Part 15 of the FCC (Federal Communications Commission) rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must be able to accept any interference received, including interference that may cause undesired operation. Any interference that may be caused should be reported to the local FCC field office or to the Federal Communications Commission; Enforcement Bureau; 445 12th Street S.W.; Room 7-C485; Washington, DC 20054.

Any changes or modifications made by the user to this equipment that are not expressly approved by Bendix Commercial Vehicle Systems LLC could void the user's authority to operate the equipment.

Every effort has been made to ensure the accuracy of all information in this SD Sheet. However, Bendix Commercial Vehicle Systems LLC makes no expressed or implied warranty or representation based on the enclosed information. Errors or omissions should be reported to:

Bendix Commercial Vehicle Systems LLC, 901 Cleveland Street, Elyria, OH 44035 or 1-800-AIR-BRAKE (1-800-247-2725).

GENERAL SAFETY GUIDELINES WARNING! PLEASE READ AND FOLLOW THESE INSTRUCTIONS TO AVOID PERSONAL INJURY OR DEATH:

When working on or around a vehicle, the following guidelines should be observed AT ALL TIMES:

- ▲ Park the vehicle on a level surface, apply the parking brakes and always block the wheels. Always wear personal protection equipment.
- ▲ Stop the engine and remove the ignition key when working under or around the vehicle. When working in the engine compartment, the engine should be shut off and the ignition key should be removed. Where circumstances require that the engine be in operation, EXTREME CAUTION should be used to prevent personal injury resulting from contact with moving, rotating, leaking, heated or electrically-charged components.
- ▲ Do not attempt to install, remove, disassemble or assemble a component until you have read, and thoroughly understand, the recommended procedures. Use only the proper tools and observe all precautions pertaining to use of those tools.
- ▲ If the work is being performed on the vehicle's air brake system, or any auxiliary pressurized air systems, make certain to drain the air pressure from all reservoirs before beginning ANY work on the vehicle. If the vehicle is equipped with a Bendix[®] AD-IS[®] air dryer system, a Bendix[®] DRM[™] dryer reservoir module, or a Bendix[®] AD-9si[™] air dryer, be sure to drain the purge reservoir.
- ▲ Following the vehicle manufacturer's recommended procedures, deactivate the electrical system in a manner that safely removes all electrical power from the vehicle.

- ▲ Never exceed manufacturer's recommended pressures.
- Never connect or disconnect a hose or line containing pressure; it may whip. Never remove a component or plug unless you are certain all system pressure has been depleted.
- ▲ Use only genuine Bendix[®] brand replacement parts, components and kits. Replacement hardware, tubing, hose, fittings, etc. must be of equivalent size, type and strength as original equipment and be designed specifically for such applications and systems.
- ▲ Components with stripped threads or damaged parts should be replaced rather than repaired. Do not attempt repairs requiring machining or welding unless specifically stated and approved by the vehicle and component manufacturer.
- ▲ Prior to returning the vehicle to service, make certain all components and systems are restored to their proper operating condition.
- ▲ For vehicles with Automatic Traction Control (ATC), the ATC function must be disabled (ATC indicator lamp should be ON) prior to performing any vehicle maintenance where one or more wheels on a drive axle are lifted off the ground and moving.
- ▲ The power MUST be temporarily disconnected from the radar sensor whenever any tests USING A DYNAMOMETER are conducted on a Bendix[®] Wingman[®] Advanced[™]-equipped vehicle.
- ▲ You should consult the vehicle manufacturer's operating and service manuals, and any related literature, in conjunction with the Guidelines above.

1.0 OPERATION

OPERATOR DISPLAY UNIT See Figure 3.

The Bendix[™] BlindSpotter[®] Radar system assists the driver by giving audible and visual alerts.

• A visual warning: The side object display unit uses two (2) LED indicators to display the status of the side radar sensor. The yellow LED indicates the system is active, but no objects are detected. The red LED indicates the system is detecting an object.

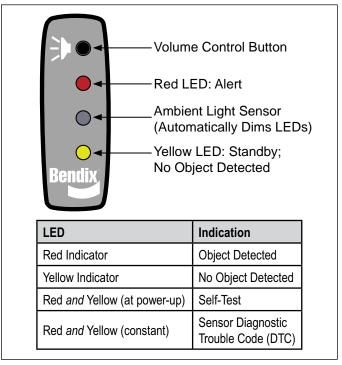


FIGURE 3 - BENDIX BLINDSPOTTER DRIVER DISPLAY UNIT LED INDICATORS

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- An audible warning: When the vehicle's turn signal is active and the sensor detects a large metallic object alongside the vehicle, the side sensor display emits an audible warning tone.
- Volume Control: Steps the volume level of the alerts between low, medium and high (and back through the sequence). The most recent selection is stored in the memory.
- **An Ambient Light Detector:** Automatically adjusts the brightness of the LEDs.

If the system detects a failure and becomes inoperative, the display unit will warn the driver by continuously illuminating both the red and yellow LEDs at the same time.

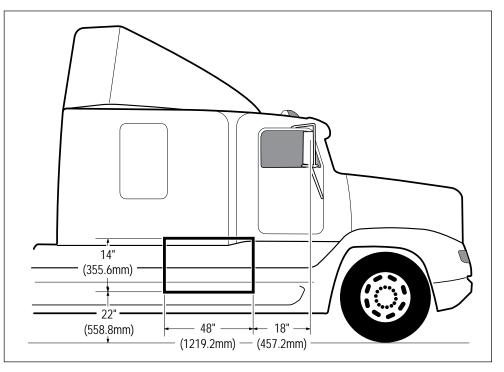


FIGURE 4 - RECOMMENDED INSTALLATION LOCATION (SINGLE SENSOR SYSTEMS)

1.1 RANGE

See Figure 2. The effective range is approximately ten (10) feet out from the vehicle and the detection zone extends seven and a half feet forward and backward from the sensor.

1.2 SENSOR LOCATION

The Bendix[™] BlindSpotter[®] Side Object Detection Sensor must be mounted on the side of the vehicle, between 22 and 36 inches from the ground and at least 18 inches rear of the side view mirror (*See Figure 4*).

Note: To reduce the possibility of the sensor detecting objects mounted to the vehicle — like the steps or fuel tanks — make sure the face of the sensor extends out a minimum of 5/16 of an inch further than any other object within six (6) inches of the sensor's body.

1.3 SENSOR ORIENTATION

The Bendix BlindSpotter Sensor should be mounted on a vertical surface and oriented so that the embossed logo is parallel to the ground — you may use the lower two mounting holes as a guide - *see Figure 5.* Orientation is crucial for proper operation due to the radar's polarized beam profile.

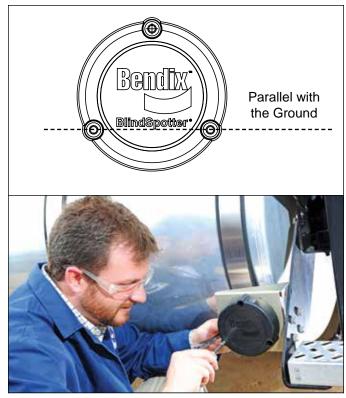


FIGURE 5 - INSTALLATION OF SENSOR

1.4 OPERATOR DISPLAY UNIT MOUNTING

The Bendix BlindSpotter Operator Display Unit (ODU) should be mounted on a windshield pillar for the side of the vehicle being monitored - *see Figure 6.*

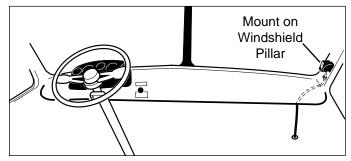


FIGURE 6 - INSTALLATION OF ODU

The Bendix BlindSpotter Operator Display Unit has a bracket that is designed to be bent up to fifteen (15) degrees in order to optimize the angle for the driver's view.

1.5 WHAT TO EXPECT WHEN USING THE BENDIX[™] BLINDSPOTTER[®] SYSTEM

POWER-UP TEST	What to Expect at Vehicle Power-Up
Situation	Typical System Indication/Alerts
At vehicle power-up (with no metal object within the sensor's detection zone).	• Both the red and yellow LEDs illuminate for a half-second as a system self-test, followed by;
	 The red LED remains on for a further 5 (five) seconds as a sensor self-test, followed by;
	The yellow LED illuminates and stays ON.
	(Note: if, instead, a metal object <i>is within the sensor's detection zone</i> , the yellow LED will extinguish, and the red LED will illuminate.)

Tables 1 and 2 illustrate what to expect from the Bendix[™] BlindSpotter[®] system in various driving situations.

TABLE 1 - POWER-UP TEST SEQUENCE

What to Expect During Vehicle Use		
		Typical System Indication/Alerts
Situation	Yellow LED	Other Indicators
Normal driving (no other vehicle present alongside).	ON	None.
The driver passes a vehicle, or a vehicle enters the sensor detection zone alongside the vehicle.	OFF	The red LED will illuminate.
A guard-rail, or similar large metallic object, is detected by the sensor.	OFF	The red LED will illuminate.
The driver passes by any non-metallic object or person (e.g. pedestrian, wooden structure, etc).	ON	None; radar technology only detects metallic objects.
The driver activates the left turn signal, and the sensor on the left side of the vehicle detects a large metallic object.	OFF	The red LED will illuminate AND the alert tone will sound on a left-mounted display unit. Note: An alert tone will sound only once each time a turn signal is activated.
Note: The sensor is wired to the turn signal on the same side of the vehicle as the sensor is mounted (e.g. A right -hand turn signal causes a right -hand mounted display to illuminate the red LED and sound a tone if a vehicle is detected).	Any audible and/or visual alert by the system means that a sizable, metallic (radar-reflective) object has been detected by the Bendix BlindSpotter system and the driver must immediately act to potentially avoid, or lessen the severity of, a collision.	
The driver activates the turn signal (towards a side of the vehicle with the Bendix BlindSpotter system installed) with no vehicle in the detection zone on that side.	ON	None.
Both red and yellow LEDs remain illuminated.	ON	A Diagnostic Trouble Code has been set. See the Troubleshooting Section.
Power supply disconnected from Bendix BlindSpotter	OFF	None.

TABLE 2 - OPERATIONAL SCENARIOS WITH THE BLINDSPOTTER SYSTEM

NOTE: These are typical situations and responses that may occur when using the Bendix BlindSpotter system. All possible situations and responses may not be covered in this table.

Due to inherent limitations of radar technology, the Bendix[™] BlindSpotter[®] technology — on rare occasions — may not detect sizable, metallic (radar-reflective) objects in the detection zone. Alerts, or warnings may not occur.

1.6 ALERTS AND WARNINGS

The Bendix BlindSpotter system operates differently compared to other collision warning systems. It is important for *YOU* to fully understand the system's features, especially the driver alerts and warnings.



Any audible and/or visual alert by the system means that a sizable, metallic (radar-reflective) object has been detected by the Bendix BlindSpotter system and the driver must immediately act to potentially avoid, or lessen the severity of, a collision.

1.7 BENDIX BLINDSPOTTER SYSTEM DIAGNOSTIC TROUBLE CODES

The Bendix BlindSpotter system monitors itself and if any malfunction is detected, a Diagnostic Trouble Code (DTC) will be set and the driver will be alerted by the illumination of both the red and yellow LEDs.

1.8 RADAR SENSOR REPLACEMENT

Sensors should only be replaced using like-for-like part numbers, or their direct replacements, as provided by the OEM or Bendix. Contact the Bendix Tech Team at 1-800-AIR-BRAKE (1-800-247-2725), option 2, to request part number assistance.



Do not interchange radar sensors without contacting Bendix first!

1.9 ALERT VOLUME

Bendix BlindSpotter systems permit the audible alert level to be adjusted by pressing the top button on the Operator Display Unit. To adjust the volume, press the button and the unit will cycle between low, medium and high, and back through the sequence.

1.10 POTENTIAL FALSE ALERTS

In certain unusual traffic or roadway conditions, the Bendix BlindSpotter systems may issue a false alert.

Drivers should take into account the road conditions, and any other factors they are encountering, as they choose how to react to any alerts they receive from the Bendix BlindSpotter system.

1.11 RADAR CLEARANCE

Vehicle equipment, including trim, etc. must not infringe upon the zone used by the radar sensor to emit and receive radar waves. Failure to comply with this requirement will impair the function of the radar. Only vehicle OEM-approved covers, trim and/or cover panels may be installed around, or directly in front of, the radar.

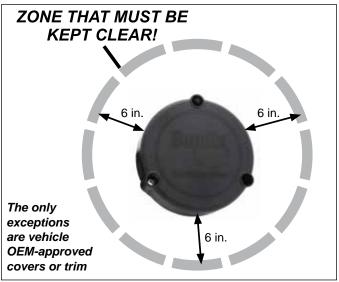


FIGURE 7 - CLEARANCE ZONE AROUND THE SENSOR

For proper operation of your Bendix BlindSpotter system, adhere to the following guidelines:

- The radar sensor assembly should be OEM-installed on the vehicle following all OEM specifications.
- The radar's field of view must NOT have interference from any other vehicle components such as hand rails, aftermarket lights, seasonal decorations, or any other commonly mounted vehicle components. The radar signal is emitted from the front of the sensor with a spreading beam. In order to ensure that no adverse interference is experienced from other nearby vehicle equipment, a suitable clearance must be maintained around the radar. This clearance must be maintained regardless if the vehicle is stationary or in motion. See *Figure 7 for a general guide to the zone required.*
- To reduce the possibility of the sensor detecting objects mounted to the vehicle like the steps or fuel tanks make sure the face of the sensor extends out a minimum of 5/16 of an inch further than any other object within six (6) inches of the sensor's body. See Figure 7.

NOTE: Bendix does not certify, nor offer warranty on, Bendix BlindSpotter systems where system performance is affected by beam obstructions of any kind or unapproved post-production covers. This document gives general guidelines that will work for most vehicles; exceptions may exist.

2.0 MAINTENANCE SECTION

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2.1 EQUIPMENT MAINTENANCE

▲ Importance of Maintenance – Optimal Bendix[™] BlindSpotter[®] system performance requires a properly maintained system, without any active Diagnostic Trouble Codes (DTCs). Have problems indicated by active DTCs repaired by a qualified technician.

System Problems – If a problem with the Bendix BlindSpotter system is detected, either both the red and yellow LEDs will be illuminated, or — in the case of power supply problems — there will be no LEDs illuminated. The system should be serviced as soon as possible to restore full functionality.

2.2 PREVENTIVE MAINTENANCE

The Bendix BlindSpotter system is relatively maintenance free. The key items to keep the system functioning properly include:

- 1. Keep the radar sensor clean and free of obstructions, mud, snow, bugs, etc... using OEM-approved cleaning products.
- 2. Inspect for any damage to the unit or the Bendix BlindSpotter mounting surface or bracket. **Never use the radar unit as a step.**

NOTE: If the radar sensor was originally installed on a vehicle panel, check the panel for damage, etc... that may affect the radar's performance before reinstalling. Replace the panel, if necessary, with an original OEM-supplied panel. **Do not paint over the radar**.

The driver is always responsible for the control and safe operation of the vehicle at all times. The Bendix[™] BlindSpotter[®] system does not replace the need for a skilled, alert professional driver, reacting appropriately and in a timely manner, and using safe driving practices.

Radar Inspection – The driver should inspect the radar and mounting bracket regularly and remove any mud, snow, ice build-up, or other obstructions. The installation of aftermarket vehicle guards — or similar potential obstructions — is not recommended, and could impair the operation of the radar.

Radar Damage/Tampering – In cases where the vehicle body and/or radar have sustained any damage, or if you suspect that the radar has been tampered with, consider disabling the Bendix BlindSpotter until repairs can be made. In addition, an indicator on the dash typically will illuminate if the system detects any of these conditions. Consult your vehicle's operator's manual or contact Bendix for more information.

2.3 GENERAL SAFETY GUIDELINES

Follow the General Safety Guidelines on Page 3 of this document.

ADDITIONAL SUPPORT AT WWW.BENDIX.COM/1-800-AIR-BRAKE (1-800-247-2725, OPTION 2)

For direct telephone technical support, the Bendix Tech Team is available at 1-800-AIR-BRAKE (1-800-247-2725, option 2) Monday through Friday, 8:00 A.M. to 6:00 P.M. ET. Follow the instructions in the recorded message.

Email the Bendix Tech Team at: techteam@bendix.com for assistance.

3.0 INTRODUCTION TO TROUBLESHOOTING SECTION

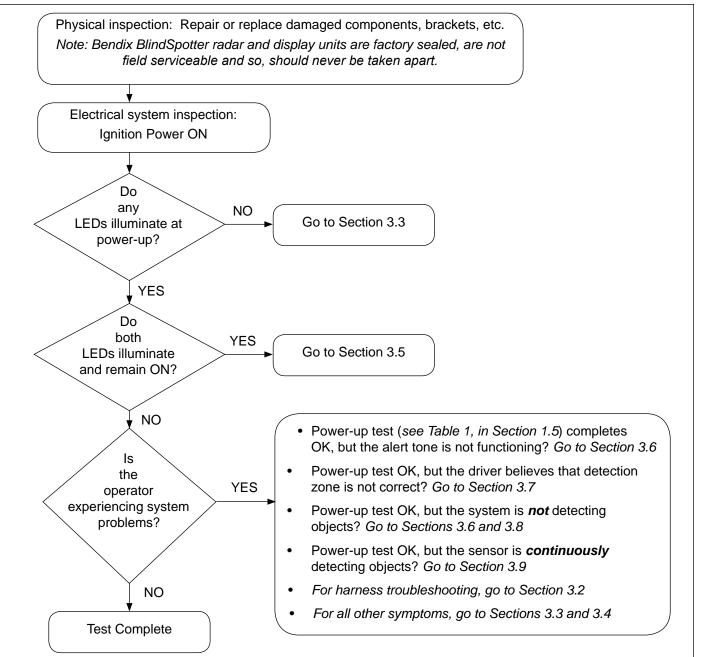
This section introduces initial steps to accurately troubleshoot the Bendix[™] BlindSpotter[®] system.

Bendix recommends reading the entire document before performing any troubleshooting.

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3.9	Troubleshooting When Objects Are Continuously Being Detected

3.1 TROUBLESHOOTING OVERVIEW



3.2 TROUBLESHOOTING WIRING HARNESSES

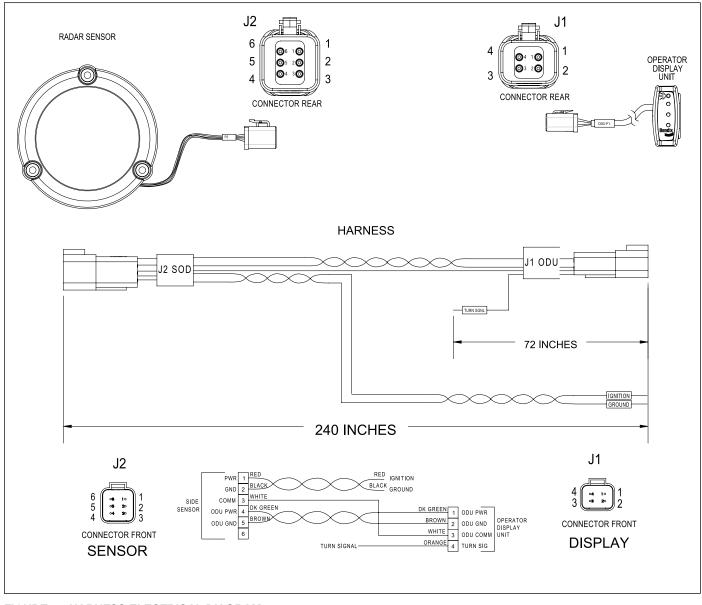
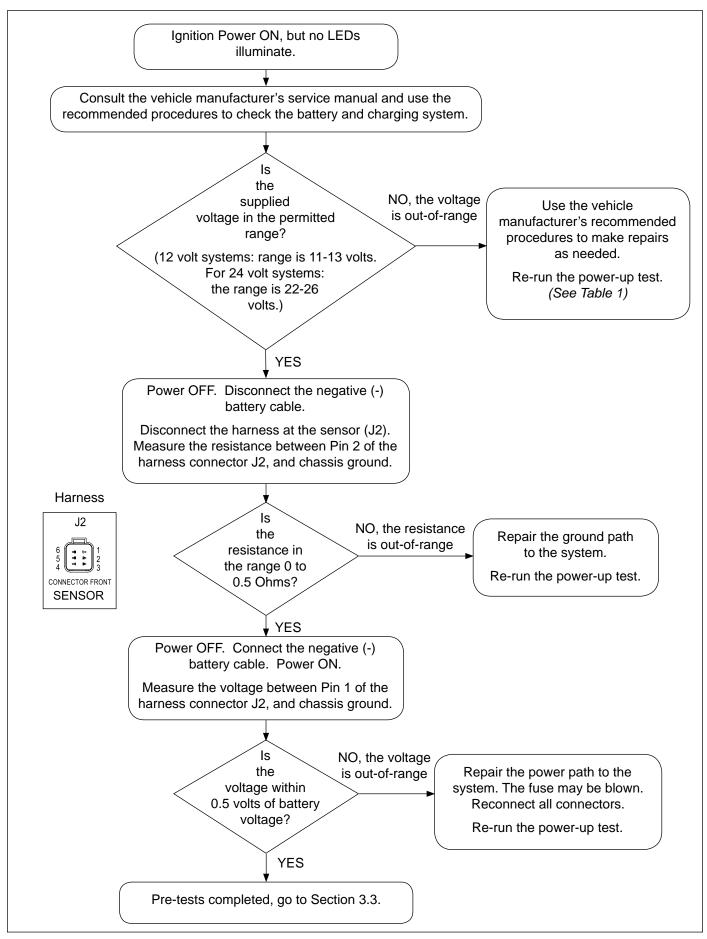


FIGURE 8 - HARNESS ELECTRICAL DIAGRAM.

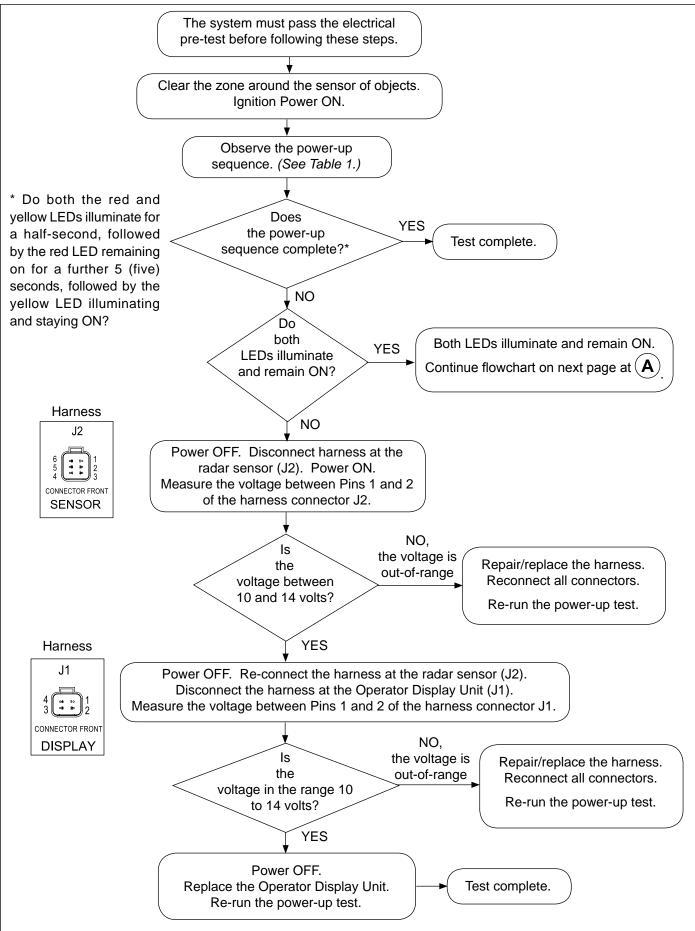
All wire harness connectors must be properly seated to maintain environmental seals. Push the mating connector until it seals with a click. When replacing a Bendix[™] BlindSpotter[®] radar sensor or Operator Display Unit, check that the wire harness connector is free of corrosion before plugging into the new device. Check for corroded or damaged wiring that may cause connector problems such as opens or shorts to voltage or ground.

If the connector terminals are corroded, this may be an indication of water intrusion into the wiring system and possibly into the radar sensor. Replacement of the entire harness is recommended. If any terminals are corroded, replacement is recommended.

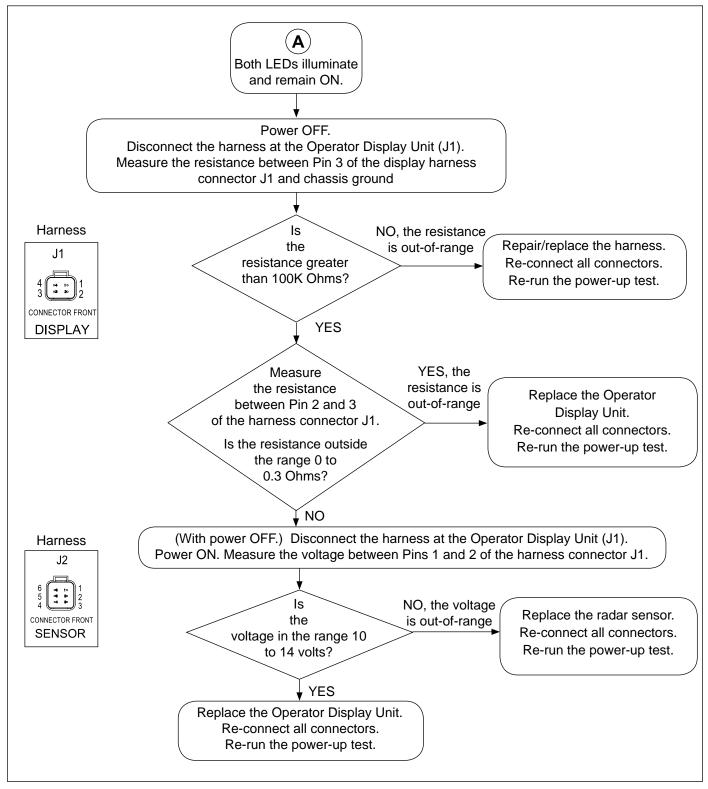
3.3 ELECTRICAL SUPPLY TROUBLESHOOTING PRE-TESTS



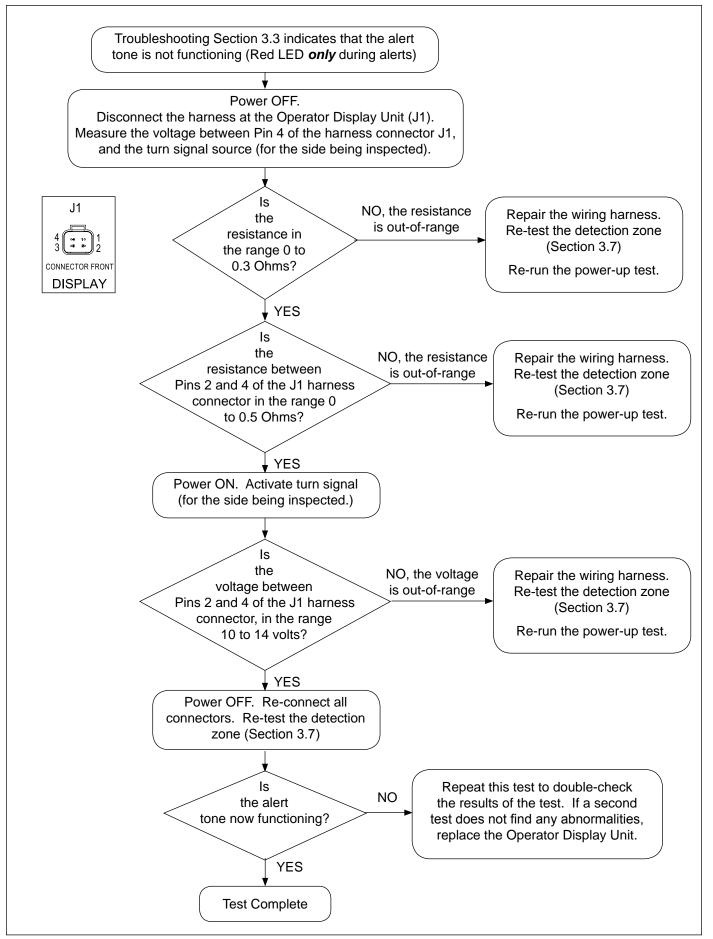
3.4 ELECTRICAL SUPPLY TROUBLESHOOTING: POWER-UP SEQUENCE



3.5 TROUBLESHOOTING WHEN BOTH LEDs REMAIN ON



3.6 TROUBLESHOOTING WHEN THE ALERT TONE IS NOT FUNCTIONING



3.7 TROUBLESHOOTING THE DETECTION ZONE

Park the vehicle in an area with no metallic objects within 15 feet of the sensor being inspected. Turn the ignition ON and wait for the self-check (See Table 1) to complete.

Activate the turn signal towards the side being examined. Using a sizeable metallic object [at least one (1) foot by one (1) foot], test the effective Detection Zone for the BendixTM BlindSpotter[®]. Note that the alert tone will sound once for each operation of the turn signal. The technician may find it helpful to have an assistant be ready to cancel and re-apply the turn signal as the metallic object is moved into the detection zone from the side, the front and back.

The red LED should remain illuminated while the object is within the detection zone. The zone should be approximately ten (10) feet from the vehicle directly in line with the sensor, and five-and-a-half (5.5) feet towards the front (and back) of the vehicle. *See Figure 9.*

If the zone is not as expected, inspect the mounting location for any obstructions, vehicle trim damage, loose brackets, etc. and repair or relocate the sensor as needed.

See Section 1.2 in cases where the sensor needs to be relocated.

See Section 1.13 for information about the required clearance zone around the sensor.

See the Sections that follow for cases where no detection or continuous detection is experienced.

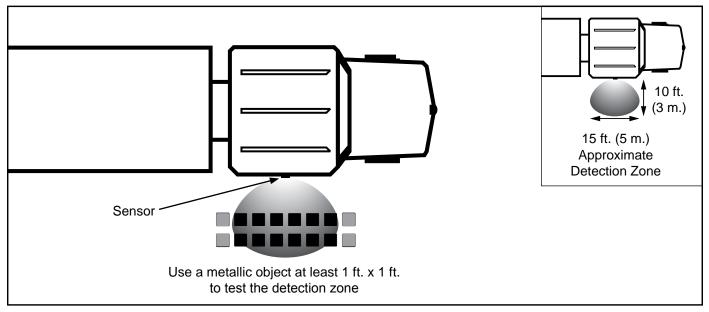
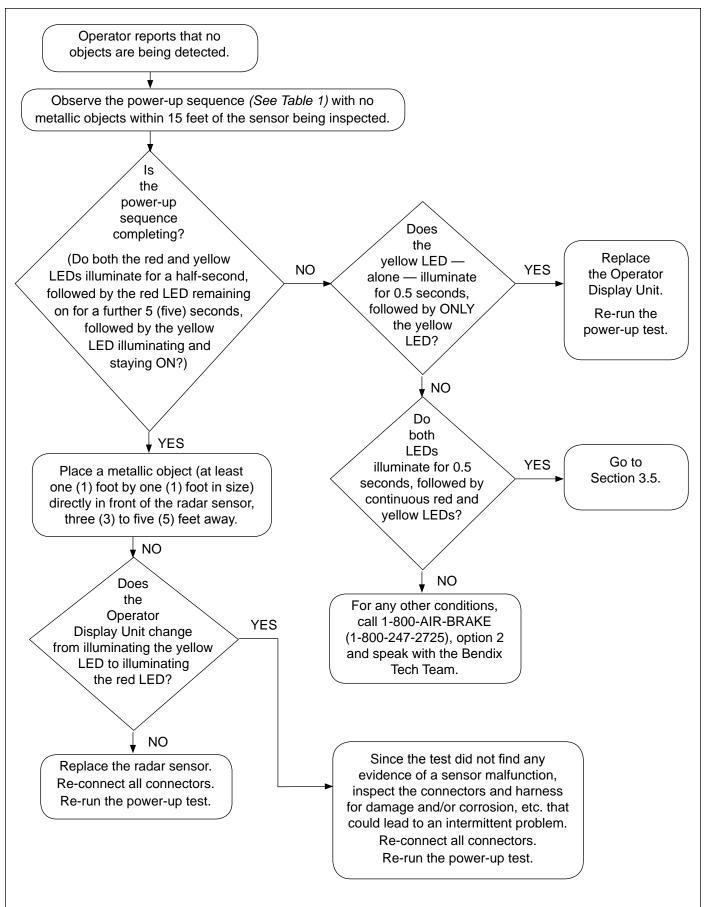
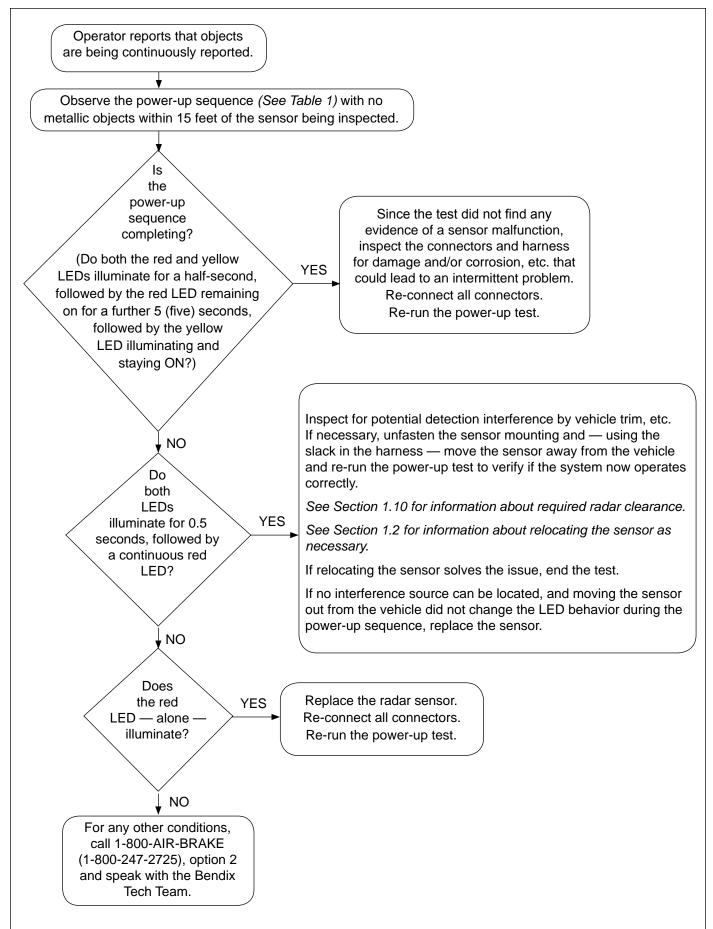


FIGURE 9 - RADAR SENSOR DETECTION ZONE (TYPICAL INSTALLATION ON PASSENGER SIDE SHOWN).

3.8 TROUBLESHOOTING WHEN NO OBJECTS ARE BEING DETECTED



3.9 TROUBLESHOOTING WHEN OBJECTS ARE CONTINUOUSLY BEING DETECTED



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NOTES

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