SEBU8838-08 (en-us)
November 2018

# Operation and Maintenance Manual

## Cat® Detect Object Detection, Gen III System, Touch Screen

DTL 1-UP (Machine Control & Guidance Products)
B9H 1-UP (Machine)
R9H 1-UP (Machine)
B9K 1-UP (Machine)
221 1-UP (Machine)
H8M 1-UP (Machine)
232 1-UP (Machine)
2T6 1-UP (Machine)
233 1-UP (Machine)
2T9 1-UP (Machine)
234 1-UP (Machine)
2T2 1-UP (Machine)
H9K 1-UP (Machine)
TW4 1-UP (Machine)
TWY 1-UP (Machine)
T6X 1-UP (Machine)
TWZ 1-UP (Machine)
DMB 1-UP (Machine)
T1Z 1-UP (Machine)
MBB 1-UP (Machine)
T1Y 1-UP (Machine)
LT6 1-UP (Machine)
WNB 1-UP (Machine)
L4Y 1-UP (Machine)
LWY 1-UP (Machine)
L6Z 1-UP (Machine)
LWZ 1-UP (Machine)
K4Y 1-UP (Machine)
MBE 1-UP (Machine)
2L4 1-UP (Machine)
RWB 1-UP (Machine)
2L9 1-UP (Machine)
SEE 1-UP (Machine)
2L3 1-UP (Machine)
SET 1-UP (Machine)
LWA 1-UP (Machine)
Z9K 1-UP (Machine)
H4C 1-UP (Machine)
Z4D 1-UP (Machine)
W7K 1-UP (Machine)
GTZ 1-UP (Machine)
880 1-UP (Machine)
ZMX 1-UP (Machine)
Z4Z 1-UP (Machine)
Z8Z 1-UP (Machine)
T8E 1-UP (Machine)
TWX 1-UP (Machine)
L8X 1-UP (Machine)
LWX 1-UP (Machine)
A9P 1-UP (Machine)
K9X 1-UP (Machine)
SMX 1-UP (Machine)
MM9 1-UP (Machine)
MRK 1-UP (Machine)
DJK 1-UP (Machine)
M9P 1-UP (Machine)
E8X 1-UP (Machine)
EWX 1-UP (Machine)
MH8 1-UP (Machine)
SWH 1-UP (Machine)
KK2 1-UP (Machine)
KK4 1-UP (Machine)
RM2 1-UP (Machine)
NL8 1-UP (Machine)
MCZ 1-UP (Machine)
RDM 1-UP (Machine)
KLS 1-UP (Machine)
M4R 1-UP (Machine)
LW4 1-UP (Machine)
WCM 1-UP (Machine)
SL9 1-UP (Machine)
WCS 1-UP (Machine)
SLL 1-UP (Machine)
WCL 1-UP (Machine)
KK3 1-UP (Machine)
KK6 1-UP (Machine)
RM3 1-UP (Machine)
RM6 1-UP (Machine)

# Important Safety Information

Most accidents that involve product operation, maintenance and repair are caused by failure to observe basic safety rules or precautions. An accident can often be avoided by recognizing potentially hazardous situations before an accident occurs. A person must be alert to potential hazards, including human factors that can affect safety. This person should also have the necessary training, skills and tools to perform these functions properly.

**Improper operation, lubrication, maintenance or repair of this product can be dangerous and could result in injury or death.**

**Do not operate or perform any lubrication, maintenance or repair on this product, until you verify that you are authorized to perform this work, and have read and understood the operation, lubrication, maintenance and repair information.**

Safety precautions and warnings are provided in this manual and on the product. If these hazard warnings are not heeded, bodily injury or death could occur to you or to other persons.

The hazards are identified by the “Safety Alert Symbol” and followed by a “Signal Word” such as “DANGER”, “WARNING” or “CAUTION”. The Safety Alert “WARNING” label is shown below.

**⚠ WARNING**

The meaning of this safety alert symbol is as follows:

**Attention! Become Alert! Your Safety is Involved.**

The message that appears under the warning explains the hazard and can be either written or pictorially presented.

A non-exhaustive list of operations that may cause product damage are identified by “NOTICE” labels on the product and in this publication.

**Caterpillar cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this publication and on the product are, therefore, not all inclusive. You must not use this product in any manner different from that considered by this manual without first satisfying yourself that you have considered all safety rules and precautions applicable to the operation of the product in the location of use, including site-specific rules and precautions applicable to the worksite. If a tool, procedure, work method or operating technique that is not specifically recommended by Caterpillar is used, you must satisfy yourself that it is safe for you and for others. You should also ensure that you are authorized to perform this work, and that the product will not be damaged or become unsafe by the operation, lubrication, maintenance or repair procedures that you intend to use.**

The information, specifications, and illustrations in this publication are on the basis of information that was available at the time that the publication was written. The specifications, torques, pressures, measurements, adjustments, illustrations, and other items can change at any time. These changes can affect the service that is given to the product. Obtain the complete and most current information before you start any job. Cat dealers have the most current information available.

**⚠ WARNING**

**When replacement parts are required for this product Caterpillar recommends using Cat replacement parts.**

**Failure to follow this warning may lead to premature failures, product damage, personal injury or death.**

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**In the United States, the maintenance, replacement, or repair of the emission control devices and systems may be performed by any repair establishment or individual of the owner's choosing.**

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# Foreword

## Literature Information

This manual should be stored in the operator's compartment in the literature holder or seat back literature storage area.

This manual contains safety information, operation instructions, and maintenance recommendations.

Some photographs or illustrations in this publication show details or attachments that can be different from your product.

Continuing improvement and advancement of product design might have caused changes to your product which are not included in this publication. Read, study and keep this manual with the product.

Whenever a question arises regarding your product, or this publication, please consult your Cat dealer for the latest available information.

## Safety

The safety section lists basic safety precautions. In addition, this section identifies the text and locations of warning signs and labels used on the machine.

## Operation

The operation section is a reference for the new operator and a refresher for the experienced operator. This section includes a discussion of gauges, switches, product controls, attachment controls, and programming information.

Photographs and illustrations guide the operator through correct procedures of checking, starting, operating and stopping the product.

Operating techniques outlined in this publication are basic. Skill and techniques develop as the operator gains knowledge of the product and its capabilities.

## Maintenance

The maintenance section is a guide to equipment care.

# Safety Section

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## Safety

**SMCS Code:** 7000

### Safety Messages

**⚠ WARNING**

**Do not operate or work on this machine unless you have read and understand the instructions and warnings in the Operation and Maintenance manuals. Failure to follow the instructions or heed the warnings could result in injury or death. Contact your authorized dealer for replacement manuals. Proper care is your responsibility.**

## Operation

Clear all personnel from the machine and from the area.

Clear all obstacles from the path of the machine. Beware of hazards (wires, ditches, etc).

Be sure that all windows are clean.

Secure the doors and the windows.

If the machine is equipped with rear view mirrors, then adjust the mirrors according to the specifications of the Operation and Maintenance Manual.

Make sure that the horn, the travel alarm (if equipped), and all other warning devices are working properly.

Fasten the seat belt securely.

Warm up the engine and the hydraulic oil before operating the machine.

Only operate the machine while you are in a seat.

The seat belt must be fastened while you operate the machine. Only operate the controls while the engine is running.

While you operate the machine slowly in an open area, check for proper operation of all controls and all protective devices. Before you move the machine, ensure that no one will be endangered. The machine can tip when you cross ditches, ridges, or other unexpected obstructions.

Do not allow riders on the machine unless the machine has the following equipment:

- Extra seat
- Extra seat belt
- Roll over Protective Structure (ROPS)

Note any needed repairs during machine operation. Report any needed repairs.

Avoid any conditions that can lead to tipping the machine. The machine can tip when you work on hills, on banks and on slopes. Also, the machine can tip when you cross ditches, ridges, or other unexpected obstructions.

Avoid operating the machine across the slope. When possible, operate the machine up the slopes and down the slopes.

Maintain control of the machine.

Do not overload the machine beyond the machine capacity.

Be sure that the hitches and the towing devices are adequate.

Never straddle a wire cable. Never allow other personnel to straddle a wire cable.

Before you maneuver the machine, make sure that no personnel are between the machine and the trailing equipment.

Always keep the Rollover Protective Structure (ROPS) installed during machine operation.

## Operation in a Blast Zone

Machines equipped with Object Detection should not operate within 30 m (98.43 ft) of a blast site. This blast site warning does not supersede the published requirements or regulations found in “Title 30 of the Code of Federal Regulations (CFR)” . This warning does not allow deviation from the published requirements or regulations found in “Title 30 of the Code of Federal Regulations (CFR)” . A hazard assessment should be conducted by each customer. Every customer should meet all the requirements of “Title 30 of the Code of Federal Regulations (CFR)” to ensure the safe storage, transportation, loading, and blasting of any explosive.

# Product Information Section

# Product Identification Information

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## Product Information

**SMCS Code:** 1000

**Note:** Check the listing for Approved Frequency Allocation Type by Country at:

https://dealer.cat.com/content/dam/dealer/Products/Technology/Mining%20Technology%20and%20Autonomy/detect/Object%20Detection%20Approved%20Country%20Listing%20-%202018-April.pdf

**Note:** Link to Cat Detect information at:

https://dealer.cat.com/en/products/technology/mining-technology-autonomy/detect.html

The Object Detection System will use the 464 - 7684 Object Detection Sensor Gp or the 397 - 2994 Object Detection Sensor Gp depending on application and regional regulatory requirements. The system will utilize one, two, or three sensors on the rear of the machine depending on application.

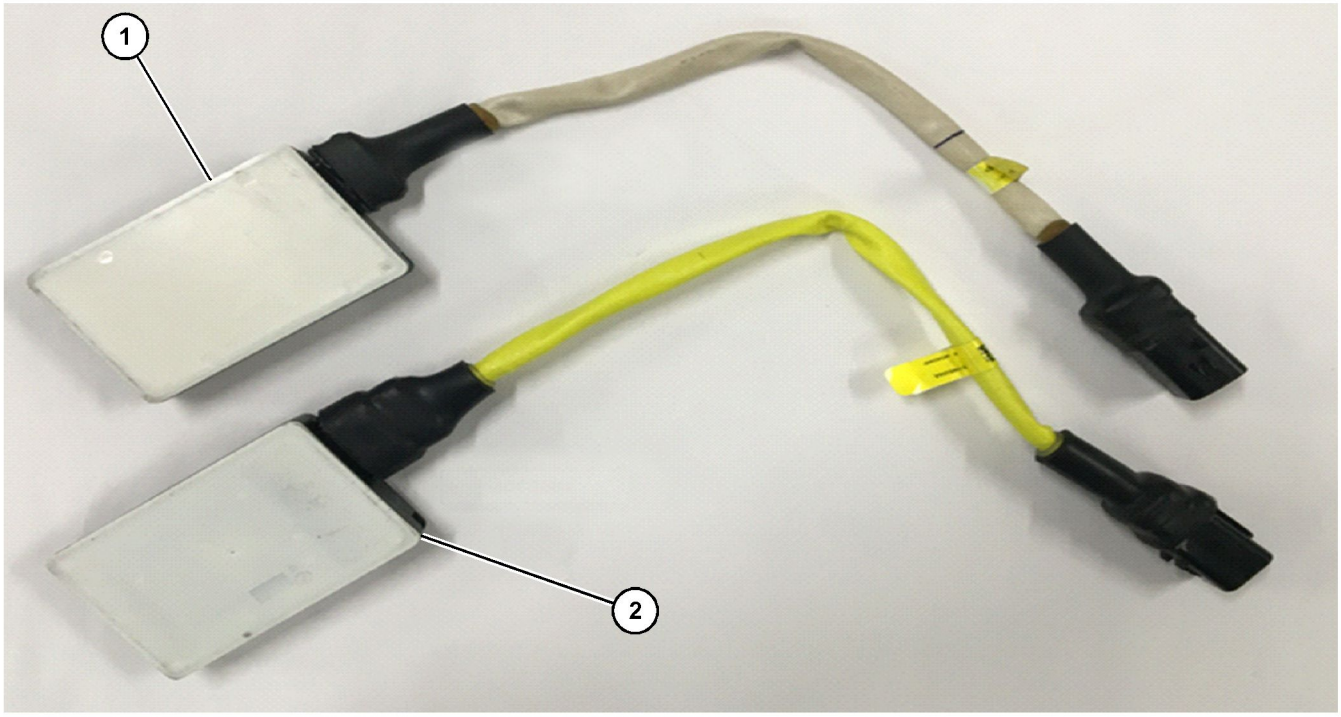



Illustration 1 g06229146

(1) 397-2994 Object Detection Sensor Gp (2) 464-7684 Object Detection Sensor Gp

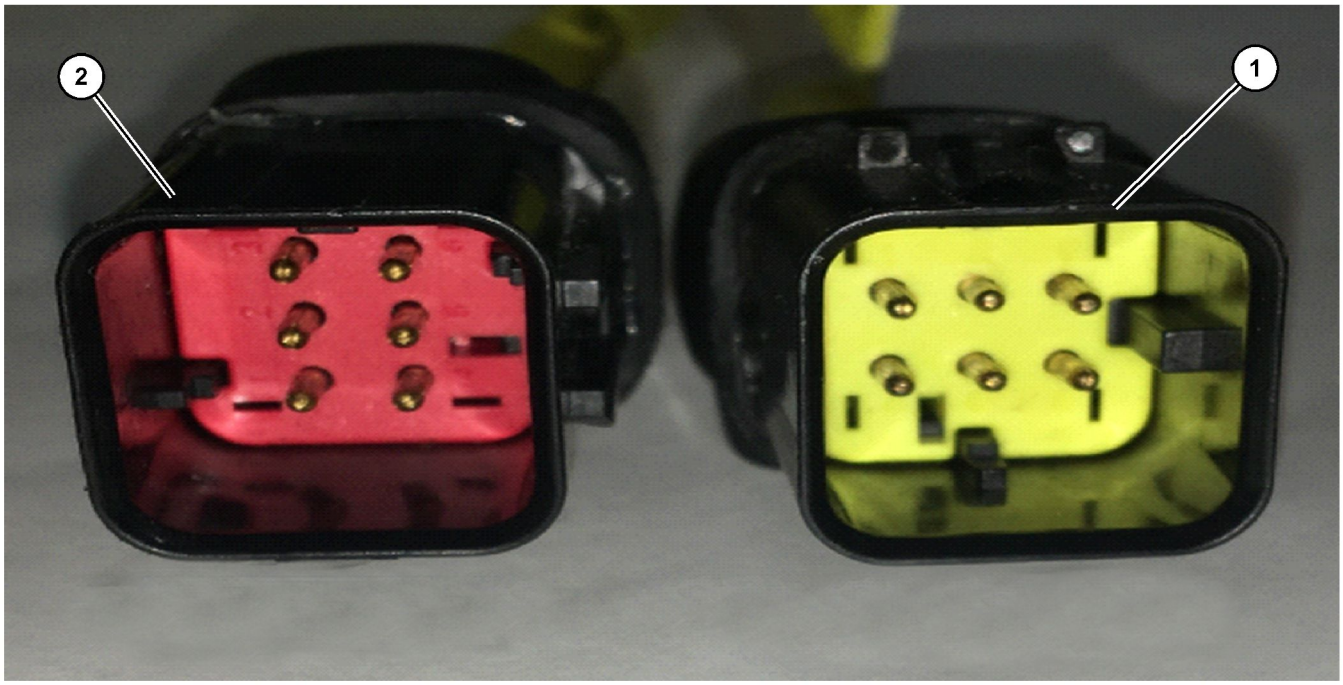



Illustration 2 g06229151

(1) 397-2994 Object Detection Sensor Gp (2) 464-7684 Object Detection Sensor Gp

The 464 - 7684 Object Detection Sensor Gp (2) can be identified by yellow harness sheathing and a red connector key. The 397 - 2994 Object Detection Sensor Gp (1) can be identified by white harness sheathing and a yellow connector key.

## 464 - 7684 Object Detection Sensor Gp (C5) Product Information

The 464 - 7684 Object Detection Sensor Gp is designed to meet the regulatory requirements of the United States and similarly regulated countries.

**Model** – 6181175

**Description** – 24 GHz SLR Ultra Wideband Sensor

**Transmit Frequency** – 23.570 GHz - 25.162 GHz (long pulse), 23.575 GHz - 25.258 GHz (short pulse)

## 397 - 2994 Object Detection Sensor Gp (C6) Product Information

### EU Notice to Users

The 397 - 2994 Object Detection Sensor Gp is designed to meet the regulatory requirements of European Union member countries. The Object Detection Sensor (Short Range Device - 24GHz) has been so constructed that it can be operated in France without infringing upon France's applicable requirements on the use of the French radio spectrum.

**Model** – 6208428

**Note:** For regulatory questions please go to:

https://www.autoliv.com/pages/RED-DoC.aspx

**Description** – Short Range Device - 24 GHz Automotive Radar

**Transmit Frequency** – 24.05 GHz - 24.25 GHz

**Transmit Power** – 20 dBm peak

**Maximum Permissible Exposure** – Compliant at 20 cm (7.87 inch) with a power density of 0.0010684 $W/M^2$

# Identification Information

# Declaration of Conformity

**SMCS Code:** 7347

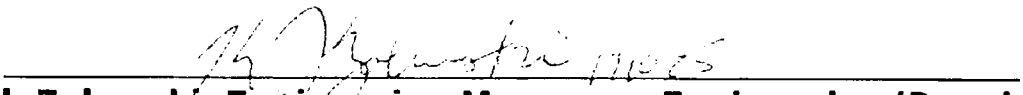
Table 1

| EU Declaration of Conformity | |
|---|---|
| EC Directive(s) | 2014/53/EU |
| Manufacturer | Autoliv ASP, Inc.<br>26545 American Drive<br>Southfield, Michigan 48034<br>United States of America |
| Radio Equipment | 6208428 |
| Description / Intended Use | Short Range Device - 24 GHz Automotive Radar |
| Article 3.2: Applied Radio Spectrum Standard(s) | EN 302 288: V2.1.1 (2017–05); EN 303 396 V1.1.1 (2016–12); Test Report No. 10418–17 V1 |
| Article 3.1(b): Applied EMC Standard(s) | Draft ETSI EN 301 489 1/-3; Version 2.2.0 (2017-03) EN 301 489-51, Test Report No. 17–1–0029401T02a |
| Article 3.1(a) Applied Health and Safety Standard(s) | EN 62368–1; VDE Folder nr: 5022978–3250–0001, Test Report No. 17–1–0029401T04a |
| Frequency band(s) in which the radio equipment operates | 21.650 - 26.650 GHz |
| Maximum radio frequency power transmitted | Max. 20dBm (24.05 - 24.25 GHz) - 41.3 dBm/MHz (24.25 - 26.65 GHz) |

Herby, Autoliv ASP, Inc . declares that the object of the declaration described above is in conformity with the relevant Union harmonization legislation (Directive 2014/53/EU. The full text of the EU Declaration of Conformity is available at the following internet address: https://www.autoliv.com/pages/RED-DoC.aspx

The notified body CETECOM Gmbh, Identification Number 0680 performed assessment in accordance with Annex III of Council Directive 2014/53/EU on Radio Equipment Directive and issued the EU-type examination certificate: R17-0296-01-TEC

This declaration is issued under the sold responsibility of the manufacturer.



**Kenneth Zalewski, Engineering Manager - Engineering/Development**
Signed for and on behalf of **Autoliv ASP, Inc.**
**Southfield Michigan, United States of America / 25 October 2017**

Illustration 3 g06351289

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# Regulatory Compliance

**SMCS Code:** 7347

## United States of America

**Autoliv Sensor (C5)** – Part Number: 464 - 7684
Model: 6208428 FCC ID:WU8SRSC6

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.

**2.** This device must accept any interference received, including interference that may cause undesired operation.

NOTICE
Changes or modifications not expressively approved by the party responsible for compliance could void the authority of the user to operate the equipment.

**Note:** Check the listing of approved radar use at https://dealer.cat.com/en/products/technology/mining-technology-autonomy/detect.html and reference “Object Detection-Approved Country Listing” .

**Autoliv Sensor (C6)** – Part Number: 397 - 2994
Model: 618117 FCC ID: WU8MRR25

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.

**2.** This device must accept any interference received, including interference that may cause undesired operation.

NOTICE
Changes or modifications not expressively approved by the party responsible for compliance could void the authority of the user to operate the equipment.

**Note:** Check the listing of approved radar use at https://dealer.cat.com/en/products/technology/mining-technology-autonomy/detect.html and reference “Object Detection-Approved Country Listing” .

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# Regulatory Compliance

**SMCS Code:** 7347

## United States of America

**Autoliv Sensor (C5)** – Part Number: 464 - 7684
Model: 6208428 FCC ID:WU8SRSC6

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.

**2.** This device must accept any interference received, including interference that may cause undesired operation.

NOTICE
Changes or modifications not expressively approved by the party responsible for compliance could void the authority of the user to operate the equipment.

**Autoliv Sensor (C6)** – Part Number: 397 - 2994
Model: 618117 FCC ID: WU8MRR25

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.

**2.** This device must accept any interference received, including interference that may cause undesired operation.

NOTICE
Changes or modifications not expressively approved by the party responsible for compliance could void the authority of the user to operate the equipment.

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# System Components

**SMCS Code:** 7347; 7347-ODS

The Cat ® Detect Object Detection System consists of the components that are listed below:

- Display
- Object detection sensors
- Cameras

# Display

## Mounting

The display is mounted in the cab and placed in an area that is visible by the operator.


Illustration 4 g03405915

Touch Screen Display

The following information lists the functions of the display:

- The display monitors the data from the system components.
- The display monitors the status of the system components.
- The display shows the information to the operator.
- The display warns the operator of objects and/or faults.
- The display provides an operator interface to control the system.

The display consists of the following components:

- A capacitive touch display.
- An audible alarm.

# Object Detection Sensor

Illustration 5 g03406116

Object Detection Sensor

The system utilizes one, two, or three medium range object detection sensors depending on application. Machines will use sensors mounted at the rear of the machine. These sensor can be used to increase awareness of objects, within the coverage area, to the machines rear. This sensor provides information on proximity to the detected object.

**Note:** The system can be equipped with either a C5 or C6 model Object Detection Sensor. The system can use up to three sensors depending on application.

**Note:** The system can use up to three sensors.

## Camera

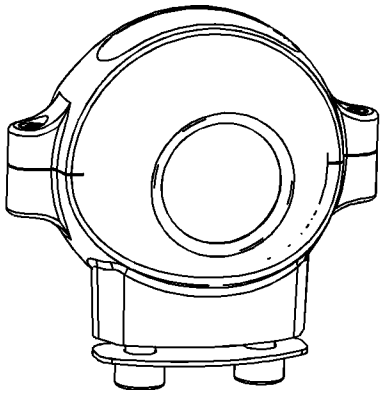

Illustration 6 g01223051

Camera

The camera provides the operator with a view of the rear of the machine. The camera is used to identify objects to the rear of the machine.

# Operation Section

# Operation

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## General Information

**SMCS Code:** 7347-ODS; 7347

**Note:** Refer to your local Cat dealer for information on installation and adjustment of the cameras and object detection sensors.

## Motor Grader

### System Diagram

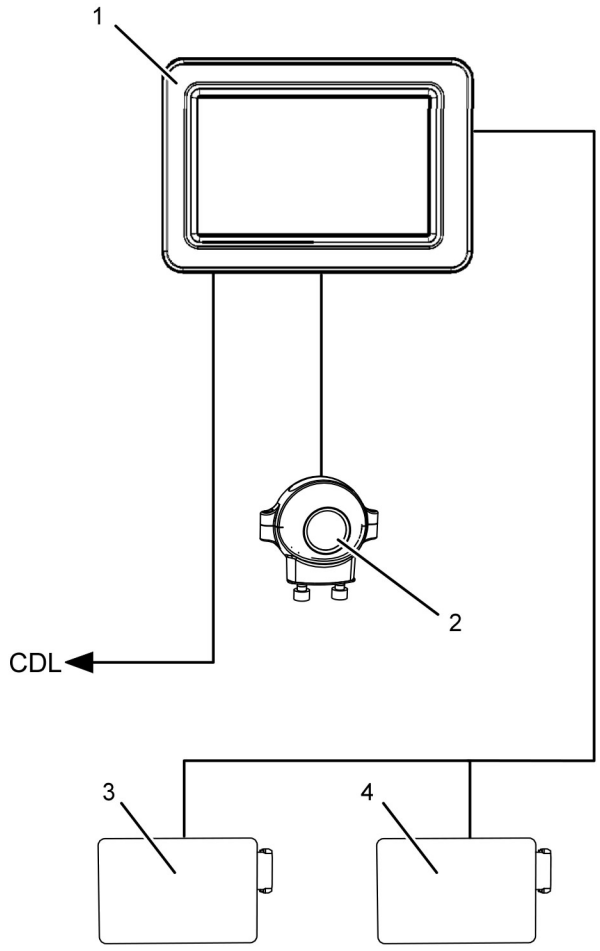


Illustration 7 g03414646

Configuration for Motor Graders

(1) Display
(2) Rear Camera
(3) Left Rear Medium Range Object Detection Sensor
(4) Right Rear Medium Range Object Detection Sensor

# Wheel Loader

## System Diagram

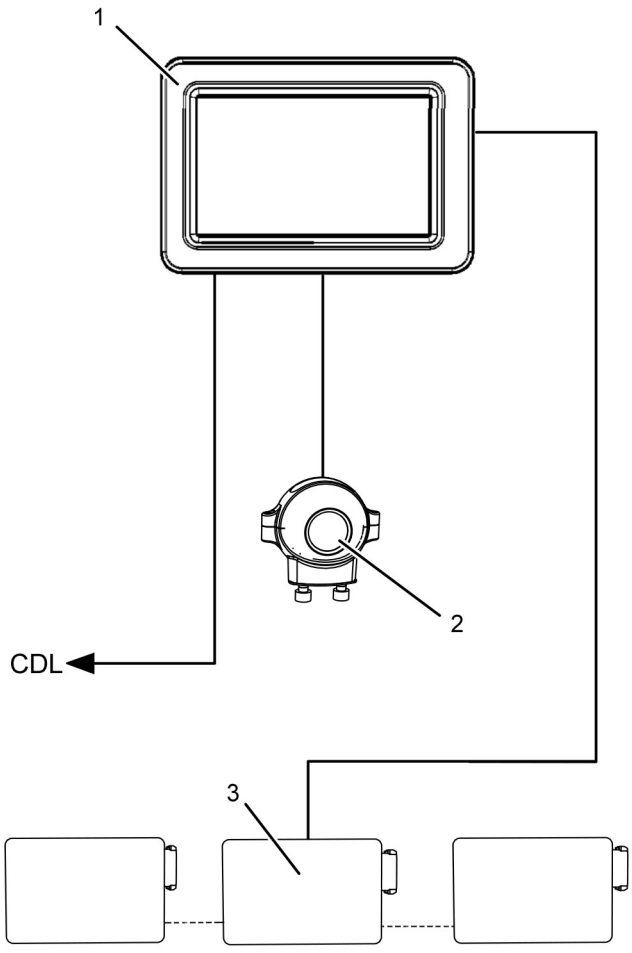


Illustration 8 g03414671

Configuration for Wheel Loaders

(1) Display
(2) Rear Camera
(3) Medium Range Object Detection Sensor

**Note:** Wheel Loaders can have up to three medium range object detection sensors.

# System Information

## Rear System

**Note:** Functioning of this system is not required for this machine to be safely operated. The operator can still use other means. Use the following examples to verify that the area is clear or provide warning before the machine is moved: direct vision (from cab and ground), mirrors, spotters and warning horns.

NOTICE
The Object Detection System is designed to enhance the operators awareness of the operators surroundings. Use of this system does not replace basic safety precautions and procedures for operating the machine. Refer to the Operation and Maintenance Manual of the machine for additional information.

The Object Detection System uses object detection sensors and video to provide the operator with additional information about the work area around the machine. The display interfaces with the object detection sensors that are mounted around the machine. The object detection sensors reduce blind spots and increases perimeter awareness. The system will detect objects as small as an adult human that is in the path of the machine.

Recognition of an object is dependent upon the material composition and the geometry of the object. The system may detect an object that is smaller than a standing adult human. Due to the limited number mounting areas for the object detection sensors on the machine, there are gaps in the object detection sensor coverage that would allow the system to miss these smaller objects.

The Illustrations below shows the coverage that is provided by the object detection sensors.

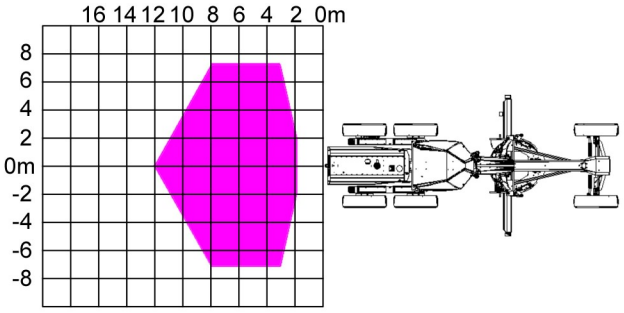


Illustration 9 g02357017

Motor Grader

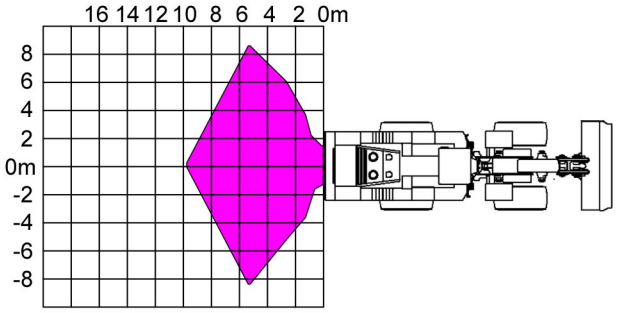


Illustration 10 g02356858

Wheel Loader

Objects are most likely to enter the blind spots of the machine when the machine has been stopped. To help prevent objects from entering a blind spot unnoticed, the Object Detection System will begin to initialize when the key switch is turned to the ON position. After the system has fully initialized and is in the active state, the system will remain in the active state until the machine transitions to a forward gear. The system remains in the active state anytime the machine is traveling in reverse.

**WARNING**

**Identify the object and the location of the object before you move the machine. Failure to identify the object and the location of the object prior to moving the machine can result in product damage, personal injury, or death.**

NOTICE

Object Detection Sensor information will not be used in order to determine the exact position of the object. Only the general area of the object relative to the machine will be displayed. The operator must use the camera for the designated machine quadrant in order to determine if the object is in the path of the machine and if evasive action is required.

Any critical zone indication will trigger an audible alarm if the following condition is true:

- If the operator has placed the machine in gear, and attempts to move in the direction that an object is detected. This situation applies to the rear of the machine only.

## Effects on System Operation

The operation of the system can be affected by any of the following factors.

**⚠ WARNING**

**Personal injury or death could result without observing the following information.**

**Environmental conditions, installation, and topographical factors can effect the proper operation of the Cat Integrated Object Detection System. The following information must be taken into consideration.**

**Environmental** – Weather conditions such as rain, snow, and sleet can create road conditions that may cause mud to build up on the face of the object detection sensor. The moisture in the mud can reduce the effectiveness of the coverage of the object detection sensors. The mud absorbs the RF energy that is emitted by the object detection sensors. If an accumulation of mud is observed on the object detection sensors, then clean the surface of the sensor. Refer to the Operation and Maintenance Manual, “Object Detection Sensor - Clean/Inspect” section of this manual for addition information on how to clean the sensors.

**Note:** The object detection sensors have blockage detection diagnostics. These diagnostics will display a message to the operator via the display when mud or other substances block the object detection sensors. The event will remain active until the sensor has been cleaned or the blockage is removed.

**Installation** – Incorrect sensor bracket installation and or alignment may also cause the object detection sensors to give nuisance warnings to the operator. The system may sense false objects because the object detection sensors are not set to the correct angle.

**Note:** The brackets may become misaligned over time because of shock and vibration the machine is subjected to during normal operations. The condition of the object detection sensor brackets should be inspected daily.

**Topographical** – The system may sense objects even though no objects are present. These detections may occur if the grade of a haul road, a loading area, or a ready line are significant enough to reflect RF energy in the same way as a vehicle or berm would. One or more false targets are possible when a V-ditch is utilized when parking the machine. The V-ditch can cause a false indication at the front or sides of the machine.

If an object is in the critical zone, the display will provide an audible and visual warning.

Any critical zone warning will trigger an audible alarm if either of the following conditions are true.

**⚠ WARNING**

**Identify the object and the location of the object before you move the machine. Failure to identify the object and the location of the object prior to moving the machine can result in product damage, personal injury, or death.**

NOTICE
Object Detection Sensor information will not be used in order to determine the exact position of the object. Only the general area of the object relative to the machine will be displayed. The operator must use the camera for the designated machine quadrant in order to determine if the object is in the path of the machine and if evasive action is required.

## Power ON/OFF

**⚠ WARNING**

**Attempting to operate the screen controls for the display while the machine is in motion could result in personal injury or death. Do not operate the screen controls for the display while the machine is in motion.**

Power is supplied to the system when the operator turns the machine keyswitch to the ON position. A screen similar to Illustration 11 will appear, after 15 seconds of keyswitched power.


Illustration 11 g03406316

Press the “Accept” key to acknowledge the screen. A screen similar to Illustration 12 and Illustration 7 appears.

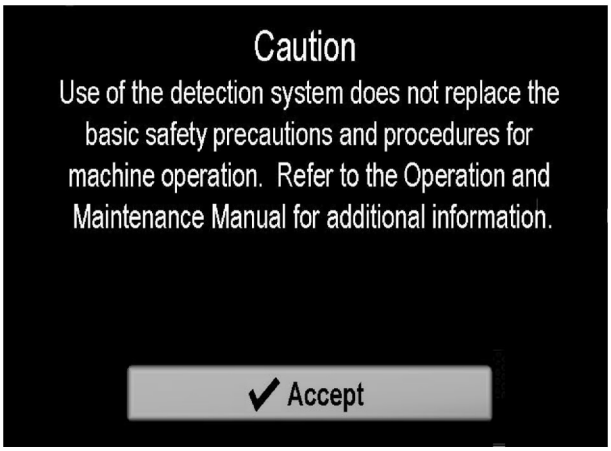


Illustration 12 g03406276


Illustration 13 g03406367

System Status Indicator

During the power up process, the display will perform a self test. During the self test, the display will ensure that all of the components are communicating and the alarm on the display will sound momentarily. When the self test is completed, the following occurs:

- The system status indicator will turn green.
- The cameras will be active.
- The proximity bar will be active.

**Note:** Ensure that the model of machine listed to the right of the “Zone Directional Radar Indicator” matches the machine that is being operated. If the correct machine does not appear, contact your .Cat dealer Refer to Illustration 7 .

If the self test fails, the system status indicator will turn red, the camera screens will be active, and the object detection sensor screen will be disabled. If the self test fails, contact your Cat dealer.

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# Display Navigation

**SMCS Code:** 7347

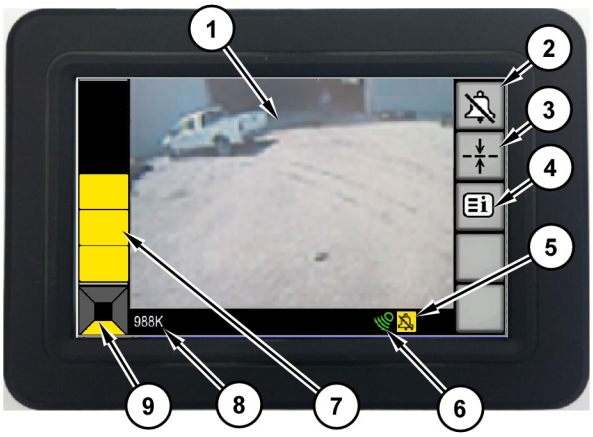


Illustration 14 g03406762

(1) Camera View
(2) Alarm Acknowledge Button
(3) Reference Line Button
(4) System Menu Button
(5) Alarm Acknowledged Indicator
(6) Indicator for the System
(7) Proximity Indicator Bar
(8) Product ID
(9) Zone Directional Indicator

## Display Buttons

### System Menu

**System Menu button – Used to access the main menu for the system.**

### Back

**Back – Used to return to the previous menu.**

## Home

**Home – Used to return to the main screen.**

## Scroll Up

**Scroll Up – Used to scroll up thru choices**

## OK

**OK – Used to lock choice of selection**

## Scroll Down

**Scroll Down – Used to scroll down thru choices**

## Reference Line button

**Reference Line Button – Toggles the reference line on and off**

## Day Mode

**Day Mode – Used to activate display brightness for day use**

## Night Mode

**Night Mode – Used to activate display brightness for night use**

**Note:** The night mode will adjust the display to the minimum brightness setting in order to reduce the amount of light emitted during night time operation. The night mode brightness can be adjusted up or down and will be remembered the next time the night mode feature is enabled. When the display returns to the day mode the brightness setting will automatically adjust the 75 percent brightness. If necessary, adjust the brightness manually for personal view preferences.

## Manual Brightness Increase

**Manual Brightness Increase – Used to adjust brightness up manually**

## Manual Brightness Decrease

**Manual Brightness Decrease – Used to adjust brightness down manually**

## Brightness Button

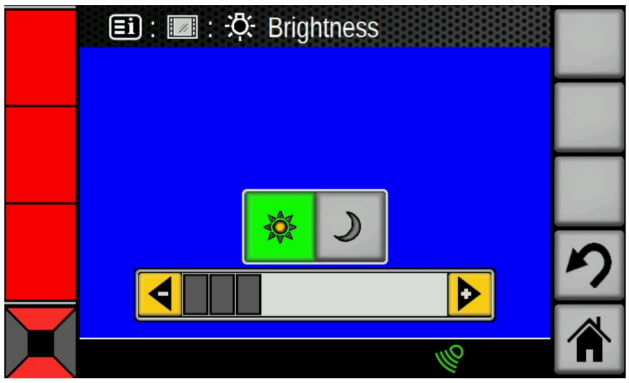


Illustration 15 g03414760
Brightness Bar example in Day Mode.

**Brightness button – Press the brightness button momentarily in order view the brightness slide bar and to allow manual adjustment of the brightness for the display screen using the arrow keys. Press and hold the brightness button for 2 seconds in order to enable/disable night mode for the display screen.**

## Alarm Acknowledge

**Alarm Acknowledge – The alarm acknowledge button can be used to silence the alarm. By pressing the alarm acknowledge button, the operator acknowledges the detection of an object. The alarm acknowledge feature is only available when the alarm is active and will automatically turn off when there is a directional change (F/R) or when the system enters “STANDBY” . If the object is still present or a new object appears, the system will sound the audible alarm again. The alarm acknowledge button also cancels any changes that were made in the configuration screen.**

## Display Navigation

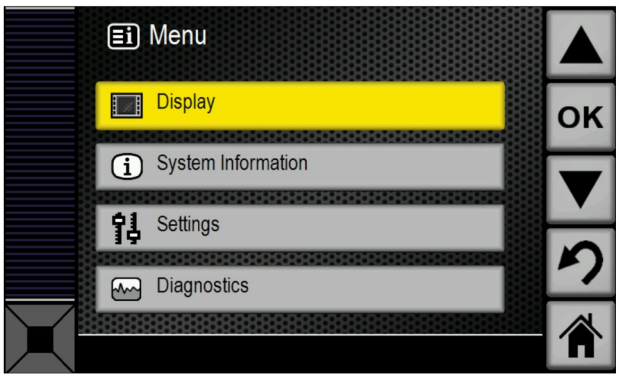


Illustration 16 g03408324

The system menu button will be pressed to access this menu, then the “UP” , “DOWN” . and “OK” buttons will be used to access the sub menus. The back button will go back to the previous menu. The home button will return the operator to the main menu.

## Screen Brightness

To navigate to the brightness adjustment screen, press “System Menu” , “Display” , and “Brightness”

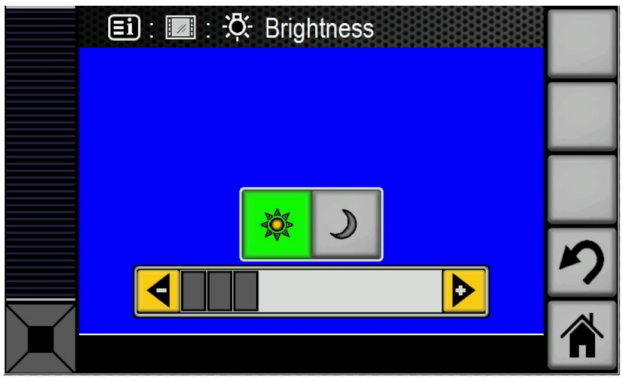


Illustration 17 g03408355

Day Mode Screen Selected

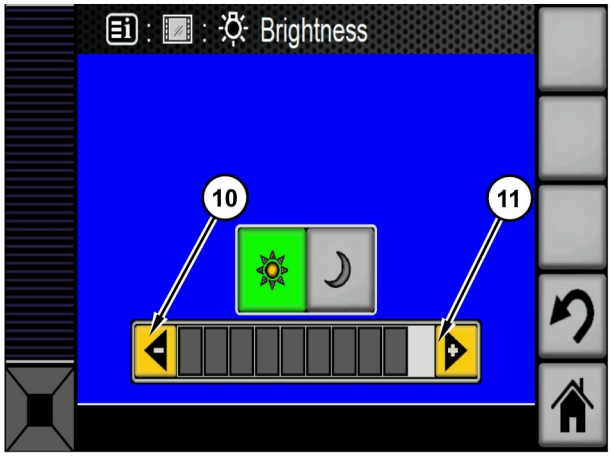


Illustration 18 g03408357

Manual Brightness Screen

(10) Manual Decrease Adjustment Button
(11) Manual Increase Adjustment Button

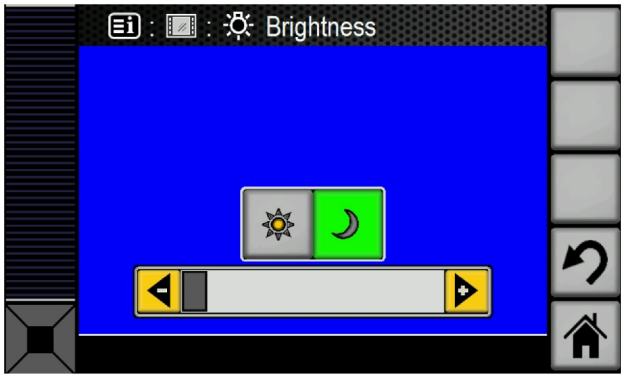


Illustration 19 g03408361
Night Mode Screen Selected

i05376766

# Proximity Indicator

**SMCS Code:** 7347

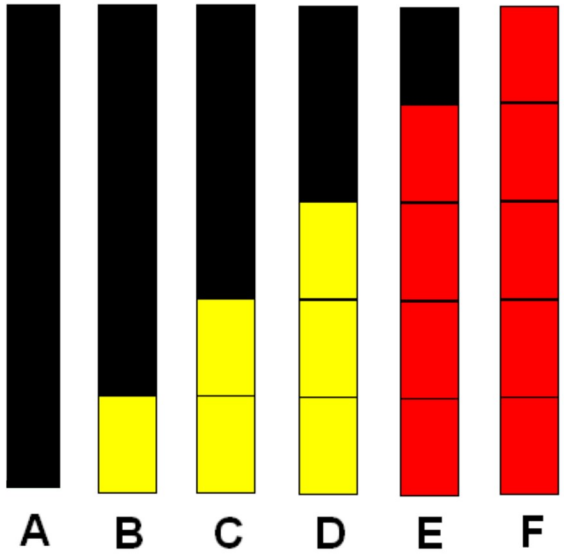


Illustration 20 g02156210
(A) No object detected
(B) Object detected in Caution Zone 1
(C) Object detected in Caution Zone 2
(D) Object detected in Caution Zone 3
(E) Object detected in Critical Zone
(F) Object detected in Stop Zone

There are five levels of proximity indication. The number and color of the bars are based on the stopping distance and speed of the machine. The display will use the screen and the warning alarm to notify the operator of the highest warning level that is present.

The proximity zones on machines that are equipped with rippers or beds will function slightly different from machines that are equipped with a bumper. The following information explains the operation of these zones.

## Motor Grader

### Caution Zone 1

When “Caution Zone 1” is active, a single yellow segment will illuminate on the left side of the display. The audible alarm is not active. Refer to scenario (B) in Illustration 20 .

When the machine is stationary, the object detected will be 10 m (33 ft) to 20 m (66 ft) from the back of the machine.

### Caution Zone 2

When “Caution Zone 2” is active, two yellow segments will illuminate on the left side of the display. The audible alarm is not active. Refer to scenario (C) in Illustration 20 .

When the machine is stationary, the object detected will be 8 m (26 ft) to 10 m (33 ft) from the back of the machine.

### Caution Zone 3

When “Caution Zone 3” is active, three yellow segments will illuminate on the left side of the display. The audible alarm is active. Refer to scenario (D) in Illustration 20 .

When the machine is stationary, the object detected will be 6 m (20 ft) to 8 m (26 ft) from the back of the bed or machine.

### Critical Zone with Variable Audible Alarm

When the “Critical Zone” is active, four red segments will illuminate on the left side of the display. The audible alarm is active. The closer the object is, the frequency of the alarm will increase. Refer to scenario (E) in Illustration 20 .

When the machine is stationary, the object detected will be 4 m (13 ft) to 6 m (20 ft) from the back of the bed or machine.

### Stop Zone with Solid Audible Alarm

When the “Stop Zone” is active, five red segments will illuminate on the left side of the display. The audible alarm is active. The alarm is sound continuously. Refer to scenario (F) in Illustration 20 .

When the machine is stationary, the object detected will be 2 m (7 ft) to 4 m (13 ft) from the back of the bed.

## Wheel Loader

### Caution Zone 1

When “Caution Zone 1” is active, a single yellow segment will illuminate on the left side of the display. The audible alarm is not active. Refer to scenario (B) in Illustration 20 .

When the machine is stationary, the object detected will be 10 m (33 ft) to 20 m (66 ft) from the back of the bumper.

### Caution Zone 2

When “Caution Zone 2” is active, two yellow segments will illuminate on the left side of the display. The audible alarm is not active. Refer to scenario (C) in Illustration 20 .

When the machine is stationary, the object detected will be 8 m (26 ft) to 10 m (33 ft) from the back of the bumper.

### Caution Zone 3

When “Caution Zone 3” is active, three yellow segments will illuminate on the left side of the display. The audible alarm is active. Refer to scenario (D) in Illustration 20 .

When the machine is stationary, the object detected will be 6 m (20 ft) to 8 m (26 ft) from the back of the bumper.

### Critical Zone with Variable Audible Alarm

When the “Critical Zone” is active, four red segments will illuminate on the left side of the display. The audible alarm is active. The closer the object is, the frequency of the alarm will increase. Refer to scenario (E) in Illustration 20 .

When the machine is stationary, the object detected will be 4 m (13 ft) to 6 m (20 ft) from the back of the bumper.

### Stop Zone with Solid Audible Alarm

When the “Stop Zone” is active, five red segments will illuminate on the left side of the display. The audible alarm is active. The alarm is sound continuously. Refer to scenario (F) in Illustration 20 .

When the machine is stationary, the object detected will be 2 m (7 ft) to 4 m (13 ft) from the back of the bumper.

i05375453

# Main Screen

**SMCS Code:** 7347

Multiple screens are available on the display. Press the “Home” button to change the main screen. Refer to the following information for the screens and the function of each screen.

## Display Screens

### Main Screen

The main screen allows the operator to monitor the system operations to aid in object detection and identification.

The main screen is divided into three areas. The main screen allows the operator to complete the following tasks:

- Monitor the object detection sensor proximity detection.
- View camera view.
- Monitor the status of the system.

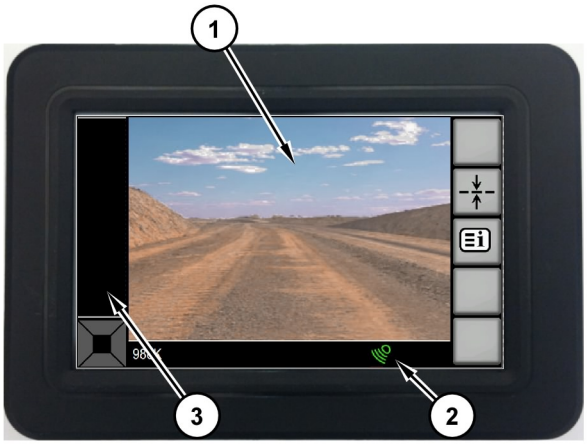


Illustration 21 g03407812

Main Screen

(1) Camera View
(2) System Status and Warnings
(3) Proximity Indicator

## Proximity Indicator

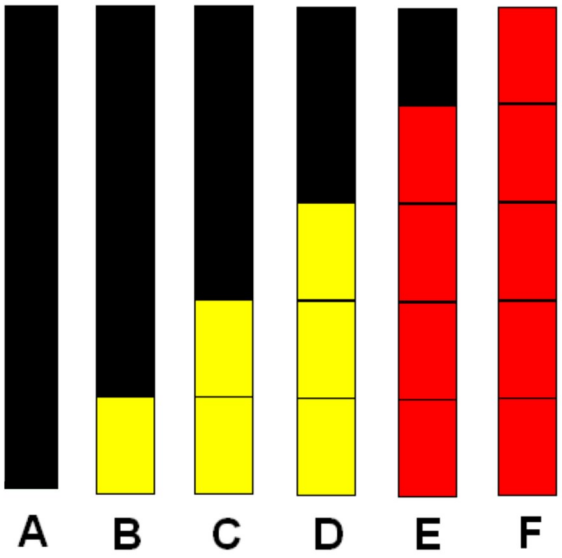


Illustration 22 g02156210

Proximity Indicators

The visual proximity indicator provides the operator with a simplified view of the information provided by the object detection sensors of the machine. For Motor Graders, and Wheel Loaders, the system visual indicator will provide the operator visual feedback on the position of detected objects anytime the system is active, and the transmission gear is in REVERSE.

The indicator is divided into five segments and provides the operator with the gross position of detected objects relative to the machine.

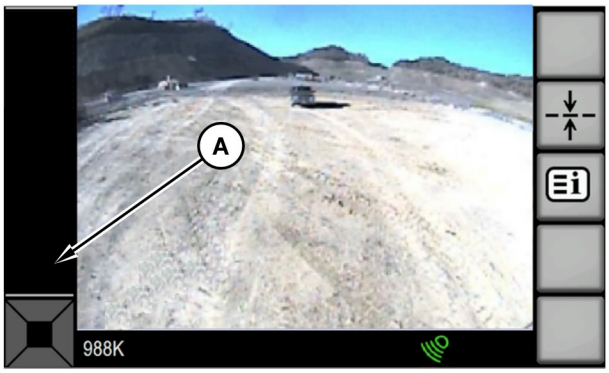


Illustration 23 g03407879

When there is no object detected, the bottom segment will be solid black (A). Refer to Illustration 23 .

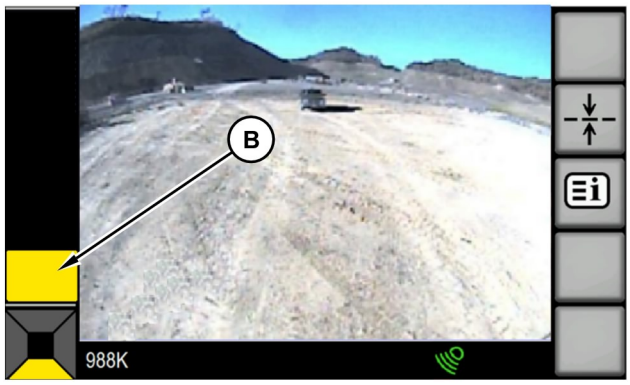


Illustration 24 g03407899

When an object is detected in caution level 1 zone, typically 10 m (32.81 ft) to 12 m (39.37 ft) away from the machine in the coverage area, the bottom segment will be solid yellow (B). Refer to Illustration 24 .

**Note:** The corresponding directional zone indicator has also changed to the color of the proximity bar.


Illustration 25 g03407943

When an object is detected in caution level 2 zone, typically 8 m (26.25 ft) to 10 m (32.81 ft) away from the machine in the coverage area, the bottom two segments will be solid yellow (C). Refer to Illustration 25 .


Illustration 26 g03407955

When an object is detected in caution level 3 zone, typically 6 m (19.69 ft) to 8 m (26.25 ft) away from the machine in the coverage area, the bottom three segments will be solid yellow (D). Refer to Illustration 26 .


Illustration 27 g03408010

When an object is detected in the critical zone, typically 4 m (13.12 ft) to 6 m (19.69 ft) away from the machine in the coverage area, the bottom four segments will be red (E). Refer to Illustration 27 .

**Note:** The corresponding directional zone indicator has also changed to the color of the proximity bar.

**Note:** Refer to Table 3 in the “Audible Alarming” section for alarming details.


Illustration 28 g03408016

When an object is detected in the stop zone, typically 2 m (6.56 ft) to 4 m (13.12 ft) away from the machine in the coverage area, all five segments will be shown as a solid red bar (F). The solid red bar (F) will blink one time per second. Refer to Illustration 28 .

**Note:** Refer to Table 3 in the “Audible Alarming” section for alarming details.

## Audible Alarming

The system will produce audible alarms when in the critical or stop zone and a reverse gear is selected. There are two Object Detection Alarm Modes, “Continuous” and “Discrete” that can be selected in the configuration page.

**Note:** The alarm will only sound when there is an object in the direction of travel and the system is active. The system will enter standby if the standby mode conditions are met. No alarming or proximity alerts will occur in standby mode. For additional information on the alarming refer to Table 3 .

### Continuous

The Object detection system will produce an audible alarm beginning in the caution level 3 zone. As the distance of the object decreases, the alarming frequency increases until a solid alarm is produced when the object enters the stop zone.

Table 2

| Continuous Alarm Mode | | | |
|---|---|---|---|
| **Gear** | **Detections** | **Alarming** | **Activation** |
| **Reverse** | **Rear** | Audible alarm beginning in the Caution Level 3 Zone increasing in frequency until a solid alarm is produced when the object enters the Stop Zone. | Alarm will continue until the Object Detection Sensors no longer detects an object, the alarm acknowledge check button is pressed, the system enters stand by mode, neutral gear is selected, or a directional gear change is made. |

**Note:** For Motor Graders, and Wheel Loaders, the system will only be active in reverse gear.

### Discrete

For the first critical zone detection in the direction of travel, the system will issue two short alarms (.5 seconds long with a .5 second break) and one solid alarm (1.5 second) in stop zones. After an audible alarm is produced because of detection on the rear, the system will NOT produce an audible alarm again if there is a new detection on the rear.

Table 3

| Discrete Alarm Mode | | | |
|---|---|---|---|
| **Gear** | **Detections** | **Alarming** | **Activation** |
| **Reverse** | **Rear** | Alarm twice for one half second if object is detected in Critical Zone. Alarm once for 1.5 seconds again if object enters Stop Zone. | After Stop Zone alarming, the audible alarm will be silenced until a gear change occurs or the system state changes. |

**Note:** For Motor Graders, and Wheel Loaders the system will only be active in reverse gear.

## Camera View

This function allows the operator to see objects around the machine to aid in object identification. The camera function is enabled whenever the system is powered up. The camera view is available in all machine states. The camera view will occupy approximately 90% of the main screen.

## System Information and Warning Display

This portion of the main screen has two functions. The first function is informing the operator of the status of the system. The status of the system can be active, standby, or faulted.

### Active


Illustration 29 g03408047

The system is in the active state when the machine is stopped or when the reverse gear is selected. Additionally, the system remains active in the FORWARD gear as long as the threshold set by the “Object Detection Standby Mode” parameter has not been met. While the machine is in the active state, the operator will be warned of objects that are detected by the system. A green indicator located on the display screen signifies the active state. Refer to Illustration 29 .

**Note:** The system remains in the active state anytime the transmission is place in the REVERSE gear.

**Standby**


Illustration 30 g03408049

The system will enter standby mode when the machine is placed in forward gear.

An amber indicator located on the display screen will signify the standby state. Refer to Illustration 30 .

**System Fault**

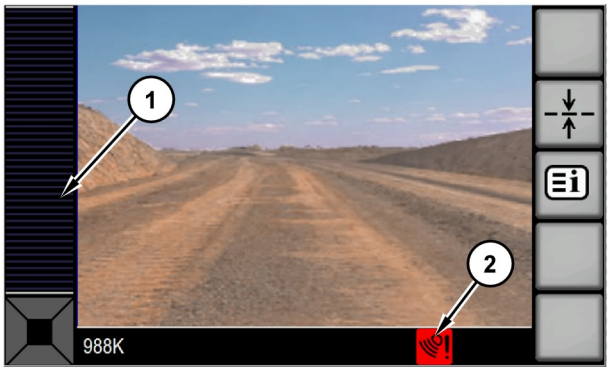


Illustration 31 g03408054

(1) Grayed Out Proximity Bar
(2) System Status Indicator

The system is in system fault mode whenever a fault is detected on one of the object detection sensors, if communication is lost with the machine controllers or if the battery voltage is out of the specified operating range, the system will trigger a fault. A red indicator located on the display and an audible alarm will be active for a two second period signifying the disabled state. Video from the camera will still continue to be displayed. Refer to Illustration 31 .

**Note:** The proximity bar will not be visible.


Illustration 32 g03408055

The second function of the system information and warning display is to provide direction indication for detections and camera view.

The directional zone indicators indicate which object detection sensor has detected an object giving the operator a general location of the object in relation to the machine. For Motor Graders, and Wheel Loaders the rear zone will be the only active zone. Additionally the directional zone indicator will change color to warn the operator how close the object is to the machine. Refer to Illustration 32 .

**Note:** Object detection sensor information will be used to determine the objects general quadrant. The operator must use the camera for the designated machine quadrant in order to determine if the object is in the path of the machine and whether action is required.

i07214476

# Configuration Screen

**SMCS Code:** 7347

**⚠ WARNING**

**Do not attempt to configure the display while operating the machine. Configuration activities can distract the operator from the critical task of maintaining control of the machine which could result in personal injury or death. Please restrict configuration activities to times when the machine is appropriately parked and in a safe state.**

Press the main menu button to access the following sub menus:

- Display
- System Information
- Settings
- Diagnostics

To edit the settings, the operator must first press the “OK” button. After entering the edit mode, the first parameter in the list that can be configured will be highlighted. The parameter must be highlighted to allow the parameter to be changed. Press the left arrow or the right arrow on the arrows button to change the highlighted parameter.

Navigation between parameters is accomplished by pressing the top and bottom parts of the arrows button. Any changes that are made to parameters will not become active until the operator has pressed the “OK” button to exit the edit mode. An example of the configuration screen is shown in Illustration 33 .

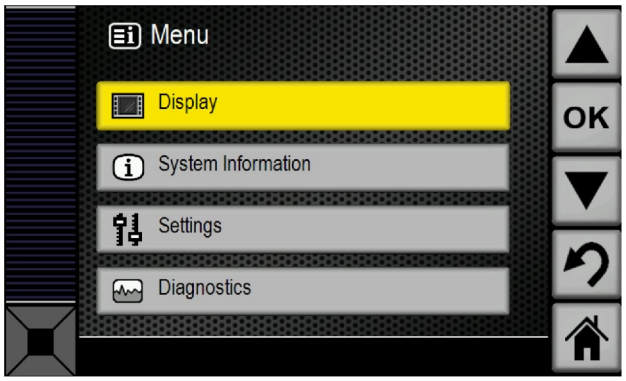


Illustration 33 g03408448

Illustration 33 shows the view that appears on the display when the configure screen is accessed for the first time. The “Change Settings” box will be located opposite the “OK” button to indicate the purpose of the button. The “Change Screens” box will be located opposite the tab button to indicate the purpose of the button.

## Configure Parameters

The following list of parameters can be configured when the “Change View” screen is accessed.

### Display

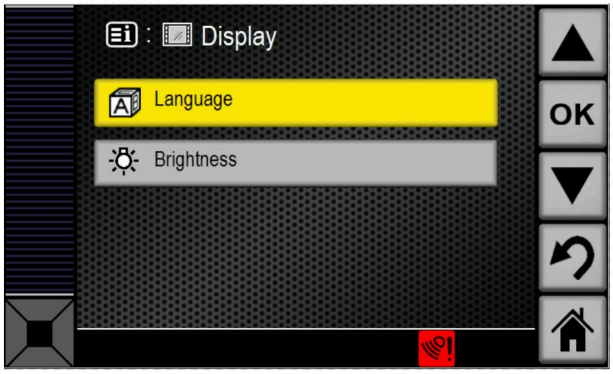


Illustration 34 g03408477

Display consists of language selection and brightness selection. Refer to Illustration 34

### System Information

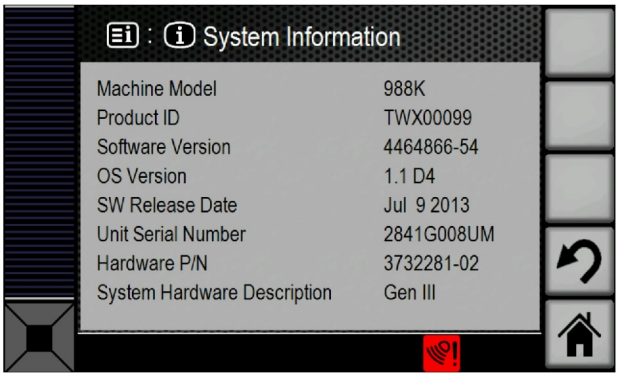


Illustration 35 g03408526

System Information Screen

System Information provides the following information:

- Machine Model
- Product ID

- Software Version
- OS Version
- SW Release Date
- Unit Serial Number
- Hardware P/N
- System Hardware Description

## Settings

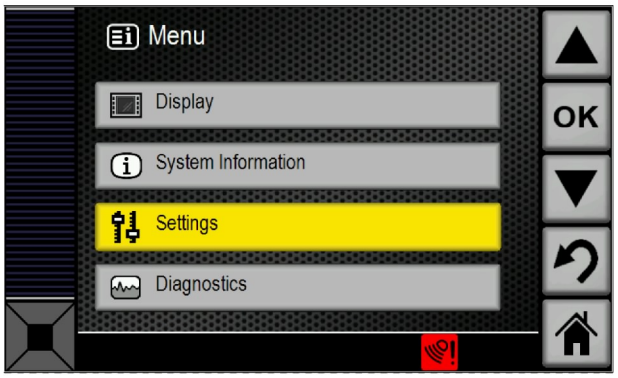


Illustration 36 g03408536
Settings Selection Screen

The settings selection screen has two selections that can be selected:

- Auto Dim
- Alarm Mode

The “Auto Dim” can be ENABLED or DISABLED. The “Alarm Mode” can be set to be continuous or discrete.

## Diagnostics

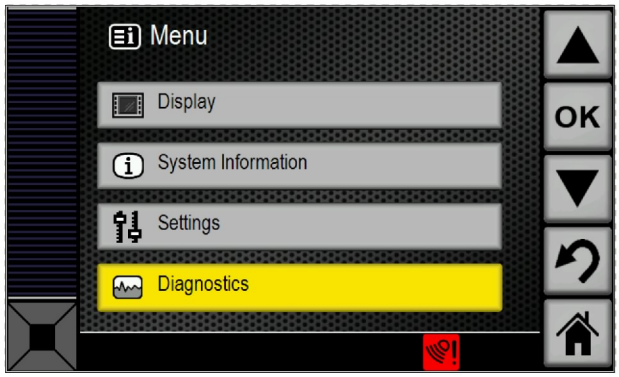


Illustration 37 g03408552
Diagnostics Selection Screen

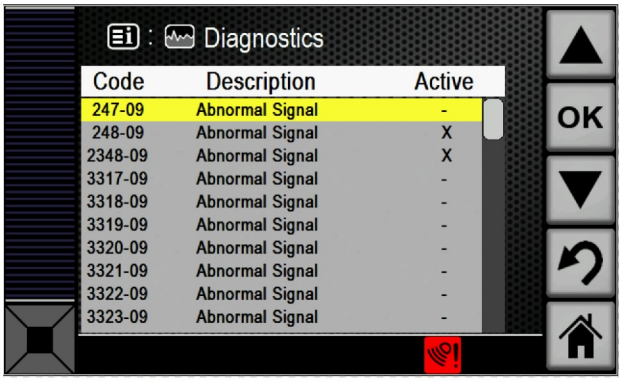


Illustration 38 g03408558
Diagnostics Signal Page

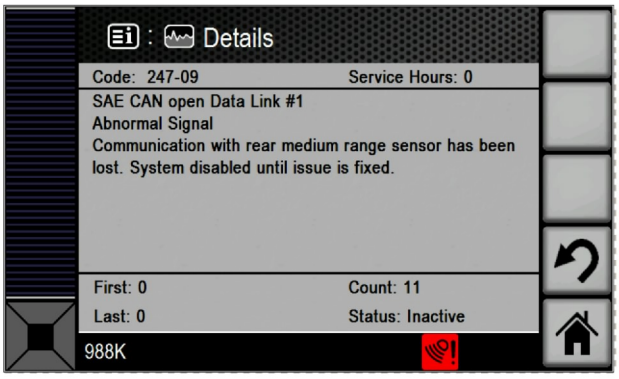


Illustration 39 g03408581
Diagnostics Detail Screen

## Language

In the display screen, language is an option. To change the language, select “Language” . Refer to illustration 34 .


Illustration 40 g03408478
Language Screen

The display supports the following list of languages:

- English
- Spanish
- Portuguese
- Indonesian
- French
- German
- Norwegian
- Swedish
- Finnish
- Dutch
- Danish
- Italian
- Turkish
- Russian
- Japanese
- Icelandic
- Chinese
- Czech
- Hindi
- Mongolian

Refer to Illustration 40 .

## Auto Dimming for the Camera View

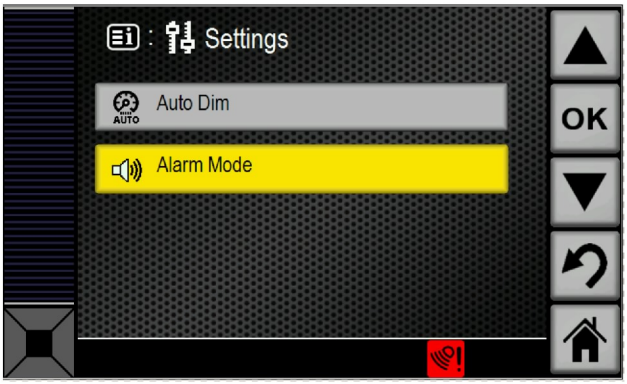


Illustration 41 g03408468
Setting Selection Screen

Under the setting screen, select “Auto Dim” . Refer to Illustration 41 . The auto dim feature will reduce the display and video brightness by one third of the current brightness setting. When night mode is selected, the system will stop providing video and the entire screen will be dimmed.

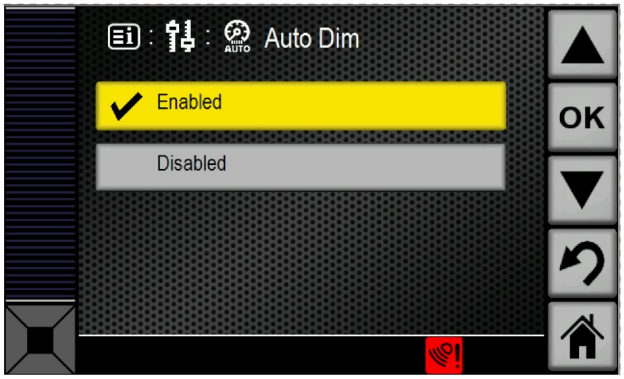


Illustration 42 g03408480

Auto dimming can be either “Enabled” or “Disabled” . Refer to Illustration 42 .

### Object Detection Alarm Mode

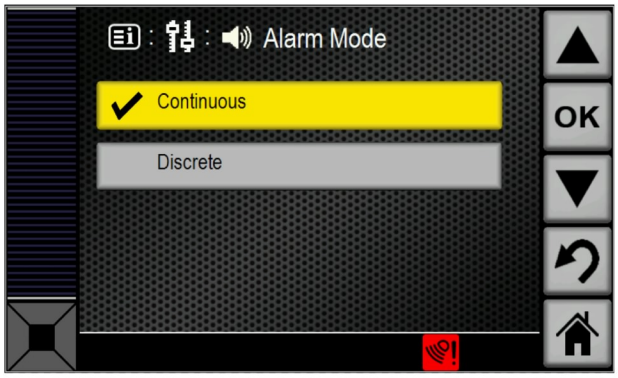


Illustration 43 g03408469

Under the setting screen, select “Alarm Mode” . Refer to Illustration 41 The “Object Detection Alarm Mode” parameter configures the audible alarm mode. The alarm mode will be “Continuous” by default. “Discrete” alarming can be selected to reduce the length of audible alarming.

**Note:** This parameter is only adjustable when the Cat ® Electronic Technician (Cat ET) is connected and communicating with the system.

i05375476

# Diagnostic Summary Screen

**SMCS Code:** 7347

## Troubleshooting

### Diagnostic Summary Screen

The diagnostic summary screen is separate from the main screen. Press the tab button twice to enter the diagnostic summary screen. Press the tab button again to change the view to the main screen. The first screen that will appear when the diagnostic summary screen is accessed will be like Illustration 45 .

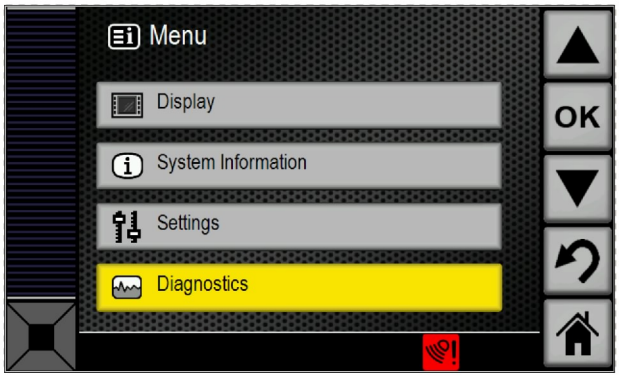


Illustration 44 g03408603

Diagnostics Selection Screen

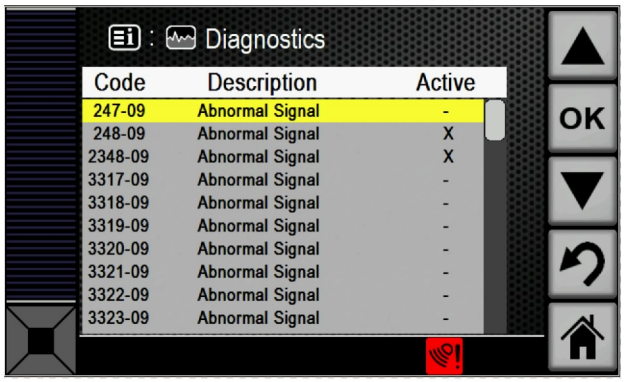


Illustration 45 g03408601

Diagnostics Signal Page

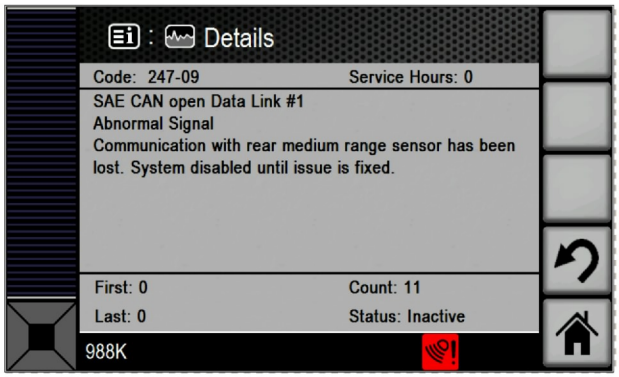


Illustration 46 g03408605

Diagnostics Detail Screen

Additional information of each code is available by highlighting the desired code and pressing the “OK” button. Press the up or down arrows to highlight the desired code. After pressing the “OK” button, the screen will change to a more detailed view of the selected code. Refer Illustration 46 .

Active codes will have a “X” while logged currently inactive codes have a “-” .

## Event Codes

## Motor Grader

Table 4

| Component | Event | Description | Possible Cause |
|---|---|---|---|
| Battery Supply Voltage | E875 | Voltage Below Normal | System voltage is below normal. There is a possible issue with the charging system. Object detection system and warnings are disabled until the system voltage is above the threshold level. Call your Caterpillar dealer. |
| Battery Supply Voltage | E876 | Voltage Above Normal | System voltage is above normal. There is a possible issue with the charging system. The object detection system and warnings are disabled until system voltage is above the threshold level. Call your Caterpillar dealer. |
| Left Rear Medium Range Object Detection Sensor | E1144 | Object Detection Sensor Blockage Detected | The Object Detection Sensor has detected a blockage. Check for debris in the box that houses the Object Detection Sensor detector. If debris is present, remove the debris. Clean the plastic cover that is on the Object Detection Sensor housing in order to remove mud or debris. An object that is in proximity of the Object Detection Sensor can also cause this event. |
| Right Rear Medium Range Object Detection Sensor | E1145 | Object Detection Sensor Blockage Detected | The Object Detection Sensor has detected a blockage. Check for debris in the box that houses the Object Detection Sensor. If debris is present, remove the debris. Clean the plastic cover that is on the Object Detection Sensor housing in order to remove mud or debris. An object that is in proximity of the Object Detection Sensor can also cause this event. |

### Wheel Loader

Table 5

| Component | Event | Description | Possible Cause |
|---|---|---|---|
| Battery Supply Voltage | E875 | Voltage Below Normal | System voltage is below normal. There is a possible issue with the charging system. Object detection system and warnings are disabled until the system voltage is above the threshold level. Call your Caterpillar dealer. |
| Battery Supply Voltage | E876 | Voltage Above Normal | System voltage is above normal. There is a possible issue with the charging system. The object detection system and warnings are disabled until system voltage is above the threshold level. Call your Caterpillar dealer. |
| Rear Middle Medium Range Object Detection Sensor | E1143 | Object Detection Sensor Blockage Detected | The Object Detection Sensor has detected a blockage. Check for debris in the box that houses the Object Detection Sensor detector. If debris is present, remove the debris. Clean the plastic cover that is on the Object Detection Sensor housing in order to remove mud or debris. An object that is in proximity of the Object Detection Sensor can also cause this event. |
| Left Rear Medium Range Object Detection Sensor | E1144 | Object Detection Sensor Blockage Detected | The Object Detection Sensor has detected a blockage. Check for debris in the box that houses the Object Detection Sensor detector. If debris is present, remove the debris. Clean the plastic cover that is on the Object Detection Sensor housing in order to remove mud or debris. An object that is in proximity of the Object Detection Sensor can also cause this event. |
| Right Rear Medium Range Object Detection Sensor | E1145 | Object Detection Sensor Blockage Detected | The Object Detection Sensor has detected a blockage. Check for debris in the box that houses the Object Detection Sensor detector. If debris is present, remove the debris. Clean the plastic cover that is on the Object Detection Sensor housing in order to remove mud or debris. An object that is in proximity of the Object Detection Sensor can also cause this event. |

i05375481

# Washing System

**SMCS Code:** 7347

## General Information

The washing system is used to clean debris from the front of the detection sensor enclosure and camera. The system consists of the following components:

- Tank
- Pumps
- “E/H” Valve
- Manifold
- Cab Controls

- Nozzles

## Operation

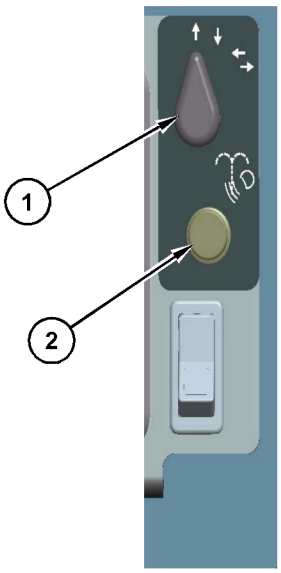


Illustration 47 g03426738

Pedestal Mount Configuration

(1) Selector Switch
(2) Wash Switch

**1.** Select which object detection system and camera to clean.

a. Up arrow selects front washers.

b. Down arrow selects rear washers.

c. Left arrow selects left washer.

d. Right arrow selects right washer.

**2.** Press the wash switch to clean the object detection system and camera.

**Note:** The length of time that the system sprays can be adjusted with the timing relays. Refer to KENR8668 to adjust the timing relays.

# Maintenance Section

i06083609

## Maintenance Interval Schedule

**SMCS Code:** 7000

### Daily

“ Display - Clean” . . . . . 39
“ Camera - Clean” . . . . . 39
“ Object Detection Sensor - Clean/Inspect” . . . . . 40
“ Washing System - Check” . . . . . 41

### Every 500 Service Hours

“ Camera - Inspect/Adjust” . . . . . 39
“ Object Detection Sensor - Inspect/Adjust” . . . . . 41

i05376747

# Display - Clean

**SMCS Code:** 7347-070

In order to maintain sufficient vision, the display must be inspected and/or cleaned at the beginning of each shift. Use a soft, damp cloth with water to clean the display. The display has a soft plastic surface that is easily damaged by and material that is abrasive.

**⚠ WARNING**

**Improper operation of an access platform could result in injury or death. Operators must carry out their duties properly and follow all instructions and guidelines given for the machine and access platform.**

i05376760

# Camera - Clean

**SMCS Code:** 7348-070

**⚠ WARNING**

**Improper operation of an access platform could result in injury or death. Operators must carry out their duties properly and follow all instructions and guidelines given for the machine and access platform.**

**⚠ WARNING**

**Be sure all personnel are clear of the equipment while the equipment is being lowered.**

**Failure to stay clear of the equipment while the equipment is being lowered may result in personal injury.**

If necessary, use a damp cloth to clean the glass of the camera. The camera is sealed. The camera is not affected by a wash with high-pressure spray.

In order to maintain sufficient vision, inspect and/or clean the lens for each camera at the beginning of each shift. The camera is equipped with and internal heater to help counteract the following effects:

- Condensation
- Snow and accumulation of ice

**Note:** When you access the cameras for cleaning, be sure to observe safe procedures for access. Maintain a three-point contact and/or use a body harness.

**Note:** Alternatively, cameras may be cleaned from the ground level by washing with a high-pressure spray or a damp rag on a wand.

i05376762

# Camera - Inspect/Adjust

**SMCS Code:** 7348-040; 7348-025

**⚠ WARNING**

**Improper operation of an access platform could result in injury or death. Operators must carry out their duties properly and follow all instructions and guidelines given for the machine and access platform.**

**⚠ WARNING**

**Be sure all personnel are clear of the equipment while the equipment is being lowered.**

**Failure to stay clear of the equipment while the equipment is being lowered may result in personal injury.**

## Inspecting the Cameras Views

**1.** Inspect the camera views from the display. The cameras were originally installed to capture one of the following views:

a. Front

- Partial view of the radiator grill
- Partial view of the stairs
- View of an object on the ground in front of the stairs

b. Rear

- Partial view of the rear of the dump body
- Partial view of the rear frame
- Partial view of the tires
- View of an object on the ground 25 m (82 ft) behind the rear tires

c. Left or Right side

- Partial view of the front left or right corner of the dump body
- Partial view of the front left or right fender

- Partial view of the front left or right tire
- View of an object on the ground to the right of the front left or right corner of the machine

**2.** If any of the cameras in the system do not capture the view as originally intended, the cameras will need to be adjusted. Consult you Cat dealer before adjustments are made to any of the cameras.

**Note:** When you access the cameras for inspection, be sure to observe safe procedures for access. Maintain a three-point contact and/or use a body harness.

i05376764

# Object Detection Sensor - Clean/Inspect

**SMCS Code:** 7347-571-ODS

**WARNING**

**Improper operation of an access platform could result in injury or death. Operators must carry out their duties properly and follow all instructions and guidelines given for the machine and access platform.**

**WARNING**

**Be sure all personnel are clear of the equipment while the equipment is being lowered.**

**Failure to stay clear of the equipment while the equipment is being lowered may result in personal injury.**

Inspect and clean the object detection sensors at the beginning of each shift. Refer to the following list for inspecting and cleaning the object detection sensors.

**Note:** When you access the object detection sensors for cleaning or inspection, be sure to observe safe procedures for access. Maintain a three-point contact and/or use a body harness.

## Inspect

**1.** Inspect the brackets and the covers of the object detection sensors.

a. Inspect the covers of the object detection sensors for cracks or damage.

**Note:** When a cover for the object detection system has been damaged, replace the cover.

b. Ensure that the mounting bolts are tight.

c. Verify that there is no damage to the object detection system and camera brackets or the object detection sensors.

d. Visibly check the angles of the object detection system boxes. If the object detection system boxes appear to have moved or have been knocked out of alignment contact service personnel.

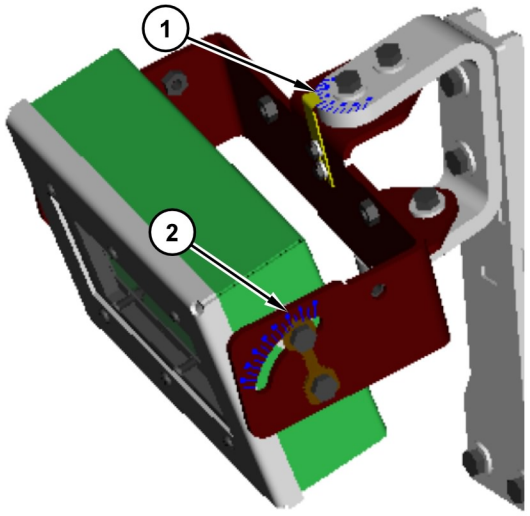


Illustration 48 g03342860

(1) Alignment Marks for Elevation
(2) Alignment Marks for Azimuth

**2.** Check the object detection sensors for an excessive amount of mud or other materials around the object detection sensors.

**Note:** When the object detection sensors are covered with mud or other debris, clean the cover of the object detection system detector and/or remove debris.

**3.** Inspect the breather tubes on the bottom of the object detection system boxes for debris. Remove any debris that exists in the breather tubes.

## Cleaning Instructions

If necessary, use a damp cloth to clean the glass of the object detection sensors. The covers of the object detection sensors are not affected by a wash with a high-pressure spray.

i05376763

# Object Detection Sensor - Inspect/Adjust

**SMCS Code:** 7347-040-ODS; 7347-025-ODS

**⚠ WARNING**

**Improper operation of an access platform could result in injury or death. Operators must carry out their duties properly and follow all instructions and guidelines given for the machine and access platform.**

**⚠ WARNING**

**Be sure all personnel are clear of the equipment while the equipment is being lowered.**

**Failure to stay clear of the equipment while the equipment is being lowered may result in personal injury.**

**Note:** Clean the object detection sensors before inspection and adjustment.

**Note:** When accessing the object detection sensors for cleaning or inspection, be sure to observe safe procedures for access. Maintain a three-point contact and/or use a body harness.

## Inspect

**1.** Inspect the brackets and the covers of the object detection sensors.

a. Inspect the covers of the object detection sensors for cracks or damage.

**Note:** When a cover for the radar detector has been damaged, replace the cover.

b. Ensure that the mounting bolts are tight.

c. Verify that there is no damage to the brackets or to the object detection sensors.

d. With the machine on a level surface and using a digital level verify that the elevation of the sensor is set to original specifications.

e. Using the azimuth marks on the bracket or a protractor, verify that the azimuth adjustment is set to the original specifications.

**Reference:** Refer to the Cat Detect Object Detection Special Instruction for model specific specifications.

f. If adjustments are needed, refer to the Cat Detect Object DetectionSpecial Instruction, “Calibration Procedure” for model specific adjustments.

i05376765

# Washing System - Check

**SMCS Code:** 1439-535-ODS; 7348-535

## Washing System Inspection

Inspect the system for proper operation at the beginning of each shift.

**⚠ WARNING**

**Improper operation of an access platform could result in injury or death. Operators must carry out their duties properly and follow all instructions and guidelines given for the machine and access platform.**

**⚠ WARNING**

**Be sure all personnel are clear of the equipment while the equipment is being lowered.**

**Failure to stay clear of the equipment while the equipment is being lowered may result in personal injury.**

**⚠ WARNING**

**Do not operate or work on this machine unless you have read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions or heed the warnings could result in injury or death. Contact any Caterpillar dealer for replacement manuals. Proper care is your responsibility.**

**Note:** When you access the system for inspection, be sure to observe safe procedures for access. Maintain a three-point contact and/or use a body harness.

**1.** Ensure that the tank is full of washer solvent.

**2.** Inspect the nozzles and other washer system components for blockage.

**3.** Washer Spray Pattern

**4.** Washer Nozzle Pressure

**5.** Verify that there is no damage to the components of the system.

- Frayed Hoses
- Leaking Hoses
- Loose Clamps

**Note:** Replace any frayed/leaking hoses and tighten loose clamps.

Manually clean any excessive debris build-up from around the washers and sensors. Adjust any washer nozzle that is not cleaning the sensors correctly. Check for washer fluid flow to the nozzles, clean, or replace affected nozzles. If all nozzles are working but flow is low, replace the filter between the tank and the pumps. If pressure to the system appears low, check to make sure that all pumps are providing pressure and fluid flow. Check each pump individually.

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# Product and Dealer Information

Note: For product identification plate locations, see the section “Product Identification Information” in the Operation and Maintenance Manual.

**Delivery Date:** _____

## Product Information

Model: _____

Product Identification Number: _____

Engine Serial Number: _____

Transmission Serial Number: _____

Generator Serial Number: _____

Attachment Serial Numbers: _____

Attachment Information: _____

Customer Equipment Number: _____

Dealer Equipment Number: _____

## Dealer Information

Name: _____ Branch: _____

Address: _____

_____

_____

| | Dealer Contact | Phone Number | Hours |
|---|---|---|---|
| Sales: | _____ | _____ | _____ |
| Parts: | _____ | _____ | _____ |
| Service: | _____ | _____ | _____ |