



# Operation and Maintenance Manual

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## **TH220B and TH330B Telehandlers**

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S/N TBF00100 & After  
S/N TBG00100 & After

*Keep this manual with machine at all times.*

Sample of manual. Download All 170 pages at:

<https://www.aresairmanual.com/downloads/2007-caterpillar-th220b-and-th330b-telehandlers-operation-and-maintenance-manual/>

## 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. 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 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.



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.

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. 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 the product will not be damaged or be made unsafe by the operation, lubrication, maintenance or repair procedures that you choose.**

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. Caterpillar® dealers have the most current information available.



**When replacement parts are required for this product Caterpillar recommends using Caterpillar replacement parts or parts with equivalent specifications including, but not limited to, physical dimensions, type, strength and material.**

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

# EFFECTIVITY PAGE

July 13, 2006 - A - Original Issue Of Manual

February 2, 2007 - B - Added Tier III information. Revised pages 9, 18, 19, 35, 36, 109, 121, 137, 138, 139, 140, 142 and 143.

# EFFECTIVITY PAGE

**Table of Contents****Foreword**

Literature Information .....	5
Safety .....	5
Operation .....	5
Maintenance.....	5
Maintenance Intervals.....	5
Certified Engine Maintenance .....	5
Machine Capacity.....	5
Contact Information.....	6

**Safety Section**

Safety Messages.....	7
Do Not Operate (1).....	9
Do Not Stand Under the Load (2) .....	10
No Hands (3).....	10
Forks (5).....	11
Do Not Weld On The ROPS/FOPS Structure (6) .....	12
No Access Platform (7) .....	12
Seat Belt (8) .....	13
Engine Coolant (9) .....	13
Low Bridge (10).....	13
Avoid Power Lines (11).....	14
Jump Start Cables (12) .....	14
Ether (13) .....	14
Impaling Hazard (14).....	15
Crushing Hazard (15).....	15
Crushing Hazard (16).....	15
Crushing Hazard (17).....	15
Impaling Hazard (18).....	16
Crushing Hazard (19).....	16
Impaling Hazard (20).....	16
Impaling Hazard (21).....	16
Crushing Hazard (22).....	17
Operation (23).....	17
Entanglement and Flying Objects (24).....	17
Trap Point (25) .....	17
Crushing Hazard (26).....	18
Ether (27) .....	18
Hand (High Pressure) (28).....	19
Universal Warning (29) .....	19
Additional Messages.....	19
General Hazard Information .....	23
Pressurized Air and Water .....	23
Trapped Pressure .....	23
Fluid Penetration .....	24
Containing Fluid Spillage .....	24
Dispose of Waste Properly.....	24
Crushing Prevention and Cutting Prevention .....	24
Burn Prevention .....	25
Coolant.....	25
Oils .....	25
Batteries .....	25
Fire Prevention and Explosion Prevention .....	25
Fire Extinguisher .....	26
Lines, Tubes and Hoses .....	26
Fire Extinguisher Location.....	26
Tire Information .....	27

Electrical Storm Injury Prevention.....	27
Before Starting Engine.....	27
Engine Starting .....	28
Before Operation.....	28
Operation .....	28
Machine Operating Temperature Range .....	28
Machine Operation .....	28
Engine Stopping.....	29
Work Tools.....	30
Parking.....	30
Equipment Lowering with Loss of Hydraulic Power.....	30
Sound Information and Vibration Information .....	30
Sound Level.....	30
Vibration Level .....	31
Operator Station.....	31
Guards (Operator Protection) .....	31
Rollover Protective Structure (ROPS), Falling Object Protective Structure (FOPS).....	31
Other Guards (If Equipped) .....	31

**Product Information Section**

General Information .....	33
Lifting Capacities .....	33
Examples of Estimating the Lift Operation from the Load Chart .....	34
Specifications .....	35
Intended Use .....	35
Application/Configuration Restrictions .....	35
Identification Information.....	36
Plate and Decal Locations .....	36
Emissions Certification Decal .....	39

**Operation Section**

Before Operation.....	41
Mounting and Dismounting .....	41
Daily Inspection .....	41
Machine Operation.....	43
Alternate Exit .....	43
Seat .....	43
Seat Belt .....	44
Operator Controls .....	47
Operator Controls (Side Console) .....	62
Battery Disconnect Switch (If Equipped) .....	63
Boom Cylinder Lock (If Equipped) .....	64
Operation Information .....	65
Work Tools.....	72
Monitoring System .....	80
Backup Alarm .....	84
Cab Door .....	84
Engine Starting .....	84
Engine Starting .....	84
Starting Below 0 °C (32°F).....	85
Engine and Machine Warm-Up.....	85
Parking.....	86
Stopping the Machine .....	86
Stopping the Engine .....	86
Stopping the Engine if an Electrical Malfunction Occurs .....	86

Leaving the Machine .....	86	Cooling System Coolant Sample (Level 2) - Obtain .....	125
Transportation Information .....	87	Cooling System Pressure Cap - Clean/Replace .....	125
Shipping the Machine.....	87	Cooling System Water Temperature Regulator Replace .....	126
Roading the Machine .....	87	Differential Oil - Change.....	127
Lifting and Tying Down the Machine .....	88	Rear Axle Differential.....	127
Towing Information.....	89	Front Axle Differential .....	127
Towing the Machine .....	89	Differential Oil Level - Check .....	127
Types of Towing Hitches and Hydraulic Services .....	93	Rear Axle Differential.....	128
Hydraulic Hitch and Hydraulic Services .....	95	Front Axle Differential .....	128
Engine Starting (Alternate Methods) .....	96	Differential Oil Sample - Obtain .....	128
Engine Starting with Jump Start Cables.....	96	Drive Shaft Spline - Lubricate .....	129
Equipment Lowering with Loss of Hydraulic Power .....	97	Drive Shaft Universal Joint Bolts - Check .....	130
<b>Maintenance Section</b>		Engine Air Filter Primary Element - Clean/Replace .....	130
Maintenance Access .....	103	Cleaning Primary Air Filter Elements.....	131
Access Doors and Covers.....	103	Inspecting the Primary Air Filter Elements....	131
Tire Inflation Information .....	104	Engine Air Filter Primary Element - Replace .....	132
Tire Inflation with Air.....	104	Engine Air Filter Secondary Element - Replace.....	132
Tire Pressure.....	104	Engine Mounts - Inspect .....	133
Tire Inflation Pressure Adjustment.....	106	Engine Oil Level - Check .....	133
Tire Damage .....	106	Engine Oil Sample - Obtain .....	133
Tire Replacement.....	106	Engine Oil and Filter - Change.....	134
Wheel and Tire Installation.....	106	Engine Valve Lash - Check.....	135
Lubricant Viscosities and Refill Capacities.....	107	Final Drive Oil - Change.....	135
Lubricant Viscosities .....	107	Final Drive Oil Level - Check .....	136
Capacities (Refill) .....	109	Final Drive Oil Sample - Obtain .....	136
SOS Information.....	110	Fork Leveling Cylinder Pin -Lubricate .....	137
Maintenance Support .....	111	Fuel System - Prime .....	137
Welding on Machines and Engines with Electronic Controls .....	111	Fuel System Water Separator - Drain .....	138
Maintenance Interval Schedule .....	111	Fuel System Water Separator Element - Replace (Tier II) .....	139
Axle Breathers - Clean/Replace.....	113	Fuel System Water Separator Element - Replace (Tier III) .....	140
Backup Alarm - Test.....	113	Fuel Tank Cap - Clean.....	140
Battery - Recycle.....	113	Fuel Tank Water and Sediment - Drain .....	141
Battery or Battery Cable -Inspect/Replace .....	113	Fuses and Relays - Replace .....	142
Belt - Inspect/Replace .....	114	Fuses .....	142
Inspect .....	114	Relays.....	143
Replace .....	114	Indicators and Gauges - Test.....	144
Boom Cylinder Pin - Lubricate .....	115	Longitudinal Stability Indicator - Calibrate.....	144
Boom Head Section - Lubricate .....	115	Longitudinal Stability Indicator -Test .....	144
Boom Pivot Shaft - Lubricate .....	115	Initial Test .....	144
Boom Telescoping Cylinder Air- Purge .....	115	Second Test.....	145
Boom Wear Pad Clearance -Inspect/Adjust.....	116	Oil Filter - Inspect.....	145
Adjustment .....	117	Inspect a Used Filter for Debris .....	145
Boom and Frame - Inspect.....	118	Parking Brake - Adjust .....	146
Braking System - Test.....	119	Radiator Core - Clean .....	146
Service Brake.....	119	Refrigerant Dryer - Replace .....	147
Parking Brake.....	120	Rollover Protective Structure (ROPS) and Falling Object Protective Structure (FOPS) -Inspect .....	147
Cab Air Filter - Clean/Replace.....	120	Seat Belt - Inspect.....	148
Primary Cab Air Filter.....	120	Seat Belt - Replace .....	148
Secondary Cab Air Filter .....	121	Tire Inflation - Check.....	148
Circuit Breakers - Test .....	121	Transmission and Hydraulic System Oil - Change .....	149
Compensating Cylinder Bearing - Lubricate.....	122	Transmission and Hydraulic System Oil Filter - Replace.....	150
Cooling System Coolant - Change.....	122		
Cooling System Coolant Level - Check.....	123		
Cooling System Coolant Sample (Level 1) - Obtain.....	124		

## Table of Contents

Transmission and Hydraulic System Oil Level - Check .....	151
Transmission and Hydraulic System Oil Sample - Obtain .....	152
Transmission and Hydraulic System Tank Breather - Clean .....	152
Turbocharger - Inspect .....	153
Wheel Nut Torque - Check .....	153
Window Washer Reservoir - Fill .....	153
Window Wiper - Inspect/Replace .....	153
Windows - Clean .....	154
Work Tool - Inspect/Replace .....	154
Forks .....	154
Buckets .....	156
<b>Reference Information Section</b>	
Approved Work Tools .....	157



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## Foreword

### Literature Information

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

This manual contains safety information, operation instructions, transportation information, lubrication information and maintenance information.

Some photographs or illustrations in this publication show details or attachments that can be different from your machine. Guards and covers might have been removed for illustrative purposes.

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

Whenever a question arises regarding your machine, or this publication, please consult your Caterpillar 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.

Read and understand the basic precautions listed in the safety section before operating or performing lubrication, maintenance and repair on this 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, machine controls, attachment controls, transportation and towing information.

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

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

## Maintenance

The maintenance section is a guide to equipment care. The Maintenance Interval Schedule (MIS) lists the items to be maintained at a specific service interval. Items without specific intervals are listed under the "When Required" service interval. The Maintenance Interval Schedule lists the page number for the step-by-step instructions required to accomplish the scheduled maintenance. Use the Maintenance Interval Schedule as an index or "one safe source" for all maintenance procedures.

### Maintenance Intervals

Use the service hour meter to determine servicing intervals. Calendar intervals shown (daily, weekly, monthly, etc.) can be used instead of service hour meter intervals if they provide more convenient servicing schedules and approximate the indicated service hour meter reading. Recommended service should always be performed at the interval that occurs first.

Under extremely severe, dusty or wet operating conditions, more frequent lubrication than is specified in the maintenance intervals chart is necessary.

### Certified Engine Maintenance

Proper maintenance and repair is essential to keep the engine and machine systems operating correctly. As the heavy duty off-road diesel engine owner, you are responsible for the performance of the required maintenance listed in the Owner Manual, Operation and Maintenance Manual, and Service Manual.

It is prohibited for any person engaged in the business of repairing, servicing, selling, leasing, or trading engines or machines to remove, alter, or render inoperative any emission related device or element of design installed on or in an engine or machine that is in compliance with the regulations (40 CFR Part 89). Certain elements of the machine and engine such as the exhaust system, fuel system, electrical system, intake air system and cooling system may be emission related and should not be altered unless approved by Caterpillar.

### Machine Capacity

Additional attachments or modifications may exceed machine design capacity which can adversely affect performance characteristics. Included would be stability and system certifications such as brakes, steering, and rollover protective structures (ROPS). Contact your Caterpillar dealer for further information.

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## Contact Information

### For:

- Accident Reporting and Product Safety Publications
- Current Owner Updates
- Questions Regarding Product Applications and Safety
- Standards and Regulations Compliance Information
- Questions Regarding Product Modifications

### Contact:

Product Safety and Reliability Department  
JLG Industries, Inc.  
1 JLG Drive  
McConnellsburg, PA 17233  
USA  
or Your Local JLG Office

### In USA:

Toll Free: 877-JLG-SAFE (877-554-7233)

### Outside USA:

Phone: 717-485-5161 or 717-485-6591

**E-mail:** [ProductSafety@JLG.com](mailto:ProductSafety@JLG.com)

# Safety Section

## Safety Messages

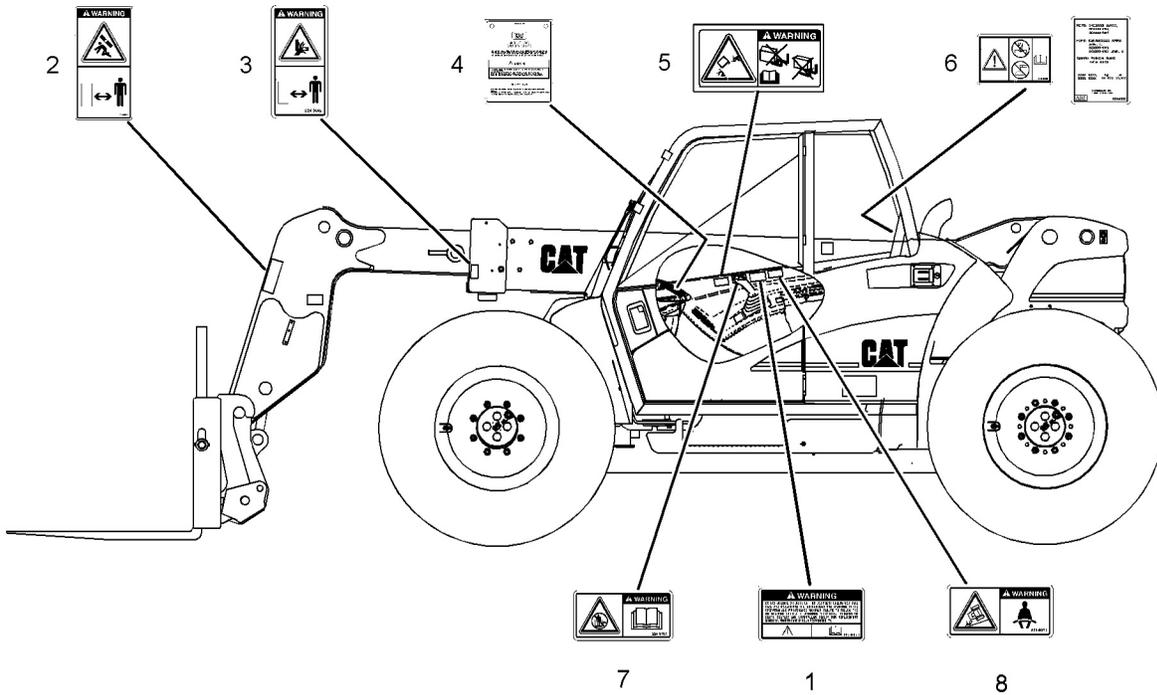


Illustration 2

g01106280

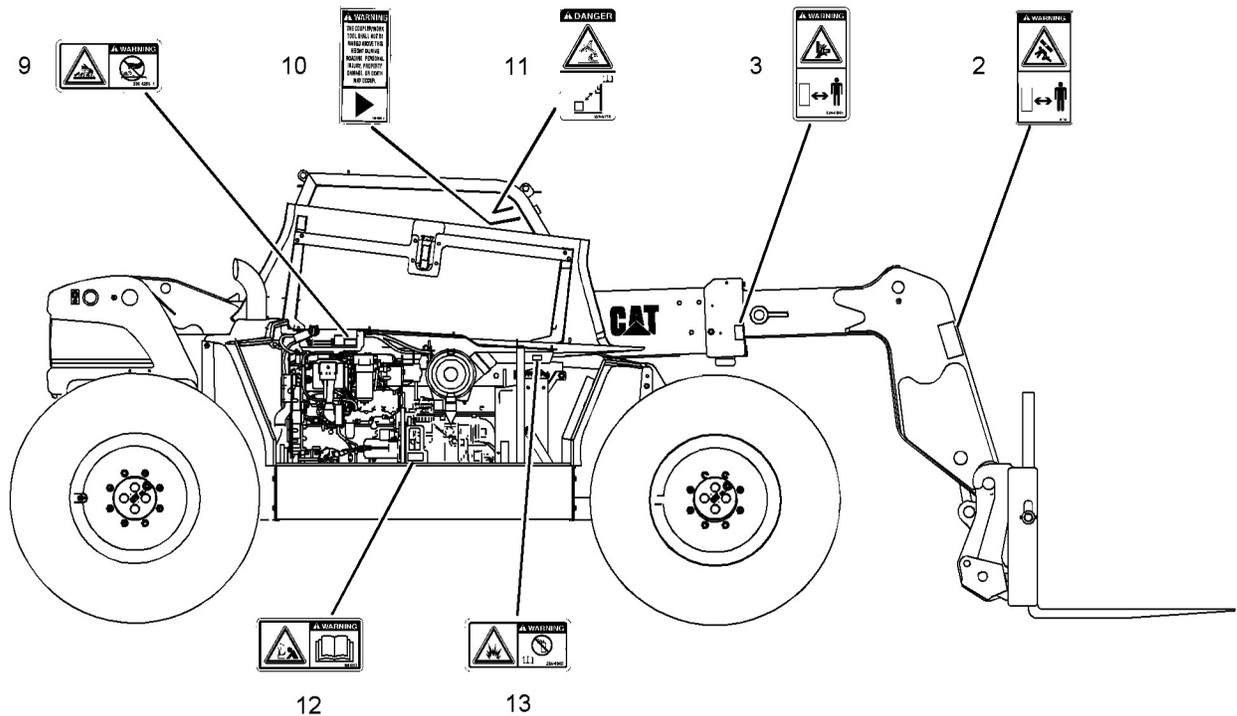


Illustration 3

g01106290

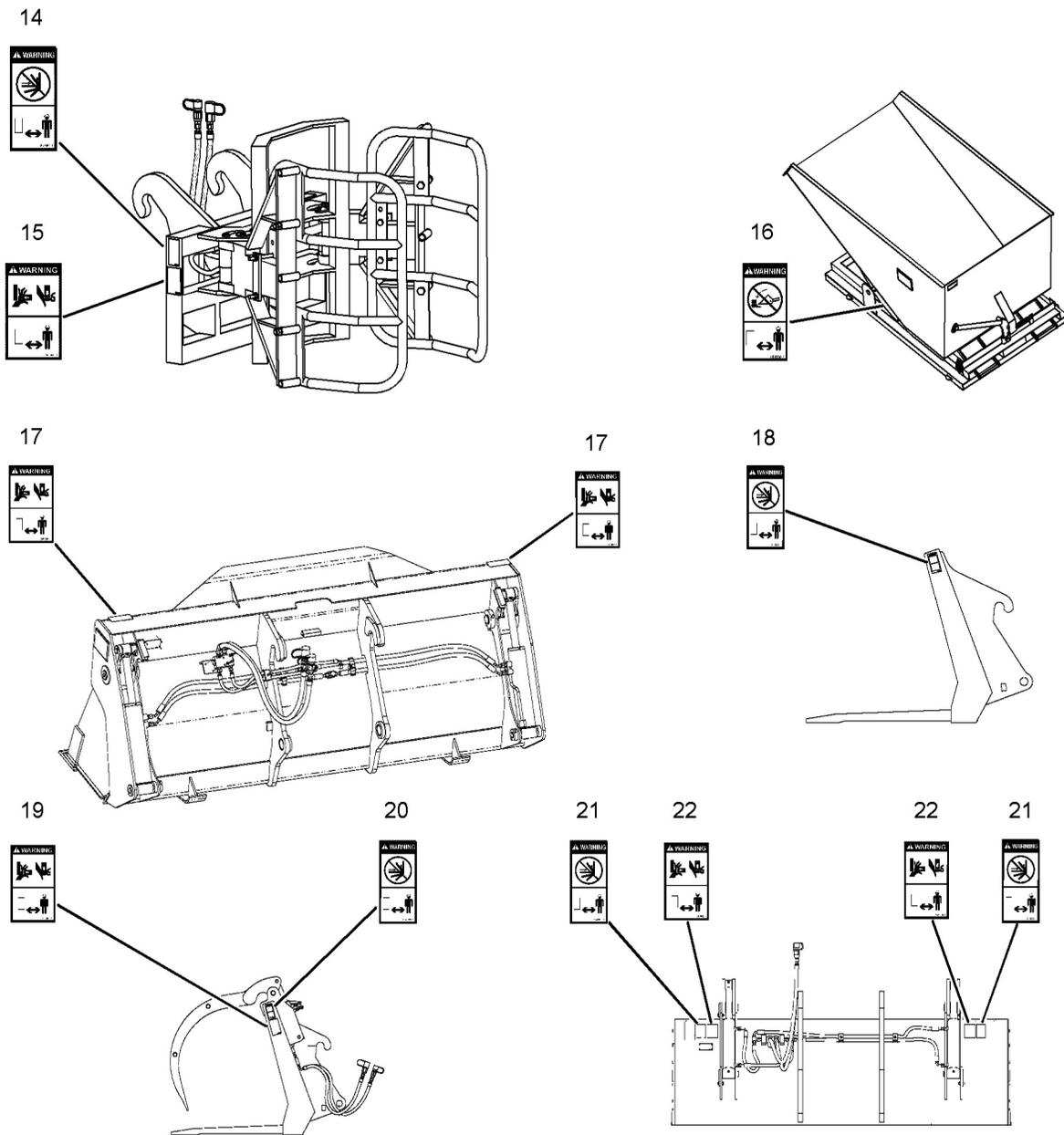


Illustration 4

g01106462

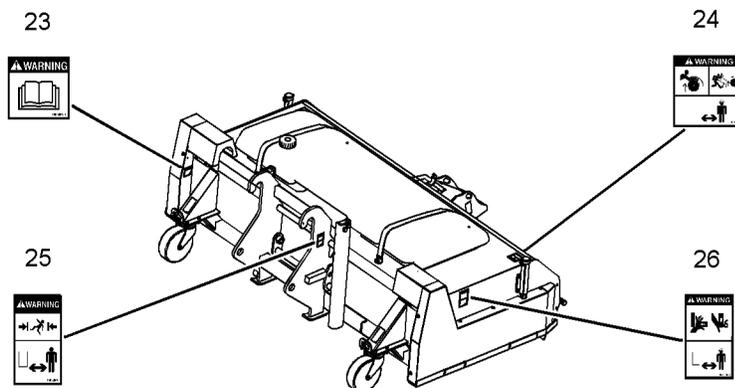
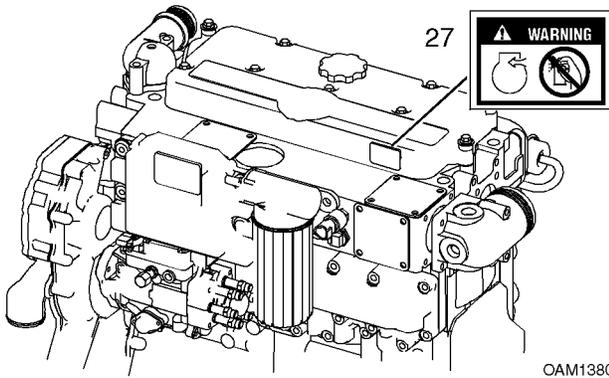


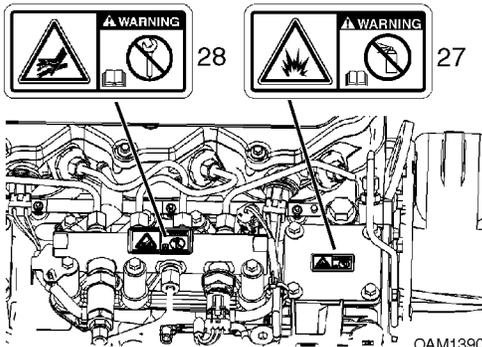
Illustration 5

g01106485



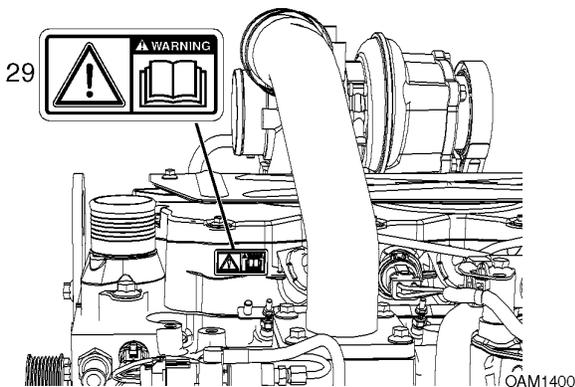
Tier II

OAM1380



Tier III

OAM1390



Tier III

OAM1400

There are several specific safety messages on these machines. The exact location of the messages and the description of the messages are reviewed in this section. Please understand all safety messages.

Make sure that all of the safety messages are legible. Clean the safety messages or replace the safety messages if you cannot read the words. Replace the illustrations if the illustrations are not legible. When you clean the safety messages, use a cloth, water and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the safety messages. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the safety message. Loose adhesive will allow the safety message to fall.

Replace any safety message that is damaged, or missing. If a safety message is attached to a part that is replaced, install a safety message on the replacement part. Any Caterpillar dealer can provide new safety messages.

### Do Not Operate (1)

This safety message is positioned on the panel at the right side of the operator station.



g00931194



**Do not operate or work on this equipment 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.**

## Do Not Stand Under the Load (2)

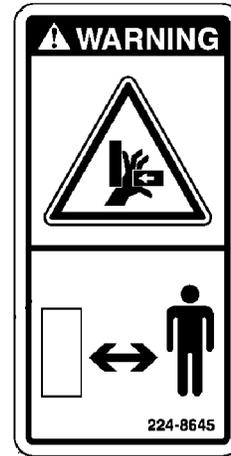
This message is positioned on the side of the boom head on both sides of the machine.



g00930659

## No Hands (3)

The message is positioned on the side of the number one boom section on both sides of the machine.



g00930870



A crushing hazard exists when the boom is lowered or from a falling load. Stay clear of the boom when the machine is in operation. Failure to stay clear of the boom could cause injury or death.



A crushing hazard exists when the boom sections are being retracted or extended. Stay clear of the boom when the machine is in operation. Failure to stay clear of the boom when the machine is operation could cause injury or death.

## Do Not Operate (4)

This safety message is located on the front dash in the operator compartment.



g00936539

### **WARNING**

Improper operation or maintenance of the machine could result in injury or death. Do not operate or work on this machine unless you have been properly trained and authorized and have read and understood the warnings and instructions in the Operation and Maintenance Manual.

Refer to Operation and Maintenance Manual, "Lifting Capacities" for more information.

## Forks (5)

This safety message is positioned on the panel at the right side of the operator station.



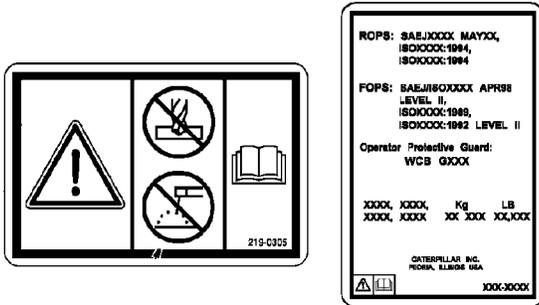
g01059274

### **WARNING**

Side loading of the forks may cause premature failure of the forks and thus a crush hazard which could cause personal injury or death. Never push loads with the forks and inspect the forks daily for any twisting or bending observed in the forks. Should twisting or bending be observed, change the fork(s) prior to any lifting operation. Read the Operation and Maintenance Manual for more information about the correct use and inspection of the forks.

## Do Not Weld On The ROPS/FOPS Structure (6)

This safety message is positioned behind the seat near the rear window.



g00932470



Structural damage, an overturn, modification, alteration, or improper repair can impair this structure's protection capability thereby voiding this certification. Do not weld on or drill holes in the structure. This will void the certification. Consult a Caterpillar dealer to determine this structure's limitations without voiding its certification.

This machine has been certified to the standards that are listed on the certification decal. The maximum mass of the machine, which includes the operator and the attachments without a payload, should not exceed the mass on the certification decal.

A typical example of the warning decal and certification decal are shown above.

Refer to Operation and Maintenance Manual, "Guards (Operator Protection)" for more information.

## No Access Platform (7)

This safety message is positioned on the panel at the right side of the operator station.



g00931203



This machine was not manufactured for, and has not been modified for, use with an access platform attachment.

Use of an access platform attachment on a machine not manufactured or properly modified for use with such an attachment could result in injury or death.

Do not use this machine with an access platform attachment.

See your Caterpillar dealer for more information about this machine and access platforms.

## Seat Belt (8)

This safety message is positioned on the panel at the right side of the operator station.



g00931188

### **WARNING**

A seat belt should be worn at all times during machine operation to prevent serious injury or death in the event of an accident or machine overturn. Failure to wear a seat belt during machine operation could result in serious injury or death.

Refer to Operation and Maintenance Manual, "Seat Belt" for more information.

## Engine Coolant (9)

This safety message is positioned on the coolant tank in the engine enclosure.



g00931247

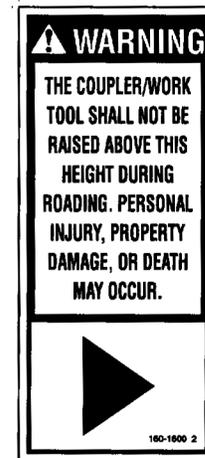
### **WARNING**

**Pressurized system! Hot coolant could cause serious burns, injury or death. To open the cooling system filler cap, stop the engine and wait until the cooling system components are cool. Loosen the cooling system pressure cap slowly in order to relieve the pressure. Read and understand the Operation and Maintenance Manual before performing any cooling system maintenance.**

Refer to Operation and Maintenance Manual, "Cooling System Coolant - Change" for the correct procedure to remove the pressure cap.

## Low Bridge (10)

This safety message is positioned in the operator station on the right side of the front window. This message is only located on machines that will be used in the United Kingdom.



g00931533

### **WARNING**

The coupler/work tool shall not be raised above this height during roading. Personal injury, property damage, or death could occur.

## Avoid Power Lines (11)

This safety message is positioned in the operator station on the right side of the front window.



g00936329



**Electrocution Hazard! Keep the machine and attachments a safe distance from electrical power. Stay clear 3 m (10 ft) plus twice the line insulator length. Read and understand the instructions and warnings in the Operation and Maintenance Manual. Failure to follow the instructions and warnings will cause serious injury or death**

Always check for power lines before raising the boom. Failure to check for power lines before raising the boom could result in injury or death by electrocution. Refer to Operation and Maintenance Manual, "Before Starting Engine" for more information.

## Jump Start Cables (12)

This safety message is positioned on a bracket next to the batteries.



g00931020



**Explosion Hazard! Improper jumper cable connections could cause an explosion resulting in serious injury or death. Batteries may be located in separate compartments. Refer to the Operation and Maintenance Manual for the correct jump starting procedure.**

Refer to Operation and Maintenance Manual, "Engine Starting with Jump Start Cables" for more information.

## Ether (13)

This safety message is positioned on the intake for the air cleaner.



g00931562

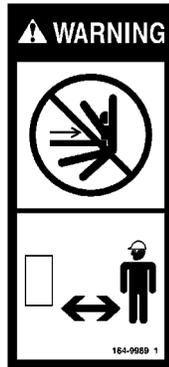


**Explosion hazard! Do not use ether! This machine is equipped with an air inlet heater. Using ether can create explosions or fires that could cause personal injury or death. Read and follow the starting procedure in the Operation and Maintenance Manual.**

Refer to Operation and Maintenance Manual, "Fire Prevention and Explosion Prevention" for more information.

### Impaling Hazard (14)

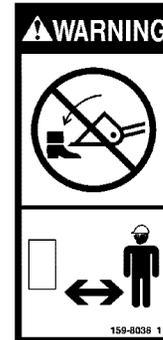
This message is located on each side of the bale handler.



g00951569

### Crushing Hazard (16)

This message is located on both sides of the hopper.



g00951560



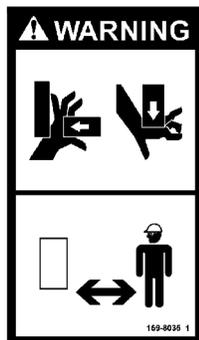
No clearance for person in this area during operation. Severe injury or death from impalement could occur. Stay away from the work tool while it is in operation.



No clearance for person in this area during operation. Severe injury or death from impalement could occur. Stay away from the work tool while it is in operation.

### Crushing Hazard (15)

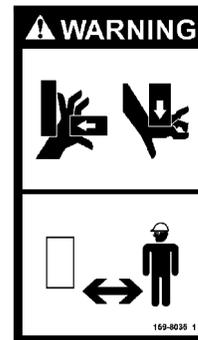
This message is located on each side of the bale handler.



g00951565

### Crushing Hazard (17)

This message is located on each side of the bucket on the top of the bucket.



g00951565



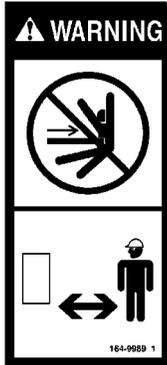
No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.



No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

### Impaling Hazard (18)

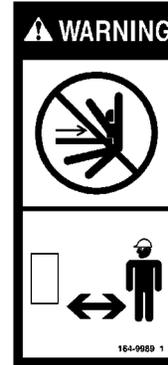
This message is located on each side of the manure fork.



g00951569

### Impaling Hazard (20)

This message is located on each side of the grapple fork.



g00951569



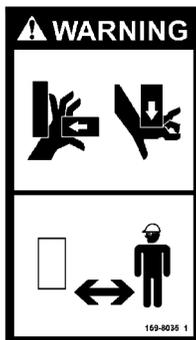
**No clearance for person in this area during operation. Severe injury or death from impalement could occur. Stay away from the work tool while it is in operation.**



**No clearance for person in this area during operation. Severe injury or death from impalement could occur. Stay away from the work tool while it is in operation.**

### Crushing Hazard (19)

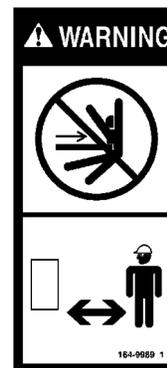
This message is located on each side of the grapple fork.



g00951565

### Impaling Hazard (21)

This message is located on each side of the grapple bucket.



g00951569



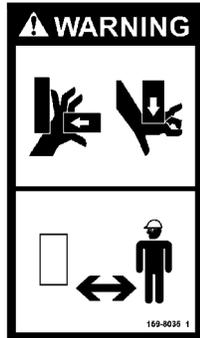
**No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.**



**No clearance for person in this area during operation. Severe injury or death from impalement could occur. Stay away from the work tool while it is in operation.**

### Crushing Hazard (22)

This message is located on each side of the grapple bucket.



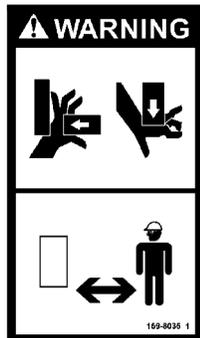
g00951565



No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

### Operation (23)

This message is located on the left hand cover at the rear of the broom.



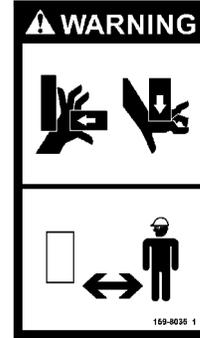
g00951565



Do not operate or work on this equipment 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.

### Entanglement and Flying Objects (24)

This message is located on each side of the top cover for the broom.



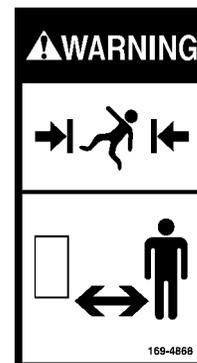
g00951565



Stay clear of this work tool during operation. Entanglement could result in personal injury or death. Flying objects from this work tool could result in personal injury or death.

### Trap Point (25)

This message is located on both sides of the hitch on the broom.



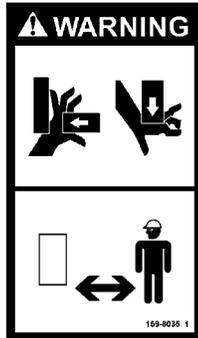
g00984061



No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

## Crushing Hazard (26)

This message is located on each side of the top cover for the broom.



g00951565



No clearance for person in this area during operation. Severe injury or death from crushing could occur. Stay away from the work tool while it is in operation.

## Ether (27)

Tier II - This message is located on the side of the valve cover.



g00924889



If equipped with an air inlet heater (AIH) for cold weather starting, do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

Tier III - This message is located on the inlet manifold cover.



OAM1280



Do not use aerosol types of starting aids such as ether. Such use could result in an explosion and personal injury.

## Hand (High Pressure) (28)

**Tier III** - This message is located on the top of the fuel manifold.



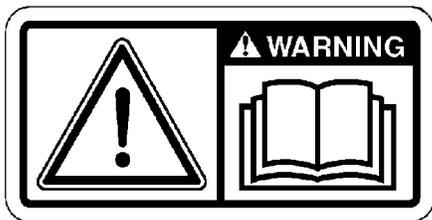
OAM1270

### **WARNING**

Contact with high pressure fuel may cause fluid penetration and burn hazards. High pressure fuel spray may cause a fire hazard. Failure to follow inspection, maintenance and service instructions may cause personal injury or death.

## Universal Warning (29)

**Tier III** - This message is located on both sides of the valve mechanism cover base.



OAM1260

### **WARNING**

Do not operate or work on this equipment unless you have read and understand the instruction and warnings in the Operation and Maintenance Manuals. Failure to follow the instructions or heed the warnings could result in serious injury or death.

## Additional Messages

There are several specific messages on these machines. The exact location of the messages and the description of the messages are reviewed in this section. Please understand all messages.

Make sure that all of the messages are legible. Clean the messages or replace the messages if the words or images are unreadable. When you clean the messages, use a cloth, water and soap. Do not use solvent, gasoline, or other harsh chemicals to clean the messages. Solvents, gasoline, or harsh chemicals could loosen the adhesive that secures the messages. Loose adhesive will allow the messages to fall.

Replace any message that is damaged, or missing. If a message is attached to a part that is replaced, install a message on the replacement part. Any Caterpillar dealer can provide new messages.

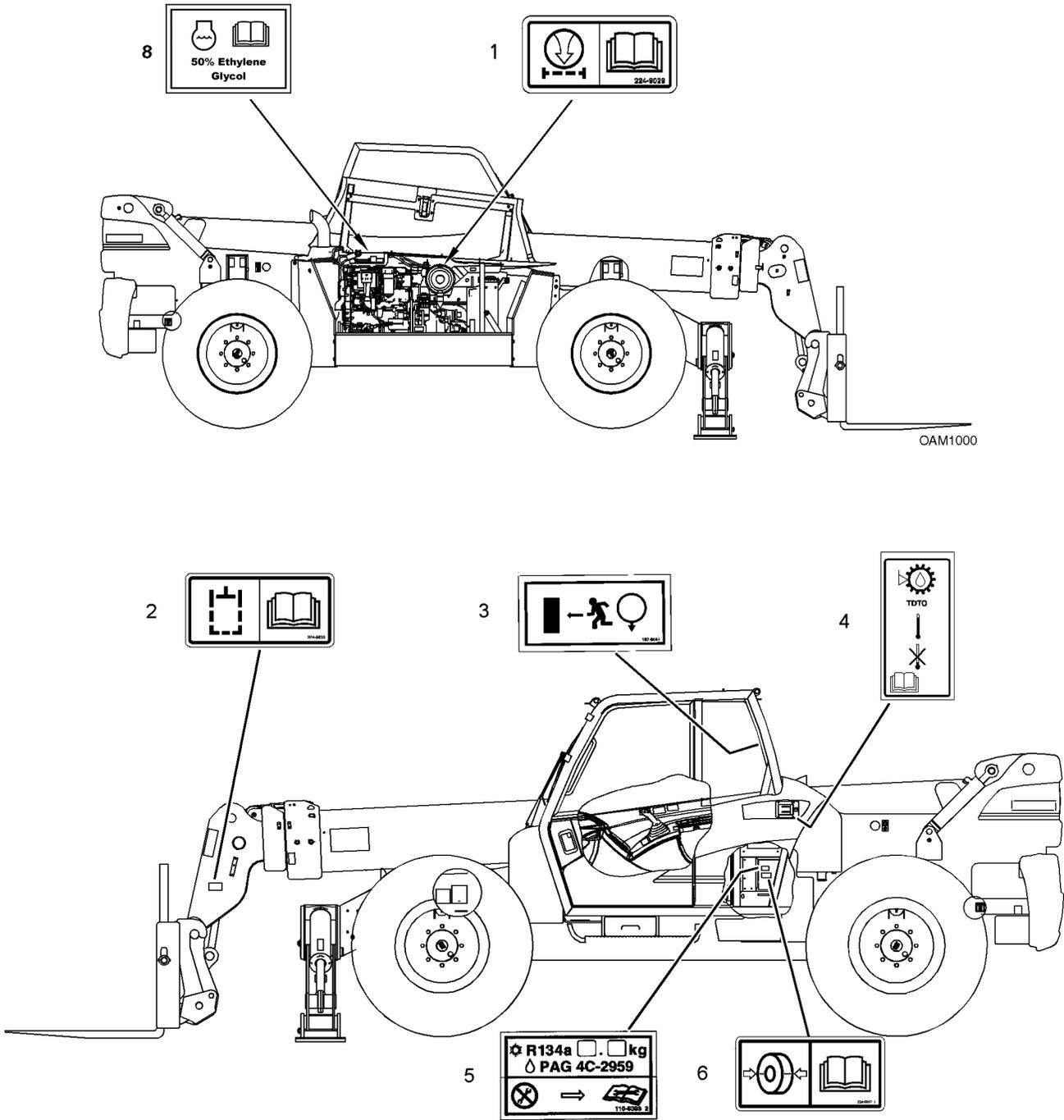


Illustration 7

g01106499

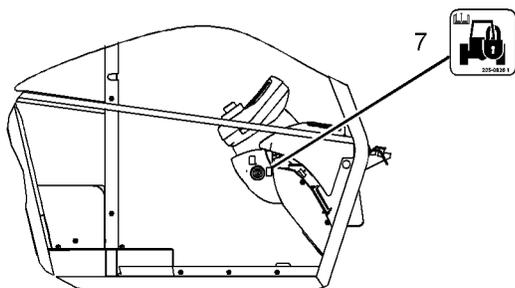


Illustration 8

g01106884

**Air Cleaner (1)**

This message is located on the cover for the air cleaner.

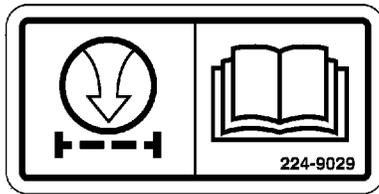


Illustration 9

g00931688

Clean the filter element or replace the filter element when the restriction indicator shows red. Refer to Operation and Maintenance Manual, "Engine Air Filter Primary Element - Clean/Replace" and Operation and Maintenance Manual, "Engine Air Filter Secondary Element - Replace" for more information.

**Auxiliary Hydraulics (2)**

If equipped, this message is located on the left side of the boom head.

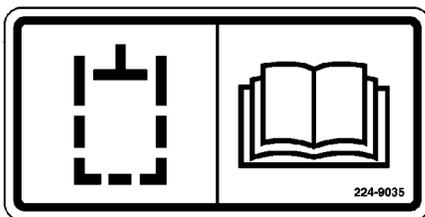


Illustration 10

g00934458

Use only work tools that are approved by Caterpillar. Refer to Operation and Maintenance Manual, "Operator Controls" and Operation and Maintenance manual, "Work Tools" for more information.

**Air Conditioner (5)**

On machines that are equipped with an air conditioner, this label is located behind the protection cover at the rear of the door.

**Alternate Exit (3)**

This message is located on the rear window of the cab.

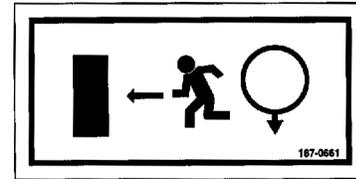


Illustration 11

g00931915

If the primary exit is blocked, exit the machine through the rear window. Use the ring on the rear window latch in order to pull out the retaining pin. This action will unlock the rear window.

**Transmission and Hydraulic Oil (4)**

If equipped, this message is located next to the sight gauge for the transmission and hydraulic oil.

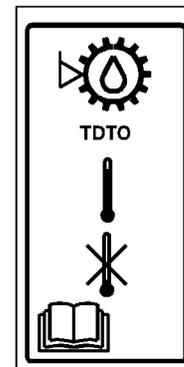


Illustration 12

g01059267

Check the transmission and hydraulic oil when the oil is warm. Do not add oil when the system is cold. If the system is cold and you add oil, you can overfill the system. This could cause machine damage. Refer to Operation and Maintenance Manual, "Transmission and Hydraulic System Oil Level - Check" for the correct procedure.

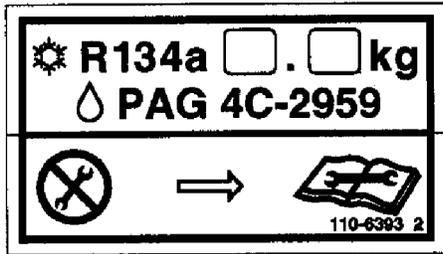


Illustration 13

g00934175

Do not work on the air conditioning system until you have read the service manual and you understand the service manual.

### Tire Pressures (6)

This message is located behind the protection cover on the left side of the cab.

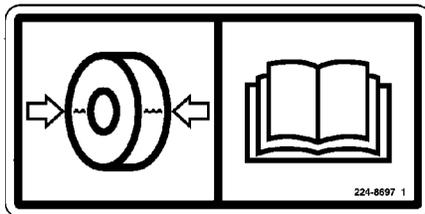


Illustration 14

g00931919

Personal injury can result from improper tire inflation. Refer to Operation and Maintenance Manual, "Tire Inflation Information" for more information.

### Machine Security System (7)

If equipped, this message is located on the left side of the steering column ahead of the engine start switch.



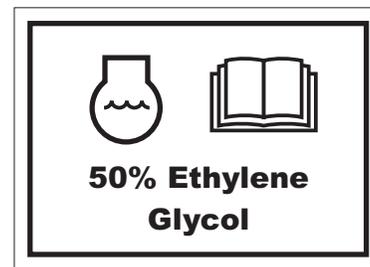
Illustration 15

g00951606

This machine is equipped with a security system. Read the Operation and Maintenance Manual before you operate the machine.

### Coolant (8)

This message is located on the coolant tank.



OAM1010

Refill with only 50/50 mixture of ethylene glycol and water. Refer to Operation and Maintenance Manual, "Cooling System Coolant Level - Check" and Operation and Maintenance Manual, "Cooling System Coolant - Change" for more information.

## General Hazard Information

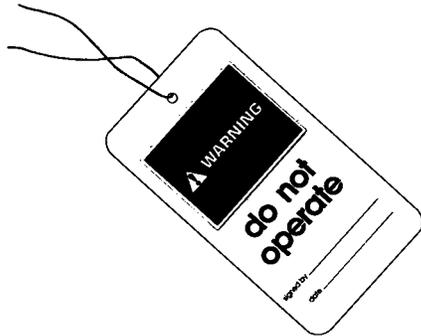


Illustration 16

g00104545

Attach a "Do Not Operate" warning tag or a similar warning tag to the start switch or to the controls before you service the equipment or before you repair the equipment. These warning tags are available from your Caterpillar dealer.

Know the width of your equipment in order to maintain proper clearance when you operate the equipment near fences or near boundary obstacles.

Be aware of high voltage power lines and power cables that are buried. If the machine comes in contact with these hazards, serious injury or death will occur from electrocution.

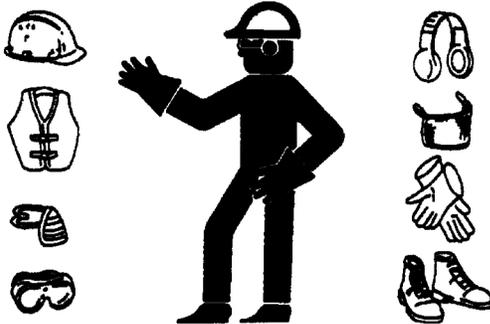


Illustration 17

g00702020

Wear a hard hat, protective glasses, and other protective equipment, as required.

Do not wear loose clothing or jewelry that can snag on controls or on other parts of the equipment.

Make sure that all protective guards and all covers are secured in place on the equipment.

Keep the equipment free from foreign material. Remove debris, oil, tools, and other items from the deck, from walkways, and from steps.

Secure all loose items such as lunch boxes, tools, and other items that are not a part of the equipment.

Know the appropriate work site hand signals and the personnel that are authorized to give the hand signals. Accept hand signals from one person only.

Do not smoke when you service an air conditioner. Also, do not smoke if refrigerant gas may be present. Inhaling the fumes that are released from a flame that contacts air conditioner refrigerant can cause bodily harm or death. Inhaling gas from air conditioner refrigerant through a lighted cigarette can cause bodily harm or death.

Never put maintenance fluids into glass containers. Drain all liquids into a suitable container.

Obey all local regulations for the disposal of liquids.

Use all cleaning solutions with care. Report all necessary repairs.

Do not allow unauthorized personnel on the equipment.

Unless you are instructed otherwise, perform maintenance with the equipment in the servicing position. Refer to Operation and Maintenance Manual for the procedure for placing the equipment in the servicing position.

## Pressurized Air and Water

Pressurized air and/or water can cause debris and/or hot water to be blown out. This could result in personal injury.

When pressurized air and/or pressurized water is used for cleaning, wear protective clothing, protective shoes, and eye protection. Eye protection includes goggles or a protective face shield.

The maximum air pressure for cleaning purposes must be below 205 kPa (30 psi). The maximum water pressure for cleaning purposes must be below 275 kPa (40 psi).

## Trapped Pressure

Pressure can be trapped in a hydraulic system. Releasing trapped pressure can cause sudden machine movement or attachment movement. Use caution if you disconnect hydraulic lines or fittings. High pressure oil that is released can cause a hose to whip. High pressure oil that is released can cause oil to spray. Fluid penetration could cause serious injury and possible death.

## Fluid Penetration

Pressure can be trapped in the hydraulic circuit long after the engine has been stopped. The pressure can cause hydraulic fluid or items such as pipe plugs to escape rapidly if the pressure is not relieved correctly.

Do not remove any hydraulic components or parts until pressure has been relieved or personal injury may occur. Do not disassemble any hydraulic components or parts until pressure has been relieved or personal injury could occur. Refer to the Service Manual for any procedures that are required to relieve the hydraulic pressure.

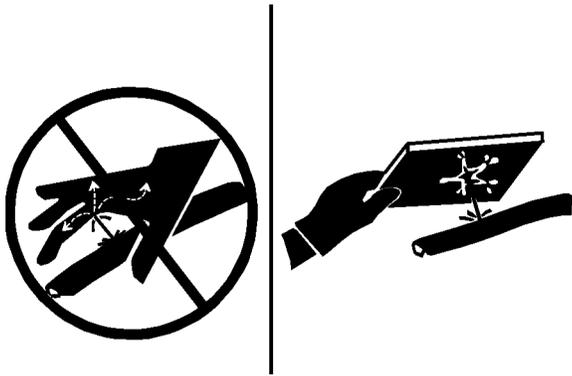


Illustration 18

g00687600

Always use a board or cardboard when you check for a leak. Leaking fluid that is under pressure can penetrate body tissue. Fluid penetration could cause serious injury and possible death. A pin hole leak can cause severe injury. If fluid is injected into your skin, you must get treatment immediately. Seek treatment from a doctor that is familiar with this type of injury.

## Containing Fluid Spillage

Care must be taken in order to ensure that fluids are contained during performance of inspection, maintenance, testing, adjusting and repair of the equipment. Prepare to collect the fluid with suitable containers before opening any compartment or disassembling any component that contains fluids.

Refer to Special Publication, NENG2500, "Caterpillar Dealer Service Tool Catalog" for the following items:

- Tools that are suitable for collecting fluids and equipment that is suitable for collecting fluids
- Tools that are suitable for containing fluids and equipment that is suitable for containing fluids

Obey all local regulations for the disposal of liquids.

## Dispose of Waste Properly

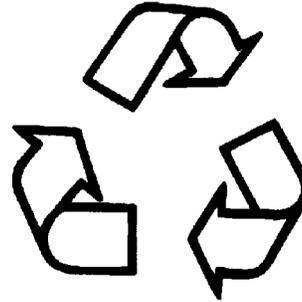


Illustration 20

g00706404

Improperly disposing of waste can threaten the environment. Potentially harmful fluids should be disposed of according to local regulations.

Always use leakproof containers when you drain fluids. Do not pour waste onto the ground, down a drain, or into any source of water.

## Crushing Prevention and Cutting Prevention

Support the equipment properly before you perform any work or maintenance beneath that equipment. Do not depend on the hydraulic cylinders to hold up the equipment. Equipment could fall if a control is moved, or if a hydraulic line breaks.

Do not work beneath the cab of the machine unless the cab is properly supported.

Unless you are instructed otherwise, never attempt adjustments while the machine is moving or while the engine is running.

Never jump across the starter solenoid terminals in order to start the engine. Unexpected machine movement could result.

Whenever there are equipment control linkages the clearance in the linkage area will change with the movement of the equipment or the machine. Stay clear of areas that may have a sudden change in clearance with machine movement or equipment movement.

Stay clear of all rotating and moving parts.

If it is necessary to remove guards in order to perform maintenance, always install the guards after the maintenance is performed.

Keep objects away from moving fan blades. The fan blade will throw objects or cut objects.

Do not use a kinked wire cable or a frayed wire cable. Wear gloves when you handle wire cable.

When you strike a retainer pin with force, the retainer pin can fly out. The loose retainer pin can injure personnel. Make sure that the area is clear of people when you strike a retainer pin. To avoid injury to your eyes, wear protective glasses when you strike a retainer pin.

Chips or other debris can fly off an object when you strike the object. Make sure that no one can be injured by flying debris before striking any object.

## Burn Prevention

Do not touch any part of an operating engine. Allow the engine to cool before any maintenance is performed on the engine. Relieve all pressure in the air system, in the oil system, in the lubrication system, in the fuel system, or in the cooling system before any lines, fittings or related items are disconnected.

## Coolant

When the engine is at operating temperature, the engine coolant is hot. The coolant is also under pressure. The radiator and all lines to the heaters or to the engine contain hot coolant.

Any contact with hot coolant or with steam can cause severe burns. Allow cooling system components to cool before the cooling system is drained.

Check the coolant level only after the engine has been stopped.

Ensure that the filler cap is cool before removing the filler cap. The filler cap must be cool enough to touch with a bare hand. Remove the filler cap slowly in order to relieve pressure.

Cooling system conditioner contains alkali. Alkali can cause personal injury. Do not allow alkali to contact the skin, the eyes, or the mouth.

## Oils

Hot oil and hot components can cause personal injury. Do not allow hot oil to contact the skin. Also, do not allow hot components to contact the skin.

Remove the hydraulic tank filler cap only after the engine has been stopped. The filler cap must be cool enough to touch with a bare hand. Follow the standard procedure in this manual in order to remove the hydraulic tank filler cap.

## Batteries

Electrolyte is an acid. Electrolyte can cause personal injury. Do not allow electrolyte to contact the skin or the eyes. Always wear protective glasses for servicing batteries. Wash hands after touching the batteries and connectors. Use of gloves is recommended.

## Fire Prevention and Explosion Prevention



Illustration 21

g00704000

All fuels, most lubricants, and some coolant mixtures are flammable.

Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire. Fire may cause personal injury and property damage.

Remove all flammable materials such as fuel, oil, and debris from the machine. Do not allow any flammable materials to accumulate on the machine.

Store fuels and lubricants in properly marked containers away from unauthorized persons. Store oily rags and any flammable materials in protective containers. Do not smoke in areas that are used for storing flammable materials.

Do not operate the machine near any flame.

Exhaust shields (if equipped) protect hot exhaust components from oil spray or fuel spray in case of a break in a line, in a hose, or in a seal. Exhaust shields must be installed correctly.

Do not weld on lines or on tanks that contain flammable fluids. Do not flame cut lines or tanks that contain flammable fluid. Clean any such lines or tanks thoroughly with a nonflammable solvent prior to welding or flame cutting.

Check all electrical wires daily. Repair any wires that are loose or frayed before you operate the machine. Clean all electrical connections and tighten all electrical connections.

20b and th330b telehandlers operation and maintenance manual

Dust that is generated from repairing nonmetallic hoods or nonmetallic fenders can be flammable and/or explosive. Repair such components in a well ventilated area away from open flames or sparks.

Inspect all lines and hoses for wear or for deterioration. The hoses must be properly routed. The lines and the hoses must have adequate support and secure clamps. Tighten all connections to the recommended torque. Leaks can cause fires.



Illustration 22

g00704059

Use caution when you are refueling a machine. Remove debris from the top of the tank before refueling. Do not smoke while you are refueling a machine. Do not refuel a machine near open flames or sparks. Always stop the engine before refueling. Fill the fuel tank outdoors.

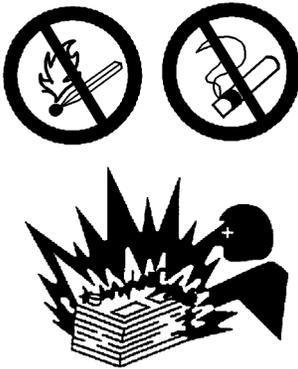


Illustration 23

g00704135

Gases from a battery can explode. Keep any open flames or sparks away from the top of a battery. Do not smoke in battery charging areas.

Never check the battery charge by placing a metal object across the terminal posts. Use a voltmeter or a hydrometer.

Improper jumper cable connections can cause an explosion that could result in injury. Refer to the Operation Section of this manual for specific instructions.

Do not charge a frozen battery. This may cause an explosion.

Sample of manual. Download All 170 pages at: <https://www.aresairmanual.com/downloads/2007-caterpillar-th220b-and-th330b-telehandlers-operation-and-maintenance-manu>

## Fire Extinguisher

Make sure that a fire extinguisher is available. Be familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instruction plate.

## Lines, Tubes and Hoses

Do not bend high pressure lines. Do not strike high pressure lines. Do not install any lines that are bent or damaged.

Repair any lines that are loose or damaged. Leaks can cause fires. Consult your Caterpillar dealer for repair or for replacement parts.

Check lines, tubes and hoses carefully. Do not use your bare hand to check for leaks. Use a board or cardboard to check for leaks. Tighten all connections to the recommended torque.

Replace the parts if any of the following conditions are present:

- End fittings are damaged or leaking.
- Outer coverings are chafed or cut.
- Wires are exposed.
- Outer coverings are ballooning.
- Flexible part of the hoses are kinked.
- Outer covers have embedded armoring.
- End fittings are displaced.

Make sure that all clamps, guards, and heat shields are installed correctly. During machine operation, this will help to prevent vibration, rubbing against other parts, and excessive heat.

## Fire Extinguisher Location

Make sure that a fire extinguisher is on the machine. Make sure that you are familiar with the operation of the fire extinguisher. Inspect the fire extinguisher and service the fire extinguisher on a regular basis. Obey the recommendations on the instruction plate.

The recommended location for mounting the fire extinguisher is on the plate for the seat to the right side of the operator.

If the fire extinguisher is mounted on the ROPS, strap the mounting plate to a leg of the ROPS. If the weight of the fire extinguisher is more than 4.5 kg (10 lb), mount the fire extinguisher as low as possible on one leg. Do not mount the fire extinguisher on the upper one-third area of the leg.