

GRADALL®

COMBINED SERVICE MANUAL

XL4210II

3 1 2 0 0 0 5 7

November 2006

Upperstructure
Starting S/N 0210017506

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GRADALL[®]

OPERATOR & SAFETY MANUAL

Keep this manual with machine at all times.

Model (s)
XL4210 II

31200056

Original Issue
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IMPORTANT SAFETY NOTICES

IT MUST REMAIN THE RESPONSIBILITY OF MACHINE OWNER to ensure that any assigned operator be fully trained and experienced, and has a full understanding of Operator/ Safety Manual provided, and that operator has had sufficient, supervised, opportunity to practice in a safe area to become familiar with machine before operating machine at a work site.

Safe operation depends upon reliable equipment and proper operating procedures. Performing the checks and services described in this manual will help keep your Gradall® Excavator in reliable condition and use of the recommended operating procedures can help you avoid accidents. Because some procedures may be new to even the experienced operator we recommend that this manual be read, understood and followed by all who operate the unit.

Strict attention to, and compliance with, instructions provided in this manual as well as the EMI & Gradall Hydraulic Excavator Safety Manuals and all instructional decals and plates affixed to the machine, will help you avoid personal injury and damage to the equipment. The information provided is not intended to cover all situations; it would be impossible to anticipate and evaluate all possible applications and methods of operation for this unit.

Any procedure not specifically recommended by The Gradall Company must be thoroughly evaluated from the standpoint of safety before it is placed in practice. If you aren't sure, contact your Gradall Excavator Distributor before operating.

**Do not modify this machine without written permission from The Gradall Company.
Use only genuine Gradall replacement parts.**

The Gradall Company retains all proprietary rights to the information contained in this manual.

The company also reserves the right to change specifications without notice.

Gradall is a registered trademark for hydraulic excavators, hydraulic material handlers and attachments manufactured by The Gradall Company.

It is Gradall Policy to continually improve its products. Therefore designs, materials and specifications are subject to change without notice and without incurring any liability on units already sold. Units shown may have optional equipment.

Though no offense or discrimination is intended, only the masculine pronouns will be used throughout this manual.

**The Gradall Company
406 Mill Ave. S.W., New Philadelphia, Ohio 44663**

GRADALL®

TABLE OF CONTENTS

IMPORTANT SAFETY NOTICES	inside of front cover
LIST OF EFFECTIVE PAGES	
TABLE OF CONTENTS	
INTRODUCTION	
General	
Related Manuals & Decals	
Operator Qualifications	
Orientation	
Serial Number Location (Product Identification No.)	
NOMENCLATURE	
TOOLS	
SAFETY	1.0 thru 1.5
DECALS	2.0 thru 2.5
SERIAL NUMBER PLATES	3.0
OPERATOR'S CAB	4.0 thru 4.7
Seat Adjustment	4.1
Control & Instrument Identification	4.2 thru 4.5
Electronic Monitor	4.4
ENGINE OPERATION	5.0 thru 5.4
Checks & Services Before Starting Engine	5.0 thru 5.1
Starting Engine	5.2
Cold Weather Starting Aids	5.2
Normal Engine Operation	5.3
Auto Idle	5.3
Stopping Engine	5.3
Warm up & Operational Checks	5.4
ATTACHMENTS	6.0 thru 6.1
Adapter Attachment Installation	6.1
CRAWLER OPERATION	7.0 thru 7.1
OPERATOR CONTROL PATTERNS	8.0 thru 8.2
TYPICAL DIGGING CYCLE	9.0 thru 9.3
MAINTENANCE & LUBRICATION DIAGRAM	10.0
RECOMMENDED LUBRICANTS & CAPACITIES	11.0
TORQUE CHART	12.0
LOADING & SECURING FOR TRANSPORT	13.0 thru 13.1
IF YOU GET STUCK	13.1
PRESERVATION & STORAGE	14.0
EXCAVATOR HAND SIGNALS	15.0 thru 15.1

INTRODUCTION

General

This manual provides important information to familiarize you with required lubrication and maintenance by operator and with proper operating procedures for the Gradall Hydraulic Excavator.

Related Manuals & Decals

Separate publications are furnished with the excavator to provide information concerning safety, replacement parts, maintenance procedures, theory of operation and vendor components. All decals and additional manuals for your machine are available from your Gradall Distributor.

Operator Qualifications

This excavator has been designed for operators weighing from 104 to 216 pounds (47 to 98.5 kg) and from 61 to 74 inches (155 to 188 cm) tall. Potential operators beyond these limits should be observed while operating and driving the unit in an open area to determine their ability for safe, efficient operation.

The operator must hold a valid, applicable driver's license which requires acceptable age, vision, hearing, manual dexterity and response. He must also be in acceptable physical and mental condition, not undergoing medical treatment or using drugs or alcohol.

Before operating the excavator at a work site, the operator must familiarize himself with the machine by practicing in an open area not hazardous to persons or property. Because many operational features of the XL 4210 II are different from previous Gradall excavators extensive practice is required for proper operation.

The operator must read, understand and comply with instructions contained in the following material furnished with the excavator:

- This Operator/Safety Manual
- Gradall Hydraulic Excavator Safety Manual
- EMI Hydraulic Excavator Safety Manual
- All Instructional decals and plates
- Any optional equipment instructions furnished

Orientation

When used to indicate direction or location, the terms front, rear, left and right relate to the orientation of a person sitting in the operator's seat (figure I-1).

Serial Number Location (Product Identification No.)

Specify Serial Number and lot number when ordering parts and when discussing specific applications and procedures with your distributor. The PIN plate (figure I-2) is located on front, center portion of upperstructure frame.

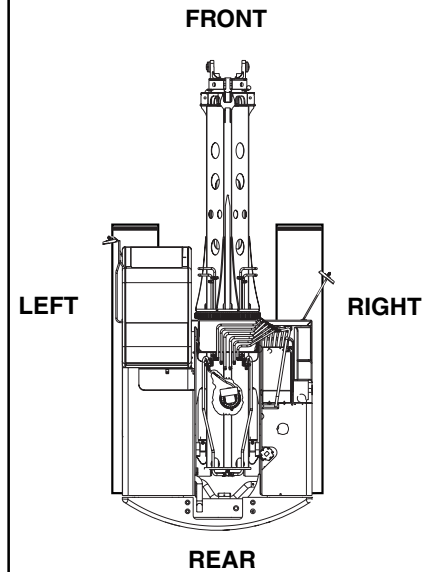


Figure I-1

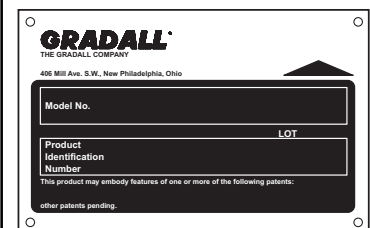
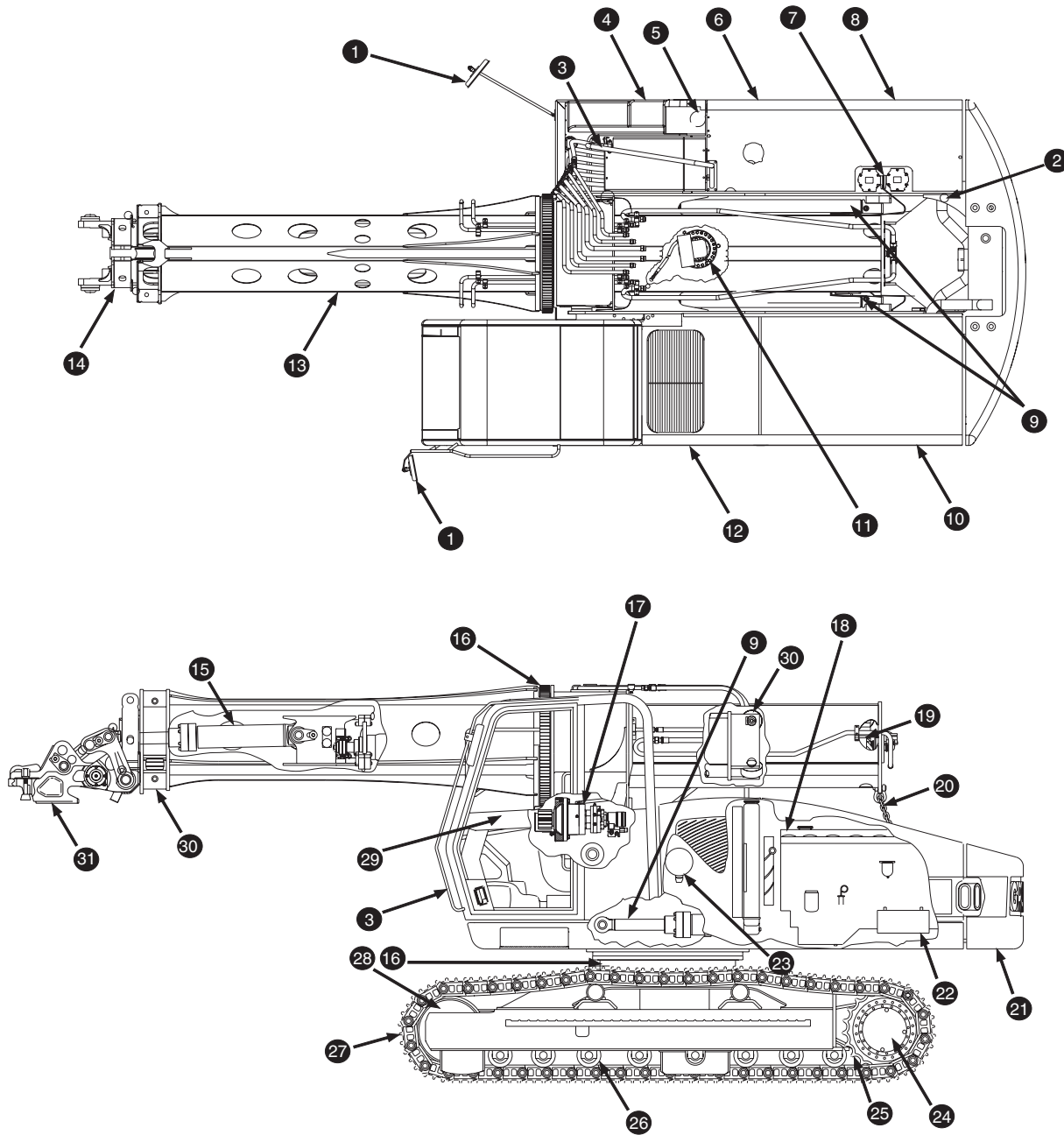
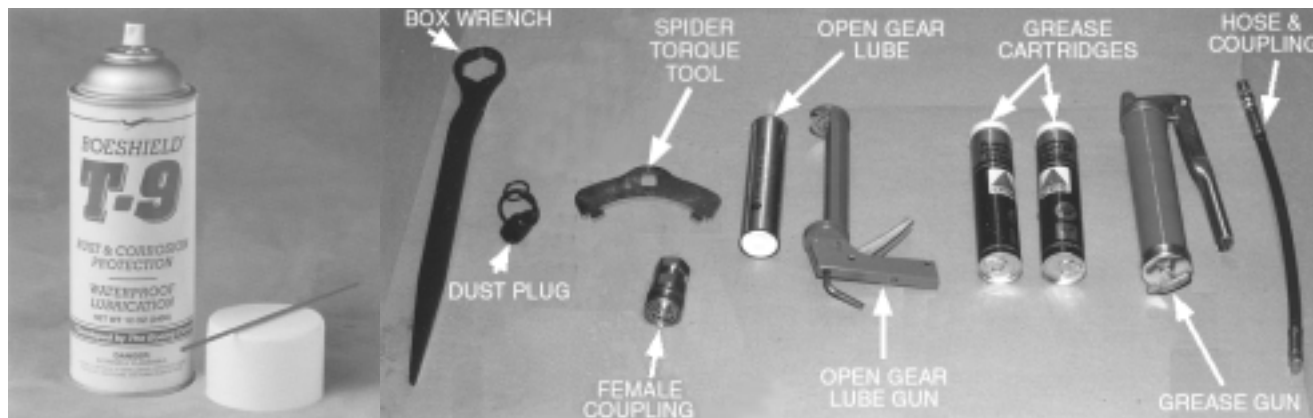


Figure I-2

NOMENCLATURE



1	Mirror	16	Swing/Tilt Bearing
2	Hydraulic Reservoir Pressure Release Valve	17	Tilt Transmission
3	Hand Rail	18	Engine
4	Valve Compartment	19	Telescoping Boom Cylinder
5	Fuel tank Fill	20	Boom Tie Down Chain
6	Fuel Tank	21	Counterweight
7	Hydraulic filters	22	Battery
8	Hydraulic Reservoir	23	Air Cleaner
9	Hoist Cylinder (2)	24	Planetary Track Drive
10	Engine/pump compartment	25	Track Drive Sprocket
11	Swing Transmission	26	Track Roller
12	Air Cleaner/Oil Cooler Compartment	27	Track
13	Main Boom	28	Track Idler
14	Telescoping Boom	29	Operator Cab
15	Tool Cylinder	30	Boom Rollers
		31	Bucket Adapter



XL 4210 II Tool Kit (Kit can be ordered under part number 8031-5004)

QTY	PART NO.	DESCRIPTION	USE
1	1440-4645	12 Oz. Can Boeshield	Cylinder Rod Protectant
1	8345-1128	Female Coupling	Pressure fill hydraulic reservoir
1	8362-3027	Dust Plug	Protect female coupling
1	8381-3109	Button Hd Coupling	Adapt grease gun to adjust tracks
1	8504-1300	Grease Gun	Apply grease to fittings
1	8504-1301	Hose and Coupling	Adapt grease gun to fittings
2	8504-1302	Grease Cartridges	Initial supply for grease gun
1	8504-1356	Box Wrench (1-7/8")	Install and remove attachment
1	8042-1115	Spider Nut Wrench	Adjust Spider on Boom Cylinder
1	8664-1304	Open Gear Lubricant	Lubricate swing & tilt gears
1	8664-1305	Open Gear Lubricant Gun	Apply open gear lubricant to gears

SAFETY

Read and understand all manuals and instructional material listed on cover, inside front cover and introduction page of this Manual before starting, operating or performing maintenance procedures on this equipment.

Safe operation depends on reliable equipment and proper operating procedures. Performing the adjustments and repairs described in this Manual will help to keep your Hydraulic Excavator in reliable condition. Use of the recommended operating procedures can help you avoid accidents. This Manual must be read, understood and followed by all who operate and service this machine.

Regardless of previous experience operating similar equipment, the operator must be given sufficient opportunity to practice with the excavator in a safe, open area (not hazardous to people or property) to gain operating skills and the proper "feel" for controls and operating clearances required for safe, efficient operation.

Complying with the DANGER, WARNING and CAUTION notes in this Manual will help you avoid injury and damage to the equipment. These notes are not intended to cover all eventualities; it would be impossible to anticipate and evaluate all possible applications and methods of operation for this equipment.

Any procedure not specifically recommended by GRADALL must be thoroughly evaluated from the standpoint of safety before it is placed in practice. If you are not sure, contact your GRADALL Distributor before operating.

Do not modify this machine without written permission from GRADALL.

BASIC SAFETY ISSUES

Always **check to be sure all controls are in neutral position before starting engine.** Although controls are designed to return to neutral when released, a foreign object could hold a control in an activated position.

Always maintain **3-point contact** with grab handles and steps when climbing on and off the machine. Never jump from the machine. Repair or replace any damaged steps and grab handles.

Perform all **"Checks and Services Before Starting the Engine"** and all **"Warm-Up and Operational Checks"** at the beginning of each work shift. Complete all required maintenance before operating the equipment.

Learn and **follow your employer's safety rules.**

Keep everyone off the machine while it is operating. Be alert for bystanders or anyone who may be working nearby. **Do not lift people with this machine.**

Never carry a water can, equipment, or other worker's tools or personal items on the machine. Such items can cause other workers to approach the machine without your knowledge and result in serious injury or death.

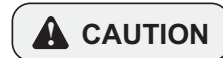
WATCH FOR THESE SYMBOLS ; THEY CALL YOUR ATTENTION TO SAFETY NOTICES.



This symbol indicates an extreme hazard which will result in high probability of death or serious injury if proper precautions are not taken.



This symbol indicates a hazard which could result in death or serious injury if proper precautions are not taken.



This symbol indicates a hazard which may result in injury or damage to equipment or property if proper precautions are not taken.



Failure to comply with safety precautions listed in this Manual and detailed on the machine could result in machine damage, personal injury or death.

Stay clear of moving fan, belts, pulleys, meshing gears, drive shafts and other moving parts. Do not operate this equipment without doors, covers, and guards in place and secured.

Be particularly careful if this is not the machine you usually operate. **Read the manuals** listed in the introduction and then **practice operating the machine in a safe, open area** to become familiar with the controls.

Always sound the horn to warn others of unexpected machine movements.

Be certain boom or attachment is resting firmly on ground and that **engine is stopped with key removed** before performing lubrication or maintenance procedures inside boom. Place a "DO NOT OPERATE" tag on the controls. **Always lower boom to rest and stop engine** before leaving cab.

Check operation of lights and flashing swing warning lights. Lights on each side of counterweight flash when upperstructure is swinging.

Mark all hoses before servicing to assure proper re-assembly.

Keep grab handles, steps, and walkways free of mud, oil, grease, and other foreign material. Replace non-skid surface material as required.

Be sure windows and door are securely latched in open or closed position when operating. Replace damaged latches and weak access cover support struts immediately.

Always stop engine before leaving cab.

Check to be sure windows and mirrors are clean and that mirrors are properly adjusted for your position and machine configuration. **Ensure adequate visibility for safe travel.**

Know overall height of your unit before traveling. Approach unknown clearances slowly (measure from ground to tallest point of machine/attachment).

Don't get too close to unstable ground or the edge of an excavation, getting too close can cause the unit to tip.

Always be especially careful when using mirrors; distances are distorted and field of view is limited, especially when swinging. **Always use a signal person when operating in tight quarters.**

Stay away from hot exhaust.

Do not use this machine in an explosive environment. This machine is not designed to protect the operator from external fire or blast.

Be aware of the potential hazards related to batteries (**Figure 1-1 & Figure 1-2**).



Operator must be seated with seat belt fastened, before traveling.



Welding could damage electrical wires, engine electronics.

Turn off engine, disconnect both the positive (+) and negative (-) battery cables and disconnect the 23-pin Deutsch connector located toward the rear L.H. side of engine before welding to prevent damage to electronic components.

Damaged electronic components could lead to an accident due to loss of vehicle control, resulting in severe injury.

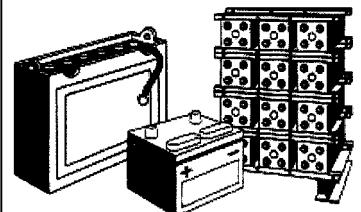
CALIFORNIA PROPOSITION 65 BATTERY WARNING

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm.

WASH HANDS AFTER HANDLING !

Figure 1-1

BATTERIES AND RELATED PARTS CONTAIN LEAD



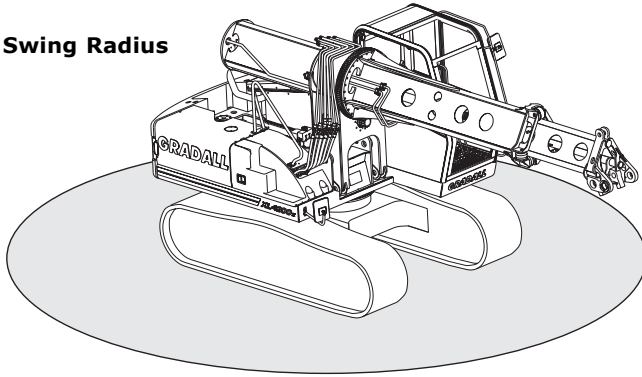
WASH HANDS AFTER HANDLING!

WARNING: Battery posts, terminal and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and reproductive harm.

Figure 1-2

SAFETY

Swing Radius



The **XL4210II Excavator is designed as a one-person machine.** There is no safe place for another person on the unit other than the operator. Do not allow anyone inside the swing radius of the boom/attachment (other than the operator) while the machine is in operation. Failure to keep all people clear could cause an accident resulting in serious injury or death.

Pressure can be maintained in hydraulic circuits long after the engine has been shut down. This pressure can cause oil (or items such as pipe plugs) to **“shoot out”** at high speed **if pressure is not released** correctly (figure 1-3). **Refer to service manual for procedure to relieve hydraulic pressure trapped in circuits.**



Figure 1-3

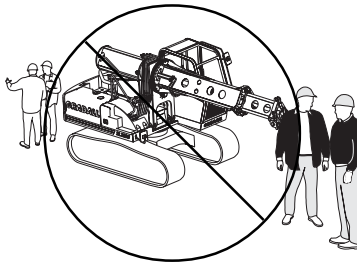


Figure 1-4

Do not operate with bystanders or other workers near machine (figure 1-4).

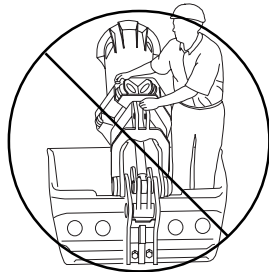


Figure 1-5

Keep everyone off of machine while it is operating. Do not lift people with this machine (figure 1-5).

WARNING

Travel on off-highway grades is recommended only under the following conditions:

Boom and attachment are positioned for maximum visibility and adequate clearances.

Surface is firm enough to support unit.

Surface provides adequate traction to prevent slipping.

Surface is not rough enough or steep enough to cause tipping.

Low travel speed is selected.

There is no load in bucket, attached to boom, or any other part of machine.

WARNING

Avoid injury! Always relieve pressure trapped in circuits before disconnecting, removing or installing hydraulic components.

Additional Precautions

- **Before traveling, adjust boom elevation to ensure clear view of right mirror. Adjust these positions as necessary to clear overhead obstructions. Return to initial positions after clearing overhead obstructions. If these instructions do not resolve all visibility problems, use a signal person.**
- **The excavator is equipped with a travel alarm to warn others in area of machine travel, either forward or reverse. If alarm fails to sound when traveling, STOP. Contact maintenance personnel to have condition repaired before traveling.**
- **Before stopping engine always be certain to position upperstructure to permit an easy, safe climb to ground and then back to cab. Always remove key from ignition before leaving cab.**
- **Before operating at a worksite, check location of all utility, phone and cable lines. Have your supervisor determine how close you can safely permit attachment to approach utility lines. Stay clear of phone and cable lines.**
- **Always fasten seat belt before operating.**



Whenever rotating equipment (such as a mower or mixer) is installed on machine, adequate shielding must be installed to deflect flying debris.

Never operate such equipment with other persons within range of possible flying debris. Be certain that mower discharge is never aimed at persons, equipment, structures, or thoroughfares.

As an additional precaution, safety glass and appropriate window guards must be installed on machine.

SAFETY

“PINCH POINTS”

Save lives and prevent injuries: Learn to recognize and avoid “Pinch Points”!

It must remain the **RESPONSIBILITY OF OWNER** to be certain **OPERATOR** is aware of **PINCH POINTS**. **PINCH POINTS** can cause **SERIOUS INJURY OR DEATH**.

It is the **OPERATOR’S** responsibility to **KEEP OTHERS CLEAR OF PINCH POINTS**. Never allow others to be on or near machine while operating or traveling.

Boom Holes & Rollers (Figure 1-10)

Always rest boom or attachment firmly on ground and stop engine before performing any procedure thru a boom hole or before servicing boom rollers.

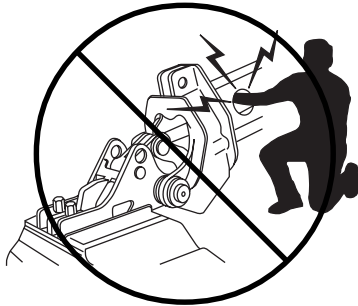


Figure 1-10

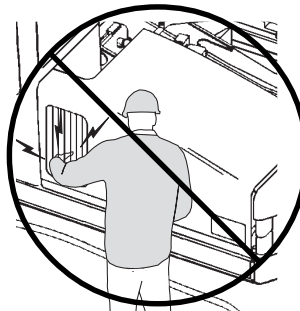


Figure 1-11

Access Covers (Figure 1-11)

Be sure all access covers are in the fully open position before performing any procedures inside compartments. Additional measures may be required to keep covers open in high wind environments.

Counterweight and Another Object (Figure 1-12)

Position machine to prevent possibility of a person being injured in a pinch point between counterweight and another object. Avoid working too close to other objects.

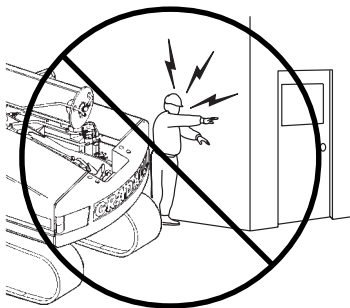


Figure 1-12

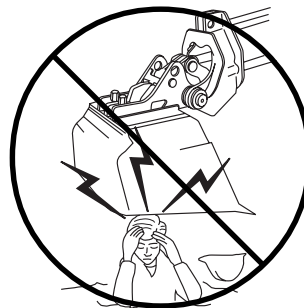


Figure 1-13

Boom and Attachment (Figure 1-13)

Never permit anyone under boom, attachment or load.

Bucket & Linkage (Figure 1-14)

Be certain that attachment is resting firmly on ground and engine is stopped before performing any procedure on bucket, linkage or boom rollers.

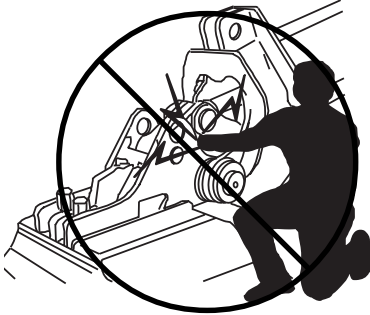


Figure 1-14

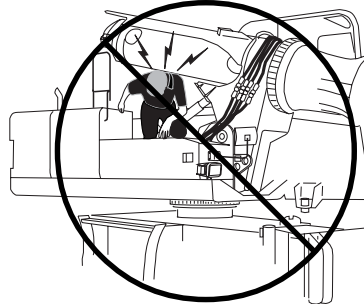


Figure 1-15

Boom Cradle & Deck (Figure 1-15)

Rest boom or attachment on ground and stop engine before permitting anyone to work beneath boom cradle.

Upperstructure & Crawler (Figure 1-16)

Never permit anyone to approach the machine while upperstructure is swinging.

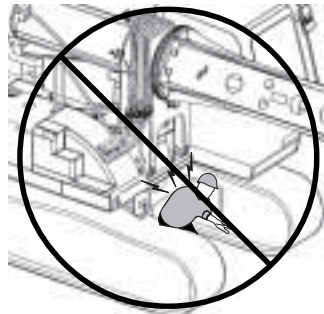
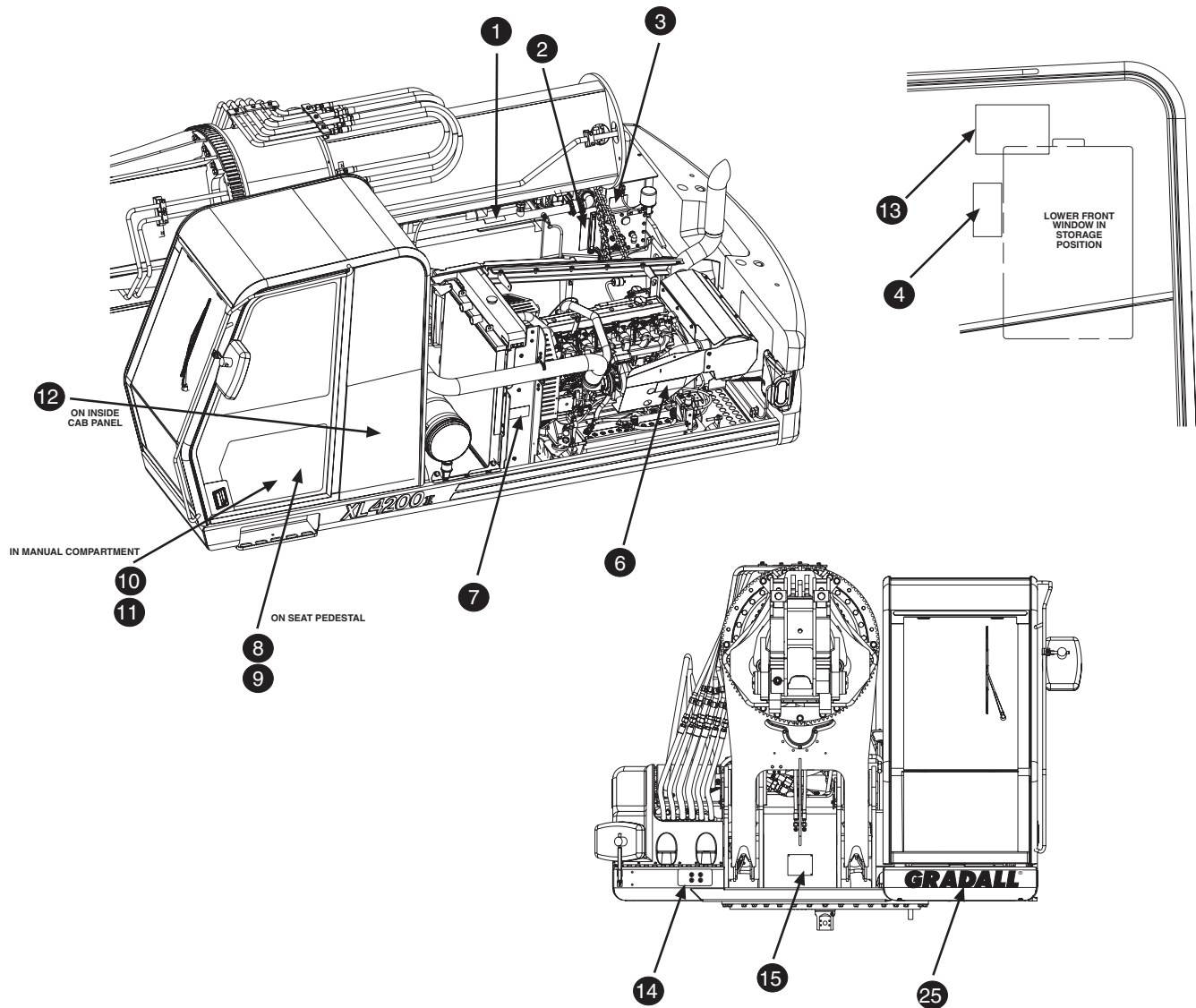


Figure 1-16

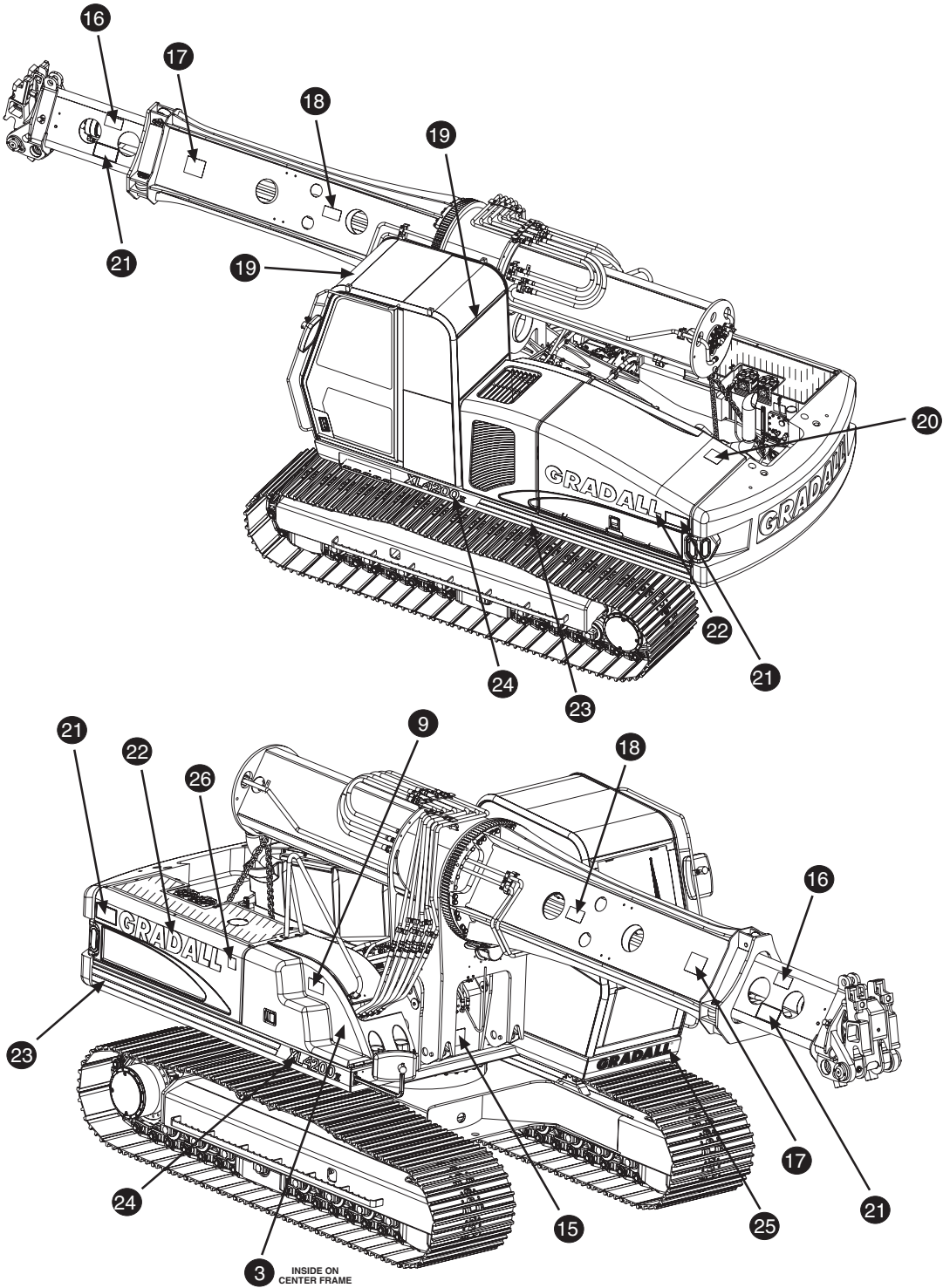
DECAL LOCATIONS



1	9114-3288	HYDRAULIC DECAL
2	8031-3019	RESERVOIR FILL DECAL
3	8090-3012	HYDRAULIC WARNING DECAL
4	8091-3074	WARNING DECAL
6	7736-3358	BATTERY WARNING DECAL
7	8060-3038	WARNING DECAL
8	7733-3027	MADE IN USA DECAL
	8036-3155	MANUAL DECAL

9	8060-3036	WARNING DECAL - CLIMBING
10	8046-3028	OPERATING DECAL - DEERE
11	8046-3027	OPERATING DECAL - GRADALL
12	8036-3181	ESCAPE HAMMER
13	8046-3064	OPERATING DECAL - SAE
14	8046-3039	LUBRICATING DECAL - UPPER
15	7733-3047	SERIAL NUMBER PLATE

DECAL LOCATIONS



16	8090-3017	WARNING DECAL - NO RIDERS
17	8033-3235	DANGER DECAL
18	8060-3037	WARNING DECAL - PINCH POINT
19	8037-3066	REFLECTIVE STRIPE
20	8037-3077	NO STEP DECAL
21	8060-3039	WARNING DECAL - SWING
22	8037-3065	LARGE GRADALL DECAL

23	8037-3104	SIDE STRIPE DECAL
24	8041-3021	XL4210II DECAL
25	8037-3061	SMALL GRADALL DECAL
26	8021-3104	DIESEL FUEL DECAL
27	8036-3088	QUICK DISCONNECT DECAL - (not shown)
28	8046-3006	FUSE DECAL -(not shown)

DECALS



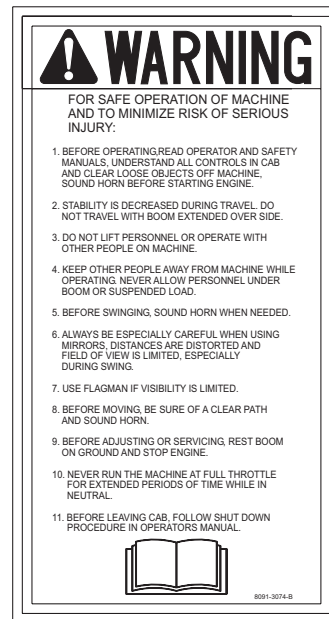
Located on tube beside pressure fill port
Part No. 9114-3288



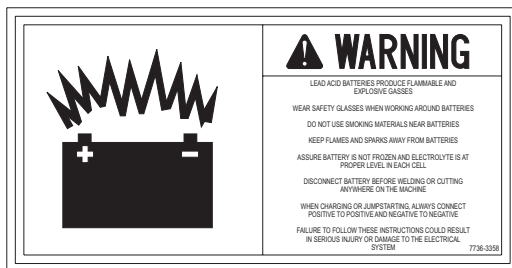
Located on inside frame by reservoir
Part No. 8090-3012



Located on reservoir by pressure fill port
Part No. 8031-3019



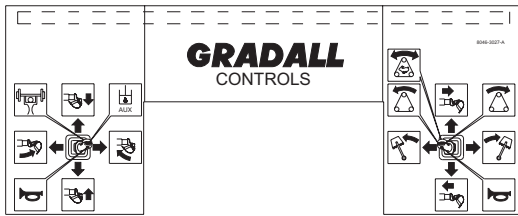
Located on inside cab window
Part No. 8091-3074



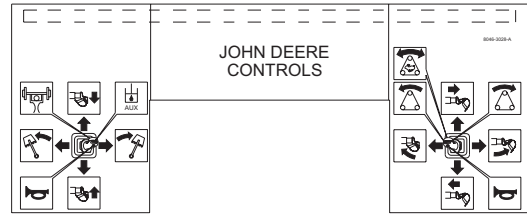
Located above battery in engine compartment
Part No. 7736-3358



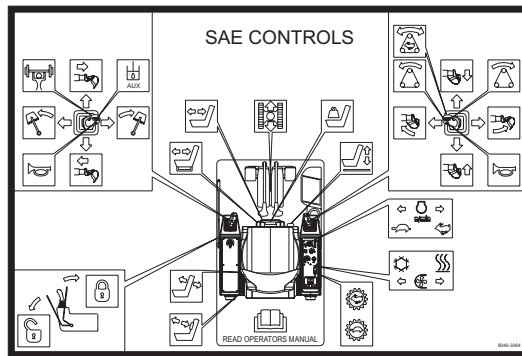
Located on side of oil cooler
Part No. 8060-3038



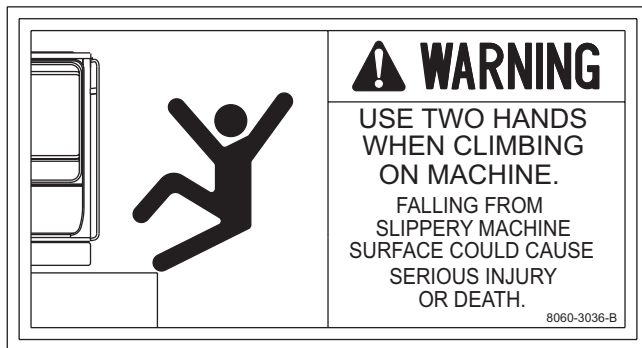
Located in manual drawer
Part No. 8046-3027



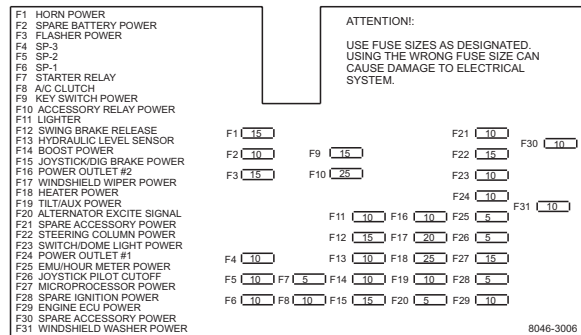
Located in manual drawer
Part No. 8046-3028



Located on inside cab window
Part No. 8046-3064

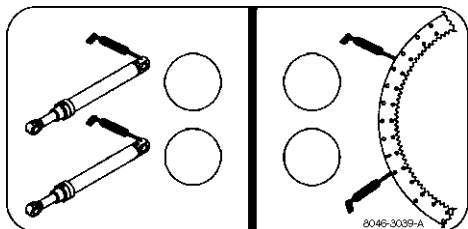


Located on seat pedestal, valve access cover
Part No. 8060-3036

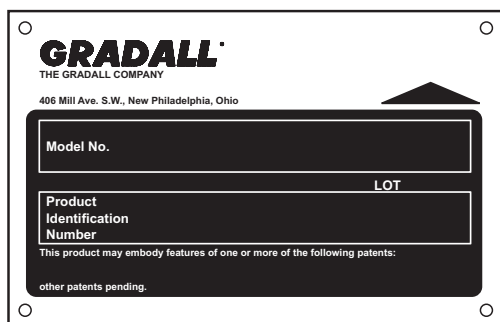


Located inside fuse cover
Part No. 8046-3006

DECALS



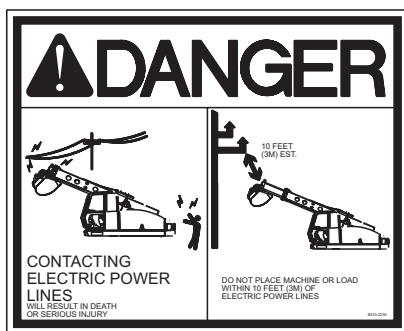
Located on front of upper frame
Part No. 8046-3039



Located on front center upper frame
Part No. 7733-3047

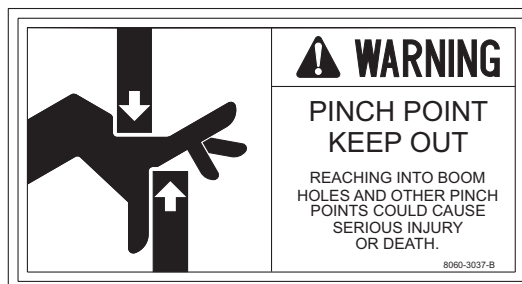


Located on both sides of boom
Part No. 8090-3017



Located on both sides of boom
Part No. 8033-3235

Located above front and rear cab windows
Part No. 8037-3066



Located on both sides of boom
Part No. 8060-3037



Located on top of engine cover
Part No. 8037-3077



Located on both sides of boom
and front of engine cover
Part No. 8060-3039

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Located on engine cover
and reservoir cover
Part No. 8037-3065