

Operation & Maintenance Manual

SKID STEER LOADER

430 Series

450 Series

WARNING

Do not start, operate or service this machine unless you have read and understood these instructions and received proper training.

Unsafe or improper use of the machine may cause serious injury or death.

Operators and maintenance personnel must read this manual and receive training before operating or maintaining the machine.

This manual should be kept with the machine for reference and periodically reviewed by the machine operator and by all personnel who will come into contact with it.

The following warning is provided pursuant to California Health & Safety Code Sections 25247.5 et, seq,

WARNING

California Proposition 65

Engine Exhaust, some of its constituents, and certain vehicle components contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

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

WASH HANDS AFTER HANDLING.

FOREWORD

- This manual explains the safety rules, lubrication, testing and controls to operate and maintain the DOOSAN Skid Steer Loader for safe and optimal performance.
- The operator should be familiar with all of the contents of this manual before starting the vehicle to insure maximum performance, safety and economy.
- Descriptions explain the testing, starting, operation, and stop procedures in detail.
- To maintain the vehicle in top condition, the operator should periodically check the vehicle in accordance with the service schedule.
- The periodic maintenance intervals in this manual are based on the service hour meter.

Environment Management

Note that DOOSAN Infracore is ISO 14001 certified which is harmonized with ISO 9001 Periodic ENVIRONMENTAL AUDITS & ENVIRONMENTAL PERFORMANCE EVALUATIONS have been made by internal and external inspection entities. LIFE - CYCLE ANALYSIS has also been made through out the total product life. ENVIRONMENT MANAGEMENT SYSTEM includes DESIGN FOR ENVIRONMENT from the initial stage of the design. ENVIRONMENT MANAGEMENT SYSTEM considers environmental laws & regulations, reduction or elimination of resource consumption as well as environmental emission or pollution from industrial activities, energy saving, environment - friendly product design(lower noise, vibration, emission, smoke, heavy metal free, ozone depleting substance free, etc.), recycling, material cost reduction, and even environmentally oriented education for the employee.

SAFETY INFORMATION

This is the safety-alert symbol.
When you see this symbol on your machine
or in this manual, be alert to the
potential for personal injury.
Follow recommended precautions and
safe operating practices



HA00A00I

SIGNAL WORDS

A signal word - **DANGER**, **WARNING**, or **CAUTION** - is used with the safety-alert symbol.

DANGER : Indicates an imminently hazardous situation which, if not avoided, will result in DEATH or SERIOUS INJURY.

WARNING : Indicates a potentially hazardous situation which, if not avoided, COULD result in DEATH or SERIOUS INJURY.

CAUTION : Indicates a potentially hazardous situation which, if not avoided, MAY result in INJURY.

ATTENTION : Indicates potential machine damage if a certain procedure is not followed.

IMPORTANT : Indicates information an operator should know to prevent minor machine damage if a certain procedure is not followed.



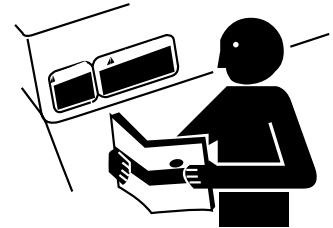
ATTENTION
IMPORTANT

IACOA001

⚠ WARNING

SAFETY INSTRUCTIONS

Carefully read all safety messages in this manual and all safety labels on your machine. Keep safety labels in good condition. Replace missing or damaged safety labels. Be sure new equipment components and repair parts include the current safety labels. Learn how to operate the machine and how to use controls properly. Do not let anyone operate the machine without instruction. Keep your machine in proper working condition. Unauthorized modifications to the machine may impair operator safety and well being and/or machine life and function.



HA00A01I

⚠ DANGER

SAFETY RULES

- ONLY trained and authorized personnel should operate and maintain the machine.
- Use common sense and follow all safety rules, precautions and instructions when operating or performing maintenance on the machine.
- When working with another person, be sure all hand signals to be used are understood.
- Certain operating conditions may require reference to applicable OSHA, ANSI, ISO, EEC or other local and national regulations. Consult your supervisor or safety coordinator to be sure all applicable standards are being followed, and for special operating conditions.
- Never operate equipment under the influence of drugs or alcohol. Certain prescription and over-the-counter medications can affect alertness and coordination. Follow instructions on labels and/or consult your physician. Notify your supervisor or consult your physician for clarification.

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● **ENVIRONMENT PROTECTION SECTION**

<https://truckmanualshub.com/>

1. OWNER/OPERATOR SAFETY OVERVIEW

1.1. Safety Message for Owners and Operators

Your DOOSAN equipment has been designed with the safety of the persons who will operate and service it in mind. However, our care in designing this equipment does not guarantee that it will be used in a safe manner. Safe operating practice is where your responsibility and the responsible actions of the persons who operate this equipment take over.

1.1.1. Owner/Employer Responsibility

Both the Occupational Safety and Health Act (OSHA) and the American National Standards Institute (ANSI) make you, the employer, responsible for providing formal training and a safe workplace environment for the use of this equipment. Your responsibility

also includes establishing daily inspections and scheduled maintenance practices to ensure the equipment's ongoing safe operating condition.

The manual you are reading now is intended to help you meet your responsibilities. It identifies warning labels on the equipment and explains what they mean. It describes some of the general and specific hazards to be aware of when operating the equipment. It also offers some suggestions for establishing workplace rules and operator training programs.

As the owner/employer, you also have the responsibility to be certain that the equipment you have placed into service is capable of doing its intended job. This includes matching equipment design to working conditions, capacity to the size of loads it will be handling, and selecting suitable attachments and

options. This section of the manual discusses these issues as well.

At the end of this overview, we list specific OSHA, ANSI, and other published resources you can consult for ways to help you comply with safety requirements for the use of this equipment in your workplace.

1.1.2. Operator Responsibility

If your job includes operating this equipment, you should first get formal training in how to operate it properly and safely. Furthermore, you should ensure that your workplace is maintained to assure your continued safety and the safety of others around whom you work.

In addition, you, the operator, have the responsibility to:

- Follow the safety practices in which you are trained - every day.

- Recognize and avoid potential hazards in your workplace.
- Understand and abide by the Warning labels attached to the equipment.
- Inspect the equipment for its serviceability at the beginning of each shift.
- Report immediately any service problems you notice before you use the equipment or that develop while you are using it.
- Report immediately any unsafe workplace conditions that threaten your safety or the safety of others.
- Avoid horseplay or other reckless actions that you know endanger yourself or others.

In short, every operator of this equipment has the responsibility to use common sense at all times and to make safety his or her number one job priority.

1.2. Maintaining a Safe Workplace

As we said, operators should recognize and avoid hazards in the workplace. Although some injuries occur because of unsafe operating practices, many result from unnecessary workplace hazards. To maintain a safe workplace environment for this equipment, do the following:

- Remove physical hazards where the equipment will be operated, in either the plant or the yard.
- Separate pedestrian and equipment traffic wherever possible.
- Place convex mirrors at blind intersections.
- Require the use of horns at intersections or when approaching pedestrian areas.
- Establish equipment speed limits.
- Install and maintain backup alarms and flashing caution lights on equipment.
- Use edge guards, levelers and trailer locks on docks.

- When the equipment is driven onto trailers, use wheel chocks and jack supports if necessary to prevent creeping and possible collapse.
- Develop - and enforce - workplace safety rules for all employees.
- Post these rules conspicuously in the areas where they apply.

Many appropriate workplace rules are published by OSHA, ANSI, and the National Safety Council. (See the list below under “Information Resources for Operation, Maintenance, and Safety.”) We recommend that you consult these publications as you develop and update the safety rules for your workplace.

1.3. Matching the Machine to the Job

Every employer and operator should ensure that equipment is properly suited to the job it must perform. It should be selected with conditions and capacity well in mind, otherwise operators and other workers may face hazards resulting directly from wrong equipment selection. Furthermore, equipment suited for one job or environment may not be suitable at all when moved to a different work area.

Equipment should be used for its intended purpose only. For example, lift truck forks and skid steer loader buckets should never serve as man-lifts or mobile work platforms.

1.3.1. Warning Signal Options

ANSI requires audible or visual alarms in high noise or low lighting environments, or in areas where pedestrians and equipment intermix. Your DOOSAN dealer can provide

effective warning signal devices to meet the conditions of your application.

1.3.2. Modifications

Many times the addition of a special attachment can affect the ability of equipment to operate at the capacity originally intended. When modifications potentially change equipment safety, OSHA and ANSI require you to obtain written approval from the manufacturer. If a modification changes a machine's capacity, the machine's capacity plate must also be changed. Consult your DOOSAN dealer before making modifications to your equipment.

1.4. Maintenance Practices

Well maintained equipment is safer equipment. A regular program of scheduled maintenance should be part of your facility's ongoing safety program. Daily inspections or inspections at the start of every shift are required by OSHA. Your DOOSAN dealer can help you train your operators for this task and provide you with genuine replacement parts and service equipment when scheduled (or unscheduled) maintenance and repairs are needed.

Although operators have a daily responsibility to inspect and report service problems, OSHA and ANSI standards require that equipment maintenance and repair be performed by authorized mechanics only. Understand what is reasonable to expect in this area, and leave the serious maintenance and repair tasks to professional mechanics and technicians.

1.5. Operator Safety Training

Although this manual contains much information about safety practices, it is not meant to be a training manual for new operators. An employer's responsibility extends beyond handing an employee this or any other document and saying "read this to learn how to operate this equipment."

1.5.1. Formal Training

OSHA and ANSI require formal training for new operators and refresher training for experienced operators, along with appropriate on-the-job supervision. Furthermore, training must be tailored to the specific conditions of your workplace and the workplace rules you have developed to protect your employees. Whenever work conditions change in ways that affect operator safety, training for the new conditions must be provided. Of course, before any employee can be selected to

operate industrial or construction type equipment, the employee must meet the employer's specific visual, auditory, physical and mental ability standards.

1.5.2. Inspection Training

OSHA furthermore requires that operators be trained to conduct daily equipment safety inspections. The goal of these inspections is to prevent any piece of equipment in need of repairs from being placed into service and thereby endangering personnel. Your DOOSAN dealer can help you develop training to comply to this and to other OSHA/ANSI requirements.

1.5.3. Training Program Development

As noted above, OSHA/ANSI requires your training to be designed around the conditions present in your operation. To ensure this, ask yourself specific questions:

- In what areas of our workplace does operating the equipment pose hazards to pedestrians?
- What hazards must operators be trained to deal with?
- Does our workplace have any one-way aisles, speed zones, high noise, low light, or fire hazard areas?
- What are the specific features of our loading docks, ramps, or railcar loading facilities?
- What specialized attachments are used on our equipment?
- What personal protective equipment or special clothing is necessary to operate the equipment in our work environment? (hard hats, seat restraints, respirators, protective shoes or gloves, etc.)
- Are operators conducting daily inspections prior to shift start?
- Does our equipment require any special refueling procedures?

One additional recommendation: ask those

employees who work around (but do not operate) the equipment for suggestions about what the operators should be taught.

1.5.4. Practical Training

The questions above and others like them can help you design an appropriate training course for your operators. But above all, be sure that your training incorporates a significant portion of practical experience.

1.5.5. Recognition

A key part of any training program is recognition. Think of ways you can recognize the achievement of those who successfully complete this important training. Certificates, licenses, patches, authorization cards and the like set these individuals apart and help create a lasting attitude of commitment to the job.

1.6. Information Resources for Operation, Maintenance, and Safety

The following publications contain information, instructions, and standards for various operation, maintenance, and safety issues related to your DOOSAN equipment.

- General Industry Standards, OSHA 2206: "OSHA Safety and Health Standards (29 CFR 1910)," "Subpart N - Materials Handling and Storage"; 29 CFR 1910.178 powered industrial trucks; 1910.177 - "Servicing Multi-Piece and Single Rim Wheels." Available from: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.
- National Fire Protection (NFPA) 505, "Powered Industrial Trucks, Type Designation, Areas of Use, Maintenance, and Operation." Available from: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

- ANSI/ASME B56.1-1988: "Safety Standard for Low Lift and High Lift Trucks" (Safety Code of Powered Industrial Trucks). Available from: Society of Mechanical Engineers, United Engineering Center, 345 E. 47Th Street, New York, NY 10017.
- EN474-1: "Earth - moving Machinery - Safety - General Requirements ",
EN474-3 : "Earth - moving Machinery - Safety - Requirements for Loaders ".
Available from: European Committee for Standardization, rue de Stassart, 36 B - 105C Brussels.
- NFPA 58: "Storage and Handling of Liquefied Petroleum Gases." Available from: National Fire Protection Association, Inc., Batterymarch Park, Quincy, MA 02269.
- Skid-Steer Loader Safety Manual. Available from the Equipment Manufacturers Institute, 10 S Riverside Plaza, Chicago, Illinois 60606-3710.
- National Safety Council Data Sheets: "1-664 - Writing and Publishing Employee Safety Regulations"; "479 - Liquefied Petroleum Gases for Industrial Trucks"; "195.71 - "The In-Plant

"Pedestrian." Available from: National Safety Council, 444 North Michigan Avenue, Chicago, IL 60611.

- Accident Prevention Manual for Industrial Operations: Two volumes: "Administration and Programs" and "Engineering and Technology." Available from: National Safety Council, 444 North Michigan Avenue, Chicago, IL 60611.
- Publications Concerning Safe Handling and Storage of LP Gas: Available from: National LP Gas Association, 1301 West 22nd Street, Oakbrook, IL 60521
- Other OSHA regulations which may be applicable to the place of use.

You can receive help in applying information from these sources to your workplace by contacting OSHA or your Worker's Compensation Insurance Company.

2. SAFETY INFORMATION

The following section of this manual discusses some of the general and specific safety issues for your equipment. It gives you basic safety precautions. It also shows you where to find warning labels used on this equipment. The warnings themselves are reproduced here for you to read.

Before you operate or perform any maintenance on this equipment, read this Safety Information section carefully. Also carefully read the operation and other sections of this manual and heed all of the safety information they contain. Also locate, read, and understand the warning decals on the equipment itself.

2.1. Safe Operating Practices

Always use common sense and be alert for possible hazards. Most accidents happen because someone failed to follow basic safety

rules or take obvious precautions. Often you can avoid an accident by recognizing situations that might be hazardous. Furthermore, anyone who operates, maintains, or repairs this equipment should have the necessary training, skills, and tools.

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

Do not operate or perform any lubrication, maintenance, or repair on this equipment until you have read and understood the operation, maintenance, and repair information in this manual.

You will find safety precautions and warnings both in this manual and on the equipment itself. If you ignore these warnings, bodily injury or death could occur to you or to others.

Hazards are identified by the exclamation point (!) "Safety Alert Symbol" followed by words such as "DANGER," "WARNING," or "CAUTION."



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Pay attention to safety alert symbols. They mean your safety and/or the safety of others is involved.

Hazard messages appear with the safety alert symbol. They explain the hazard, either in words or by internationally recognized pictures.

The dangers, warnings, and cautions in this manual and on the equipment cannot cover

every possible circumstance that might involve a hazard. You must ensure that your operating techniques, tools, and work procedures are safe for you and others. You should also make sure that the equipment will not be damaged or made unsafe by your chosen operation, maintenance, or repair procedures.

The information in this manual was current at the time the manual was written. However, specifications, torques, pressures, measurements, adjustments, and illustrations can change at any time. These changes can affect equipment service. Before starting any job, obtain the most current and complete information. Consult your DOOSAN dealer for the most current information.

The safety rules and regulations in this section represent some, but not all rules and regulations of the Occupational Safety and Health Act (OSHA). They are paraphrased without repre-

sensation that the OSHA rules and regulations have been reproduced verbatim.

The best method for preventing serious injury or death is for the operator to be familiar with the proper operation of the equipment. Be alert and avoid actions or conditions that can result in an accident.

2.2. Rated Operating Load Plate

DO NOT exceed machine rated operating load as described on the rated operating load plate attached to your machine.

(1) CE

			
MACHINE TYPE	SKID - STEER LOADER		
MACHINE NAME			
SERIAL NUMBER			
ENGINE POWER	KW	rpm	
OPERATING WEIGHT	LBS,	kg	
RATED OPERATING LOAD	LBS,	kg	
YEAR OF MFG			

(2) Non-CE

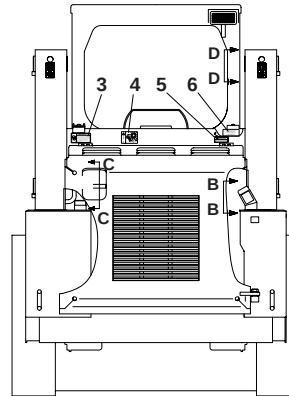
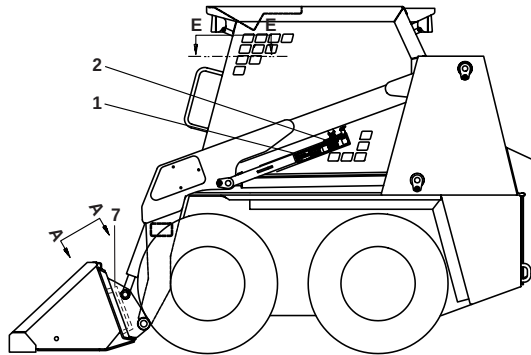
	
MACHINE TYPE	SKID - STEER LOADER
MACHINE NAME	
SERIAL NUMBER	
ENGINE POWER	KW rpm
OPERATING WEIGHT	LBS, kg
OPERATING LOAD	LBS, kg

2.3. Safety Warning Label Locations and Descriptions

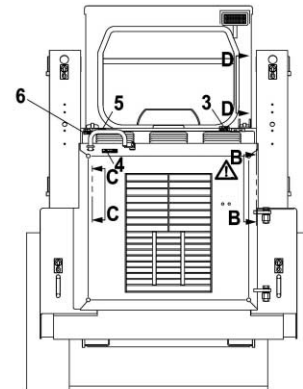
2.3.1. Label Locations

CAUTION

Always keep safety and information labels clean. If they are lost or damaged, attach them again or replace them with a new label. Safety labels are available in languages other than ENGLISH. Please contact your dealer or DOOSAN if you need non-English labels.



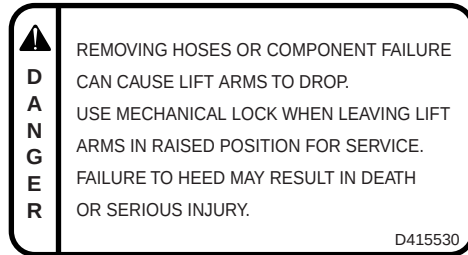
430 (Plus)



450 (Plus)

2.3.2. Label Descriptions

① Danger warning for Boom lock



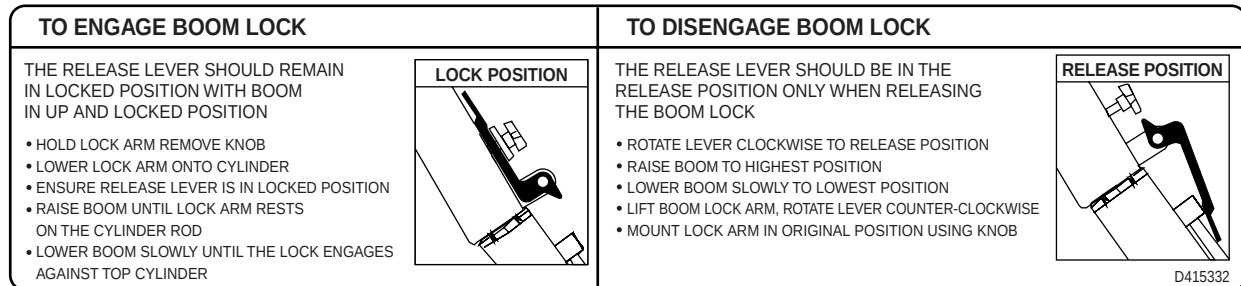
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③ Warning for canopy latch



IA00A10I

② Boom Lock Operation



IA00A12I

④ Warning for engine fan



IA00A08I

⑤ Warning for high temperature muffler



IA00A09I

⑥ ROPS/FOPS



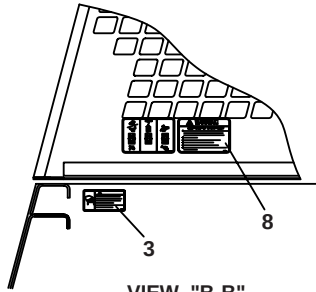
IA00A07I

⑦ Warning for Universal Attachment System (Quick-tach)



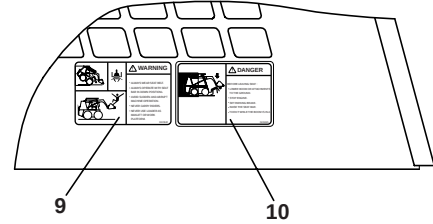
View "A- A"

IA00A05I



VIEW "B-B"
(Inside of Canopy RH)

IA4O2002



View "C-C"
(Inside of Canopy. LH)

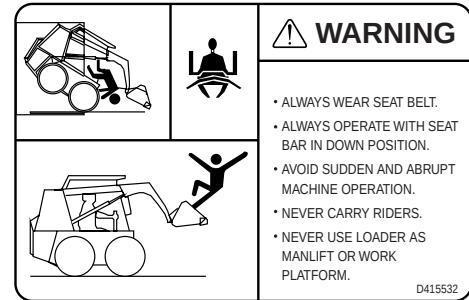
IA00A171

⑧ Warning for general safety rules.



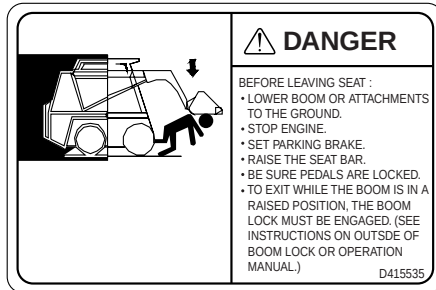
IA00A151

⑨ Warning for fastening seat belt and seat bar.



IA00A131

⑩ Danger warning for maintenance.



IA00A141

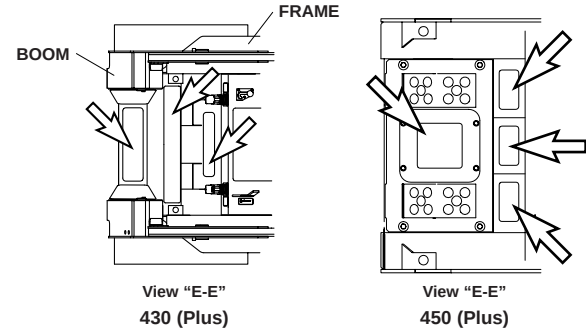
⑪ Service Schedule label

SERVICE SCHEDULE		HOURS				
ITEM	SERVICE REQUIRED	Every Day	Every 50	Every 100	Every 200	Every 500
Engine Oil	Check the oil level and fill if as needed.	○	○	○	○	○
Engine Oil	Replace the oil.	○	○	○	○	○
Full System	Check and replace fuel filter element.	○	○	○	○	○
Engine Cooling System	Check coolant level and add as needed. Check for leaks.	○	○	○	○	○
Hydraulic Oil	Check the level and adjust the level of the tank.	○	○	○	○	○
Air Cleaner	Check the indicator. Check or replace the water element after the first 50 hours. Clean the fuel filter.	○	○	○	○	○
Spark Plug	Replace the water element. Every third replacement of the water element, replace the hour element also.	○	○	○	○	○
Spark Plug	Check the spark chamber.	○	○	○	○	○
Tire	Check all pressures and storage in time.	○	○	○	○	○
Wheel Nut	Tighten to correct torque if loose.	○	○	○	○	○
Seat Belt	Check the condition of seat belt.	○	○	○	○	○
Seat Bar	Check the seat bar for correct operation.	○	○	○	○	○
Safety Sign	Check for damaged signs and replace damaged signs.	○	○	○	○	○
Pinch	Grease joints as needed.	○	○	○	○	○
Battery	Check the water level and battery cables for connection. Check that the battery cables are tight. Check events.	○	○	○	○	○
Hydraulic Oil	Check the oil level and add as needed.	○	○	○	○	○
Hydraulic Hose and	Check for damage and leaks and replace as needed.	○	○	○	○	○
Check Hose at	Replace the check hose oil.	○	○	○	○	○
Hydraulic	Replace the hydraulic filter.	○	○	○	○	○
Hydraulic Oil Test	Replace the hydraulic oil.	○	○	○	○	○

View "D-D"

IA402004

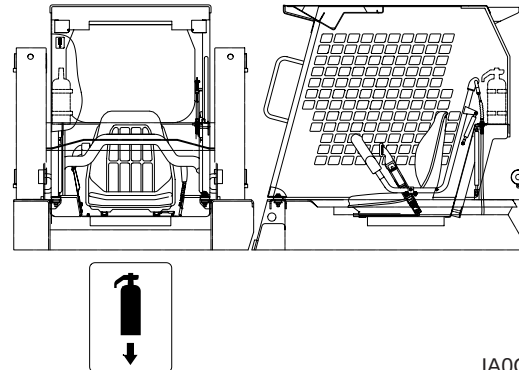
⑫ Anti-Skid surface



IA00A18P

IA00A100

⑬ Extinguisher



IA00A76I

2.4. General Safety and Hazard Information

2.4.1. Unauthorized Modification



WARNING

UNAUTHORIZED MODIFICATION

- Any modification made without authorization from DOOSAN can create hazards.
- Before making a modification, consult your DOOSAN dealer.
Improper modification could result in injury or death.
- Improper use of safety features could result in serious bodily harm or death.

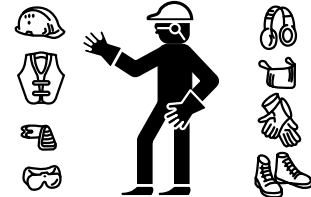
2.4.2. Clothing and Personal Protective Items



WARNING

CLOTHING AND PERSONAL PROTECTIVE ITEMS

- Do not operate or perform system maintenance with loose clothing, jewelry, and loose long hair. They can catch on controls or in moving parts and cause serious injury or death. Also, do not wear oily clothes or wear or have other flammable substances around the equipment.
- Always wear personal protective equipment appropriate for your working conditions, such as a hard hat, safety shoes, hearing protection, mask and gloves.



HA00A021

2.4.3. Mounting and Dismounting



CAUTION

MOUNTING AND DISMOUNTING

- **NEVER** jump on or off the machine. **NEVER** get on or off a moving machine.
- When mounting or dismounting, always face the machine and use the handrails.
- Do not grasp or come in contact with any control levers when getting on or off the machine.
- Ensure safety by always maintaining at least three-point contact of hands and feet with the handrails and steps.
- Always remove any oil or mud from the handrails, steps and shoes.
- **NEVER** mount or dismount the machine with engine running.



HA00A03I

2.4.4. Fire Prevention and Hazardous Fluids and Vapors



DANGER

FIRE PREVENTION AND HAZARDOUS FLUIDS AND VAPORS

Fuel, oil, antifreeze, and other flammable fluids and combustibles can be ignited by a flame or hot surfaces. Vapors can be particularly **FLAMMABLE** and can be **HAZARDOUS**.

- Keep open flame and hot surfaces away from flammable fluids and combustibles.
- Stop the engine and do not smoke when refueling.
- Tighten all fuel and oil caps securely.
- Refueling and oiling should be done in well ventilated areas.
- Keep oil and fuel in a designated area and do not allow unauthorized persons to enter.
- Thoroughly remove wood chips, leaves, paper and other flammable items accumulated in the engine compartment .
- Check fuel and hydraulic systems for leaks prior to starting or using vehicle.
Have any leaks repaired before operating the machine.
Wipe up any excess oil, fuel or other flammable fluids.
- Be sure a fire extinguisher is present and working and that personnel are properly trained in extinguisher operation.
- Never use ether or other starting aids on any engine with glow plugs or other engine preheating devices.
- See OSHA Class 1910.178.
- Avoid skin contact, injection and excessive breathing of vapors from fuel, oil, antifreeze, and other fluids.
- See California Proposition 65 in the front of this book.



HA00A04I

2.5. Operating Safety

2.5.1. Work Site Safety

WARNING

SAFETY AT WORK SITE

Before starting the engine, thoroughly check the area for any unusual conditions that could pose a hazard.

- Before starting the engine, examine the terrain and soil conditions of the work site. Determine the best and safest method of operation.
- If you need to operate on a street, protect pedestrians and cars by designating a person for work site traffic duty and/or by installing fences around the work site.
- Water lines, gas lines, and high-voltage electrical lines (or other objects) may be buried under the work site. Contact each utility and identify their locations. Be careful not to sever or cut any of these lines.
- DOOSAN does not recommend operation of loader in moving water. User should consult a supervisor or safety coordinator anytime water is encountered for any special operating procedures.



IA00A16I

2.5.2. Operator's Cab



WARNING

IN OPERATOR'S CAB

- Do not leave tools or spare parts lying around in the operator's compartment. They may damage, break, or interfere with the control levers or switches.
- Keep the cab floor, controls, steps and handrails free of oil, grease, snow, and excess dirt.
- Always check the seat belt, seat bar, and hardware for damage or wear. Replace any worn or damaged parts. Always use seat belts and seat bar when operating your machine.

2.5.3. Safe Operating Practices



WARNING

SAFE OPERATING PRACTICES

- Never use vehicle as a personnel lift.
- Never carry riders, vehicle is designed for single operator only.
- Keep bystanders out of work area.
- Always keep bucket or attachments as low to the ground as possible during all machine operations.
- Loading, unloading, and turning should be performed on flat, level surfaces.
- Never exceed machine's rated capacity.

2.5.4. Ventilation for Enclosed Areas

 DANGER	VENTILATION FOR ENCLOSED AREAS
• If it is necessary to start or run the engine within an enclosed area, provide adequate ventilation. Exhaust fumes from the engine can KILL.	
	
HA00A07I	

2.5.5. Flammable and Explosive Atmospheres

 DANGER	FLAMMABLE AND EXPLOSIVE ATMOSPHERES
• NEVER OPERATE A LOADER IN AN AREA WITH A FLAMMABLE/EXPLOSIVE ATMOSPHERE! • A standard loader or a loader equipped with a spark arrestor/spark arresting muffler cannot be operated in these areas. Use of these machines in flammable/explosive atmospheres can result in fires and/or explosions which could cause serious injury or death. • See Code of Federal Regulations (OSHA) 29CFR Part 1910.178, to determine where machines which are approved and labeled as G, GS, D, DS, DY, LP, LPS, G/LP, or GS/LPS are permitted to operate.	

2.5.6. Precautions for Mirrors, Windows, and Lights



CAUTION

PRECAUTIONS FOR MIRRORS, WINDOWS AND LIGHTS

- Always remove all dirt from the surface of the windows and lights to ensure that you can see well.
- Check that the head lamps and working lamps are installed to match the operating conditions. Check also that they light up properly.

2.5.7. Ensuring visibility



CAUTION

ENSURE GOOD VISIBILITY

- When working in dark places, install working lamps and head lamps, and set up lighting in the work area if necessary.
- Stop operations if the visibility is poor, such as in mist, snow, rain, or other cause, and wait for conditions to improve to a level that allows the operation to be carried out safely.

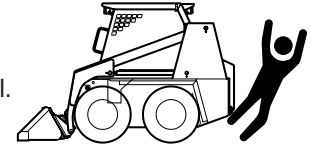
2.5.8. Traveling in Reverse, Safe Working Zone



DANGER

CHECK THAT NO ONE IS NEAR THE MACHINE BEFORE MOVING, TURNING, TRAVELING IN REVERSE OR OPERATING ANY ATTACHMENTS

- Always use a signalman in dangerous places or places where the view is not clear.
- Make sure that no one comes inside the turning radius or direction of travel.
- Before starting to move any part of the machine, give a signal to bystanders to remain clear of the machine.



IA00A20I

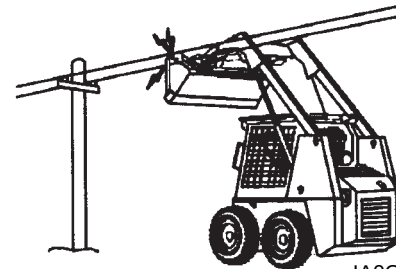
2.5.9. Avoiding High-Voltage Cables



DANGER

AVOID HIGH-VOLTAGE CABLES

- Serious injury or death can result from contact with or close proximity to electric lines.
- Keep all parts of the machine or load far away from all electric lines.



IA00A22S

2.5.10. Operating on Snow

CAUTION

OPERATE CAREFULLY ON SNOW, ICE, OR WET SURFACES

- When working on snow or icy or wet roads, even a slight slope may cause the machine to slip to the side, so always travel at low speed and avoid sudden starting, stopping, or turning.
- When there has been heavy snow, the road and objects placed beside the road are buried in the snow and cannot be seen, so always carry out snow-clearing operations carefully.

2.5.11. Working on Loose Ground

DANGER

WORKING ON LOOSE GROUND OR UNEVEN SURFACES

- Avoid operating your machine too close to the edge of cliffs, overhangs, loading docks, deep ditches, and other uneven surfaces or drop-offs. If these areas collapse or you get too close to the edge, your machine could fall or tip over and result in serious injury or death. Remember that the soil after heavy rain or blasting is weakened in these areas.
- Earth laid on the ground and the soil near ditches are loose. It can collapse under the weight or vibration of your machine.

2.5.12. Preventing Crushing or Cutting



DANGER

CRUSHING OR CUTTING PREVENTION

- Never enter, or put your hand or arm or any other part of your body between movable parts such as between the work equipment and cylinders, or between the machine and work equipment. If the machine or work equipment is operated or moved, the clearance will change and this may lead to serious damage or personal injury.
- **ALWAYS keep both feet on pedals and both hands on controls when operating loader.**
- The cab structure of the 430 (Plus) or 450 (Plus) complies with the following ROPS (Rollover Protective Structure) and FOPS (Falling Object Protective Structure) criteria. -ROPS per ISO 3471
-FOPS per ISO 3449 Level I
- Never operate without a ROPS/FOPS approved cab.

2.5.13. Parking



DANGER

PARKING MACHINE

- Avoid stopping suddenly. Give yourself ample room when stopping.
- When stopping the machine, select flat hard ground and avoid dangerous places. If it is unavoidably necessary to park the machine on a slope, insert blocks between tires and ground. As a safety measure, thrust the bucket into the ground.
- If the control lever is touched by accident, the work equipment or the machine may move suddenly, and this may lead to a serious accident.
- Before leaving the operator's compartment, always fully engage the park brake.
- Lower the bucket horizontally until the bottom touches the ground.
- **NEVER exit machine with engine running.**
- **NEVER leave lift arms raised without boom safety locks being fully engaged.**

2.5.14. Precautions for Attachments



WARNING

PRECAUTIONS FOR ATTACHMENTS

- When installing/using an optional attachment, read the instruction manual for the attachment and the information related to attachments in the manual.
- Never use attachments that are not authorized by DOOSAN or your DOOSAN dealer. Use of unauthorized attachments could create a safety problem and adversely affect the proper operation and useful life of the machine.
- **NEVER** attempt to engage or disengage the Universal Attachment System (Quik-tach) levers with the engine running.

2.5.15. Precautions for Loading and Emptying the Bucket



WARNING

- Load, unload and turn on flat level ground. Do not exceed machine rated operating load shown on the rated operating load name plate attached to your machine. Failure to obey warnings can cause the machine to tip or roll over and cause injury or death.



WARNING

- Never dump over an obstruction that can enter the operator cab. The machine could tip forward and cause injury or death.

2.5.16. Precautions for Stopping the engine.

CAUTION

When the engine stops and the seat bar (pedal locking device/parking) is secured in place (lowered). if the pedal is depressed, then the boom or the bucket descends.

CAUTION

When the pedal is kept depressing, then even though the seat bar (pedal locking device/parking) is raised, the boom or the bucket keeps moving regardless of engine's running or not.

2.6. Maintenance Safety

2.6.1. Periodic Maintenance

WARNING

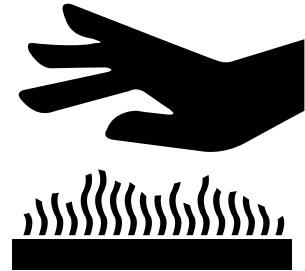
1. Never attempt to service a machine unless you are authorized and qualified to do so.
2. Before attempting any service on this machine, familiarize yourself with all instructions and warnings in the operators manual and all machine decals.
3. Do not attempt to service machine unless you have the necessary skill, information, safety gear, and tools and equipment to perform the procedure correctly.
4. While service is being performed ensure a warning tag is installed on or near the ignition key switch and clearly visible to prevent inadvertent starting of the machine during service.
5. If a service procedure necessitates running the engine, the control levers must remain in the neutral position and the emergency brake must be fully engaged. Failure to do so can result in injury or death.
6. After completing service check for: proper operation of all controls, correct torque on all fasteners and fittings, any fluid leaks (prior to and after starting engine), all tools and equipment must be removed from the machine.
7. Ensure all hoisting and supporting equipment is in good repair and of adequate capacity to support loader.
8. Failure to follow safety precautions and proper service procedures can lead to machine malfunction or damage, injury to operator or bystanders, or death.

2.6.2. Precautions for High Temperature Operations

WARNING

PRECAUTIONS WHEN HANDLING AT HIGH TEMPERATURES

- Immediately after operations are stopped, the engine coolant, engine oil, and hydraulic oil are at high temperatures, and are still under pressure. Attempting to remove the cap, drain the oil or water, or replace the filters may lead to serious burns. Always wait for the temperature to go down, and follow the specified procedures when carrying out those operations.
- To prevent hot water and oil from spurting out:
 1. Turn engine off.
 2. Allow water and oil to cool.
 3. Slowly loosen cap to relieve pressure before removing.



HA00A05I

2.6.3. Maintaining and Inspecting Hydraulic Equipment



CAUTION

MAINTAINING AND INSPECTING HYDRAULIC EQUIPMENT

1. Be sure that the machine is parked on level, solid ground when servicing hydraulic equipment.
2. Lower the bucket to the ground and stop the engine.
3. Begin servicing hydraulic equipment only after components, hydraulic oil and lubricant are completely cooled, as they will remain hot and pressurized for a period of time after operation. While servicing heated and pressurized hydraulic equipment, oil may flow off or escape suddenly with a potential of serious injury.
4. Before servicing hydraulic equipment, bleed air from the hydraulic oil tank to release internal pressure.
5. Even after bleeding the air from the hydraulic oil tank, pressure can remain in the various circuits of the hydraulic system. Be sure to operate each control lever a few times to release residual pressure from the system.
6. Avoid inspecting and servicing the travel circuits on slopes, as they are pressurized by gravity even after bleeding the hydraulic oil tank.
7. When connecting hydraulic hoses and tubes, take special care to keep seal surfaces free from dirt and to avoid damaging them.
8. When adding hydraulic oil, always use a recommended manufacturer's oil. Do not mix oil viscosities. See section 8.2.9, "Fluid Capacities & Specifications" in the back of this manual.
9. Do not run the engine without oil in the hydraulic oil tank.
 - During operation the hydraulic system parts become very hot. Allow the machine to cool down before beginning inspection or maintenance.
 - Keep body and face away from plugs or screws when removing them as they may be pressurized even when cooled.
 - The hydraulic oil tank is pressurized. Remove tank cap to release pressure.
10. Whenever possible, all maintenance and lubrication should be done on the machine with the boom lowered to the ground and the engine stopped. Secure boom locks if maintenance is performed with boom raised.
11. Before disconnecting any hydraulic lines, be sure to attach proper labels to the lines to prevent incorrect connections. Always check the machine for proper function after the repair.

2.6.4. Precautions for High Pressure Oil

WARNING

PRECAUTIONS WITH HIGH PRESSURE OIL

- Do not bend high-pressure hoses or hit them with hard objects. Do not use any bent or cracked piping, tubes or hoses. They may burst during use.
- Always repair any loose or broken fuel hoses or oil hoses. If fuel or oil leaks, it may cause a fire.
- Be aware that the machine hydraulic circuits are always under pressure.
- Do not add oil, drain oil, or carry out maintenance or inspection before completely releasing the internal pressure.
- If oil is leaking under high pressure from small holes, it is dangerous if the jet of high-pressure oil hits your skin or enters your eyes. It also can be extremely hot. Always wear safety glasses and appropriate gloves, and use a piece of cardboard or a sheet of wood to check for oil leakage. The stream of oil may not be visible.
- If your skin is punctured by a jet of high-pressure oil, seek a doctor immediately for medical attention.



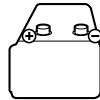
IA00A26I

2.6.5. Preventing Battery Hazards

WARNING

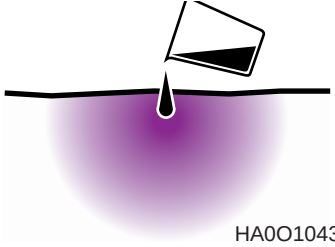
BATTERY HAZARD PRECAUTIONS

- Battery electrolyte contains sulfuric acid and can quickly burn the skin and eat holes in clothing. If you spill acid on yourself, immediately flush the area with water.
- Battery acid could cause blindness if splashed into the eyes. If acid gets into eyes, flush them immediately with large quantities of water and see a doctor immediately.
- If you accidentally swallow battery acid, drink a large quantity of water or milk, beaten egg or vegetable oil. Call a doctor or poison prevention immediately.
- When working with batteries, ALWAYS wear safety glasses, goggles, or face shield.
- Batteries generate hydrogen gas. Hydrogen gas is very EXPLOSIVE, and is easily ignited with a small spark or flame.
- Before working with batteries, stop the engine and turn the starting switch to the OFF position.
- Avoid short-circuiting the battery terminals through accidental contact with metallic objects, such as tools, across the terminals or between the hot (+) post and frame or other grounding surface.
- Keep the battery terminals tightened securely. Loose terminals can generate sparks and lead to an explosion.
- When repairing the electrical system or when carrying out electrical welding, remove the negative (-) terminal of the battery to stop the flow of current.
- NEVER attempt to charge or jump start a frozen battery. An explosion may occur.

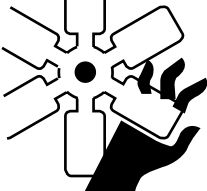


IA00A27I

2.6.6. Waste Material Precautions

⚠ CAUTION	WASTE MATERIALS
• Never dump waste oil in a sewer system, rivers, etc. • Always put oil drained from your machine in containers. Never drain oil directly on the ground. • Obey appropriate state, local, and federal laws and regulations when disposing of harmful liquids, objects, or wastes such as oil, fuel, coolant, solvent, acids, filters, batteries and others.	
 HA001043I	

2.6.7. Rotating Fans and Belts

⚠ DANGER	ROTATING FAN AND BELT
• Keep away from all moving or rotating parts and be careful not to let anything get caught in them. • Never touch any rotating parts. If your body or tools touch the fan blades or fan belt, they may be cut off or sent flying or it may pull you into the equipment.	
 IA00A28I	

2.6.8. Tire Maintenance

Tires should be checked regularly for wear, damage, and proper inflation. When replacing tires, ensure that the size matches those already on the vehicle. Mismatched tire sizes can change vehicle performance and cause

premature wear and damage to drive train components. If tires are replaced in pairs, they should be mounted on the same side of the vehicle to minimize stress on the drive train.

DANGER

Tires should only be mounted/dismounted from rims or repaired by trained and authorized personnel using the proper equipment and procedures. Death or serious injury could result. See OSHA 1910.177.

3. SERIAL NUMBER LOCATIONS

3.1. Vehicle Serial Number

(1) CE

			
<i>Infracore</i>			
MACHINE TYPE	SKID - STEER LOADER		
MACHINE NAME			
☐ SERIAL NUMBER			
ENGINE POWER	KW	rpm	
OPERATING WEIGHT	LBS,	kg	
RATED OPERATING LOAD	LBS,	kg	
YEAR OF MFG			

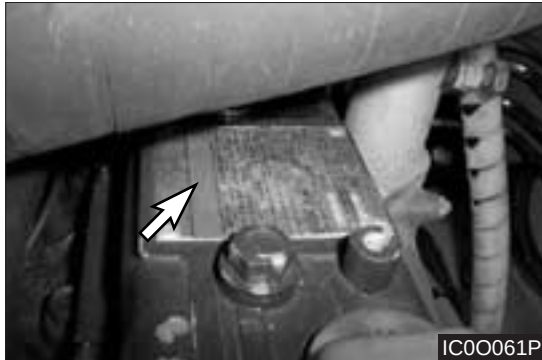
(2) Non-CE

			
<i>Infracore</i>			
MACHINE TYPE	SKID - STEER LOADER		
MACHINE NAME			
☐ SERIAL NUMBER			
ENGINE POWER	KW	rpm	
OPERATING WEIGHT	LBS,	kg	
OPERATING LOAD	LBS,	kg	

The vehicle serial number plate is riveted on the inner side of left-hand mast.

3.2. Engine Serial Number

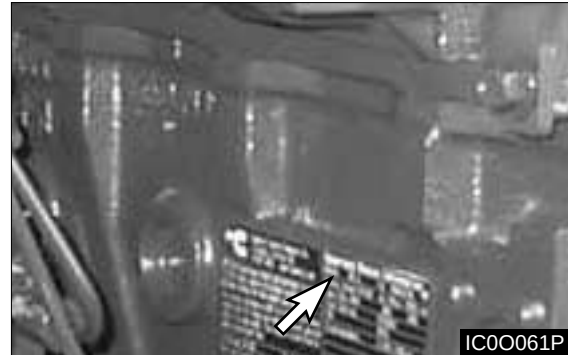
(1) 430 (Plus)



The engine serial number tag is riveted on the top of engine valve cover.

If you need parts, service or information for your engine, you must give the complete engine number to your distributor.

(2) 450 (Plus)

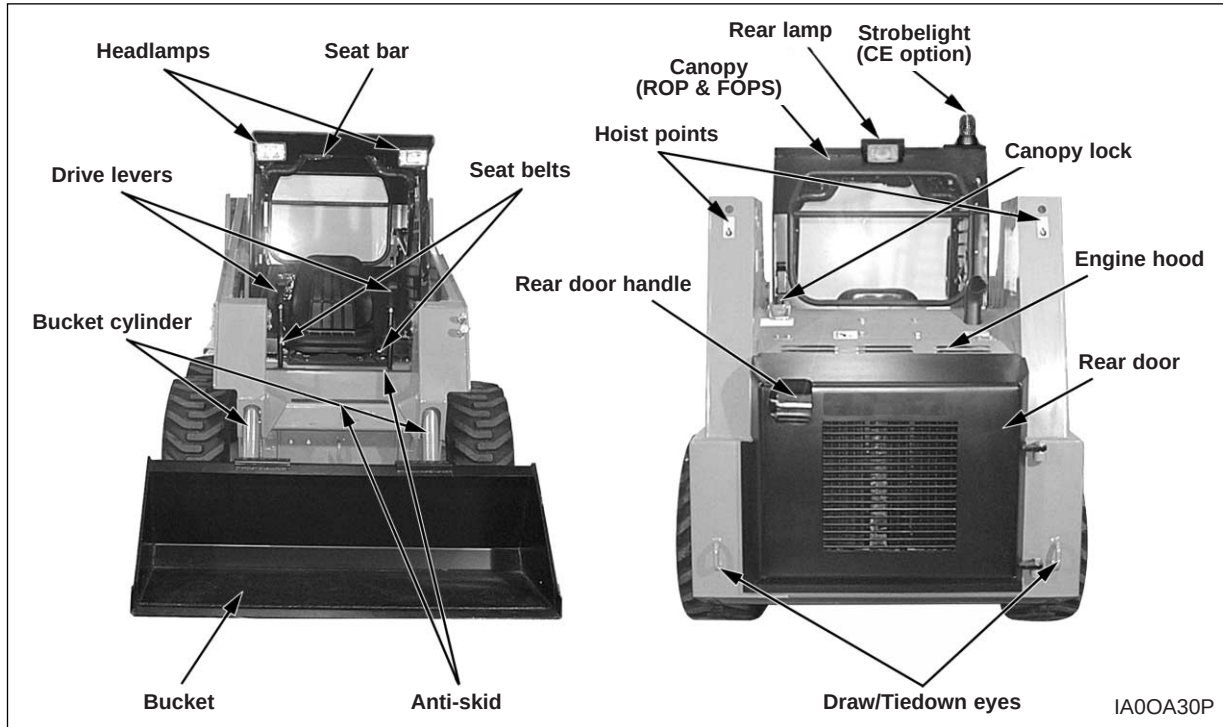


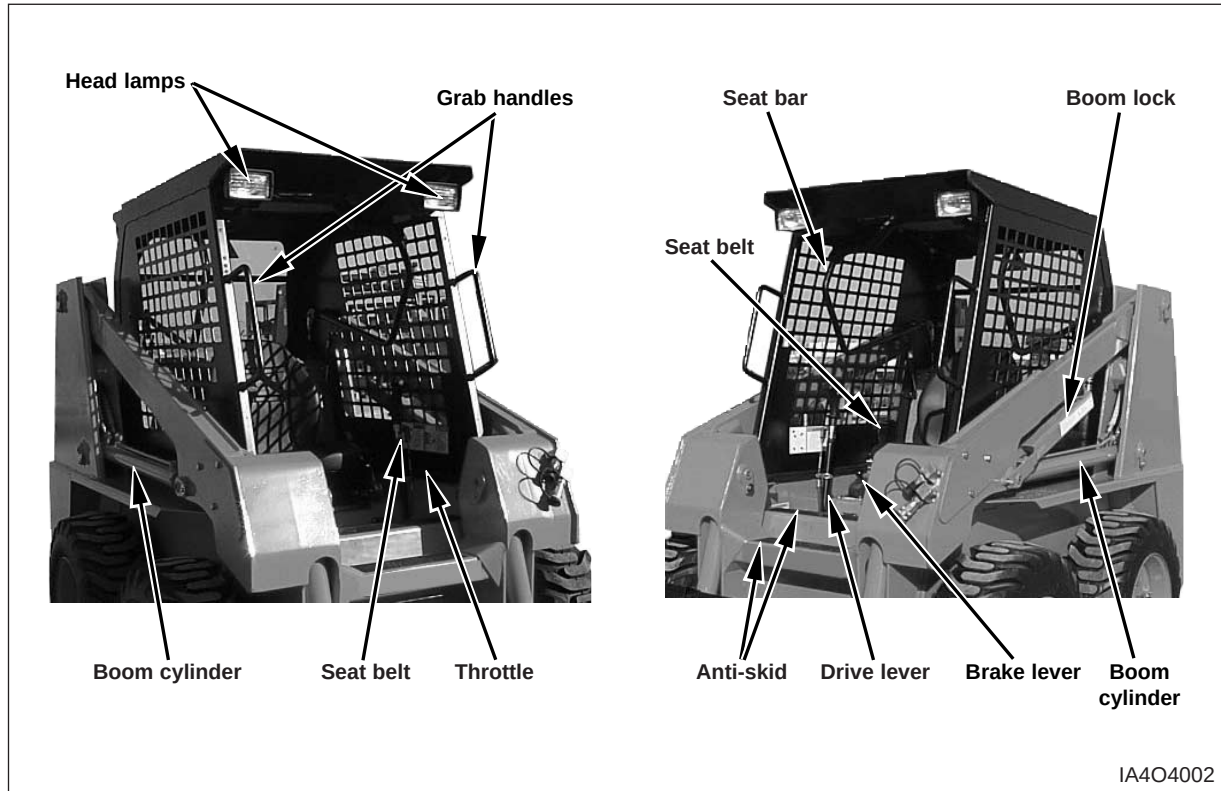
The engine serial number tag is riveted on the side of engine block.

If you need parts, service or information for your engine, you must give the complete engine number to your distributor.

4. MACHINE COMPONENTS

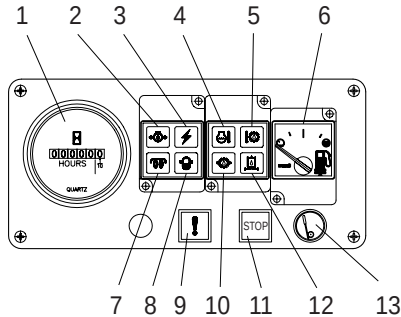
4.1. Identification of Machine Parts





5. CONTROLS AND INSTRUMENTS

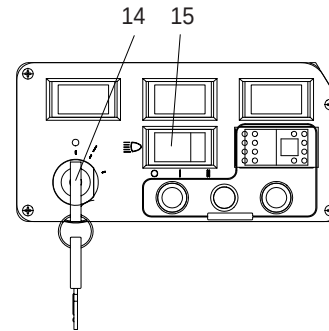
5.1. Instrument Panel



IC00006I

INSTRUMENT PANEL-LH

- (1) Hour meter
- (2) Engine oil pressure warning light
- (3) Alternator indicator light
- (4) Water temperature warning light
- (5) HST oil temperature warning light
- (6) Fuel gage
- (7) Pre-heat light
- (8) Diesel engine water in fuel filter indicator light

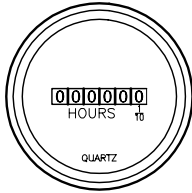


IC00007I

INSTRUMENT PANEL-RH

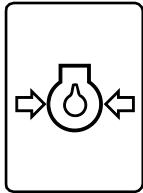
- (9) Warning light
- (10) HST pressure warning light
- (11) Stop light
- (12) Oil filter warning light
- (13) Parking brake light
- (14) Key Switch
- (15) Light switch

(1) Hour Meter



- Hour meter indicates the total hours of vehicle operating

(2) Engine oil pressure warning light



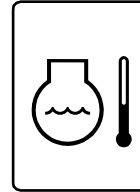
- The light turns on when the engine oil pressure is below 0.5kg/cm^2 (15 psi).

(3) Alternator indicator light



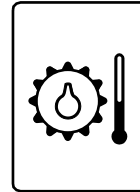
- indicates if the battery charging system is operational. The light will come on when the ignition switch is turned to the ON position.

(4) Water Temperature warning light



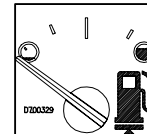
- The light turns on when the temperature of the engine cooling water exceeds 110°C (230°F)

(5) HST oil temperature warning light



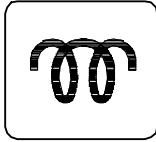
- The light turns on when the temperature of the hydraulic oil to drive HST goes up to 100°C (212°F).

(6) Fuel Gauge



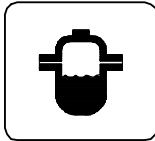
- Fuel gauge shows the amount of fuel in the fuel tank.

(7) Pre-heat light



- When the key is turned to the "IGN" position and cold weather, the light turns on and preheating of air begins. Light turns off automatically after 5 seconds.

(8) Diesel engine water in fuel filter indicator light



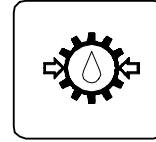
- Indicates when the engine is running, there is water in the fuel filter exceeds 100cc.

(9) Warning light



- The light turns on simultaneously with charge, HST oil temperature, HST pressure and oil filter warning lights.

(10) HST pressure warning light



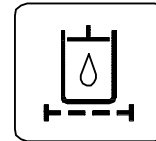
- The light turns on when the pressure of the HST pump oil falls down below 5.97 kg/cm^2 (85 psi)

(11) Stop light



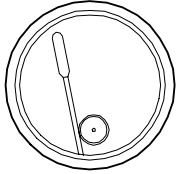
- The light turns on simultaneously with water temperature and engine oil pressure warning lights.

(12) Oil filter warning light



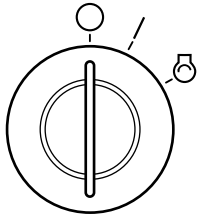
- If the oil filter becomes clogged, the light turns on.

(13) Parking brake light



- Raising the hand lever, the parking brake is engaged and the light turns on.

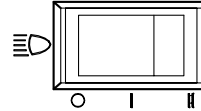
(14) Key switch



- When the key is turned to the “IGN” position, all the warning lights on the instrument panel come on.
And use this position to start in cold weather, when pre-heating is completed (5 seconds), the pre-heat light turns off.
- When the key is turned to the “ST” position, the engine is started.
When the key is released, it will return to the “IGN” position automatically.

IA00C04I

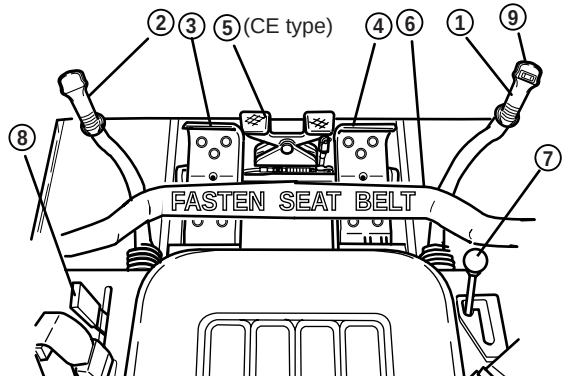
(15) Light Switch



- Step 1 : Two front lights turn on.
- Step 2 : Two front lights and on rear light turn on simultaneously.

5.2. Controls

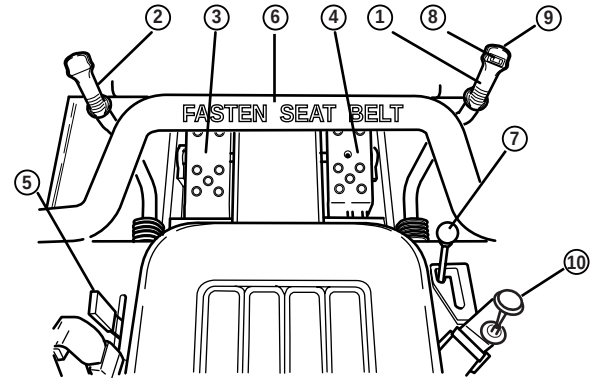
(1) 430 (Plus)



IA4O5001

- | | |
|---------------------------|-------------------------|
| ① Drive Control Lever(RH) | ⑥ Seat Bar |
| ② Drive Control Lever(LH) | ⑦ Parking Brake |
| ③ Boom Pedal | (Released Position) |
| ④ Bucket Pedal | ⑧ Throttle Lever |
| ⑤ Attachment Pedal | ⑨ Horn Button(Optional) |

(2) 450 (Plus)

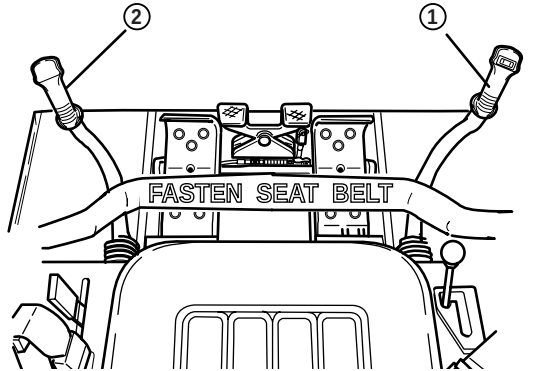


IA0OC05I

- | | |
|---------------------------|-----------------------|
| ① Drive control lever(RH) | ⑦ Parking Brake |
| ② Drive control lever(LH) | (Released Position) |
| ③ Boom pedal | ⑧ Auxiliary Hydraulic |
| ④ Bucket pedal | Thumb Control |
| ⑤ Throttle Lever | ⑨ Horn Button |
| ⑥ Seat Bar | ⑩ Pressure Relief |

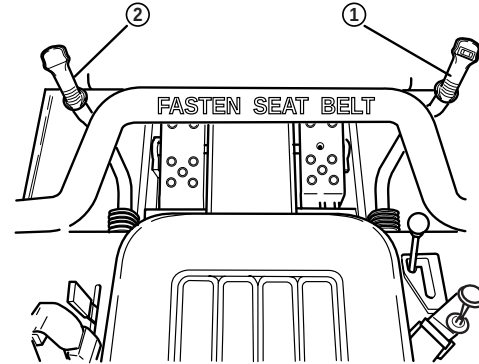
5.2.1. Drive control lever(① ②)

(1) 430 (Plus)



IA405002

(2) 450 (Plus)



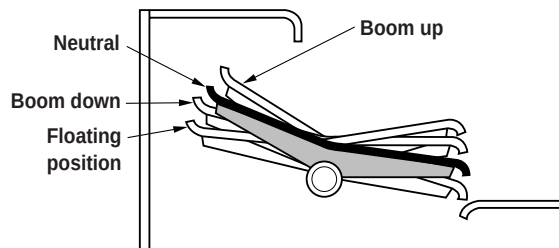
IA00C06I

- The steering levers are on the left and right sides in front of the seat. The levers are independent of each other.
 - FORWARD MOVE : Push both levers forward.
 - BACKWARD MOVE : Pull both levers backward.
 - STOP : Hold both levers at neutral position.The distance of lever movement is proportional to travel speed.

NOTE : For safety purposes, the operator can start the engine only when both drive levers are in the neutral position.

5.2.2. Boom Pedal (③)

Boom pedal controls the lifting and lowering of the boom. The speed is controlled by the degree of the pedal.



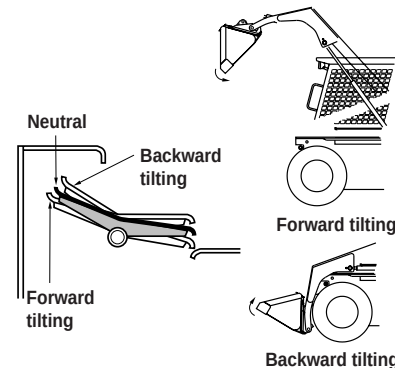
IA00A37L

NOTE: Press the front part of the pedal fully to the bottom, then the pedal will be locked to

floating position, which makes the boom move freely. That is a comfortable function to level the ground. To release the boom from the floating status, press the rear part of the pedal. Float position should **only** be used with vehicle in reverse.

5.2.3. Bucket Pedal (④)

- This is the pedal to tilt the bucket forward or backward. The speed is controlled both for forward and backward tilting by the degree of the pedal pressing.



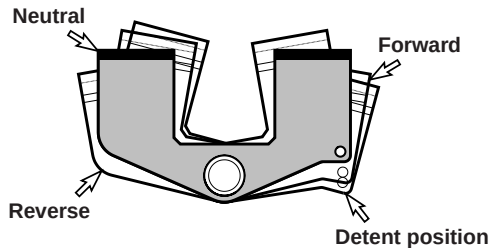
IA00A38I

5.2.4. Attachment Pedal(⑤) - 430 (Plus) Only

- This pedal is used to operate the auxiliary hydraulics(attachments) instead of the standard bucket.

(1) CE

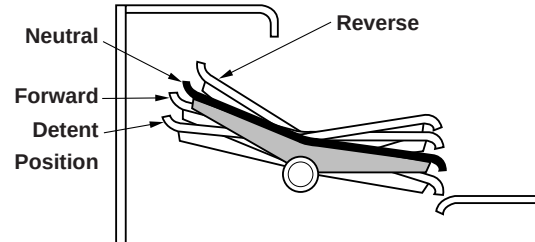
Note: Press the right part of the pedal fully to the bottom, then the pedal will be locked to detent position, which makes the attachment operate in succession. To release the attachment from detent position, press the left part of pedal.



IA4O5006

(2) Non - CE

Note: Press the front part of the pedal fully to the bottom, then the pedal will be locked to detent position, which makes the attachment operate in succession. To release the attachment from detent position, press the rear part of pedal.

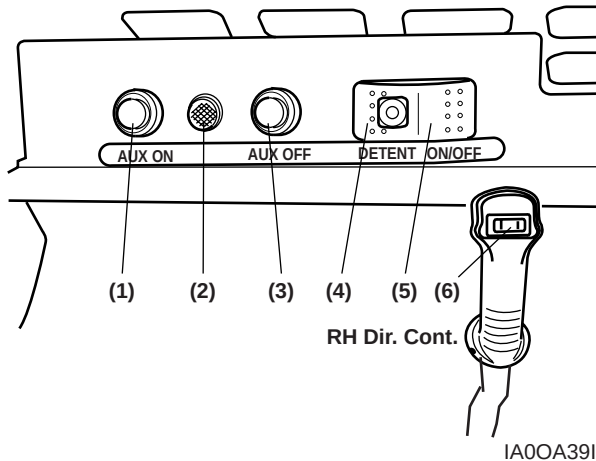


IA00A371

⚠ CAUTION

When using an attachment other than the standard bucket, follow the instructions for each separate attachment.

5.2.5. Auxiliary Hydraulic Thumb Control - 450 (Plus) Only



CAUTION

When using an attachment other than the standard bucket, follow the instructions for each separate attachment.

The **Auxiliary Hydraulics Thumb Control** system is activated by pushing the “on” button (1) on the forward control panel. The green light (2) on the panel will illuminate when the system is active. This system can be operated in two modes by utilizing the rocker switch (4) (5) on control panel.

Momentary control : This system is activated with the rocker switch (5) in the down position. The auxiliary hydraulics will only operate when the thumb button (6) on the drive control handle is depressed.

Detent control : This system is activated with the rocker switch (4) in the down position. The thumb button (6) controls the direction of flow in this mode but it cannot stop or pause flow once the system is activated. Auxiliary hydraulics will remain active until the “off” button (3) on the panel is pushed or the key switch is turned to off.



- When auxiliary hydraulic attachment has residual pressure, so you cannot remove attachment from machine, you must reciprocate the knob up and down to bleed off the attachment (Only 450/450 Plus).

5.2.6. Engine Control



- Throttle lever (A) controls the engine speed. Push the throttle lever forward to increase the engine rpm and pull backward to decrease the engine rpm.

5.2.7. Seat Bar

- The seat bar is installed to help protect the operator.



Raised Position

NOTE: The pedals are locked if the seat bar is in the raised position. Lower the seat bar to operate the pedals.

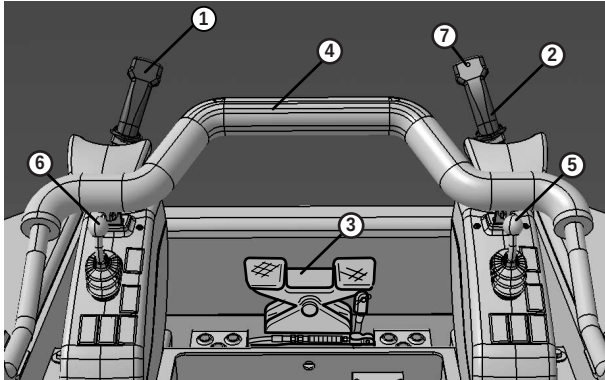


Operating Position

NOTE : The loader is equipped with a seat bar safety interlock that sets the park brake with the seat bar raised. The seat bar must be lowered for travel.

5.3. Controls (Joystick : Option)

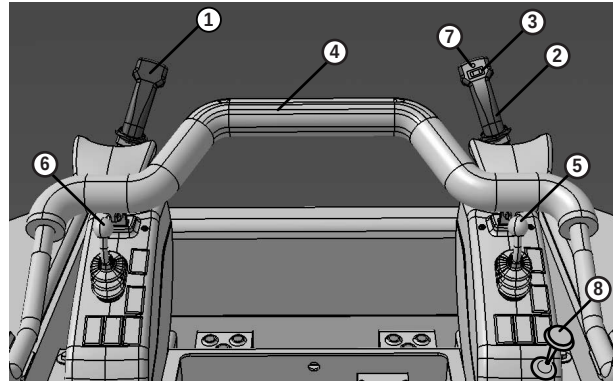
(1) 430 (Plus)



IA405001

- ① Drive Control Handle
- ② Boom & Bucket Handle
- ③ Attachment Pedal
- ④ Seat Bar
- ⑤ Parking Brake Lever
- ⑥ Throttle Lever
- ⑦ Horn Button(Optional)

(2) 450 (Plus)

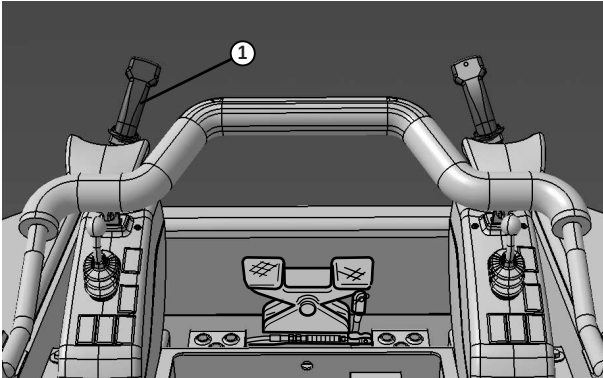


IA00C05I

- ① Drive Control Handle
- ② Boom & Bucket Handle
- ③ Auxiliary Hydraulic Thumb Control
- ④ Seat Bar
- ⑤ Parking Brake
- ⑥ Throttle Lever
- ⑦ Horn Button
- ⑧ Pressure Relief

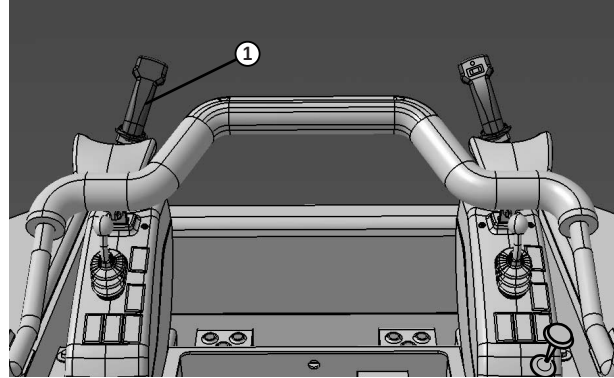
5.3.1. Drive control lever(① Joystick)

(1) 430 (Plus)



IA4O5002

(2) 450 (Plus)



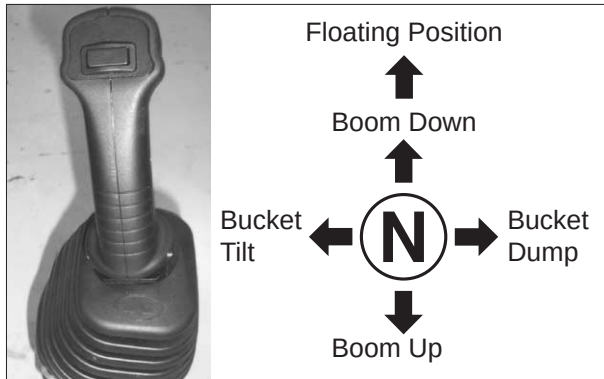
IA0OC06I

- The steering handle are on the left sides in front of the seat.
 - FORWARD MOVE : Push forward.
 - BACKWARD MOVE : Pull backward.
 - STOP : Hold handle at neutral position.The distance of handle movement is proportional to travel speed.

NOTE : For safety purposes, the operator can start the engine only when drive handle are in the neutral position.

5.3.2. Boom & Bucket Handle (②)

Boom handle controls the lifting or lowering of the boom, and tilting or dumping Bucket. The speed is controlled by the degree of the handle.

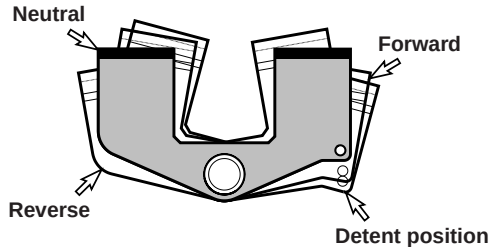


NOTE: Push the Boom handle fully to the forward, then the handle will be locked to floating position, which makes the boom move freely. That is a comfortable function to level the ground. To release the boom from the floating status, pull the boom handle backward. Float position should **only** be used with vehicle in reverse.

5.3.3. Attachment Pedal(③ Joystick) - 430 (Plus) Only

- This pedal is used to operate the auxiliary hydraulics(attachments) instead of the standard bucket.

Note: Press the right part of the pedal fully to the bottom, then the pedal will be locked to detent position, which makes the attachment operate in succession.
To release the attachment from detent position, press the left part of pedal.

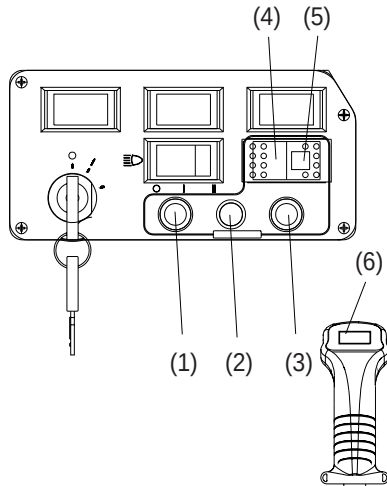


IA4O5006

CAUTION

When using an attachment other than the standard bucket, follow the instructions for each separate attachment.

5.3.4. Auxiliary Hydraulic Thumb Control - 450 (Plus) Only Joystick



IA00A39I

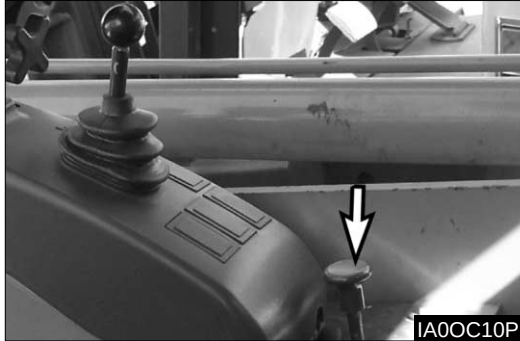
CAUTION

When using an attachment other than the standard bucket, follow the instructions for each separate attachment.

The **Auxiliary Hydraulics Thumb Control** system is activated by pushing the “on” button (1) on the forward control panel. The green light (2) on the panel will illuminate when the system is active. This system can be operated in two modes by utilizing the rocker switch (4) (5) on control panel.

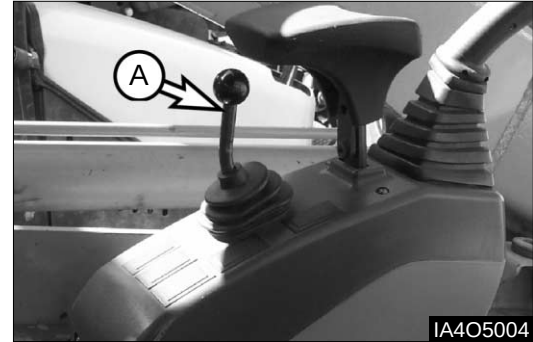
Momentary control : This system is activated with the rocker switch (5) in the down position. The auxiliary hydraulics will only operate when the thumb button (6) on the drive control handle is depressed.

Detent control : This system is activated with the rocker switch (4) in the down position. The thumb button (6) controls the direction of flow in this mode but it cannot stop or pause flow once the system is activated. Auxiliary hydraulics will remain active until the “off” button (3) on the panel is pushed or the key switch is turned to off.



- When auxiliary hydraulic attachment has residual pressure, so you cannot remove attachment from machine, you must reciprocate the knob down to bleed off the attachment (Only 450/450 Plus).

5.3.5. Engine Control Joystick



- Throttle lever (A) controls the engine speed. Push the throttle lever forward to decrease the engine rpm and pull backward to increase the engine rpm.

6. OPERATING INSTRUCTIONS

6.1. Inspection Before Boarding

Refer to Section 7.3 Daily Pre/Post Start Checks

6.2. Boarding the Loader



- (1) Use the bucket steps and grip handles to get on and off the loader.



- (2) Adjust the seat position with the seat adjusting lever.



- (3) Fasten the seat belt and adjust it snugly across the hips.



- (4) Lower the seat bar all the way.

6.3. Starting

CAUTION

Refer to section 7.3 for pre-start maintenance checks.

- (1) Be sure all controls (the foot pedals and drive control levers) are in neutral position.
- (2) Set the throttle lever at half-throttle position.
- (3) When the key is turned to the “PREHEAT” ”  position, the light turns on and preheating of air begins. The light goes off automatically after 30 seconds. Then start the engine by turning the key to the start position.



 DANGER

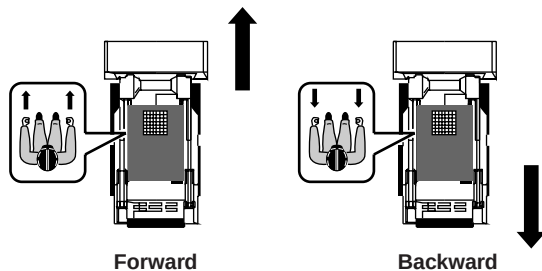
Cold Temperature Starting and Operation

Before any Doosan skid steer loader is operated in cold ambient temperatures (below 45° F), the hydrostatic system needs to be properly warmed up to assure precise drive operation. This is especially crucial due to the fact it has a servo controlled hydrostatic drive system.

To properly warm up the hydraulic system you should: 1. Disconnect any attachment lines from the auxiliary hydraulic couplings. 2. Following all proper procedures as outlined in this manual, start the engine and run at high idle (full throttle position). 3. Set the auxiliary hydraulic pedal in the full operational position. 4. Depending on ambient temperature proper warm up time will vary from 3 to 15 minutes. This procedure should be continued until both A) The outside of the hydraulic tank is warm to the touch and B) Using short slow movements the drive controls react normally to inputs. Caution should be taken during the initial control movements as warm oil may be delayed in reaching the control servos.

6.4. Traveling and Steering

- (1) Push the throttle lever forward to raise the engine speed.
- (2) Operate the boom and bucket pedals to raise the bucket to 15-20 cm (6-8 in) above the ground.
- (3) Push left and right drive control levers simultaneously forward (or pull them backward) to make the vehicle travel forward (or backward).
- (4) To stop the vehicle, make the left and right drive control levers return to the neutral position slowly. DOOSAN skid steer loader is designed with drive control levers which return to neutral positions automatically, when the levers are released.

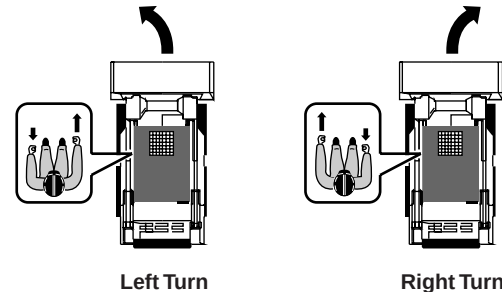


IA00A45I

- (1) Steering procedure is illustrated as follows:

- Gradual Turning

Push one lever farther forward than the other.



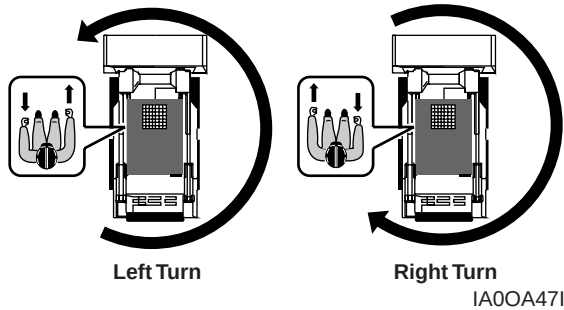
IA00A46I

CAUTION

When traveling or steering, always lower the boom to the carry position.

- Sharp Turning

Push one lever forward and pull another lever backward.

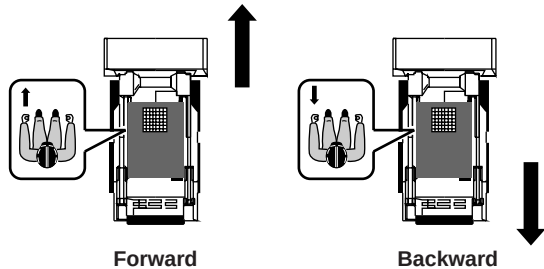


⚠ CAUTION

Be alert for tail swing.

6.5. Traveling and Steering (Joystick : Option)

- (1) Pull the throttle lever backward to raise the engine speed.
- (2) Operate the boom and bucket handle to raise the bucket to 15-20 cm (6-8 in) above the ground.
- (3) Push left drive control handle forward (or pull it backward) to make the vehicle travel forward (or backward).
- (4) To stop the vehicle, make the left drive control handle return to the neutral position slowly. DOOSAN skid steer loader is designed with drive control handle which return to neutral positions automatically, when the levers are released.

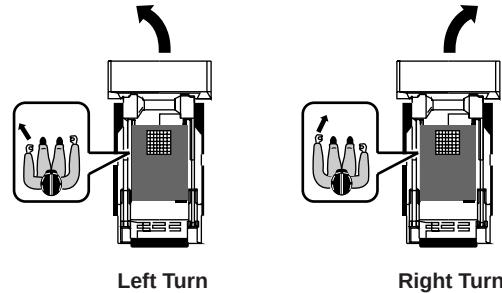


IA00A45I

- (1) Steering procedure is illustrated as follows:

- Gradual Turning

Push left drive handle diagonally forward.



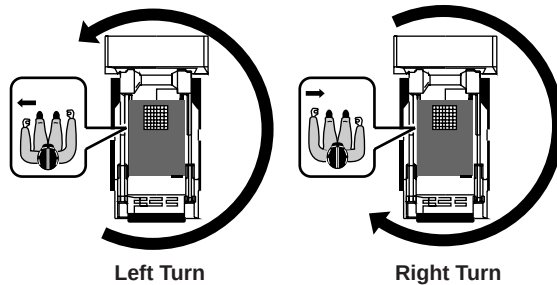
IA00A46I

⚠ CAUTION

When traveling or steering, always lower the boom to the carry position.

- Sharp Turning

Push left drive handle left side or right side.



IA00A471

⚠ CAUTION

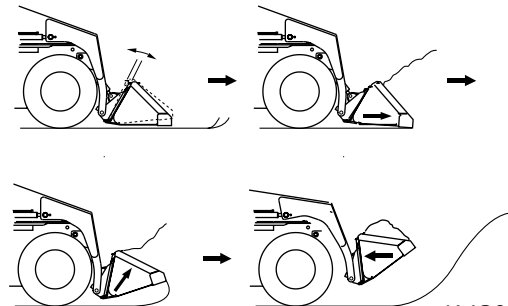
Be alert for tail swing.

6.6 Operation

⚠ CAUTION

For safe and economical handling with the DOOSAN skid steer loader, the operator must have a thorough knowledge of safety instructions and a good grasp of the construction and performance features of the vehicle. Then he must choose the operating approach best matched to the actual conditions.

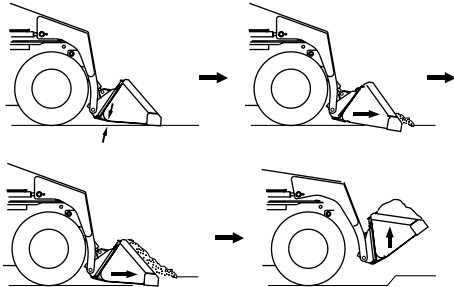
(1) Bucket filling



CAUTION

When traveling forward into the material, make the bucket parallel to ground. .

(2) Bucket scooping

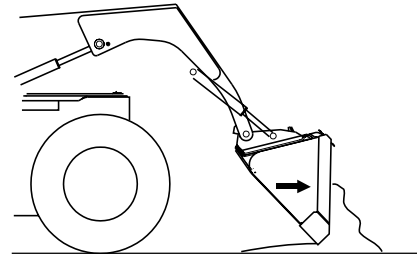


IA4O6005

Move the vehicle forward slowly with the bucket held parallel to the ground or tilted down slightly. When the bucket is sufficiently full, roll back and raise the bucket simultaneously.

(3) Bucket dumping

Keep the bucket load level while raising the boom to prevent the load from falling down over the back of the bucket. Raise the bucket high enough and tilt the bucket forward to dump a bucketful of material. When loading a truck, be careful not to contact the bucket or frame with the truck.



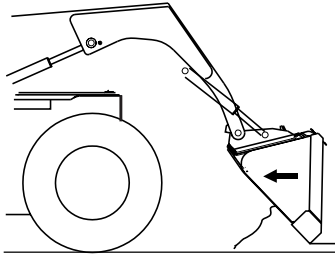
IA4O6006

IMPORTANT Do not shake the bucket unnecessarily to dislodge sticky material. Vibrations put excess stress on the bucket cylinder and stopper, which in turn will reduce machine life.

(4) Leveling the ground

Drive forward or backward with the bucket tilted and raised slightly off the ground to perform leveling.

Also, leveling jobs can be performed by using the floating position for the boom according to operating conditions. Make the bucket parallel to the ground as much as possible.



IA4O6007

CAUTION

Do not drive forward with the boom in float position.

6.7. Traveling on a Slope, Parking

CAUTION

- Operate your DOOSAN skid-steer loader on level ground as much as possible.
- Use caution when operating on slopes.
- Keep load as low as possible for maximum stability.

(1) Traveling on a slope

Drive the loader on slopes as illustrated below.



(With Full Bucket - forward up and backward down)



(With Empty Bucket - forward down and backward up)

(2) Parking

- Stop the loader on level ground.
- Lower the boom and put the bucket cutting edge on the ground.

- Pull the throttle lever all the way back.
- Engage the parking brake.
- Turn the key to the “OFF” position.
- Make sure that all controls in operator cabin are in stop position.
- Raise the seat bar all the way up to the roof.
- Disconnect the seat belt.
- Remove the key from the switch.

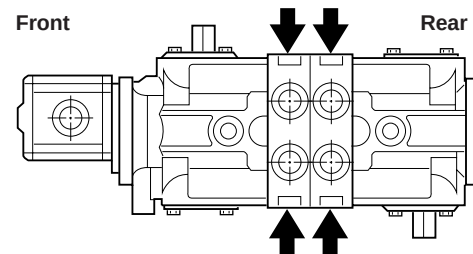
⚠ DANGER
NEVER exit machine with engine running.

⚠ DANGER
NEVER exit machine with boom arms raised unless secured by safety locks.

6.8. Towing Procedures

⚠ WARNING
Towing loaders without following the procedures listed below can result in damage to machine and injury to personnel

- (1) Open canopy and secure with safety latches.
- (2) Locate bypass/relief valves on each side of HST pumps (refer to illustrations)



IA00A52I

- (3) Loosen valves by turning counterclockwise two revolutions.

WARNING

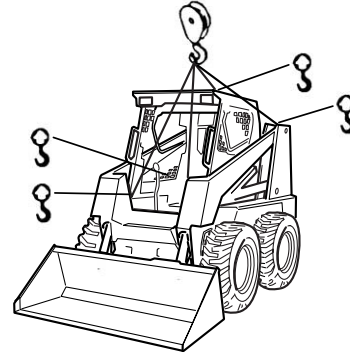
Opening of bypass valves will result in a loss of hydrostatic braking capacity. Take precautions to prevent machine movement when opening the valves, and after valves are opened.

- (4) Tow loader using the two draw eyes located at lower rear portion of frame.
- (5) After towing, tighten valves to 9.5-14 Nm (7-10 ft/lbs.)

Damage to units may result from over-torquing valves.

- (6) DOOSAN Skid Steer Loader can draw another machine using the 2 drawing eyes on rear frame. Specified draw bar forces are as follows:
- 430 (Plus) : 1,950Kg(w/load)
1,700Kg (w/o load)
- 450 (Plus) : 3,831Kg(w/load)
3,060Kg (w/o load)

6.9. Lifting



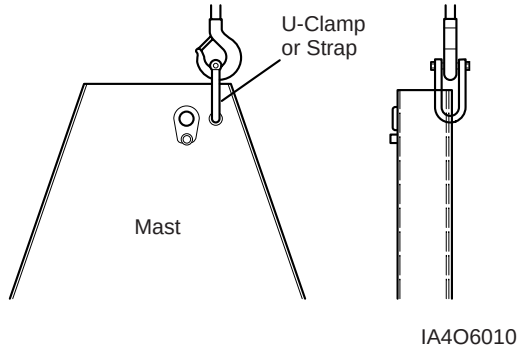
IA00A53S

WARNING

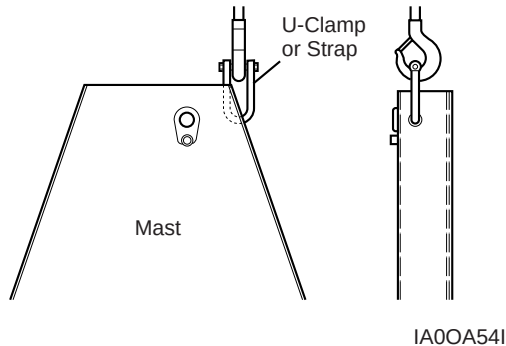
Lifting may shift the load and could result in death or serious injury.

1. Use proper rated cables and slings for lifting.
(min. durable force of cable/sling = 1,400Kgf)
2. Lifting cables should have sufficient length to prevent contact with the machine.
3. Use the 4 holes for lifting i.e. 2 holes in front upper frame and 2 holes in rear inner mast with U-clamp or strap.

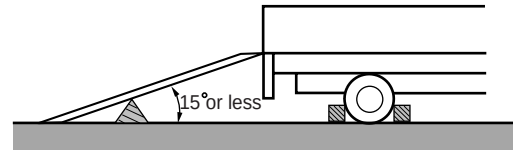
(1) 430 (Plus)



(2) 450 (Plus)



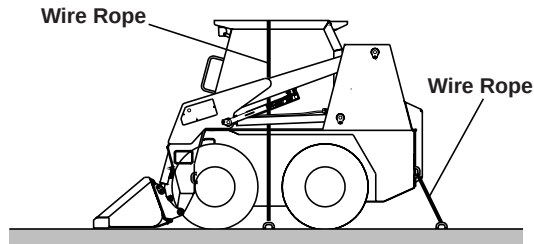
6.10. Transportation



IA00A55I

- Use secure, stable, sufficient strength ramps to load (or unload) the machine onto (or from) a transport vehicle and keep the steel ramps inclined 15° or less.
- Follow instructions of the traveling on slopes, while moving on the ramp.
- Lower the bucket to the floor and stop the engine after loading the machine onto a transport vehicle.
- Engage the parking brake.

- Fix the skid loader tightly to the transport truck bed with an approved securing device. The machine has 3 fixing points, i.e. 1 holes in front upper frame and 2 holes in lower rear frame.
- Use wheel blocks to prevent vehicle from moving during transportation.



IA4O6011

6.11. Bucket and Attachments

The loader is equipped with a Universal Attachment System (Quick-tach) in front of the vehicle for rapid replacement of bucket or various attachments.

(1) Installation



<Figure 1>

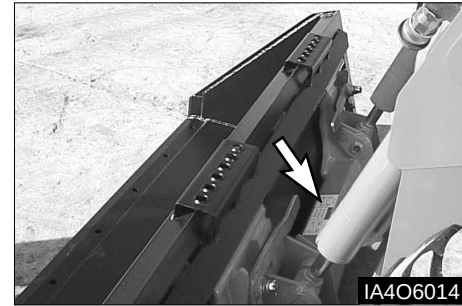
- (1) Pull up both handles assembled on the upper area of Quick-tach.
- (2) Tilt the Quick-tach forward slightly and drive forward to the bucket until the upper

edge of the Quick-tach is completely inserted to the flange of the bucket. (Figure 1)



<Figure 2>

backward until the back of bucket becomes perpendicular to ground. (Figure 2)



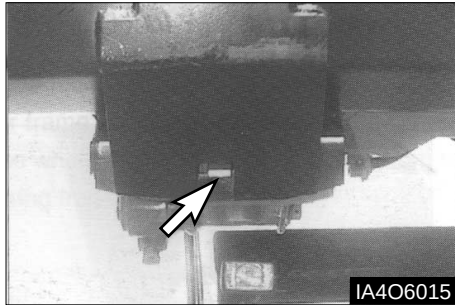
<Figure 3>

CAUTION

Do not hit the Quick-tach handles when engaging the bucket.

(4) Lock the bucket and Quick-tach by pushing down both handles. (Figure 3)

(3) Make sure that the top edge of the Quick-tach is inserted and tilt the Quick-tach

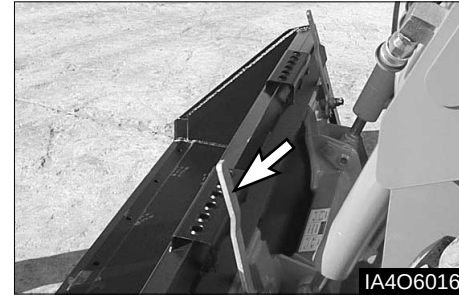


<Figure 4>

- (5) Make sure that both wedges are inserted firmly through the holes on the bucket (or attachments). (Figure 4)

(2) Removal

- (1) Lower the boom thoroughly and tilt the bucket down until the bucket cutting edge touches to ground.
- (2) Pull out both handles and disengage the locking pin. (Figure 5)



<Figure 5>

- (3) Remove the bucket from the machine by driving backward with the Quick-tach tilting down. (Figure 6)



<Figure 6>

6.12. Boom Lock Operation



DANGER

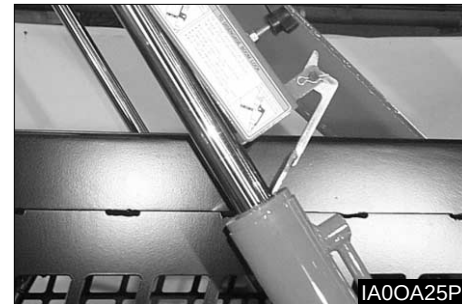
When working on a machine with the boom up, always engage the boom lock.



<Figure 1>



<Figure 2>



<Figure 3>

(1) To engage boom lock

Make sure the release lever is secured in the lock position with knob when the boom lock is in use.

- With boom fully lowered, hold lock arm and remove knob
- Lower lock arm onto cylinder
- Ensure release lever is in lock position and secured with knob
- Raise boom until lock arm rests on the cylinder rod.
- Lower boom slowly until the lock arm contacts top of cylinder. (Figure 1)

(2) To disengage boom lock

The release lever should be in the release position only when releasing the boom lock.

- Rotate lever clockwise to release position (Figure 2)
- Raise boom until lever reaches position as

shown in illustration. (Figure 3)

- Lower boom slowly to lowest position
- Lift boom lock arm, rotate lever counter-clockwise
- Mount lock arm in original position using knob

IMPORTANT Do not attempt to lower boom once lock is engaged or cylinder damage will result.

7. PERIODIC MAINTENANCE

7.1. Safety Warnings

WARNING

1. Never attempt to service a machine unless you are authorized and qualified to do so.
2. Before attempting any service on this machine, familiarize yourself with all instructions and warnings in the operators manual and all machine decals.
3. Do not attempt to service machine unless you have the necessary skill, information, safety gear, and tools and equipment to perform the procedure correctly.
4. While service is being performed ensure a warning tag is installed on or near the ignition key switch and clearly visible to prevent inadvertent starting of the machine during service.
5. If a service procedure necessitates running the engine, the control levers must remain in the neutral position and the emergency brake must be fully engaged. Failure to do so can result in injury or death.
6. After completing service check for: proper operation of all controls, correct torque on all fasteners and fittings, any fluid leaks (prior to and after starting engine), all tools and equipment must be removed from the machine.
7. Ensure all hoisting and supporting equipment is in good repair and of adequate capacity to support loader.
8. Failure to follow safety precautions and proper service procedures can lead to machine malfunction or damage, injury to operator or bystanders, or death.

7.2. Access to Items Requiring Service

IMPORTANT Daily maintenance checks can be carried out by opening the rear door and engine hood of DOOSAN skid steer loader.

7.2.1. Rear Door and Engine Hood

Pull the door handle backward to open the rear door.

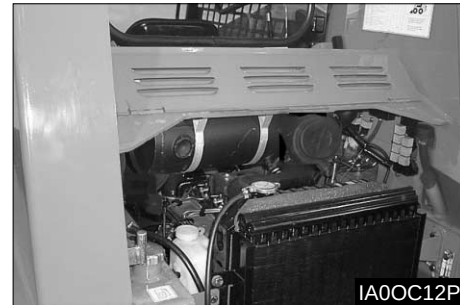


Push the door handle forward to close the rear door.

NOTE: The rear door can be locked by placing a pad lock on the hasp provided on the handle.

CAUTION

ALWAYS keep rear door closed except for service. Confirm that the rear door is closed and the door latch is firmly engaged before operating the loader.



More service space can be obtained if operator opens up the engine hood after opening the rear door.

7.2.2. Canopy Tilting



- Stop the loader on level ground and lower the boom all the way.
- Turn off skid loader
- Set park brake
- Loosen both mounting bolts at the front corners of the canopy.

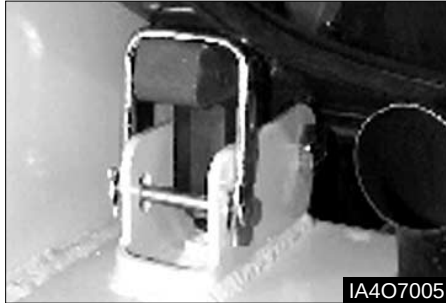


- Remove attaching hardware



- Hold the grip handles on canopy and then lift-slowly all the way up.

(1) 430 (Plus)



Canopy Lock (LEFT)

- Hook the rectangular canopy lock to the hook attached on the canopy.
- To lower, reverse the above procedure.

⚠ CAUTION

Never operate without canopy lowered and properly secured.

(2) 450 (Plus)



Canopy Lock (RIGHT)

7.3. Daily Pre/Post Start Checks

7.3.1. Pre-Start Checks

1. Check engine oil level. Refill if necessary.
2. Check hydraulic oil level. Refill if necessary.
3. Check coolant level. Refill if necessary.
4. Check the engine fan/alternator belt.
5. Check the battery and battery cables.
6. Check the fuel system for leaks.
7. Check the hydraulic system.
8. Grease all fittings.
9. Inspect for any loose or missing nuts and bolts
10. Inspect structural members and welds for cracks or deformation.
11. Check the loader tires for proper inflation and unusual wear
12. Check the fuel level.
13. Check the condition and security of the operator seat belt and seat bar.

WARNING

If any of the following pre/post start checks indicate that service may be required, have such service performed before using the machine.

7.3.2. After Starting-Before Operation

1. Start the engine and observe the initial exhaust color at start and at normal operating temperatures.
Excessively black, blue, or white exhaust is an indication of a problem. Listen for any abnormal sounds.
2. Check the operation of all exterior lights, instrument panel indicator lights and installed optional equipment.
3. Check the operation of all switches.
4. Check the operation of all controls.
 - a. Check loader for movement with controls in neutral. Should movement occur refer to

service manual for proper adjustment procedure.

- b. Check for proper operation of boom, bucket, and accessories (if attached).
- c. Insure that the boom, bucket, attachment pedals are locked with the seat bar raised.

7.4. Service Schedule

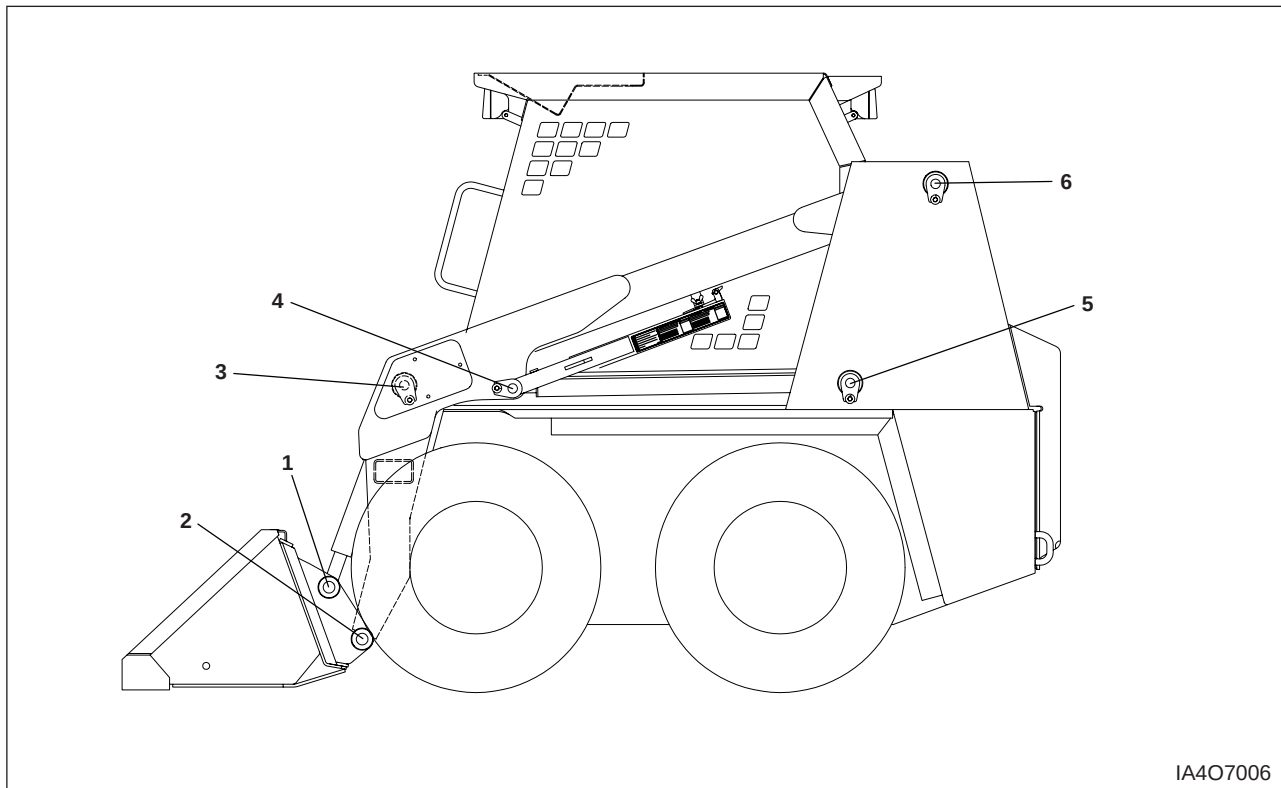
This maintenance schedule was designed for you to receive optimum performance and reliability from your SKID STEER LOADER under typical working conditions. Failure to follow a

scheduled maintenance program can lead to premature wear and component failure. Adverse conditions (e.g., excessive dust or corrosive vapors, etc.) may require more frequent service.

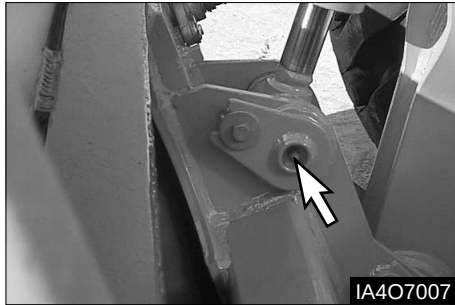
SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	every day	every 50	every 100	every 250	every 500	every 1000
Engine Oil	Check the oil level and fill oil as needed.	○					
	Replace the oil.				○ 430(Plus)	○ 450(Plus)	
	Replace the oil filter.				○ 430(Plus)	○ 450(Plus)	
Fuel System	Replace fuel filter element.						○
	Clean the fuel strainer[450 (Plus) Only].					○	
Engine Cooling System	Check cooling level and add as needed. Check for leaks	○					
	Check and adjust the tension of fan belt	○					
Air Cleaner	Check the indicator. (Clean or replace the outer element when the red ring shows.) Clean the dust cover.	○					
	Replace the outer element. (Replace the inner element every third time the outer element is replaced).				○ (Clean)		○ (Replace)

SERVICE SCHEDULE		HOURS					
ITEM	SERVICE REQUIRED	every day	every 50	every 100	every 250	every 500	every 1000
Tires	Check air pressure and for damage to tires.	○					
Wheel Nuts	Tighten to correct torque if loose.	○					
Seat Belt	Check the condition of seat belt.	○					
Seat Bar	Check the seat bar for correct operation.	○					
Safety Signs	Check for damaged signs and replace if needed.	○					
Pivots	Grease pivots as needed.	○					
Battery	Check the water level and battery cables for corrosion. Check whether battery cables are tightly clamped. Check covers.		○				
Hydraulic Oil	Check the oil level and add as needed.	○					
	Replace the hydraulic oil.						○
Hydraulic Tubes and Hoses	Check for damage and leaks and replace as needed.	○					
Chain Case Oil	Replace the chain case oil.						○
Hydraulic Filter	Replace the hydraulic filter.		(First time) ○			○	
Spark Arrestor for Muffler	Clean the spark chamber			○			
Suction filter in tank	Inspect and clean or change				(First time) ○		○
Air breather cap	Inspect and clean or change					○	

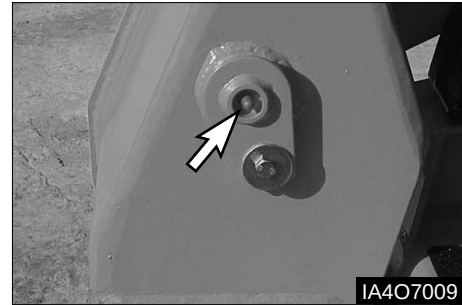
7.5. Lubrication Points



1. Bucket cylinder pivot



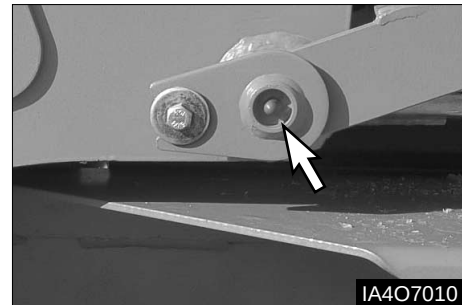
3. Upper bucket cylinder pivot



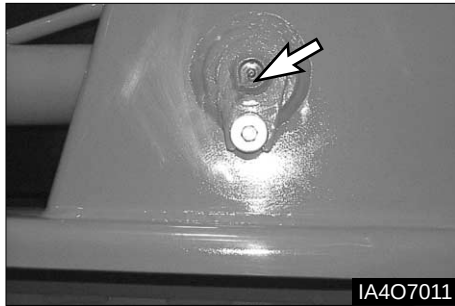
2. Lower bucket/boom pivot



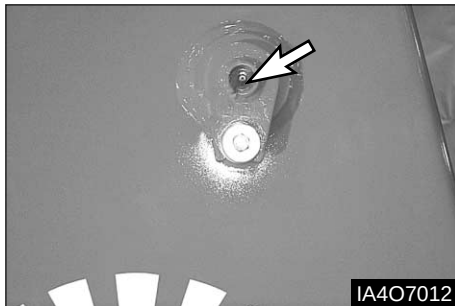
4. Front mast cylinder pivot



5. Rear mast cylinder pivot

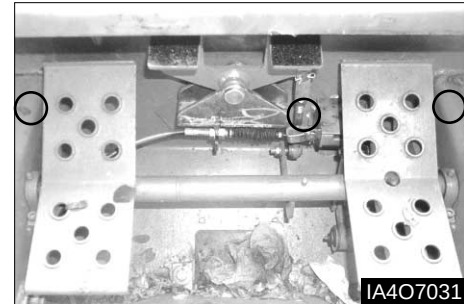


6. Upper mast pivot

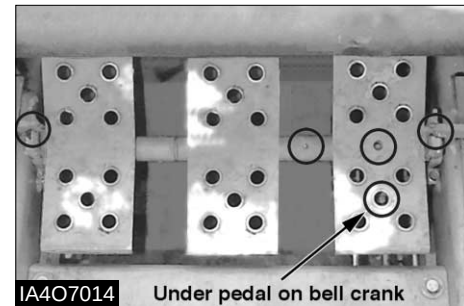


7. Pedal assembly grease fittings [430 (Plus) Only]

(1) CE

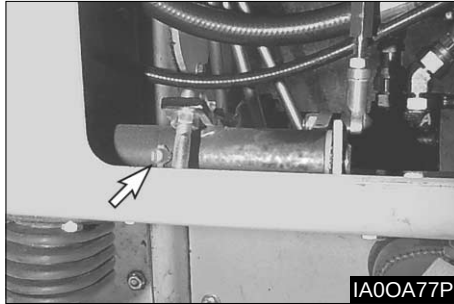


(2) Non CE



8. Drive control lever fitting

NOTE: Cab must be opened to access.



7.6. Operator Restraint Lubrication and Maintenance

7.6.1. Lubrication

All seat bar mounting points (right shown-left in mirror position) should be checked for security, cleaned of any dirt and debris, and lubricated daily. Use either a spray lubricant or a light machine oil at the points marked on the illustration. Lubrication for the pedal lock linkage is covered in the previous section (7.5).



7.6.2. Function

Sit in seat and fasten seat belt. Check the seat belt for security at mounting points. With the seat bar up, check for full engagement of the pedal locks (right and left) into the corresponding slots under the pedal assembly. Lower the seat bar. Pedal lock assemblies should fully disengage from pedals.

7.7. Engine Lubrication

7.7.1. General

Engine oil level should be checked daily. After draining oil and changing filter approximate refill amounts is 1.7 gallon for the 430 (Plus) or 2.0 gallon for the 450 (Plus). Run loader briefly and check oil level on dipstick before returning the loader to service.

See section 8.2.10 for fluid recommendations.

(1) 430 (Plus)



(2) 450 (Plus)



7.7.2. Draining Engine Oil

Remove the four bolts from the access plate located on the left bottom corner of the chassis. Remove the drain plug by either reaching through the opening between the radiator and the chassis or through the access plate. Drain oil into an approved waste oil receptacle. Inspect drain plug gasket and if serviceable, replace drain plug. If gasket is deformed or torn, replace gasket and re-install drain plug. Discard oil in accordance with local environmental rules and regulations.

(1) 430 (Plus)



(2) 450 (Plus)



7.7.3. Remove/Replace Engine Oil Filter

Raise and secure operators cab. Filter is located on left side of engine block. Using a strap type or other style filter wrench, remove the engine oil filter. Before installing new filter, coat the rubber gasket on the filter with clean oil. Install filter **BY HAND** and tighten until gasket fully contacts the mounting surface. Once this tighten another 1/2 to 3/4 of a turn by hand only.

(1) 430 (Plus)



(2) 450 (Plus)

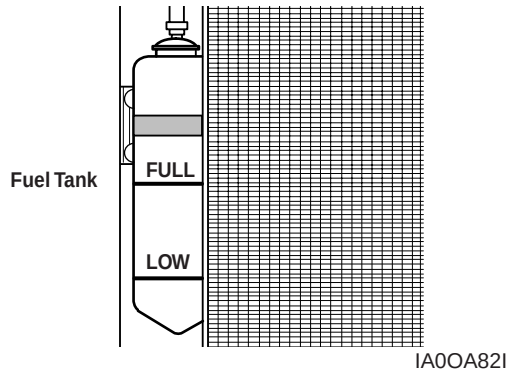


7.8. Engine Cooling System

NOTE: Check the cooling water level while the engine is cold.

Accurate coolant level check is not guaranteed when engine is hot, because a hot radiator can flow coolant to sub-tank.

Check the coolant level on the sub-tank. Remove the top cap of the sub-tank and fill to the “FULL” mark if coolant level is below “LOW” mark on sub-tank.



NOTE: The radiator drain petcock is located on the right radiator tank for 430 (Plus), or the bottom of the radiator tank for 450 (Plus). Attach a section of 5/16” tubing to the nipple on the petcock to allow fluid to drain outside of the chassis. Collect the fluid and discard it in accordance with local/federal environmental rules and regulations.



CAUTION

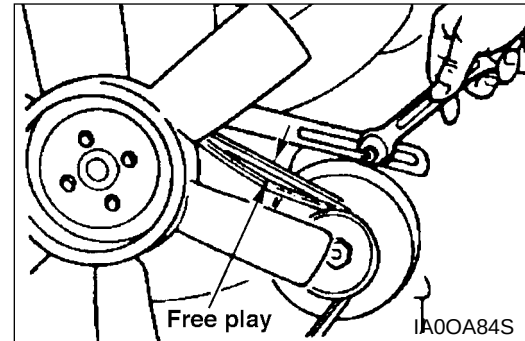
- (1) Steam or hot liquid may spurt out if the radiator cap is removed soon after the engine is stopped.
- (2) When removing the radiator cap, turn your face away from cap and cover the cap with a cloth. Turn the cap slowly to release the pressure inside the radiator.

7.9. Fan Belt

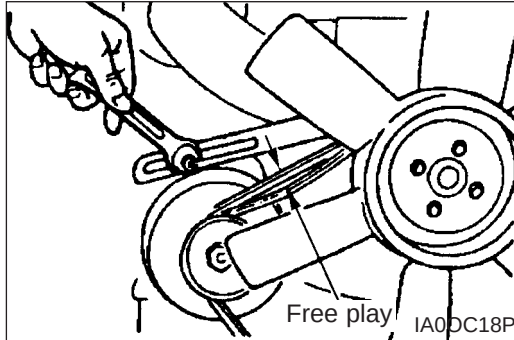
7.9.1. Belt Tension

Properly adjusted, the belt should have approximately 3/8" to 9/16" (10-15 mm) of free play when checked by pressing firmly on the belt between the fan and alternator pulleys.

(1) 430 (Plus)



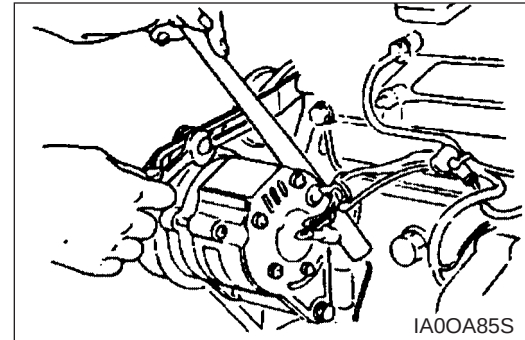
(2) 450 (Plus)



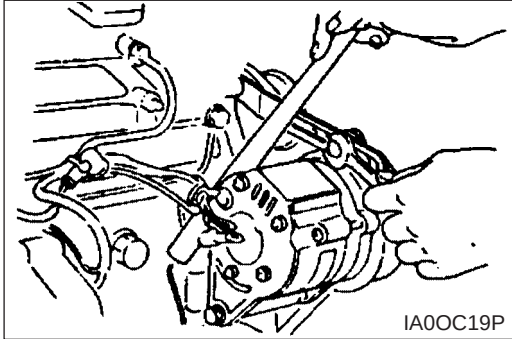
7.9.2. Adjustment

Belt tension can be adjusted by loosening the upper and lower pivot bolts on the alternator. Use a small pry bar to move the alternator to achieve proper tension and retighten pivot bolts.

(1) 430 (Plus)

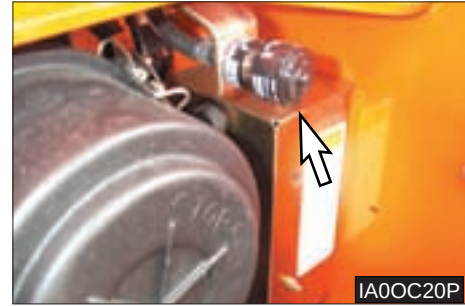


(2) 450 (Plus)

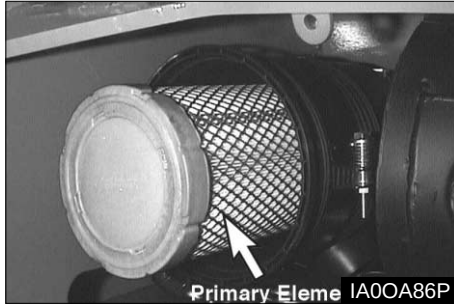


7.10. Two Stage Air Cleaner

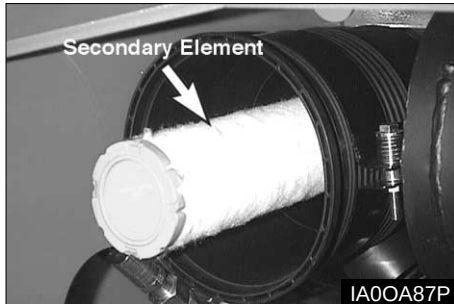
(1) Air Cleaner Indicator



(2) Primary Element



(3) Secondary Element



7.10.1. Removal-Primary Element

Every day or when the red ring shows on the air cleaner indicator, the primary air cleaner element should be removed and cleaned. Access to the air cleaner assembly is gained through the rear service door. Loosen the canister cover wing nut and remove the cover and gasket. Loosen the cover latches and remove the cover. Rotate the element slightly to separate it from its base and remove it from the air cleaner housing. This element should be cleaned every 250 service hours using compressed air and should be replaced every 1000 service hours.

7.10.2. Removal-Secondary Element

Unlike the primary element, the secondary element is designed for replacement only and is not to be cleaned. The secondary element is nested inside the primary element and can be removed easily once the primary element is out of the vehicle. The secondary element should be replaced at least with every third change of the primary element.

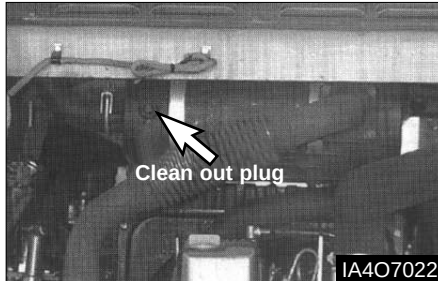
7.10.3. Installation

Installation is simply the reverse of the above procedures. Ensure that the element and gasket are not damaged during replacement. The air cleaner will not function properly if the gaskets do not seat completely.

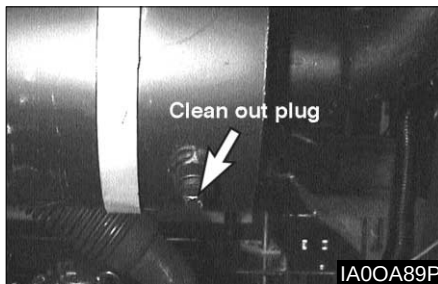
IMPORTANT Extreme operating conditions may greatly accelerate the need to clean or replace these elements.

7.11. Spark Arrestor

(1) 430 (Plus)



(2) 450 (Plus)



7.11.1. General

This vehicle is equipped with a U.S.D.A. Forestry Service approved spark arrestor muffler. To keep it in working condition, the spark chamber must be emptied every 100 hours of operation.

7.11.2. Maintenance

The engine must be completely cool before attempting to clean the spark chamber. **NEVER** attempt to empty the spark chamber on a hot engine. Raise and support the loader and open and secure the operators cab. Remove the clean out plug from the spark chamber. Ensure that the individuals performing this operation are wearing safety glasses with side shields. Start the engine and run for approximately 10 seconds while the second individual wearing protective gloves holds a piece of wood over the exhaust outlet. Re-install plug and lower and secure cab.

7.12. Battery



7.12.1. Remove and Install

Removal: The battery is located in the right rear corner of the chassis. Access to battery is gained through the rear service door. Disconnect the negative (-) battery cable first, then disconnect the positive (+) cable. Remove the wing nuts from the battery hold down clamp, and remove the clamp assembly. Remove the battery from the loader.

Installation: Installation procedure is the

reverse of the removal procedure. Before beginning installation, clean the battery terminals and cable ends with a wire brush. Be sure to connect the negative (-) cable last to minimize the potential for sparking. Coat the terminals and cable ends with grease to prevent corrosion.

7.12.2. Jump Starting the Loader

(See caution - frozen battery)

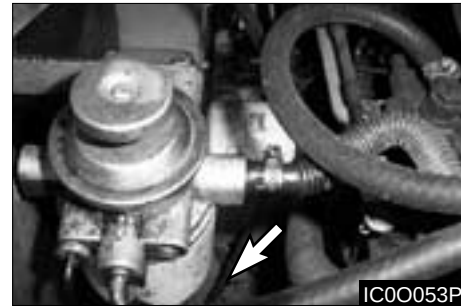
Never attempt to jump start a loader by yourself. There **must** be one person in the operators seat and one person to connect and disconnect the jumper cables. Before beginning to connect jumper cables, ensure that the ignition switch is in the off position, controls are in neutral and parking brake in fully engaged. Connect from the positive (+) terminal from the jumper battery to the positive (+) terminal on the loader battery. Next, connect from the negative (-) terminal on the

jumper battery to the negative (-) terminal on the loader frame. Once loader has started, remove the ground cable from the frame first.

NOTE: Ensure the jumper battery being used is a 12 volt battery or electrical system damage will result.

7.13. Fuel System/Filters

(1) 430 (Plus)



(2) 450 (Plus)



7.13.1. Removal/Installation-Fuel Filter

Open and secure the operators cab. Facing the loader, the fuel filter is located above the right corner of the engine. Follow the service schedule for replacement intervals. Align the filter bowl and tighten the retaining ring by hand until snug. Finish tightening using the spanner wrench. When complete, refer to section 7.14 for priming fuel system.

7.13.2. Fuel Tank Drain

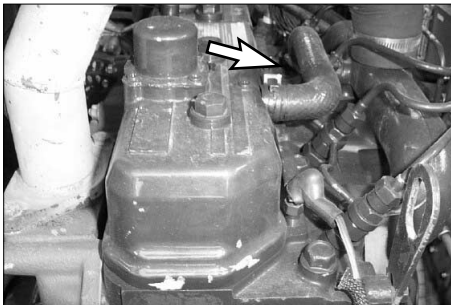
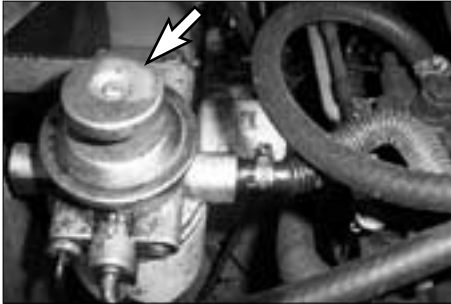


The fuel tank drain plug is located directly behind the left rear tire on the chassis. Fuel drained should be disposed of into an approved waste oil container. Discard the fuel in accordance with local/federal environmental rules and regulations.

7.14. Priming the Fuel System

7.14.1. Breeding the Fuel System

(1) 430 (Plus)



If air enters the fuel system, it must be eliminated before the engine can be started.

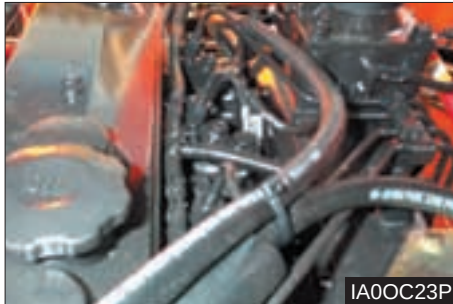
Air can enter the system if:

- The fuel tank is drained during normal operation.
- The low-pressure fuel pipes are disconnected.
- A part of the low-pressure fuel system leaks during engine operation.

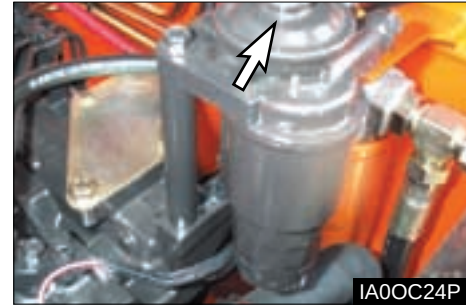
In order to eliminate air from the fuel system, proceed as follows:

(2) 450 (Plus)

After changing the fuel filter cartridge assembly, or after having serviced any part of the fuel system, make sure that the air is bled from the system.



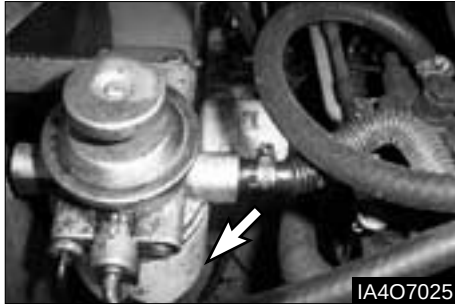
1. Loosen the clamp on the side of the fuel injection pump.
2. Operate the priming lever of the fuel lift pump until fuel, free from air, comes from the vent point. Tighten the vent plug.
3. Turn the start key on the "ON" position.



4. Operate the starter motor for intervals of 15 seconds until the engine starts. If the engine runs correctly for a short time and then stops or runs roughly, check for air in the fuel system. If there is air in the fuel system, there is probably a leakage in the low pressure system. Stop the engine and turn the start key to the "OFF" position

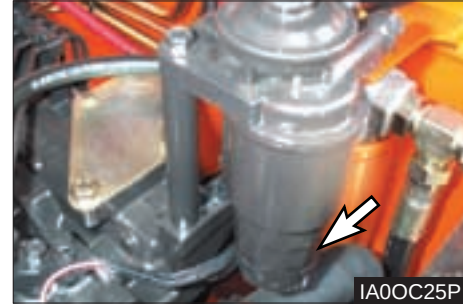
7.14.2. Draining the Water

(1) 430 (Plus)



WATER SEPARATOR: The water separator is located inside the rear door on the left hand side. Removal, cleaning and installation are identical to the procedure for the fuel filter.

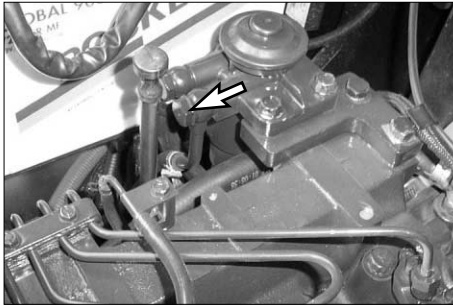
(2) 450 (Plus)



1. Turn the wing nut counter clockwise to open the drain valve on the bottom of the fuel filter.
2. Drain some fuel (and any water) until clean fuel flows from the filter.

7.14.3. Cleaning Fuel Strainer [450 (Plus) Only]

At every Engine oil exchange, clean the strainer of fuel feed pump



Fuel passes through fuel strainer from fuel tank to fuel filter.

The first filtering device uses the mesh strainer and the second one uses the paper element.



Periodically the mesh strainer must be cleaned and the paper element must be replaced.

Disassembly and cleaning of fuel filter.

1. Loosen the bolts and separate the mesh strainer.
2. Pull out the mesh strainer.



3. Soak the mesh strainer in diesel oil and wipe the outside with a non-metallic brush.
4. Soak the mesh strainer again in new diesel oil and take it out.
5. Blowing the compressed air inside the mesh strainer.
6. Repeat items 3 through 5, 4-5 times.
7. Assemble in the reverse order of disassembly.

7.15. Hydraulic System Maintenance

7.15.1. Oil Level Indicator

The hydraulic oil level indicator and filler neck are located on the right hand side of the loader inside the rear service door. To daily check the fluid level, the loader should be on level ground with the boom completely lowered and the Quick-tach assembly tilted back. The fluid level as indicated on the sight gauge should read between the two red lines. Refer to specifications section 8.2.10 for complete information on fluid capacities and requirements.



OIL LEVEL INDICATOR

- HYDRAULIC FLUID FILLER NECK



450 (Plus)

- HYDRAULIC FILTER



430 (Plus)

7.15.2. Filter Replacement

- Replace the filter accordingly to service schedule(7.4)
- The filter should be changed whenever the fluid is changed or whenever the filter indicator shows that it is necessary to change the filter(a red warning lamp on the instrument panel is lit)

REMOVAL

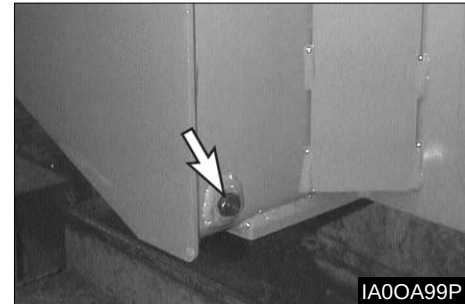
Access to the Hydraulic filter is through the rear service door. Remove the filter by turning counterclockwise. Drain the hydraulic oil into an approved waste oil container. While draining, check fluid and filter base for signs of particle contaminants.

INSTALLATION

Before installation you must coat the rubber seal on the new filter with a light coat of hydraulic oil. Spin on filter by hand turning clockwise until the rubber filter seal makes complete contact with the filter head assembly.

At this point, turn the filter an additional 3/4 turn to fully tighten. When complete, run the loader and check the hydraulic oil level indicator. Add fluid as needed. Discard the used filter in accordance with local/federal environmental rules and regulations.

7.15.3. Hydraulic fluid replacement



TO REPLACE THE FLUID

The hydraulic tank drain plug is located directly behind the right rear tire on the chassis. Before draining, the loader should be on

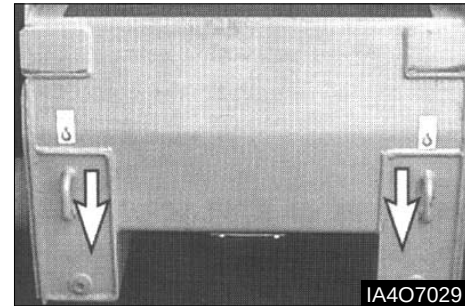
level ground with the boom completely lowered and the Quick-tach tilted back. Once the loader is drained, oil should be disposed of into an approved waste oil container in accordance with local/federal rules and regulations.

INTERVAL OF REPLACEMENT

- Replace the fluid according to service schedule(7.4)
- It may be necessary to change more frequently than the normal interval if the fluid becomes with foreign material(dirt, water, grease, etc) or if the fluid has been subjected to temperature levels greater than the maximum recommended.

7.16. Chain Case Oil Drain and Refill

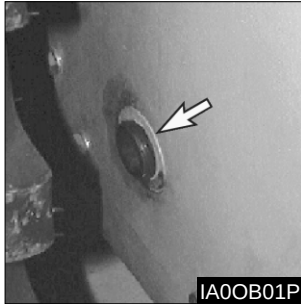
7.16.1. Chain case oil drain



TO DRAIN CHAIN CASE:

Remove drain plugs and drain case oil into an approved waste oil container.

7.16.2. Chain Case Oil Refill



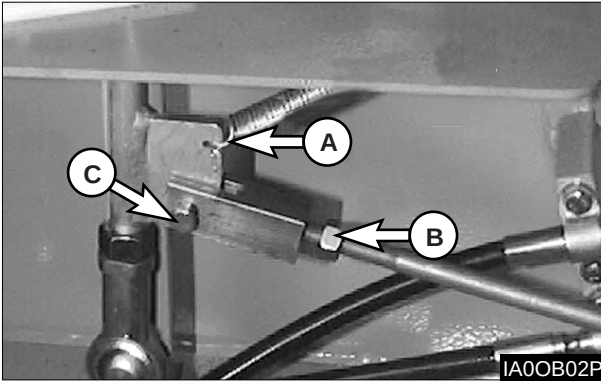
TO REFILL CHAIN CASE:

- 1) Re-install and tighten case drain plugs.
- 2) Remove fill plugs (left side shown-right in mirror position)
- 3) Open cab and secure with safety latches.
- 4) Locate chain case filter necks.

NOTE: Recommended fluid is DEXORN III

- 5) Refill is 430 (Plus) : 1.7 gal/side, 450 (Plus) : 1.85 gal/side or until level is within 1/2" of inspection cover plug.
- 6) Replace and tighten inspection cover plug
- 7) Close and secure cab.

7.17. Parking Brake Adjustment



and re-connect spring when completed with the adjustment procedure. Inability to achieve proper adjustment using this procedure is indicative of more serious problem and should be referred to your DOOSAN dealer.

Should adjustment be required begin by opening the cab and securing with safety latches. Locate the park brake handle linkage and return spring. Remove the spring **(A)** to release tension from the parking brake linkage. Loosen the jam nut **(B)**, remove bolt **(C)**, and rotate the clevis on the linkage to adjust the cable tension until parking brake engages fully and interlock functions properly. Re-attach clevis, re-tighten jam nut

7.18. Tire Maintenance

7.18.1. General Information

Tires should be checked regularly for wear, damage, and proper inflation. When replacing tires, ensure that the size matches those already on the vehicle. Mismatched tire sizes can change vehicle performance and cause premature wear and damage to drive train components. If tires are replaced in pairs, they should be mounted on the same side of the vehicle to minimize stress on the drive train.



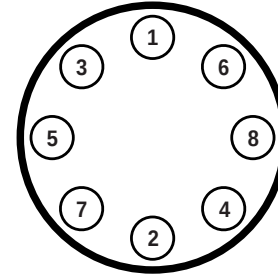
DANGER

Tires should only be mounted/dismounted from rims or repaired by trained and authorized personnel using the proper equipment and procedures. Death or serious injury could result. See OSHA 1910.177.

7.18.2. Inflation Pressures

430 (Plus)-45 psi (3.2 kg/cm²)

450 (Plus)-50 psi (3.5 kg/cm²)



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7.18.3. Installation and Removal

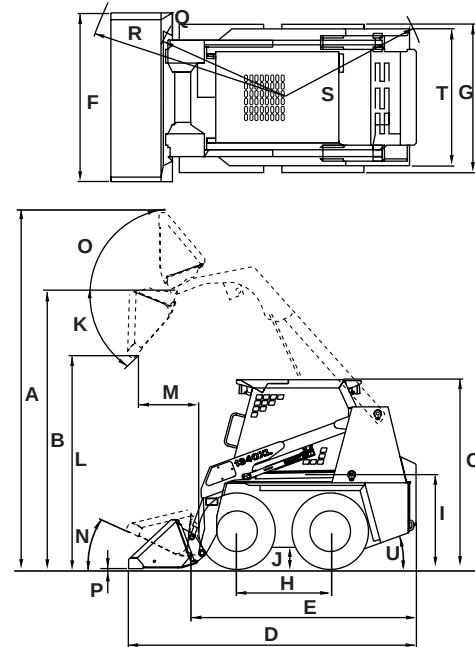
REMOVAL: Support the frame so that the tire(s) to be removed are off the ground. Insert a wedge under the tire to prevent rotation while the lug nuts are being removed. Remove tire and rim assembly.

INSTALLATION: Install the tire and rim assembly on the axle. Tighten lug nuts to seat rim against axle assembly. Insert a wedge under the tire to prevent rotation while torquing lug nuts. Torque lug nuts to 102-112 ft/lbs (138-152Nm) in the pattern illustrated above. Recheck torque after 10 hours of operation.

8. DIMENSIONAL & PERFORMANCE SPECIFICATIONS

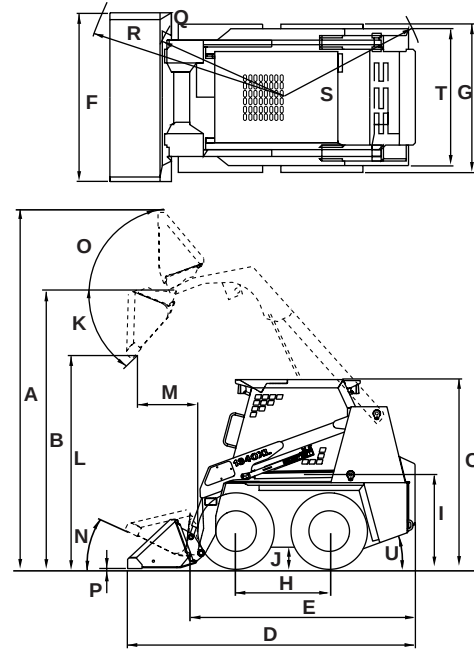
8.1. DIMENSIONAL SPECIFICATIONS

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
• Overall Height			
A. Fully Raised	in(mm)	142.4 (3617)	153.2 (3892)
B. To Hinge Pin	in(mm)	112.0 (2845)	119.9 (3045)
C. To Canopy	in(mm)	76.1 (1934)	79.3 (2015)
• Overall Length			
D. With Bucket	in(mm)	120.0 (3047)	126.5 (3212)
E. Less Bucket	in(mm)	93.3 (2371)	100.1 (2543)
• Overall Width			
F. With Bucket	in(mm)	61.5 (1562)	67.5 (1713)
G. Less Bucket	in(mm)	58.5 (1486)	65.4 (1662)
• Others			
H. Wheel Base	in(mm)	37.7 (957)	41.8 (1061)
I. Height of S.I.P.	in(mm)	37.8 (959)	40.9 (1040)
J. Ground Clearance	in(mm)	7.5 (190)	8.6 (218)
T. Tread	in(mm)	48.1 (1222)	53.1 (1350)
U. Departure Angle	deg	27°	28°



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Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
• Dumping			
K. Dump Angle	deg	45°	40°
L. Dump Height	in(mm)	86.3 (2192)	91.5 (2323)
• Reach			
M. Fully Raised	in(mm)	20.4 (518)	22.5 (572)
• Rollback			
N. Max. at Ground	deg	25°	26°
O. Max. Fully Raised	deg	94°	98°
• Digging			
P. Digging Depth	in(mm)	0.5 (13)	0.4 (10)
• Clearance (Circle)			
Q. Front, Less Bucket	in(mm)	46.6 (1183)	45.1 (1146)
R. Front, With Bucket	in(mm)	71.0 (1804)	74.1 (1883)
S. Rear	in(mm)	60.4 (1534)	62.7 (1593)



IA00B04I

Definitions: (Doosan Skid Steer Loader)

Refer to sketches on this section.

Overall Operating Height (A) - Fully Raised - The vertical distance in inches (millimeters) from the ground to the highest point attainable.

Height to Hinge Pin (B) - Fully Raised - The vertical distance in inches (millimeters) from the ground to the centerline of the bucket hinge pin.

Overall Height (C) - The vertical distance in inches (millimeters) from the ground to the highest point on the unit with the bucket on the ground.

Overall Length (D) - The horizontal distance in inches (millimeters) with the bucket on the ground and level, measured from the foremost point of the bucket cutting edge to the rear most point of the machine.

Overall Length (E) - Without Bucket - The horizontal distance in inches (millimeters) from the furthest rearward to the furthest point forward.

Bucket Width (F) - The maximum outside width in inches (millimeters) of the bucket specified.

Overall Width (G) - The maximum outside width in inches (millimeters) of the machine specified exclusive of bucket.

Wheelbase (H) - The vertical distance in inches (millimeters) from the center of the front wheel or idler to the center of the rear wheel or sprocket.

Height to S.I.P. (I) - The vertical distance in inches (millimeters) from the ground to the Seat Index Point.

Ground Clearance (J) - The minimum vertical distance in inches (millimeters) from the ground to the lowest point on the machine between the tires or tracks with the lift arm raised.

Dump Angle (K) - The maximum angle in degrees that the longest flat section of the inside bottom of the bucket will rotate below horizontal with the bucket hinge pin at maximum height.

Dump Height (L) - The vertical distance in inches (millimeters) from the ground to the lowest point of the cutting

edge with the bucket hinge pin at maximum height and the bucket at a 45° dump angle. The angle is less than 45°, specify angle.

Reach (M) at Maximum Height - The horizontal distance in inches (millimeters) from the foremost point on the machine (including tires, tracks, or loader frame) to the front most point on the bucket cutting edge at a 45° angle with the bucket hinge pin at maximum height. Specify angles less than 45°.

Maximum Rollback (N) - at Ground - Maximum rollback angle in degrees without movement of the lift arm.

Maximum Rollback (O) - Fully Raised - The angle in degrees from the bucket cutting edge level position to the maximum rollback position.

Digging Depth (P) - The vertical distance in inches (millimeters) from the ground to the bottom of the bucket cutting edge at the lowest position with the bucket cutting edge horizontal.

Loader Clearance Circle (Q) - Front No Attachment - The smallest diameter measured in inches (millimeters) that the outermost front point on the machine will describe measured from a point located at 1/2 the wheelbase (H) and 1/2 the overall width (G) of the machine.

Loader Clearance Circle (R) - Front with Standard Attachment - The smallest diameter measured in inches (millimeters) that the outermost front point on the machine will describe measured from a point located at 1/2 the wheelbase (H) and 1/2 the overall width (G) of the machine.

Loader Clearance Circle (S) - Rear - The smallest diameter measured in inches (millimeters) that the outermost rear point on the machine will describe measured from a point located at 1/2 the wheelbase (H) and 1/2 the overall width (G) of the machine.

Tread or Track Gauge (T) - The transverse distance in inches (millimeters) between the centerlines of the tires or sprockets. If the front and rear are different, both must be specified.

Angle of Departure (U) - The angle in degrees taken from a line drawn from the lowest and rear most portion of the rear overhang to the rear bottom face of the rear tire to the ground.

8.2. OPERATIONAL SPECIFICATION (PER SAE J732 FEB 80)

8.2.1. Performance

Item		Unit	Spec.			
			430	430 Plus	450	450 Plus
• Rated Capacity		lb(kg)	1300 (590)	1450 (658)	1700 (771)	1950 (885)
• Bucket Capacity (Dirt-60")		ft ³ (m ³)	10.5 (0.30)	←	13.0 (0.37)	←
• Operating Weight		lb(kg)	5604 (2542)	5703 (2587)	6885 (3123)	6911 (3135)
• Tipping Load		lb(kg)	2866 (1300)	3009 (1365)	3616 (1640)	4122 (1870)
• Hydraulic Lifting Capacity		lb(kg)	3373 (1530)	←	5732 (2600)	←
• Break Out Force	-Bucket	lb(kg)	3139 (1424)	←	4678 (2122)	←
	-Boom	lb(kg)	2890 (1310)	←	4656 (2112)	←
• Raising Time	-W/O Load	sec	4.2	←	3.6	←
	-W/ Load	sec	4.4	←	3.6	←
• Lower Time	-W/O Load	sec	3.0	←	3.5	←
	-W/ Load	sec	2.7	←	3.1	←
• Dump Time	-W/O Load	sec	3.0	←	2.6	←
	-W/ Load	sec	2.8	←	2.5	←
• Rollback Time	-W/O Load	sec	2.6	←	2.1	←
	-W/ Load	sec	2.9	←	2.5	←
• Drawbar Pull	-W/O Load	lb(kg)	3748 (1700)	←	4698 (2131)	5848 (2653)
	-W/ Load	lb(kg)	4299 (1950)	←	5849 (2653)	5765 (2615)
• Travel Speed	• Forward	mph(km.h)	7.5 (12.1)	←	7.4 (12.3)	←
	• Reverse	mph(km/h)	7.5 (12.1)	←	7.4 (12.3)	←

8.2.2. Power Unit

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
- Make	-	Cummins	Cummins
- Model	-	A2000	B3.3NA
- Type of Fuel	-	Diesel	Diesel
- Cooling Method	-	Water	Water
- No. of Cylinders	ea.	4	4
- Displacement	in ³ (cc)	122.0 (2000)	198.9 (3260)
- Bore Size	in(mm)	3.31 (84)	3.74 (95)
- Stroke	in(mm)	4.0(94.0)	7.0 (115)
- Horsepower Net	hp(ps)/rpm	45 (45.6)/2800	65/2600
- High Idle	rpm	2950±50	2800±50
- Low Idle	rpm	970±30	970±30
- Torque	ft.lb(kg.m)/rpm	101.3 (14.0)/1600	157.7 (21.8)/1600
		19.7	20
- Torque Rise	%	Full Flow	Full Flow
- Lubrication	-		

8.2.3. Final Drive Components

Item	Unit	Spec.			
		430	430 (Plus)	450	450 (Plus)
- Chain	-	2 Chain with RS80HT & RS80HT	2 Chain with RS80HT & RS80HT	2 Chain with RS100HT & RS100HT	← ←
- No. of Teeth	ea.	11	11	10	←
• Drive Sprocket (Motor)	ea.	32	32	28	←
• Drive Sprocket (Axle)		2.91	2.91	2.8	←
- Ratio					
- Tire					
- Type	-	Flotation Tubeless	←	Flotation Tubeless	←
- Size	-	10-16.5, 6PR	←	12-16.5, 8PR	←
- Pressure	psi (kg/cm ²)	46 (3.25)	← ←	50 (3.5)	← ←
- Wheel					
- Size	-	8.25 x 16.5	←	9.75 x 16.5	←
- Hole x Pitch Circle Diameter	-	8 x 8"	←	8 x 8"	←

8.2.4. Hydrostatic Transmission Pump

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
- Type - Max. Displacement - Relief Setting Pressure - Internal Charge Pump - Rotation - Swash Plate Operating Angle - Mounting - Shaft	- - in³(cc)/rev - bar(psi) - - - deg - -	- Piston, Variable Displacement (Manual) 2.14(35) 230(3336) - None - Clockwise ±16 - SAE 2 Bolt B Mount - ANSI B92.1-1970 - Class No.5 30×15×16/32	- Piston, Variable Displacement (Manual) 2.68(44) 250(3555) - None - Clockwise ±16 - SAE 2 Bolt B Mount - ANSI B92.1-1970 - Class No.5 30×15×16/32
- Standard Pump Pressure and Flow - Flow (Max) - Relief Pressure (max.) at Charging Pump	- LPM(GPM) - psi- (bar)	44.9 (11.9) 2540±35 (175±2.4bar)	82.0 (21.7) 3000±35 (207±2.4bar)
- High Flow Option Pump Pressure and Flow - Flow - Relief Pressure (max.) at Charging Pump	- LPM(GPM) - psi-	101 (26.7) 2540±35 (175±2.4bar)	122.3 (32.3) 3000±35 (207±2.4bar)

8.2.5. Hydraulic System

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
- Motor			
- Type	-	Orbit, Fixed, Displacement Bi-rotational	Orbit, Fixed, Displacement Bi-rotational
- Displacement	in ³ (cc)/rev	25.07 (410.8)	32.04 (523.6)
- Mounting	-	SAE 4 Bolt B Mount Spline Shaft	SAE 4 Bolt B Mount Spline Shaft
- Pump			
- Type	-	Gear	Gear
- Capacity	in ³ (cc)/rev	0.98(16.0)	1.92(31.5)
- Max. Pressure	psi	230(3,335)	230(3,335)
- Max. Speed	rpm	3,250	3,000
- Mounting	-	SAE 2 Bolt A Mount	SAE 2 Bolt A Mount
- Shaft	-	SAE Spline Shaft	SAE Spline Shaft
- Rotation	-	Clockwise	Clockwise
- Control Valve			
- No. of Spool	-	3 2,392 (+70)	2,840 (+70)
- Relief Setting Pressure (set by valve supplier)	psi	(165(+5) bar)	(195(+5) bar)
- Circuit	-	- Series on Lift Float Function with Detent - Series on Tilt - Series on Auxiliary With Detent	- Series on Auxiliary With Electric Detent (thumb control)

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
- Boom Cylinder			
- Type	-	Single Rod, Double Acting	←
- Number	ea.	2	←
- Cylinder Bore	in(mm)	1.97 (50)	2.36 (50)
- Cylinder Rod	in(mm)	1.38 (35)	1.50 (38)
- Stroke	in(mm)	31.0 (788)	33.5 (850)
- Mounting	-	- Single Crest Crevice	←
- Plating on Rod	-	- Hard Chrome with15-50 Micron Thickness	←
- Bucket Cylinder			
- Type	-	Single Rod, Double Acting	←
- Number	each	2	←
- Cylinder Bore	in(mm)	2.48 (63)	2.48 (63.0)
- Cylinder Rod	in(mm)	1.10 (30)	1.5 (38.0)
- Stoke	in(mm)	14.29 (363)	20.0 (507)
- Mounting	-	- Single Crest Crevice	←
- Plating on Rod	-	- Hard Chrome with15-50Micron Thickness HRC 52-60 Hardness	←

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
• Hydraulic Filter			
• Type	-	Full Flow Spin-On	←
• Filter Rating	-	13 Micron Beta Rating of 20	←
• Rated Flow	l(gal)/min	132.5 (35)	←
• By-Pass Valve		Closing PR50 PSID (Normally Open Type)	←
• Hydraulic Lines and Fittings			
• Type	-	O-Ring Face Seal Fitting (SAE J1453)	←
• Thread	-	Unified Thread is Standard	←
• Medium Pressure Line	-	SAE 100R1 Hose (SAE J517)	←
• Hydraulic High Pressure Line	-	SAE 100R2 Hose (SAE J517)	←
• HST High Pressure Line	-	SAE 100R2 Hose (Parker 381-10)	←

8.2.6. Electrical Components

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
- Alternator	-	12V - 45A	12V - 60A
- Battery	-	12V-100AH, 750CCA	12V-100AH, 850CCA
- Starter	-	12V - 2.0kW	12V - 2.2kW
- Lighting			
- Head Lamps	ea.	2	←
- Rear Lamps	ea.	1	←

8.2.7. Instrument Features

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
- Instrument Panel (A) • Buzzer Alarm • Stop (Red) Warning (Yellow) Warning • Engine Oil Pressure • Engine Water Temperature • Battery Voltage • HST Charge Pressure • HST Oil Temperature • HST Filter		Standard	Standard
- Instrument Panel (B) • Fuel Meter • Hour Meter • Park Brake Monitor • Pre-Heater Monitor		Standard	Standard
- Key Switch			
- Light Switch			
- Fuses			

8.2.8. Seat

Item	Unit	Spec.	
		430 (Plus)	450 (Plus)
- Cover Material	-	Vinyl, Black	←
- Cushion Material	-	Urethane Foam	←
- Fore/Aft Adjustment	in(mm)	±3 (76)	←
- Density			
• Cushion	lb/ft³(kg/m³)	833 (52)	←
• Backrest	lb/ft³(kg/m³)	609 (38)	←

8.2.9. Noise [With Noise Package]

Model	Noise Level [Unit : dB(A)]	
	Sound Pressure Level at Operator Ear (86/662/EEC)	Guaranteed Sound Power(L _{WA}) measured by Directive 2000/14/EC
430 (Plus)	84	104
450 (Plus)	84	103

8.2.10. Fluid Capacities & Specifications

Item	Specifications	Unit	Q'ty	
			430 (Plus)	450 (Plus)
- Engine Lubrication - w/filter - w/o filter	API CH SAE 10W30 for Ambient Temp above -4 deg. F	gal(liter)	1.7 (6.5)	2.0 (7.5)
	API CH SAE 5W30 for Ambient Temp below -4 deg. F	gal(liter)	1.6 (6.1)	1.8 (7.0)
Hydraulic Tank	Total Transmission MP (UTTO), Mobil Fluid 423	gal(liter)	6.1 (23)	13.2 (50)
Chain Case Oil	DEXTON III	gal(liter)	3.4 (13)	3.7 (14)
Fuel Tank, Max	#2 Diesel recommended for Ambient Temp above 40 deg. F	gal(liter)	13.8 (52.4)	18.5 (70)
	#1 Diesel recommended for Ambient Temp above 40 deg. F			
Cooling Fluid	Recommended mixture is 50/50 ethylene glycol and water	gal(liter)	2.3 (8.8)	1.2 (4.5)
Grease	Recommended is mineral based grease with lithium thicker and rust, corrosion and extreme pressure additives. Viscosity conforms to NLGI grade 2.			

ENVIRONMENT PROTECTION SECTION

When servicing this lift truck, use an authorized servicing area and an approved container to collect coolant, oil, fuel, grease, electrolyte and any other potential environmental pollutant before any lines, fittings or related items are disconnected or removed. After servicing, dispose of those materials in an authorized place and container. When cleaning the lift truck, be sure to use an authorized area.