



Operation & Maintenance Manual

DL Hydraulic Quick Coupler

DOOSAN and the *DOOSAN* logo are registered trademarks of *DOOSAN* Corporation in the United States and various other countries around the world.



950106-01123EN

January 2020

Foreword

This Operation & Maintenance Manual was written to give owner or operator instructions on safe operation and maintenance of the *DOOSAN* attachment. **READ AND UNDERSTAND THIS OPERATION & MAINTENANCE MANUAL BEFORE OPERATING YOUR *DOOSAN* ATTACHMENT.** Keep this manual in the cab so it is always available. If it is lost, order another one from your *DOOSAN* distributor.

If there are any questions, contact your *DOOSAN* distributor. This manual may illustrate options and accessories not installed on your attachment.

Any modification made without written authorization or approval from *DOOSAN* can create a safety hazard.

Always replace parts with genuine *DOOSAN* parts or *DOOSAN* authorized replacement parts.

Intended Use

The attachment is intended to be used under normal conditions for applications described in this manual. If it is used for other purposes, or in potentially hazardous environments, special precautions must be followed and the attachment must be equipped for such use. Examples include, but are not limited to, are: falling object guards, work lights, etc. Do not engage in prohibited uses as described in this manual. Contact your *DOOSAN* distributor for further information.

Attachment Maintenance

Proper inspection, maintenance and repair is essential to keeping the attachment properly operating.

As the attachment owner, you are responsible for performing required maintenance. The required maintenance procedures are outlined in this Operation & Maintenance Manual, or Shop Manual.

Product Identification Number (PIN)

A PIN number (Figure 1) is located above the lower pivot pin on the outer right side plate on the quick coupler.

Please make note of this number and location. This will be required whenever warranty or service work is requested. Keep this number on file, in case the attachment is stolen.

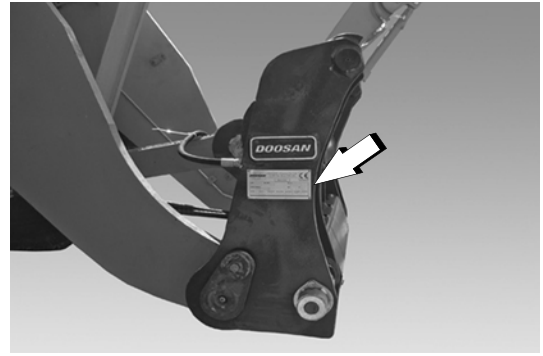


Figure 1

Table of Contents

Safety	1-1
To the Operator of a Wheel Loader Hydraulic Quick Coupler	1-1
Identification and Machine Signs (Decals)	1-3
Unauthorized Modifications	1-5
General Hazard Information	1-5
Before Starting Engine	1-10
Machine Operation	1-11
Maintenance	1-13
 Operating Controls	 2-1
Pilot Control Valve	2-2
Hydraulic Quick Coupler Switch	2-3
 Operation	 3-1
Handling The Hydraulic Quick Coupler	3-1
Approved Models and Requirements	3-3
Entering and Exiting Wheel Loader	3-5
Installing Attachment	3-8
Travel	3-13
Removing Attachment	3-14
 Inspection, Maintenance and Adjustment	 4-1
Preventive Maintenance	4-1
Preliminary Setup for Maintenance	4-3
Table of Recommended Lubricants	4-4
Maintenance Intervals	4-5
Initial Installation	4-6
10 Hour / Daily Service	4-8

50 Hour / Weekly Service	4-9
100 Hour Service	4-11
250 Hour / Monthly Service.....	4-12
Transportation	5-1
Transporting	5-1
Troubleshooting	6-1
Hydraulic Quick Coupler	6-1
Specification	7-1
Hydraulic Schematic	7-1
Electrical Schematic.....	7-2
Hydraulic Quick Coupler Specifications	7-3
Hydraulic Quick Coupler Overall Dimensions	7-4
Standard Torques	7-5
Pallet Forks	8-1
Approved Models and Requirements.....	8-1
Installing Attachment.....	8-3
Operation	8-3
Travel	8-5
Removing Attachment.....	8-5
Specification	8-6
Pallet Fork Overall Dimensions.....	8-6
Index	9-1

TO THE OPERATOR OF A WHEEL LOADER HYDRAULIC QUICK COUPLER



WARNING

Improper use of the attachment could cause serious injury or death. Before operating the attachment, or performing maintenance, the operator or technician must read and understand entire Operation & Maintenance Manual.

Any operation, maintenance, travelling or shipping methods that do not follow safety guidelines printed in this Manual could cause serious injury or death.

Make sure to read and understand the hydraulic quick coupler's Operation & Maintenance Manual.

Please respect the importance of taking responsibility for your own safety and that of other people who may be affected by your actions.

The safety information on the following pages is organized into the following sections:

1. "Identification and Machine Signs (Decals)" on page 1-3
2. "Unauthorized Modifications" on page 1-5
3. "General Hazard Information" on page 1-5
4. "Before Starting Engine" on page 1-10
5. "Machine Operation" on page 1-11
6. "Maintenance" on page 1-13



SAFETY ALERT SYMBOL



Be Prepared - Get to Know All Operating and Safety Instructions

This is the Safety Alert Symbol. Wherever it appears - in this manual or on safety signs on the attachment or machine - you must be alert to potential for personal injury or accidents. Always observe safety precautions and follow recommended procedures.

Learn Signal Words Used With Safety Alert Symbol

The words **"IMPORTANT"**, **"CAUTION"**, **"WARNING"** and **"DANGER"** used throughout this manual and on decals on the attachment indicate degree of risk of hazards or unsafe practices. All three degrees of risk indicate that safety is involved. Observe precautions indicated whenever you see the Safety Alert "Triangle", no matter which signal word appears next to the "Exclamation Point" symbol.

IMPORTANT

This notice identifies procedures which must be followed to avoid damage to the machine.



CAUTION

The signal word **CAUTION** on the machine and in the manuals indicates a hazardous situation which, if not avoided may result in minor or moderate injury.



WARNING

The signal word **WARNING** on the machine and in the manuals indicates a potentially hazardous situation which, if not avoided could result in death or serious injury.



DANGER

The signal word **DANGER** on the machine and in the manuals indicates a hazardous situation which, if not avoided will result in death or serious injury.

IDENTIFICATION AND MACHINE SIGNS (DECALS)

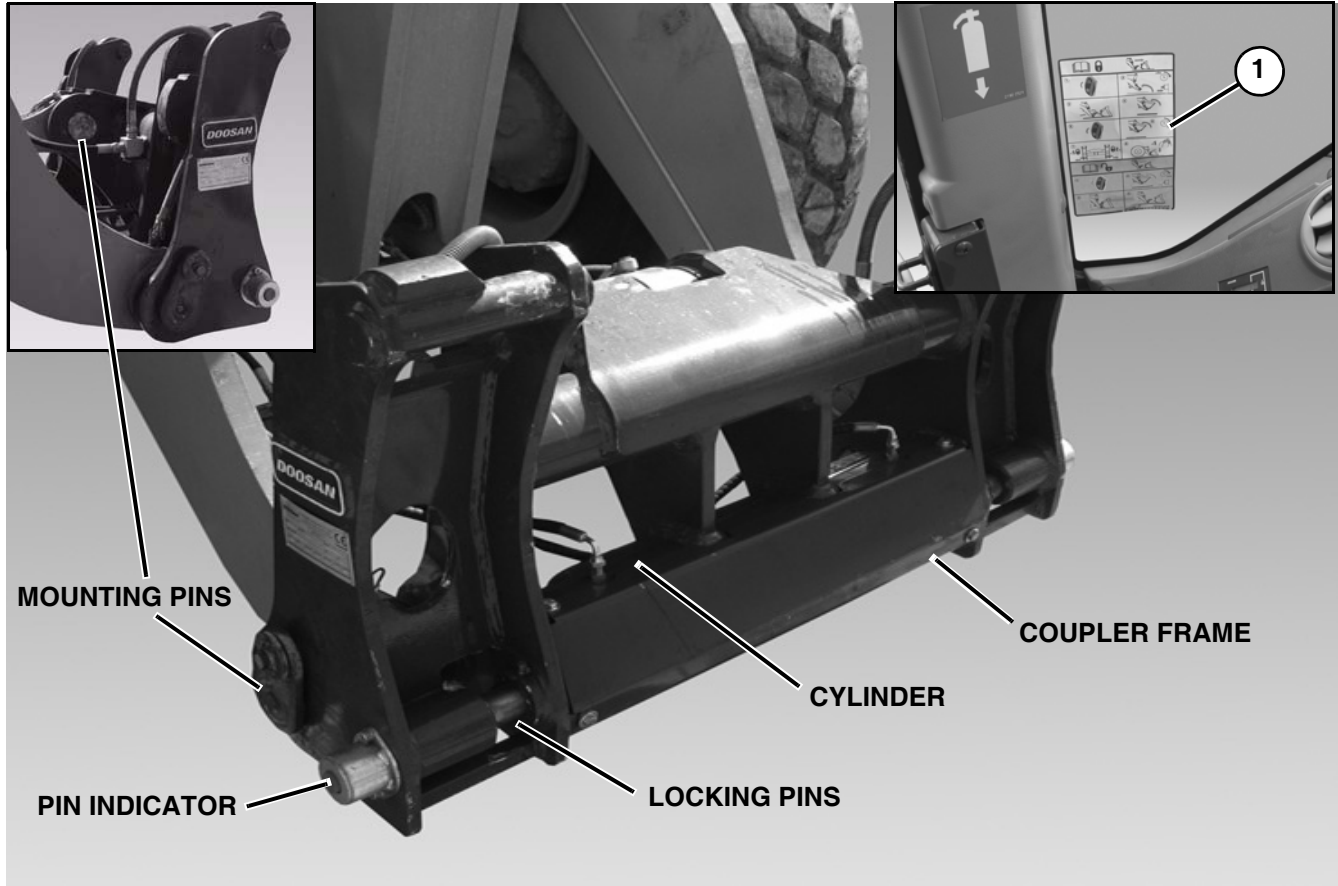


Figure 1

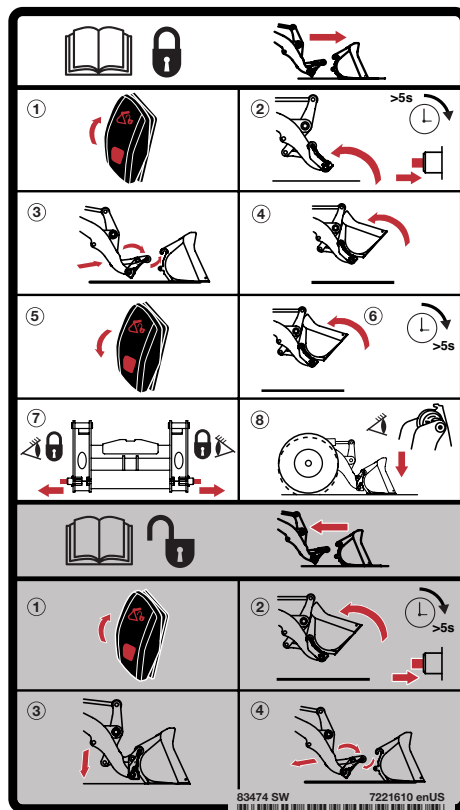
There are machine signs included with this attachment. The location of the machine signs and descriptions are reviewed in this section.

Please become familiarized with all machine signs.

Make sure that all the machine signs are legible. Clean the machine signs or replace the machine signs if you cannot read the words. When you clean the machine signs, use a cloth, water and soap. Do not use solvent, petrol, or other harsh chemicals to clean the machine signs. Solvents, petrol, or other harsh chemicals could loosen the adhesive that secures the machine sign. Loose adhesive will allow the machine sign to come off.

Replace any machine sign that is damaged, or missing. If a machine sign is attached to a part that is replaced, install a replacement machine sign on the replacement part.

1. Attachment Operation (7221335)



UNAUTHORIZED MODIFICATIONS

Any modification made without authorization or written approval from *DOOSAN* can create a safety hazard, for which the owner will be held responsible.

Replace all OEM parts with the correct authorized or genuine *DOOSAN* part. Contact your *DOOSAN* distributor for repair or replacement parts.

GENERAL HAZARD INFORMATION

Safety Rules

Only trained and authorized personnel can operate and maintain the attachment.

Follow all safety rules, precautions and instructions when operating or performing maintenance on the attachment.

Do not operate the machine and attachment if you are not feeling well, have consumed drugs or alcohol, or if you are suffering from emotional problems. These will interfere with your sense of judgment and impair alertness and coordination. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine and attachment.

When working with another operator or with a person on work site traffic duty, be sure that all personnel know the nature of the work and understand all hand signals that are to be used.

Always observe strictly any other rules related to safety.

Safety Features

Be sure that all guards and covers are installed in their proper position. Have guards and covers repaired immediately if damaged.

Never remove any safety features. Always keep safety features in good operating condition.

Failure to use safety features according to the instructions in the Operation & Maintenance Manual could result in serious bodily injury.

Clothing and Personal Protective Items

Secure long hair, and avoid loose clothing and jewelry. These items have the tendency to catch on controls or protrude into parts and cause serious injury or death.

Do not wear oily clothes. They are highly flammable.

Full eye protection, a hard hat, safety shoes and gloves may be required at the work site.

While working on the machine or attachment, never use inadequate tools. They could break or slip, causing injury, or they may not adequately perform intended functions.

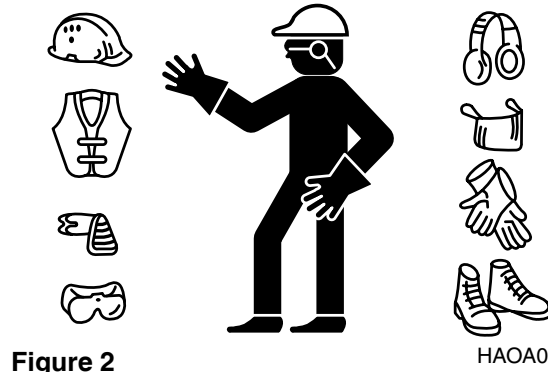


Figure 2

Breathing Masks, Ear Protection May Be Required

Do not forget that some risks to your health may not be immediately apparent. Exhaust gases and noise pollution may not be visible, but these hazards can cause disabling or permanent injuries.

Fuel, Oil and Hydraulic Fluid Fire Hazards

Fuel, oil and antifreeze will catch fire if it is brought close to a flame. Fuel is particularly flammable and can be hazardous.

Always strictly observe the following:

- Add fuel, oil, antifreeze and hydraulic fluid to the machine only in a well ventilated area. The machine must be parked with controls, lights and switches turned "OFF". The engine must be "OFF" and any flames, glowing embers, auxiliary heating units or spark causing equipment must be extinguished, turned "OFF" and / or kept well clear of the machine.
- Static electricity can produce dangerous sparks at the fuel filling nozzle. Very cold, dry weather or other conditions could produce a static discharge. Keep the tip of the fuel nozzle in constant contact with the neck of the fuel filling nozzle, to provide a ground.
- Keep fuel and other fluid reservoir caps tight and do not start the engine until caps have been secured.



Figure 3

Precautions When Handling Fluids at High Temperature

Immediately after operations are stopped, the coolant, engine oil, and hydraulic fluid are at highest temperatures and the radiator and hydraulic tank are still under pressure. Attempting to remove cap, drain the oil or coolant, 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 these operations.

To prevent hot coolant from being expelled out, shut down engine, wait for the coolant to cool, then loosen the cap slowly to relieve the pressure.

To prevent hot oil from being expelled out, shut down engine, wait for the oil to cool, then loosen the cap slowly to relieve the pressure.

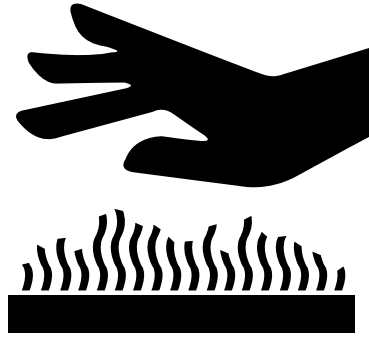


Figure 4

HAOA0



Figure 5

HAOA0

Avoid Silica Dust

Cutting or drilling concrete containing sand or rock containing quartz may result in exposure to silica dust. Do not exceed Permissible Exposure Limits (PEL) to silica dust as determined by OSHA or other job site Rules and Regulations. Use a respirator, water spray or other means to control dust. Silica dust can cause lung disease and is known to the state of California to cause cancer.



Figure 6

ARO17

Fire Extinguisher and First Aid Kit

As a precaution if any injury or fire should occur, always do the following.

- Be sure that fire extinguishers have been provided and read the labels to ensure that you know how to use them. It is recommended that an appropriately sized (2.27 kg [5 lb] or larger) multipurpose "A/B/C" fire extinguisher be mounted in the cab. Check and service the fire extinguisher at regular intervals and make sure that all work site crew members are adequately trained in its use.
- Provide a first aid kit in the storage compartment and keep another at the work site. Check the kit periodically and make any additions if necessary.
- Know what to do in case of injury from fire.

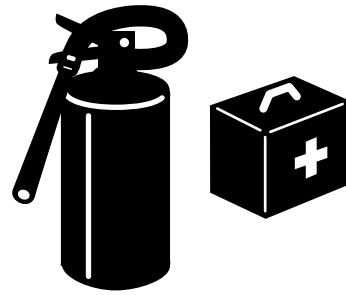


Figure 7

HDO100

Protection from Falling or Flying Objects

On work sites there is a danger that falling or flying objects may hit the operator's cab. Select a guard to match the operating conditions to protect the operator.

Working in mines, tunnels, deep pits or on loose or wet surfaces could produce danger of falling rocks, roll over or hazardous flying objects. Additional protection for operator's cab could be required in the form of a Falling Object Protective Structure (FOPS) and / or Roll Over Protective Structure (ROPS) reinforcement system.

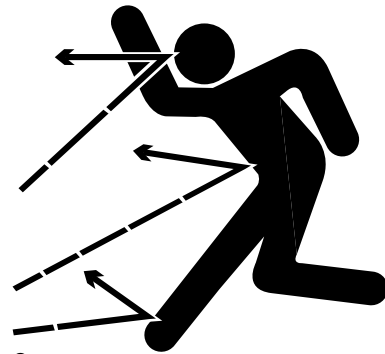


Figure 8

HAOA1

Never attempt to alter or modify any protective structure reinforcement system, by drilling holes, welding, remounting or relocating fasteners. Any serious impact or damage to the system requires a complete integrity reevaluation. Reinstallation, recertification and / or replacement of the system may be necessary.

Contact your *DOOSAN* distributor for available safety guards and / or recommendations to prevent danger of getting hit by objects that could strike the operator's cab. Make sure that all other work site crew members are kept well away from the wheel loader and safe from possible hazards.

If any glass on the machine is broken, replace it with new glass immediately.



Figure 9

HAOA1

Indoor Ventilation

Engine exhaust gases can cause fatal accidents, and unconsciousness, loss of alertness, judgment and motor control and serious injury.

Make sure there is adequate ventilation before starting the engine in any enclosed area.

You should also be aware of open windows, doors or ductwork where exhaust may be carried, or blown by the wind, exposing others to danger.



Figure 10

ARO17

BEFORE STARTING ENGINE

Work Site Precautions

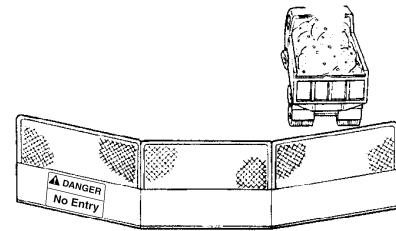
Before starting operations, thoroughly check the area for any unusual conditions that could be dangerous.

Check the terrain and condition of the ground at the work site, and determine the best and safest method of operation.

Make sure the ground surface is as hard and horizontal as possible before carrying out operations. If there is a lot of dust and sand on the work site, spray water before starting operations.

Erect fences, post "No Entry" signs, and take other steps to prevent people from coming close to or entering the work site. If people come close to a moving machine, they may be hit or caught by the machine or attachment, and this may lead to serious personal injury or death.

Waterlines, gas lines, phone lines and high-voltage electrical lines may be buried under the work site. Contact each utility and identify their locations. Be careful not to damage or cut any of these lines.



ARO1251L

Figure 11



WARNING

AVOID DEATH OR SERIOUS INJURY

Check work site for overhead or underground lines such as electrical, gas, oil, water, etc. Consult local utilities before working. Extreme caution must be used in areas where utility lines are present.

Any object in vicinity of boom could represent a potential hazard, or cause the operator to react suddenly and cause an accident. Use a spotter or signal person when working near bridges, phone lines, work site scaffolds, or other obstructions.

Avoid entering soft ground. It will be difficult for the machine to escape.

Avoid operating your machine too close to the edge of cliffs, overhangs, and deep ditches. The ground may be weak in such areas. If the ground collapses, the machine could fall or tip over resulting in serious injury or death.

Remember that soil after heavy rain, blasting or after earthquakes, is weakened.

Newly laid earth and the soil near ditches is typically loose. It can collapse under the weight or vibration of your machine and cause your machine to tip over.

Install the safety guard if working in areas where there is a danger of falling rocks.

MACHINE OPERATION

Digging Beneath Overhangs

Digging beneath an overhang is dangerous. Overhang could collapse on top of operator and cause serious injury or death. Go on to another digging area before steep overhangs are formed. Know height and reach limits of wheel loader and plan while working. Park wheel loader away from overhangs before work shut down.

Digging Beneath Wheel Loader

Digging beneath wheel loader is dangerous. Earth beneath could collapse. This could cause wheel loader to tip, which could cause serious injury or death to operator. Working around deep pits, trenching or along high walls may require support blocks, especially after heavy rainfalls or during spring thaws.

Stay Alert for People Moving Through Work Area

When loading a truck you should always know where the driver is.

Avoid loading over the cab of a truck even if the driver is in a safe spot. Someone else could have gone inside, for any number of reasons. Avoid working where unseen passersby might be.

Slow down work cycle and use slower travel speeds in congested or populated areas. Use a commonly understood signal so other members of work crew can warn operator to slow or halt work in a potentially hazardous situation.



Figure 12

HAOA1

Never Let Anyone Ride on Attachment

Never let anyone ride on any work attachment, such as the bucket, crusher, grapple, or clamshell (grab bucket). There is a danger of the person falling and suffering serious injury.

WRONG



Figure 13

HAAD4I

Precautions for Operation

Use the machine only for its main purpose. Using it for other purposes will cause failures.

To ensure a good view, always do the following:

- When working in dark areas, attach working lights and front lights to the machine. If necessary, set up lighting at the work site.
- Stop operations when the visibility is poor. Wait for the visibility to improve to a level which causes no problems for the operation.

To avoid hitting the work equipment, always do the following:

- When working in tunnels, on bridges, under electrical wires, or when parking the machine or carrying out other operations in places with limited height, be careful not to hit the attachment or other parts.
- To prevent collisions, operate the machine at a safe speed when working in confined spaces, indoors, or in crowded areas.
- Do not pass the attachment over the heads of workers.

Avoid High-voltage Cables

Serious injury or death can result from contact or proximity to high-voltage electrical lines. The attachment does not have to make physical contact with power lines for current to be transmitted.

Use a spotter and hand signals to stay away from power lines not clearly visible to the operator.

Voltage	Minimum Safe Distance
6.6 kV	3 m (9' 10")
33.0 kV	4 m (13' 1")
66.0 kV	5 m (16' 5")
154.0 kV	8 m (26' 3")
275.0 kV	10 m (32' 10")

Use these minimum distances as a guideline only. Depending upon the voltage in the line and atmospheric conditions, strong current shocks can occur with the boom or bucket / attachment as faraway as 3 - 10 m (9.8 - 32.8 ft.) from the power line. Very high voltage and rainy weather could further decrease that safety margin.

NOTE: *Before starting any operation near power lines (either above ground or buried cable type), you should always contact the power utility company directly and work out a safety plan with them.*

WRONG

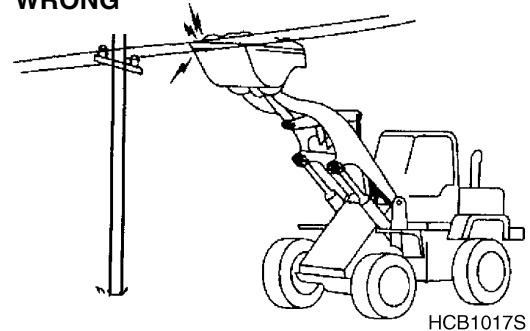


Figure 14

MAINTENANCE

Warning Tag

Alert others that service or maintenance is being performed and tag operator's cab controls – and other machine areas if required – with a warning notice.

Warning tags for controls are available from *DOOSAN* distributors.



FG012195

Figure 15

Clean Before Inspection or Maintenance

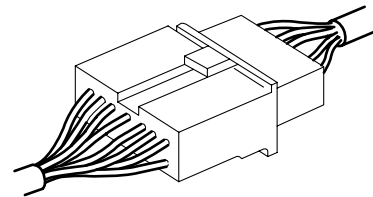
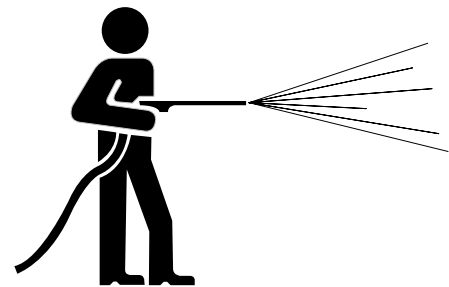
Clean the machine / attachment before carrying out inspection and maintenance. This prevents dirt from getting into the machine / attachment and ensures safety during maintenance.

If inspection and maintenance are carried out when the machine / attachment is dirty, it will become more difficult to locate the problems, and there is a danger that you may get dirt or mud in your eyes or that you may slip and injure yourself.

When washing the machine / attachment, do the following:

- Wear shoes with nonslip soles to prevent yourself from slipping and falling on wet places.
- Wear safety glasses and protective clothing when washing the machine / attachment with high-pressure water.
- Take action to prevent touching high-pressure water and cutting your skin or having mud fly into your eyes.
- Do not spray water directly on electrical components (sensors, connector). Excessive moisture can damage the electrical system.

Pick up any tools or hammers that are laying in the workplace, wipe up any grease or oil or any other slippery substances, and clean the area to make it possible to carry out the operation safely. If the workplace is left untidy, you may trip or slip and suffer injury.



ARO1330L

Figure 16

Proper Tools

Use only tools suited to the task. Using damaged, low quality, faulty, or makeshift tools could cause personal injury.



WARNING

AVOID DEATH OR SERIOUS INJURY

Wear safety glasses to prevent eye injury when any of the following conditions exist:

- When fluids are under pressure.
 - Flying debris or loose material is present.
 - Engine is running.
 - Tools are being used.
-



Figure 17

HDO100

Fire Prevention and Explosion Prevention

All fuels, most lubricants and some coolant mixtures are flammable. Leaking fuel or fuel that is spilled onto hot surfaces or onto electrical components can cause a fire.

Store all fuels and all lubricants in properly marked containers and away from all unauthorized persons.

Store oily rags and other flammable material in a protective container.

Do not smoke while you refuel the machine or while you are in a refueling area.

Do not smoke in battery charging areas or in areas that contain flammable material.

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

Remove all flammable materials before they accumulate on the machine.

Do not weld on pipes or on tubes that contain flammable fluids. Do not flame cut on pipes or on tubes that contain flammable fluids. Before you weld on pipes or on tubes or before you flame cut on pipes or on tubes, clean the pipes or tubes thoroughly with a nonflammable solvent.



Figure 18

HDO1015I

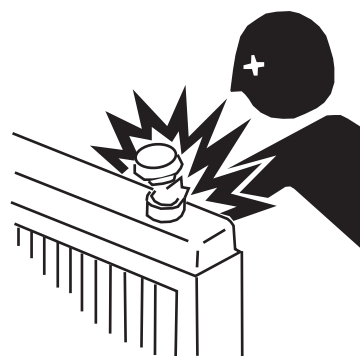
Burn Prevention

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

Remove hydraulic tank filter plug only after the engine has been stopped. Make sure that hydraulic tank filter plug is cool before you remove it with your bare hand. Remove hydraulic tank filter plug slowly to relieve pressure.

Relieve all pressure in the hydraulic fluid system before you disconnect any lines, fittings, or related items.

Always wear protective glasses when working with hydraulics.



HAAE1980

Figure 19

Welding Repairs

IMPORTANT

Disconnect all cables from the battery, and disconnect the wires from the alternator before you start any welding.

When carrying out welding repairs, carry out the welding in a properly equipped place. The welding should be performed by a qualified worker.

The qualified welder must do the following:

- To prevent explosion of the battery, disconnect the battery terminals and remove batteries.
- To prevent generation of gas, remove paint from the location of the weld.
- If hydraulic equipment, piping or areas close to them are heated, a flammable gas or mist will be generated causing a fire hazard. To avoid this, never subject these areas to heat.
- Do not weld or flame cut on pipes or tubes that contain flammable fluids. Before you weld or flame cut on pipes or tubes, clean the pipes or tubes thoroughly with a nonflammable solvent.
- If heat is applied directly to rubber hoses or piping under pressure, they may suddenly break, so cover them with a fireproof covering.
- Wear protective clothing.
- Make sure there is good ventilation.
- Remove all flammable objects and provide a fire extinguisher.

Precautions for Removal, Installation, and Storage of Attachments

Before starting removal and installation of attachments, decide on the team leader.

Do not allow anyone except the authorized workers close to the machine or attachment.

Place attachments that have been removed from the machine in a safe place so they do not fall. Put up a fence around the attachments and take other measures to prevent unauthorized persons from entering.



Figure 20

HDO10.

Prevention of Crushing and Cutting

You should always have at least two people working together if the engine must be run during service. One person needs to remain in the operator's seat, ready to work the controls or stop the machine and shut off the engine.

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

Stay clear of all rotating parts and moving parts.

Keep objects away from moving fan blades. The fan blades will throw objects and the fan blades can cut objects.

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

To avoid eye injury, always wear protective glasses when working on equipment. Make sure the area is clear of all personnel before striking a retaining pin. The retainer pin may fly out, causing injury to personnel.

Supports and Blocking for Work Equipment

Do not allow weight or equipment loads to remain suspended.

Lower everything to the ground before leaving the operator's seat.

Do not use hollow, cracked or unsteady supports.

Do not work under any equipment supported only by a lifting jack.



WARNING

AVOID DEATH OR SERIOUS INJURY

Securely block up the attachment before working underneath.



Figure 21

HDO104

Action When Abnormality Is Found During Inspection

If any abnormality is found during inspection, always carry out repairs. If the attachment is used before repairs can be made, it may lead to serious injury.

If necessary depending on the type of failure, please contact your *DOOSAN* distributor for repairs.

Precautions with High-pressure Lines, Tubes and Hoses

When inspecting or replacing high-pressure piping or hoses, check to verify that pressure has been released from the circuit. Failure to release the pressure may lead to serious injury. Always do the following:

- Wear protective glasses and leather gloves.
- Hydraulic fluid under pressure can penetrate skin or eyes, causing serious injury or death. Fluid leaks under pressure may not be visible. Always use a piece of wood or cardboard to check for suspected hydraulic leaks. Never use your bare hands.
- Do not bend high-pressure lines. Do not strike high-pressure lines. Do not install lines, tubes or hoses that are bent or damaged.
- Make sure that all clamps, guards and heat shields are installed correctly to prevent vibration, rubbing against other parts, and excessive heat during operation.
- If any of the following conditions are found, replace the part:
 - Damage or leakage from hose end.
 - Wear, damage, cutting of covering, or exposure of strengthening wire layer.
 - Swollen or bulging hoses.
 - Twisting or crushing at movable parts of hose.
 - Foreign material is embedded in the covering.
 - Hose end is deformed.

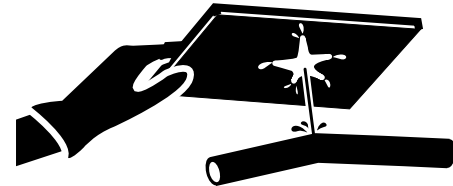
WRONG



WRONG



CORRECT



H D O 1 0 4 5 I

Figure 22

Operating Controls

The "Operating Controls" section presented here consists of the following groups:

1. "Pilot Control Valve" on page 2-2
2. "Hydraulic Quick Coupler Switch" on page 2-3

Each group is explained with a point location drawing or photo and a brief description.

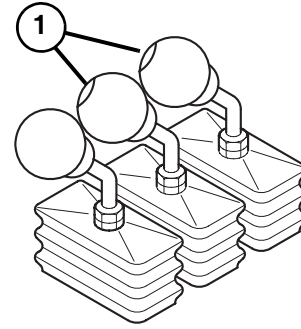
IMPORTANT

Stop the engine if any one or more warning lights on the control console comes ON. Investigate and correct the problem before proceeding with operation.

PILOT CONTROL VALVE

Two / Three Lever (Optional)

The levers (1, Figure 1) control the boom and bucket functions. See the wheel loader Operation & Maintenance Manual for detailed information on lever controls.

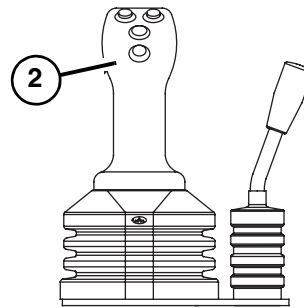


FG003935

Figure 1

Joystick (Optional)

The joystick (2, Figure 2) controls the boom and bucket functions. See the wheel loader Operation & Maintenance Manual for detailed information on joystick controls.



FG003941

Figure 2

HYDRAULIC QUICK COUPLER SWITCH

Location

The switch (1, Figure 3) is located in the head liner

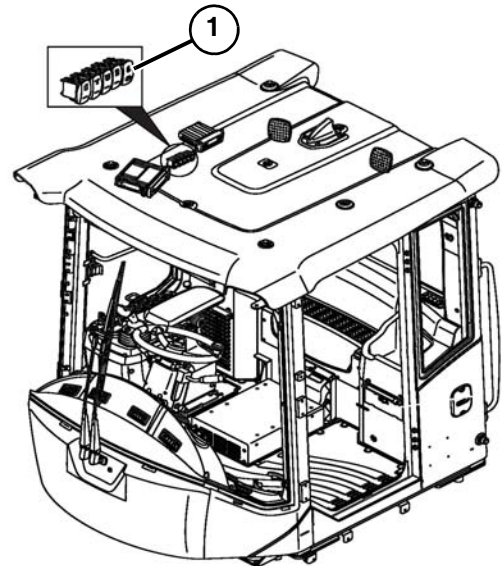


Figure 3

Operation

This switch (Figure 4) is used for securing or releasing the attachment.

- O. In this position, the quick coupler is "LOCKED". The attachment is secured to the quick coupler.
- I. In this position, the quick coupler is "UNLOCKED". The attachment is released from the quick coupler.

NOTE: To move the switch, pull up on the toggle and then move it into the "UNLOCK" position.

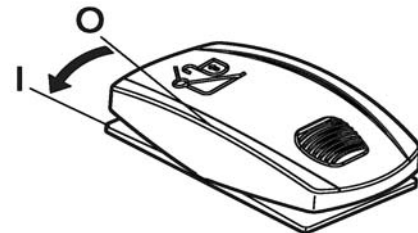


Figure 4



WARNING

AVOID DEATH OR SERIOUS INJURY

DO NOT OPERATE machine and attachment if quick coupler switch is in "I" (UNLOCKED) position. Attachment can come off causing death or serious injury.

Operation

HANDLING THE HYDRAULIC QUICK COUPLER

Daily Inspection

If the hydraulic quick coupler is not properly maintained, it may affect the life-span and operation. Inspect the following items daily:

NOTE: *Prior to daily inspection, remove the attachment to properly inspect the quick coupler.*

1. Check hydraulic lines, cylinder, connections and fittings for hydraulic fluid leaks. Repair or replace damaged parts if necessary.
2. Check that all moving parts are free of debris, stones or any obstacles.
3. Check the hydraulic quick coupler frame (1, Figure 1) and hydraulic quick coupler mounting hardware (2, Figure 1) for broken welds, damaged or excessively worn parts. Repair or replace damaged parts if necessary.
4. Check the lock pins (3, Figure 3) and pin indicators (4, Figure 3). Look for broken welds, damaged or excessively worn parts. Repair or replace damaged parts if necessary.

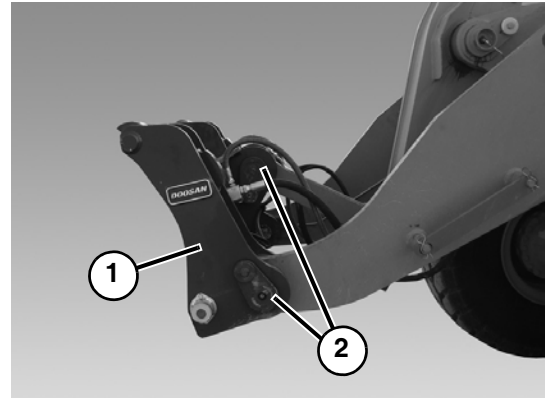


Figure 1

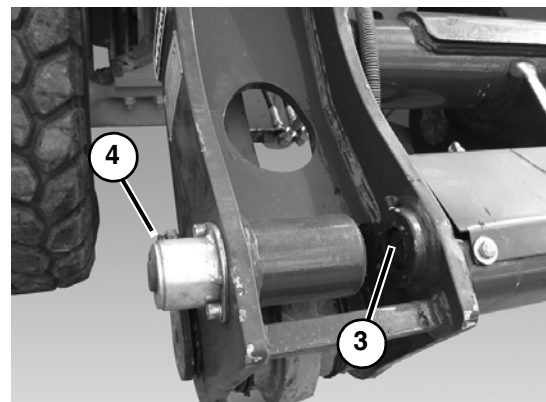


Figure 2

5. Inspect the pivot pins and mounts (1, Figure 3) (on the attachment) for wear or damage. Repair or replace damaged parts if necessary.

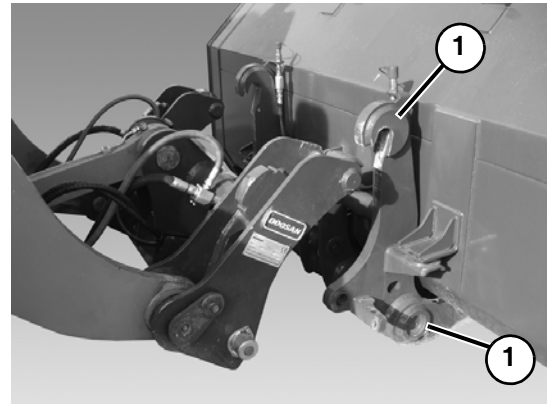


Figure 3

6. Lubricate the fittings (2, Figure 4) (both sides) every 8 working hours or more if required.

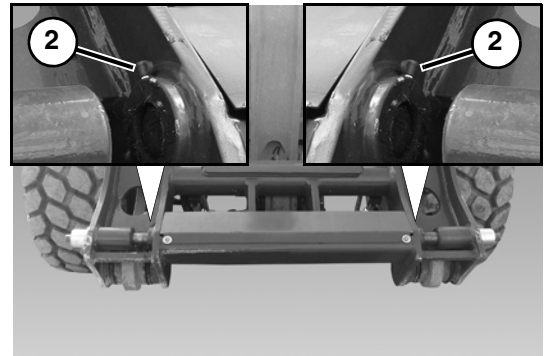


Figure 4

7. The controls must be tested during the start-up procedure to ensure that system is working properly. When turning the starter switch, check that the multifunction display in the gauge panel turns on and the warning buzzer is sounding in the cab. See the machine's Operation & Maintenance Manual for start-up procedure information.

For additional inspection information and service schedule See "Inspection, Maintenance and Adjustment" on page 4-1.

APPROVED MODELS AND REQUIREMENTS

Selecting Hydraulic Quick Coupler

If a hydraulic quick coupler is installed, consider the equipment's stability and suitability for such modification. Contact *DOOSAN* for authorization and approval of attachments and their compatibility.

IMPORTANT

If an attachment is installed without *DOOSAN*'s authorization, it may create a serious malfunction which will not be covered under the wheel loader warranty or the attachment warranty.



WARNING

AVOID DEATH OR SERIOUS INJURY

Never use attachments or buckets which are not approved by *DOOSAN*. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause death or serious injury.

The following machines (listed below) are approved for use with a quick coupler, see your *DOOSAN* distributor for an available hydraulic quick coupler kit for your wheel loader model.

Wheel Loader Model
DL200-3
DL250-3
DL300-3
DL350-3
DL420-3

NOTE: *The lifting capacity of the wheel loader is reduced when the hydraulic quick coupler is installed.*

NOTE: *See the specification section for the weight of the hydraulic quick coupler approved for your wheel loader. This weight must be subtracted from the wheel loaders tipping capacity.*

Additional Requirements

Protective Structures

In a work site where falling objects, roll over or hazardous flying objects may occur, be sure to install safety guards to protect the operator. Contact your *DOOSAN* distributor for kits available for your model wheel loader.

Be sure to install all protective structures required for work site conditions.



WARNING

AVOID DEATH OR SERIOUS INJURY

Some attachment applications can cause flying debris or objects to enter front, top or rear cab openings. Install protective structures required for work site conditions to provide added operator protection in these applications.

Never attempt to alter or modify any protective structure reinforcement system.



WARNING

AVOID DEATH OR SERIOUS INJURY

Never modify or alter protective structure(s) by welding, grinding, drilling holes or adding attachments. Modifying a protective structure can cause loss of operator protection and result in injury or death.

Attachment Precautions

Optional piping / valving and auxiliary control kits are available through your distributor. Because *DOOSAN* cannot anticipate, identify or test all the attachments that owners may wish to install on their machines, please contact your *DOOSAN* distributor for authorization and approval of attachments and their compatibility with optional kits.



WARNING

AVOID DEATH OR SERIOUS INJURY

Never use attachments or buckets which are not approved by *DOOSAN*. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause serious injury or death.

ENTERING AND EXITING WHEEL LOADER

Before getting on or off the machine, if there is any oil, grease, or mud on the handrails or steps, wipe it off immediately. Always keep these parts clean. Repair any damage and tighten any loose bolts.

Entering

Use the grab handles and the safety treads to enter the wheel loader. See Figure 5.

NOTE: *Maintain three-point contact at all times while entering or exiting the wheel loader. Do not jump.*

NOTE: *Fully open the door until it locks in the open position. This will prevent the door from swinging while entering the wheel loader.*



Figure 5

Fasten the seat belt snugly. Adjust the seat belt so the belt is over the operator's hips (1, Figure 6).

Start the engine.

Set transmission neutral lock lever to the "DRIVE" position.

Set pilot cutoff switch to "I" (ON) position.

Set parking brake switch to "O" (OFF) position to release parking brake.

NOTE: *Refer to wheel loader's Operation & Maintenance Manual to correctly operate wheel loader.*

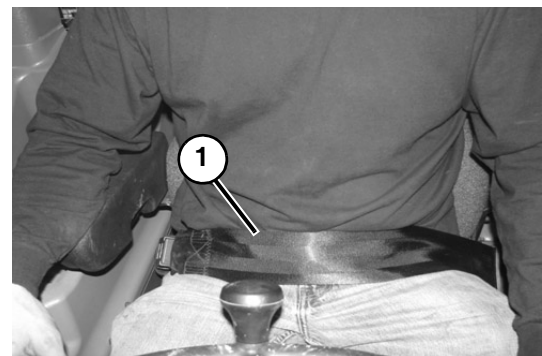


Figure 6



WARNING

AVOID DEATH OR SERIOUS INJURY

When operating the machine:

- Keep the seat belt fastened snugly.
- Keep your feet and arms inside the cab.

Exiting

Place the transmission lever in the neutral position and set transmission neutral lock lever to "NEUTRAL LOCK" position.

Set parking brake switch to "I" (ON) position to apply parking brake.

Fully lower the work equipment to the ground (Figure 7).

Set pilot cutoff switch to "O" (OFF) position.

Stop the engine and remove the key.

NOTE: *Refer to wheel loader's Operation & Maintenance Manual to correctly operate wheel loader.*



Figure 7



WARNING

AVOID DEATH OR SERIOUS INJURY

Before leaving the machine:

- Lower the boom and place attachment on the ground.
- Place the transmission lever in neutral.
- Set pilot cutoff switch to "O" (OFF) position.
- Engage the parking brake.
- Stop the engine and remove the key.

Unlock seat belt (1, Figure 8).

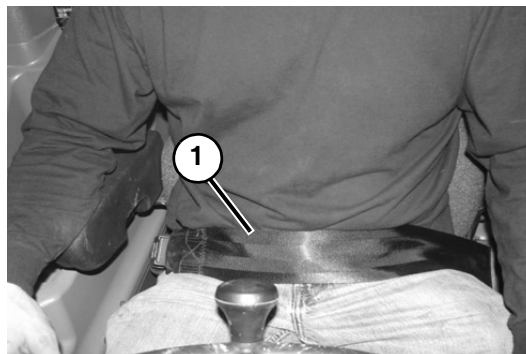


Figure 8

NOTE: *Fully open the door until it locks in the open position. This will prevent the door from swinging while exiting the wheel loader.*

Use the grab handles and the safety treads to exit the wheel loader (Figure 9).

NOTE: *Maintain three-point contact at all times while entering or exiting the wheel loader. Do not jump.*



Figure 9

INSTALLING ATTACHMENT

Mounting Attachment on Hydraulic Quick Coupler

Enter the wheel loader. See “Entering” on page 3-5. Start the engine.

NOTE: Refer to wheel loader's Operation & Maintenance Manual to correctly operate wheel loader.

Position the wheel loader with the upper quick coupler carrier tubes parallel to the attachment hooks. Drive the wheel loader forward until the quick coupler is about 1 m (3 ft) from the attachment.

Press top of switch to place the switch in the "UNLOCKED" position. See “Hydraulic Quick Coupler Switch” on page 2-3.

When the quick coupler switch is in the "UNLOCKED" position, a warning message (1, Figure 10) will appear on the multifunction display and a warning buzzer will sound in the cab.

NOTE: A warning message will appear on the multifunction display and a warning buzzer will sound in cab until the quick coupler switch is placed in the "LOCKED" position.



Figure 10

Curl in (rollback) quick coupler (2, Figure 11) against stops, continue holding the pilot valve control in the curl in (rollback) position until both quick coupler locking pins (3, Figure 11) are FULLY RETRACTED. See the red pin indicators (4, Figure 11).

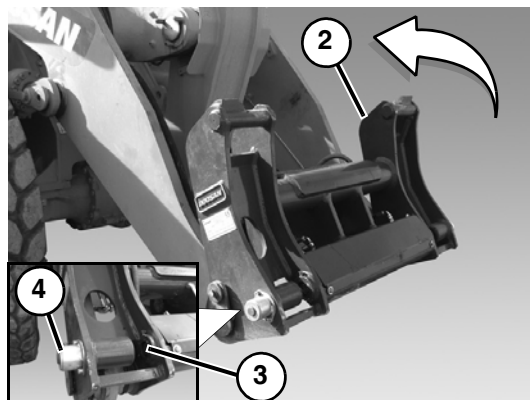


Figure 11



WARNING

AVOID DEATH OR SERIOUS INJURY

Keep attachment close to ground during installation. Attachment can fall without warning if not properly attached causing serious injury or death.

Curl out (dump) the quick coupler until the upper quick coupler carrier tubes (1, Figure 12) are lower than the attachment hooks (2, Figure 12).

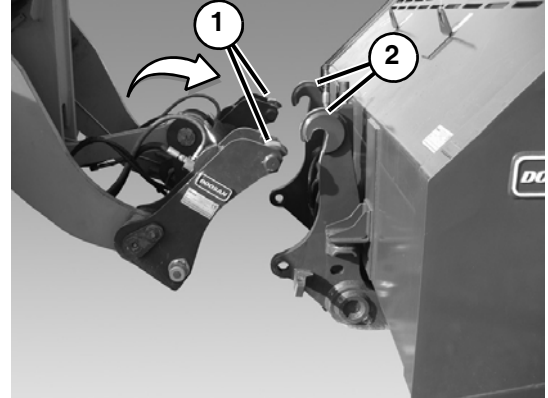


Figure 12

Drive forward until the upper quick coupler carrier tubes are right below the attachment hooks (Figure 13).

Engage the upper quick coupler carrier tubes in the attachment hooks by raising the arms (Figure 13).

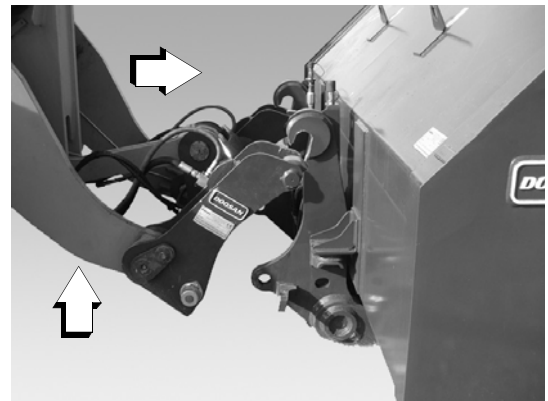


Figure 13

Curl in (rollback) quick coupler against stops to align the attachment pin holes with the quick coupler locking pins (3, Figure 14).

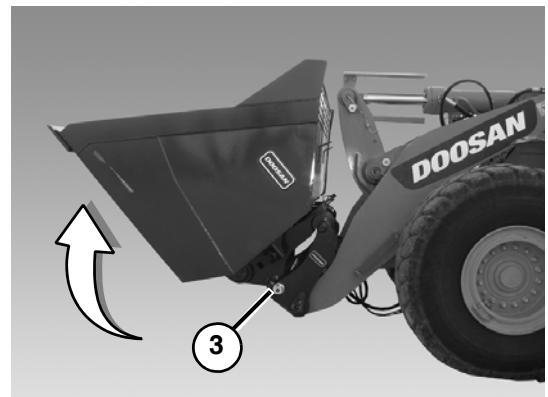


Figure 14

Press bottom of switch to place the switch in the "LOCKED" position. See "Hydraulic Quick Coupler Switch" on page 2-3. The warning message will disappear from the multifunction display and a warning buzzer will stop.

Curl in (rollback) quick coupler (Figure 15) against stops, continue holding the pilot valve control in the curl in (rollback) position until both quick coupler locking pins are FULLY EXTENDED. Make sure the locking pins extend through the holes of the attachment carrier. Check the red pin indicators (1, Figure 15).

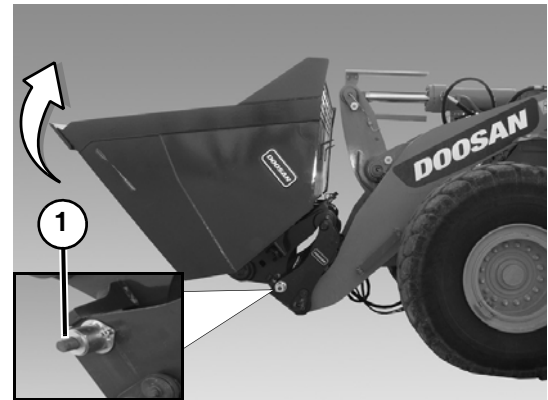


Figure 15

Connecting Attachment Auxiliary Hydraulics (If Equipped)

Lower the boom and put the attachment flat on the ground (Figure 16).

Release the auxiliary hydraulic pressure.

Stop the engine and engage the parking brake. See the wheel loader Operation & Maintenance Manual for detailed information.

Remove the key.

Exit the wheel loader. See "Exiting" on page 3-6.



WARNING

AVOID DEATH OR SERIOUS INJURY

Before leaving the machine:

- Lower the boom and place attachment on the ground.
 - Place the transmission lever in neutral.
 - Set pilot cutoff switch to "O" (OFF) position.
 - Engage the parking brake.
 - Stop the engine and remove the key.
-

Connect the two hydraulic hoses for the 3rd function located on the quick coupler to the attachment (Figure 17 & Figure 18).



Figure 16



Figure 17

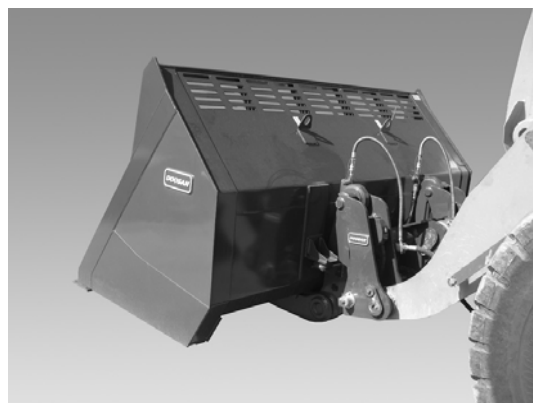


Figure 18

Attachment Connection Verification Test

Before operating the installed attachment, do the following test to verify the attachment connection with the quick coupler locking pins.

Lower the arms and put the attachment flat on the ground, engage the parking brake.

Continue to slowly lower the arms, if the attachment is properly connected to the quick coupler, the front of the machine is able to raise off the ground (Figure 19).

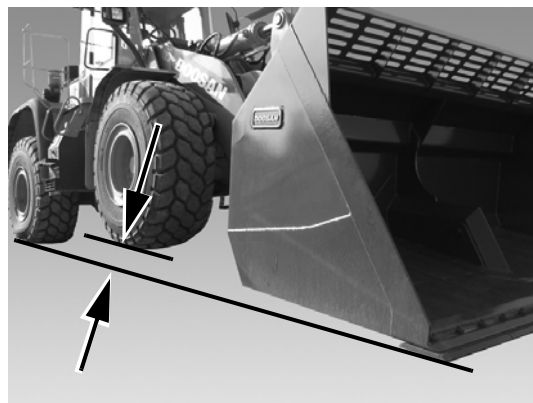


Figure 19

If the attachment is not properly connected to the quick coupler, the quick coupler carrier tubes (1, Figure 20) will move down compared to the attachment hooks (2, Figure 20).

Continuing to slowly lower the arms, the attachment will be pushed slightly forward and the front of machine will remain on the ground.

Check that there is no debris or obstacles in the attachment holes, repeat the connection procedure.

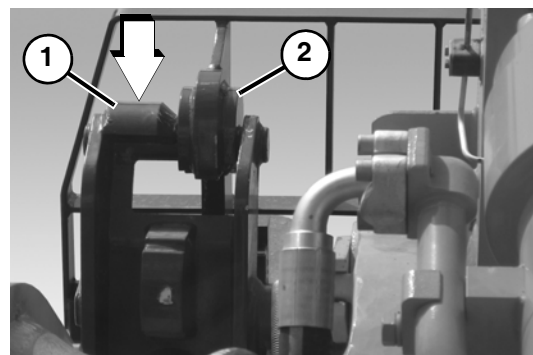


Figure 20



WARNING

**FAILURE TO FULLY ENGAGE LOCKING PINS CAN
CAUSE DEATH OR SERIOUS INJURY**

**Locking pins must extend through the holes in the
attachment mounting frame. Failure to engage locking pins
can allow attachment to come off.**

TRAVEL

General Travel Instructions

Carry attachment low with bucket rolled back against stops. See Figure 21.

Set pilot cutoff switch to "O" (LOCKED) position. This will prevent boom and / or attachment from moving during travel, due to accidental movement of the pilot control valve levers or joystick.

NOTE: *Make sure the pilot cutoff switch is set to the "O" (LOCKED) position.*

Refer to wheel loader's Operation & Maintenance Manual for information on travelling with wheel loader.



Figure 21



WARNING

When travelling at high-speed or on a steep hill, do not make sharp changes in direction. This could cause the machine to overturn.

When travelling or changing direction, always look to be certain that there is no obstructions or objects in the path of the wheel loader.

REMOVING ATTACHMENT

Removing Attachment From Hydraulic Quick Coupler

Disconnecting Attachment Auxiliary Hydraulics (If Equipped)

Lower the boom and put the attachment flat on the ground (Figure 22).

Release the auxiliary hydraulic pressure.

Stop the engine and engage the parking brake. See the wheel loader Operation & Maintenance Manual for detailed information.

Remove the key.

Exit the wheel loader. See "Exiting" on page 3-6.



WARNING

AVOID DEATH OR SERIOUS INJURY

Before leaving the machine:

- Lower the boom and place attachment on the ground.
 - Place the transmission lever in neutral.
 - Set pilot cutoff switch to "O" (OFF) position.
 - Engage the parking brake.
 - Stop the engine and remove the key.
-

Disconnect the two hydraulic hoses for the auxiliary hydraulics from the attachment (Figure 23).

Install dust caps on hydraulic fittings.



Figure 22



Figure 23

Removing Attachment

Enter the wheel loader. See "Entering" on page 3-5. Start the engine.

NOTE: *Refer to wheel loader's Operation & Maintenance Manual to correctly operate wheel loader.*

Keep attachment close to ground and in curl in (rollback) position during removal (Figure 24).



WARNING

AVOID DEATH OR SERIOUS INJURY

Keep attachment close to ground during removal. Attachment can fall without warning if quick coupler or attachment hooks are damaged, causing serious injury or death.



Figure 24

Press top of switch to place the switch in the "UNLOCKED" position. See "Hydraulic Quick Coupler Switch" on page 2-3.

When the quick coupler switch is in the "UNLOCKED" position, a warning message (1, Figure 25) will appear on the multifunction display and a warning buzzer will sound in the cab.

NOTE: *A warning message will appear on the multifunction display and a warning buzzer will sound in cab until the quick coupler switch is placed in the "LOCKED" position.*



Figure 25

Curl in (rollback) quick coupler (Figure 26) against stops, continue holding the pilot valve control in the curl in (rollback) position until both quick coupler locking pins are FULLY RETRACTED. See the red pin indicators (2, Figure 26).

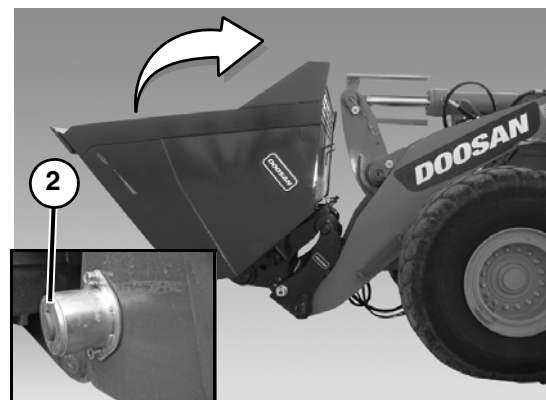


Figure 26

Set the attachment (1, Figure 27) on flat, level ground.

Slightly curl out (dump) the quick coupler until the lower quick coupler frame is clear of attachment.

NOTE: *Attachment may slide forward slightly when the quick coupler is curled out (dump).*

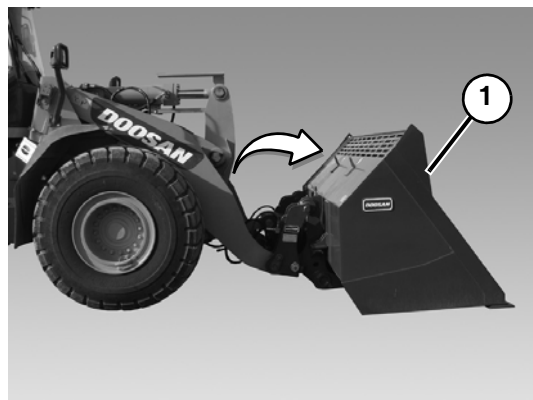


Figure 27

Disengage the upper quick coupler carrier tubes from the attachment hooks by lowering the arms (Figure 28).

NOTE: *Attachment may slide forward slightly when lowering the arms to disengage the upper carrier tubes from the attachment hooks.*

Back the loader away from the attachment (Figure 28).

It is now ready to install a different attachment (See "Installing Attachment" on page 3-8.) or press bottom of switch to place the switch in the "LOCKED" position. See "Hydraulic Quick Coupler Switch" on page 2-3. The warning message will disappear from the multifunction display and a warning buzzer will stop.

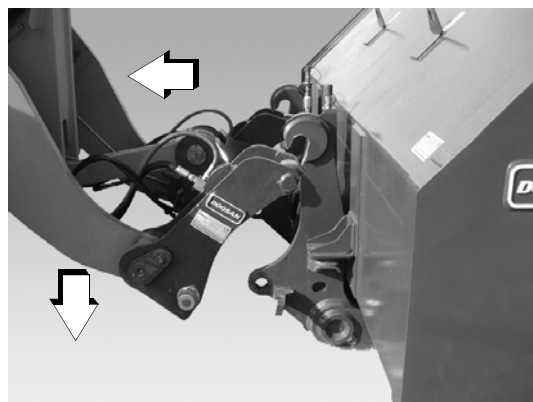


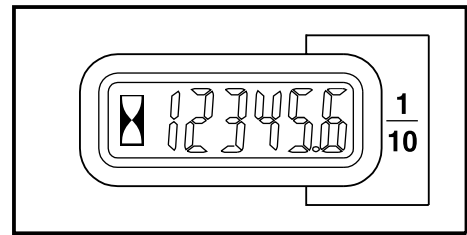
Figure 28

Inspection, Maintenance and Adjustment

PREVENTIVE MAINTENANCE

Routine maintenance and inspections are required to keep your wheel loader and attachment in the correct operating condition. The following pages list the inspection intervals, the system or component checks, and location references.

NOTE: *The following pages list the service checks and their required intervals. The service cycles may need to be shortened depending on the working conditions. Extremely hot or dusty conditions will require more frequent service. Operational hours are determined by the amount of time accumulated on the engine hour meter on the control console in the cab (Figure 1).*



HAOA601L

Figure 1

Safety Precautions

1. Before performing any maintenance checks, move pilot cutoff switch to "LOCKED" position. Place a Warning Tag on controls so no one begins to operate machine while maintenance checks are being performed.
2. When repairing or inspecting the machine, with the front structure raised in the air, firmly support the front structure. When installing a supporting structure and verify that it can handle the load. If installing the boom support device see the machine's Operation & Maintenance Manual.

High-pressure loads between the boom structure and support may cause the support to slip, causing the boom to collapse, leading to injuries or death. Take the installation location of support and supporting surface into consideration.

A supporting structure must be used, when disconnecting front hoses or removing any other mechanical component related to the front structure. High-pressure oil can be ejected from the front cylinder. A sudden shift of a front structure load may cause a boom collapse leading to injuries or death.

3. Clean up all fuel / oil spills. Fuel / oil spills are hazardous, especially around engine.
4. Inspect all fuel / oil lines for leakage. Replace any lines, fittings, O-rings, or filters that show signs of wear or damage.
5. If a test procedure requires engine to be running, use two people and keep all unnecessary personnel away from machine.



WARNING

AVOID DEATH OR SERIOUS INJURY

Instructions are necessary before operating or servicing machine. Read and understand the Operation & Maintenance Manual and safety labels (decals) on machine. Follow warnings and instructions in the manuals when making repairs, adjustments or servicing. Check for correct function after adjustments, repairs or service. Untrained operators and failure to follow instructions can cause injury or death.

PRELIMINARY SETUP FOR MAINTENANCE

When performing maintenance specified in this manual, always park the wheel loader and attachment as follows.

NOTE: *Certain types of maintenance may require the machine and attachment to be positioned differently. Always return machine and attachment to this position.*

Park on firm, level ground.

Place the transmission lever in the neutral position and set transmission neutral lock lever to "NEUTRAL LOCK" position.

Set parking brake switch to "I" (ON) position to apply parking brake.

Fully lower the work equipment to the ground (Figure 2).

Set pilot cutoff switch to "O" (OFF) position.

NOTE: *Refer to wheel loader's Operation & Maintenance Manual to correctly operate wheel loader.*

Allow engine to run at low idle for a minimum of five minutes to allow engine to cool. If this is not done, heat surge may occur.

Shut down engine by turning key to "O" (OFF) position. Remove key from starter switch.

Before starting maintenance work, place a tag, "Do Not Touch When Performing Inspection or Maintenance" on cab door or cab controls.



Figure 2



WARNING

If engine must be run while performing maintenance, use extreme care. Always have one person in the cab at all times. Never leave the cab with the engine running.

TABLE OF RECOMMENDED LUBRICANTS

IMPORTANT

Do not use lubricants other than those recommended, without prior written approval from *DOOSAN*.



CAUTION

Do not mix oils from different manufacturers. *DOOSAN* does not endorse specific brands but does suggest that owners select quality oils whose suppliers provide assurance that required standards will always be met or exceeded.

See the wheel loader's Operation & Maintenance Manual for a list of approved / recommended lubricants.

MAINTENANCE INTERVALS

Service Intervals

SERVICE ITEM	PAGE
Initial Installation	
Quick Coupler Pin Engagement Check	4-6
Curl In (Rollback) and Curl Out (Dump) Stop Adjustment	4-7
10 Hour / Daily Service	
Quick Coupler Frame and Locking Pin Inspection	4-8
Mounting / Retaining Hardware	4-8
Hydraulic Hoses Inspection	4-8
Grease Hydraulic Quick Coupler	4-8
50 Hour / Weekly Service	
Perform All Daily Service Checks	4-9
Curl In (Rollback) and Curl Out (Dump) Stops Inspection	4-9
100 Hour / Bi-Weekly Service	
Perform All Daily and 50 Hour Service Checks	4-11
Pins / Hinge Points	4-11
250 Hour / Monthly Service	
Perform All Daily, 50 and 100 Hour Service Checks	4-12
Pins / Hinge Points	4-12

INITIAL INSTALLATION

Quick Coupler Pin Engagement Check

Mount attachment on the quick coupler. See “Mounting Attachment on Hydraulic Quick Coupler” on page 3-8.

If the quick coupler pins do not engage the attachment.

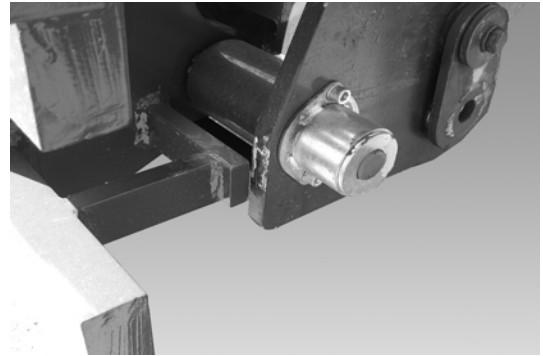


Figure 3

Remove the indicator pin housing (1, Figure 4) by removing the two mounting screws (2, Figure 4).

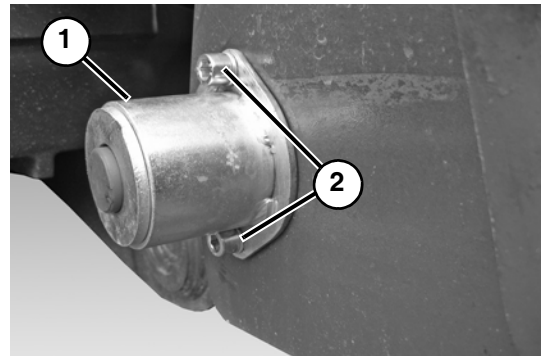


Figure 4

Visually check the axial alignment (3, Figure 5) of the quick coupler pin and attachment retaining hole.



WARNING

DO NOT USE finger or tool to check axial alignment.

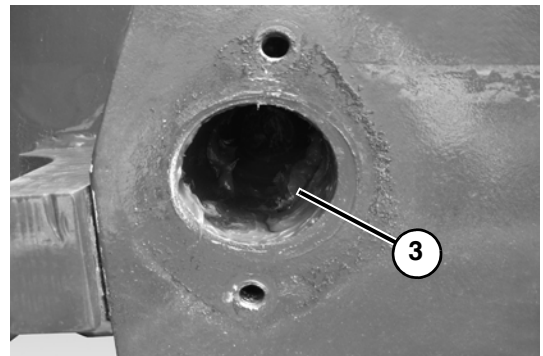


Figure 5

Add or remove material from the attachment stop (1, Figure 6) to allow proper alignment and pin engagement.

To remove material, grind the attachment stop surface. This may require more than one adjustment until the attachment stop is the correct thickness to obtain proper alignment and pin engagement.

To add material, weld using a low hydrogen 7018 rod to build up the attachment stop surface. Grind welds smooth. This may require more than one adjustment until the attachment stop is the correct thickness to obtain proper alignment and pin engagement.

NOTE: *See the wheel loader's Operation & Maintenance Manual for correct procedure before welding on wheel loader.*

Position the indicator pin housing (2, Figure 7) by aligning the mounting holes, install and torque the two mounting screws (3, Figure 7).

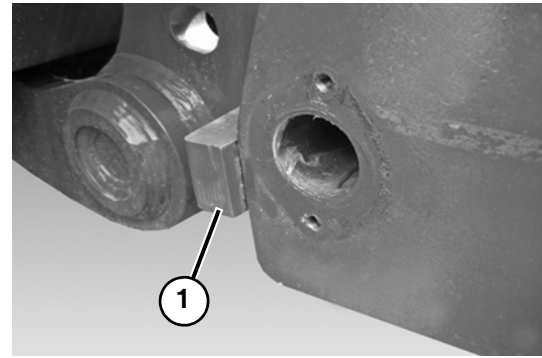


Figure 6

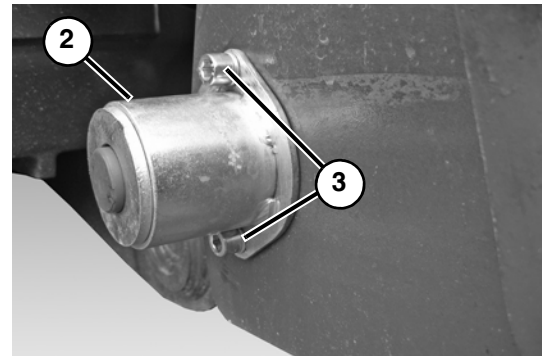


Figure 7

Curl In (Rollback) and Curl Out (Dump) Stop Adjustment

NOTE: *It is mandatory to test the curl in (rollback) and curl out (dump) stops with an attachment installed on the quick coupler.*

It is required that the curl in (rollback) and curl out (dump) stops be checked and adjusted when the quick coupler is installed. Add or remove material from the contact point areas to allow the stops to contact evenly with arms / linkage kinematic. See "Curl In (Rollback) Stops" on page 4-9. and See "Curl Out (Dump) Stops" on page 4-10.

Improper curl in (rollback) and curl out (dump) stop adjustment will invalidate the warranty.

10 HOUR / DAILY SERVICE

Quick Coupler Frame and Locking Pin Inspection

Inspect the quick coupler (1, Figure 8) for excessive wear, damage and cracked welds. Replace any parts that are damaged, bent or missing. Contact your *DOOSAN* distributor for repair or replacement parts.

Inspect the locking pins (2, Figure 8) for excessive wear or damage. Replace any parts that are damaged, bent or missing. Contact your *DOOSAN* distributor for repair or replacement parts.

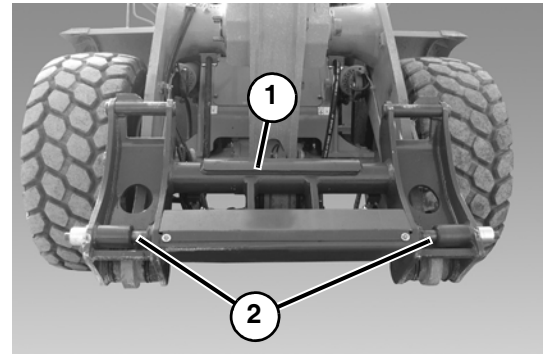


Figure 8

Mounting / Retaining Hardware

Visually inspect the mounting / retaining hardware for any loose or missing hardware. Replace any missing hardware. Tighten any loose mounting / retaining hardware to the proper torque. (See “Standard Torques” on page 7-5.) Contact your *DOOSAN* distributor for repair or replacement parts.

Hydraulic Hoses Inspection

Inspect the hydraulic hoses for damage, excessive wear or appear defective in any way, replace them immediately. Contact your *DOOSAN* distributor for repair or replacement parts.

Grease Hydraulic Quick Coupler

Grease the following fittings (3, Figure 9) daily or every 8 - 10 hours.

NOTE: *If attachments are being used in water, grease fittings immediately after machine is removed from water.*

NOTE: *Dispose of purged grease according to local regulations.*

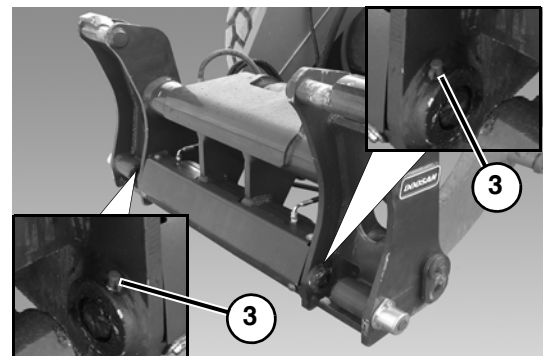


Figure 9

50 HOUR / WEEKLY SERVICE

Perform All Daily Service Checks

Curl In (Rollback) and Curl Out (Dump) Stops Inspection

Curl In (Rollback) Stops

Park the wheel loader on a firm level surface.

Set the attachment in the carry position.



WARNING

AVOID SERIOUS INJURY OR DEATH

Stop the engine and chock the wheels of the wheel loader before working underneath.

Roll the attachment back until the kinematic limit (cylinder fully extended for the Z system). Check that both curl in (rollback) stops contact evenly on the arm stop points (1, Figure 10).

If stops do not contact, contact early or do not contact equally, perform the following steps:

To add stop material, weld using a low hydrogen 7018 rod to build up the stop surface of the wheel loader. Grind smooth. This may require more than one adjustment until the stop is the correct thickness to obtain equal contact of the curl in (rollback) stops.

NOTE: See the wheel loader's Operation & Maintenance Manual for correct procedure before welding on wheel loader.

To remove stop material, grind the stop surface of the wheel loader until it is the correct thickness to obtain equal contact of the curl in (rollback) stops.

CURL IN (ROLLBACK) STOPS



Figure 10



WARNING

CRUSHING CAN CAUSE SERIOUS INJURY OR DEATH

Never go under a raised boom without a boom support device installed.

Curl Out (Dump) Stops

With machine on level ground, raise the boom and roll out the attachment until the kinematic limit (cylinder fully retracted for the Z system). Check that both curl out (dump) stops contact evenly on the arm stop points (1, Figure 11).

If stops do not contact, contact early or do not contact equally, perform the following steps:

To add stop material, weld using a low hydrogen 7018 rod to build up the stop surface of the wheel loader. Grind smooth. This may require more than one adjustment until the stop is the correct thickness to obtain equal contact of the curl out (dump) stops.

NOTE: *See the wheel loader's Operation & Maintenance Manual for correct procedure before welding on wheel loader.*

To remove stop material, grind the stop surface of the wheel loader until it is the correct thickness to obtain equal contact of the curl out (dump) stops.

CURL OUT (DUMP) STOPS

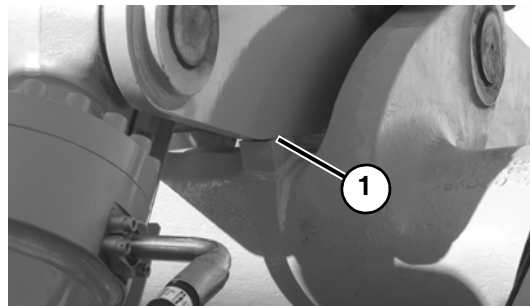


Figure 11

100 HOUR SERVICE

Perform All Daily and 50 Hour Service Checks

Pins / Hinge Points

NOTE: *Check for proper installation of the connection pins and play between the connection pins and hinge points after the first 100 hours. After that, check every 250 hours. Follow procedure under the 250 hour maintenance interval "Pins / Hinge Points" on page 4-12*

250 HOUR / MONTHLY SERVICE

Perform All Daily, 50 and 100 Hour Service Checks

Pins / Hinge Points

Check the play between the connection pins and hinge points (Figure 11). If there is 0,6 - 0,9 mm (0.02 - 0.04 in) of play, replace the connection pins and hinge bushings. Contact your *DOOSAN* distributor for repair or replacement parts.



Figure 12

Transportation

TRANSPORTING

Wheel Loader and Attachment

Obey all local regulations for the transportation of the wheel loader. If unsure of regulations check with local authorities.

Check the intended route for road width, overhead clearances, weight restrictions, and traffic control regulations. Special approval or permits may be required.

See your wheel loader's Operation & Maintenance Manual for the correct procedure.

Troubleshooting

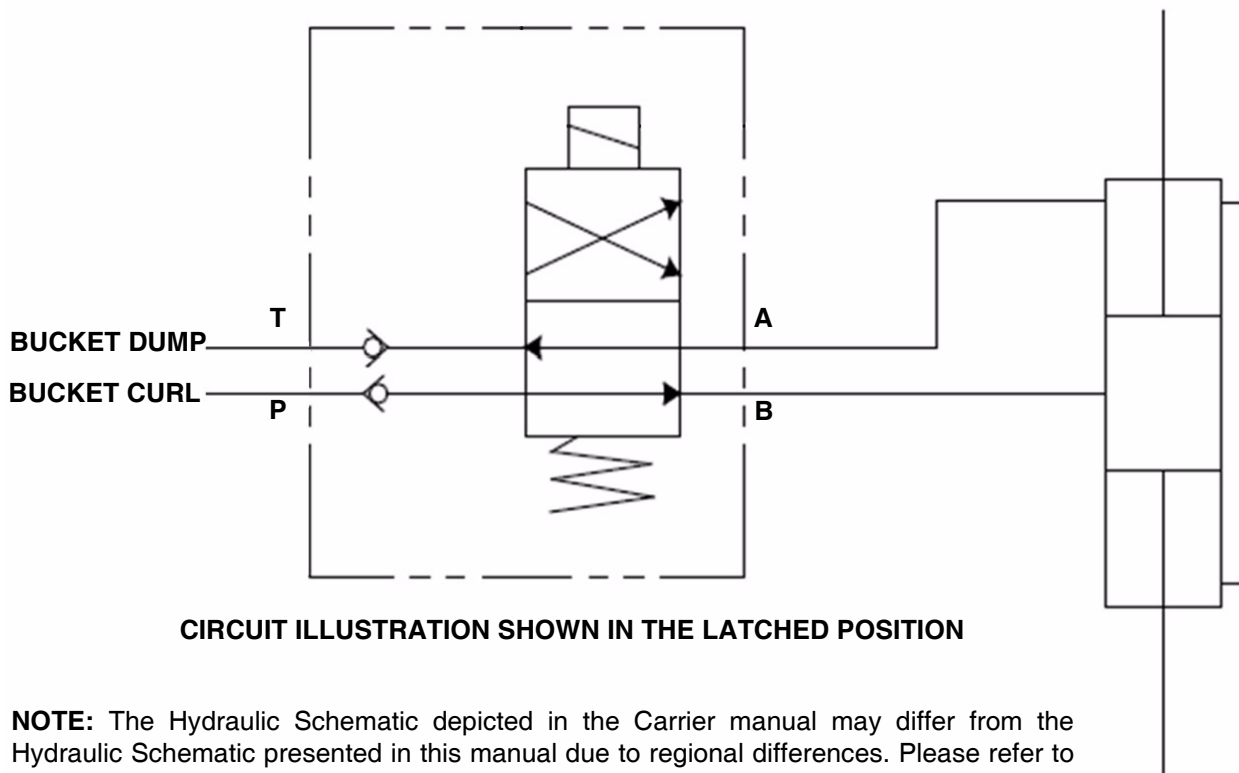
Anytime a malfunction occurs, take immediate corrective action. Check for and investigate the cause of the malfunction. A scheduled maintenance program can prevent malfunctions from occurring by doing preventative maintenance. A systematic approach should be taken to troubleshooting, since several overlapping malfunctions may give the appearance of a problem that does not exist. If cause for the malfunction cannot be determined, contact your *DOOSAN* distributor. Never perform an adjustment of or disassembly of hydraulic components, electrical and electronic components, without first consulting a *DOOSAN* distributor.

HYDRAULIC QUICK COUPLER

Problem	Possible Cause	Remedy
Coupler cylinder does not extend.	Faulty solenoid valve or incorrect wiring.	Check wiring, replace valve if necessary.
	Hoses are not connected to correct ports.	Inspect connections in relation to schematic.
Plungers extend but do not retract.	Jump hoses connected to wrong port at lock cylinder.	Switch hoses at cylinder.
	Check valves are dirty.	Clean check valves.
	Faulty solenoid valve or incorrect wiring.	Check wiring, replace valve if necessary.
Plunger on one side not retracting fully.	Internal lock set screw on cylinder piston backing out.	Remove cylinder and disassemble. "Loctite®" set screw and reinstall. Reassemble cylinder with new seal kit.
	Internal cylinder damage.	Remove cylinder and disassemble. Replace if damaged.

Specification

HYDRAULIC SCHEMATIC



NOTE: The Hydraulic Schematic depicted in the Carrier manual may differ from the Hydraulic Schematic presented in this manual due to regional differences. Please refer to the Hydraulic Schematic shown in this manual for most accurate information regarding the Hydraulic function of your Quick Coupler.

Figure 1

ELECTRICAL SCHEMATIC

For the ELECTRICAL SCHEMATIC refer to the machine's Operation & Maintenance or Shop manual. See QUICK CLAMP (OPT) detail.

HYDRAULIC QUICK COUPLER SPECIFICATIONS

Hydraulic Quick Coupler (ISO / FDIS 23727 Compatible)	Operating weight	Approved Carrier	*Approved Attachments	Max Material Density kg/m³ (lb/yd³)
H200 (Type S)	358 kg (789.25 lb)	DL200-3	General Purpose Bucket Heavy Material Bucket Light Material Bucket Pallet Fork 5T (150 x 50 x 1500) Pallet Fork 7T (150 x 60 x 1500)	1500 (2530) 1700 (2865) 700 (1180) N/A N/A
H250 (Type S)	378 kg (833.35 lb)	DL250-3	General Purpose Bucket Heavy Material Bucket Light Material Bucket Pallet Fork 5T (150 x 50 x 1500) Pallet Fork 7T (150 x 60 x 1500)	1500 (2530) 1700 (2865) 700 (1180) N/A N/A
H300 (Type S)	462 kg (1018.50 lb)	DL300-3	General Purpose Bucket Heavy Material Bucket Light Material Bucket Pallet Fork 5T (150 x 50 x 1500) Pallet Fork 7T (150 x 60 x 1500) Pallet Fork 9T (200 x 60 x 1500)	1500 (2530) 1700 (2865) 700 (1180) N/A N/A N/A
H350 (Type S)	586 kg (1291.90 lb)	DL350-3	General Purpose Bucket Heavy Material Bucket Light Material Bucket Pallet Fork 5T (150 x 50 x 1500) Pallet Fork 7T (150 x 60 x 1500) Pallet Fork 9T (200 x 60 x 1500)	1500 (2530) 1700 (2865) 700 (1180) N/A N/A N/A
H420 (Type S)	785 kg (1730.60 lb)	DL420-3	General Purpose Bucket Heavy Material Bucket Light Material Bucket Pallet Fork 5T (150 x 50 x 1500) Pallet Fork 7T (150 x 60 x 1500) Pallet Fork 9T (200 x 60 x 1500)	1500 (2530) 1700 (2865) 700 (1180) N/A N/A N/A

* See your *DOOSAN* distributor for an updated list of approved attachments.

HYDRAULIC QUICK COUPLER

OVERALL DIMENSIONS

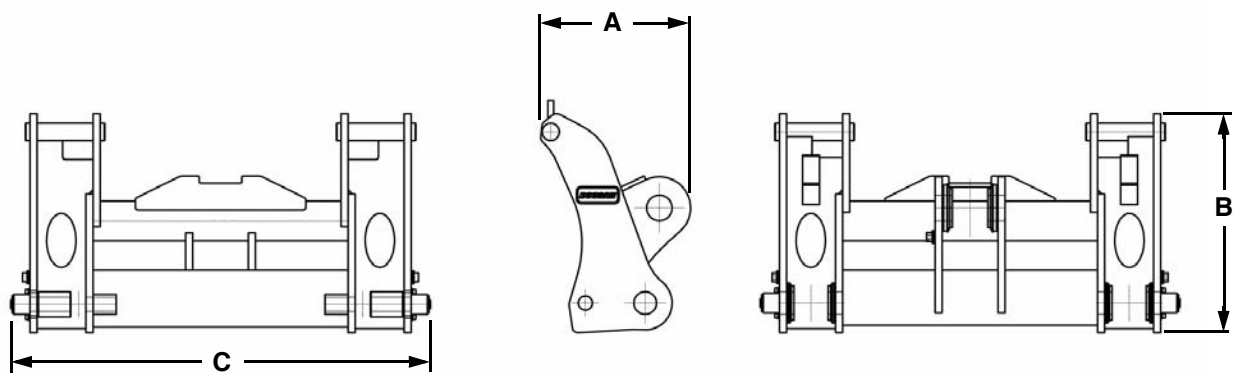


Figure 2

DIMENSION	H200 (Type S)	H250 (Type S)	H300 (Type S)	H350 (Type S)	H420 (Type S)
Length (Dim A)	504 mm (19.84 in)	484 mm (19.06 in)	528 mm (20.79 in)	502 mm (19.76 in)	576 mm (22.68 in)
Height (Dim B)	775 mm (30.51 in)	771 mm (30.35 in)	771 mm (30.35 in)	775 mm (30.51 in)	786 mm (30.94 in)
Width (Dim C)	1379 mm (54.29 in)	1424 mm (56.06 in)	1478 mm (58.19 in)	1482 mm (58.35 in)	1561 mm (61.46 in)

STANDARD TORQUES

Torque Values for Standard Metric Fasteners

NOTE: The units for the torque values are kg•m (ft lb).

Dia. x Pitch (mm)	Grade										
	3.6 (4A)	4.6 (4D)	4.8 (4S)	5.6 (5D)	5.8 (5S)	6.6 (6D)	6.8 (6S)	6.9 (6G)	8.8 (8G)	10.9 (10K)	12.9 (12K)
M5 x Std.	0.15 (1.08)	0.16 (1.15)	0.25 (1.80)	0.22 (1.59)	0.31 (2.24)	0.28 (2.02)	0.43 (3.11)	0.48 (3.47)	0.50 (3.61)	0.75 (5.42)	0.90 (6.50)
M6 x Std.	0.28 (2.02)	0.30 (2.16)	0.45 (3.25)	0.40 (2.89)	0.55 (3.97)	0.47 (3.39)	0.77 (5.56)	0.85 (6.14)	0.90 (6.50)	1.25 (9.04)	1.50 (10.84)
M7 x Std.	0.43 (3.11)	0.46 (3.32)	0.70 (5.06)	0.63 (4.55)	0.83 (6.00)	0.78 (5.64)	1.20 (8.67)	1.30 (9.40)	1.40 (10.12)	1.95 (14.10)	2.35 (16.99)
M8 x Std.	0.70 (5.06)	0.75 (5.42)	1.10 (7.95)	1.00 (7.23)	1.40 (10.12)	1.25 (9.04)	1.90 (13.74)	2.10 (15.18)	2.20 (15.91)	3.10 (22.42)	3.80 (27.48)
M8 x 1	0.73 (5.28)	0.80 (5.78)	1.20 (8.67)	1.00 (7.23)	1.50 (10.84)	1.35 (9.76)	2.10 (15.18)	2.30 (16.63)	2.40 (17.35)	3.35 (24.23)	4.10 (29.65)
M10 x Std.	1.35 (9.76)	1.40 (10.12)	2.20 (15.91)	1.90 (13.74)	2.70 (19.52)	2.35 (19.99)	3.70 (26.76)	4.20 (30.37)	4.40 (31.18)	6.20 (44.84)	7.20 (52.07)
M10 x 1	1.50 (10.84)	1.60 (11.57)	2.50 (18.08)	2.10 (15.18)	3.10 (22.42)	2.80 (20.25)	4.30 (31.10)	4.90 (35.44)	5.00 (36.16)	7.00 (50.63)	8.40 (60.75)
M12 x Std.	2.40 (17.35)	2.50 (18.08)	3.70 (26.76)	3.30 (23.86)	4.70 (33.99)	4.20 (30.37)	6.30 (45.56)	7.20 (52.07)	7.50 (54.24)	10.50 (75.94)	12.50 (90.41)
M12 x 1.5	2.55 (18.44)	2.70 (19.52)	4.00 (28.93)	3.50 (25.31)	5.00 (36.16)	4.50 (32.54)	6.80 (49.18)	7.70 (55.69)	8.00 (57.86)	11.20 (81.00)	13.40 (96.92)
M14 x Std.	3.70 (26.76)	3.90 (28.20)	6.00 (43.23)	5.20 (37.61)	7.50 (54.24)	7.00 (50.63)	10.00 (72.33)	11.50 (83.17)	12.00 (86.79)	17.00 (122.96)	20.00 (144.66)
M14 x 1.5	4.10 (29.65)	4.30 (31.10)	6.60 (47.73)	5.70 (41.22)	8.30 (60.03)	7.50 (54.24)	11.10 (80.28)	12.50 (90.41)	13.00 (94.02)	18.50 (132.66)	22.00 (158.12)
M16 x Std.	5.60 (40.50)	6.00 (43.39)	9.00 (65.09)	8.00 (57.86)	11.50 (83.17)	10.50 (75.94)	15.50 (112.11)	17.90 (129.47)	18.50 (133.81)	26.00 (188.05)	31.00 (224.22)
M16 x 1.5	6.20 (44.84)	6.50 (47.01)	9.70 (70.16)	8.60 (62.20)	12.50 (90.41)	11.30 (81.73)	17.00 (122.96)	19.50 (141.04)	20.00 (144.66)	28.00 (202.52)	35.50 (256.77)
M18 x Std.	7.80 (56.41)	8.30 (60.03)	12.50 (90.41)	11.00 (79.56)	16.00 (115.72)	14.50 (104.87)	21.00 (151.89)	27.50 (198.90)	28.50 (206.14)	41.00 (296.55)	43.00 (311.01)
M18 x 1.5	9.10 (65.82)	9.50 (68.71)	14.40 (104.15)	12.50 (90.41)	18.50 (133.81)	16.70 (120.79)	24.50 (177.20)	27.50 (198.90)	28.50 (206.14)	41.00 (296.55)	49.00 (354.41)
M20 x Std.	11.50 (83.17)	12.00 (86.79)	18.00 (130.19)	16.00 (115.72)	22.00 (159.12)	19.00 (137.42)	31.50 (227.83)	35.00 (253.15)	36.00 (260.38)	51.00 (368.88)	60.00 (433.98)
M20 x 1.5	12.80 (92.58)	13.50 (97.64)	20.50 (148.27)	18.00 (130.19)	25.00 (180.82)	22.50 (162.74)	35.00 (253.15)	39.50 (285.70)	41.00 (296.55)	58.00 (419.51)	68.00 (491.84)
M22 x Std.	15.50 (112.11)	16.00 (115.72)	24.50 (177.20)	21.00 (151.89)	30.00 (216.99)	26.00 (188.05)	42.00 (303.78)	46.00 (332.71)	49.00 (354.41)	67.00 (484.61)	75.00 (542.47)
M22 x 1.5	17.00 (122.96)	18.50 (133.81)	28.00 (202.52)	24.00 (173.59)	34.00 (245.92)	29.00 (209.75)	47.00 (339.95)	52.00 (44.76)	56.00 (405.04)	75.00 (542.47)	85.00 (614.80)
M24 x Std.	20.50 (148.27)	21.50 (155.50)	33.00 (238.68)	27.00 (195.29)	40.00 (289.32)	34.00 (245.92)	55.00 (397.81)	58.00 (419.51)	63.00 (455.67)	82.00 (593.10)	92.00 (655.43)
M24 x 1.5	23.00 (166.35)	35.00 (253.15)	37.00 (267.62)	31.00 (224.22)	45.00 (325.48)	38.00 (202.52)	61.00 (441.21)	67.00 (484.61)	74.00 (535.24)	93.00 (672.66)	103.00 (744.99)

Torque Values for Standard U.S. Fasteners

Type	S.A.E. Grade	Description	Bolt Head Marking
1	1 OR 2	WILL HAVE NO MARKINGS IN THE CENTRE OF THE HEAD. Low or Medium Carbon Steel Not Heat Treated.	
5	5	WILL HAVE THREE RADIAL LINES. Quenched and Tempered Medium Carbon Steel.	
8	8	WILL HAVE 6 RADIAL LINES. Quenched and Tempered Special Carbon or Alloy Steel.	

Recommended torque, in foot pounds, for all Standard Application Nuts and Bolts, provided:

1. All thread surfaces are clean and lubricated with SAE-30 engine oil. (See Note.)
2. Joints are rigid, that is, no gaskets or compressible materials are used.
3. When reusing nuts or bolts, use minimum torque values.

NOTE: *Multiply the standard torque by:*

- 0.65 When finished jam nuts are used.
- 0.70 When Molykote, white lead or similar mixtures are used as lubricants.
- 0.75 When Parkerized bolts or nuts are used.
- 0.85 When cadmium plated bolts or nuts and zinc bolts w/waxed zinc nuts are used.
- 0.90 When hardened surfaces are used under the nut or bolt head.

NOTE: *When reusing bolts and nuts in service, use minimum torque values.*

The following General Torque Values must be used in all cases where **SPECIAL TORQUE VALUES** are not given.

NOTE: <i>Torque values listed throughout this manual are lubricated (wet) threads; values should be increased 1/3 for nonlubricated (dry) threads.</i>				
Thread Size	Heat Treated Material Grade 5 and Grade 8			
	Grade 5 (3 Radial Dashes On Head)		Grade 8 (6 Radial Dashes On Head)	
	Foot Pounds (ft lb)	Newton Meter (Nm)	Foot Pounds (ft lb)	Newton Meter (Nm)
1/4" - 20	6	8	9	12
1/4" - 28	7	9	11	15
5/16" - 18	13	18	18	24
5/16" - 24	15	20	21	28
3/8" - 16	24	33	34	46
3/8" - 24	27	37	38	52
7/16" - 14	38	52	54	73
7/16" - 20	42	57	60	81
1/2" - 13	58	79	82	111
1/2" - 20	65	88	90	122
9/16" - 12	84	114	120	163
9/16" - 18	93	126	132	179
5/8" - 11	115	156	165	224
5/8" - 18	130	176	185	251
3/4" - 10	205	278	290	393
3/4" - 16	240	312	320	434
7/8" - 9	305	414	455	617
7/8" - 14	334	454	515	698
1" - 8	455	617	695	942
1" - 14	510	691	785	1064
1 1/8" - 7	610	827	990	1342
1 1/8" - 12	685	929	1110	1505
1 1/4" - 7	860	1166	1400	1898
1 1/4" - 12	955	1295	1550	2102
1 3/8" - 6	1130	1532	1830	2481
1 3/8" - 12	1290	1749	2085	2827
1 1/2" - 6	1400	2034	2430	3295
1 1/2" - 12	1690	2291	2730	3701
1 3/4" - 5	2370	3213	3810	5166
2" - 4 1/2	3550	4813	5760	7810

NOTE: *If any bolts and nuts are found loose or at values less than what the chart states, it is recommended that the loose bolt and / or nut be replaced with a new one.*

Type 8 Phosphate Coated Hardware

This chart provides tightening torque for general purpose applications using original equipment standard hardware as listed in the Parts Manual for the machine involved. **DO NOT SUBSTITUTE.** In most cases, original equipment standard hardware is defined as Type 8, coarse thread bolts and nuts and thru hardened flat washers (Rockwell "C" 38 - 45), all phosphate coated and assembled without supplemental lubrication (as received) condition.

The torques shown below also apply to the following:

1. Phosphate coated bolts used in tapped holes in steel or gray iron.
2. Phosphate coated bolts used with phosphate coated prevailing torque nuts (nuts with distorted threads or plastic inserts).
3. Phosphate coated bolts used with copper plated weld nuts.

Markings on bolt heads or nuts indicate material grade **ONLY** and are **NOT** to be used to determine required torque.

Nominal Thread Diameter	Standard Torque $\pm 10\%$	
	Kilogram Meter (kg•m)	Foot Pounds (ft lb)
1/4"	1.1	8
5/16"	2.2	16
3/8"	3.9	28
7/16"	6.2	45
1/2"	9.7	70
9/16"	13.8	100
5/8"	19.4	140
3/4"	33.2	240
7/8"	53.9	390
1"	80.2	580
1 - 1/8"	113.4	820
1 - 1/4"	160.4	1160
1 - 3/8"	210.2	1520
1 - 1/2"	279.4	2020
1 - 3/4"	347.1	2510
2	522.8	3780

Torque Values for Hose Clamps

The following chart provides the tightening torques for hose clamps used in all rubber applications (radiator, air cleaner, operating lever boots, hydraulic system, etc.).

Clamp Type And Size	Torque			
	Radiator, Air Cleaner, Boots, Etc.		Hydraulic System	
	Kilogram Meter (kg•m)	Inch Pounds (in lb)	Kilogram Meter (kg•m)	Inch Pounds (in lb)
"T" Bolt (Any Diameter)	0.68 - 0.72	59 - 63	-----	-----
Worm Drive - Under 44 mm (1-3/4 in) Open Diameter	0.2 - 0.3	20 - 30	0.5 - 0.6	40 - 50
Worm Drive - Over 44 mm (1-3/4 in) Open Diameter	0.5 - 0.6	40 - 50	-----	-----
Worm Drive - All "Ultra-Tite"	0.6 - 0.7	50 - 60	0.5 - 0.6	40 - 50

Torque Values for Split Flanges

The following chart provides the tightening torques for split flange connections used in hydraulic systems. Split flanges and fitting shoulders should fit squarely. Install all bolts, finger tight and then torque evenly.

NOTE: *Over torquing bolts will damage the flanges and / or bolts, which may cause leakage.*

Flange Size (*)	Bolt Size	Bolt Torque	
		Kilogram Meter (kg•m)	Foot Pounds (ft lb)
1/2"	5/16"	2.1 - 2.5	15 - 18
3/4"	3/8"	3.0 - 3.7	22 - 27
1"	3/8"	3.7 - 4.8	27 - 35
1 - 1/4"	7/16"	4.8 - 6.2	35 - 45
1 - 1/2"	1/2"	6.4 - 8.0	46 - 58
2"	1/2"	7.6 - 9.0	55 - 65
2 - 1/2"	1/2"	10.9 - 12.6	79 - 91
3"	5/8"	19.1 - 20.7	138 - 150
3 - 1/2"	5/8"	16.2 - 18.4	117 - 133

(*) - Inside diameter of flange on end of hydraulic tube or hose fitting.

NOTE: *Values stated in chart are for Standard Pressure Series (Code 61) Split Flanges.*

Torque Wrench Extension Tools

Very large diameter, high grade fasteners (nuts, bolts, cap screws, etc.) require a great deal of turning force to achieve recommended tightening torque values.

Common problems that could occur as a result are:

- Recommended torque exceeds the measuring capacity of the torque wrench.
- Specialized sockets do not fit the adapter on the front end (nose) of the torque wrench.
- Generating adequate force on the back end (handle) of the wrench is difficult or impossible.
- Restricted access or an obstruction may make use of the torque wrench impossible.
- A unique application requires fabrication of an adapter or other special extension.

Most standard torque wrenches can be adapted to suit any one of the proceeding needs or situations, if the right extension tool is used or fabricated.

Torque Multiplication

A wrench extension tool can be used to increase the tightening force on a high capacity nut or bolt.

For example, doubling the distance between the bolt and the back (handle) end of the torque wrench doubles the tightening force on the bolt. It also halves the indicated reading on the scale or dial of the torque wrench. To accurately adjust or convert indicated scale or dial readings, use the following formula:

$I = A \times T / A + B$ where:

I = Indicated force shown on the torque wrench scale or dial.

T = Tightening force applied to the nut or bolt (actual Torque).

A = Length of the torque wrench (between the centre of the nut or bolt and the centre of the handle).

B = Length of the extension.

As an example, if a 12" extension is added to a 12" torque wrench, and the indicated torque on the dial reads "150 ft lb," the real force applied to the bolt is 300 ft lb:

$$I = \frac{A \times T}{A + B} = \frac{12 \times 300}{12 + 12} = \frac{3600}{24} = 150$$

NOTE: *The formula assumes that there is no added deflection or "give" in the joint between the extension and torque wrench. Readings may also be inaccurate:*

- If the extension itself absorbs some of the tightening force and starts to bend or bow out.

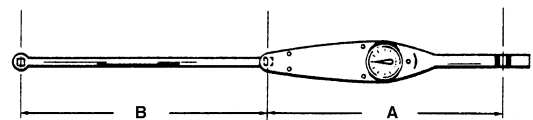


Figure 3

0552A

- If an extension has to be fabricated that is not perfectly straight (for example, an extension made to go around an obstruction, to allow access to a difficult to tighten fastener), the materials and methods used must be solid enough to transmit full tightening torque.

Other Uses for Torque Wrench Extension Tools

Torque wrench extensions are sometimes made up for reasons other than increasing leverage on a fastener.

For example, a torque wrench and extension can be used to measure adjustment "tightness" of a linkage or assembly. Specially fabricated extensions can be used to make very precise checks of the force required to engage or disengage a clutch mechanism, release a spring-applied brake assembly, or "take up" free play in most any movable linkage.

Once the value of the adjustment force is established, repeated checks at regular intervals can help to monitor and maintain peak operating efficiency. These types of adjustment checks are especially useful if physical measurements of linkage travel are difficult to make or will not provide the needed degree of precision and accuracy.

To allow the assembly or mechanism to accept a torque wrench, welding a nut or other adapter on the end of a linkage shaft or other leverage point will allow turning the shaft or assembly manually.

Tightening Torque Specifications (Metric)

(For coated threads, prelubricated assemblies.)



CAUTION

Disassembly, overhaul and replacement of components on the attachment, installation of new or replacement parts and / or other service related maintenance may require the use of thread or flange sealing assembly compound.

Use the information on this page as a general guide in selecting specific formulas that will meet the particular requirements of individual assembly installations. *DOOSAN* does not specifically endorse a specific manufacturer or brand name but the following table of "Loctite®" applications is included for which cross-references to other makers' products should also be widely available.

IMPORTANT

Use primer "T" or "N" for all cold weather assembly of fastener adhesives, with Thread locker sealers 222, 242/243, 262, 271, 272, or 277.

I. "Loctite®" Fastener Adhesives

Product	Application	Colour	Removal	Breakaway Cure Strength (in lb) of Sealer Alone
222	Low strength for 6 mm (1/4") or smaller fasteners.	Purple	Hand tools	45
242 or 243	Medium strength for 6 mm (1/4") and larger fasteners.	Blue	Hand tools	80
262	High strength for high grade fasteners subject to shock, stress and vibration.	Red	Heat/260°C (500°F) Remove HOT (NO solvent)	160
271	Extra high strength for fine thread fasteners up to 25 mm (1") diameter.	Red	Heat/260°C (500°F) Remove HOT	160
272	High temperature / high strength for hostile environments to 232°C (450°F).	Red	Heat/316°C (600°F) Remove HOT	180
277	Extra high strength for coarse thread fasteners 25 mm (1") diameter and larger.	Red	Heat/260°C (500°F) Remove HOT	210

II. "Loctite®" Pipe Thread Sealant

Product	Application	Colour	Removal	Required Setup
545	"No-filler / nonclog" formula for high-pressure hydraulic systems. Over application will not restrict or foul system components.	Purple	Hand tools	4 Hours (or 1/2 hour with Locquic "T" Primer)
656	Solvent resistant, higher viscosity tapered thread sealer.	White	Hand tools	4 Hours (or 1/2 hour with Locquic "T" Primer)

III. "Loctite®" Gasket / Flange Sealer

Product	Application	Colour	Notes
518	Gasket eliminator specifically made for aluminum flanges / surfaces. For hydraulic systems to 34,475 kPa (5,000 psi).	Red	Use Locquic "N" primer for fast (1/2 - 4 hours) setup. Unprimed setup 4 - 24 hours.
504	Low-pressure / wide-gap gasket eliminator compound. Fills gaps to 0.0012 mm (0.030"), cures to rigid seal.	Orange	Use Locquic "N" primer for faster (1/2 - 4 hours) setup. Unprimed setup 4 - 24 hours.
515	General purpose, fast setup, flexible-cure gasket eliminator. For nonrigid assemblies subject to shock, vibration or deflection.	Purple	Use Locquic "N" primer for faster (1/4 - 2 hours) setup. Unprimed setup 1 - 12 hours.

IV. "Loctite®" Retaining Compounds

Product	Application	Colour	Notes
609	For bushings, sleeves, press fit bearings, splines and collars. For gaps to 0.0002 mm (0.005"), temperatures to 121°C (250°F).	Green	Use Locquic "N" primer for increased bond strength and all cold temperature applications.
620	For high temperatures to 232°C (450°F).	Green	Same as 609, above.
680	For high strength bonds and tight clearance gaps, to 0.00008 mm (0.002").	Green	Same as 609, above.

V. "Loctite®" Adhesives

Product	Application	Colour	Notes
380	Black Max instant adhesive for shock and vibration-resistant bonds.	Black	May take 120 hours to reach full cure strength.
454	Adhesive for porous surfaces.	Clear	Full strength in 24 hours.
480	Increased strength (+50%), shock and vibration-resistant.	Black	Full strength in 24 hours.

Pallet Forks

APPROVED MODELS AND REQUIREMENTS

Selecting Pallet Forks

If pallet forks are installed, consider the equipment's stability and suitability for such modification. Contact *DOOSAN* for authorization and approval of attachments and their compatibility.

IMPORTANT

If an attachment is installed without *DOOSAN's* authorization, it may create a serious malfunction which will not be covered under the wheel loader warranty or the attachment warranty.



WARNING

AVOID DEATH OR SERIOUS INJURY

Never use attachments or buckets which are not approved by *DOOSAN*. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause death or serious injury.

The following machines (listed below) are approved for use with pallet forks, see your *DOOSAN* distributor for an available hydraulic quick coupler kit for your wheel loader model.

Wheel Loader Model	Pallet Fork (5 Ton)	Pallet Fork (7 Ton)	Pallet Fork (9 Ton)
DL200-3	X	X	
DL250-3	X	X	
DL300-3	X	X	X
DL350-3	X	X	X
DL420-3	X	X	X

NOTE: *The lifting capacity of the wheel loader is reduced when the hydraulic quick coupler and pallet forks are installed.*

NOTE: See the specifications for the weight of the hydraulic quick coupler and pallet forks approved for your wheel loader. This weight must be subtracted from the wheel loaders tipping capacity.

Additional Requirements

Protective Structures

In a work site where falling objects, roll over or hazardous flying objects may occur, be sure to install safety guards to protect the operator. Contact your *DOOSAN* distributor for kits available for your model wheel loader.

Be sure to install all protective structures required for work site conditions.



WARNING

AVOID DEATH OR SERIOUS INJURY

Some attachment applications can cause flying debris or objects to enter front, top or rear cab openings. Install protective structures required for work site conditions to provide added operator protection in these applications.

Never attempt to alter or modify any protective structure reinforcement system.



WARNING

AVOID DEATH OR SERIOUS INJURY

Never modify or alter protective structure(s) by welding, grinding, drilling holes or adding attachments. Modifying a protective structure can cause loss of operator protection and result in injury or death.

Attachment Precautions

Optional piping / valving and auxiliary control kits are available through your distributor. Because *DOOSAN* cannot anticipate, identify or test all the attachments that owners may wish to install on their machines, please contact your *DOOSAN* distributor for authorization and approval of attachments and their compatibility with optional kits.



WARNING

AVOID DEATH OR SERIOUS INJURY

Never use attachments or buckets which are not approved by *DOOSAN*. Buckets and attachments for safe loads of specified densities are approved for each model. Unapproved attachments can cause serious injury or death.

INSTALLING ATTACHMENT

Mounting Attachment on Hydraulic Quick Coupler

See “Mounting Attachment on Hydraulic Quick Coupler” on page 3-8.

OPERATION

After forks are installed onto frame, install bolt into threaded hole (1, Figure 1) to prevent forks from coming off frame.



WARNING

AVOID DEATH OR SERIOUS INJURY

Install bolt into the lower frame threaded hole to prevent the forks from coming off the frame.

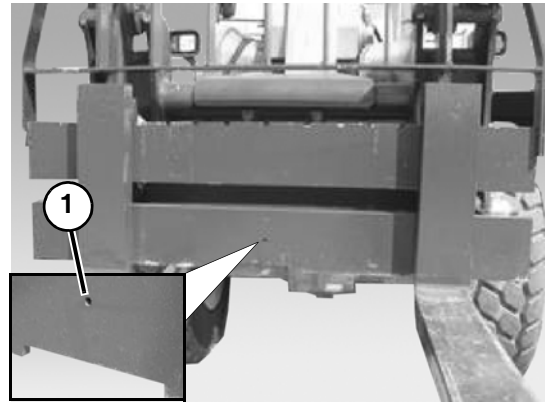


Figure 1

The pallet fork maximum weight capacity is based using two forks, with the load Centre of Gravity located horizontally at 500 mm (19.69 in) from the front face of fork arm shank.

Only use pallet forks to load / unload items. Always use two forks, do not use a single fork (Figure 2).

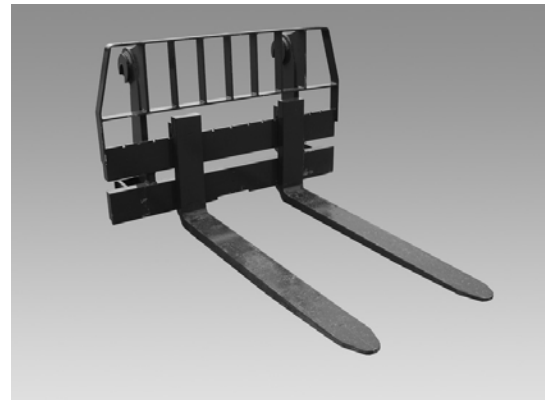


Figure 2

Keep the forks level and spread wide as possible (Figure 3).



WARNING

AVOID DEATH OR SERIOUS INJURY

Never use forks for pushing, pulling, prying, etc., improper use of forks may cause death or serious injury.



Figure 3

Position the load against the back of the pallet fork (Figure 4).



Figure 4

Always keep the load level by adjusting the Z-bar as you raise or lower the lift arms (Figure 5).



Figure 5

TRAVEL

General Travel Instructions

Carry load low with forks parallel to the ground.

Set pilot cutoff switch to "O" (LOCKED) position. This will prevent boom and / or attachment from moving during travel, due to accidental movement of the pilot control valve levers or joystick.

NOTE: *Make sure the pilot cutoff switch is set to the "O" (LOCKED) position.*

Refer to wheel loader's Operation & Maintenance Manual for information on travelling with wheel loader.



WARNING

When travelling at high-speed or on a steep hill, do not make sharp changes in direction. This could cause the machine to overturn.

When travelling or changing direction, always look to be certain that there is no obstructions or objects in the path of the wheel loader.

REMOVING ATTACHMENT

Removing Attachment From Hydraulic Quick Coupler

See "Removing Attachment From Hydraulic Quick Coupler" on page 3-14.

Specification

PALLET FORK OVERALL DIMENSIONS

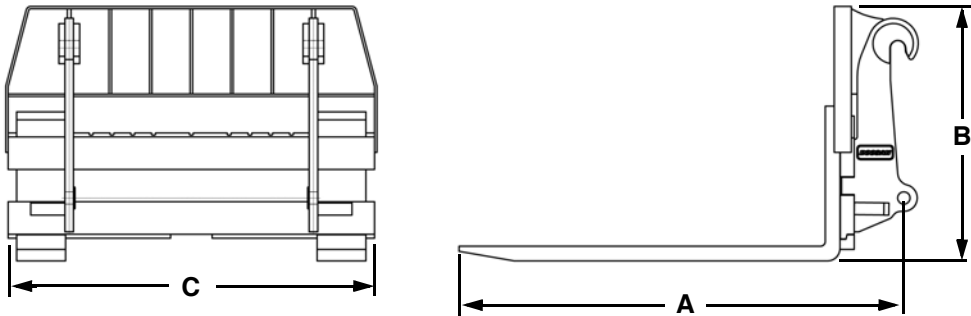


Figure 6

DIMENSION	QC PALLET FORK (5 TON)	QC PALLET FORK (7 TON)	QC PALLET FORK (9 TON)
Length (Dim A)	1811 mm (71.30 in)	1821 mm (71.69 in)	1821 mm (71.69 in)
Height (Dim B)	1045 mm (41.14 in)	1045 mm (41.14 in)	1045 mm (41.14 in)
Width (Dim C)	1500 mm (59.06 in)	1500 mm (59.06 in)	1500 mm (59.06 in)
Weight	545 kg (1201.5 lb)	625 kg (1377.9 lb)	805 kg (1774.7 lb)

Numerics

- 10 Hour / Daily Service 4-8
- 100 Hour Service 4-11
- 250 Hour / Monthly Service 4-12
- 50 Hour / Weekly Service 4-9

A

- Approved Models and Requirements 3-3
 - Additional Requirements 3-4
 - Attachment Precautions 3-4
 - Protective Structure 3-4
 - Selecting Hydraulic Quick Coupler 3-3

E

- Entering and Exiting Wheel Loader 3-5
 - Entering 3-5
 - Exiting 3-6

G

- Grease Hydraulic Quick Coupler 4-8

H

- Hydraulic Quick Coupler
 - Overall Dimensions 7-4
- Hydraulic Quick Coupler Specifications 7-3
- Hydraulic Quick Coupler Switch 2-3
- Hydraulic Schematic 7-1

I

- Identification and Machine Signs (Decals) 1-3
- Inspection
 - Curl In (Rollback) and Curl Out (Dump) Stops 4-9
 - Hydraulic Hoses 4-8
- Inspection, Maintenance and Adjustment 4-1
- Installing Attachment 3-8
 - Mounting Attachment on Hydraulic Quick Coupler 3-8

J

- Joystick (Optional) 2-2

M

- Maintenance Intervals 4-5
 - Service Intervals 4-5
- Mounting / Retaining Hardware 4-8

O

- Operating
 - Controls 2-1
 - Precautions 3-4
- Operation 3-1

P

- Pallet Forks 8-1
- Pilot Control Valve 2-2
- Preliminary Setup for Maintenance 4-3
- Preventive Maintenance 4-1

Q

- Quick Coupler Frame and Locking Pin Inspection 4-8

R

- Removing Attachment 3-14
 - Removing Attachment From Hydraulic Quick Coupler 3-14

S

- Safety 1-1
- Safety Precautions 4-2
- Service Intervals 4-5
- Specification 7-1
 - Electrical Schematic 7-2
 - Hydraulic Quick Coupler
 - Overall Dimensions 7-4
 - Specifications 7-3
 - Hydraulic Schematic 7-1
- Standard Torques 7-5
- Torque Values 7-5
 - Hose Clamps 7-9
 - Metric Fasteners 7-5
 - Phosphate Coated Hardware 7-8
 - Split Flanges 7-9
 - U.S. Fasteners 7-6
- Torque Wrench Extension Tools 7-10

T

- Table of Recommended Lubricants 4-4
- Transportation 5-1
- Transporting 5-1
 - Wheel Loader and Attachment 5-1
- Travel 3-13
- Troubleshooting 6-1
 - Hydraulic Quick Coupler 6-1
- Two / Three Lever (Optional) 2-2