



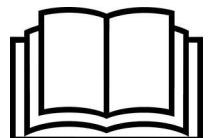
EN

Operation & Maintenance Manual

Bucket, Rock, and Root Grapples



Grapple Bucket 62 S/N: B68900101 & Above
Grapple Bucket 68 S/N: B66E00101 & Above
Grapple Bucket 74 S/N: B66D00101 & Above
Grapple Bucket 82 S/N: B66C00101 & Above
Grapple Rock 62 S/N: B68H00101 & Above
Grapple Rock 68 S/N: B68G00101 & Above
Grapple Rock 74 S/N: B68F00101 & Above
Grapple Rock 82 S/N: B68E00101 & Above
Grapple Root 62 S/N: B68A00101 & Above
Grapple Root 68 S/N: B68B00101 & Above
Grapple Root 74 S/N: B68C00101 & Above
Grapple Root 82 S/N: B68D00101 & Above



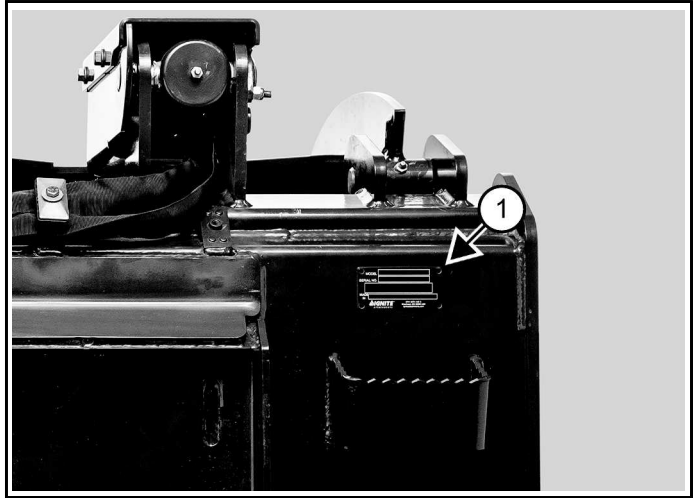


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MANUFACTURER**North America**

Ignite Attachments
2741 20th Avenue South
Moorhead, MN 56560

SERIAL NUMBER LOCATION**Attachment Serial Number****Figure 1**

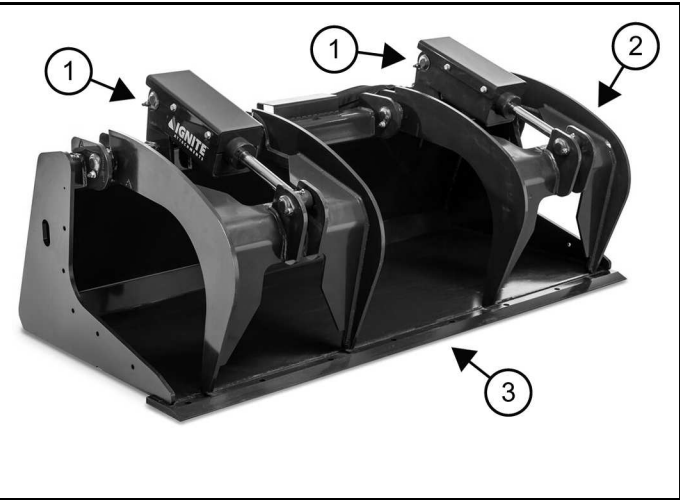
C220733a

Always use the serial number (Item 1) [Figure 1] of the grapple when requesting service information or when ordering parts. Earlier or later models (identification made by serial number) may use different parts, or it may be necessary to use a different procedure in doing a specific service operation.

ATTACHMENT IDENTIFICATION

Bucket Grapple

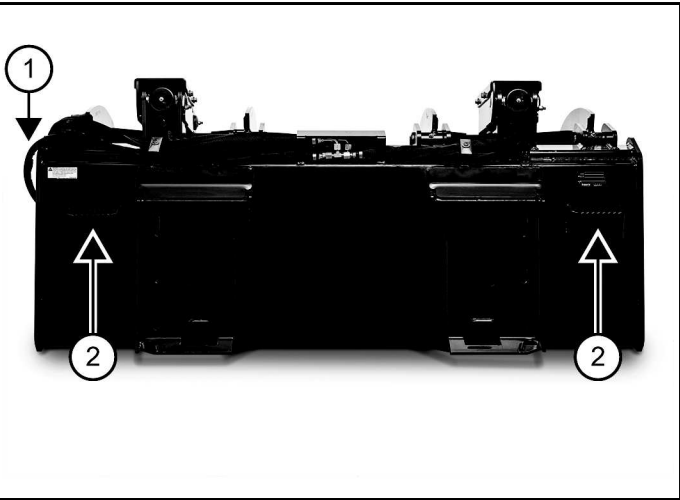
Figure 2



C220515a

REF.	Description
1	Hydraulic Cylinder
2	Grapple Fork
3	Cutting Edge

Figure 3

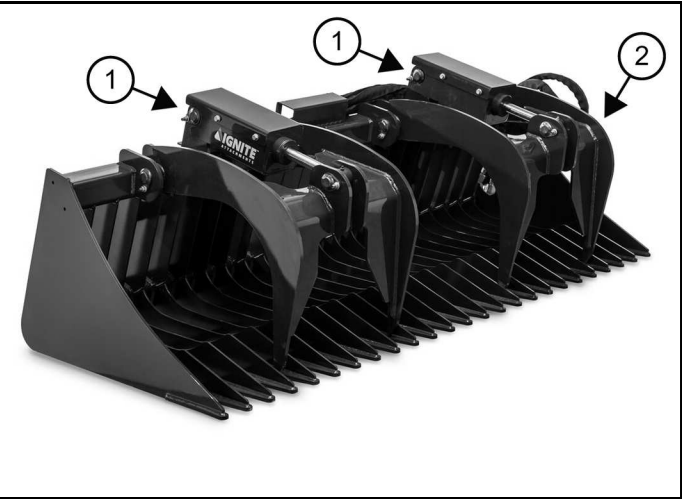


C220516c

REF.	Description
1	Hydraulic Quick Coupler
2	Step

Rock Grapple

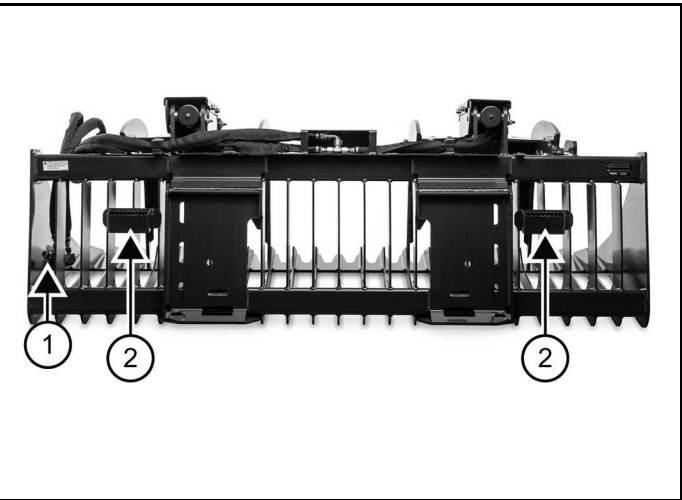
Figure 4



C220511a

REF.	Description
1	Hydraulic Cylinder
2	Grapple Fork

Figure 5

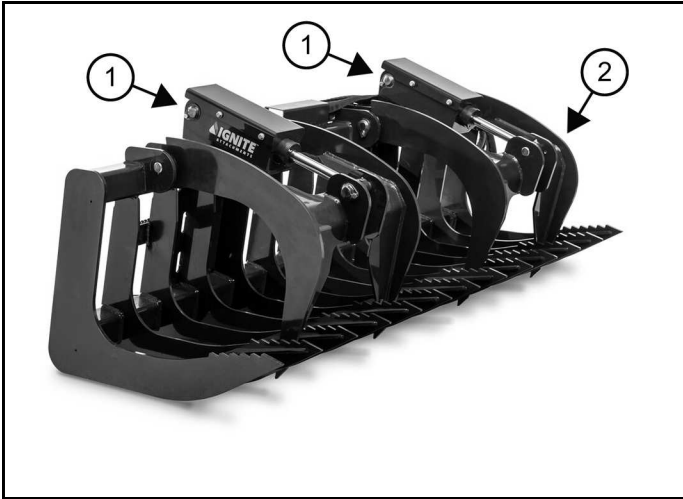


C220512a

REF.	Description
1	Hydraulic Quick Coupler
2	Step

Root Grapple

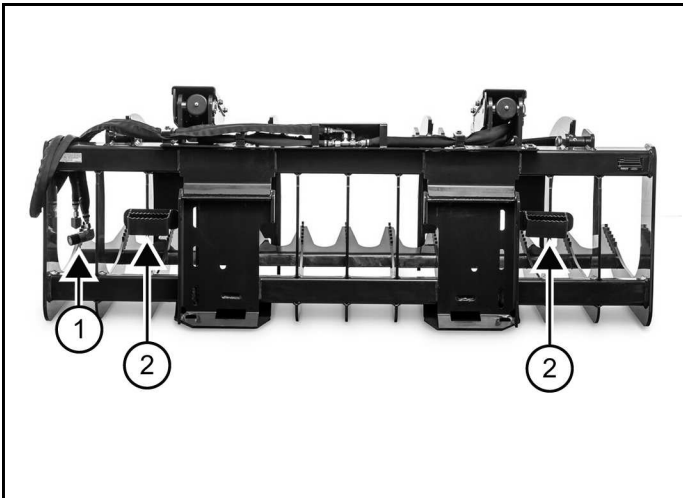
Figure 6



C220513a

REF.	Description
1	Hydraulic Cylinder
2	Grapple Fork

Figure 7



C220514a

REF.	Description
1	Hydraulic Quick Coupler
2	Step

FEATURES AND ACCESSORIES

Standard Items

The attachment is equipped with the following standard items:

- Fully Enclosed Cylinder Covers (All Models)
- Reversible Left / Right Hydraulic Hose Routing (All Models)
- Flush Face Connect Under Pressure Hydraulic Quick Couplers (All Models)
- Profiled Skeletal Teeth (Root and Rock Grapples)

Options And Accessories

Below is a list of options and accessories available for your attachment. Contact your Ignite Attachments representative for other available options and accessories.

- Bolt-On Side Plates (Bucket Grapple)
- Reversible Bolt-On Cutting Edges (Bucket Grapple)

Special Applications Kit For Attachment Carriers

WARNING

IMPACT AND PUNCTURE HAZARD

Flying debris or objects entering the operator cab can cause serious injury or death.

Some attachment / implement applications can cause flying debris or objects to enter the front, top or rear cab openings. *

W-3198

See your Machine's Operation & Maintenance Manual or carrier representative for kits that restrict objects from entering the operator's cab in these applications.

SAFETY INSTRUCTIONS

Safe Operation Is The Operator's Responsibility




Safety Alert Symbol

This symbol with a warning statement means: "Warning, be alert! Your safety is involved!" Carefully read the message that follows.



DANGER

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



WARNING

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



IMPORTANT

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

The machine and attachment must be in good operating condition before use.

Safe Operation Needs A Qualified Operator

For an operator to be qualified, he or she must not use drugs or alcoholic drinks which impair alertness or coordination while working. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine.

Use Safety Rules

- Read and follow instructions in the machine and the attachment's Operation & Maintenance Manual before operating.
- Check for underground lines before operating attachment (if applicable).
- In addition to the design and configuration of equipment, hazard control, and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of equipment.
- Check that the attachment is securely fastened to the machine.

- Make sure all the machine controls are in the neutral position before starting the machine.
- Operate the attachment only from the operator's position.
- Operate the attachment according to the Operation & Maintenance Manual.
- When learning to operate the attachment, do it at a slow rate in an area clear of bystanders.
- DO NOT permit personnel to be in the work area when operating the machine and attachment.
- The attachment must be used ONLY on approved machines. Visit igniteattachments.com for an updated list of approved attachments for each machine model.
- DO NOT modify equipment or add attachments that are not approved by the manufacturer.
- DO NOT make any adjustments or repairs on the machine or attachment while the engine is running.
- Keep shields and guards in place. Replace if damaged.

Call Before You Dig

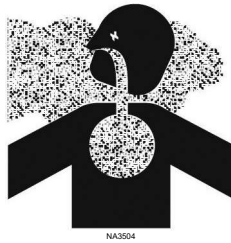


Dial 811 (USA Only)

Dial 1-888-258-0808 (USA & Canada)

When you call, you will be directed to a location in your state / province / city for information about buried lines (telephone, cable TV, water, sewer, gas, etc.).

Silica Dust Exposure



Silica dust can cause lung disease and is known to the state of California to cause cancer.

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.

FIRE PREVENTION



Maintenance

The machine and some attachments have components that are at high temperatures under normal operating conditions. The primary source of high temperatures is the engine and exhaust system. The electrical system, if damaged or incorrectly maintained, can be a source of arcs or sparks.

Flammable debris (leaves, straw, etc.) must be removed regularly. If flammable debris is allowed to accumulate, it can cause a fire hazard. Clean often to avoid this accumulation. Flammable debris in the engine compartment is a potential fire hazard.

The operator's area, engine compartment, and engine cooling system must be inspected every day and cleaned if necessary to prevent fire hazards and overheating.

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

Operation

Do not use the machine where exhaust, arcs, sparks, or hot components can contact flammable material, explosive dust, or gases.

Electrical



P200082

Check all electrical wiring and connections for damage. Keep the battery terminals clean and tight. Repair or replace any damaged part or wires that are loose or frayed.

Battery gas can explode and cause serious injury. Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump starting. Do not jump start or charge a frozen or damaged battery. Keep any open flames or sparks away from batteries. Do not smoke in battery charging area.

Hydraulic System

Check hydraulic tubes, hoses and fittings for damage and leakage. Never use open flame or bare skin to check for

leaks. Hydraulic tubes and hoses must be properly routed and have adequate support and secure clamps. Tighten or replace any parts that show leakage.

Always clean fluid spills. Do not use gasoline or diesel fuel for cleaning parts. Use commercial nonflammable solvents.

Fueling



Stop the engine and let it cool before adding fuel. No smoking! Do not refuel a machine near open flames or sparks. Fill the fuel tank outdoors.

Ultra Low Sulfur Diesel (ULSD) poses a greater static ignition hazard than earlier diesel formulations with higher sulfur content. Avoid death or serious injury from fire or explosion. Consult with your fuel or fuel system supplier to ensure the delivery system is in compliance with fueling standards for proper grounding and bonding practices.

Starting

Do not use ether or starting fluids on any engine that has glow plugs or an air intake heater. These starting aids can cause explosion and injure you or bystanders.

Use the procedure in the Operation & Maintenance Manual for connecting the battery and for jump starting.

Spark Arrester Exhaust System

The spark arrester exhaust system is designed to control the emission of hot particles from the engine and exhaust system, but the muffler and the exhaust gases are still hot.

Check the spark arrester exhaust system regularly to make sure it is maintained and working properly. Use the procedure in the Operation & Maintenance Manual for cleaning the spark arrester muffler (if equipped).

Welding And Grinding

Always clean the machine and attachment, disconnect the battery, and disconnect the wiring from the Ignite Attachments controllers before welding. Cover rubber hoses, battery, and all other flammable parts. Keep a fire extinguisher near the machine when welding.

Have good ventilation when grinding or welding painted parts. Wear a dust mask when grinding painted parts. Toxic dust or gas can be produced.

Dust generated from repairing nonmetallic parts such as hoods, fenders, or covers can be flammable or explosive. Repair such components in a well-ventilated area away from open flames or sparks.

Fire Extinguishers



Know where fire extinguishers and first aid kits are located and how to use them. Inspect the fire extinguisher and service the fire extinguisher regularly. Obey the recommendations on the instructions plate.

PUBLICATIONS AND TRAINING RESOURCES

The following publications are also available for your Ignite Attachments product. Access them online at igniteattachments.com.



Operation & Maintenance Manual

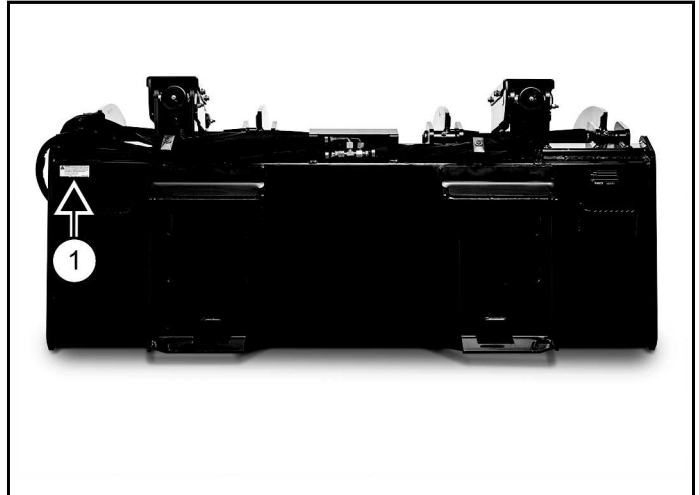
Complete instructions on the correct operation and the routine maintenance of your Ignite Attachments product.
7498299

For the latest information on Ignite Attachments products and the Ignite Attachments Company, visit our website at igniteattachments.com



ATTACHMENT SIGNS (DECALS)

NOTE: The location of the decal is the same on the bucket, rock, and root grapples.

Figure 8



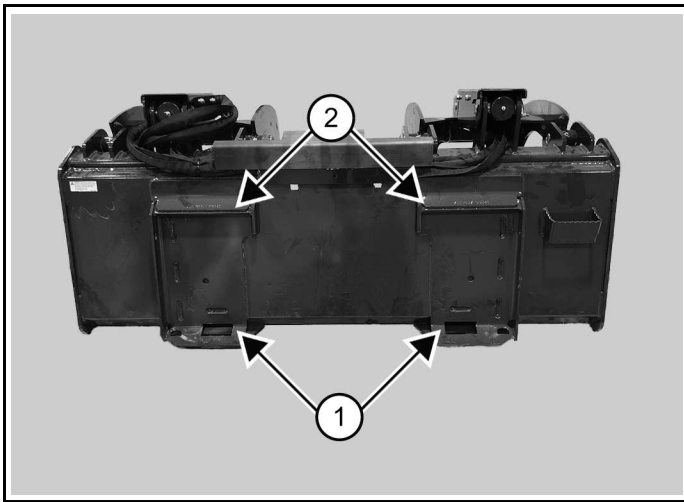
C220510b

REF.	DECAL
1	<p>Emissions Warning</p> <p>Located on the back of the frame</p> <p>73536420IG</p> <div>  <p>WARNING: This product can expose you to chemicals including lead and lead compounds, mineral oils, and phthalates which are known to the State of California to cause cancer and birth defects or other reproductive harm.</p> <p>For more information go to www.P65Warnings.ca.gov.</p> <p>SW 21 73536420IG enUS</p>  <p>73536420IG</p> </div>

DAILY INSPECTION

Inspecting The Attachment Mounting Frame

Figure 9



Inspect the attachment mounting frame wedge mounts (Item 1), mounting flanges (Item 2) [Figure 9], and all welds on the grapple for wear and damage each time the grapple is removed from the machine.

Frequently inspect the grapple to ensure that all components are secure and that all bolts and nuts are thoroughly tightened.

Inspecting The Machine Quick Coupler

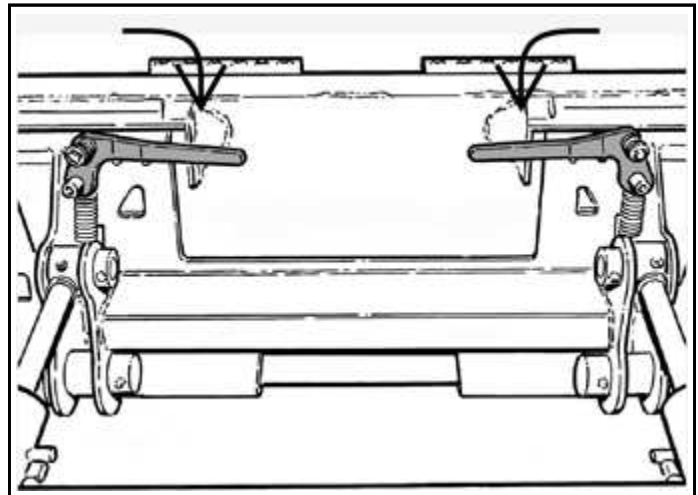
WARNING

CRUSHING HAZARD

Failure to secure attachment coupler wedges can allow attachment to come off and cause serious injury or death.

Both wedges must extend through the holes in the attachment mounting frame. Levers must be fully down and locked.

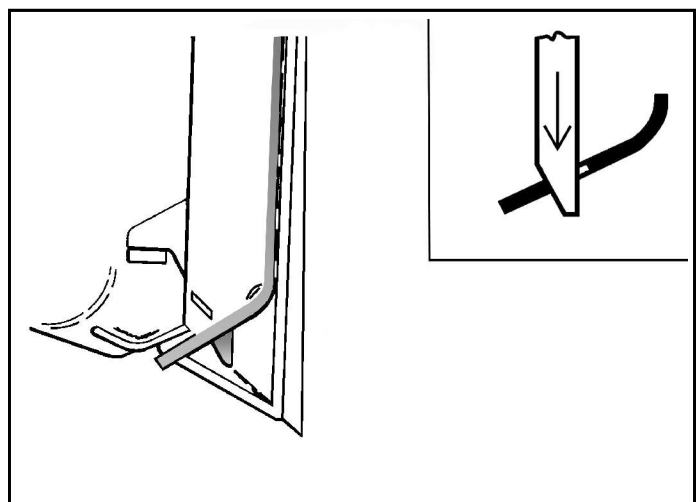
Figure 10



- Lower down the quick coupler levers until they are fully engaged in the locked position [Figure 10] (wedges fully extended through the attachment mounting frame holes).

The levers and wedges must move freely [Figure 10].

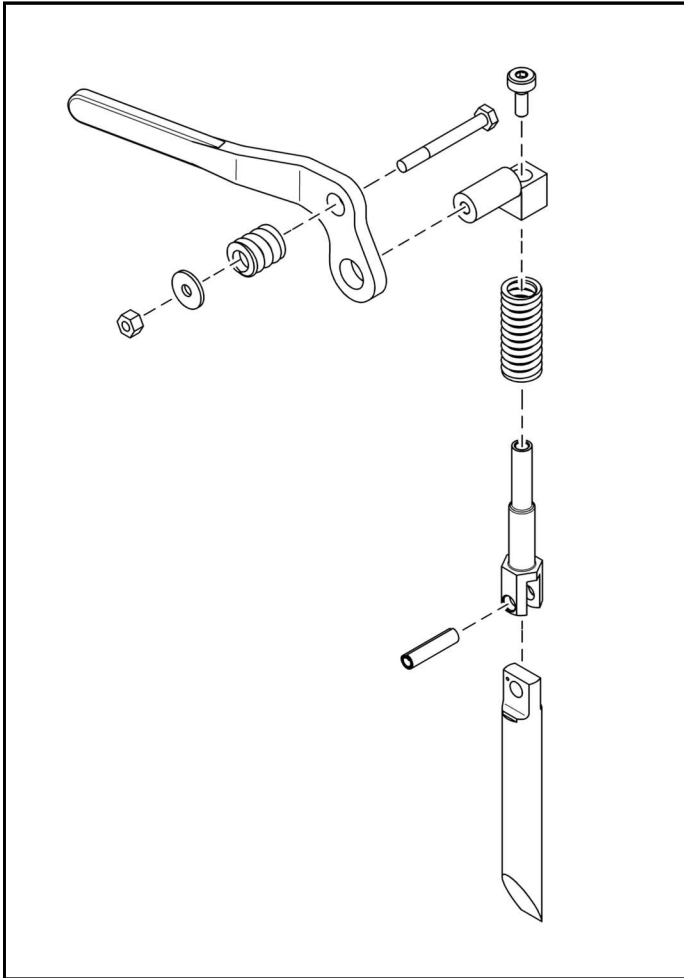
Figure 11



The wedges must extend through the holes in the attachment mounting frame, securely fastening the attachment to the machine quick coupler [Figure 11].

If the wedge does not contact the lower edge of the hole, the attachment will be loose and can come off the quick coupler.

Figure 12



NA13086S

- Inspect the attachment mounting frame.
- Replace any parts that are damaged, bent, or missing [Figure 12].
- Keep all fasteners tight.
- Look for cracked welds.
- Contact your Ignite Attachments representative for replacement parts.
- Lubricate the wedges. (See the machine's Operation & Maintenance Manual for the correct procedure.)

OPERATING PROCEDURE

Approved Models And Requirements

	Model	Minimum ROC of Carrier	Maximum HP of Carrier	Maximum Hydraulic Pressure
Bucket Grapple	62 Inch	590 kg (1300 lb)	Up to 75 HP	241 Mpa (3500 psi)
	68 Inch	590 kg (1300 lb)	Up to 75 HP	241 Mpa (3500 psi)
	74 Inch	726 kg (1600 lb)	Up to 75 HP	241 Mpa (3500 psi)
	82 Inch	816 kg (1800 lb)	Up to 75 HP	241 Mpa (3500 psi)
Rock Grapple	62 Inch	635 kg (1400 lb)	Up to 75 HP	241 Mpa (3500 psi)
	68 Inch	680 kg (1500 lb)	Up to 75 HP	241 Mpa (3500 psi)
	74 Inch	726 kg (1600 lb)	Up to 75 HP	241 Mpa (3500 psi)
	82 Inch	816 kg (1800 lb)	Up to 75 HP	241 Mpa (3500 psi)
Root Grapple	62 Inch	590 kg (1300 lb)	Up to 75 HP	241 Mpa (3500 psi)
	68 Inch	635 kg (1400 lb)	Up to 75 HP	241 Mpa (3500 psi)
	74 Inch	680 kg (1500 lb)	Up to 75 HP	241 Mpa (3500 psi)
	82 Inch	816 kg (1800 lb)	Up to 75 HP	241 Mpa (3500 psi)

The chart shows the approved grapple models for machines based on minimum Rated Operating Capacity (ROC), maximum horsepower, and maximum hydraulic pressure. To prevent potential overloading issues, compare the machine's rated operating capacity to the weight of the attachment, plus the estimated weight of the load. Never attempt to lift more than the rated operating capacity of the loader (attachment weight and load). See the Specification section for the weight of your grapple. (See Specifications on Page 33)

WARNING

INSTABILITY HAZARD

Excessive load can cause loss of control or tipping leading to serious injury or death.

DO NOT exceed Rated Operating Capacity (ROC). ◀

W-2053

Warranty on this attachment is void if used on a non-approved carrier. Contact your Ignite Attachments representative for a current list of approved carriers.

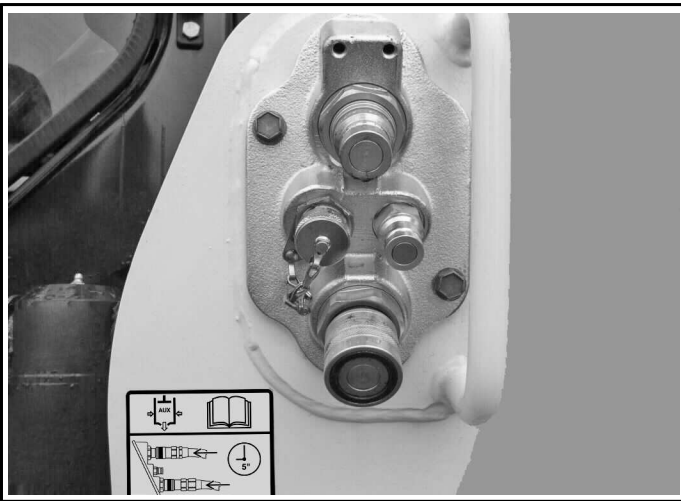
⚠ WARNING

MODIFICATION AND INSUFFICIENT INSTRUCTION HAZARD

Use of unapproved attachments / implements or improperly sized attachments / implements can cause serious injury or death. Attachments / implements and buckets for safe loads of specified densities are approved for each model. Never use attachments / implements or buckets which are not approved by Ignite Attachments. ◀

W-2662

Figure 13



p-85281

The machine must be equipped with front auxiliary hydraulics [Figure 13] for proper operation of the grapple. Contact your machine's manufacturer for available kits for your model machine.

Machine / Attachment Setup

Port Relief Valve

Before installing the grapple, verify that the machine has the port relief valve and / or restrictor needed for proper operation of the grapple. See the machine's Operation & Maintenance Manual to verify if a port relief valve and / or restrictor is needed.

Entering And Exiting The Machine

⚠ WARNING

GENERAL HAZARD

Failure to obey warnings can cause serious injury or death.

Obey all warnings on the machine and in the manuals. ◀

W-2744

Figure 14



C216077a

Use the attachment / implement steps (if equipped), grab handles, and safety treads (on the machine and frame) to get in and out of the machine, maintaining a three-point contact at all times [Figure 14]. Do not jump.

See the machine's Operation & Maintenance Manual for detailed instructions on entering and exiting the machine.

Installing The Attachment

Installing With Non-powered Machine Quick Coupler

The illustrations and instructions provided explain how to install a bucket attachment onto a machine. Follow these same instructions if you are installing different attachments such as a grapple, snow pusher, sweeper, etc.

The attachment mounting frame for the attachment has a top flange that is designed to receive the top edge of the machine quick coupler and the lower part of the frame is designed to receive the quick coupler wedges.

⚠ WARNING

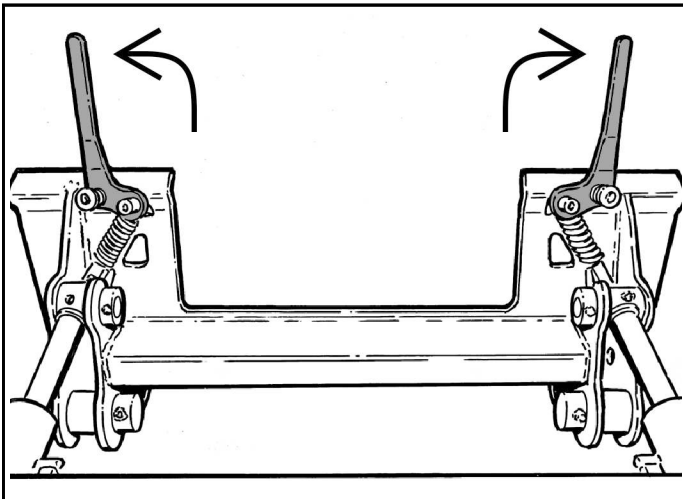
GENERAL HAZARD

Failure to obey warnings can cause serious injury or death.

Obey all warnings on the machine and in the manuals. ◀

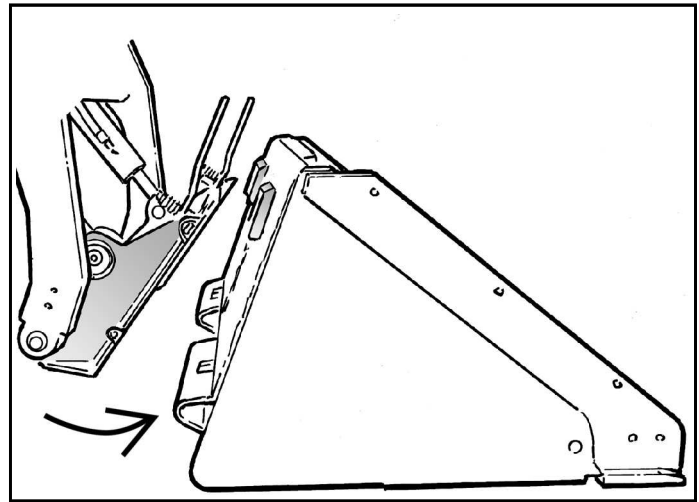
Always inspect the machine's quick coupler and the attachment mounting frame before installation. (See the machine's Operation & Maintenance Manual.) (See Daily Inspection on Page 10)

Figure 15



1. Pull the quick coupler levers up until they are fully raised (wedges fully raised) [Figure 15].
2. Enter the machine.
3. Turn the machine on.
4. Release the parking brake.
5. Lower the lift arms and tilt the machine quick coupler forward.

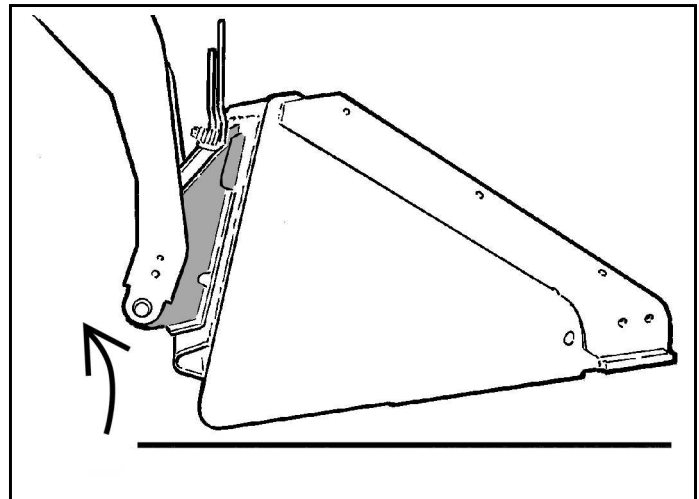
Figure 16



6. Drive the machine slowly forward until the top edge of the quick coupler is completely under the top flange of the attachment [Figure 16].

NOTE: Be sure the quick coupler levers do not hit the attachment.

Figure 17



7. Tilt the quick coupler backward until the attachment is slightly off the ground [Figure 17].

This will cause the attachment mounting frame to fit up against the front of the quick coupler.

NOTE: When leaving the operator's seat to install an attachment, tilt the attachment until it is slightly off the ground.

8. Turn the machine off and exit the machine.

⚠ WARNING

GENERAL HAZARD

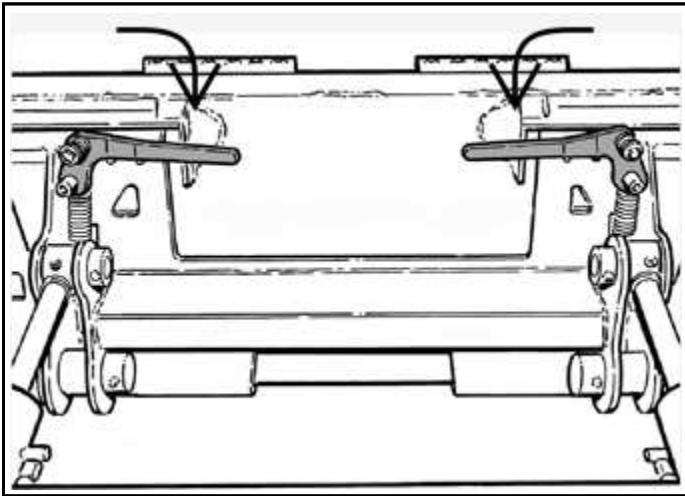
Failure to follow instructions can cause serious injury or death.

Before you leave the operator's seat:

- Lower the lift arms and put the attachment / implement flat on the ground.
- Engage the parking brake.
- Move all controls to the **NEUTRAL / LOCKED** position to make sure the lift, tilt, and drive functions are deactivated.
- Stop the engine. ◀

W-3156

Figure 18



NA3445A

9. Push down on the quick coupler levers until they are fully engaged in the locked position [Figure 18] (wedges are fully extended through the attachment mounting frame holes).

If both levers do not engage in the locked position, see your machine dealer or representative for maintenance.

⚠ WARNING

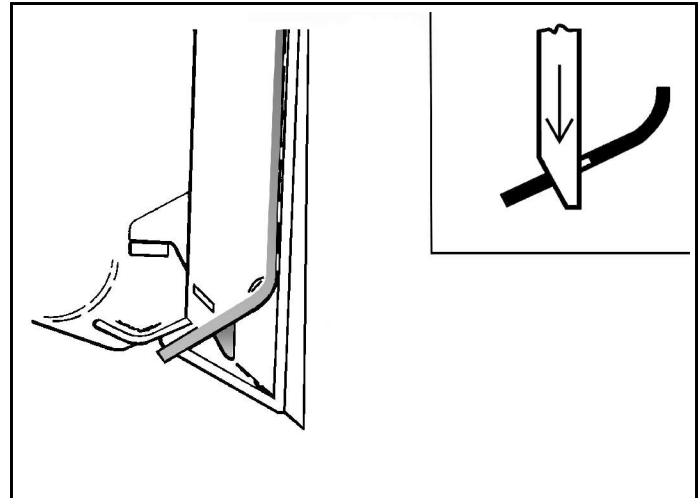
CRUSHING HAZARD

Failure to secure attachment coupler wedges can allow attachment to come off and cause serious injury or death.

Both wedges must extend through the holes in the attachment mounting frame. Levers must be fully down and locked. ◀

W-2715-EF

Figure 19



NA3450A

The wedges must extend through the holes in the attachment mounting frame, securely fastening the attachment to the quick coupler [Figure 19].

Installing With Powered Machine Quick Coupler

⚠ WARNING

GENERAL HAZARD

Failure to obey warnings can cause serious injury or death.

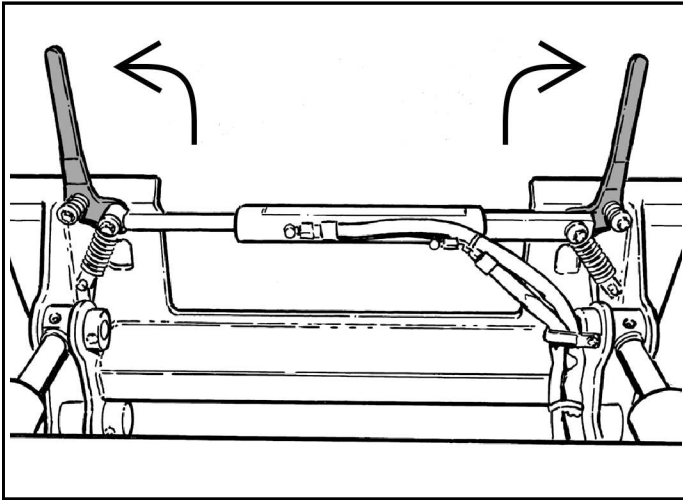
Obey all warnings on the machine and in the manuals. ◀

W-2744

Some machines may be equipped with a powered machine quick coupler. For specific control location and operation of the machine's powered quick coupler, see the machine's Operation & Maintenance Manual.

1. Enter the machine.
2. Turn the machine on.
3. Release the parking brake.

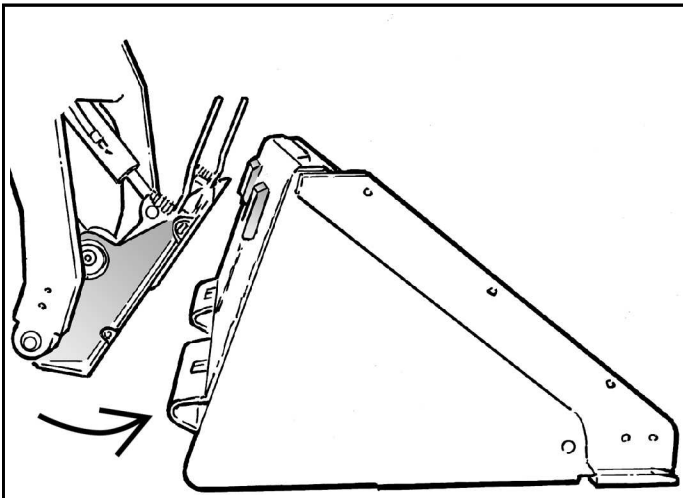
Figure 20



NA3453A

4. Operate the powered quick coupler until the levers are fully raised (wedges fully raised) [Figure 20].
5. Lower the lift arms and tilt the machine quick coupler slightly forward.

Figure 21

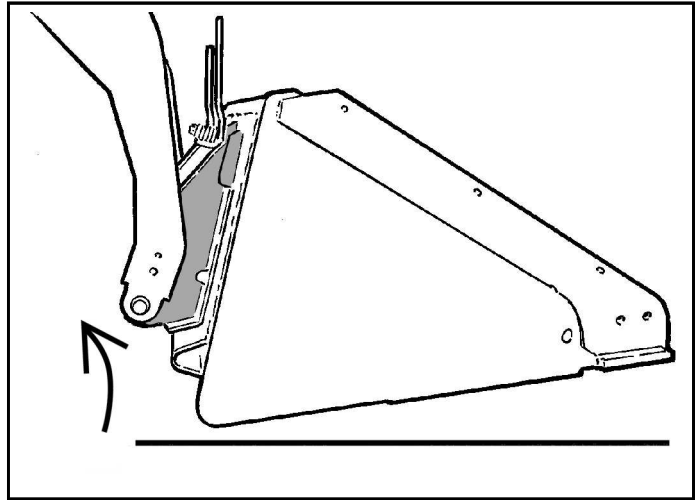


NA3446a

6. Drive the machine slowly forward until the top edge of the quick coupler is completely under the top flange of the attachment mounting frame [Figure 21].

NOTE: Be sure the quick coupler levers do not hit the attachment.

Figure 22



NA3447a

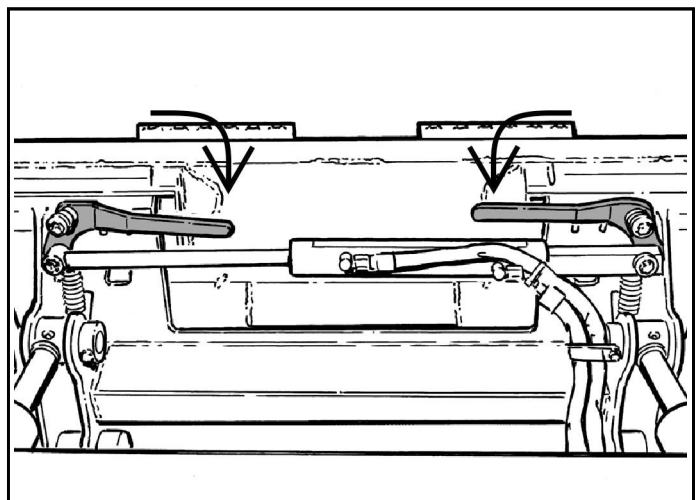
7. Tilt the quick coupler backward until the attachment is slightly off the ground [Figure 22].

This will cause the attachment mounting frame to fit up against the front of the quick coupler.

Some powered quick coupler system have continuous pressurized hydraulic oil to keep the wedges in the engaged position and prevent attachment disengagement. Because the wedges can slowly lower, the operator may need to reactivate the powered quick coupler to be sure both wedges are fully raised before installing the attachment.

8. Operate the powered quick coupler until the levers are fully raised (wedges fully raised).

Figure 23



NA3454A

9. Operate the powered quick coupler until the levers are fully engaged in the locked position [Figure 23] (wedges fully extended through the attachment mounting frame holes).

If both levers do not engage in the locked position, see your machine dealer or representative for maintenance.

⚠ WARNING

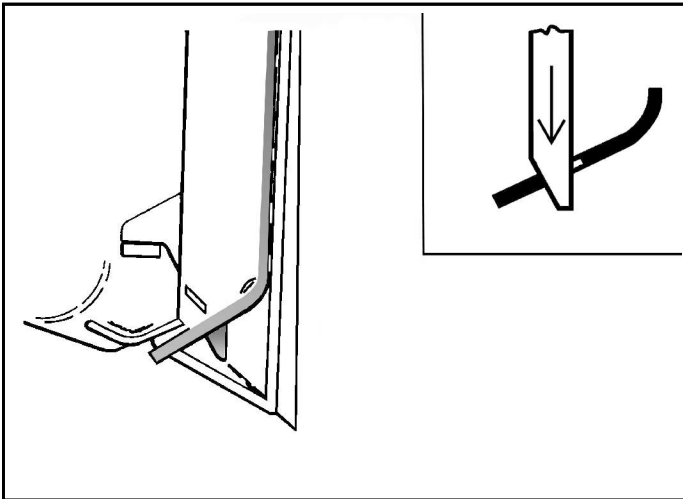
CRUSHING HAZARD

Failure to secure attachment coupler wedges can allow attachment to come off and cause serious injury or death.

Both wedges must extend through the holes in the attachment mounting frame. Levers must be fully down and locked. ◀

W-3156

Figure 24



NA3450A

10. The wedges must extend through the holes [Figure 24] in the attachment mounting frame, securely fastening the attachment to the quick coupler.
11. Lower the lift arms and put the attachment flat on the ground.
12. Turn the machine off and exit the machine.

⚠ WARNING

GENERAL HAZARD

Failure to follow instructions can cause serious injury or death.

Before you leave the operator's seat:

- Lower the lift arms and put the attachment / implement flat on the ground.
- Engage the parking brake.
- Move all controls to the NEUTRAL / LOCKED position to make sure the lift, tilt, and drive functions are deactivated.
- Stop the engine. ◀

W-3156

Connecting The Hydraulic Hoses For The First Time

New attachments are factory equipped with flush face hydraulic quick couplers. If installing an attachment equipped with poppet style couplers, the attachment couplers will have to be changed to match the machine. Contact your Ignite Attachments representative for parts information.

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Failure to follow directions may result in machine damage.

Thoroughly clean the quick couplers before making connections. Dirt can quickly damage the system. Contain and dispose of any oil leakage in an environmentally safe manner. ◀

I-2278

1. With the machine's engine off and using the hose guides (if equipped), route the attachment hydraulic hoses to the machine.
2. Connect the attachment hydraulic quick couplers to the machine's couplers.
(See Hydraulic Quick Couplers on Page 17)
3. Check that the attachment hydraulic hoses are not twisted or contacting any moving parts of the machine or attachment.

NOTE: It may be necessary to loosen the hydraulic quick couplers on the attachment hydraulic hoses to remove any twists in the hoses.

⚠ WARNING

IMPACT AND INJECTION HAZARDS

Flying debris or pressurized fluids can cause serious injury or death.

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

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

W-2019

4. Loosen the hydraulic quick coupler connections on the attachment hydraulic hoses while connected to the machine. Do not remove the hydraulic quick couplers.
5. Rotate the attachment hydraulic hoses as needed so the hoses are not twisted or contacting any moving parts of the machine or attachment.
6. With the twist(s) removed from the hydraulic hoses, tighten the attachment hydraulic quick coupler connections while the couplers are still connected to the machine.

This will help hold the hydraulic hoses in position while tightening.

7. Tighten the hydraulic quick coupler connections to the torque specified in the hydraulic connection specifications.
(See Hydraulic Connection Specifications on Page 41)
8. Enter the machine.
9. Start the engine.
10. Engage auxiliary hydraulics. (See the machine's Operation & Maintenance Manual for correct procedure).

⚠ WARNING

INJECTION HAZARD

Pressurized diesel fuel or hydraulic fluid can penetrate skin and eyes, causing serious injury or death.

Fluid leaks under pressure may not be visible. Use a piece of cardboard or wood to find leaks. DO NOT use your bare hand. Wear safety goggles. If fluid enters skin or eyes, get immediate medical attention from a doctor familiar with this injury. ◀

W-2072

11. Check the attachment hydraulic quick coupler connections for leaks.

Hydraulic Quick Couplers

⚠ IMPORTANT

MACHINE DAMAGE HAZARD

Failure to follow directions may result in machine damage.

Thoroughly clean the quick couplers before making connections. Dirt can quickly damage the system. Contain and dispose of any oil leakage in an environmentally safe manner. ◀

I-2278

New attachments are factory equipped with flush face hydraulic quick couplers. If installing an attachment

equipped with poppet style couplers, the attachment couplers will have to be changed to match the machine. Contact your Ignite Attachments representative for parts information.

NOTE: Make sure the hydraulic quick couplers are fully engaged. If the hydraulic quick couplers do not fully engage, check to see that the couplers are the same size and type.

Connecting Hydraulic Quick Couplers

⚠ WARNING

BURN HAZARD

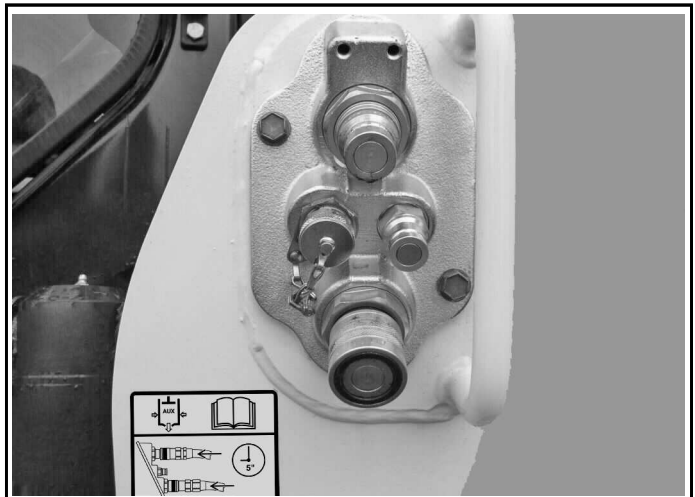
Hydraulic fluid, tubes, fittings and quick couplers can get hot when running machine and attachments / implements.

Be careful when connecting and disconnecting quick couplers. ◀

W-2229

1. Remove any dirt or debris from the surface of both the male and female couplers, and from the outside diameter of the male coupler.

Figure 25



2. Visually check the couplers for corroding, cracking, damage, or excessive wear. If any of these conditions exist, the coupler(s) must be replaced [Figure 25].

3. Install the male coupler into the female coupler.

Full connection is made when the ball release sleeve slides forward on the female coupler [Figure 25].

Check that the attachment hydraulic hoses are not twisted or contacting any moving parts of the machine or attachment. See (See Connecting The Hydraulic Hoses For The First Time on Page 16) for proper adjustment.

Disconnecting Hydraulic Quick Couplers

Always make sure that the oil in the attachment has reached operating temperature prior to disconnecting. Disconnecting the attachment when the oil is cold may result in damage to the system.

1. Relieve hydraulic pressure. (See the machine's Operation & Maintenance Manual for the correct procedure.)
2. Push the couplers together.
3. Retract the sleeve on the female coupler until the couplers disconnect.

Control Functions

1. Enter the machine.
2. Fasten the seat belt and lower the seat bar (if applicable).
3. Start the engine.
4. Activate the auxiliary hydraulics. (See the machine's Operation & Maintenance Manual for correct procedure)
5. To open the grapple, engage the auxiliary hydraulics until the grapple is opened to the desired amount. (See the machine's Operation & Maintenance Manual for correct procedure)
6. To close the grapple, engage the auxiliary hydraulics until the grapple is completely closed. (See the machine's Operation & Maintenance Manual for correct procedure)

If the grapple does not function as explained above, stop the engine. Relieve the auxiliary hydraulic pressure. Exit the machine and switch the couplers on the hoses.

Operating The Grapple

Operating On Slopes With A Full Attachment

NOTE: The illustrations and instructions provided explain how to operate a machine with a generic attachment. Follow these same instructions for all load-carrying attachments.

⚠ WARNING

GENERAL HAZARD
Contact with equipment can cause serious injury or death.
Keep all bystanders 6 m (20 ft) away from equipment when operating. ◀

W-2288

⚠ WARNING

GENERAL HAZARD

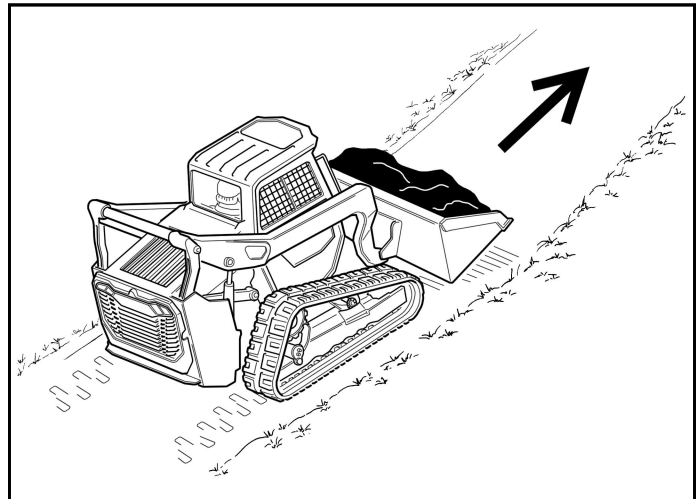
Failure to follow instructions can cause serious injury or death.

When operating the machine:

- Keep the seat belt fastened snugly.
- The seat bar must be lowered.
- Keep your feet on the pedal controls or footrests and hands on the controls. ◀

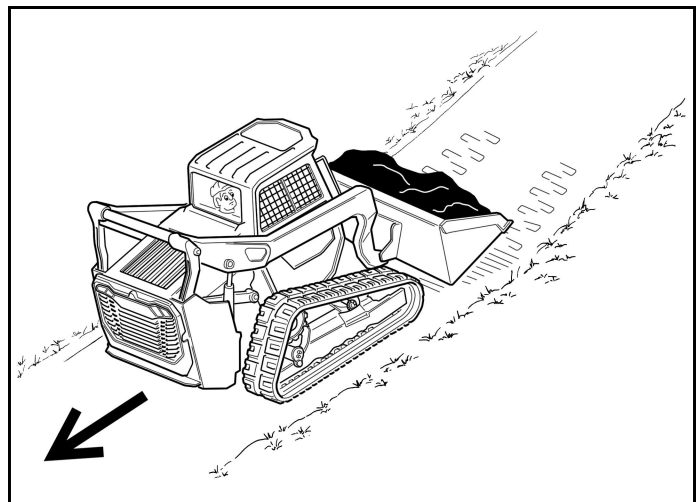
W-2281

Figure 26



NA15864

Figure 27



NA15865

- With a full attachment, drive up or down the slope with the heavy end toward the top of the slope [Figure 26] and [Figure 27].

Operating On Slopes With An Empty Attachment

Figure 28

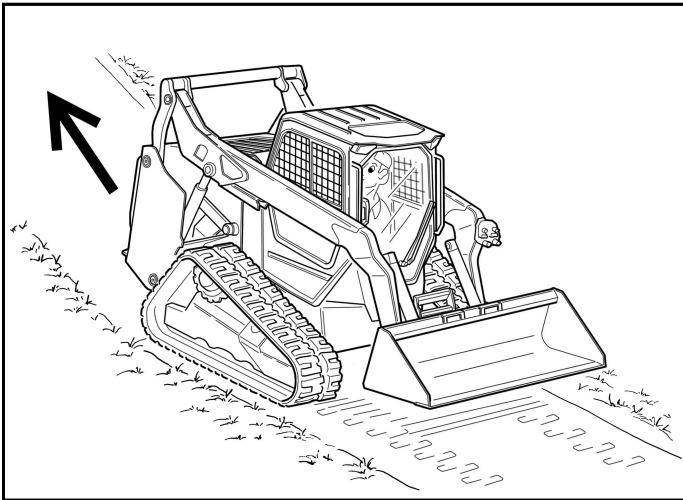
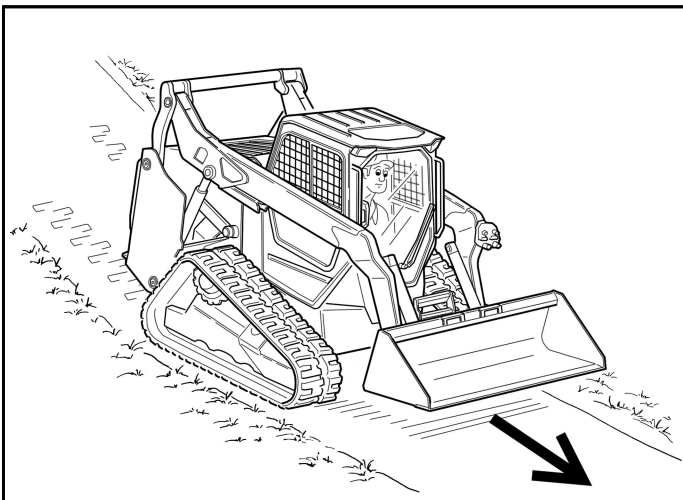


Figure 29



- With an empty attachment, drive up or down the slope with the heavy end toward the top of the slope [Figure 28] and [Figure 29].

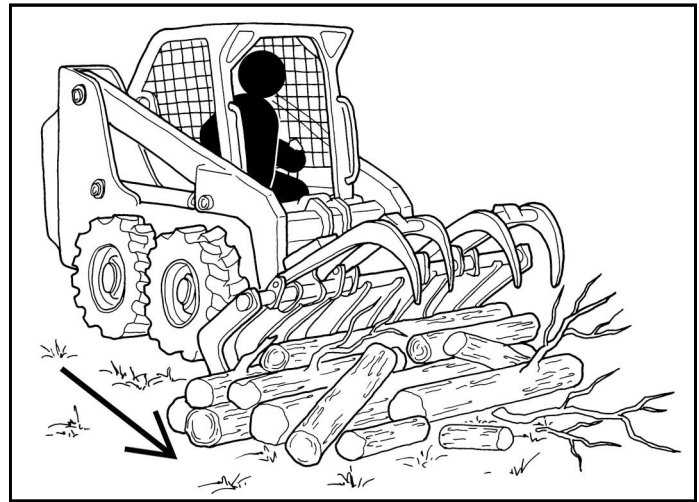
Filling The Grapple

⚠ WARNING

IMPACT AND PUNCTURE HAZARD
Flying debris or objects entering the operator cab can cause serious injury or death. Some attachment / implement applications can cause flying debris or objects to enter the front, top or rear cab openings.

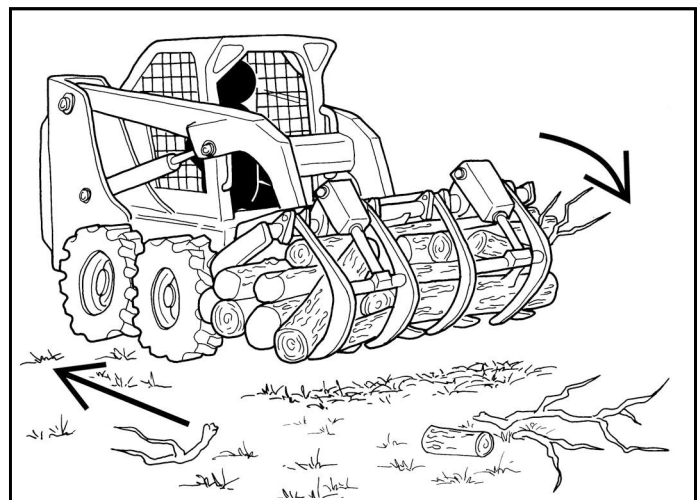
W-3198

Figure 30



1. Open the grapple as far as required [Figure 30].
2. Lower the lift arms all the way [Figure 30].
3. Tilt the grapple forward until the lower edge of the grapple is on the ground [Figure 30].
4. Drive slowly forward into the material [Figure 30].

Figure 31



5. Close the grapple all the way when the grapple is full [Figure 31].
6. Drive backward away from material [Figure 31].

Emptying The Grapple

WARNING

PUNCTURE AND CRUSHING HAZARDS

Tipping forward into an object can cause serious injury or death.

Never dump over an obstruction, such as a post, that can enter the operator cab.

W-2057

WARNING

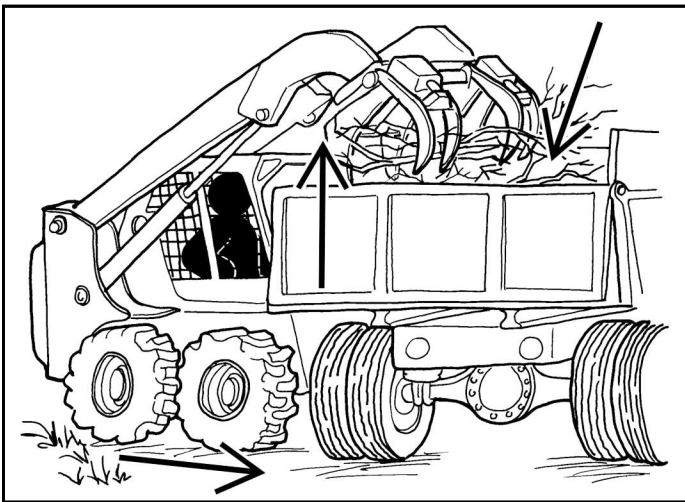
INSTABILITY HAZARD

Machine tipping or rollover can cause serious injury or death.

Load, unload and turn on flat level ground. DO NOT exceed ROC.

W-3199

Figure 32



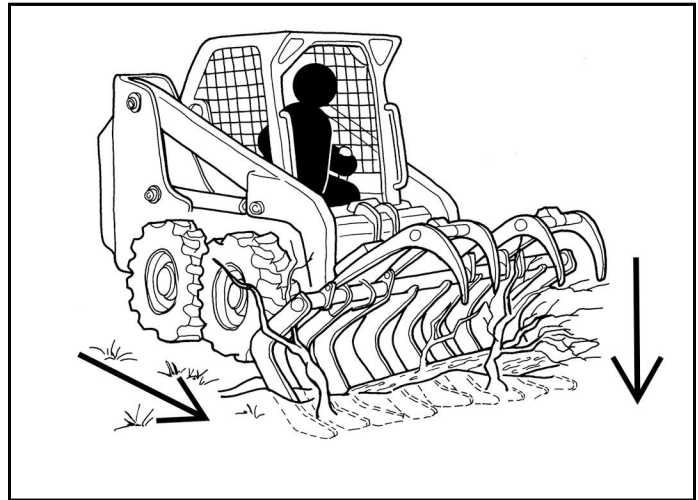
na24253a

1. Keep the grapple low when moving to the area where you want to empty the grapple [Figure 32].
2. Raise the lift arms [Figure 32].
3. Level the grapple while raising the lift arms to help prevent material from falling out the back of the grapple [Figure 32].
4. Drive forward slowly until the grapple is over the top of the truck box or bin [Figure 32].
5. Empty the grapple [Figure 32].

If all the material is near the side of the truck or bin, use the tilt to move it to the other side.

Digging Into The Ground With The Grapple

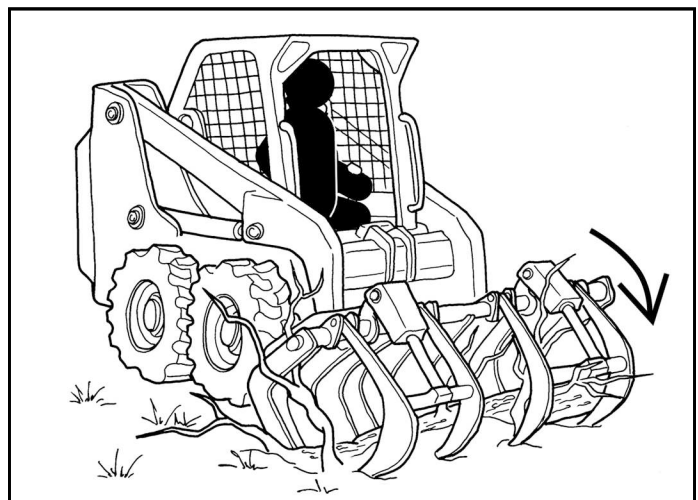
Figure 33



na24254a

1. Lower the lift arms and place the grapple on the ground [Figure 33].
2. Fully open the grapple [Figure 33].
3. Drive forward slowly and continue to tilt the grapple down until it enters the ground [Figure 33].
4. Raise the grapple a small amount to increase traction.
5. Continue to drive forward until the grapple is full.
6. When the ground is hard, raise and lower the leading edge of the grapple while slowly moving forward.

Figure 34



na24255a

- When the grapple is full, stop driving forward, tilt the grapple fully backward, and close the grapple [Figure 34].

Figure 35



- Raise the lift arms so the grapple will clear any obstacles on the ground [Figure 35].
- Drive backward away from the digging area [Figure 35].

Removing The Attachment

Removing With Non-powered Machine Quick Coupler

- Lower the lift arms and put the attachment flat on the ground.
NOTE: In muddy conditions or to prevent the attachment from freezing to the ground, put the attachment on planks or blocks before removing the attachment from the machine.
- Turn the machine off and release auxiliary hydraulic pressure (if applicable). (See the machine's Operation & Maintenance Manual for correct procedure.)

⚠ WARNING

GENERAL HAZARD

Failure to follow instructions can cause serious injury or death.

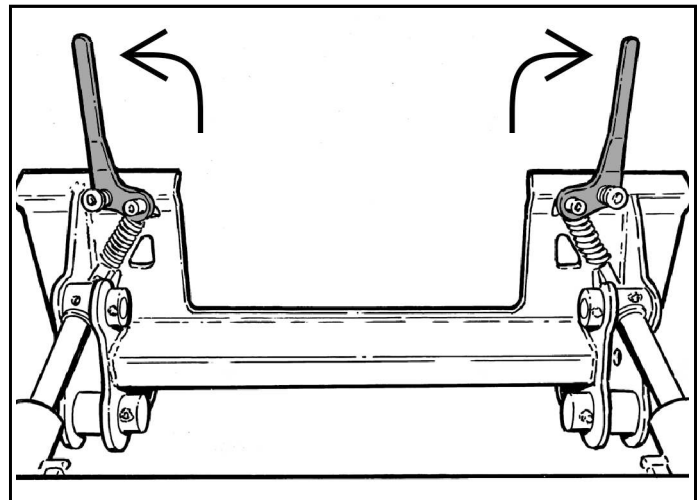
Before you leave the operator's seat:

- Lower the lift arms and put the attachment / implement flat on the ground.
- Engage the parking brake.
- Move all controls to the **NEUTRAL / LOCKED** position to make sure the lift, tilt, and drive functions are deactivated.
- Stop the engine. ◀

W-3156

- Exit the machine.

Figure 36



- Pull the machine quick coupler levers up [Figure 36] until they are fully raised (wedged fully up).

⚠ WARNING

PINCHING HAZARD

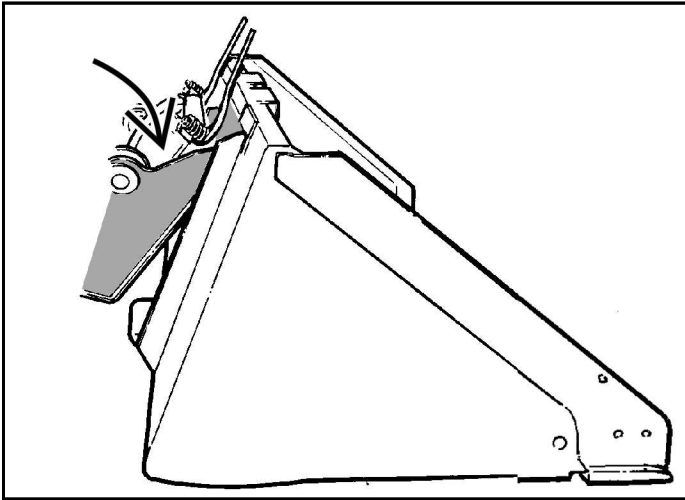
Failure to follow instructions can cause serious injury.

Keep fingers and hands out of pinch points when latching and unlatching the attachment quick coupler. ◀

W-2541

- Enter the machine.
- Turn the machine on.
- Release the parking brake.

Figure 37



8. Tilt the quick coupler forward and drive the machine backward, away from the attachment [Figure 37].

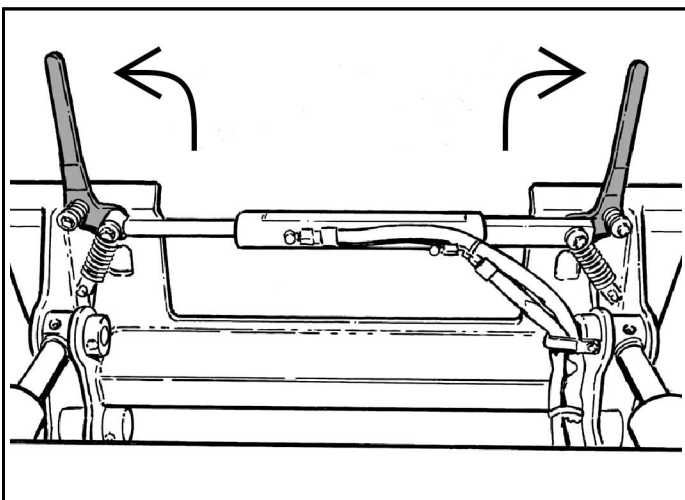
Removing With Powered Machine Quick Coupler

For specific control location and operation of the machine's powered quick coupler, see the machine's Operation & Maintenance Manual.

1. Lower the lift arms and put the attachment flat on the ground. Lower or close the hydraulic equipment (if equipped).

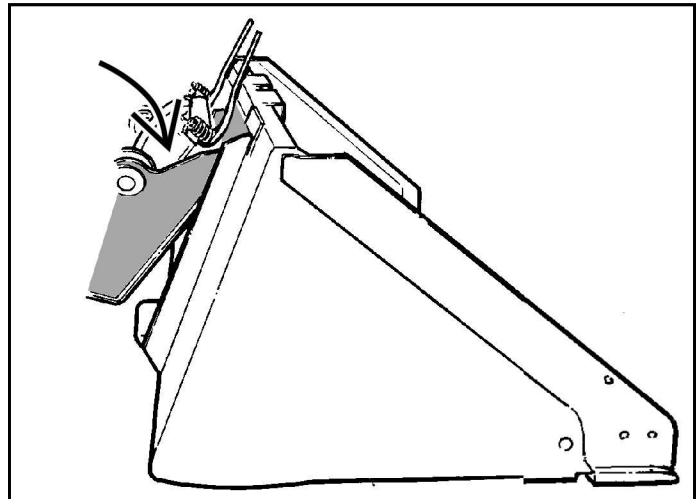
NOTE: In muddy conditions or to prevent the attachment from freezing to the ground, put the attachment on planks or blocks before removing the attachment from the machine.

Figure 38



2. Operate the powered quick coupler until the levers are fully raised (wedges fully raised) [Figure 38].

Figure 39



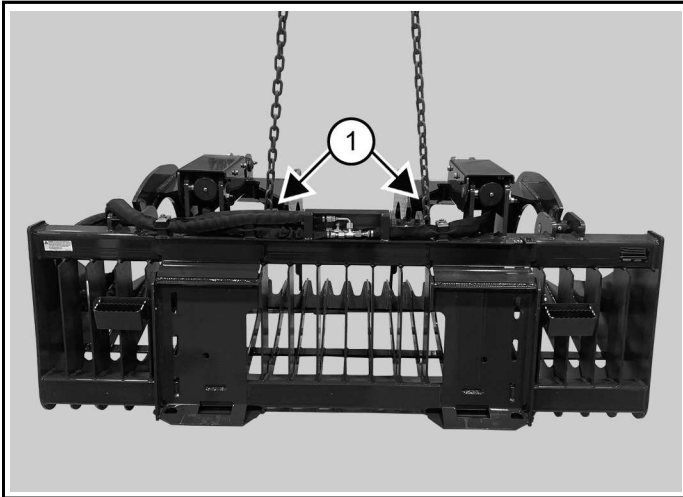
3. Tilt the quick coupler forward and drive the machine backward, away from the attachment [Figure 39].

Some powered quick couplers have continuous pressurized hydraulic oil to keep the wedges in the engaged position and prevent attachment disengagement. Because the wedges can slowly lower, the operator may need to reactivate the powered quick coupler when removing an attachment to be sure both wedges are fully raised.

LIFTING THE ATTACHMENT

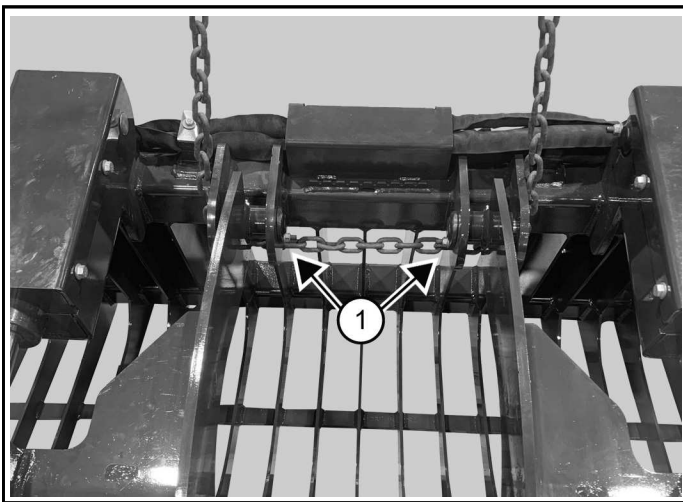
NOTE: Use chains that are in good condition and of adequate capacity to lift the attachment.

Figure 40



C220986a

Figure 41



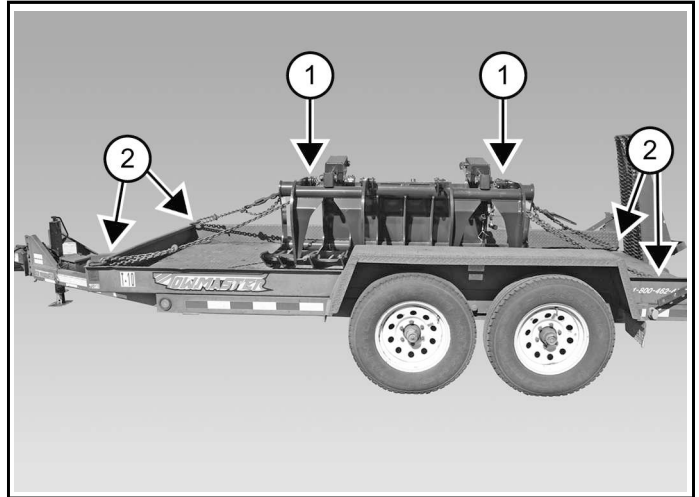
C220987a

- Fasten chain (Item 1) to the frame [Figure 40] and [Figure 41].

TRANSPORTING THE ATTACHMENT ON A TRAILER

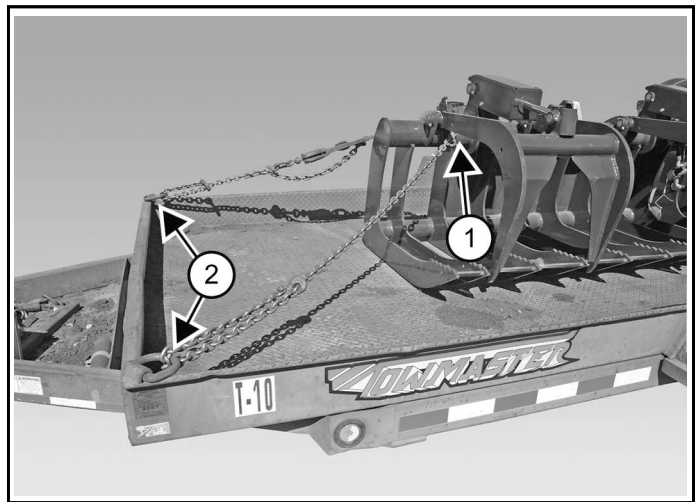
Fastening The Root Grapple

Figure 42



p-83767a

Figure 43

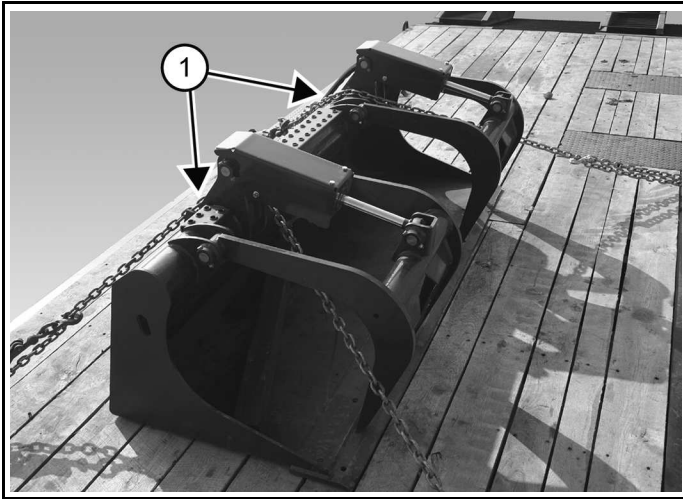


p-83768b

1. Put the root grapple on the transport vehicle and fasten chains to both ends of the root grapple frame (Item 1) [Figure 42] and [Figure 43].
2. Secure the chains to the transport vehicle (Item 2) [Figure 42] and [Figure 43].
3. Use chain binders to prevent the root grapple from moving during transport.

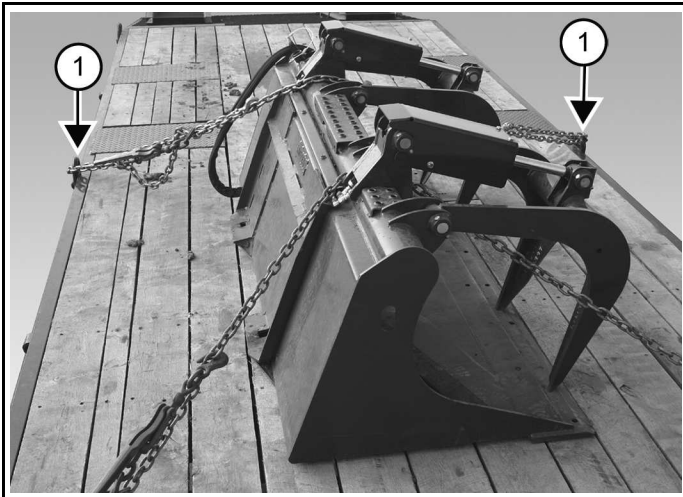
Fastening The Bucket And Rock Grapples

Figure 44



1. Put the grapple on the transport vehicle and fasten chains to both ends of the grapple frame (Item 1) [Figure 44].

Figure 45



2. Secure the chains to the transport vehicle (Item 1) [Figure 45].
3. Use chain binders to prevent the grapple from moving during transport.

TRANSPORTING THE ATTACHMENT AND MACHINE ON A TRAILER

⚠ WARNING

INSTABILITY HAZARD

Wood ramps can break and cause personal injury. Use adequately designed ramps of sufficient strength to support the weight of the machine loading onto a transport vehicle.†

W-2058

Be sure the transport and towing vehicles are of adequate size and capacity for weight of machine and attachment combination. (See machine and attachment Operation & Maintenance Manuals for specifications.)

Loading

- The rear of the trailer must be blocked or supported when loading and unloading to prevent the front of the trailer from raising.
- Load the heaviest end of the machine and attachment combination first.
- Lower the attachment to the floor.
- Turn the machine off.
- Engage the parking brake (if equipped).
- Exit the machine. (See the machine's Operation & Maintenance Manual for the correct procedure.)

Fastening

- Install the chains at the front and rear tie-down positions on the machine. (See the machine's Operation & Maintenance Manual to properly chain the machine to the transport vehicle.)
- Install chains on the attachment (if required).
- Fasten each end of the chain to the transport vehicle.

NOTE: Use chain binders to prevent the attachment and machine from moving during transport.



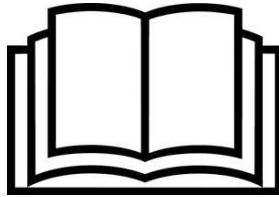
MAINTENANCE SAFETY WARNINGS



- Never service the Ignite Attachments attachment / implement without instructions. Read and understand the Operation & Maintenance Manual and safety signs (decals) on machine.
- Follow warnings and instructions in 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.



This Safety Alert Symbol means: “Attention! Be Alert! Your Safety is Involved!” Carefully read the message that follows.



- Never service attachments / implements without instructions. See Operation & Maintenance Manual and Attachment / Implement Service Manual.
- Cleaning and maintenance are required daily.
- Never service or adjust attachment / implement with the engine running unless instructed to do so in manual.
- Always lower the attachment / implement to the ground before lubricating or servicing.
- Avoid contact with leaking hydraulic fluid or diesel fuel under pressure. It can penetrate skin or eyes.
- Stop, cool, and clean engine of flammable materials before checking fluids.
- Keep body, loose objects, and clothing away from moving parts, electrical contacts, hot parts, and exhaust.
- Safety glasses are needed for eye protection from electrical arcs, battery acid, compressed springs, fluids under pressure, and flying debris or when tools are used. Use eye protection approved for type of welding.

Maintenance procedures which are given in the Operation & Maintenance Manual can be performed by the owner/operator without any specific technical training. Maintenance procedures which are not in the Operation & Maintenance Manual must be performed **ONLY BY QUALIFIED SERVICE PERSONNEL**. Always use genuine Ignite Attachments replacement parts.

TROUBLESHOOTING

Troubleshooting Chart

⚠ WARNING

INSUFFICIENT INSTRUCTIONS HAZARD

Untrained operators or failure to follow instructions can cause serious injury or death.

- Read and understand the Operation & Maintenance Manual and 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. ◀

WI-2408

If the attachment is not working correctly, check the hydraulic system of the machine thoroughly before making any repairs on the attachment. Attachment problems can be affected by a hydraulic system that is not operating to specifications. Connect a flow meter to the machine to check the hydraulic pump output, relief valve setting, and tube lines to check flow and pressure. (See the machine's Service Manual for the correct procedure to connect the flow meter.)

Use the following troubleshooting chart to locate and correct problems that most often occur with the attachment.

PROBLEM	CAUSE	CORRECTION
Grapple does not mount properly on the machine quick coupler.	Quick coupler wedges are not fully retracted during hook-up.	Retract quick coupler wedges before installing attachment.
	Mud, dirt or stones are lodged between the quick coupler and the grapple mount.	Remove debris between quick coupler and grapple mount.
Grapple does not open or close.	No hydraulic flow.	Activate front auxiliary hydraulics.
		Check hydraulic quick couplers connection. Check for damaged hose ends and fittings.

LUBRICATING THE ATTACHMENT

Lubrication Locations

Always use a good quality lithium base multi-purpose grease when lubricating the grapple. Apply lubricant until extra grease shows.

⚠ WARNING

IMPACT AND INJECTION HAZARDS

Flying debris and high pressure fluids can cause serious eye injury.

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

- High pressure fluids, springs or other stored energy components.
- Flying debris or loose material.
- Engine is running.
- Tools are being used. ◀

WI-2505

⚠ IMPORTANT

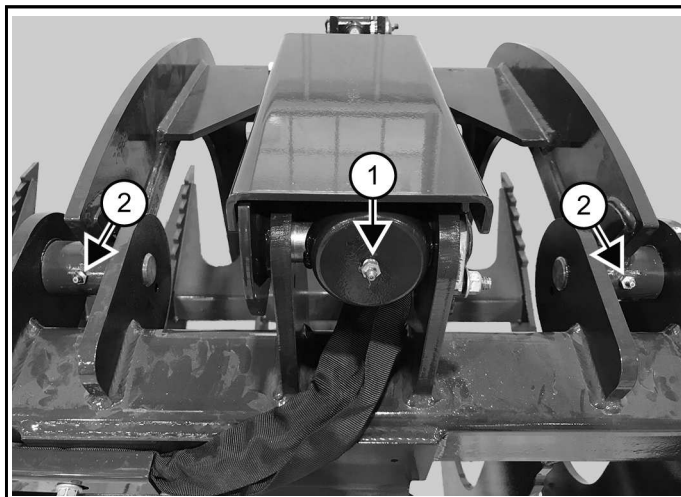
ENVIRONMENTAL HAZARD

Fluids such as engine oil, hydraulic fluid, coolants, grease, etc. must be disposed of in an environmentally safe manner. Some regulations require that certain spills and leaks on the ground must be cleaned in a specific manner. See local regulations for correct disposal methods. ◀

I-2067

Lubricate the grease fittings every 8 – 10 hours of operation:

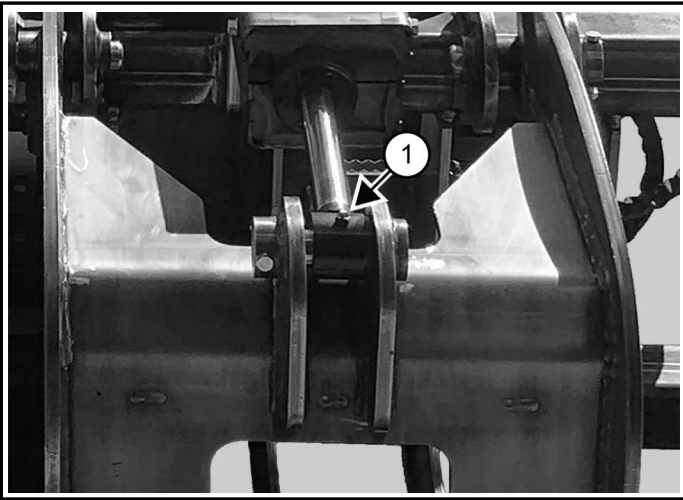
Figure 46



C220167a

Apply grease to the cylinder base end grease fitting (Item 1) and to the grapple pivot grease fittings (Item 2) (both sides) [Figure 46].

Figure 47



C220747a

Apply grease to the cylinder rod end grease fittings (Item 1) (both sides) [Figure 47].

REMOVING AND INSTALLING THE CUTTING EDGE

⚠ WARNING

CRUSHING HAZARD

Falling attachment / implement can cause serious injury or death.

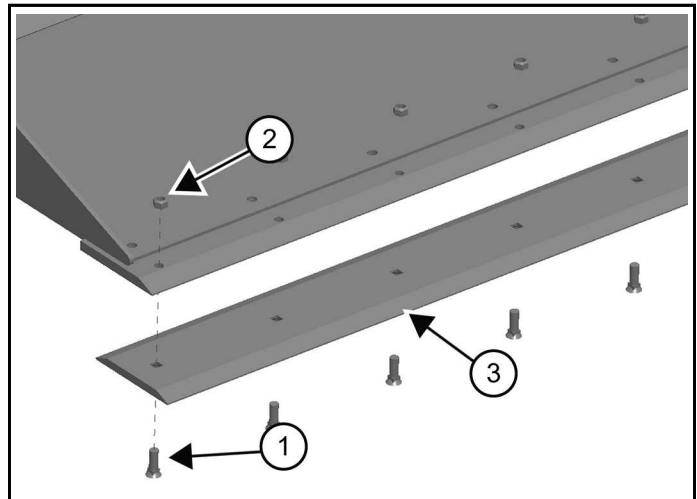
Securely block up the attachment / implement before working underneath. ◀

W-2795

1. Place blocks under the bucket and fully lower the bucket onto the blocks.

This will keep the front edge of the bucket off of the ground to provide access for removal and / or installation of the cutting edge.

Figure 48



p-83968a

2. Remove the bolts (Item 1) and nuts (Item 2) from the cutting edge (Item 3) [Figure 48].
3. Remove and replace cutting edge (Item 3) [Figure 48].
4. Contact your Ignite Attachments representative for repair or replacement parts.

During installation, lubricate and tighten the bolts to 240 – 260 N•m (175 – 190 ft-lb) torque.

REMOVING AND INSTALLING THE GRAPPLE FORK

⚠ WARNING

IMPACT AND INJECTION HAZARDS

Flying debris and high pressure fluids can cause serious eye injury.

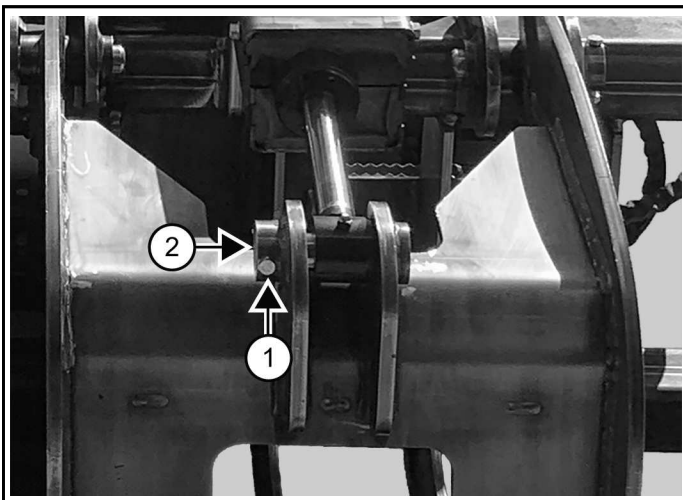
Wear safety glasses to prevent eye injury when any of the following conditions exist:

- High pressure fluids, springs or other stored energy components.
- Flying debris or loose material.
- Engine is running.
- Tools are being used.

W-2505

1. Fully lower the grapple onto the ground and remove from the machine.

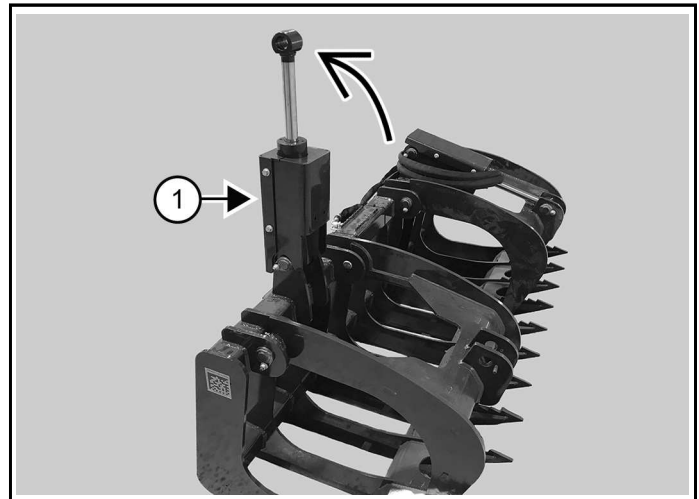
Figure 49



C220747b

2. Remove the bolt and nut (Item 1) [Figure 49].
3. Remove the cylinder pin (Item 2) [Figure 49].

Figure 50

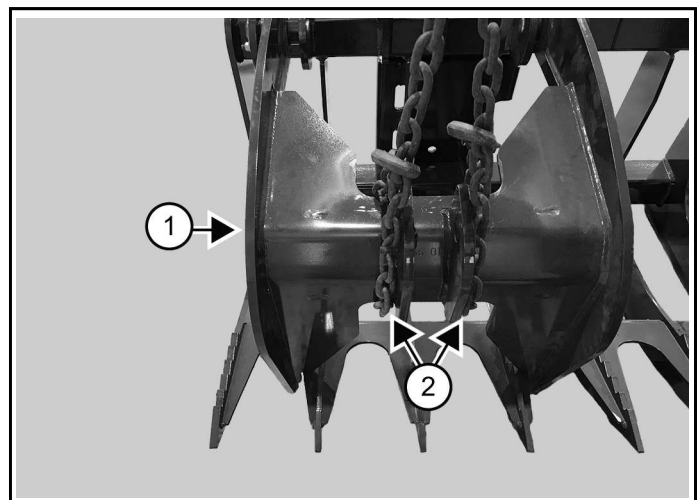


C220170a

4. Rotate the cylinder (Item 1) [Figure 50] upward.

During installation, rotate the cylinder downward and install cylinder mounting pin aligning retaining holes. Install bolt through retaining hole, install and tighten nut.

Figure 51

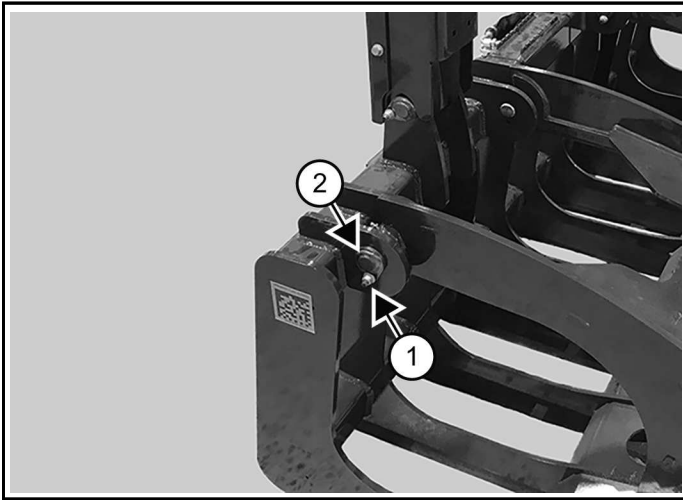


C220171a

5. Support the grapple fork (Item 1) by fastening chains (Item 2) [Figure 51].

Use chains that are in good condition and of adequate capacity to lift the attachment.

Figure 52



6. Remove the bolt and nut (Item 1), remove the mounting pin (Item 2) (both sides) [Figure 52].
7. Remove and replace grapple fork.
8. Contact your Ignite Attachments representative for repair or replacement parts.

During installation, place grapple fork in position. Install mounting pin aligning retaining holes. Install bolt through retaining hole, install and tighten nut. Remove the chains supporting the grapple fork.

REMOVING AND INSTALLING THE CYLINDER

⚠ IMPORTANT

MACHINE DAMAGE

When repairing hydrostatic and hydraulic systems, clean the work area before disassembly and keep all parts clean.

Always use caps and plugs on hoses, tubelines, and ports to keep dirt out. Dirt can quickly damage the system.

I-2003

⚠ WARNING

IMPACT AND INJECTION HAZARDS

Flying debris or pressurized fluids can cause serious injury or death.

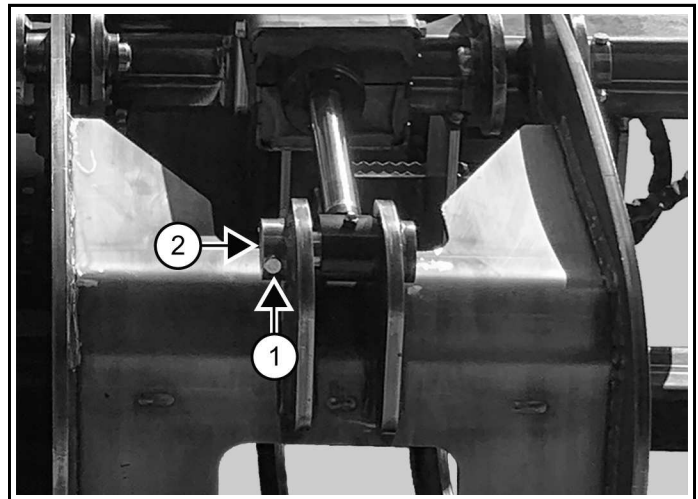
Wear safety glasses to prevent eye injury when any of the following conditions exist:

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

W-2019

1. Fully lower the grapple onto the ground and remove from the machine.

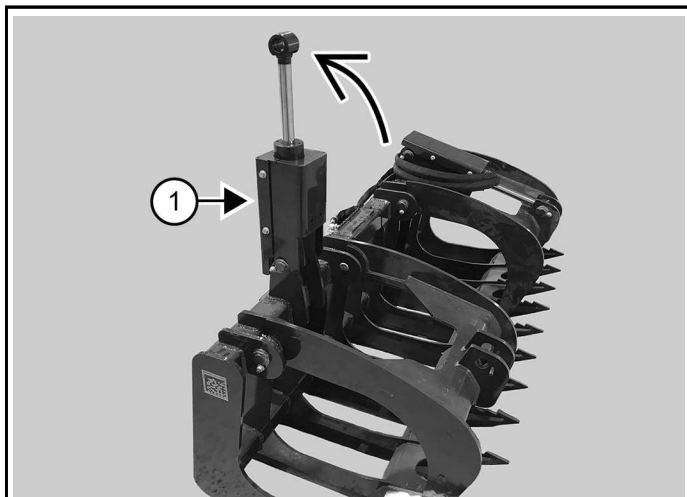
Figure 53



C220747b

2. Remove the bolt and nut (Item 1) [Figure 53].
3. Remove the cylinder pin (Item 2) [Figure 53].

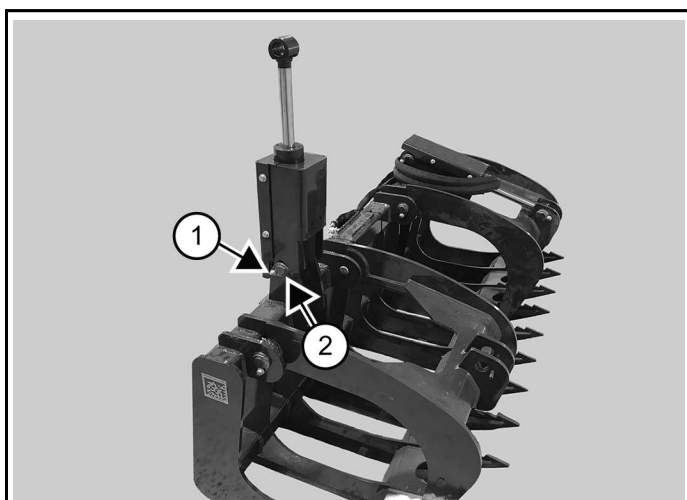
Figure 54



4. Rotate the cylinder (Item 1) [Figure 54] upward.

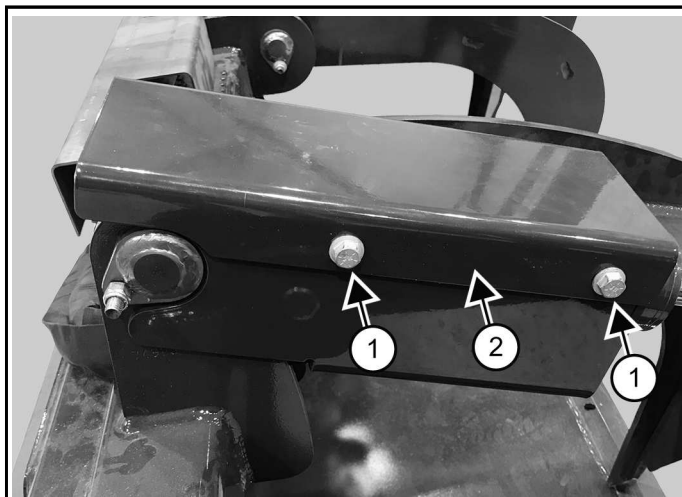
During installation, rotate the cylinder downward and install cylinder mounting pin aligning retaining holes. Install bolt through retaining hole, install and tighten nut.

Figure 55



5. Remove the bolt and nut (Item 1), and partially remove the mounting pin (Item 2) [Figure 55].

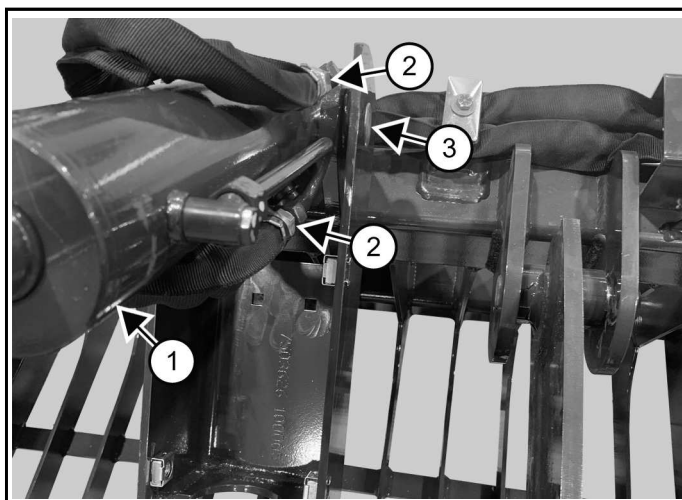
Figure 56



6. Remove the four bolts (Item 1) and cylinder cover (Item 2) [Figure 56].

During installation, install the cylinder cover and four bolts. Tighten bolts to 48 N·m (35 ft-lb) torque.

Figure 57



7. Lower the cylinder (Item 1) [Figure 57].
 8. Disconnect the hydraulic lines (Item 2) [Figure 57].
 9. Finish removing mounting pin (Item 3) [Figure 57] and remove the cylinder.

During installation, position the cylinder, partially install the mounting pin. Connect the hydraulic lines.

ATTACHMENT STORAGE AND RETURN TO SERVICE

Attachment Storage

Sometimes it may be necessary to store your Ignite Attachments attachment for an extended period of time. Below is a list of items to perform before storage.

- Thoroughly clean the attachment.
- Lubricate the attachment.
- Inspect the attachment mounting frame upper flange, lower mounts, and all welds on the attachment for wear and damage.
- Check for loose hardware, missing guards, or damaged parts.
- Replace worn or damaged parts.
- Check for damaged or missing decals. Replace if necessary.
- Place the attachment in a dry protected shelter.
- Place the attachment flat on the ground.

NOTE: In muddy conditions or to prevent the attachment from freezing to the ground, put the attachment on planks or blocks before removing the attachment from the machine.

Return To Service

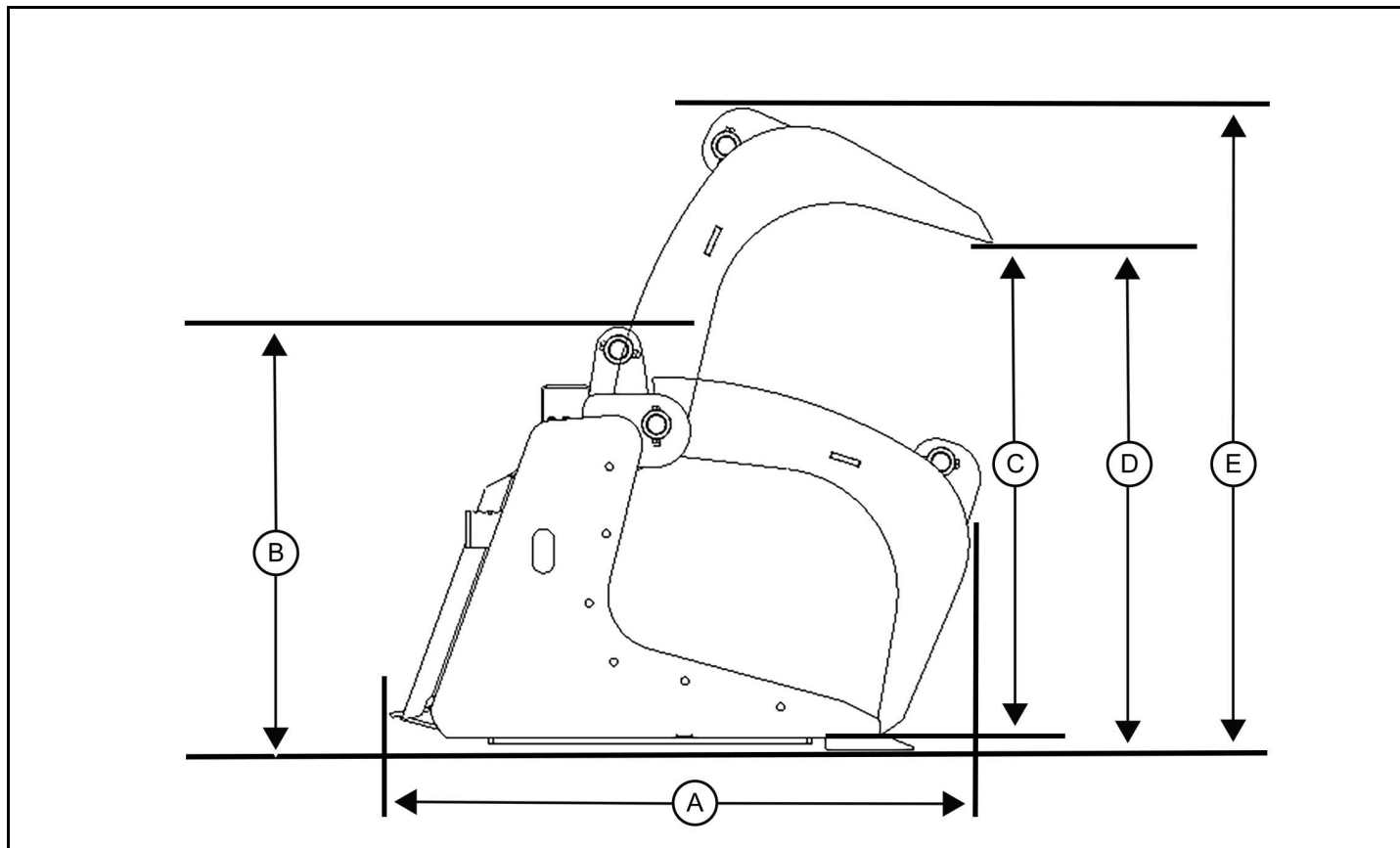
After the Ignite Attachments attachment has been in storage, it is necessary to follow a list of items to return the attachment to service.

- Be sure all shields and guards are in place.
- Lubricate the attachment.
- Install and operate attachment, check for correct function.
- Check for leaks. Repair as needed.

BUCKET GRAPPLE DIMENSIONS

Where applicable, specifications conform to SAE and ISO standards and are subject to change without notice.

Figure 58



C220554a

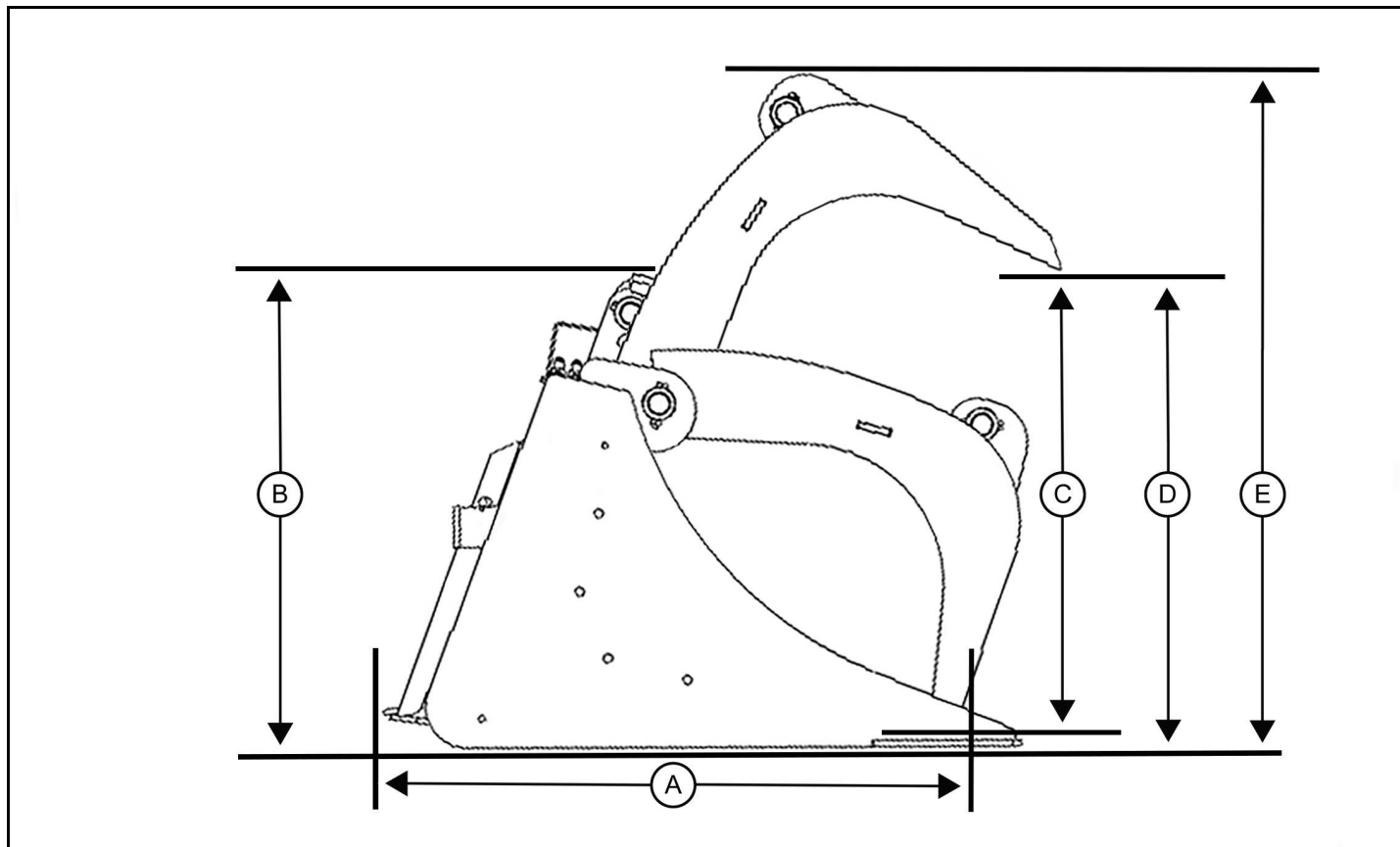
DESCRIPTION	GRPL 62 BKT	GRPL 68 BKT	GRPL 74 BKT	GRPL 82 BKT
Overall Depth Of Grapple (A)	1023 mm (40.3 in)	1023 mm (40.3 in)	1023 mm (40.3 in)	1023 mm (40.3 in)
Closed Height Of Grapple (B)	752 mm (29.6 in)	752 mm (29.6 in)	752 mm (29.6 in)	752 mm (29.6 in)
Maximum Opening Of Grapple (C)	858 mm (33.8 in)	858 mm (33.8 in)	858 mm (33.8 in)	858 mm (33.8 in)
Inside Height Of Grapple (D)	877 mm (34.5 in)	877 mm (34.5 in)	877 mm (34.5 in)	877 mm (34.5 in)
Opened Height Of Grapple (E)	1103 mm (43.4 in)	1103 mm (43.4 in)	1103 mm (43.4 in)	1103 mm (43.4 in)
Number Of Grapple Forks	2	2	2	2
Overall Width Of Grapple Forks	540 mm (21.2 in)	540 mm (21.2 in)	540 mm (21.2 in)	540 mm (21.2 in)

DESCRIPTION	GRPL 62 BKT	GRPL 68 BKT	GRPL 74 BKT	GRPL 82 BKT
Overall Width Of Grapple	1559 mm (61.4 in)	1731 mm (68.1 in)	1902 mm (74.9 in)	2073 mm (81.6 in)
Weight	343.8 kg (758 lb)	358.8 kg (791 lb)	372.4 kg (821 lb)	386.5 kg (852 lb)
Cylinder Stroke	203,2 mm (8.00 in)	203,2 mm (8.00 in)	203,2 mm (8.00 in)	203,2 mm (8.00 in)
Cylinder Bore Diameter	63,5 mm (2.50 in)	63,5 mm (2.50 in)	63,5 mm (2.50 in)	63,5 mm (2.50 in)
Cylinder Rod Diameter	31,8 mm (1.25 in)	31,8 mm (1.25 in)	31,8 mm (1.25 in)	31,8 mm (1.25 in)

ROCK GRAPPLE DIMENSIONS

Where applicable, specifications conform to SAE and ISO standards and are subject to change without notice.

Figure 59



C220555a

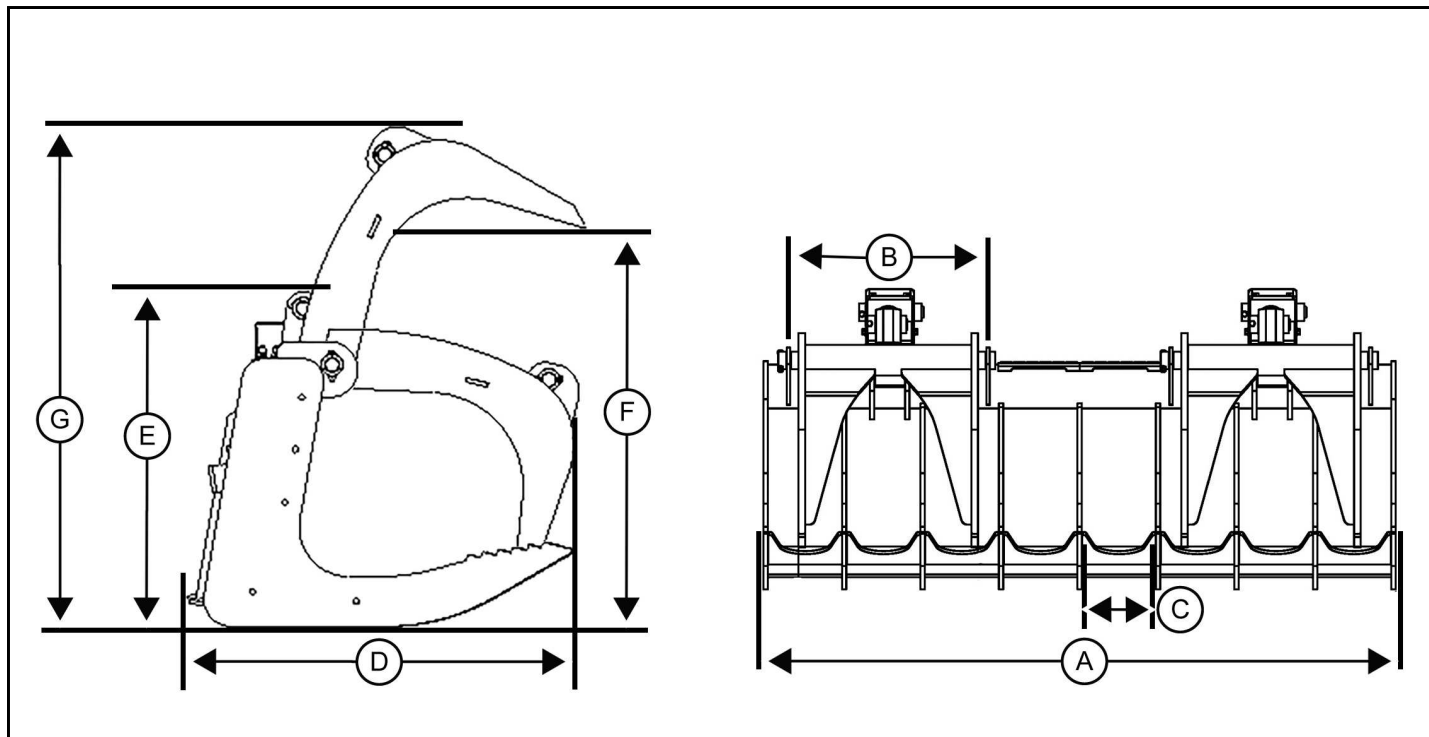
DESCRIPTION	GRPL 62 ROCK	GRPL 68 ROCK	GRPL 74 ROCK	GRPL 82 ROCK
Overall Depth Of Grapple (A)	980 mm (38.6 in)	980 mm (38.6 in)	980 mm (38.6 in)	980 mm (38.6 in)
Closed Height Of Grapple (B)	725 mm (28.5 in)	725 mm (28.5 in)	725 mm (28.5 in)	725 mm (28.5 in)
Maximum Opening Of Grapple (C)	724 mm (28.5 in)	724 mm (28.5 in)	724 mm (28.5 in)	724 mm (28.5 in)
Inside Height Of Grapple (D)	734 mm (28.9 in)	734 mm (28.9 in)	734 mm (28.9 in)	734 mm (28.9 in)
Opened Height Of Grapple (E)	1029 mm (40.5 in)	1029 mm (40.5 in)	1029 mm (40.5 in)	1029 mm (40.5 in)
Number Of Grapple Forks	2	2	2	2
Number Of Times	23	21	19	17
Tine Spacing	78 mm (3.1 in)	78 mm (3.1 in)	78 mm (3.1 in)	78 mm (3.1 in)

DESCRIPTION	GRPL 62 ROCK	GRPL 68 ROCK	GRPL 74 ROCK	GRPL 82 ROCK
Overall Width Of Grapple Forks	540 mm (21.2 in)	540 mm (21.2 in)	540 mm (21.2 in)	540 mm (21.2 in)
Overall Width Of Grapple	1572 mm (61.9 in)	1743 mm (68.6 in)	1915 mm (75.4 in)	2086 mm (82.1 in)
Weight	377.8 kg (833 lb)	396.0 kg (873 lb)	414.1 kg (913 lb)	432.3 kg (953 lb)
Cylinder Stroke	203,2 mm (8.00 in)	203,2 mm (8.00 in)	203,2 mm (8.00 in)	203,2 mm (8.00 in)
Cylinder Bore Diameter	63,5 mm (2.50 in)	63,5 mm (2.50 in)	63,5 mm (2.50 in)	63,5 mm (2.50 in)
Cylinder Rod Diameter	31,8 mm (1.25 in)	31,8 mm (1.25 in)	31,8 mm (1.25 in)	31,8 mm (1.25 in)

ROOT GRAPPLE DIMENSIONS

Where applicable, specifications conform to SAE and ISO standards and are subject to change without notice.

Figure 60



C220566a

DESCRIPTION	GRPL 62 ROOT	GRPL 68 ROOT	GRPL 74 ROOT	GRPL 82 ROOT
Overall Width Of Grapple (A)	1552,0 mm (61.1 in)	1724,7 mm (67.88 in)	1895,6 mm (74.63 in)	2067,1 mm (81.38 in)
Overall Width Of Grapple Forks (B)	540,0 mm (21.2 in)	540,0 mm (21.2 in)	540,0 mm (21.2 in)	540,0 mm (21.2 in)
Tine Spacing (C)	161,9 mm (6.38 in)	161,9 mm (6.38 in)	161,9 mm (6.38 in)	161,9 mm (6.38 in)
Overall Depth of Grapple (D)	898,4 mm (35.37 in)	898,4 mm (35.37 in)	898,4 mm (35.37 in)	898,4 mm (35.37 in)
Closed Height Of Grapple (E)	791 mm (31.1 in)	791 mm (31.1 in)	791 mm (31.1 in)	791 mm (31.1 in)
Inside Height Of Grapple (F)	917 mm (36.1 in)	917 mm (36.1 in)	917 mm (36.1 in)	917 mm (36.1 in)
Opened Height Of Grapple (G)	1143 mm (45.0 in)	1143 mm (45.0 in)	1143 mm (45.0 in)	1143 mm (45.0 in)
Number Of Tines	13	12	11	10
Weight	362.9 kg (800 lb)	381.0 kg (840 lb)	396.9 kg (875 lb)	417.3 kg (920 lb)
Cylinder Stroke	203,2 mm (8.00 in)	203,2 mm (8.00 in)	203,2 mm (8.00 in)	203,2 mm (8.00 in)

DESCRIPTION	GRPL 62 ROOT	GRPL 68 ROOT	GRPL 74 ROOT	GRPL 82 ROOT
Cylinder Bore Diameter	63,5 mm (2.50 in)	63,5 mm (2.50 in)	63,5 mm (2.50 in)	63,5 mm (2.50 in)
Cylinder Rod Diameter	31,8 mm (1.25 in)	31,8 mm (1.25 in)	31,8 mm (1.25 in)	31,8 mm (1.25 in)

TORQUE SPECIFICATION FOR BOLTS

Torque For General SAE Bolts

The following minimum and maximum torque values are for use on steel hardware coated with zinc phosphate & oil and zinc dichromate in general applications and where torque values are not otherwise specified. The same torque values apply to coarse or fine threads.

THREAD SIZE	CAP SCREW BOLT AND NUT SAE GRADE 5	CAP SCREW BOLT AND NUT SAE GRADE 8	SOCKET HEAD CAP SCREW OR 12-POINT HEAD CAP SCREW
1/4"	9 – 10 N•m (80 – 90 in-lb)	13 – 14 N•m (110 – 120 in-lb)	15 – 16 N•m (130 – 145 in-lb)
5/16"	21 – 23 N•m (180 – 200 in-lb)	24 – 27 N•m (215 – 240 in-lb)	31 – 34 N•m (270 – 300 in-lb)
3/8"	34 – 38 N•m (25 – 28 ft-lb)	48 – 54 N•m (35 – 40 ft-lb)	61 – 68 N•m (45 – 50 ft-lb)
7/16"	54 – 61 N•m (40 – 45 ft-lb)	82 – 88 N•m (60 – 65 ft-lb)	95 – 102 N•m (70 – 75 ft-lb)
1/2"	88 – 95 N•m (65 – 70 ft-lb)	125 – 135 N•m (90 – 100 ft-lb)	150 – 160 N•m (110 – 120 ft-lb)
9/16"	125 – 135 N•m (90 – 100 ft-lb)	170 – 190 N•m (125 – 140 ft-lb)	205 – 225 N•m (150 – 165 ft-lb)
5/8"	170 – 190 N•m (125 – 140 ft-lb)	240 – 260 N•m (175 – 190 ft-lb)	285 – 310 N•m (210 – 230 ft-lb)
3/4"	300 – 330 N•m (220 – 245 ft-lb)	410 – 450 N•m (300 – 330 ft-lb)	490 – 540 N•m (360 – 400 ft-lb)
7/8"	450 – 490 N•m (330 – 360 ft-lb)	645 – 710 N•m (475 – 525 ft-lb)	600 – 650 N•m (815 – 880 ft-lb)
1"	645 – 710 N•m (475 – 525 ft-lb)	985 – 1085 N•m (725 – 800 ft-lb)	1220 – 1360 N•m (900 – 1000 ft-lb)
1-1/8"	880 – 975 N•m (650 – 720 ft-lb)	1425 – 1600 N•m (1050 – 1175 ft-lb)	1770 – 1970 N•m (1300 – 1450 ft-lb)
1-1/4"	1220 – 1360 N•m (900 – 1000 ft-lb)	2000 – 2200 N•m (1475 – 1625 ft-lb)	2510 – 2720 N•m (1850 – 2000 ft-lb)
1-3/8"	1630 – 1830 N•m (1200 – 1350 ft-lb)	2720 – 2980 N•m (2000 – 2200 ft-lb)	3330 – 3660 N•m (2450 – 2700 ft-lb)
1-1/2"	2040 – 2240 N•m (1500 – 1650 ft-lb)	3520 – 3870 N•m (2600 – 2850 ft-lb)	4270 – 4680 N•m (3150 – 3450 ft-lb)

NOTE: Use the torque value for the part having the lesser grade when a fastener and nut are used together but have a different grade.

Torque For General Metric Bolts

Torque values shown in table below apply to combinations of a fastener and nut having the same property class, and both being coated with zinc phosphate and oil or zinc dichromate.

Use the torque value for the part having the lesser property class when a fastener and nut are used together but have a different property class.

THREAD NOM. DIA.	PROPERTY CLASS		
	8.8	10.9	12.9
M4	2,5 – 3,5 N•m (2.0 – 2.5 ft-lb)	3,8 – 4,2 N•m (2.8 – 3.1 ft-lb)	4,7 – 5,3 N•m (3.5 – 3.9 ft-lb)
M5	5,5 – 6,5 N•m (4.0 – 5.0 ft-lb)	7,6 – 8,4 N•m (5.6 – 6.2 ft-lb)	8,5 – 9,5 N•m (6.2 – 7.0 ft-lb)
M6	9,5 – 10,5 N•m (7.0 – 7.5 ft-lb)	12,3 – 13,7 N•m (9.1 – 10.1 ft-lb)	14,2 – 15,8 N•m (10.4 – 11.6 ft-lb)
M7	15 – 17 N•m (11.0 – 12.5 ft-lb)	20 – 22 N•m (14.7 – 16.2 ft-lb)	23,7 – 26,3 N•m (17.5 – 19.5 ft-lb)
M8	24 – 26 N•m (18 – 19 ft-lb)	29,4 – 32,6 N•m (21.7 – 24.0 ft-lb)	35 – 39 N•m (25.5 – 28.5 ft-lb)
M10	43 – 47 N•m (32 – 35 ft-lb)	57 – 63 N•m (42.0 – 46.5 ft-lb)	71 – 79 N•m (52.5 – 58.5 ft-lb)
M12	75 – 85 N•m (55 – 60 ft-lb)	105 – 115 N•m (78 – 85 ft-lb)	123 – 137 N•m (91 – 110 ft-lb)
M14	125 – 140 N•m (90 – 100 ft-lb)	160 – 180 N•m (118 – 133 ft-lb)	190 – 210 N•m (140 – 155 ft-lb)
M16	190 – 210 N•m (140 – 155 ft-lb)	255 – 285 N•m (188 – 210 ft-lb)	300 – 330 N•m (225 – 245 ft-lb)
M18	260 – 290 N•m (190 – 215 ft-lb)	345 – 385 N•m (255 – 285 ft-lb)	420 – 460 N•m (310 – 340 ft-lb)
M20	370 – 410 N•m (275 – 300 ft-lb)	490 – 550 N•m (360 – 405 ft-lb)	590 – 650 N•m (440 – 490 ft-lb)
M22	500 – 550 N•m (370 – 400 ft-lb)	660 – 740 N•m (490 – 545 ft-lb)	800 – 880 N•m (590 – 650 ft-lb)
M24	640 – 700 N•m (470 – 520 ft-lb)	850 – 950 N•m (625 – 700 ft-lb)	1000 – 1120 N•m (730 – 830 ft-lb)
M27	930 – 1030 N•m (680 – 760 ft-lb)	1230 – 1370 N•m (900 – 1000 ft-lb)	1470 – 1630 N•m (1100 – 1200 ft-lb)
M30	1260 – 1400 N•m (930 – 1030 ft-lb)	1700 – 1900 N•m (1250 – 1400 ft-lb)	2000 – 2200 N•m (1500 – 1600 ft-lb)
M33	1720 – 1900 N•m (1270 – 1400 ft-lb)	2300 – 2500 N•m (1700 – 1850 ft-lb)	2700 – 3100 N•m (2000 – 2300 ft-lb)
M36	2200 – 2450 N•m (1620 – 1800 ft-lb)	2900 – 3200 N•m (2200 – 2400 ft-lb)	3500 – 3900 N•m (2600 – 2900 ft-lb)

HYDRAULIC CONNECTION SPECIFICATIONS

Tubelines And Hoses

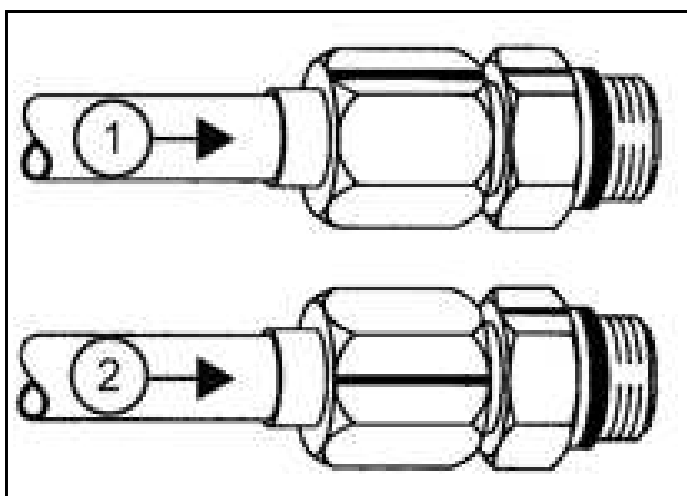
Replace any tubelines that are bent or flattened. They will restrict flow, which will slow hydraulic action and cause heat.

Replace hoses which show signs of wear, damage or weather cracked rubber.

Always use two wrenches when loosening and tightening hose or tubeline fittings.

Tightening The Flare Fitting

Figure 61



Tighten the nut until it makes contact with the seat. Make a mark across the flats of both the male and female parts of the connection (Item 1) [Figure 61].

Use the chart below to find the correct tightness needed (Item 2) [Figure 61]. If the fitting leaks after tightening, disconnect it and inspect the seat area for damage.

Flare Fitting Tightening Torque					
Wrench Size	Tubeline Outside Diameter	Thread Size	TORQUE N·m (ft-lb)	NEW Rotate No. of Hex Flats	RE-ASSEMBLY Rotate No. of Hex Flats
5/8"	5/16"	1/2" – 20	23 (17)	2 - 1/2	1
11/16"	3/8"	9/16" – 18	30 (22)	2	1
7/8"	1/2"	3/4" – 16	54 (40)	2	1
1"	5/8"	7/8" – 14	81 (60)	1 - 1/2	1

Flare Fitting Tightening Torque

1 - 1/4"	3/4"	1 - 1/16" – 12	114 (84)	1	3/4
1 - 3/8"	1"	1 - 5/16" – 12	160 (118)	3/4	3/4

ATTACHMENT / IMPLEMENT WARRANTY

A statement explaining the terms and conditions of the warranty coverage that applies to your attachment / implement is available by visiting Igniteattachments.com.

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Reference Information

Product Serial Number:

Engine Serial Number:

Dealer Information:



WARNING Cancer and Reproductive Harm. This product can expose you to chemicals including lead and lead compounds, mineral oils, and phthalates which are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.