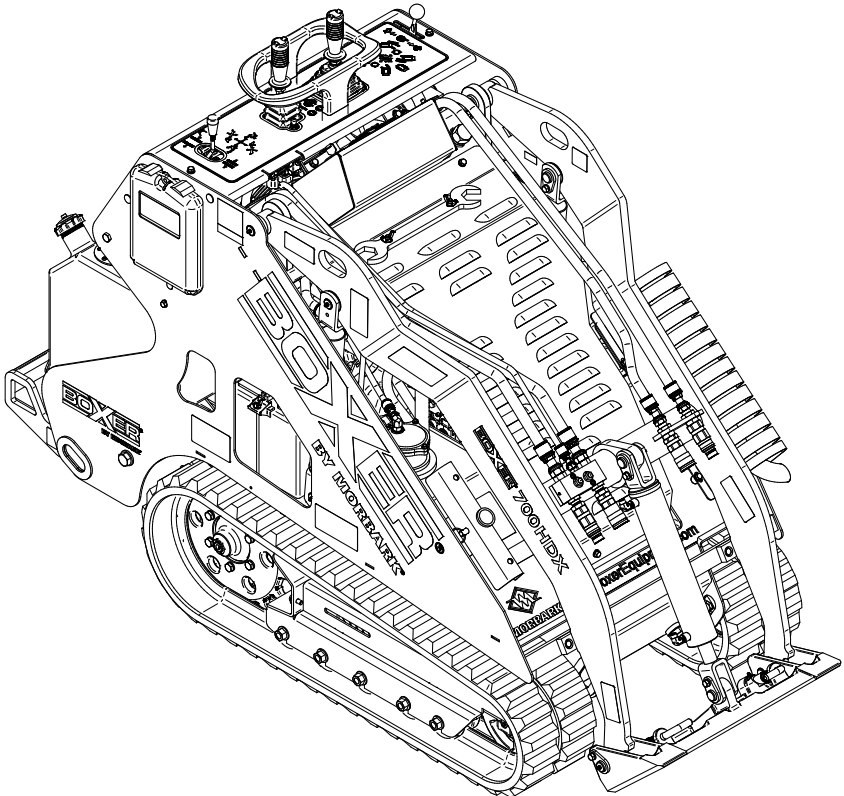


# BOXER<sup>®</sup>

BIG POWER IN ALL PLACES



## 700HDX Operator's Manual

Serial No.s 5121 and Higher

Part No. 76347-314

---

Manufactured by:

Phone:  
Sales - 800-831-0042  
Parts and Service - 800-255-8839  
[www.boxerequipment.com](http://www.boxerequipment.com)



Morbark<sup>®</sup>, LLC.  
8507 S. Winn. Rd., P.O. Box 1000,  
Winn, Michigan 48896  
[www.morbark.com](http://www.morbark.com)

Your machine's Model, Weight, and Power Rating along with Serial Number and Date of Manufacture of your machine are located on the right side panel at the top.

The Engine information is located on a decal on your engine. Refer to your Engine OEM Manual for decal location.



**MANUFACTURED BY:**  
**MORBARK®**  
**WINN, MICHIGAN, USA**

**MODEL NO.** **700HDX**

**WEIGHT** **2660** **LB** **1206.7** **KG**

**POWER** **25** **HP** **18.64** **KW**

**MORBARK, LLC**  
**Sales (800) 831-0042**  
**Parts and Service (800) 255-8839**  
**www.morbark.com**

39510-154

**SERIAL NO.** **XXXX**

**DATE OF MANUFACTURE** **00-00-0000**

---

## MANUAL REVISION LOG

<b>Revision:</b>	<b>Date Issued:</b>	<b>Pages Affected:</b>	<b>Description of Changes:</b>
-	10/10/2017	All	Initial Release
A	9/19/18	iii, 1.8	Page iii: Added Man Rev Log, Page 1.8: Added Dust Caution

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 www.morbark.com

**LIMITATION OF DAMAGES**

City: \_\_\_\_\_ State/Province: \_\_\_\_\_ Zip/Postal  
 Code: \_\_\_\_\_  
 Phone: \_\_\_\_\_ E-mail address: \_\_\_\_\_

Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_  
 Engine S/N: \_\_\_\_\_  
 Location Purchased: \_\_\_\_\_ Date  
 Purchased: \_\_\_\_\_

I, (the purchaser), have read and fully understand the operator’s manual, safety instructions and warranty conditions provided with this equipment.

In-service date restart will only be accepted if this form and a copy of the bill of sale is completed and returned within 30-days of the in-service date.

Customer Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Product Description	Morbark Manufactured Components	Vendor Purchased Components	Extended Coverage
New Boxer Compact Utility Loaders	One (1) year/1,000 hours; whichever comes first	Warranty from vendor applies, minimum of one (1) year	Can purchase prior to start-up
Used Equipment	As stated on equipment order	N/A	N/A
New Engines	N/A	See Engine Warranty Statement	Can purchase prior to start-up or possibly up to two (2) years after start-up depending on the programs offered by the engine supplier
Wear Items including but not limited to such items as, lubricants, anti-freeze, fluids, filters, belts, bearings, hoses and fittings, etc...	Manufacturer’s limited warranty extended to the original purchaser to cover conditions that are reasonably considered to have been within the manufacturer’s control. Conditions not within the manufacturer’s control such as irregular wear, lack of maintenance, damage due to accidents or vandalism are not covered.	Manufacturer’s limited warranty extended to the original purchaser to cover conditions that are reasonably considered to have been within the manufacturer’s control. Conditions not within the manufacturer’s control such as irregular wear, lack of maintenance, damage due to accidents or vandalism are not covered.	N/A



## Boxer® Warranty Registration

Dear Customer,

Morbark, LLC., manufacturer of the Boxer® Compact Utility Loader, would like to thank you for your purchase. Morbark is committed to providing unsurpassed products and product support to our customers. To accomplish this, we need to update our database with information regarding your purchase. Currently, the warranty start date (in-service date) is listed as the date the Boxer® Compact Utility Loader left Morbark, LLC., which may be several months before you received and placed your new Boxer® product into service.

To ensure you get the full warranty coverage for your purchase, Morbark, LLC. will restart the warranty start date (in-service date) if you complete the information below and return this form to us with a copy of the equipment invoice (bill of sale) verifying the in-service date of your Boxer® Compact Utility Loader. Without receipt of this form, we will continue to use the original equipment ship date as the warranty start date (in-service date) and not returning this form may result in denial of warranty entitlements.

To restart the equipment in-service date, simply complete the form below and mail, e-mail, or fax the completed form and bill of sale to:

Morbark, LLC.  
P.O. Box 1000  
8507 S. Winn Road  
Winn, MI 48896-1000  
E-mail: lee.martin@morbark.com  
Fax: (989) 866-2280

Fold

Company Name: \_\_\_\_\_ Contact Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
City: \_\_\_\_\_ State/Province: \_\_\_\_\_ Zip/Postal Code: \_\_\_\_\_  
Phone: \_\_\_\_\_ E-mail address: \_\_\_\_\_  
Model No. \_\_\_\_\_ Serial No. \_\_\_\_\_ Engine S/N: \_\_\_\_\_  
Location Purchased: \_\_\_\_\_ Date Purchased: \_\_\_\_\_

**I, (the purchaser), have read and fully understand the operator’s manual, safety instructions and warranty conditions provided with this equipment.**

**In-service date restart will only be accepted if this form and a copy of the bill of sale is completed and returned within 30-days of the in-service date.**

Customer Signature: \_\_\_\_\_ Date: \_\_\_\_\_



Affix  
Stamp  
Here

Morbark, LLC.  
8507 South Winn Road  
P.O. Box 1000  
Winn, MI 48896

---

# Safety Introduction

## Be Prepared - Get to Know All Operating and Safety Instructions

This is the Safety Alert Symbol.



Wherever it appears, either in this manual or on safety signs on the machine, you should be alert to the potential for personal injury or accidents. Always observe safety precautions and follow recommended procedures.

## Learn the Signal Words Used with the Safety Alert Symbol

The words “DANGER”, “WARNING”, and “CAUTION” are used throughout this manual and on labels on the machine to indicate hazards or unsafe practices. All three statements indicate that safety is involved. Observe the precautions indicated whenever you see the Safety Alert symbol no matter which signal word appears next to the Safety Alert symbol.

 **DANGER**

**INDICATES A HAZARDOUS SITUATION THAT, IF NOT AVOIDED, IS VERY LIKELY TO CAUSE DEATH OR EXTREMELY SERIOUS INJURY. IT MAY ALSO BE USED TO ALERT AGAINST EQUIPMENT THAT MAY EXPLODE OR DETONATE IF HANDLED OR TREATED CARELESSLY.**

 **WARNING**

**Indicates a hazardous situation that, if not avoided, could result in serious injury or death. It may also be used to alert against a highly unsafe practice.**

 **CAUTION**

**Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury. It may also be used to alert against a generally unsafe practice.**

**NOTICE**

This type of statement is used to draw attention to a procedure that needs to be followed to prevent machine damage.

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# REVISION LOG

Rev:	Rev. Date:	Pages Affected:	Description of Changes:
-	Jan 20, 2017	All	Initial Release

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# Section 1 - Safety Precautions

Since Morbark LLC. has no direct control over machine application or operation, following the proper safety practices is the responsibility of the owner and/or operator. Remember that this unit is only as safe as those who operate it. Safety practices described throughout this Operator's Manual must be followed at all times.

## GENERAL SAFETY

- Never operate the Boxer without first completely reading and understanding this Owner's Manual.
- Only authorized, qualified, and trained personnel are allowed to operate this machine.
- Never operate the machine under the influence of alcohol, awareness altering drugs or medications that would affect your ability to operate safely.
- **KEEP CHILDREN CLEAR FROM THE WORK SITE AREA AT ALL TIMES!**
- **NEVER ALLOW A CHILD TO OPERATE OR RIDE ON THE MACHINE!**
- Serious injury or death involving children can occur. Stay ALERT and be aware of your surroundings at all times. Stop operations if children wander onto the job site. Resume work only when the operating area is clear.
- Keep all non-operating personnel away from the machine during operation.
- Passengers must never be allowed to ride on the machine or any attachment.
- Wearing protective clothing and gear, such as hard hats, safety glasses, safety shoes, hearing protection, breathing protection, and long pants and shirts is highly recommended. Do not operate in clothing or shoes which will expose skin or feet to possible flying debris.
- Clothing should be relatively close fitting. Loose clothing, rings, and other jewelry should be avoided because of the danger of catching them on machine parts or controls or on any rotating parts, either on the machine or any attachment.
- Keep hands/fingers clear from all rotating parts.
- Never touch engine parts or machine components while they are hot.
- Always perform the "Standard Shut Down Procedure" shown in this manual, if the unit will be left unattended for any length of time.
- Use only original Morbark or approved replacement parts and attachments. Imitation parts may lead to unit damage and/or injury to personnel. The machines warranty may be voided if unauthorized parts and attachments are used.

## **OPERATING SAFETY**

- Plan ahead and learn as much as possible about your job-site area before beginning any work.
- Know the exact location of overhead power lines or obstructions.
- Have all buried lines such as gas, electric, water, telephone, and cable TV marked by the proper authorities.
- Prior to use, perform the “Pre-Start Inspection” and Daily Maintenance to make sure that the unit is in safe operating condition.
- Never operate a malfunctioning unit.
- Keep hands, gloves, shoes, control knobs, and operator platform clean. Slippery controls can cause you to lose control, which may result in an accident.
- Always keep a firm grip on the hand rails located at the operator’s platform during travel and operation to prevent falling off the unit.
- When working on an unfamiliar construction site, review, understand, and follow job site safety rules.
- Keep the work site clear of all non-operating personnel. Should a person enter the work area, stop machine operation until the work area is clear.
- Prior to unloading the unit and starting to work, inspect the path you will travel and work site area for potential hazards. Some of the hazardous conditions you may encounter are:
  - Holes
  - Deep ditches or excavations
  - Drop-offs
  - Soft un-compacted soil
  - Culverts
  - Deep mud/Standing Water
  - Large rocks
  - Slippery surfaces
  - Steep slopes
  - Tall grass, trees or shrubs

If any of these conditions exist, correct the hazard or obstruction. If any of these conditions can not be corrected, avoid operating or traveling near them.

- Be extremely cautious traveling through or near trees, brush, shrubs or any obstacles which might obscure your vision. These might hide potential hazards, such as the edge of a steep slope, deep holes, large rocks, etc.
- Never operate near a ditch or embankment where loose or soft ground conditions could cause the surface to give way under the machine causing it to become unstable.
- Never exceed the rated capacity of the machine. When using attachments, know their capacity ratings and unit limitations. Unit specifications can be found in the Operator’s Manual.

- Never attempt to operate any attachment without first understanding proper installation and operating procedures. The center of gravity, stability, and operating characteristics of the entire machine will change with the use of different attachments.
- Operate all controls slowly and smoothly and never abruptly stop any function. This can cause the machine to become unstable.
- Always look in the direction of travel.
- Come to a complete stop prior to reversing travel directions.
- Reduce speed and proceed with caution when traveling in reverse or turning.
- Never travel with the loader boom or attachment raised. Lower the boom or attachment as soon as possible and travel with the boom at the lowest safe height.
- When traveling with a loaded bucket or forks, the load should be level and the bucket or forks tilted back to reduce spilling or losing the load.
- Approach corners slowly, turning too fast or sharp may cause the machine to tip over.
- Stay alert when operating near traffic or roadways.
- If the unit should begin to tip or become unstable, DO NOT try to stabilize the unit with your legs or arms.
- If the unit is involved in an accident or inadvertently damaged during operation, stop and perform a thorough inspection. Make sure the unit is in safe operating condition prior to resuming work.
- Be alert to any unusual reaction to any of the controls. If anything unusual is noticed, shut the machine down and thoroughly inspect it to determine the cause of the problem. Do not operate the machine until all required repairs have been made.
- If the unit must be left unattended, shut the machine down and make sure that it can not be started by an unauthorized individual.
- Operating on steep slopes can be dangerous and there is a greater risk of the machine tipping over or becoming unstable. The list of rules below must be understood and followed for maximum safety:
  - Avoid excessively steep slopes or unstable surfaces. If travel on a slope is necessary, keep the load low and proceed with extreme caution.
  - DO NOT travel ACROSS excessively steep slopes under any circumstances.
  - Travel straight up and down slopes with the heavy end of the machine pointing up the incline. When the machine has no load, the operator's platform end of the machine is considered the heavy end. When the machine is loaded or has an attachment on the front of the machine, the front is considered the heavy end.
  - Turning on slopes is not a recommended practice, however if you must turn on slopes; reduce travel speed to as slow as possible, and exercise extreme caution. Avoid sharp turns or sudden movements.
  - Wet or slick ground conditions should be avoided as reduced traction could cause the machine to slide down the slope.
  - Do not attempt to install or remove attachments on a slope.
  - Never park the unit on a slope.

## SERVICE & MAINTENANCE SAFETY

Maintenance work can be hazardous if not done in a careful manner. All personnel should realize the hazards and strictly follow safe maintenance practices. Failure to comply with these safety precautions may result in serious personal injury and/or death.

- Use only Morbark supplied or approved replacement parts and attachments. Imitation parts may lead to unit damage and/or injury to personnel. Warranty may be voided if unauthorized parts and attachments are used.
  - Wear the proper protective clothing and personal safety equipment necessary to perform the maintenance or service required.
  - Keep the machine free of grass, leaves or other debris build-up.
  - Clean up oil or fuel spillage.
- 



## WARNING

### Fuel, oil leaks or spills can create a fire or explosion hazard.

---

- Prior to performing maintenance or service, park the unit in a level area away from obstructions and/or work site hazards.
- Be sure the area has adequate light and is well ventilated. NEVER operate the machine inside a closed area.
- Clean-up any oil, grease, mud, water or snow which might cause the floor surface to become slippery.
- If the machine requires maintenance, take the machine out of service and attach a “Do Not Operate” tag at the control panel and remove the ignition key.
- If maintenance or repairs require the boom to be raised, the “Hydraulic Cylinder Lock” must be installed.
- Know where all pinch points and rotating parts on the unit are. These areas must be avoided to prevent serious injury.
- Remove only those guards or covers on the component being serviced and replace them immediately upon completion of the work.
- Never attempt to adjust or service engine or machine components while they are hot.

## ELECTRICAL SYSTEM HAZARDS

- Prior to working on the electrical system:
  - Disconnect battery cables, removing the battery ground cable first.
  - When re-connecting the battery, connect the battery ground cable last.
  - Never allow battery cables to contact hydraulic lines or rub against sharp edges.

## Battery Hazards

Before working with batteries, the following are important points about battery safety that you should be aware of:

- Batteries are always surrounded by extremely explosive gases. This is especially true when the battery is being charged. To avoid explosion:
  - Do not smoke near batteries.
  - Keep arcs, sparks, and open flames away from batteries.
  - Perform battery service work only in a well ventilated area.
- Make sure to dispose of batteries according to local regulations.
- Electrolyte Hazards:

**NOTE:** The batteries on the machine may be either be “wet cell” or gel cell. It is still important to know and follow these warnings and cautions.

Battery electrolyte in standard “wet cell” batteries contains sulfuric acid which is poisonous and can cause severe chemical burns. To avoid personal injury:

- Wear a face shield to prevent sulfuric acid contact with your eyes.
- Wear chemical resistant gloves and clothing to keep acid off your skin and clothing.
- Since “wet cell” batteries give off explosive gases, use a flashlight to check the electrolyte level, not an open flame such as a match.
- Never check the battery by placing a metal object across the battery posts. The resulting spark could ignite anything flammable, causing fire or an explosion.
- If electrolyte is splashed into your eyes, flush them immediately with clean water and seek medical attention.
- If electrolyte is swallowed, seek medical attention immediately.
- If electrolyte is splashed onto exposed skin or clothing, flush and clean the area immediately with clean water and seek medical attention if necessary.

## Jump Starting/Battery Charging Hazards

Follow the instructions for jump starting or battery charging in the engine owner’s manual. You must be at the operator’s platform when attempting to start the unit with booster batteries and jumper cables so that you are at the controls when the engine starts.

Here are some general safety rules you must follow for jump starting the machine:

- Make sure to connect the positive jumper cable to the positive post of the battery.
- Connect the negative cable to the engine, machine chassis or the furthest ground point away from the battery. Never make the final connection at the starter or dead battery. Sparks may ignite the explosive gases surrounding the battery.
- When disconnecting cables after jump starting, remove the negative cable first and then the positive cable. **NOTE:** DO NOT let the cable clamps touch when disconnecting them. Severe damage can occur to the booster battery or machine.
- Never charge a battery or attempt to jump start a frozen battery. The sudden surge in electrical power could cause the battery to explode.

## Hydraulic System Hazards

The hydraulic system is under pressure whenever the engine is running and may hold pressure even after the engine is shut off. Cycle all hydraulic controls after the loader boom is resting on the ground. Some components will retain residual or trapped pressure. Use extreme caution when removing any hydraulic component.

During inspection of the hydraulic system:

- Cycle all hydraulic controls to release residual pressure.
  - Wait for the hydraulic fluid to cool down before disconnecting any hydraulic lines. Hot hydraulic fluid can cause severe burns.
- 



**Hydraulic oil under pressure can penetrate body tissue causing serious injury and possible death. When troubleshooting a hydraulic system for leaks, always use cardboard or wood as a detector. DO NOT USE YOUR BARE HANDS. If you are injected with hydraulic oil or any other fluids, immediately seek treatment by a doctor trained in the treatment of penetrating fluid injuries.**

---

- Hydraulic system, loosen the filler cap slowly to allow any pressure in the hydraulic tank to be reduced. Hydraulic fluid can cause permanent eye injury. Wear safety glasses or a full face shield to provide appropriate eye protection.
- When venting or filling the hydraulic tank, loosen the filler cap slowly to allow any pressure in the hydraulic tank to be released and remove the cap gradually.

## Fueling Hazards

Most fuels are highly flammable. Observe the following precautionary practices to reduce the possibility of a serious accident:

- Always refuel the unit in an open, well ventilated area away from sparks or open flames.
- 

 **DANGER**

### Diesel Engines:

- **Shut the engine off before attempting to fuel the machine. Never refuel a unit while it is running.**
  - **Allow engine to cool before re-fueling.**
  - **Always use a funnel or pour spout when filling the tanks.**
  - **Under certain circumstances a static charge can develop and ignite the fuel. Make sure that you are standing on the ground when filling the fuel tanks.**
  - **If you are filling the fuel tanks from a service vehicle, make sure to connect the service vehicles ground cable to the machine before beginning the fueling process. Keep the fuel nozzle in constant contact with the rim of the machines fuel tank.**
  - **When filling a portable fuel container, always place it on the ground. Never fill a portable fuel container while it is inside a vehicle, truck, pick-up bed or any surface.**
  - **To avoid static sparks when using a portable fuel container, only fill the container when it is positioned on the ground and keep the fuel container nozzle in contact with the tank opening during filling.**
  - **Make sure to move the unit from the transport truck or trailer and only refuel the unit on the ground, using an approved container.**
  - **Keep sparks and flames away from fuel.**
  - **Do not smoke while refueling or when handling the fuel container.**
  - **Never cut or weld on or near fuel lines, tanks or containers.**
  - **Never overfill the tank.**
  - **Clean up spilled fuel immediately.**
  - **Store fuel in an approved container and keep out of the reach of children.**
-

## **Boxer Brush/Sweeper Attachment Silica Dust Caution**

An OSHA ruling has established new permissible exposure limits (PEL) for occupational exposure to respirable crystalline silica. OSHA standard 29 CFR 1926.1153 covers the construction industry, and 29 CFR 1910.1053 covers the general and maritime industries. The rules also requires employee protections such as performing exposure assessments, using exposure control methods, using respiratory protections, offering medical surveillance, developing hazard communication information, and keeping silica-related records.

Under the new standard the employer shall not allow dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible. The employer bears the burden of showing the alternative methods are not feasible.

-The use of non-grit, oil, or waxed based sweeping compounds are an acceptable dust suppression housekeeping method.

-The use of compressed air for cleaning is allowed where the compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air, or where no alternative method is feasible.

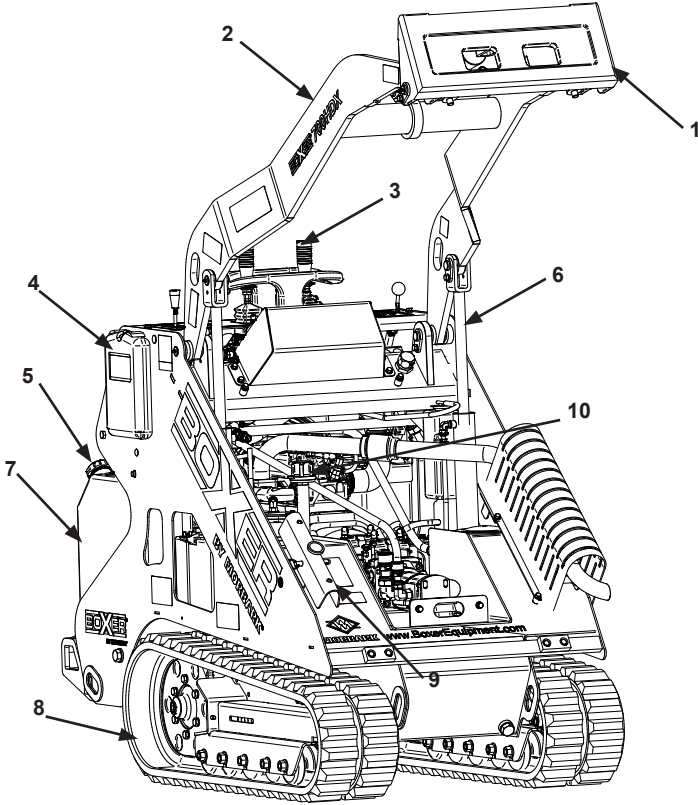
-The employer's exposure control plan must include the description of the housekeeping measures.

# Section 2 - Operating Controls

## Component Locations

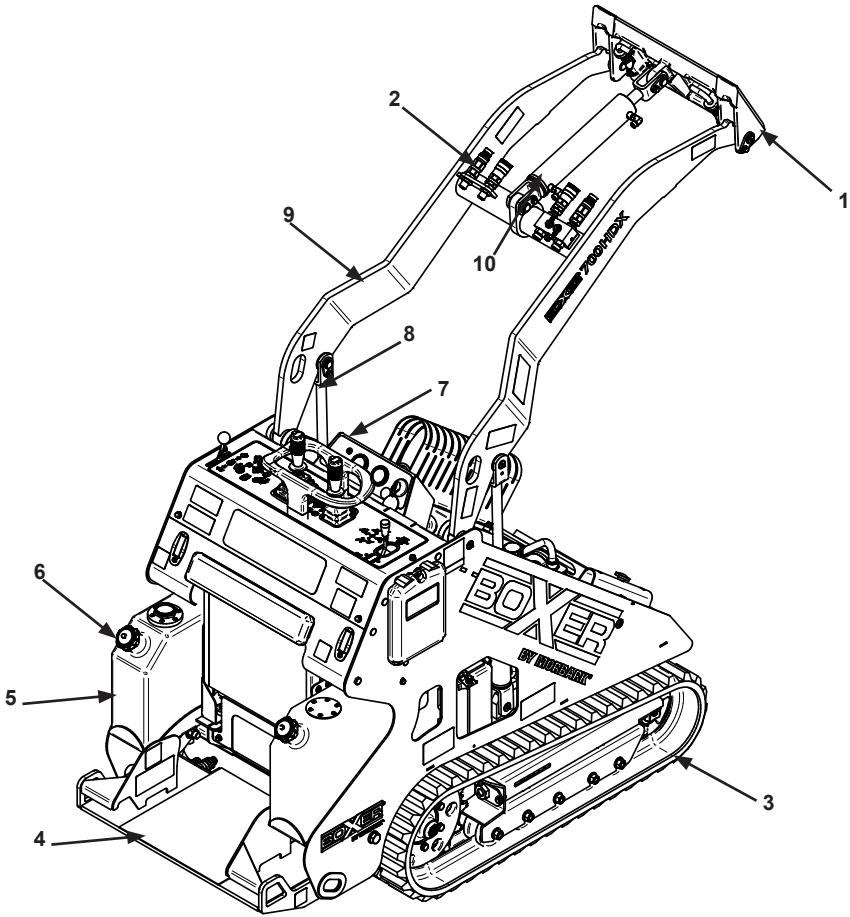
NOTE: FRONT PANEL REMOVED FOR CLARITY.

### Left Front View



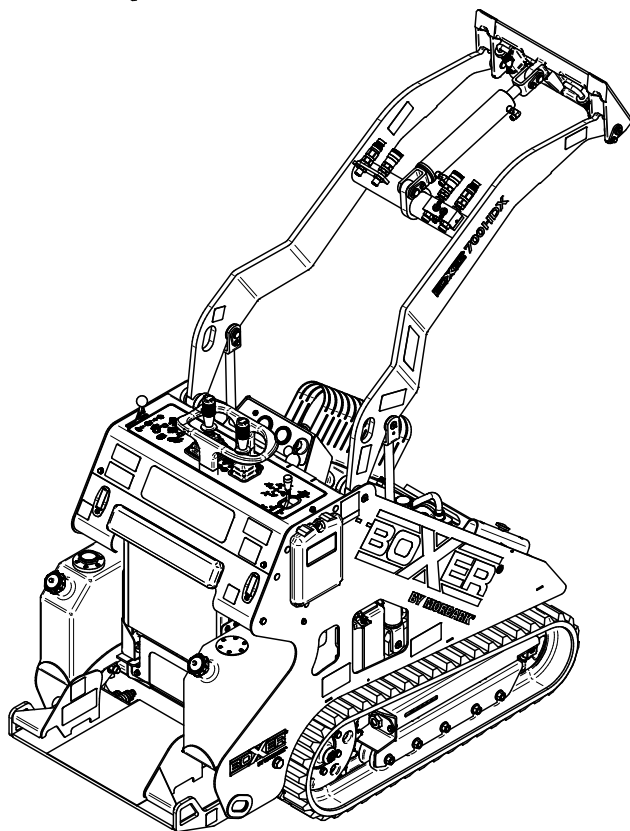
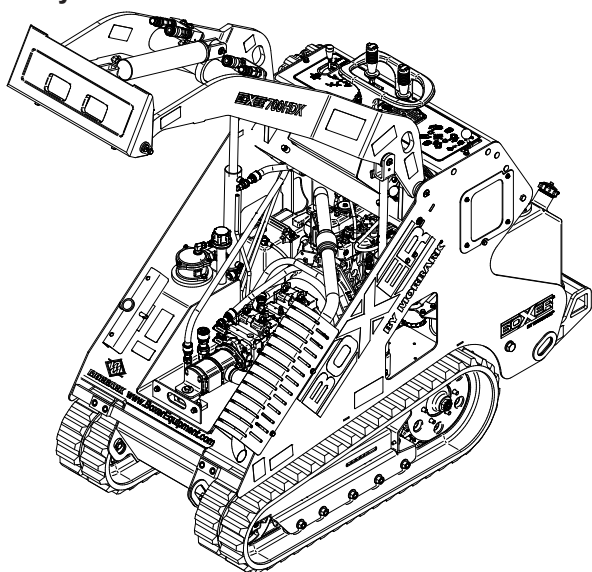
Item No.	Description
1	Attachment mounting plate
2	Boom
3	Joysticks
4	Manual Holder
5	Fuel Fill Cap
6	Lift Cylinder
7	Fuel Tank
8	Right Track Assembly
9	Lift Cylinder Safety Lock
10	Hydraulic Level Check

## Right Rear View



Item No.	Description
1	Attachment mounting plate
2	Attachment hydraulic quick connects
3	Right track assembly
4	Operator's platform
5	Fuel tank
6	Fuel fill cap
7	Engine hour meter
8	Loader arm lift cylinder
9	Loader arms
10	Tilt cylinder

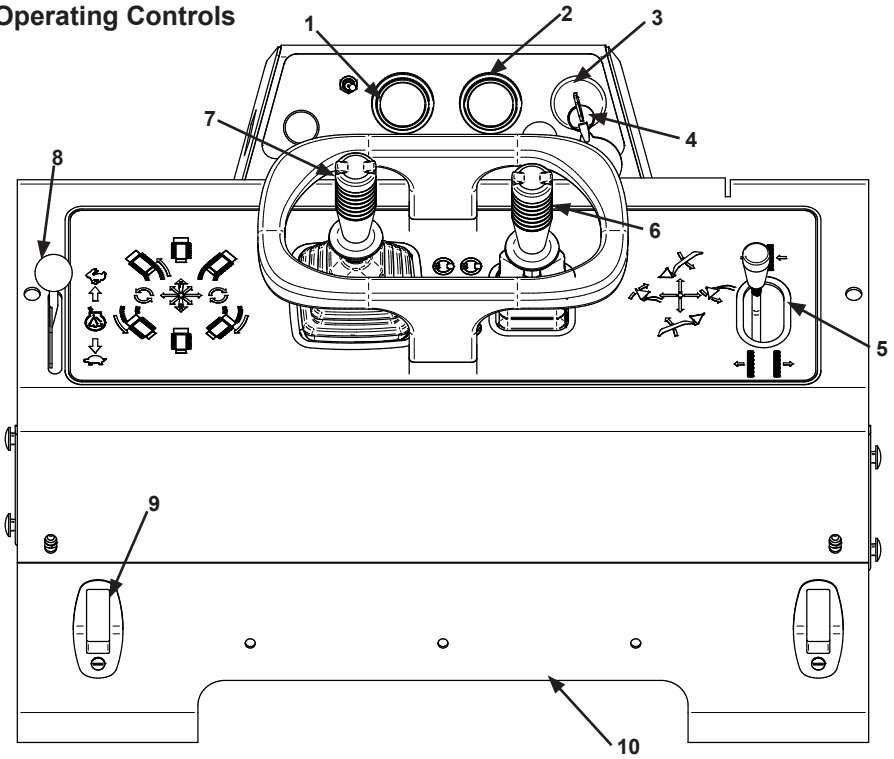
## Safety Decals



## Safety Decals (Continued)

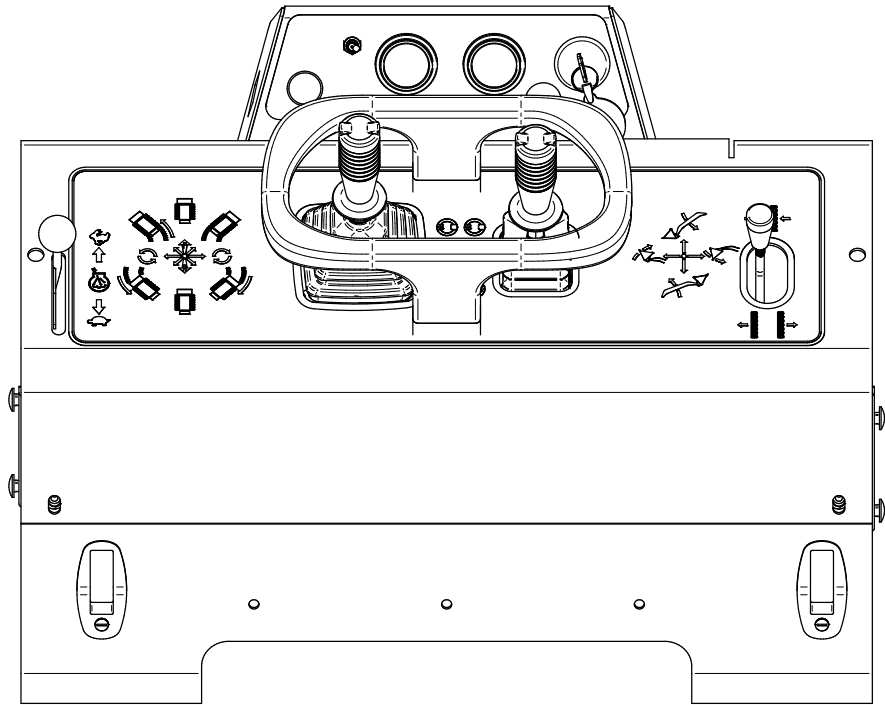
Item No.	Description	Quantity	Part Number
1	CONTROLS DECAL	1	39510-452
2	CAUTION,BURN HAZARD/SYM CONNECT	4	39510-009
3	LIFT POINT	2	39510-004
4	"CALL BEFORE YOU DIG"	1	39510-149
5	LOCKING PIN	1	39510-018
6	WARNING,ATTACHMENT SECURE CAUTION	2	39510-013
7	WARNING,STAY BACK/SYM DANGER	2	39510-006
8	WARNING, CRUSH HAZARD/SYM DANGER	4	39510-001
9	HYD OIL,ISO PREMIUM 46	1	39510-015
10	WARNING,INSTALL CYL LOCK/SYM WARNING	1	39510-012
11	WARNING,READ MANUAL/SYM WARNING	1	39510-008
12	WARNING,BATTERY GROUND (SYM)	1	39510-007
13	NOTICE,ULTRA LOW SULFUR DIESEL	2	39510-152
14	WARNING CA PROP 65	1	39510-014
15	BOXER -LARGE	2	39510-443
16	"700HDX" DECAL	2	39510-444
17	BIG POWER DECAL	2	39510-140
18	OPERATOR CONTROLS -SAFETY-	1	39510-068
19	OPERATOR CONTROLS	1	39510-067
20	CONTROL PANEL DECAL	1	39510-070
21	BOXER INTERNET ADDRESS DECAL	1	39510-446
22	MORBARK LOGO DECAL	1	39510-145
23	TAG, MOD, WT, HP	1	39510-156
24	TAG, SN, MAN DATE	1	39510-154
25	ULTRA LOW SULPHUR DIESEL	1	39511-951
26	GASOLINE/PETROL ONLY	2	39510-002
27	TIE DOWN	3	39510-005
28	WARNING, EXPLOSION HAZARD	1	39511-952
29	WARNING, FIRE HAZARD	2	39510-011
30	SHUT OFF FUEL	1	39510-003
31	DANGER, CRUSH HAZARD	2	39510-144
32	BOXER - SMALL	2	39510-445

Operating Controls



Item No.	Description
1	Engine coolant temperature gauge
2	Engine oil pressure gauge
3	Ignition switch
4	Ignition key
5	Track widen control
6	Right joystick
7	Left joystick
8	Engine throttle
9	Access panel Lock Levers
10	Lower service access panel

## Operating Controls Description



1. **Engine Coolant Temperature Gauge** – Gauge indicates the temperature of the engine coolant.
2. **Engine Oil Pressure Gauge** – Gauge indicates the engine oil pressure when the engine is running.
3. **Ignition Switch** – Rotating the key switch to the left activates the engine glow plug. Rotating the key switch one position to the right turns on the electrical controls. Rotating the switch fully to the right activates the engine starter.
4. **Ignition Key**
5. **Track Widen Control** – Pushing the lever forward retracts the track. Pulling the lever backwards widens/expands the track to the normal track width.
6. **Right Joystick** – Push joystick forward to lower the boom arm. Pull joystick backwards to raise the boom arm. Push joystick to the right to tilt the attachment to the down position. Push the joystick to the left to tilt the attachment to the up position.
7. **Left Joystick** – Push the joystick straight forward to move the machine forward. Push the joystick forward and slightly left to turn left while moving forward. Push the joystick forward and slightly right to turn right while moving forward. Pull the joystick straight backwards to move the machine in reverse. Pull the joystick

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**Operating Controls Description (cont.)**

backwards and slightly right to turn right while moving in reverse. Pull the joystick backwards and slightly left to turn left while moving in reverse. Push the joystick directly right to spin machine right. Push the joystick directly left to spin machine left.

**8. Engine Throttle** - Moving the control lever forward increases the engine speed and moving the lever backward slows the engine speed.

**9. Access Panel Lock Levers**

**10. Lower Service Access Panel** – This panel enables access to the engine and hydraulic controls for service procedures.



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## Section 3 - Pre-Start Inspection and Operation

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 **DANGER**

**IMPROPER USE OF THE COMPACT UTILITY LOADER COULD CAUSE DEATH OR SERIOUS INJURY. BEFORE OPERATING THE MACHINE OR PERFORMING MAINTENANCE, THE OPERATOR MUST READ AND UNDERSTAND THE ENTIRE OPERATOR'S MANUAL, REVIEW MACHINE CONTROLS, LOCATE AND REVIEW ALL WARNINGS AND SAFETY PLACARDS, AND RELEVANT OPERATOR SAFETY MATERIALS INCLUDING WRITTEN, VISUAL, VIDEO OR VERBAL INSTRUCTIONS.**

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### Pre-Start Inspection

It is very important to do a visual inspection of the machine before beginning operation. This inspection should include:

- Check all decals and warning signs for damage.
- Check engine oil.
- Check and refill fuel tanks.
- Check hydraulic lines and hoses for signs of damage or leaks.
- Inspect the machine for any signs of damage or loose fasteners.
- Check fluid levels and any signs of leaking fluids.
- Do all Daily Service Checks.
- Check machine controls to make sure that they automatically return to the neutral position.

The following information presents details on these inspection points and service checks

### Daily Service Check and Start - Up Inspections

Service Cycle Table

Activity	Daily (10 Hours)
Fuel	Check and fill
Engine Oil	Check and fill if low
Engine Oil Filter	Inspect for leaks
Engine Radiator	Inspect add if necessary
Air Filter	Check air filter dirt release
Fuel Filter	Inspect for leaks
Battery	Inspect terminals/leaks
Hydraulics <ul style="list-style-type: none"><li>- Hydraulic Filter</li><li>- Hydraulic Fluid</li><li>- Hydraulic Hoses</li></ul>	Inspect for leaks Check and fill if low Inspect for leaks
Grease	Check*
Track Damage	Inspect
Visual Check for Loose/Missing Fasteners	Inspect
Check and Adjust Track Tension	Inspect
Check both Track Widening Stop Bolts	Inspect

\*Under very wet, muddy, dusty or dirty working conditions more frequent lubrication may be required.

Do the following pre-start service checks:

1. Check condition of all warning and instructional decals. Replace any damaged decals with genuine Morbark replacement decals.
2. Check engine oil:
  - Make sure that the engine is OFF.
  - Pull out the dipstick and look for both the full and add oil lines (Item 1, **Figure 3-1**) indicated by the letters “F” and “A”. The correct oil level is between those two lines.

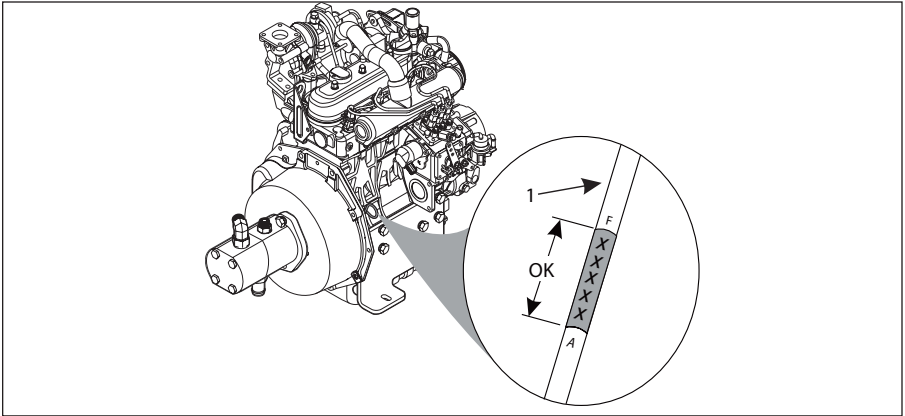


Figure 3-1 Engine Oil Level Check

- If the engine oil level is below the add line, indicated by the letter “A” on the dipstick, carefully add the proper amount of oil through the engine oil filler.

It is important to add the correct type of engine oil as stated in the engine manual.

**NOTE:** Make sure to reinstall and secure the oil filler cap.

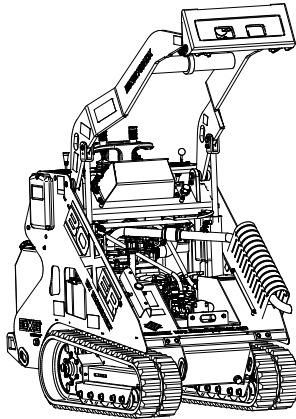


Figure 3-2 Filler Cap

**NOTE:** Extremely dusty or dirty working conditions may require more frequent checking, filling and/or changing of engine oil.

- After filling the oil, wait a few minutes and check the oil level again.  
Make sure to securely reinstall the dipstick into the dipstick tube before starting the engine.

# NOTICE

3. The Boxer has two saddle fuel tanks (Item 1, **Figure 3-3**). Remove cap (Item 2, **Figure 3-3**) and visually inspect fuel level. Make sure that each tank has been filled on a daily basis.

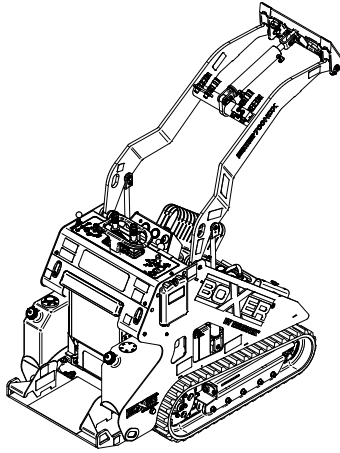


Figure 3-3 Fuel Level Check

- Carefully pour the fuel into the tank, until fuel level is at bottom of fill spout.

## ⚠ CAUTION

- Allow engine to cool before filling fuel tanks.
- Do not overfill, fuel could spill onto hot engine parts and ignite or explode.

4. Check engine coolant level.

## ⚠ CAUTION

The coolant is hot and under pressure. **DO NOT** check until the engine radiator is cool to the touch.

- Remove radiator cap (Item 1, **Figure 3-4**) and check the radiator fluid level. The proper coolant level will be to the bottom of filler neck.

# NOTICE

- The overflow bottle is a non-pressurized container that is only for any high heat overflow. Do not add coolant to this container. It will not be drawn into the engine.
- If coolant is required, make sure to add the proper coolant as shown in the Engine Manual.

5. Inspect the radiator to make sure that the air flow is not blocked. The fan located between the radiator and engine is a suction fan, which draws air from outside the machine. Check radiator (Figure 3-5) to make sure that debris has not been sucked against the radiator blocking air flow.

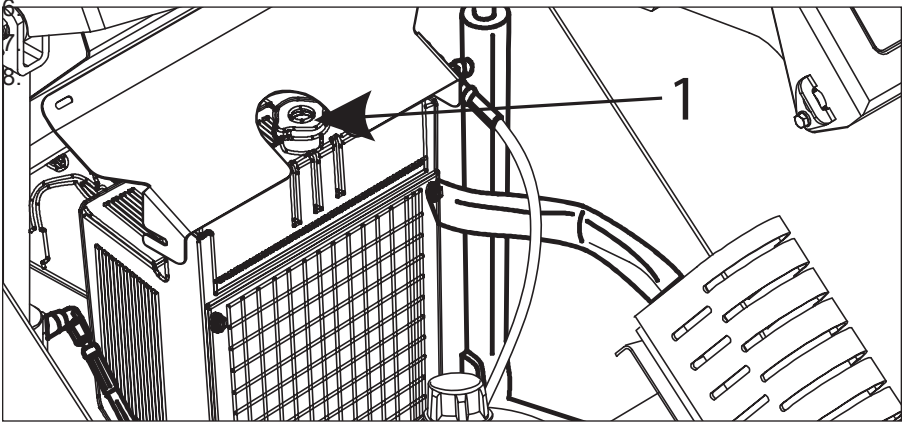


Figure 3-4 Filler Cap

# ⚠ CAUTION

**DO NOT** check until the engine radiator is cool to the touch.

NOTE: Some items in **Figure 3-5** have been removed for clarity.

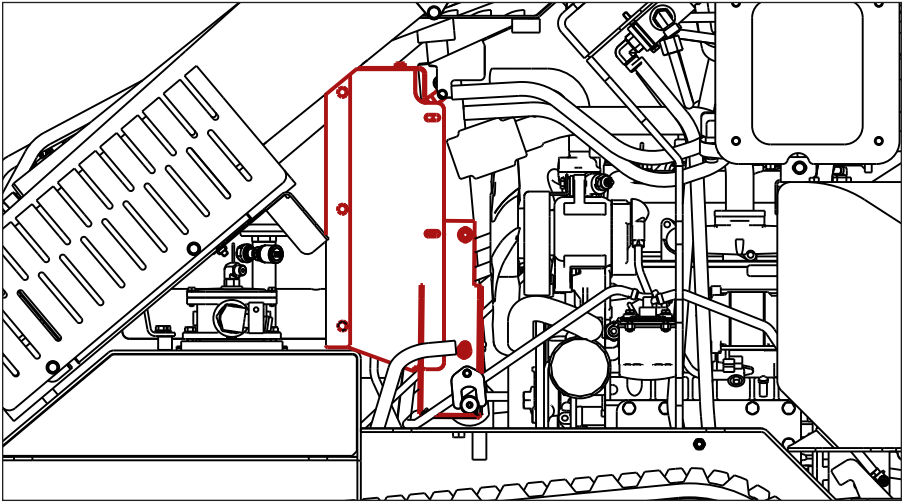


Figure 3-5 Radiator Air Flow Inspection

9. Check all hydraulic hoses, lines, and fittings.

## **WARNING**

Hydraulic oil under pressure can penetrate body tissue causing serious injury and possible death. When troubleshooting a hydraulic system for leaks, always use cardboard or wood as a detector. **DO NOT USE YOUR BARE HANDS.** If you are injected with hydraulic oil or any other fluids, immediately seek treatment by a doctor trained in the treatment of penetrating fluid injuries.

- Visually inspect all of the hydraulic hoses, lines, and fittings for signs of damage, wear or leaking.
- If any signs of damage are visible, do not operate the machine until repairs have been made.
- Some examples of common hydraulic hose damage are shown in **Figure 3-6**.

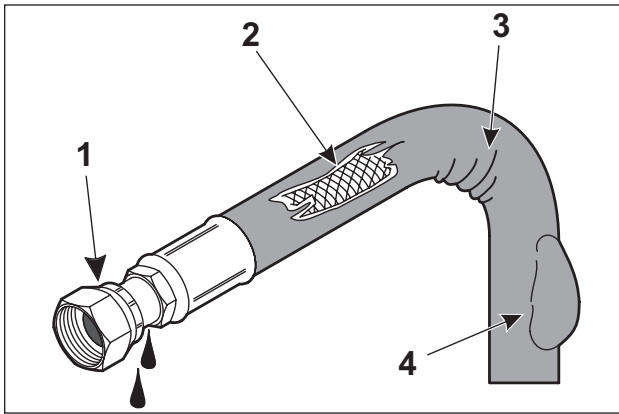


Figure 3-6 Hydraulic Hose Damage

- 1. End fittings damaged or leaking.**
- 2. Outer covering chafed or cut, and reinforcing wire is exposed.**
- 3. Hose shows signs of kinking or crushing.**
- 4. Outer covering ballooning.**

10. Check for loose or missing fasteners.

- Inspect for any loose or missing bolts.
- Tighten or replace any missing bolts immediately.

11. While you are performing the daily maintenance, inspect the machine for any signs of damage, such as missing or damaged components, cracked welds, etc.

12. Check the track assemblies to make sure that:

- The tracks are in good condition and are not showing any signs of wear.
- Track tension is properly set.
- Track drive motors are not leaking oil or hydraulic fluid.

13. Grease pivot shafts with proper type of grease. There are 14 grease points on this machine, see **Figure 3-7** on page 3-7.

14. Inspect the Track Widening Stop Bolts, one for each track assembly, (Item 1, **Figure 3-8**) for:

- Signs of wear or damage and make sure that the bolt is not loose.
- Check the widening bolt lock nut (Item 2, **Figure 3-8**) to make sure that it is tight against the mounting block (Item 3, **Figure 3-8**).

**NOTE:** The lock nut, when it is fully tightened, secures the track widening stop bolt to the mounting block.

- The track extension system has been designed to have a slight gap between the track frame and the stop bolt head when the tracks are fully extended. If this gap is not noted, the track widening stop bolts need to be adjusted. Refer to Section 4 for the adjustment instructions.

**⚠ CAUTION**

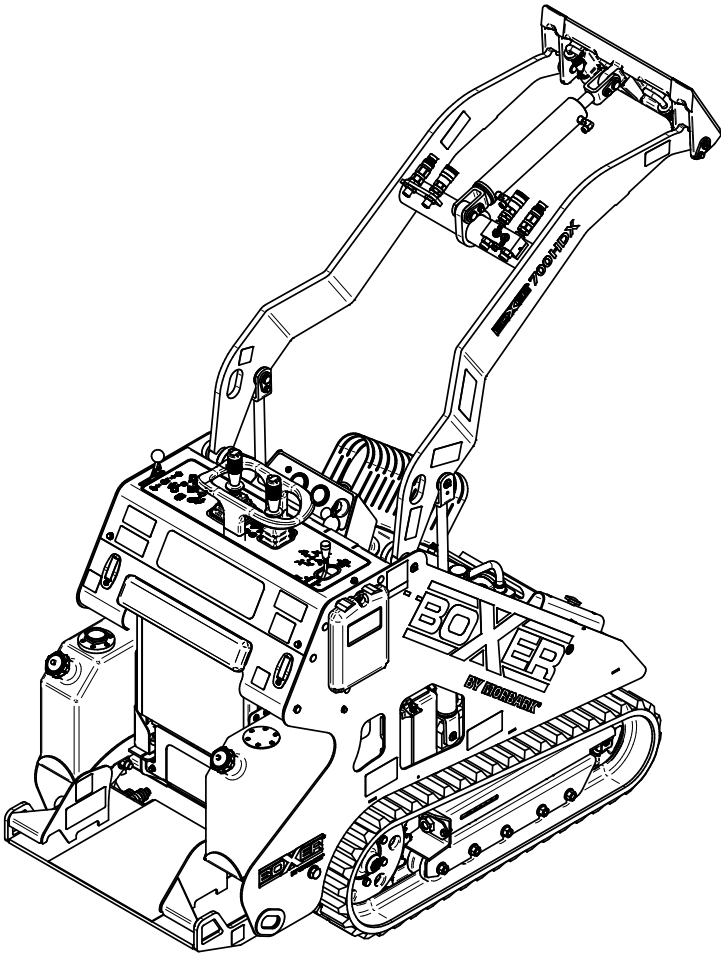


Figure 3-7 Lubrication Points

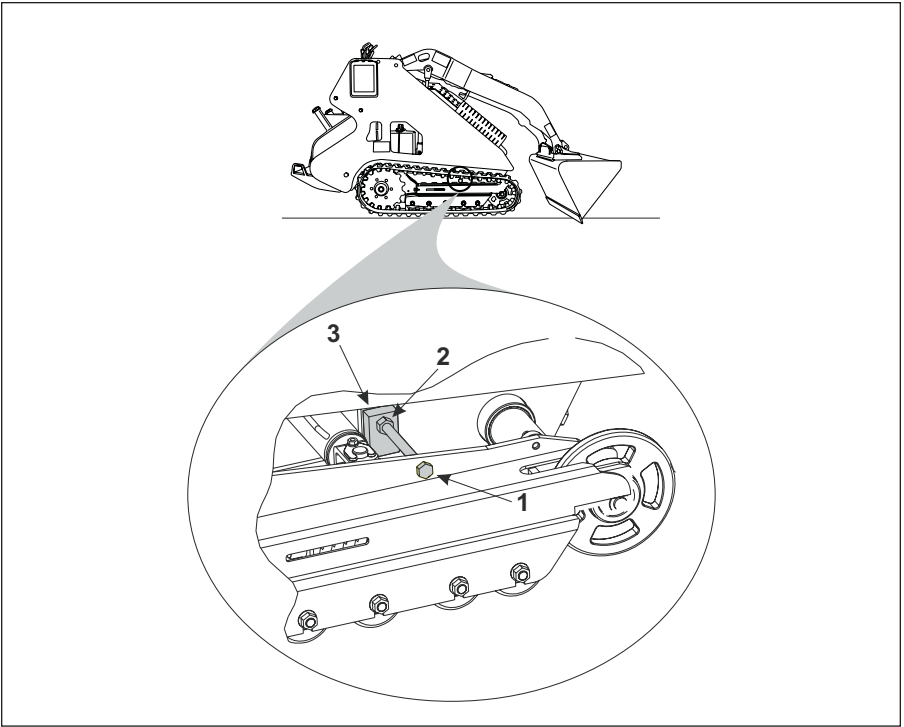


Figure 3-8 Track Widening Stop Bolts

**NOTE:** Extremely dusty or dirty working conditions may require more frequent service/replacement track widening stop bolts.

## Cylinder Lock Installation

# ! WARNING

Make sure to install the cylinder lock before performing any service work underneath the raised loader arm assembly.

1. Start the engine. (See Machine Start-up in this section for engine starting instructions.)
2. Fully raise the loader arm.
3. Shut off the engine.
4. While holding the cylinder lock (Item 1, [Figure 3-9](#)), remove the lock knob (Item 2, [Figure 3-9](#)) and pull the safety lock pin (Item 3, [Figure 3-9](#)) outwards, releasing the cylinder lock.
5. Install the cylinder lock onto either of the loader arm lift cylinders.
6. Fully reinsert the safety lock pin (Item 4, [Figure 3-9](#)), securing the cylinder lock (Item 5, [Figure 3-9](#)) in the support position.

**NOTE:** Make sure that the safety lock pin goes behind the loader arm cylinder.

7. Lower the loader arm assembly until it is supported by the cylinder lock.

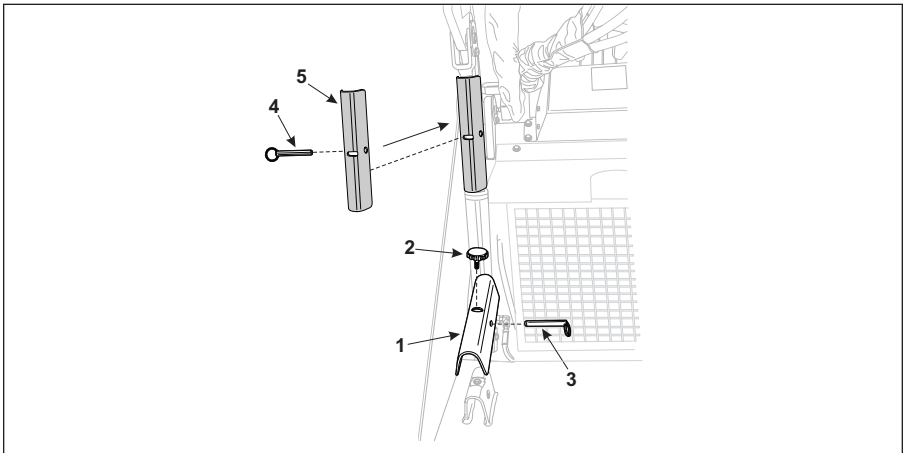


Figure 3-9 Safety Lock Installation

## Cylinder Lock Removal

1. Start the engine and raise the loader arm to its full height.
2. Shut off the engine.
3. Pull the safety lock pin (Item 4, [Figure 3-9](#)) fully outwards.
4. Remove the cylinder lock (Item 5, [Figure 3-9](#)) and return it to the storage position on one of the hydraulic lines, such as over the filter return line.
5. Fully insert the safety lock pin (Item 3, [Figure 3-9](#)) and lock knob (Item 2, [Figure 3-9](#)) to secure the cylinder lock in the storage position.

## Operating Instructions

### Machine Start-up

To start the machine, the operator must:

1. Stand on the operator's platform (Item 1, [Figure 3-10](#)).

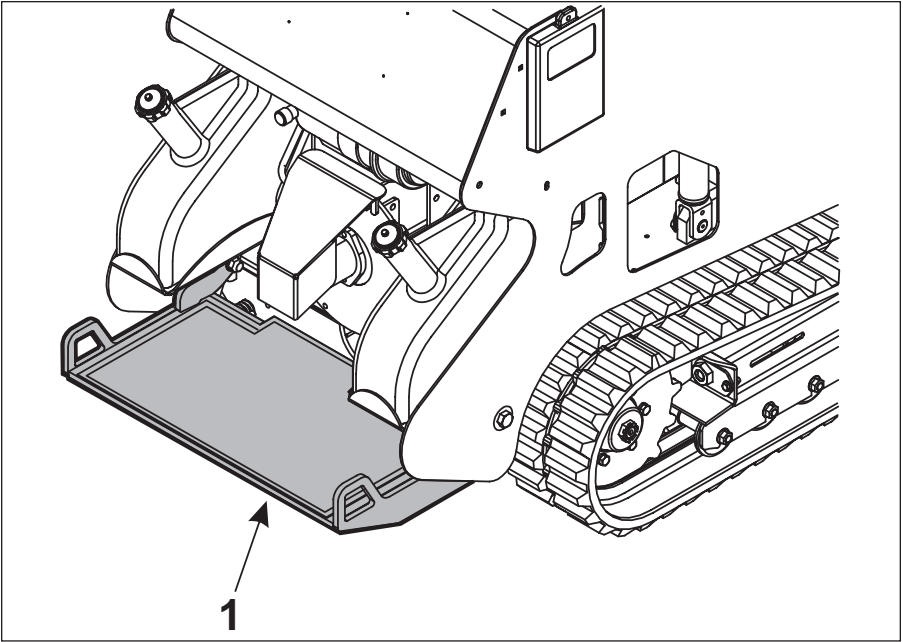


Figure 3-10 Operator's Platform

2. Rotate the ignition key switch to the HEAT position (Item 1, [Figure 3-11](#)) for about 10 seconds.
3. Move the throttle lever (Item 1, [Figure 3-12](#)) to about half way between fast and idle engine speeds.
4. Rotate and hold the starter switch in the START (Item 4, [Figure 3-11](#)) position until the engine starts.

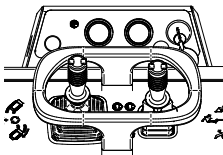


Figure 3-11 Ignition Switch

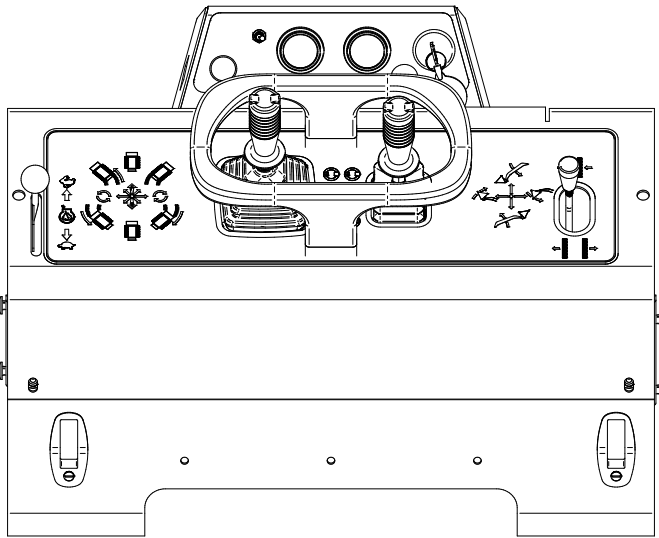


Figure 3-12 Throttle Settings

5. As soon as the engine starts, release the starter key. The key will automatically return to the RUN position (Item 3, [Figure 3-11](#)).
6. Leave the throttle setting at about the halfway position and allow the engine to idle. This will begin warming the engine coolant and hydraulic oil.
7. In cold weather (32° F [0° C]) after about 5 minutes of engine idling, operate all of the main hydraulic controls to cycle warmed hydraulic oil through the hydraulic lines into the cylinders and hydraulic motors. Allow the engine to idle for another 5 minutes before beginning any machine operations.

## **WARNING**

**When warming the hydraulic oil, the operator must cycle all functions every 5 minutes. This will assist in warming the hydraulic oil in all systems evenly and more rapidly. Failure to do this can cause the control systems to stick creating a run-away situation.**

### **Machine Shut-down**

To safely shut the machine down, the operator must:

1. Park the machine on a solid, level area.
2. Lower the loader arm and attachment to the ground.
3. Idle the engine for 5 - 10 minutes to allow the machine to cool down.
4. Shut off the engine.
5. Clean off any accumulated mud and/or dirt from the machines operating surfaces, operator's platform, both track assemblies, etc.

## Transportation

1. Move the throttle control lever to the mid-range engine speed and set the transport speed to the LOW range. Raise the attachment so that it will clear the ramp of the transport trailer.

**NOTE:** The longer the attachment, like the trencher, the more the attachment needs to either be tilted or raised. It is recommended to back the machine onto the transport trailer and position the machine so that the heaviest weight (center of balance) is towards the front (hitch end) of the trailer. See [Figure 3-13](#).

# ⚠ CAUTION

The Boxer is designed for maximum working balance. When traveling on an incline, always have the heaviest portion of the machine pointing uphill.

2. Follow general load carrying safety. Always carry the heaviest load pointing uphill.

**NOTE:** When operating without an attachment, the operator becomes the load.

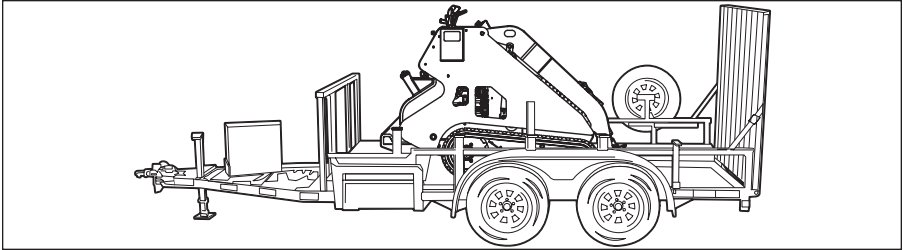


Figure 3-13 Transport Position on Trailer

3. When the machine is positioned on the trailer properly, lower the attachment to the trailer deck.

4. Shut the engine off and remove the key.

5. Secure the unit to the transport vehicle with DOT (Department of Transportation) approved chains, binders, in accordance to DOT guidelines. Make sure to use the appropriate tie-down locations on the machine and trailer.

### NOTE:

- Never tow or pull the machine. Damage to the hydraulic motors could result.
- If the machine is totally in-operable, use lifting straps or cables and a machine that can safely lift 4,000 lbs (1820 Kg), to lift the machine and place on a trailer. Refer to “Lifting Procedures” on page 3-13.

# ⚠ WARNING

When transporting the machine, make sure to use DOT approved chains and binders (Item 1, [Figure 3-14](#)) to secure the machine to the “D” rings on the trailer.

**NOTE:** It is recommended to secure the machine through the lifting holes located at the lift cylinder end of the boom assembly (Item 2, [Figure 3-14](#))

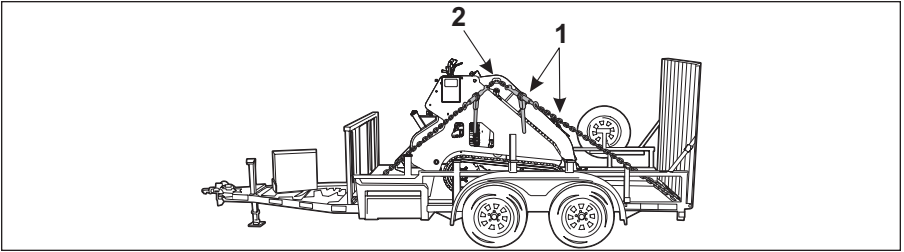


Figure 3-14 Travel Chains and Binders

## Lifting Procedures

When it becomes necessary to lift the machine

1. Use a lifting device that can safely lift 4,000 lbs (1820 Kg).
2. Use appropriate lifting chains (Item 1, [Figure 3-15](#)) that can safely lift 4,000 lbs (1820 Kg).
3. Route the chains through the lifting eyes (Item 2, [Figure 3-15](#)) located at the top of the boom arms.
4. Make sure that the length of chain on each side of the lifting point is the same (Item 3 A, [Figure 3-15](#)) is the same as (Item 3 B, [Figure 3-15](#)) so that the machine is lifted straight upwards.



## CAUTION

- Lift the machine approximately 12" to make sure that the machine is balanced before completing the lift.
- If lifting the machine with an attachment installed, the overall machine may not be balanced from front to back.

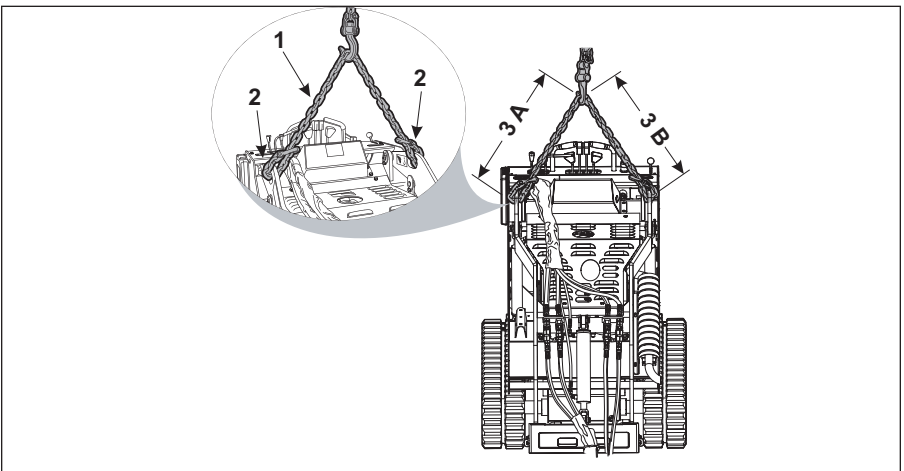


Figure 3-15 Machine Lifting

## Machine Travel Controls

- Joysticks and levers should return to the neutral position when they are released.
- Make sure that all of the levers and joysticks are in the neutral (middle) position before starting the engine.
- Operate the levers and joysticks gradually and smoothly. Excessive speed and quick control movements without regard for working conditions could cause an unsafe situation.
- Make sure to maintain your grip on the hand grip area around the joysticks, any time the machine is in motion.

# NOTICE

Due to the spring tension system built into the track drive as a safety mechanism, the machine can be put into an extreme situation during which the drive sprocket will bypass the rubber track guide holes causing a popping noise, called “cogging”. This situation is part of the track drive systems safety design and indicates that this portion of the safety system is functioning properly.

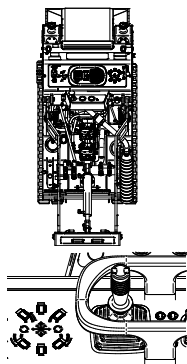
The “cogging” condition is most likely to occur while operating in a reverse direction pulling a heavy load and during the first 50 hours of track usage. It is caused by the tension spring being fully compressed due to high track load.

If a cogging condition occurs, immediately stop machine travel and auxiliary functions and reverse travel direction slightly to de-compress track tension. Continued cogging will cause the track drive sprocket to seat into the rubber track incorrectly, and cause damage to the track. If cogging occurs, stop travel function and check for and remove any debris or foreign matter in the drive system, check track for proper tension as shown in Section 4 of this manual and resume operation.

### Forward Travel

Push left joystick forward to travel straight forward. The farther this is moved, the faster the machine will travel. See [Figure 3-16](#).

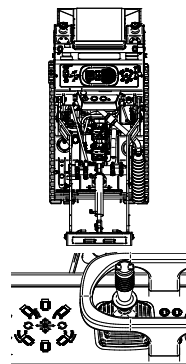
Figure 3-16  
Forward Travel



### Reverse Travel

Pull left joystick backwards to travel straight backwards. The farther this is moved, the faster the machine will travel. See [Figure 3-17](#).

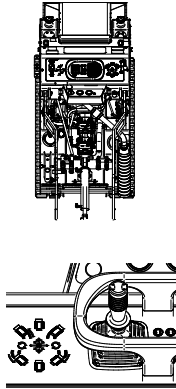
Figure 3-17  
Reverse Travel



**Right Turn During Forward Travel**

To turn to the right, move the left joystick forward and slightly to the right. The farther forward and slightly right the joystick is moved, the faster the right turn will be made. See **Figure 3-18**.

Figure 3-18  
Right Hand Turn  
in Forward

**Left Turn During Forward Travel**

To turn to the left, move the left joystick forward and slightly to the left. The farther forward and slightly left the joystick is moved, the faster the left turn will be made. See **Figure 3-19**.

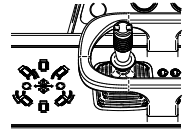
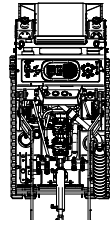
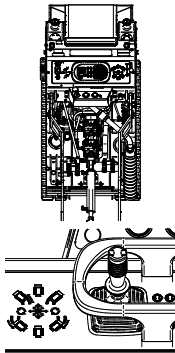


Figure 3-19  
Left Hand Turn  
in Forward

**Right Turn During Reverse Travel**

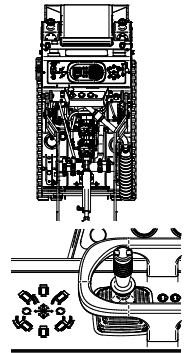
Move the left joystick backwards and slightly to the right. The farther backwards and slightly to the right the left joystick is moved, the faster the right turn will be made. See **Figure 3-20**.

Figure 3-20  
Right Hand Turn  
in Reverse

**Left Turn During Reverse Travel**

Move the left joystick backwards and slightly to the left. The farther backwards and slightly to the left the left joystick is moved, the faster the left turn will be made. See **Figure 3-21**.

Figure 3-21  
Left Hand Turn  
in Reverse



## Spin Turn

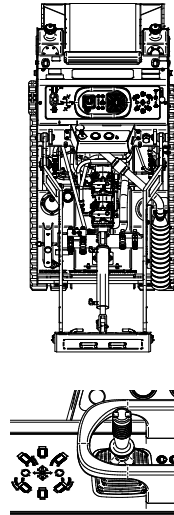
**⚠ CAUTION**

**Make sure to use the machine hand holds while doing a spin turn to maintain your balance.**

Move the left joystick directly to the right to spin the machine on its axis to the right.  
Move the left joystick directly to the left to spin the machine on its axis to the left

See  
**Figure 3-22.**

Figure 3-22 Spin Turn



# ⚠ WARNING

- Do not travel up or across a slope steeper than 15°. See **Figure 3-23**.
- Make sure that the tracks are extended to their widest position, providing the broadest stance for the machine.
- Keep attachments as low as possible when traveling on slopes or rough terrain.

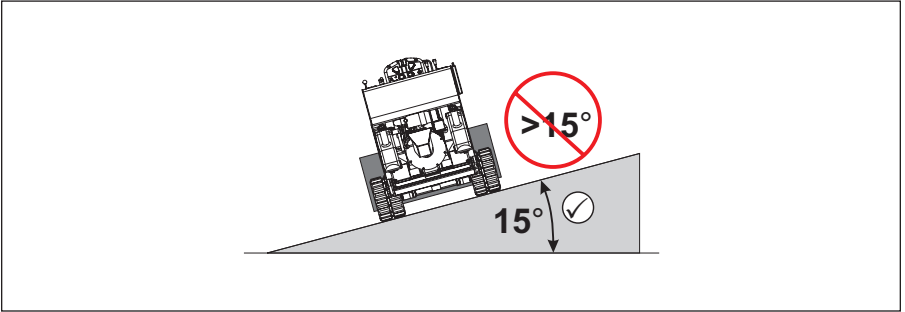


Figure 3-23 Slide Slope Travel

- Keep the heavy end of the machine towards the uphill direction when traveling up or down a slope.

**NOTE:** When the machine has no attachment or load, the heavy end is the operator's platform end of the machine. See **Figure 3-24**.

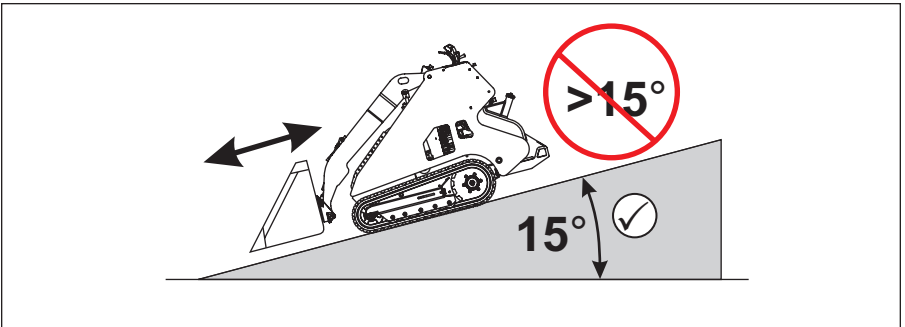


Figure 3-24 Uphill/Downhill Travel

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## Attachment Installation and Removal

### Attachment Lock Pins

The mounting plate located at the front of the machine provides for the easy installation and safe use of the wide variety of available attachments. This system is very easy to use, but requires the proper use of the attachment lock pins. There are two positions for the attachment lock pins, the unlocked position and the locked position.

Once the machine has picked up an attachment, shut off the engine and rotate the attachment locks into the “locked” position (Item 1, [Figure 3–25](#)). As you rotate the lock pin, it will drop downwards, securing the attachment to the machine. If the lock pin does not drop into the locked position, start the engine and tilt the attachment slightly forwards or backwards until the lock pins snap into place.

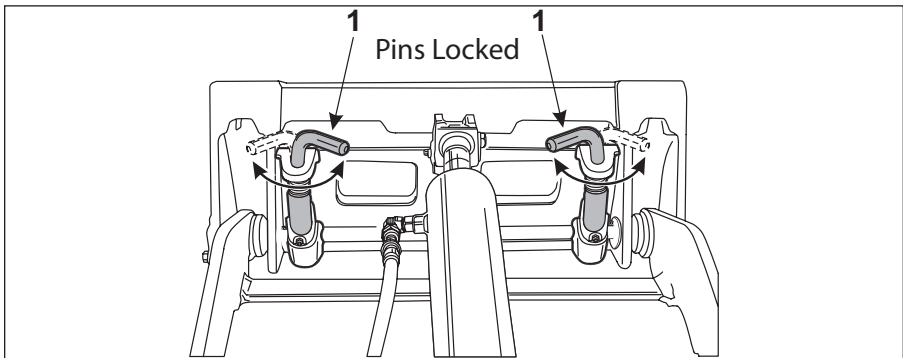


Figure 3-25 Attachment Locks in Locked Position



**CAUTION**

**Until the attachment lock pins are fully in the locked position, the attachment has not been safely secured to the machine. Do not stand near the attachment until it is fully secured to the machine.**

---

To release an attachment, rotate the attachment locks to the “unlocked” position (Item 1, [Figure 3–26](#)). The lock pins will automatically rise, releasing the attachment from the machine. If the pins do not release the attachment or are very hard to rotate, start the engine and tilt the attachment slightly forwards or backwards until the pins can be rotated.

## Installation of Non-Hydraulically Powered Attachments

# ⚠ CAUTION

Make sure to keep your hands and feet away from the attachment during the unlocking process. As the attachment becomes free from the machine, it may move.

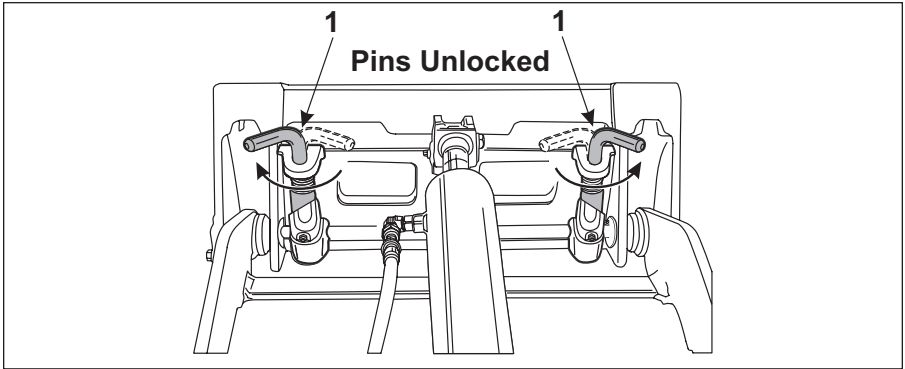


Figure 3-26 Attachment Locks in Unlocked Position

There are many available attachments that are very easy to install. To install any of the non-hydraulically powered attachments:

1. Position the attachment on a level surface.

**NOTE:** Clean the inside lower edge of the female attachment mounting plate (Item 2, Figure 3-27) to remove any debris that might interfere with the attachment installation.

2. Start the machine's engine, lower the loader arm and tilt the mounting plate forwards

**NOTE:** Make sure that both of the attachment lock pins (Item 1, Figure 3-26) are in the "unlocked" position. Refer to "Attachment Lock Pins" on page 3-18.

3. Slowly drive towards the attachment and align the top edge of the male mounting plate (Item 1, Figure 3-27) and the upper lip of the female attachment mounting plate (Item 2, Figure 3-27). Slide the upper edge of the male mounting plate into the upper lip of the female attachment mounting plate.

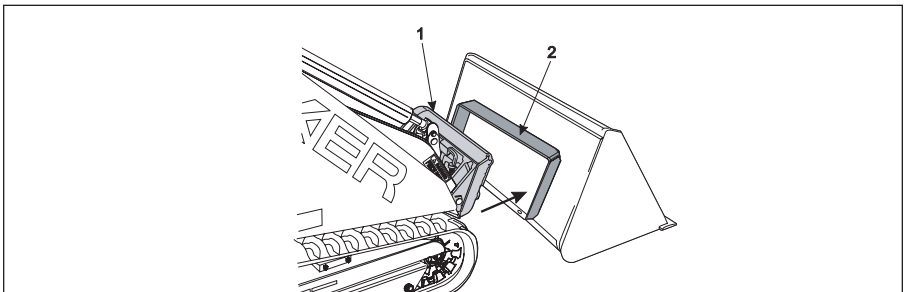


Figure 3-27 Installing a Non-powered Attachment

4. When the top of the attachment mounting plate (Item 1, **Figure 3-28**) is firmly seated in the attachment mounting bracket (Item 2, **Figure 3-28**), tilt the attachment mounting plate backward slightly to allow the lower edge of the attachment mounting bracket to slide into place on the attachment mounting plate.

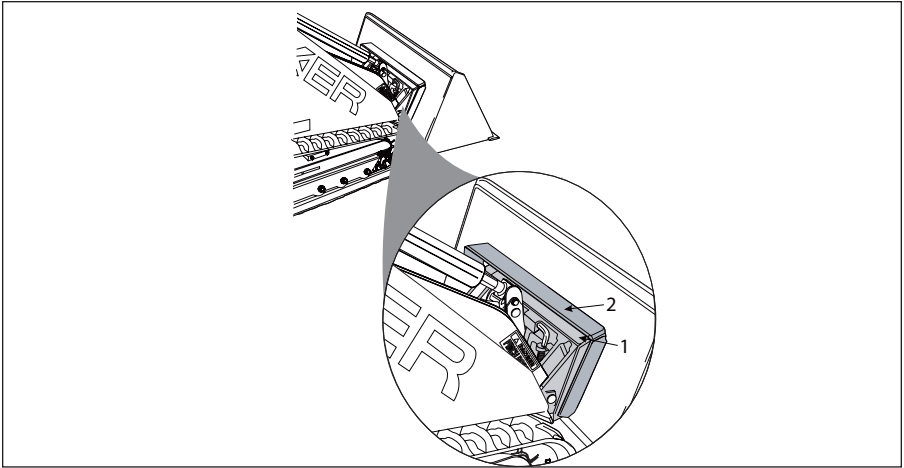


Figure 3-28 Attachment Installed

5. Shut the engine off.
6. Rotate the attachment lock pins (Item 1, **Figure 3-29**) into the locked position, securing the attachment to the machine.

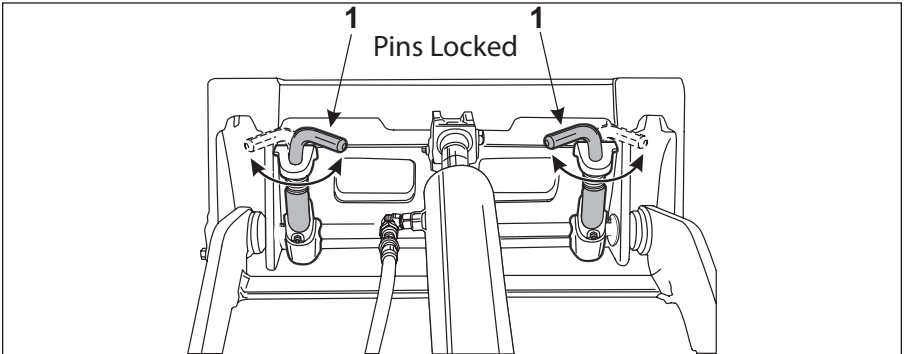


Figure 3-29 Attachment Locks in Locked Position

**⚠ CAUTION**

**DO NOT** go underneath the attachment when it is raised.

7. Start the engine and raise the attachment off the ground. Visually inspect the bottom edge of the attachments mounting plate to make sure that both of the attachment lock pins are securely holding the attachment in position.

## Removal of Attachment

1. Lower the attachment onto a firm, level surface.
2. Shut off the machine engine.
3. Rotate the attachment lock pins to the UNLOCKED position (Item 1, [Figure 3-30](#)).

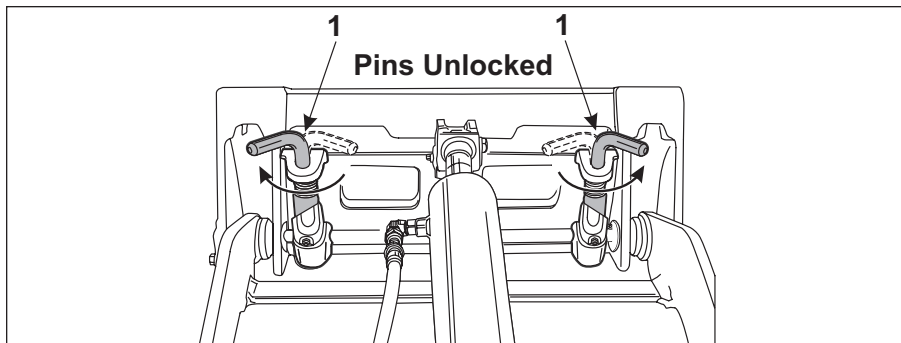


Figure 3-30 Attachment Locks in Unlocked Position

4. Start the engine and rotate the mounting plate downwards.
5. Back away from the attachment.

**NOTE:** It may be necessary to lower the loader arm assembly slightly to fully disengage from the attachment.

## Installation of Hydraulically Powered Attachments

There are many hydraulically powered attachments available that are very easy to install. To install any of these attachments:

1. Position the attachment on a level surface.

**NOTE:** Clean the lower edge of the female attachment mounting plate to remove any debris that might interfere with the attachment installation.

2. Start the machine engine, lower the loader arm and tilt the mounting plate forwards

**NOTE:** Make sure that both of the attachment lock pins (Item 1, [Figure 3-31](#)) are in the “unlocked” position.

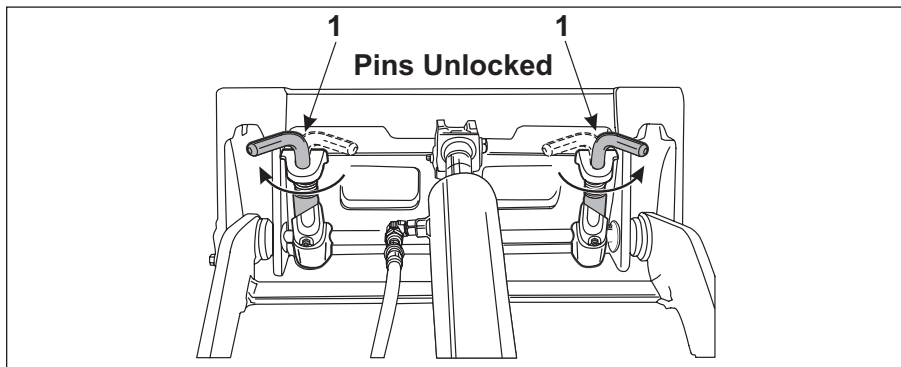


Figure 3-31 Attachment Locks in Unlocked Position

3. Slowly drive towards the attachment and align the top edge of the male mounting plate (Item 1, [Figure 3-32](#)) and the upper lip of the female attachment mounting plate (Item 2, [Figure 3-32](#)).

## NOTICE

Make sure to position the attachments hydraulic hoses (Item 4, [Figure 3-32](#)) so that they are not damaged during the installation process.

4. Tuck the upper edge of the male mounting plate into the upper lip of the female attachment mounting plate.

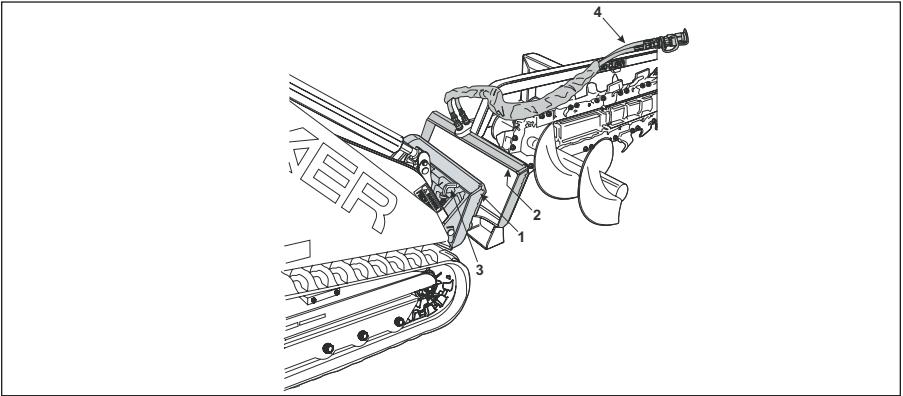


Figure 3-32 Hydraulically Powered Attachment Installation

5. When the machines mounting plates top edge is seated in the attachment mounting plate, tilt the machines mounting plate backwards slightly to allow the lower edge of the machines mounting plate to slide into position. See [Figure 3-33](#).

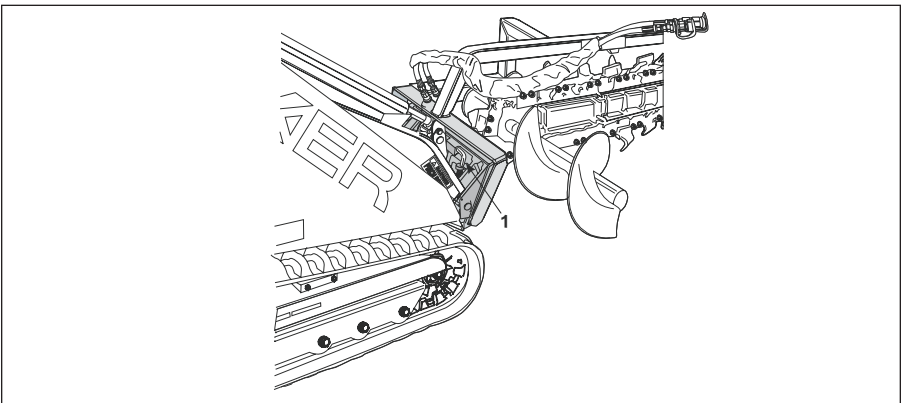


Figure 3-33 Hydraulically Powered Attachment Installed

6. Shut the engine off.

## CAUTION

**DO NOT go underneath the attachment when it is raised.**

7. Rotate the attachment lock pins (Item 1, [Figure 3-34](#)) into the locked position securing the attachment to the machine.

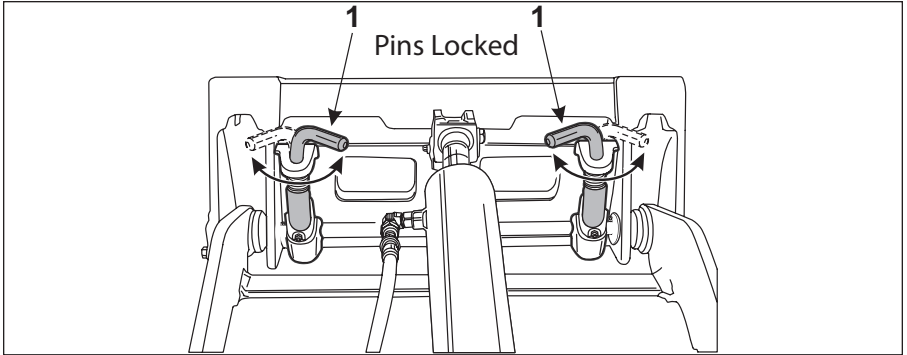


Figure 3-34 Attachment Locks in Locked Position

8. Start the engine and raise the attachment off the ground. Visually inspect the bottom edge of the attachments mounting plate to make sure that both of the attachment lock pins are securely holding the attachment in position.

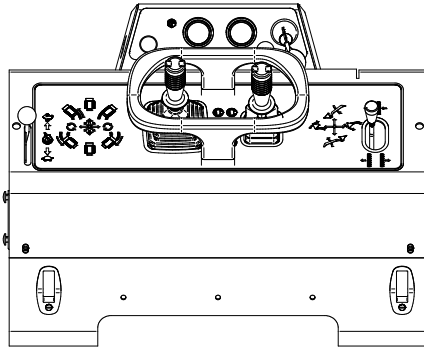
9. Shut off the engine.

10. Relieve hydraulic pressure stored in the hoses. NOTE: To relieve pressure in high flow side, depress push buttons located on the pressure relief block (see [Figure 3-37](#)).

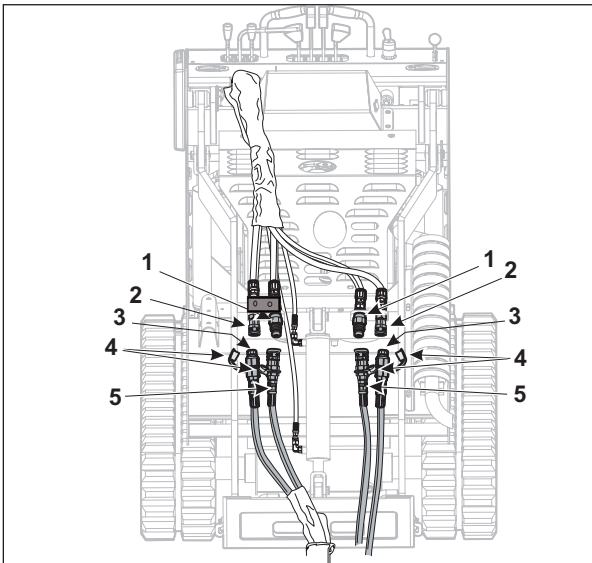
11. Attach the hydraulic hoses to the quick connects. See [Figure 3-36](#).  
NOTE: There are two hydraulic hoses that need to be connected. The quick connect system prevents you from incorrectly connecting the hydraulic hoses, but both hoses need to be connected for the attachment to operate.

## WARNING

**Make sure that the engine has been shut off before beginning this procedure.**



- a. Remove the protective covers (Items 4, **Figure 3-36**) from the attachment quick connectors.
- b. Wipe off the end of each of the connectors (Items 1, 2, 3, 5 **Figure 3-36**) to remove any dirt or debris.



3-36 Auxiliary Hydraulic Quick Connects

- c. Insert the attachment's male coupling (Item 3, **Figure 3-36**) into the female bulkhead quick coupling (Item 2, **Figure 3-36**) on the machine and push until the connector locks into position.
- d. Repeat the above process to connect the attachments' female quick connect (Item 5, **Figure 3-36**) on the other hose to the male bulkhead connector (Item 1, **Figure 3-36**) on the machine.
- e. Check the security of both connections by gently tugging on the attachment hoses to make sure that the quick connects are seated properly.

12. Make sure that the hydraulic hoses are routed so that they will not be in the way or damaged during machine operation. **Figure 3-37** shows how the hoses might be routed to keep them out of the way during operation and prevent them from being damaged.

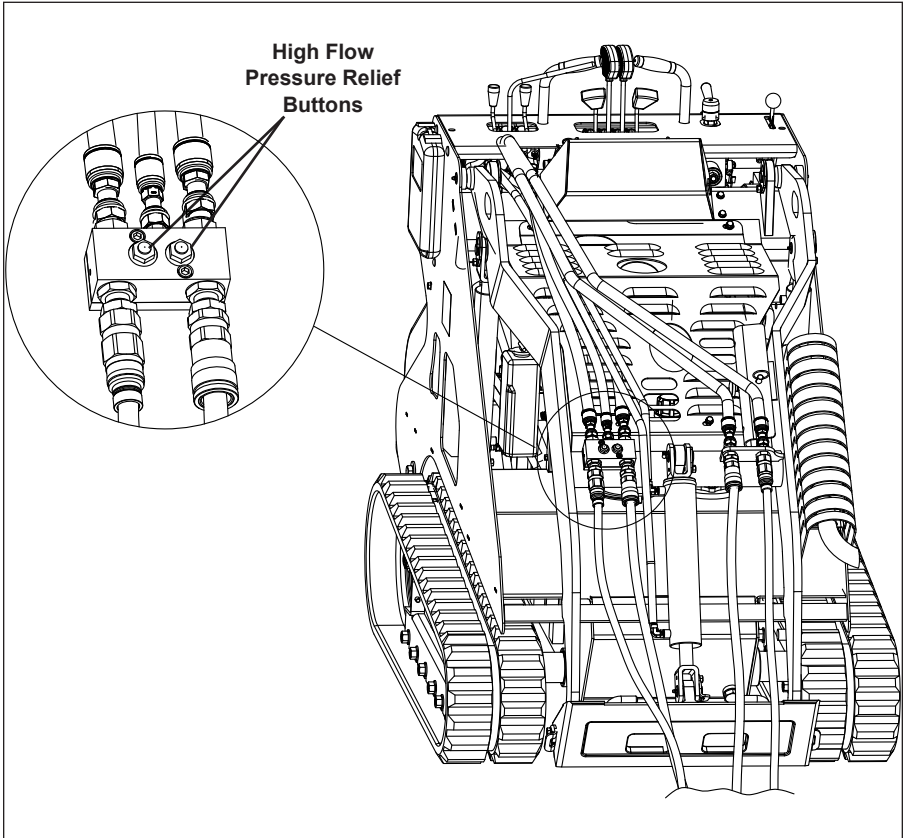


Figure 3-37 Attachment Hydraulic Hose Routing (shown without hose covers)

13. The attachment is now ready to use.

## CAUTION

Before starting the engine, make sure that the Auxiliary Hydraulic control lever is in the NEUTRAL position. If this control is left in either the forward or reverse position and the engine is started, the attachment will begin to function.



## Removal of Hydraulically Powered Attachments

# ⚠ CAUTION

After use, the quick couplers and hydraulic fluid will be very hot. Wear gloves when disconnecting the auxiliary hydraulic lines.

To remove a hydraulically powered attachment;

1. Lower the attachment to the ground and shut off the engine.
2. Relieve hydraulic pressure stored in the hoses. NOTE: To relieve pressure in low flow side, move auxiliary control lever (see Item 2, [Figure 3-39](#)) back and forth then leave in the detent. To relieve pressure in high flow side, depress push buttons located on the pressure relief block (see [Figure 3-37](#)).
3. Some of the female couplings will have a lock button preventing accidental disconnection. To release this type of quick connect, rotate the collar on the female quick connect (Item 1, [Figure 3-41](#)) to align the notch on the collar with the lock button (Item 2, [Figure 3-41](#)).
4. Slide the collar backwards on the female quick connect (Item 4, [Figure 3-41](#)) until it stops against the lock button (Item 3, [Figure 3-41](#)). The male connector will be released. Move the attachment hose away from the bulkhead fitting.
5. If the female connector does not have the lock pin type collar, just slide the collar backwards until the male connector is released.

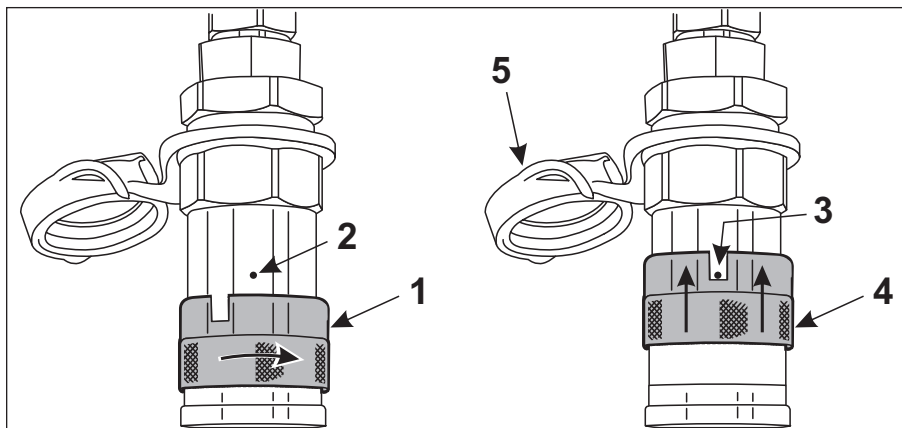


Figure 3-41 Quick Connect Locking Collar

6. Repeat this procedure on the other hydraulic line.
7. Cover the hose connections with the dust caps (Item 5, [Figure 3-41](#)) and store the hydraulic hoses to prevent damage. NOTE: If your hoses do not have dust caps, keep hoses connected/coupled together to prevent dirt intrusion.
8. Follow the instructions in "Removal of Attachment" earlier in this section to complete the attachment removal.

## Section 4 - Routine Service and Maintenance

The following information presents the routine service and maintenance required to make sure that the machine functions safely and properly. More detailed service information is contained in the Service Manual.

**Table 4-1 Service Cycle Table**

Activity	Daily (10 Hours)	New Machine (20 Hours)	Weekly (50 Hours)	Monthly (200 Hours)	Annual
Safety Placards	I				
Fuel	C				
Engine Oil	C	R*		R†	R†
Engine Oil Filter	I	R*		R†	R†
Engine Coolant	I and A	C**			
Engine Radiator	I****				
Air Filter	C			R**	R**
Fuel Filter	I			R**	
Engine Idle Speed					C
Check and Clean Battery Terminals and Battery	I				
Hydraulics					
- Hydraulic Filter	I	R*			R**
- Hydraulic Fluid Level	I****				R**
- Hydraulic Hoses	I				
Grease	I***				
Track Tension	I				
Visual Check for Loose/Missing Fasteners	I				
Clean Oil Cooler Fins	I				
Inspect and Adjust Track Tension	I				
Inspect both Track Widening Stop Bolts	I				

Service Cycle - R = Replace I = Inspect A = Add C = Clean

† Refer to engine manual for oil change cycles.

\* First 20 operational hours, then follow normal service cycle.

\*\* Extremely dusty or dirty working conditions may require more frequent service/replacement.

\*\*\* Under very wet and muddy conditions, more frequent lubrication may be required.

\*\*\*\*Check when cold, fill to max fill level.

---

## Daily Maintenance Procedures

Do the following procedures daily or every 10 operating hours:

1. Check condition of all warning and instructional decals. Before operating the machine, replace any missing or damaged decals.

**NOTE:** Make sure to read and understand all WARNING and SAFETY decals before operating the machine.

---



# CAUTION

- Allow engine to cool before filling fuel tanks.
  - Do not overfill because fuel could spill onto hot engine parts and ignite or explode.
  - Make sure engine is turned off.
- 

2. Check engine fuel and fill as needed:

- a. The Boxer has a saddle tank (Item 1, [Figure 4-1](#)), on each side of the machine.

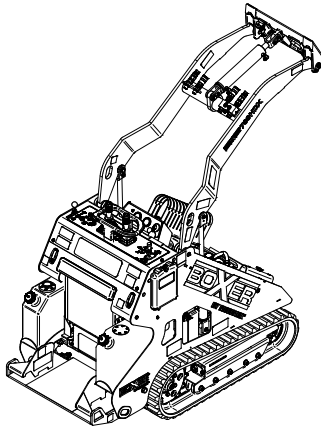


Figure 4-1 Fuel Level Check

- b. Remove cap (Item 2, [Figure 4-1](#)) and visually inspect fuel level. Make sure that each tank has been filled on a daily basis.
- c. Carefully pour fuel into the tank, not exceeding level at bottom of fill spout.

### 3. Check engine oil -

- a. Make sure that the engine is OFF.
- b. Pull out the dipstick (Item 1, **Figure 4-2**) and look for the “FULL” line.

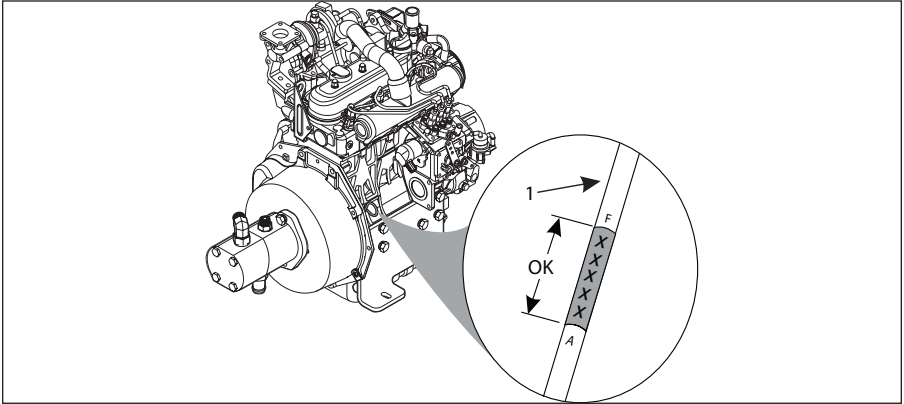


Figure 4-2 Oil Level Check

- c. If the engine oil level is below the add line, indicated by the letter “A” on the dipstick, carefully add the proper amount of oil through the engine oil filler (Item 1, **Figure 4-3**). The correct SAE viscosity grade of oil is determined by the minimum ambient temperature during cold engine start-up, and the maximum ambient temperature during operation. The engine is filled at the factory with Chevron Delo 400 Multigrade SAE 15W-40. The recommended ambient temperature range for this oil is 14° F (-10° C) minimum to 122° F (50° C) maximum. Refer to the engine Operation and Maintenance Manual for additional information on the proper selection of engine oil.

**NOTE:** Make sure to reinstall and secure the oil filler cap.

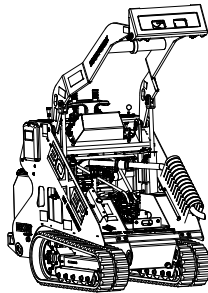


Figure 4-3 Engine Oil Fill

**NOTE:** Extremely dusty or dirty working conditions may require more frequent checking, filling and/or changing of engine oil.

- d. After filling the oil, wait a few minutes and check the oil level again.
- e. Make sure to securely reinstall the dipstick into the dipstick tube before starting the engine.

---

4. Check engine coolant level.

---

**⚠ CAUTION**

• **The coolant is hot and under pressure. DO NOT check until the engine radiator is cool to the touch.**

- 
- Remove radiator cap (Item 1, **Figure 4-4**) and check the radiator fluid level. The proper coolant level will be to the bottom of filler neck.
- 

**NOTICE**

- The overflow bottle is a non-pressurized container that is only for any high heat overflow. Do not add coolant to this container. It will not be drawn into the engine.
  - If coolant is required, make sure to add the proper coolant as shown in the Engine Manual.
- 

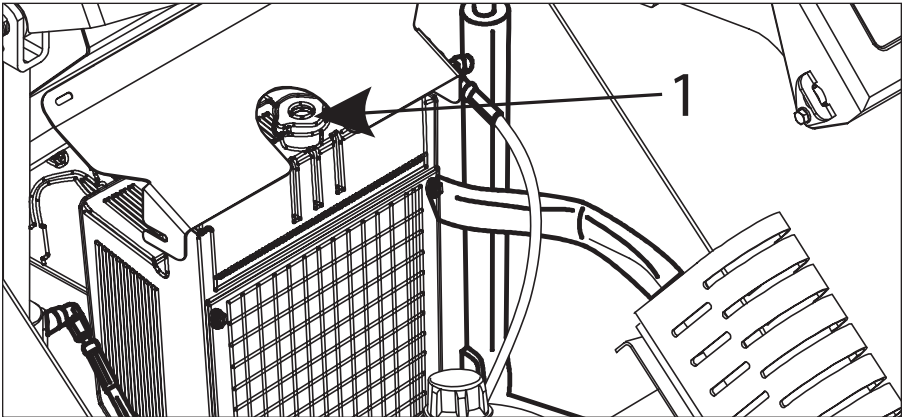


Figure 4-4 Filler Cap

5. Inspect the radiator to make sure that the air flow is not blocked. The fan located on engine side of radiator unit is a suction fan, which draws air from inside the machine. Check the engine side of the radiator (Figure 4-5) to make sure that debris has not been sucked against the radiator blocking air flow.

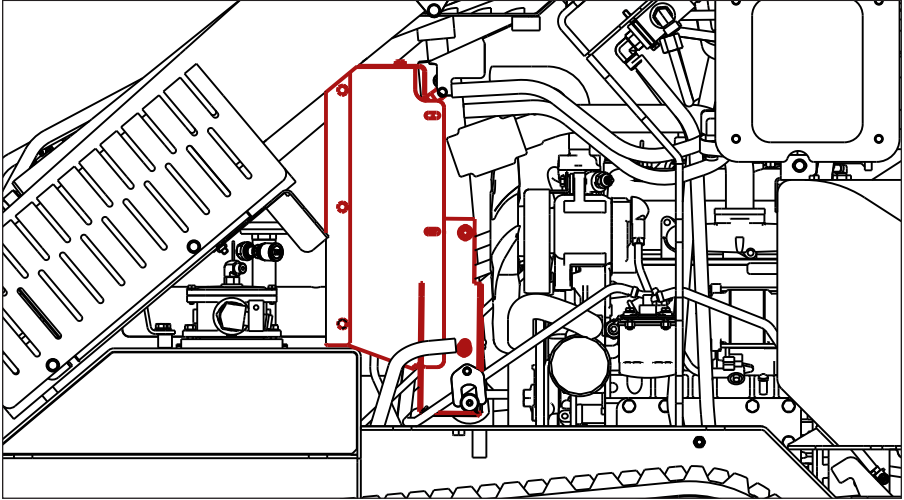


Figure 4-5 Radiator Air Flow Inspection

**NOTE:** Some items in Figure 4-5 have been removed for clarity.

6. Release dirt from separator tube at the bottom of the air filter by squeezing the rubber dust ejector valve (Item 1, Figure 4-6) underneath the air filter.

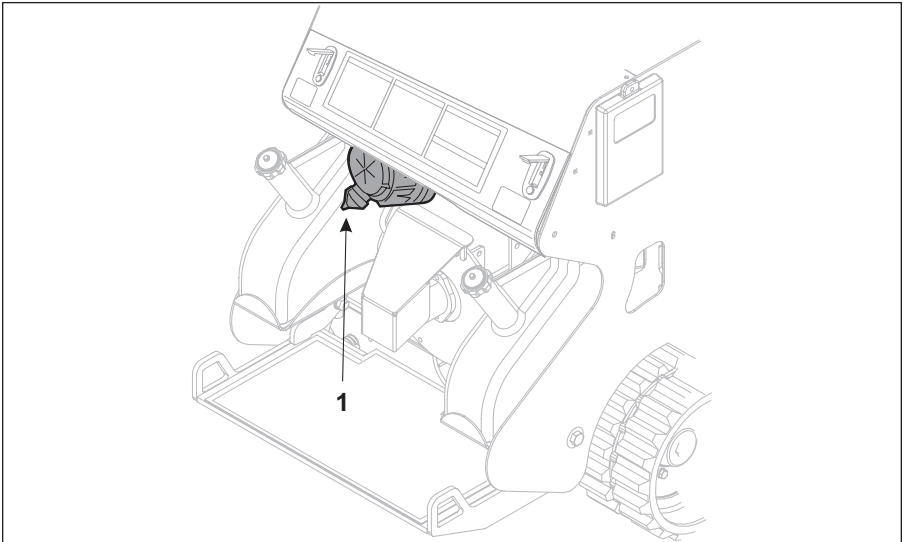


Figure 4-6 Air Filter Dirt Release

# ⚠ CAUTION

If you are checking the fluid level after a period of use, the hydraulic system and hydraulic fluid will be very hot. Wear gloves when inspecting the hydraulic fluid level.

7. Check hydraulic oil level, fill as needed with the proper hydraulic oil - be sure engine is off.
  - a. The hydraulic oil dipstick can be reached through the opening in the front cover.
  - b. Unscrew the dipstick assembly and remove from the machine. (Item 1, [Figure 4-7](#)).
  - c. Make sure that the hydraulic fluid is between the marker holes in the dip stick.

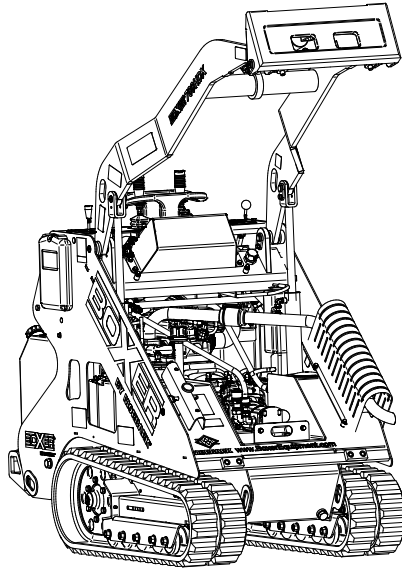


Figure 4-7 Hydraulic Fluid Level Dip Stick

- d. Add the proper hydraulic fluid (Chevron Rykon Premium ISO 46 hydraulic fluid or equivalent) until the fluid level is 1/4" below marker hole in the dipstick.

# NOTICE

- Do not over fill the hydraulic system. Damage to the hydraulic system might result.

8. Check hydraulic hoses.

---

 **WARNING**

**Hydraulic oil under pressure can penetrate body tissue causing serious injury and possible death. When troubleshooting a hydraulic system for leaks, always use cardboard or wood as a detector. DO NOT USE YOUR BARE HANDS. If you are injected with hydraulic oil or any other fluids, immediately seek treatment by a doctor trained in the treatment of penetrating fluid injuries.**

---

- a. Fully raise the loader arm, install and secure the safety support.
- b. Follow all of the hoses, line and tubes from the control valve to their end (Items 2, 3, 4 and 5, **Figure 4–8**). Inspect the connections and look for signs of leaking hydraulic fluid, wear or damage.
- c. Carefully inspect both sets of quick couplers (Item 1, **Figure 4–8**) to make sure that they are not damaged or leaking. Make sure to check for signs of leakage or damage to the drive motors and to their hydraulic connections.

**NOTE:** Item 3 is the track extension cylinder located underneath the machine, but protected by the belly pan. If any leakage from underneath the machine is noticed, do not use the machine and have it inspected and repaired by your servicing dealer.

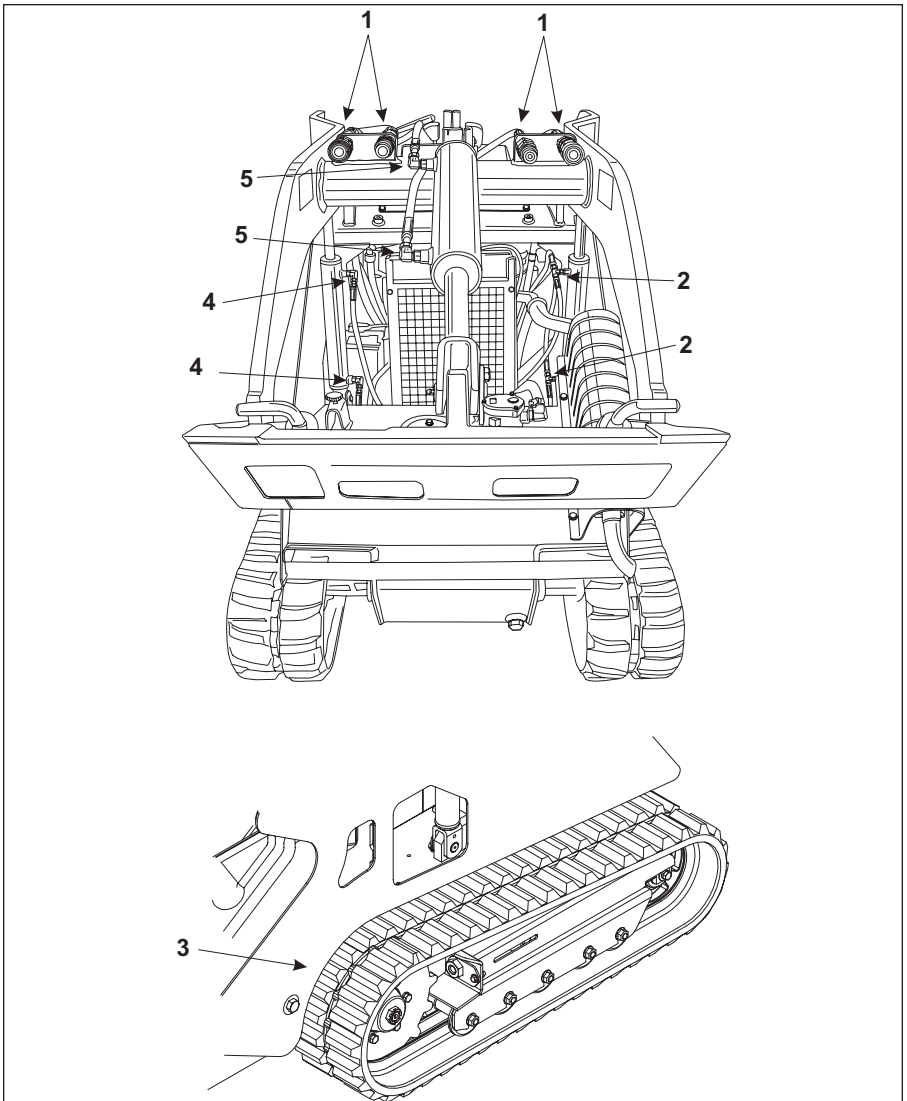


Figure 4-8 Inspect Hydraulic Lines and Fittings

d. If any signs of damage are visible, do not operate the machine until repairs have been made.

e. Some examples of common hydraulic hose damage are shown in **Figure 4-9**:

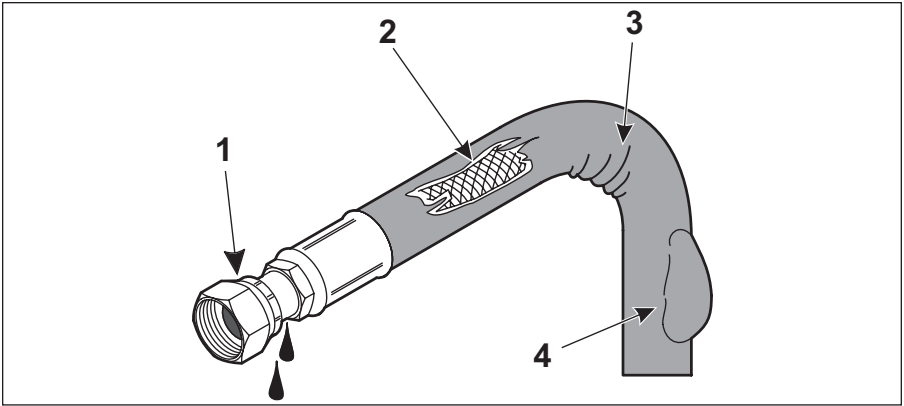


Figure 4-9 Hydraulic Hose Damage

- 1. End fittings damaged or leaking.**
- 2. Outer covering chafed or cut, and wire reinforcing is exposed.**
- 3. Hose shows signs of kinking or crushing.**
- 4. Outer covering ballooning**

9. Lubricate pivot shafts with grease. There are 14 lubrication points on this machine, see **Figure 4-10**.

Figure 4-10 Lubrication Points

**NOTE:** Extremely dusty or dirty working conditions may require more frequent service/replacement.

---

**10. Check both track assemblies for:**

- a. The proper tension. Too little or too much tension can cause premature track wear and travel motor damage.
- b. Make sure that the tracks are not worn or damaged.
- c. Make sure that the nylon guide block is centered within the track and is guiding the track properly.
- d. Make sure the Track Adjustment Guide Bushings (located in Frame) are not worn or damaged.
- e. Check for loose or missing fasteners.
- f. Inspect for any loose or missing bolts or fasteners.
- g. Tighten or replace any missing bolts or fasteners before operating the machine.

**11. Check for proper track tension.**

- a. Raise the machine off the ground and support it using a device capable of safely supporting 4000 lbs. (1820 kg) See **Figure 4-11** for suggested location of the support devices.
  - b. Tilt the bucket downwards until the cutting edge is touching the ground. See **Figure 4-11**.
  - c. Lower the loader arm assembly, pushing the front of the machine upwards. Continue raising the machine until the rear drive sprocket is off the ground. Shut off the engine.
- 

**CAUTION**

**Keeps hands and fingers from under the track and track guide rollers.**

---

- d. Measure the gap between the bottom of the center bogey guide roller (Item 1, **Figure 4-11**) and the track. The proper tension will be about a 1/4" - 3/8" (6 mm - 10 mm) deflection.
  - e. If an adjustment is needed, remove tension lock plate (see Item 3, **Figure 4-9**) then rotate the track tension adjustment nut (Item 2, **Figure 4-11**) until the proper track deflection measurement is achieved.
  - f. With the tracks still off the ground, start the engine and rotate just the track being adjusted three or four times in both forward and reverse. Shut off the engine after rotating the track.
  - g. Remeasure the deflection dimension. If good, install tension lock plate and bolt.
  - h. Check the other track for the correct tension measurement. If needed, repeat Steps 10e - 10g.
  - i. Lower the machine onto the ground and remove the support devices.
- 12. Inspect the Track Widening Stop Bolts for:**

- a. Signs of damage or wear:
  - Fully retract the tracks and make sure that the stop bolts (Item 1, **Figure 4-12**) are not bent or damaged.
  - If the bolt shows any signs of damage, replace the bolt.
  - Extend the tracks to make sure that the track assemblies move freely.

**NOTE:** The distance between the inner edge of the mounting block and inner edge of the stop bolt head must be  $6 \frac{3}{4}$ " (17 cm). If this measurement is not maintained, damage to the machine may occur.

- b. Make sure that the stop bolt lock nuts (Item 2, **Figure 4-12**) are tight against the mounting block (Item 3, **Figure 4-12**).
- c. Make sure to check both track assembly stop bolts.

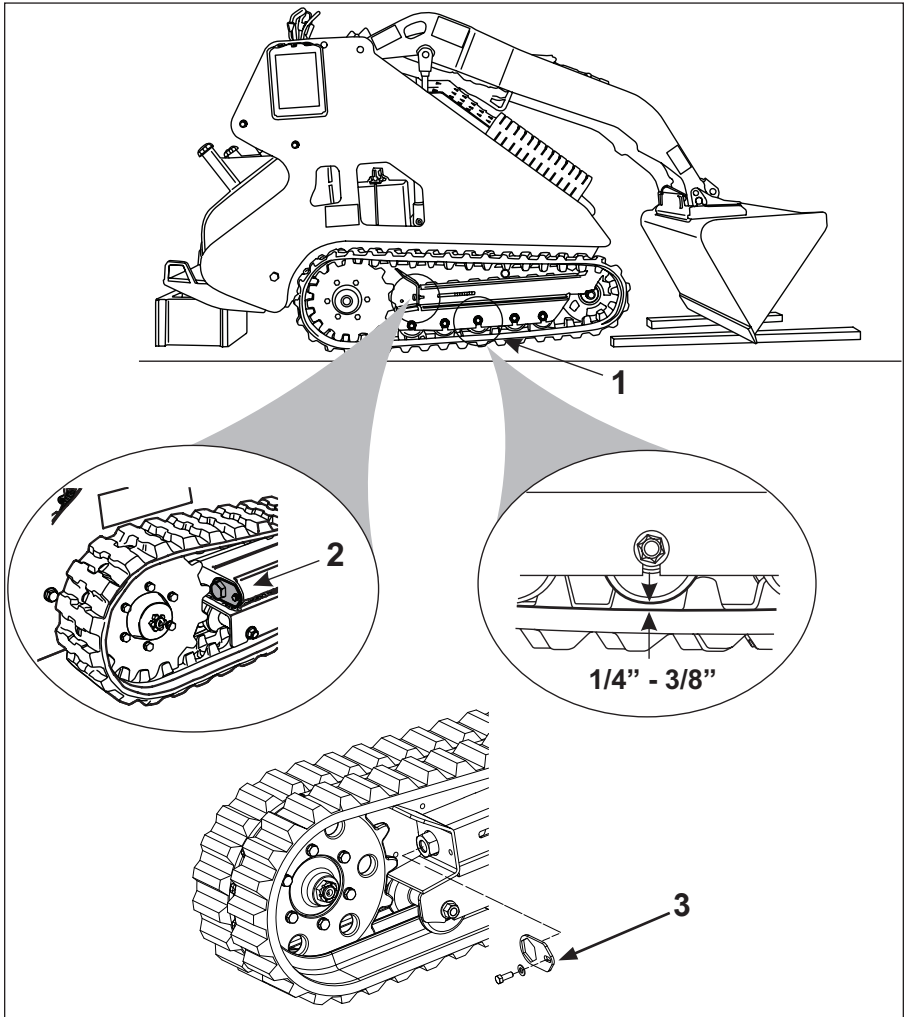


Figure 4-11 Track Deflection Measurement and Adjustment

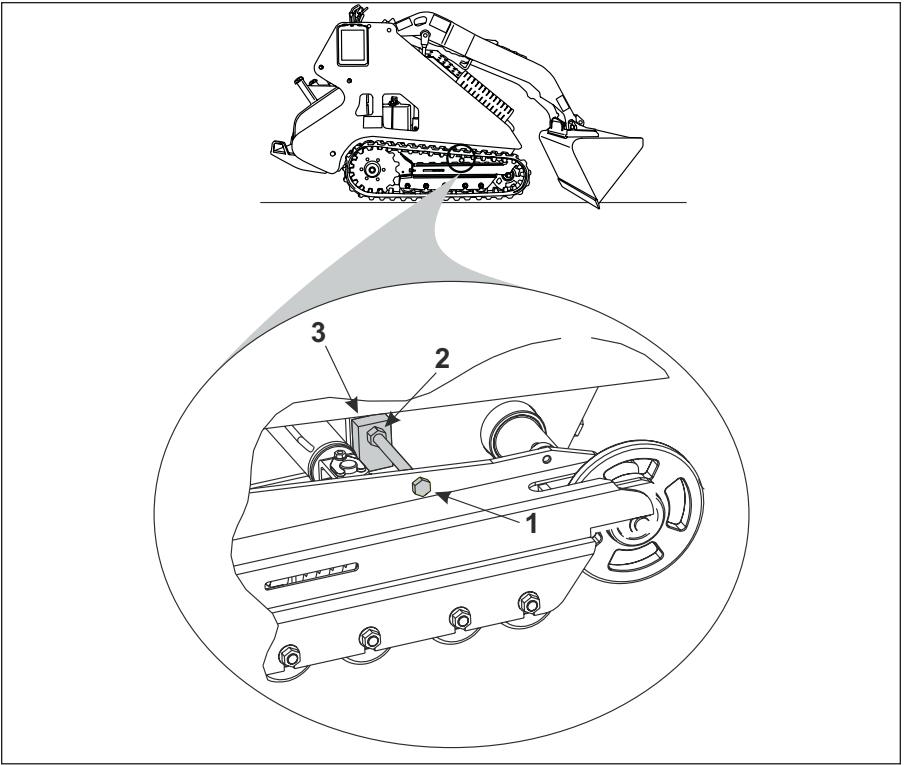


Figure 4-12 Track Extension (Widening) Stop Bolt

13. If the stop bolt lock nut (Item 3, **Figure 4-13**) is loose, check the distance between the mounting block (Item 4, **Figure 4-13**) and bottom side of the bolt head (Item 1, **Figure 4-13**). The correct measurement is 6 3/4" (17 cm) from the outside edge of the stop block to the bottom edge of the head of the stop bolt (Item 1, **Figure 4-13**).
14. If an adjustment to the track widening stop bolt is required,
  - a. Loosen the lock nut (Item 3, **Figure 4-13**),
  - b. Rotate the stop bolt (Item 2, **Figure 4-13**) to set the correct measurement of 6 3/4" (17 cm) from the outside edge of the stop block to the bottom edge of the head of the stop bolt (Item 1, **Figure 4-13**).
  - c. After adjusting the stop bolt, make sure to fully tighten the lock nut, securing the stop bolt.

**NOTE:** The distance between the inner edge of the mounting block and inner edge of the stop bolt head must be 6 3/4" (17 cm). If this measurement is not maintained, damage to the machine may occur.

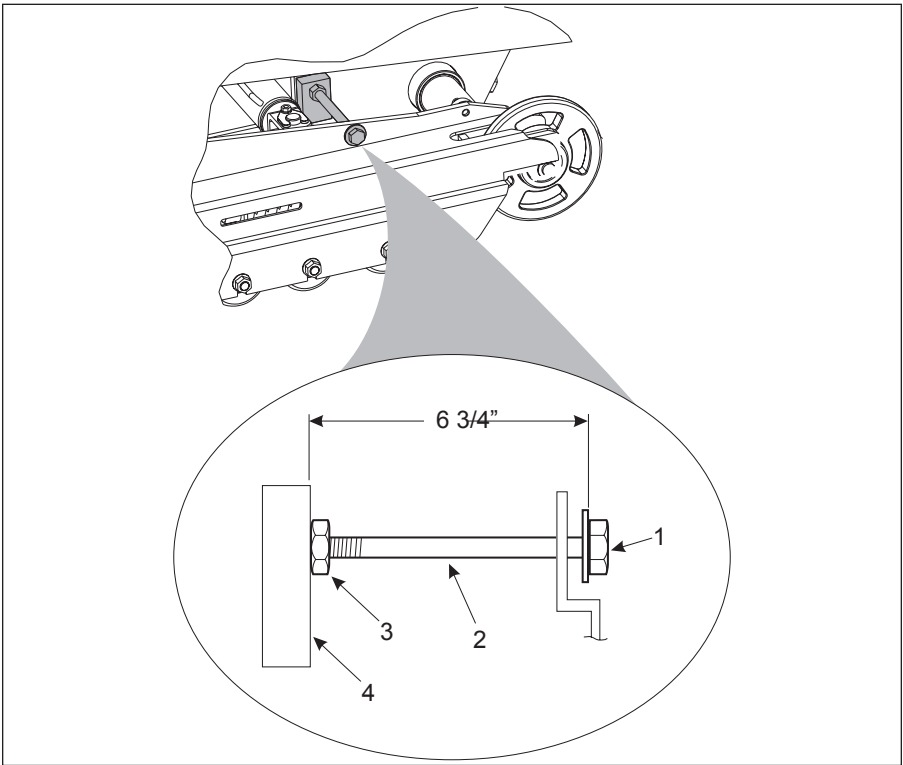


Figure 4-13 Track Widening Stop Bolt Adjustment

## New Machine Brake-in Maintenance Procedures

Do the following after the first 20 operating hours for a new machine only.

1. Change engine oil. Refer to the engine manual for the proper engine oil changing instructions.
2. Change engine oil filter, which is located on the left side of the - engine. Refer to the engine manual for the proper engine oil filter changing instructions. The oil filter is located at the front of the engine (Item 1, [Figure 4-14](#)).

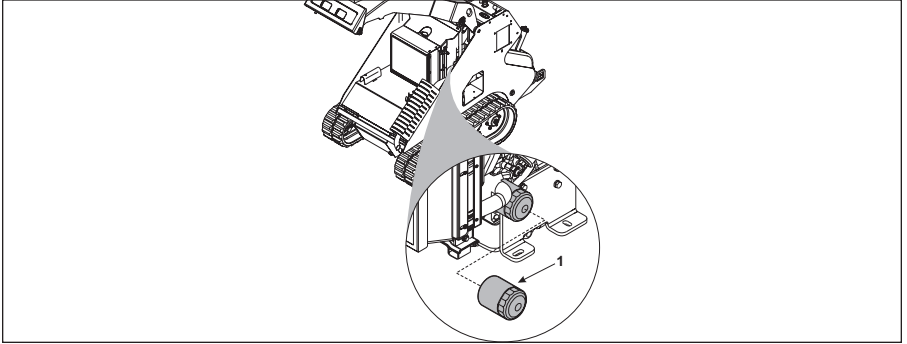


Figure 4-14 Engine Oil Filter

3. Replace the hydraulic filter. See Service Manual and [Figure 4-15](#).
  - a. Remove the three bolts (Item 1, [Figure 4-15](#)) holding the filter cover (Item 2, [Figure 4-15](#)) in place.

**NOTE:** Press downwards on filter cover to relieve the upwards pressure from the spring.

  - b. Remove the filter cover and spring (Item 4, [Figure 4-15](#)).
  - c. Remove the filter element (Item 5, [Figure 4-15](#)) and replace with a new filter element.
  - d. Inspect the filter cover O-ring (Item 3, [Figure 4-15](#)) for any signs of wear or damage. Replace as needed.
  - e. Reinstall spring and filter cover.

**NOTE:** Make sure that the O-ring is properly seated in the filter cover.

  - f. Start and run the engine for about 30 seconds.

Using the hydraulic oil level dip stick (Item 6, [Figure 4-15](#)), check the hydraulic oil level. Add the appropriate hydraulic fluid as needed.

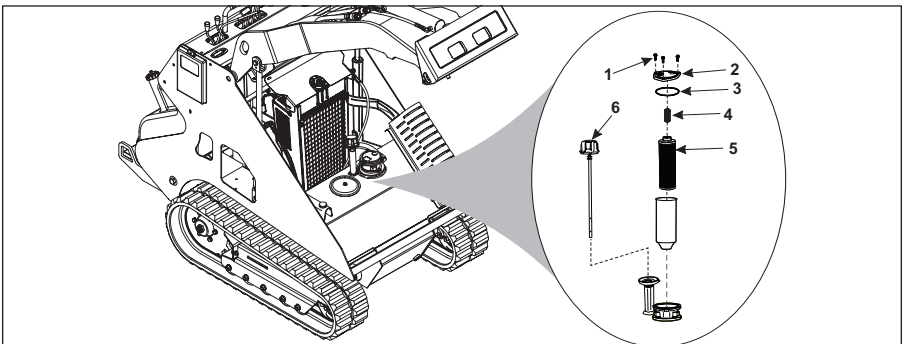


Figure 4-15 Hydraulic Oil Filter Assembly

## Weekly Maintenance Procedures

Do the following procedures weekly or every 50 operating hours:

1. Do all Daily maintenance procedures
2. Check the battery (Item 1, **Figure 4-16**) and cable connections (Items 2 and 3, **Figure 4-16**) for signs of leaking, corrosion or damage. (Some items have been removed for clarity.)

**NOTE:** The electrical system on this machine is a NEGATIVE ground system.

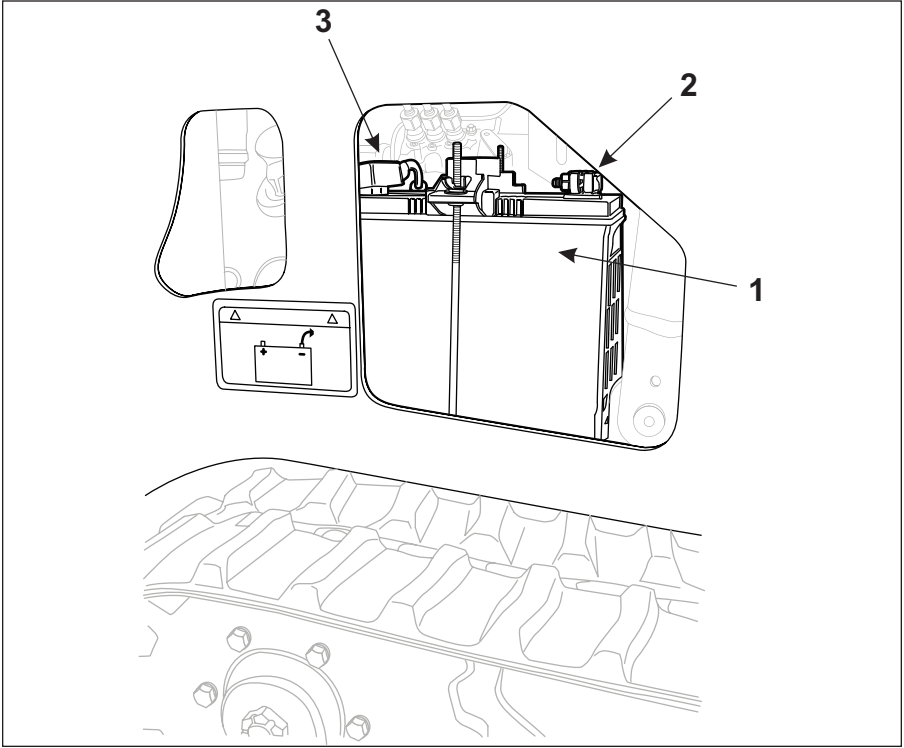


Figure 4-16 Battery and Cable Connections

## Monthly Maintenance Procedures

Do the following procedures monthly or every 200 operating hours:

1. Do all Daily and Weekly maintenance procedures
2. Replace engine oil and engine oil filter - see engine manual
3. Check air filter and replace outer paper element (Item 2, [Figure 4-17](#)).
4. Replace the outer paper element (Item 2, [Figure 4-17](#)) and check inner element (Item 3, [Figure 4-17](#))

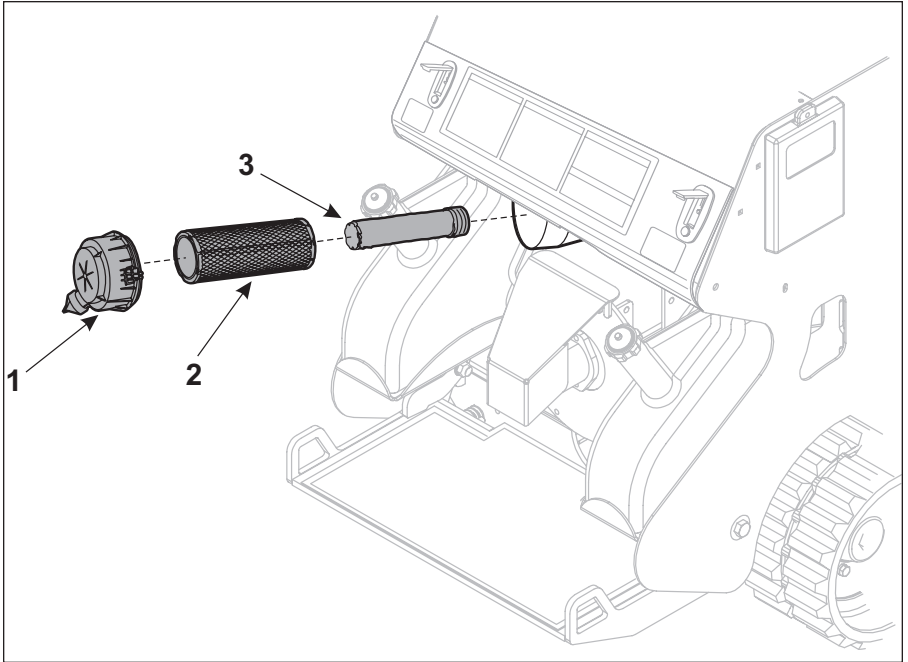


Figure 4-17 Check Engine Air Filter

- a. Unhook the two retaining clips and remove the end cap from the air cleaner housing.
- b. Pull the outer air cleaner element out of the housing.
- c. After the main element is removed, check the condition of the inner element . It should be replaced whenever it appears dirty, typically every other time the main element is replaced. Clean the area around the base of the inner element before removing it, so dirt does not get into the engine.
- d. Do not wash the paper element and inner element or use pressurized air, this will damage the elements. Replace dirty, bent or damaged elements with new genuine Morbark repair parts as required.
- e. Handle new elements carefully; do not use if the sealing surfaces are bent or damaged.
- f. Check all parts for wear, cracks, or damage.
- g. Replace any damaged components.
- h. If needed, install the new inner element, followed by the outer element. Slide each fully into place in the air cleaner housing.

- i. Reinstall the end cap so the dust ejector valve is down and secure the end cap with the two retaining clips.

\*In extremely dusty or dirty operating conditions, this service cycle may need to be shortened.

## 5. Replace fuel filter.

---

# CAUTION

**Make sure to clean up any spilled fuel from in and around the engine compartment of the machine. Spilled fuel may be ignited by a hot engine.**

---

- a. Locate fuel filter assembly through the opening in the frame along the left side of the machine.
- b. Unscrew the filter canister.

### NOTE:

- The fuel filter will be filled with diesel fuel. Make sure to drain the fuel from the filter into an appropriate container.
  - Dispose of the used fuel filter in an appropriate manner, and according to State and Local regulations.
- c. Before installing the new canister filter, lubricate the rubber sealing ring on top of the filter with a small amount of diesel fuel.
  - d. Install the new filter.

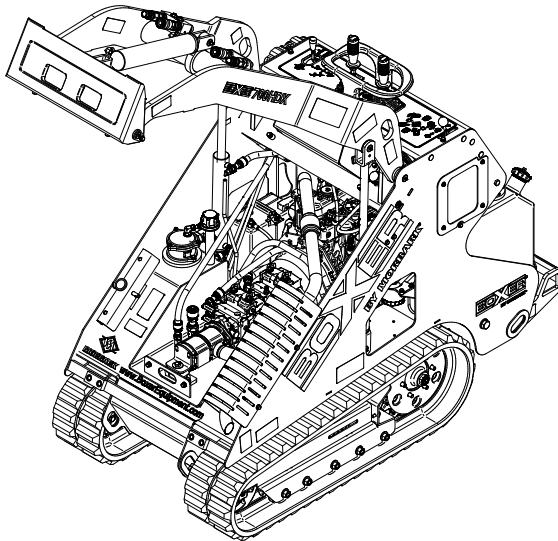


Figure 4-18 Fuel Filter Assembly

**NOTE:** Place a container underneath the fuel injection pump to catch any spilled diesel fuel. Dispose of the used fuel in an appropriate manner.

- e. Loosen, but DO NOT remove, the air bleed bolt (Item 2, **Figure 4-19**).
- f. Raise and lower the primer pump handle (Item 1, **Figure 4-19**) until only diesel fuel without any air bubbles comes out of the air bleed.
- g. Fully tighten the air bleed bolt.

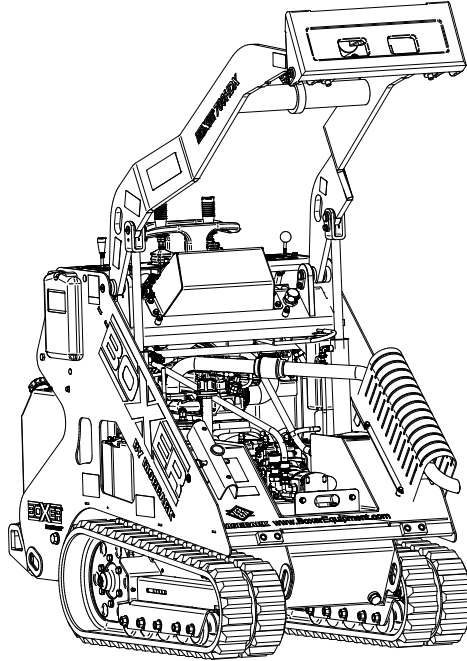


Figure 4-19 Fuel Feed Pump Lever

6. Check battery for signs of leakage and for corrosion on the battery cables.
  - On a monthly basis, check the battery for signs of leaking electrolyte. If any signs of damage are visible, remove and replace the battery.



**CAUTION**

**Wear the proper protective clothing when handling the battery. Leaking battery fluid contains acid that can cause burns. Fumes from the leaking fluid can cause respiratory problems.**

- To prevent corrosion, spray on a battery protectant and sealer onto both terminals and cable clamps after cables are installed.
- The electrical system on this machine is a NEGATIVE ground system.
- Check both of the battery cables for signs of damage or corrosion. Loosen the cable clamps and remove the cable from the battery. Clean the terminals with a battery brush. Reinstall and secure the cable clamps.

- Check the battery hold down clamp (Items 4 and 6, [Figure 4-20](#)) to make sure that the battery is being held securely to the machine.  
**NOTE:** If the battery needs to be replaced, make sure to dispose of the old battery according to local regulations.

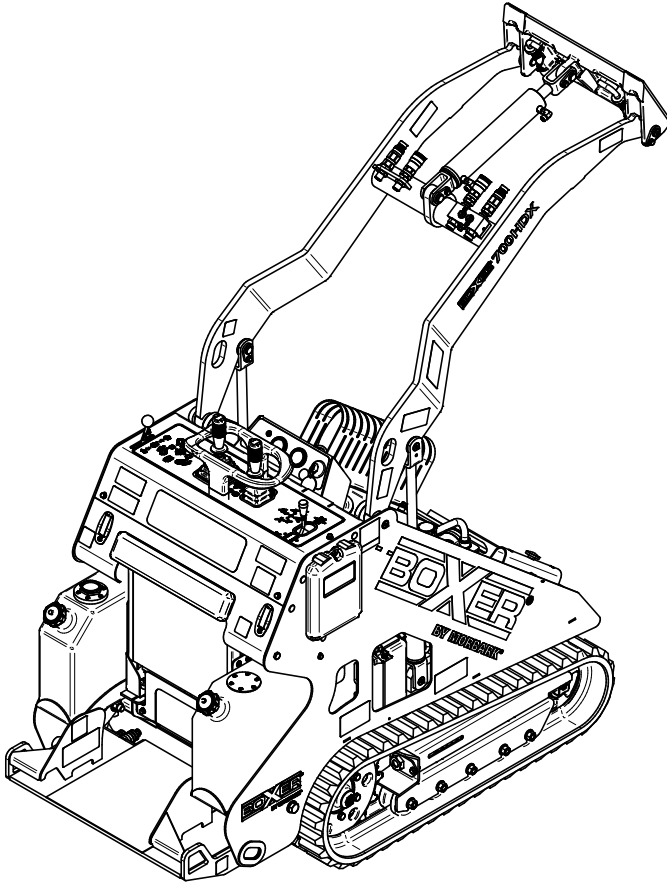


Figure 4-20 Battery and Connections

## Annual Maintenance Procedures

Do the following procedures annually:

1. Do all Daily, Weekly and Monthly maintenance procedures.
2. Replace air filter\*\* See page 4-14, Step 3.
3. Check engine idle speed (Refer to engine manual).
4. Replace hydraulic fluid\*\*.
  - a. Place a suitable sized container at the left front corner of the Boxer.
  - b. Remove the hydraulic tank drain plug (Item 1, **Figure 4-21**) and drain all hydraulic fluid from the machine.

**NOTE:** Make sure to inspect the O-ring (Item 2, **Figure 4-21**) on the drain plug. Replace the O-ring if any signs of damage are noted.

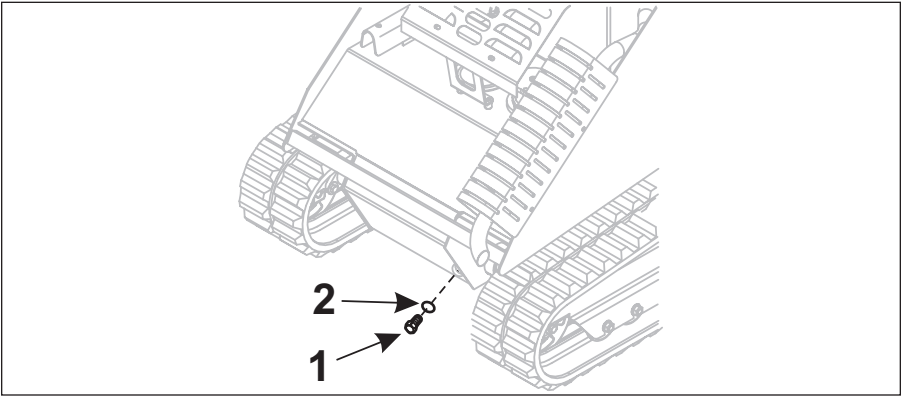


Figure 4-21 Hydraulic Tank Drain Plug

- c. When all of the hydraulic fluid has drained out of the tank, reinstall and secure the drain plug.

## NOTICE

- Make sure to dispose of the used hydraulic fluid in an appropriate manner and according to State and Local regulations.
- The hydraulic filter will be filled with hydraulic fluid. Make sure to dispose of the used hydraulic filter in an appropriate manner and according to State and Local regulations.

- d. Replace hydraulic filter. See page 4-14, Step 3.

**NOTE:** The hydraulic oil dipstick can be reached through the opening in the front cover.

# NOTICE

Do not over fill the hydraulic system. Damage to the hydraulic system might result.

- e. Unscrew the dipstick assembly and remove from the machine and fill the hydraulic tank with the proper hydraulic fluid (Chevron Rykon Premium ISO 46 or equivalent) until the fluid level is at but not above the upper marker hole in the dipstick.

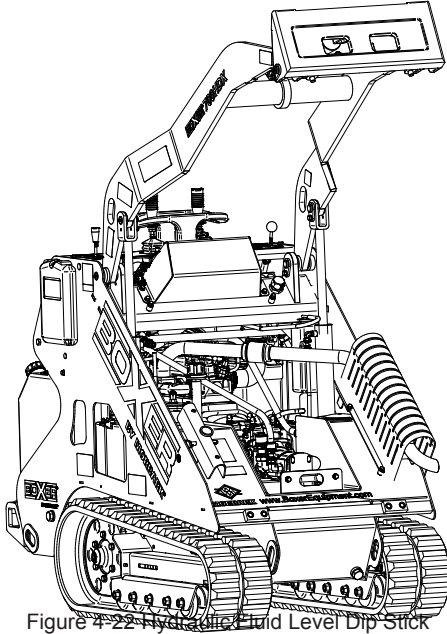


Figure 4-22 Hydraulic Fluid Level Dip Stick

- f. Start the machine and run the engine at low idle for several minutes. Shut off the engine.
- g. Recheck the hydraulic fluid level as described above.

## General Maintenance

### Draining Fuel Tank (Diesel)

**! DANGER**

1. DIESEL FUEL IS EXTREMELY FLAMMABLE AND HIGHLY EXPLOSIVE.
2. A FIRE OR EXPLOSION FROM DIESEL FUEL CAN BURN YOU OR OTHERS AND CAUSE PROPERTY DAMAGE.
3. DRAIN FUEL FROM TANKS WHEN THE ENGINE IS COLD.
4. FUEL TANKS SHOULD ONLY BE DRAINED IN AN AREA THAT IS WELL VENTILATED.
5. WIPE UP ANY DIESEL FUEL THAT SPILLS.

1. Park the machine on a level surface, to ensure that the fuel tank is completely drained.
2. Lower the loader arms and stop the engine and remove the key.
3. Allow the engine to cool completely.
4. Shut off the fuel valve (Item 1, [Figure 4-23](#)) located on the bottom of each of the fuel tanks.

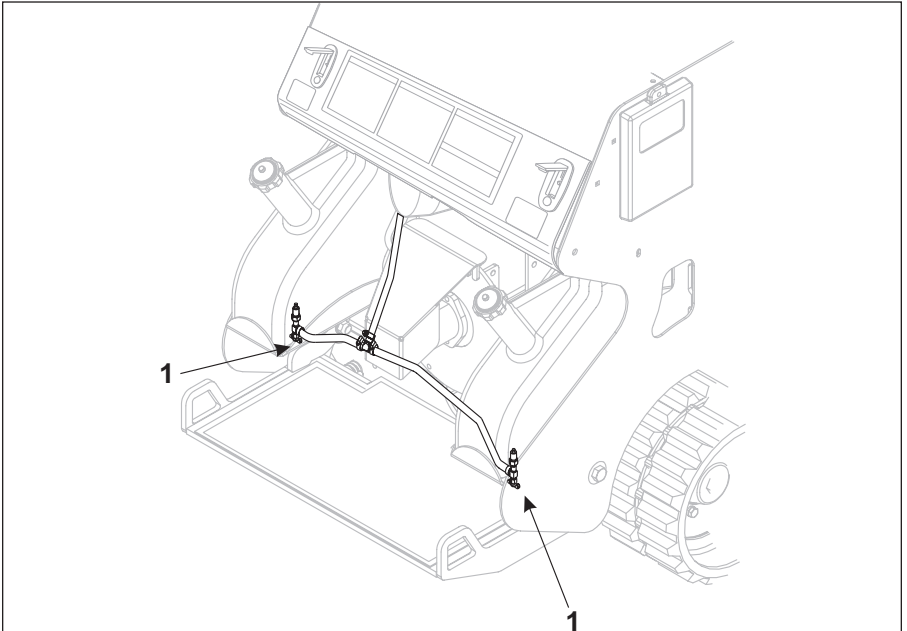


Figure 4-23 Fuel Shut Off Valves

5. Loosen the intake hose clamp (Item 2, [Figure 4-22](#)) at the top of the fuel filter assembly (Item 1, [Figure 4-22](#)). Slide the clamp along the fuel line (Item 3, [Figure 4-22](#)) away from the fuel filter assembly.

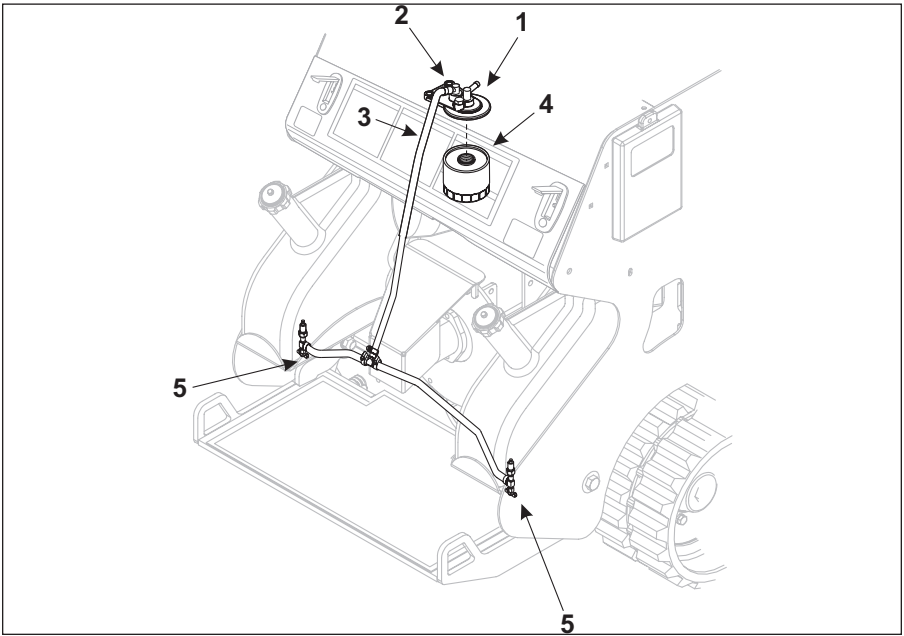


Figure 4-24 Fuel Filter

6. Pull the fuel line off the fuel filter assembly and place the line in a suitable sized container.

**NOTE:**

- a. Each of the fuel tanks holds approximately 4.5 gallons of fuel.
- b. Make sure that the fuel hose is positioned lower than the fuel valves to make sure that all fuel is drained from the tanks.

7. Open the fuel valves on the bottom of each tank and allow the fuel to drain into the drain pan.
8. Install a new spin on fuel filter (Item 4, [Figure 4-24](#)) as described earlier in this section.

**NOTE:**

- The used fuel filter will be filled with diesel fuel. Make sure to drain the fuel from the filter into an appropriate container.
- Dispose of the used fuel filter in an appropriate manner and according to State and Local regulations.

9. Install the fuel line onto the fuel filter assembly.
10. Secure the fuel line onto the fuel filter assembly using the spring clamp removed earlier.

11. Fill the fuel tanks with fresh diesel fuel.

**NOTE:** Place a container underneath the fuel injection pump to catch any spilled diesel fuel. Dispose of the used fuel in an appropriate manner.

12. Loosen the air bleed screw on the top of the filter assembly slightly. DO NOT remove this bolt.

13. Loosen the air bleed bolt (Item 2, **Figure 4-24**). DO NOT remove this bolt.

14. Raise and lower the primer pump handle (Item 1, **Figure 4-24**) until only diesel fuel without any air bubbles comes out of the air bleed.

15. Fully tighten the air bleed bolt.

---

## CAUTION

**Make sure to clean up any spilled fuel from in and around the engine compartment of the machine. Spilled fuel may be ignited by a hot engine.**

---

### **Fuse Panel**

The electrical circuits on the machine are protected by fuses. The fuse panel is located below the gauge indicator panel, underneath the removable locking access panel.

---

## NOTICE

If a fuse blows, determine the cause before replacing it with a new one.

---

## CAUTION

**Always replace fuses with ones matching the amperage rating shown on the top of the blown fuse.**

---

All fuses and their locations are shown in illustration **Figure 4-25**.

Fuse	Circuit	Amp Rating
1	Voltage Regulator	3
2	Crawl Speed Solenoid	3
3	Hydraulic Oil Cooler Fan	15
4	Fuel Solenoid	15
5	Hour Meter	1
6	Indicator Gauges	1
7	In-line Starter Solenoid Fuse (not shown in illustration - located in the RED power line between the ignition switch and the starter motor.)	30

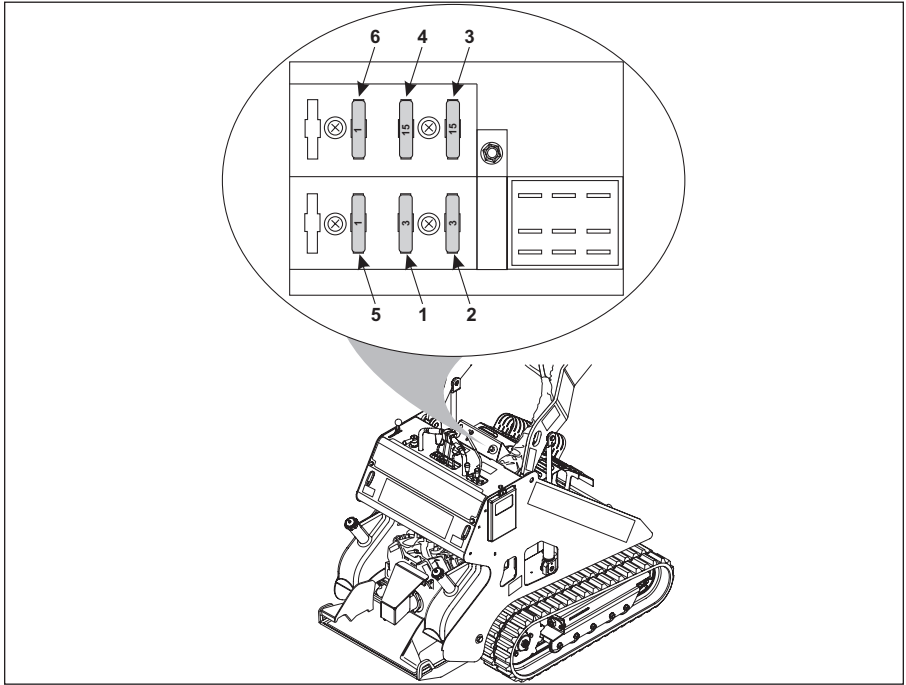


Figure 4-25 Fuse Panel

## Track and Tension System Installation

1. Securely elevate the machine. See [Figure 4-26](#) and Track Tensioning instructions.

# ⚠ CAUTION

- Make sure that the machine has been securely elevated and that there is no danger of it tipping before beginning this procedure.
- To fully stabilize the machine, it may be necessary to insert an additional support at the front of the machine, under the hydraulic tank. When this support has been installed, raise the boom.

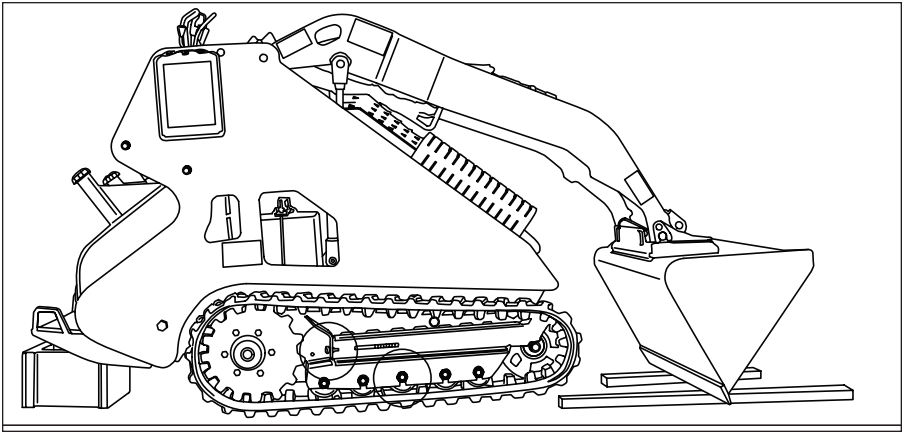


Figure 4-26 Machine Elevation

# NOTICE

If any of the track tensioning components have come out of the track tension assembly when the track came off of the machine, proceed to Step 2. If not, skip to Step 7.

2. Fully extend the track assemblies.
3. Shut off the engine.
4. Install tension bolt and thrust washer (Item 1, [Figure 4-27](#)) into track frame.

**NOTE:** Make sure that the thrust plate is rotated as far backwards as possible on the tension bolt, releasing all track tension.

5. Install tension spring (Item 2, [Figure 4-27](#)) into track frame.
6. Install idler wheel (Item 3, [Figure 4-27](#)) assembly into track frame.

**NOTE:**

- Make sure that the idler wheel assembly is installed so that the axle bolt head is visible and that the lower edge of the idler wheel aligns with the lower edge of the idler rollers.
- Make sure to slide the tension system components as far back into the track frame as possible.

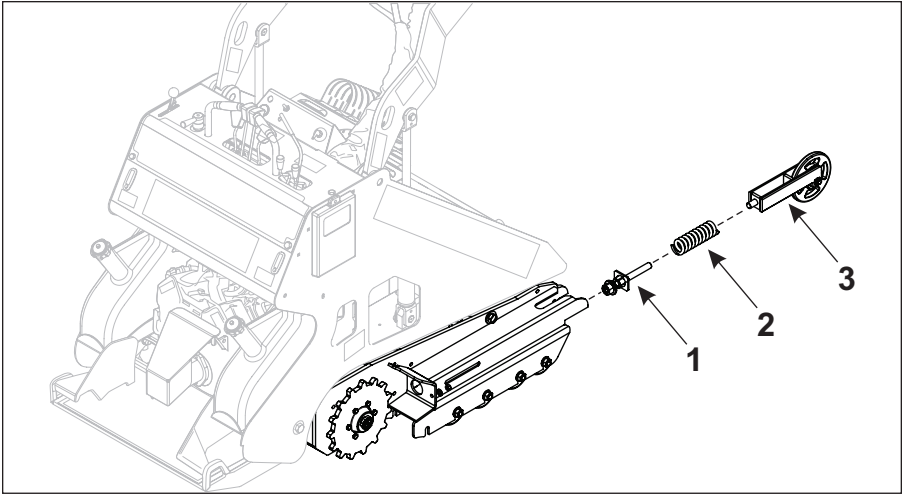


Figure 4-27 Track Drive Components Installed

7. Move rubber track away from the machine.

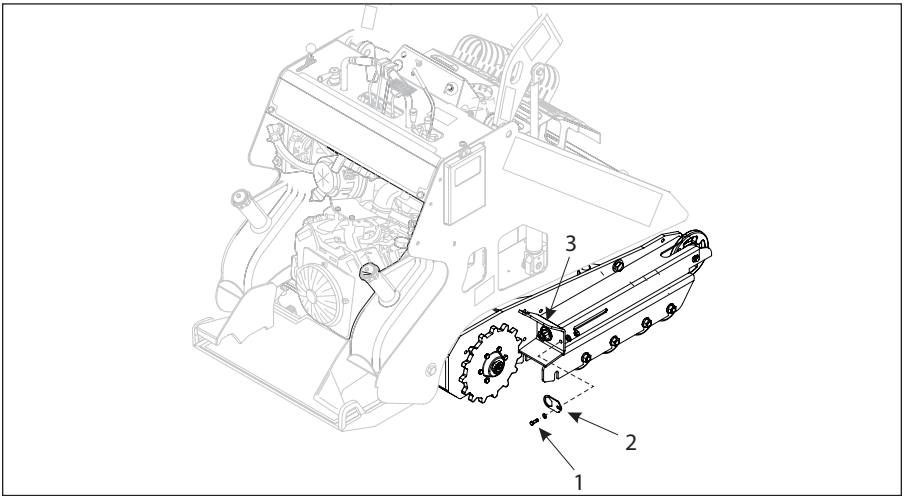


Figure 4-28 Remove Lock Plate

8. Remove track tension lock plate bolt (Item 1, **Figure 4-28**) using a 9/16" wrench

9. Remove lock plate (Item 2, **Figure 4-28**)

10. Loosen track tension by rotating the tension bolt (Item 3, **Figure 4-28**)  
CLOCKWISE using a 1 5/8" wrench.

**NOTE:** On recent models, the track tension wrench is located under the removable service access cover.

11. Using a  $\frac{3}{4}$ " wrench (or tire cross) (Item 1, **Figure 4-29**), remove the 6 bolts (Item 2, **Figure 4-29**) securing the drive sprocket (Item 3, **Figure 4-29**) to the drive motor.

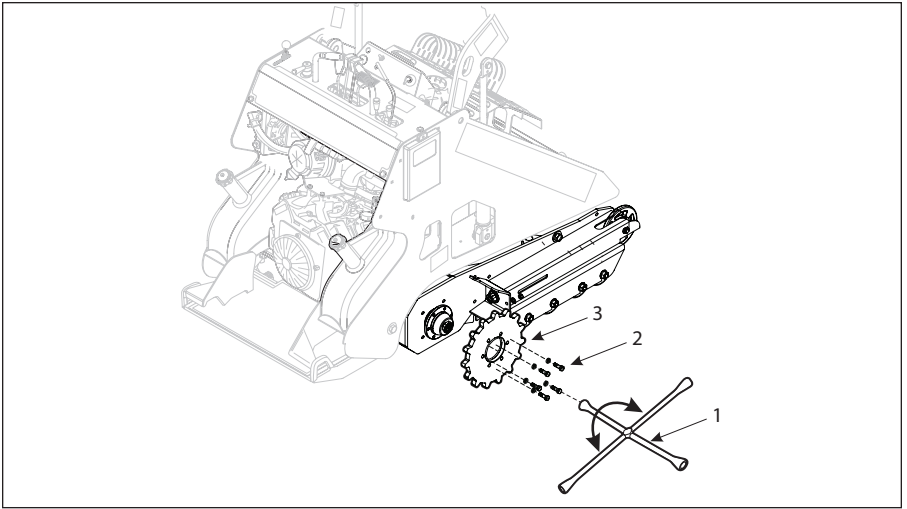


Figure 4-29 Remove Drive Sprocket

12. Slide the track (Item 2, **Figure 4-30**) on the front idler wheel (Item 1, **Figure 4-30**) making sure that the track lugs are on each side of the idler wheel.

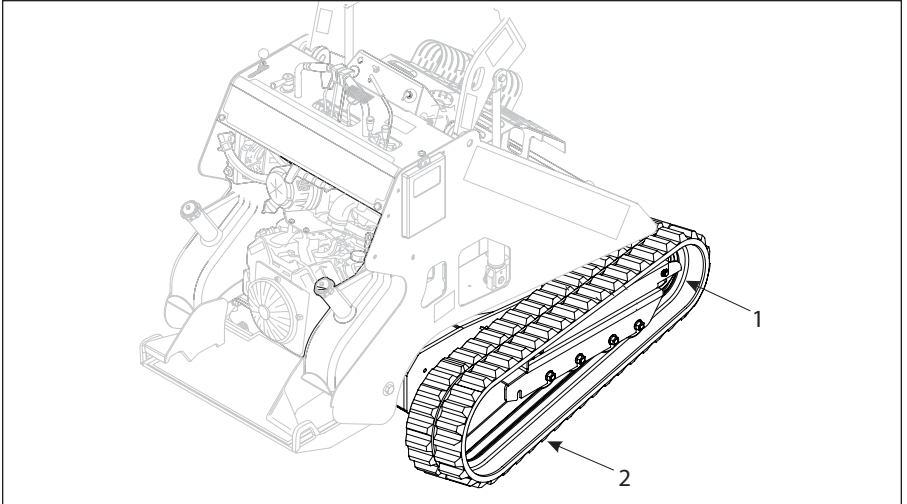


Figure 4-30 Install track onto front idler wheel

13. Insert the drive sprocket (Item 1, [Figure 4-31](#)) into rear of the track (Item 2, [Figure 4-31](#)), between the track lugs and with the sprocket teeth in the track sprocket holes.

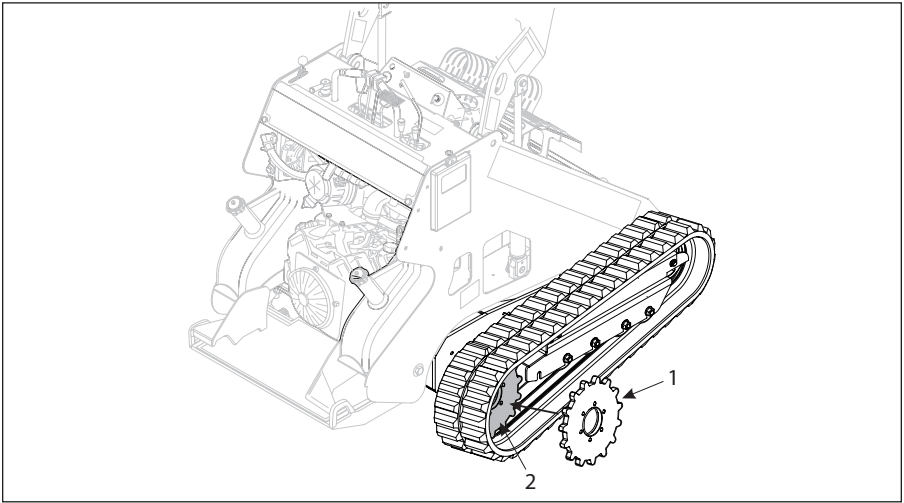


Figure 4-31 Insert Drive Sprocket into Track

14. Position the drive sprocket and the track onto the drive motor.
15. Rotate the drive sprocket (Item 1, [Figure 4-32](#)) and track to align the bolt holes.

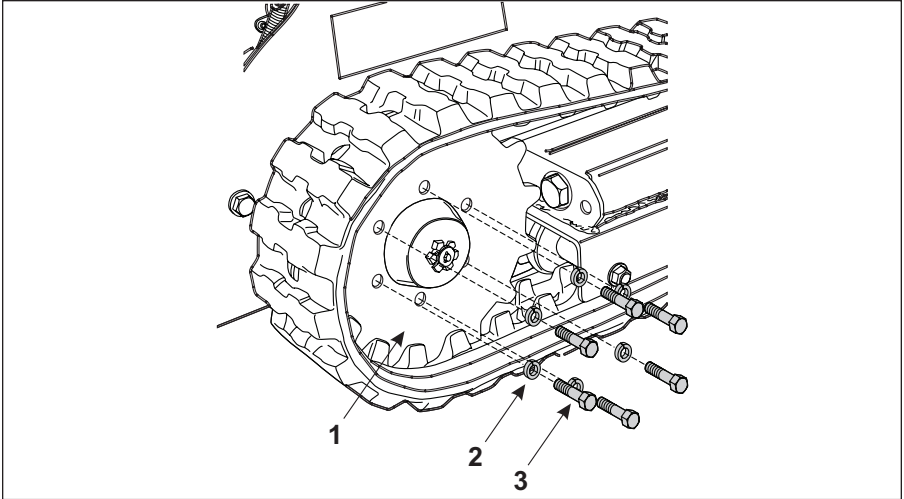


Figure 4-32 Install Track and Drive Sprocket

16. Install and secure the 6 drive sprocket lock washers (Item 2, [Figure 4-32](#)) and mounting bolts (Item 3, [Figure 4-32](#)).

**NOTE:** Tighten the bolts evenly around the drive sprocket.

17. Rotate the tension bolt (Item 3, **Figure 4-33**) COUNTER CLOCKWISE until the correct track tension is set. See Track Tensioning earlier in this manual.

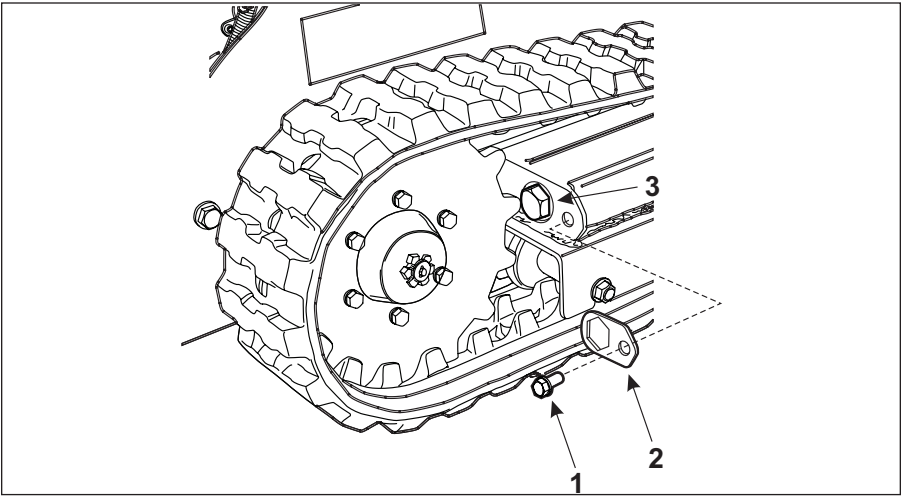


Figure 4-33 Set Track Tension

18. Set Track Tension. Start the engine and slowly rotate the track forward and backward to make sure that the track is properly seated on the drive sprocket.
19. Fully rotate the track forward and backward several times.
20. Shut off the engine.
21. Double check track tension. Adjust as needed.
22. Install track tension bolt lock plate (Item 2, **Figure 4-33**) and secure it with the lock bolt (Item 1, **Figure 4-33**).
23. Return the machine to service.

---

## Section 5 - Troubleshooting

The following procedures will assist you in determining the potential cause of a machine operating problem.

# NOTICE

Make sure to follow all safety precautions stated in this manual when doing any work on the machine.

---

Problem	Possible Causes	Corrective Action
Starter does not turn the engine over.	<ul style="list-style-type: none"><li>• Auxiliary hydraulics lever is either in Forward or Reverse position with no hydraulically powered attachment installed.</li></ul>	<ul style="list-style-type: none"><li>• Move lever to neutral position.</li></ul>
	<ul style="list-style-type: none"><li>• Battery is dead.</li></ul>	<ul style="list-style-type: none"><li>• Charge the battery.</li><li>• If battery does not hold a charge, replace the battery.</li></ul>
	<ul style="list-style-type: none"><li>• Electrical connections are corroded or loose.</li></ul>	<ul style="list-style-type: none"><li>• Check electrical connections for good contact.</li><li>• Remove cables from battery terminals and fully clean battery terminals and cable clamps.</li><li>• If the cable clamps can not be properly cleaned, replace connectors.</li></ul>
	<ul style="list-style-type: none"><li>• Relay or starter switch is defective.</li></ul>	<ul style="list-style-type: none"><li>• Contact Authorized Service Dealer.</li></ul>
	<ul style="list-style-type: none"><li>• Engine is in hydraulic lock due to a cylinder filled with fuel.</li></ul>	<ul style="list-style-type: none"><li>• Allow engine to cool before attempting this procedure.</li><li>• Remove fuel injectors and turn engine over to pump excess fuel from engine cylinder.</li></ul>

Problem	Possible Causes	Corrective Action
<p>Engine will not start, starts hard, or fails to keep running.</p>	<ul style="list-style-type: none"> <li>• Auxiliary hydraulics lever is not in neutral position with a hydraulically powered attachment installed.</li> </ul>	<ul style="list-style-type: none"> <li>• Move lever to neutral position.</li> </ul>
	<ul style="list-style-type: none"> <li>• Fuel tanks are empty.</li> </ul>	<ul style="list-style-type: none"> <li>• Fill fuel tanks with diesel fuel.</li> </ul>
	<ul style="list-style-type: none"> <li>• Glow plugs not working.</li> </ul>	<ul style="list-style-type: none"> <li>• Cycle glow plugs for about 10 seconds and try starting engine.</li> </ul>
	<ul style="list-style-type: none"> <li>• Air cleaner is dirty.</li> </ul>	<ul style="list-style-type: none"> <li>• Clean air filter housing and replace the filter elements.</li> </ul>
	<ul style="list-style-type: none"> <li>• Injectors may be plugged</li> </ul>	<ul style="list-style-type: none"> <li>• Have the diesel fuel injectors serviced by your Authorized Service Dealer.</li> </ul>
	<ul style="list-style-type: none"> <li>• Air in fuel system.</li> </ul>	<ul style="list-style-type: none"> <li>• Bleed air from fuel system. See Kubota engine manual for complete procedures and see Section 4, Replacing Fuel Filter for air bleed instructions.</li> </ul>
	<ul style="list-style-type: none"> <li>• Dirty or contaminated fuel filter.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace fuel filter.</li> </ul>
	<ul style="list-style-type: none"> <li>• Dirt, water or stale fuel is in fuel system.</li> </ul>	<ul style="list-style-type: none"> <li>• Drain fuel in tanks into an appropriate storage container and dispose of bad fuel properly.</li> <li>• Refill fuel tanks with fresh, clean fuel.</li> <li>• Replace fuel filter.</li> </ul>
<p>Engine loses power.</p>	<ul style="list-style-type: none"> <li>• Engine load is excessive.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce ground speed.</li> <li>• Reduce speed of attachment.</li> </ul>
	<ul style="list-style-type: none"> <li>• Air cleaner is dirty.</li> </ul>	<ul style="list-style-type: none"> <li>• Clean air filter housing and replace the filter elements.</li> </ul>
	<ul style="list-style-type: none"> <li>• Engine oil level in crankcase is low.</li> </ul>	<ul style="list-style-type: none"> <li>• Add the appropriate engine oil to crankcase. See engine manual for oil specifications.</li> </ul>
	<ul style="list-style-type: none"> <li>• Cooling fins and air passages under engine blower housing are plugged.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove obstruction from cooling fins and air passages.</li> </ul>
	<ul style="list-style-type: none"> <li>• Fuel injectors may be plugged or dirty.</li> </ul>	<ul style="list-style-type: none"> <li>• Have the diesel fuel injectors serviced by your Authorized Service Dealer.</li> </ul>

Problem	Possible Causes	Corrective Action
Engine loses power.	<ul style="list-style-type: none"> <li>• Dirty or contaminated fuel filter.</li> <li>• Dirt, water, or stale fuel is in fuel system.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace fuel filter.</li> <li>• Drain fuel in tanks into an appropriate storage container and dispose of bad fuel properly.</li> <li>• Refill fuel tanks with fresh, clean fuel.</li> <li>• Replace fuel filter.</li> </ul>
Engine overheats.	<ul style="list-style-type: none"> <li>• Engine load is excessive.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce ground speed.</li> <li>• Reduce speed of attachment.</li> </ul>
	<ul style="list-style-type: none"> <li>• Engine oil level in crankcase is low.</li> </ul>	<ul style="list-style-type: none"> <li>• Add the appropriate engine oil to crankcase. See engine manual for oil specifications.</li> </ul>
	<ul style="list-style-type: none"> <li>• Cooling fins and air passages under engine blower housing are plugged.</li> </ul>	<ul style="list-style-type: none"> <li>• Remove obstruction from cooling fins and air passages.</li> </ul>
	<ul style="list-style-type: none"> <li>• Cooling system low on coolant</li> </ul>	<ul style="list-style-type: none"> <li>• Check and refill coolant to levels and with the type of coolant indicated in the engine manual.</li> </ul>
	<ul style="list-style-type: none"> <li>• Dirty or plugged radiator</li> </ul>	<ul style="list-style-type: none"> <li>• Clean the radiator.</li> </ul>
Abnormal engine vibration.	<ul style="list-style-type: none"> <li>• Engine mounting bolts are loose.</li> </ul>	<ul style="list-style-type: none"> <li>• Tighten engine mounting bolts.</li> </ul>
With the machines engine turned off, the boom creeps downward more than 3" per hour (less than 3" per hour is normal for this machine).*	<ul style="list-style-type: none"> <li>• Valve spool leakage.</li> </ul>	<ul style="list-style-type: none"> <li>• Contact Service Dealer.</li> </ul>
	<ul style="list-style-type: none"> <li>• Cylinder seals are leaking.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace cylinder seals.</li> </ul>
With the machines engine turned off, boom drops downward quickly and then stops.	<ul style="list-style-type: none"> <li>• Cylinder seals are leaking.</li> </ul>	<ul style="list-style-type: none"> <li>• Replace cylinder seals.</li> </ul>
The machine does not travel in either forward or reverse directions.	<ul style="list-style-type: none"> <li>• Engine is not running at full speed.</li> </ul>	<ul style="list-style-type: none"> <li>• Advance throttle to full engine speed.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hydraulic fluid is cold.</li> </ul>	<ul style="list-style-type: none"> <li>• Fully warm hydraulic fluid.</li> </ul>
	<ul style="list-style-type: none"> <li>• Hydraulic fluid level is low.</li> </ul>	<ul style="list-style-type: none"> <li>• Check and fill the hydraulic fluid tank with the appropriate hydraulic fluid.</li> </ul>
	<ul style="list-style-type: none"> <li>• Fuel tanks are empty and engine stops.</li> </ul>	<ul style="list-style-type: none"> <li>• Fill fuel tanks with fuel.</li> </ul>
	<ul style="list-style-type: none"> <li>• If all above has been checked.</li> </ul>	<ul style="list-style-type: none"> <li>• Contact authorized service dealer.</li> </ul>

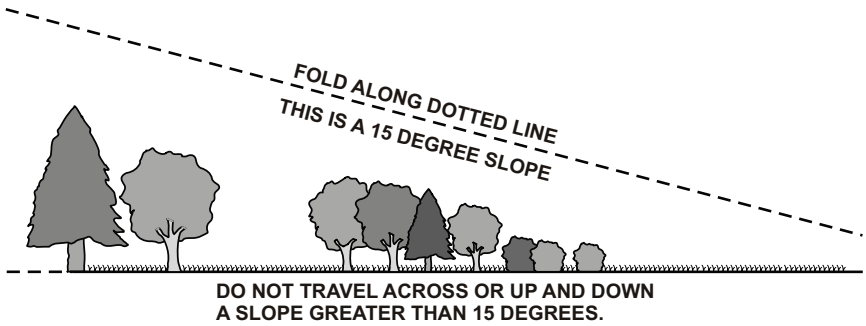
\*Tested with warm oil and no more than 530 lbs (240 Kg) in the bucket. Measure the downward drop at the attachment lock pins on the back of the mount plate.



## Section 6 - General Specifications

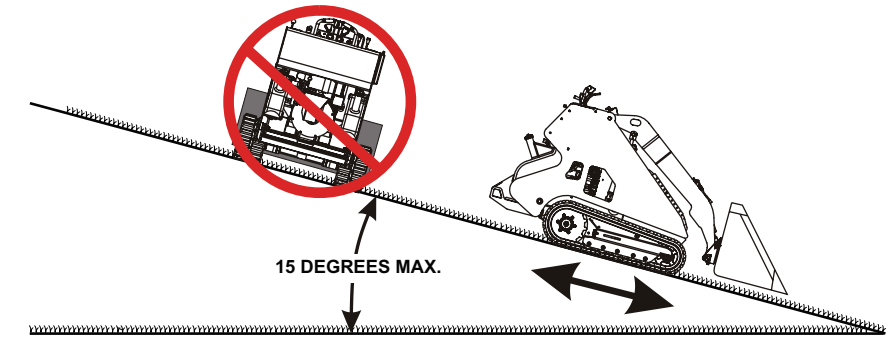
<b>Engine System</b>		
Type	Kubota D1105-E4B	
Cooling System	Liquid Cooled	
HP	24.8	
Engine System - Intake	Normally Aspirated	
Fuel Tank	4.5 Gallons (17-litre) per tank	
Air Cleaner	Heavy-Duty Air Cleaner	
<b>Hydraulic System</b>		
Oil Cooling System	Air to oil cooler with electric fan	
Pressure (Auxiliary/Boom & Tilt Cylinder Circuit)	3000 psi (20684 kPa) system relief	
Pressure Ground Drive Circuit	2600 psi (17926 kPa) system relief	
Flow Auxiliary	14.5 GPM	
Flow Ground Drive	Variable Flow 0 - 14.5 GPM	
Reservoir Capacity	20 Gallons (76-litres)	
Filter	10 Micron	
<b>Electrical System</b>		
Battery	12 Volt DC	
<b>Control System</b>		
Starting	Keyed ignition switch.	
Steering	Two spring centered control lever with zero turning type controls.	
Boom/Loader Arms	Four position, spring centered lever control. Up, neutral, down, and float.	
Bucket/Attachment Tilt	Three position, spring centered lever control. Extend, neutral, and curl.	
Auxiliary/Attachment Control	Three position, detent lever control.	
Wheel/Track Options	9" (230mm) wide track with variable width undercarriage from 34.5" - 43.5" (88 cm - 110.5 cm)	
Drive Train	Double Gear Pump	
Creep Control	Variable	
Operator Platform	Spring Cushioned Stand On Platform	
Mount Plate	Universal CUL Attachment Plate	
<b>Warranty</b>		
Engine Warranty	Two Year	
Product Warranty	One Year	
<b>Ground Drive System-Dimensions</b>		
Units	English	Metric
Wheelbase	37 in.	940 mm
Ground Clearance	5.0 in.	127 mm
Overall Length (w/ Bucket)	96 in.	2440 mm
Overall Length (without Bucket)	77 in.	1956 mm
Overall Width (Fully Retracted)	35 in.	876 mm
Overall Width (Fully Extended)	43.5 in.	1105 mm
Overall Height	54 in.	1360 mm
Overall Operating Height (Fully Raised)	98 in.	2489 mm

Hinge Pin Height (Fully Raised)	76 in.	1930 mm
<b>Units</b>	<b>English</b>	<b>Metric</b>
Dump Height	60 in.	1524 mm
Ground Speed (Max)	3.0 mph	4.83 kph
Dump Angle	37 deg.	37 deg.
Reach	34 in.	864 mm
Tip Capacity	2100 lb.	952.5 kg
Operating Capacity, 35% of tip load.	735 lb.	333.5 kg
Operating Capacity, 50% of tip load.	1,050 lb.	476 kg
Weight (without Bucket) (*w/Bucket)	2680 lb.	1214 kg
Ground Pressure	3.6 psi	0.2531 kg/cm <sup>2</sup>



**SUGGESTED GUIDE FOR SIGHTING SLOPES FOR SAFE OPERATION  
OF A COMPACT UTILITY LOADER WITH AN ATTACHMENT.**

**DO NOT REMOVE THIS PAGE FROM THE MANUAL.**



**⚠ WARNING**

- To avoid serious injury, operate your unit up and down the face of slopes.
- Travel across slopes with great caution.
- Do not operate on slopes greater than 15 degrees.
- Make turns gradually to prevent tipping or loss of control.
- Exercise extreme caution when changing direction on slopes.
- Control of the machine may be affected by installed attachments.
- Reduce travel speed on slopes.
- Read and understand all Warnings and Operating Instructions in the Operator's Manual.

1. Fold this page along dotted line indicated above. **DO NOT** remove the page from the manual.
2. Hold page before you so that its left edge is vertically parallel to a tree trunk or other upright structure.
3. Sight across the fold in the direction of the hill slope you want to measure.
4. Compare the angle of the fold with the slope of the hill.



---

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