Heavy Duty Tractor Rototiller

Operation and Maintenance Manual

429030

Register your **WARRANTY** within 30 days of purchase

SATISFACTION BLUE DIAMOND® GUARANTEED

BD-092

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Introduction: *Owner Information*

Thank you for your decision to purchase a Blue Diamond® Heavy Duty Tractor Rototiller. To ensure maximum performance of your equipment, it is mandatory that you thoroughly study the Operator's Manual and follow the recommendations. Proper operation and maintenance are essential to maximize equipment life and prevent personal injury.

Operate and maintain this equipment in a safe manner and in accordance with all applicable local, state, and federal codes, regulations and / or laws. Follow all on-product labeling and instructions.

Make sure that all personnel have read this Operator's Manual and thoroughly understand safe and correct operating, installation and maintenance procedures.

Blue Diamond® is continually working to improve its products. Blue Diamond® reserves the right to make any improvements or changes as deemed practical and possible without incurring any responsibility or obligation to make any changes or additions to equipment sold previously.

Although great care has been taken to ensure the accuracy of this publication, Blue Diamond® makes no warranty or guarantee of any kind, written or expressed, implied or otherwise with regard to the information contained within this manual. Blue Diamond® assumes no responsibility for any errors that may appear in this manual and shall not be liable under any circumstances for incidental, consequential or punitive damages in connection with, or arising from the use of this manual.

Keep this manual available for frequent reference. All new operators or owners must review the manual before using the equipment and annually thereafter. Contact your Blue Diamond® Attachments Dealer for assistance, information, or additional copies of the manual. Contact www.bluediamondattachments.com or call 888-376-7027 for a complete list of dealers in your area.

Serial Number Location:

Please record attachment information in the space provided for future reference.

Model Number:_____

Serial Number: _____

Dealer Name: _____

Dealer Number:_____

Date of Purchase:_____

The serial number plate is located on top of rototiller to the left of the gear drive as shown above.

Always use your serial number when requesting information or when ordering parts.

NOTE: The directions left, right, front, and rear, as mentioned throughout this manual, are as viewed from the operator's position.

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1. Introduction

1.1 *Attachment Identification*

1.2 *About this Attachment*

Our Tractor Rototillers are designed to be used for horticultural, agricultural, or commercial applications to till soil for seedbed and planting preparation.

This attachment is designed to be mounted on tractors equipped with hydraulic lift and universal 3–point hitch that can support the implement's weight and can be driven by the power of the machine through the PTO driveshaft.

1.3 *Attachment Model Numbers*

Model Number	HP Rating	Width
429030	50 – 65	84”

2.1 *General Safety Information*

SAFETY ALERT SYMBOL

This **SAFETY ALERT SYMBOL** identifies important safety messages on the equipment and in the owner's manual. When you see this symbol, be alert to the possibility of personal injury and carefully read the message that follows.

IMPORTANT

The signal word **IMPORTANT** identifies procedures which must be followed to avoid damage to the machine.

DANGER

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

WARNING

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

CAUTION

The signal word **CAUTION** on the machine and in the manuals indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

NOTE: Notes are used to indicate important information. This information may be repeated in other areas of the manual.

Terminology

Host Machine, Machine, Prime Mover:

- The Tractor Rototiller can be attached to many different pieces of equipment; therefore, the terms "host machine", "machine", and "prime mover" will be used. Host machine, machine, and prime mover mean any vehicle, tractor, or skid steer providing power to the attachment.

Attachment, Implement, Equipment:

- The Tractor Rototiller is the tool that is being attached to the host machine; therefore, the terms "attachment", "implement", and "equipment" will be used. The attachment, implement, and equipment mean any tool that is being used on any vehicle, tractor, or skid steer being used for different applications.

Operating Safety

- Read and follow instructions in this manual and the machine's Operator's Manual before operating.
- The manual must always remain with the machine. In case of loss or damage, request a new copy from your dealer or from Blue Diamond®.
- Strictly follow all rules prescribed by the safety pictograms/decals applied to the machine. Ensure that all safety pictograms/decals are legible. If pictograms/decals are worn, they must be replaced with new ones obtained from Blue Diamond® and placed in the position indicated by this manual.
- Before using the machine, make sure that all safety devices are installed and in good working condition. In case of damaged or missing shields, replace them immediately.
- It is absolutely forbidden to remove or alter safety devices and/or safety precautions.
- Pay maximum attention to avoid any accidental contact with rotating parts of the machine.
- If the use of the machine is required at night or in conditions of reduced visibility, use the lighting system of the prime mover and an auxiliary lighting system if required.

2.2 *Operators*

Qualified Operators

The operator is a person suited to the work and who is physically and psychologically able to withstand the demands connected with operating the equipment for its intended use. The operator must not allow anyone to approach the machine while it is working and must not allow external personnel to operate the machine or attachment.

The operator is to follow the given instructions in this manual and the machine's Operator's Manual in order to obtain maximum performance, minimal fuel consumption, and maximum safety for himself and for others.

The operator is responsible for scrupulously observing all the instructions given in this manual.

DANGER

AVOID SERIOUS INJURY OR DEATH

Operators must receive instructions before operating the machine. Untrained operators can cause serious injury or death.
For an operator to be qualified, he or she must not use drugs or alcoholic drinks which impair alertness or coordination while working. An operator who is taking prescription drugs must get medical advice to determine if he or she can safely operate a machine and the equipment.
For an operator to be qualified, he or she must have read and understood the instructions of this manual, he or she must make adequate preparation for the proper use of the machine, and he or she must hold a driving license.
In case of doubt regarding the use of the machine and/or the interpretation of this manual, the operator must contact either their dealer or Blue Diamond®.

Operator Training

- Check the rules and regulations at your location. The rules may include an employer's work safety requirements. Regulations may apply to local driving requirements or use of a Slow Moving Vehicle (SMV) emblem. Regulations may identify a hazard such as a utility line.
- The new operator must start in an area without bystanders and use all the controls until he or she can operate the machine safely under all conditions of the work area.

Operator Safety

- Use the machine for its intended purpose only. Improper use can damage the machine, attachment, and/or surrounding personnel.
- Before starting and during operation of the attachment, make sure there are no people or animals in the operation area; the machine can project material from the back with risks of serious injury or death.
- During operation, adjustment, maintenance, repairing, or transportation of the machine, the operator must always use appropriate Personal Protective Equipment (PPE) including but not limited to safety glasses, working gloves, dust-mask, safety helmet, and hearing protection.
- Do not operate the attachment or machine while wearing loose fitting clothing that can be entangled or caught in parts of the machine.
- Do not operate the implement when tired, not in good condition, or under the influence of alcohol or drugs.

2.3 *Safety Guidelines*

Operating Safety

- Read and follow instructions in this manual and the machine's Operator's Manual before operating.
- Under no circumstances should young children be allowed to work with this equipment.
- This equipment is dangerous to persons unfamiliar with its operation.
- Check for overhead and/or underground lines before operating equipment (if applicable).
- In addition to the design and configuration of equipment, hazard control and accident prevention are dependent upon the awareness, concern, prudence, and proper training of personnel involved in the operation, transport, maintenance, and storage of equipment.
- Check that the attachment is securely fastened to the machine.
- Make sure all the machine controls are in the NEUTRAL before starting the machine.
- Operate the equipment only from the operator's position.
- Do not leave the operator's position when the attachment is in use.
- Operate the equipment according to the Operator's Manual.
- When learning to operate the equipment, do it at a slow rate in an area clear of bystanders.
- The attachment must be slightly lifted off the ground before making changes in direction.
- Disengage the PTO before raising the attachment, and never engage the PTO with the attachment raised as objects might be thrown.
- Do not permit personnel to be in the work area when operating the equipment.
- The equipment must be used ONLY on approved machines.
- Do not modify the equipment in any way. Unauthorized modification may impair the function and/or safety and could affect the life of the equipment.
- Do not make any adjustments or repairs on the equipment while the machine is running.
- Keep shields and guards in place. Replace if damaged.
- DO NOT operate equipment in poor visibility conditions such as fog, darkness, or any conditions that limit clear visibility less than 300 feet (100 m) in front of and to the sides of the equipment.
- When conditions make it necessary to slow ground speed, shift to a lower gear rather than reducing engine speed. The engine will maintain rated speed and keep the rotor rotating at optimum tilling speed.
- Do not operate in a work area that has not been inspected for foreign debris and obstacles.
- Remove any foreign objects from the work area and clearly mark any objects that cannot be removed.
- Immediately stop operating the attachment if a tine strikes a foreign object. Repair all damage and make certain that the rotor and the tines are in good condition before resuming operation.
- Wear safety glasses, gloves, hearing protection, and other protective clothing when required.
- Do not engage the tractor's PTO if people are close to the driveshaft.
- Before engaging the tractor's PTO, always make sure that the driveshaft is mounted in the correct direction and that its clamping elements are properly connected both to the tractor side and the implement side.
- Do not use the attachment with missing bolts, screws, pins, or other hardware.

2.3 *Safety Guidelines Cont'd*

Operating Safety Cont'd

- Always disengage the tractor PTO when the driveshaft exceeds an angle of 10° up or down while operating. An excessive angle with the driveshaft rotating can break the driveshaft and cause flying objects.
- All adjustment operations on the attachment must be performed by a qualified and trained technician with the tractor engine off, the PTO disengaged, and attachment set on a flat, level surface, ignition key removed, and the parking brake set.

Machine Requirements and Capabilities

- Keep bystanders clear of moving parts and the work area. Keep children away.
- See "6.1 Attachment Specifications" on page 45 potential operating restrictions.
- Use caution on slopes and near banks and ditches to prevent overturn.
- Do not operate the machine on too muddy, sandy, or rocky soil.
- Keep the machine and attachment clean from debris and foreign objects.
- Do not use the attachment if the category of the connecting pins does not match that of the tractor hitch system.
- Make certain, by adding front ballast that is at least 20% of the total weight (tractor, implement, and ballast) is on the front axle of the tractor to ensure stability.
- Before engaging the tractor PTO, make sure the tractor PTO speed is set as required for the machine (540 or 1000 rpm). Overspeeding the PTO shaft will result in damage to the machine.
- Before engaging the PTO, always make sure that the driveshaft is mounted in the correct direction and that its clamping elements are properly connected both to the tractor side and implement side.
- Do not operate the machine if the driveshaft is damaged. The driveshaft could be subjected to breakage during operation, causing serious injury or death. Remove and replace the driveshaft.
- Avoid overheating the clutch, which can be caused by too long or frequent slipping of the clutch.
- Avoid prolonged use of the attachment, which can cause overheating of the gearbox. Do not touch the gearbox during use and immediately after as it will be extremely hot.
- When the attachment is disconnected from the tractor, rest the driveline on the provided support.

Fire Prevention Safety

- Flammable debris (leaves, grass, etc.) must be removed regularly. If flammable debris is allowed to accumulate, it can cause a fire hazard. Clean often to avoid this accumulation.
- The equipment's gearbox compartment must be inspected every day and cleaned if necessary to prevent fire hazards and overheating.
- All fuels, most lubricants, and some coolant mixtures are flammable. Flammable fluids that are leaking or spilled onto hot surfaces or onto electrical components can cause a fire.

Hydraulic System

- Check hydraulic tubes, hoses, and fittings for damage and leakage. Never use open flame or bare skin to check for leaks. Hydraulic tubes and hoses must be properly routed and have adequate support and secure clamps. Tighten or replace any parts that show leakage.
- Always clean fluid spills. Do not use gasoline or diesel fuel for cleaning parts. Use commercial nonflammable solvents.

2.3 *Safety Guidelines Cont'd*

Transporting Safety

- Comply with state and local laws governing highway safety and movement of machinery on public roads.
- Check local laws for all highway lighting and marking requirements.
- Always yield to oncoming traffic and move to the side of the road so any following traffic may pass.
- Never allow riders on either machine or equipment.
- Do not lift or transport people, animals, or objects using either machine or equipment.
- If transporting the equipment on a truck or trailer, make sure the equipment is properly secured to the transport vehicle.
- Before transporting, determine the stopping characteristics of the tractor and implement.
- Transport only at speeds where control of the machine and implement can be maintained.
- When driving on roads, the attachment must be in a transport position where it is adequately raised with the lifting hydraulics locked.

Maintenance Safety

- All maintenance and repairing operations must be performed by qualified and trained operators with the tractor engine off, the PTO disengaged, the attachment lowered on a flat, level surface, the ignition key removed, and the parking brake set.
- Only use spare parts provided by Blue Diamond® Product Support.
- Before any maintenance operation, make sure that the parts which may become hot during use (clutch, gearbox, etc.) have cooled.
- Contact Blue Diamond® Product Support if the technician needs assistance.

Storage Safety

- Never leave the tractor unattended with the attachment in the lifted position. Accidental operation of lifting lever or a hydraulic failure may cause a sudden drop of the unit.
- Make sure all parked machines are on a firm, level surface, and all safety devices are engaged.
- Store the unit away from human activities. See "4.7 Storage" on page 26 for more information.

Personal Protective Equipment

Proper Work Clothes: To help ensure your safety as a designated operator wear proper work clothes including tight fitting clothes, protective gloves, and shoes.

Hand Protection: To help ensure your safety as a designated operator wear protective gloves.

Protective Shoes: To help ensure your safety as a designated operator wear protective shoes.

Safety Helmet: To help ensure your safety as a designated operator wear a safety helmet.

Safety Helmet and Eye/Ear Protection: To help ensure your safety as a designated operator wear a safety helmet and eye/ear protection.

3. Operation

3.1 *Pre–Operation Inspection*

Before operating the Tractor Rototiller for the first time and each time thereafter, use the following list as a guideline during equipment inspection.

WARNING

AVOID SERIOUS INJURY OR DEATH

- **Engage the machine's parking brake, stop the engine, and make sure all moving parts are completely stopped before connecting, disconnecting, adjusting, or cleaning equipment.**
- **Always keep shields and guards in place when using the equipment.**
- **Disengage machine's auxiliary hydraulics for road travel.**
- **Keep hands, feet, and clothing away from rotating parts.**

- Lubricate the attachment per the schedule outlined in the Maintenance section. See "4.3 Gearbox Lubrication" on page 24 for more information.
- Check the attachment mounting frame for damage or cracks.
- Confirm that the attachment mounting frame is compatible with the host machine.
- Check that all shields and guards are in place and have no damage. Repair if necessary.
- Check for loose bolts and tighten them if necessary.
- Check all welds on the attachment for wear and damage each time the attachment is removed from the machine.
- Check for damaged or missing safety decals. Replace if necessary.
- Inspect the machine's mounting frame. (See the machine's Operator's Manual for inspecting the mounting frame.) Replace any parts that are damaged, bent, or missing. Keep all fasteners tight. Look for cracked welds.
- Verify that the attachment is properly connected to the machine.

WARNING

Leaking fluids under pressure can enter the skin and cause serious injury or death. Immediate medical attention is required.
Wear goggles. Use cardboard to check for leaks.

- Check the condition of all hydraulic components for leaks. Repair as required.

NOTE: Do not operate with hydraulic leaks.

- Check that the attachment itself is in good condition. Repair or replace damaged parts if necessary.
- Check that the attachment has no missing parts. Replace if necessary.
- Verify that the PTO driveshaft is properly installed (see "Installing the Driveline" on page 15).
- Check that the driveshaft clutch is in good condition and that its components are not subject to sticking (see "4.6 Driveshaft" on page 26).
- Check for oil leaks from the gearbox or the transmission side cover. Repair if necessary.
- Check that the tines are not excessively worn and its hardware is torqued properly. See "6.2 Torque Specifications – Metric" on page 46.
- Check that there are no constraints that may prevent the movement of the attachment. Remove any constraint if necessary.
- Clear the work area of foreign objects (rocks, branches, debris, etc.). Remove any obstacle, and flag each obstacle that cannot be removed.
- Make sure no people or animals are in the work area.
- Make sure the soil to be worked is not too grassy, muddy, sandy, or rocky.

3.2 *Setup Instructions*

The Tractor Rototiller is delivered fully assembled and equipped with a driveshaft with torque limiter (clutch discs) and the related Operation and Maintenance Manual.

When the machine is delivered, check that there is no damage to the attachment or the driveshaft. In case of damage or missing parts, notify Blue Diamond® Product Support immediately.

Hitch Positioning

The Heavy Duty Rototillers are designed to be mounted on tractors equipped with

- 3–Point Hitch Category I (ISO 730 Standard)
- 3–Point Hitch Category II (ISO 730 Standard)

The position of the lower hitches must be adjusted accordingly.

3–Point Hitch Category I (ISO 730 Standard)

If the tractor is equipped with a 3–Point Hitch Category I (ISO 730 Standard), verify that the lower hitches are equipped with Category I pins, so that the distance between the upper and lower pins is 18” (460 mm) as required by the standard. If not, contact Blue Diamond® Product Support for a set of original Category I pins.

Verify the lower hitches on the square tube are at a distance of 13 7/16” (341 mm) from the center of the attachment’s PTO. The hitches should be positioned symmetrically in reference to the PTO at a total of 26 7/8” (683 mm). See Figure 1.

If not, perform the following:

1. Loosen the bolts clamping the hitches to the square tube.
2. Slide the hitch on the square tube, positioning it at a distance of 13 7/16” (341 mm) from the center of the attachment’s PTO.

   The lower hitches should now be symmetrically in reference to the attachment’s PTO at a total distance of 26 7/8” (683 mm).
3. Retighten the bolts, referring to "6.2 Torque Specifications – Metric" on page 46.

Figure 1

3.2 *Setup Instructions Cont'd*

Hitch Positioning Cont'd

3–Point Hitch Category II (ISO 730 Standard)

If the tractor is equipped with a 3–Point Hitch Category II (ISO 730 Standard), verify that the lower hitches are equipped with Category II pins, so that the distance between the upper and lower pins is 24" (610 mm) as required by the standard. If not, contact Blue Diamond® Product Support for a set of original Category II pins.

Verify the lower hitches on the square tube are at a distance of 16 1/4" (413 mm) from the center of the attachment's PTO. The hitches should be positioned symmetrically in reference to the PTO at a total of 32 1/2" (825 mm). See Figure 2.

If not, perform the following:

1. Loosen the bolts clamping the hitch to the square tube.
2. Slide the hitch on the square tube, positioning it at a distance of 16 1/4" (413 mm) from the center of the attachment's PTO.

   The lower hitches should now be symmetrically in reference to the attachment's PTO at a total distance of 32 1/2" (683 mm).
3. Retighten the bolts, referring to "6.2 Torque Specifications – Metric" on page 46.

Figure 2

3.3 *Entering & Exiting the Prime Mover*

IMPORTANT

See the machine's Operator's Manual for detailed information on operating the loader.

Entering the Operator's Position

Use the safety treads, handles, and steps on the attachment and machine to enter the operator's position. Always maintain three (3) points of contact.

When in the operator's position, secure the seatbelt, start the engine, and release the parking brake.

Leaving the Operator's Position

WARNING

AVOID SERIOUS INJURY OR DEATH

- Always park on a flat, level surface.
- Lower lift arms, and place attachment flat on the ground.
- Place all controls in NEUTRAL.
- Engage the parking brake.
- Stop the engine, and remove the key.
- Wait for all moving parts to stop.

SEE MACHINE'S OPERATOR'S MANUAL FOR ADDITIONAL INFORMATION.

Park the machine/attachment on a flat, level surface.

Place all controls in neutral, engage the parking brake, stop the engine, and wait for all moving parts to stop. Leave the operator's position.

3.4 *Attachment Installation*

Connecting Attachment to the Machine

WARNING

CRUSH HAZARD

- Before moving the machine, look in all directions and make sure no bystanders, especially small children are in the work area. Do not allow anyone between the machine and attachment when approaching the attachment for connecting.
- Keep fingers and hands out of pinch points when connecting and disconnecting the attachment.

Before connecting to the attachment, inspect the machine's mounting plate. (See the machine's Operator's Manual for inspecting the mounting frame.)

Drive the tractor in reverse, aligning the rear lifting arms to the lower hitches of the attachment.

Set the parking brake, turn off the engine, remove the ignition key, and exit the prime mover (see "Leaving the Operator's Position" on page 14).

Connect the lifting arms of the host machine to the lower hitches of the attachment. Install pins and the relative safety split pins.

3.4 *Attachment Installation Cont'd*

Connecting Attachment to the Machine Cont'd

Raise the attachment until both the tractor's PTO and the attachment's PTO are at the same height. Adjust the 3–point top link so that the front of the attachment is level to the back (the axis of the attachment's PTO must be parallel to the ground) to limit stress on the attachment caused by the driveshaft.

Make sure the left side of the attachment is level with the right by adjusting the tractor lifting arms, then lock the arms to prevent swinging, which could compromise the stability of the tractor and attachment.

Once the attachment to secured to the machine, retract the parking stand, and place the snap pin through the bottom hole.

Installing the Driveline

IMPORTANT

Prior to installing the driveline, the operator must read the manual for the driveshaft and the manual for the tractor to make sure that the rotations per minute (rpm) and direction of rotation of the tractor PTO match that of the Rototiller.

If the direction of rotation of the PTO tractor does not match that of the attachment, contact your local dealer or Blue Diamond® Product Support.

1. Park the tractor and attachment on a flat, level surface, set the parking brake, turn off the engine, remove the key from the ignition. Exit the tractor (see "Leaving the Operator's Position" on page 14).
2. Check that the safety devices of the driveshaft, rototiller, and tractor are in good condition. Fix or replace if necessary.
3. Remove the attachment's PTO shield by removing its bolts.
4. Position the driveshaft with the clutch turned towards the attachment side.
5. Insert the clutch hub on the attachment's PTO, then tighten it onto the shaft using its fastener.
6. Insert the driveshaft yoke on the tractor's PTO, then tighten it onto the shaft using its fastener.
7. Hook the two (2) retaining chains of the driveline shielding to the tractor and the attachment. This is to prevent shielding rotation during operation of the machine.

Checking Driveline Length

Before operating the attachment, ensure that the size of the driveshaft is accurate. The driveshaft supplied with the machine has a standard length, but it does not apply to all host machines. To fit your machine, the length may need adjusted.

How to know if the driveline is the correct length:

- Avoids bottom out of the transmission tubes when the driveshaft is in the compressed position (when the attachment is raised)
- Ensures an overlapping of the transmission tubes enough to transmit the torque required when the driveshaft is fully extended (when the attachment is lowered)
- When the driveshaft is at its minimum length (maximum compressed position), there must be at least 3/4" (20 mm) of distance between the ends of each transmission tube and the yokes side.
- When the driveshaft is at its maximum operational extension, there must be an overlap between the tube's profiles of at least 6" (150 mm). See Figure 3.

Figure 3

3.4 *Attachment Installation Cont'd*

Installing the Driveline Cont'd

A driveshaft that is too long may cause structural damage to the tractor and attachment. If the driveshaft is too long, remove it and shorten the tubes according to the instructions provided by its operation and maintenance manual.

A driveshaft that is too short can cause the tubes to disengage during operation. This is a huge hazard for the operator and can use structural damage to the tractor and attachment. If the driveshaft is too short, it must be replaced with a longer driveshaft. If this is the case, contact your local dealer or Blue Diamond® Product Support.

IMPORTANT

- Before operating the attachment for the first time, make sure that the driveshaft is lubricated in accordance to the manufacturer manual.
- Before operating the attachment for the first time and after long periods of inactivity, make sure that the driveline clutch has run a short "run in" in accordance to the manufacturer manual, removing the possible oxidation of the components that may compromise the correct slipping during the usage (see "4.6 Driveshaft" on page 26).
- Always engage the tractor PTO at low rpm to minimize the effect of the peak torque on the driveline and on the attachment.

Disconnecting the Attachment

Never leave the tractor unattended with the attachment in the lifted position.

To disconnect the Rototiller from the tractor, perform the following steps:

- Adjust the skids to their lowest position (see "Skid Shoes" on page 20 under 3.8 Adjustments).
- Adjust the parking stand to the lowest position by using the retaining pin.
- Park the tractor on a firm, level, and dry surface.
- Reduce the engine speed.
- Disengage the PTO.
- Wait for all rotating parts to top before lowering the attachment to the ground.
- Set the parking brake.
- Turn off the engine, and remove the key before leaving the operator's position (see "Leaving the Operator's Position" on page 14).
- Place the safety blocks under the Rototiller to prevent the attachment from tipping over, which could result in injury or death.
- Disconnect the driveline from the tractor PTO and rest it on the support plate of the Rototiller.
- Disconnect the top hitch and rear lifting arms of the tractor from the lower hitches.
- Check the attachment's stability. If needed, place additional safety blocks.
- Enter the operator's position (see "Entering the Operator's Position" on page 14), start the engine, and slowly move away from the Rototiller.
- See "4.7 Storage" on page 26 for how to properly store the attachment for long periods of inactivity.

3.5 *Tractor–Attachment Stability*

The weight of the machine modifies the stability of the tractor, which could result in loss of control and braking.

CAUTION

Check the lifting capacity and stability of the tractor. If necessary, apply a front ballast. To determine the appropriate characteristics of the ballast, refer to the tractor's manual.

Use one of the following equations to determine if a front ballast is required. See Figure 4.

- $M \times (S1 + S2) \leq 0.2 \times T \times i + Z \times (d + i)$
- $M \leq 0.3T$

Key for Figure 4

- i = tractor wheelbase (cm)
- d = distance between front axle and ballast center of mass (cm)
- T = weight of tractor + operator (kg)
- Z = ballast weight (kg)
- M = attachment weight (kg)
- S1 = distance between rear axle and lower hitch points (cm)
- S2 = distance between lower hitch points and implement center of mass (cm)

3.6 *Operating the Attachment*

DANGER

- **Before operating the attachment, the operator should have read and understood the operator's manuals for the attachment, tractor, and PTO shaft.**
- **During operation, adjustment, maintenance, repairing or transportation of the machine, the operator must always use appropriate personal protective equipment (PPE).**
- **Before operating, ensure that all machine guards are in good condition and fully functional. Repair or replace if necessary.**
- **During operation, the machine can throw material from the back. Be sure the work area is clear prior to beginning operation.**

Starting the Attachment

1. Start the tractor and engage the tractor PTO at a low rpm, making sure that the Rototiller is NOT in a raised position but close to the ground, then increase the speed engine until 540 rpm.

Figure 4

3.6 *Operating the Attachment Cont'd*

Starting the Attachment Cont'd

2. Lower the Rototiller onto the ground and simultaneously start driving the tractor at a low speed. Then increase the ground speed, depending on ground conditions.

   If the outside temperature is extremely cold, Blue Diamond® recommends to continue running the tractor PTO at a low rpm before lowering the attachment completely onto the ground.

3. Drive the tractor forward with the PTO running. Be sure to intermittently check the quality of the work performed.

   If the operator needs to exit the machine, lift the attachment so that it is slightly above the enough, reduce engine speed and disengage the PTO, set the parking brake, stop the engine, and remove the key from the ignition. See "Leaving the Operator's Position" on page 14.

   If the working depth and/or soil texture is not as desired, this can be corrected by adjusting the skid shoes and the tailgate. See "3.8 Adjustments" on page 19.

Stopping the Attachment

1. Bring the tractor to a complete stop.
2. Place the transmission in park or neutral.
3. Reduce the engine speed.
4. Disengage the PTO.
5. Wait for all rotating parts to stop before lowering the Rototiller to the ground.
6. Set the parking brake.
7. Turn off the tractor's engine, and remove the key before leaving the operator's position (see "Leaving the Operator's Position" on page 14).
8. Perform the cleaning and maintenance required to make the machine ready for later use (see "4.7 Storage" on page 26). These steps can be followed for proper care of the attachment without storing it due to inactivity.

3.7 *Operating Tips*

- Always keep the tractor engine at the appropriate rpm rate, ensuring that the Rototiller is using right power required for use.
- Always keep tractor speed adequate to conditions of the soil to be worked, ranging from approximately 1 to 6 miles per hour (2 to 10 km per hour). If the soil is hard and/or stony, reduce speed.
- When working on hills, "climb" the slope. Do not work parallel to hillsides if possible. Instead, till from the bottom of the hill to the top in one pass, moving perpendicular to the hillside. If possible, always try to work up the slope.
- Always perform changes and reverse the direction with the PTO disengaged and the attachment slightly lifted from the ground to avoid damage to the machine.
- Periodically check for foreign objects wrapped around the rotor shaft and remove them after disengaging the PTO, turning off the engine, removing the ignition key, and waiting for all moving parts to stop.
- If the tines strike a foreign object or in the case of prolonged intervention of the clutch due to an object wedged into the rotor, stop operating immediately, idle the engine speed, and disengage the PTO. Wait for all rotating parts to stop, then raise the implement, set the parking brake, turn off the engine, remove the ignition key. Remove the object, and repair any damage immediately. Make sure the rotor and tines are in good condition before continuing operation.
- Avoid friction clutch overheating caused by too long or too frequent slipping of the clutch, since this can damage the friction plates and clutch parts.

3.8 *Adjustments*

WARNING

AVOID SERIOUS INJURY OR DEATH

The following must always be performed prior to any adjustment being made:

- **Always park on a flat, level surface.**
- **Lower lift arms, and place attachment flat on the ground.**
- **Place all controls in NEUTRAL.**
- **Engage the parking brake.**
- **Stop the engine, and remove the key.**
- **Wait for all moving parts to stop.**
- **Set the parking stand.**

SEE MACHINE'S OPERATOR'S MANUAL FOR ADDITIONAL INFORMATION.

Lower Hitches

To adjust the lower hitch position:

1. Loosen the bolts [Figure 5, Item 1].
2. Slide the hitch and bracket [Item 2] on the square tube.
3. Tighten the bolts after making the required adjustment. See "6.2 Torque Specifications – Metric" on page 46 for proper torque.

Figure 5

Friction Clutch

The PTO driveshaft and friction clutch are designed to transmit adequate power to the attachment.

The clutch preserves the machine from overloads through the slipping of friction discs and limits the maximum torque transmissible to a calibrated value set a factory. Blue Diamond® recommends to leave this value unchanged to avoid damages to the machine or to the driveshaft.

Figure 6

However, an adjustment can be performed when the clutch slips too frequently, which means that the calibration is too low.

On the contrary, nuts loosening over the springs will give a decrease in transmissible torque.

IMPORTANT

For details about clutch adjustment, refer to the driveline's Operator's Manual.

NOTE: Excessive tightening of the springs can prevent the clutch from slipping and to protect the machine from overload.

NOTE: Make sure that the height of all the compressed springs is equal to prevent the clutch from malfunctioning.

3.8 *Adjustments Cont'd*

Skid Shoes

The working depth of the Rototiller is determined by the position of the skid shoes. Both must be adjusted to the same height.

Raise the skid shoes to increase the working depth.

Lower the skid shoes to decrease the working depth.

To adjust the working depth, perform the following steps:

1. Lift the implement, securely place it on blocks, turn off the host machine's engine, disengage the PTO, set the parking brake, and remove the ignition key.
2. Loosen the front bolt. Do not remove it [Figure 7, Item 1].
3. Loosen and remove the rear bolt [Item 2].
4. Adjust the skid shoe until it is at its desired height.
5. Reinstall the rear bolt [Item 2]. For proper torque, "6.2 Torque Specifications – Metric" on page 46.
6. Tighten the front bolt [Item 1]. For proper torque, see "6.2 Torque Specifications – Metric" on page 46.
7. Once complete, verify that both skids are at the same level, and check if the front of the attachment is level with the back when lowered to the ground. Adjust the 3–point hitch if necessary.

Figure 7

Tailgate

Blue Diamond's line of Tractor Rototillers are equipped with a tailgate with a lift chain.

The position of the tailgate is adjustable by varying the number of chains between the J–bolts [Figure 8, Item 1], which holds a chain link that creates the tension between the tailgate and deck, and the tailgate anchor point [Item 2].

Figure 8

To raise the tailgate, reduce the number of chain links in tension. The raised tailgate will allow a coarser soil texture and increase the tractor's ground speed.

To lower the tailgate, increase the number of chain links in tension. The lowered tailgate will allow a finer soil texture and decrease the tractor's ground speed.

WARNING

To avoid the risk of crushing or cutting fingers, raise or lower the tailgate only from the bottom edge, NOT from the sides.

IMPORTANT

Be sure to set the same number of chain links in tension for each chain to equally divide the weight of the tailgate between the two chains.

3.9 *Transporting the Attachment*

To prepare the Rototiller for transportation, perform the following steps:

1. Idle the tractor engine, disengage the tractor PTO, and wait for all rotating parts come to a complete stop.
2. Lift the Rototiller, making sure the driveline transmission tubes do not come in contact with the tractor and attachment. A minimum gap of 3/4" (20 mm) should be left between the tubes, tractor, and attachment (see "Installing the Driveline" on page 15).
3. Lock the tractor's lifting hydraulics, turn off the engine, set the parking brake, remove the ignition key, and exit the tractor (see "Leaving the Operator's Position" on page 14).
4. Remove the parking stand's retaining pin, adjust the parking stand so it is at its highest point to prevent damage, and reinsert the retaining pin through the lowest retaining hole.

WARNING

When driving on public roads, reduce speed, be aware of surrounding traffic, and allow vehicles moving faster than the tractor to safely pass.

4. Maintenance

4.1 *Service Schedule*

DESCRIPTION	SERVICE PROCEDURES					
	Check	Clean	Lube	Change	Adjust	Drain
Daily Maintenance (or every 8 hours)						
Tines (wear, damage, and loosening)	•					
Rotor Shaft	•					
All Hardware	•					
Deck	•	•				
Bearing Housing			•			
Weekly Maintenance (or every 50 hours)						
All Hardware	•					
Tine Torque	•					
Deck (cracks, bends, or damage)	•					
Gearbox Oil	•			•*		
Rotor Side Gear Drive	•					
Monthly Maintenance						
Tines (cracks, bends, or excessive wear)	•					
Skid Shoes	•					
All Hardware	•					
500 Hour Maintenance						
Gearbox Oil				•		
Rotor Side Gear Drive				•		

*The gearbox oil must be changed after the first 50 hours of service and then every 500 hours thereafter.

4. Maintenance

Proper and regular maintenance ensures a long life of the attachment, avoids failures, and saves time and repair costs.

Periodic inspections and maintenance operations described in this section must be performed by an operator in times and terms prescribed. Failure to comply with maintenance prescriptions can compromise the function and lifetime of the attachment, which will result in the warranty becoming void.

Repairs, maintenance, and modifications other than those mentioned in this manual should NOT be performed without consulting Blue Diamond® Product Support.

Wrong or inappropriate repairs or maintenance may generate abnormal operating conditions, equipment damage, and generate risks for the operator.

WARNING

AVOID SERIOUS INJURY OR DEATH

The following must always be performed prior to any maintenance performed:

- **Always park on a flat, level surface.**
- **Lower lift arms, and place attachment flat on the ground.**
- **Place all controls in NEUTRAL.**
- **Engage the parking brake.**
- **Stop the engine, and remove the key.**
- **Wait for all moving parts to stop.**
- **Set the parking stand.**

SEE MACHINE'S OPERATOR'S MANUAL FOR ADDITIONAL INFORMATION.

4.2 *Tine Replacement*

Every eight (8) hours, check the wear condition of the tines and make sure the hardware is properly torqued. See Torque Specifications on page 46. The lifetime of the tines can vary depending on the type of soil.

Tine replacement is necessary when the operator notices an increase of power absorption during operation or when the tine dimension is significantly reduced compared to the original.

IMPORTANT

Remove and install one tine at a time to ensure the tines are correctly oriented when installed.

To replace the tines, perform the following steps:

1. Remove the two (2) bolts and washers clamping the tines onto the rotor flange.
2. Remove the tine carefully as worn tines still may be sharp.
3. Position the new tine in the same position as worn tine was in. Be sure to install the tine with the cutting edge in front of the direction of rotation. See Figure 9.
4. Tighten the bolts to the proper torque (see "6.2 Torque Specifications – Metric" on page 46).
5. Repeat until all tines have been replaced.
6. After replacing all tines, make sure the tines have the right helical arrangement as shown in Figure 9.

Figure 9

4.3 *Gearbox Lubrication*

CAUTION

Wait until the gearbox has sufficiently cooled before touching the gearbox.

IMPORTANT

Frequently check for possible oil leaks from the attachment.

How to Check the Oil

Check the oil level after every 50 hours of operation.

To check the oil, perform the following steps:

1. Remove the filling plug from the top of the gearbox.
2. Check the dipstick, making sure the oil mark is located between the two reference marks, minimum and maximum. See Figure 10.
3. If the oil mark is below the minimum, fill with HP 85W140 (API GL4) oil to where it is between the minimum and maximum marks.

How to Change the Oil

The oil must be changed after the first 50 hours of operation, and after every 500 hours of operation thereafter.

To change the oil, perform the following steps:

1. Place a tank under the oil drain plug at the bottom of the gearbox.
2. Remove the oil drain plug, and completely drain the oil into the tank.
3. Retighten the drain plug.
4. Remove the filling plug from the top of the gearbox.
5. Fill with oil until it is between the minimum and maximum marks.
6. Retighten the filling plug.
7. Properly dispose of the oil removed from the attachment.

Figure 10

4.4 *Rotor Side Gear Drive Lubrication*

How to Check the Oil

Check the oil level after every 50 hours of operation.

The oil must reach the level plug on the transmission cover. If it is below the level plug, fill with HP 85W140 (API GL 4).

How to Change the Oil

The oil must be changed every 500 hours of operation and after the first 50 hours of operation.

To change the oil, perform the following steps:

1. Remove the skid shoe from the transmission side.
2. Place a tank under the oil level plug.
3. Remove the oil level plug to completely drain the oil into the tank [Figure 12].
4. Reinsert the level plug.
5. Remove the oil filling plug from the top of the transmission cover.
6. Fill with oil until it reaches the level plug.
7. Reinsert the filling plug.
8. Reattach the skid shoe.
9. Properly dispose of the oil removed from the attachment.

Figure 12

4.5 *Bearing Housing Lubrication*

Grease the rotor hub every eight (8) hours of operation using SAE multi–purpose lithium–type grease.

IMPORTANT

Make sure to remove all dirt from the zerk before using the grease gun.

Do not let excess grease collect on or around parts, particularly when operating in sandy areas.

Figure 11

4.6 *Driveshaft*

IMPORTANT

For details about maintenance and lubrication of the driveshaft, refer to the manufacturer's manual.

Grease crosses, sliding parts of protective shielding and driveshaft transmission tubes.

Driveshaft Clutch

If the Rototiller and the driveshaft are exposed to the elements for a long period of inactivity, oxidation of some clutch components may occur, creating a "sticking" effect on the clutch.

Consequently, the torque required to the slippage of the clutch increases considerably in respect to the value set at the factory. This may cause the driveshaft to break during operation or damage the implement or tractor.

To avoid damage, the operator must perform the following:

1. Check the height of the compressed springs.
2. Loosen the bolts that compress the springs.
3. Connect the Rototiller to the tractor (see "Connecting Attachment to the Machine" on page 14).
4. Connect the driveshaft (see "Installing the Driveline" on page 15).
5. Start the tractor and engage the PTO for a few seconds to cause slippage and separation of the clutch parts that are "sticking".
6. Turn off the tractor, remove the key, and wait for all components are stopped before exiting the tractor.
7. Retighten the bolts, restoring the original springs' position on the driveshaft.

4.7 *Storage*

Storage

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

- Thoroughly wash the attachment before storing it for long periods.
- Lubricate the attachment, and fill with oil to the proper level.
- Coat the exposed portion of the mechanical components to protect them against rust.
- Check for loose hardware, missing guards, or damaged parts.
- Check for damaged or missing decals. Replace if necessary.
- Replace worn or damaged parts.
- Place the attachment flat on the ground in a dry, protected shelter.
- If the driveshaft is equipped with a friction clutch, it is suggested to take note of the height of the compressed springs and loosen the bolts that compress the springs to prevent the discs from "sticking" due to moisture, which may cause clutch failure when the driveshaft is used in the following season.

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

Return to Service

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

- Lubricate the attachment.
- Connect and operate the attachment and check for correct function.
- Check the driveshaft clutch for possible oxidation.
- Check for leaks. Repair as needed.

4.8 *Troubleshooting*

PROBLEM	CAUSE	SOLUTION
Gearbox/transmission case noise noticeable and constant	Low oil level	Add oil to the gearbox/transmission case.
	Worn gears	Replace gears.
Intermittent noise from Rototiller	Loose tines	Tighten tines' hardware.
	Gear tooth damaged	Replaced damaged gear.
Noise and/or vibration from Rototiller	Tines worn or damaged	Replace tines.
	Bearings damaged	Replace bearings.
	The front of the Rototiller is not level with the back	Adjust 3–point top link of the tractor so that the attachment's PTO is parallel to the ground.
	Rotor damaged	Repair/replace rotor.
	Hard soil	Reduce ground speed.
Driveline vibration	Worn driveshaft	Replace driveshaft.
	Machine lifted too high	Lower machine and readjust tractor lift stop.
	Debris wrapped on rotor	Remove debris.
Rotor stops turning	Slip clutch slipping	Reduce load to attachment or adjust slip clutch.
	Broken chain in chain box	Repair broken link.
Attachment skips or leaves crop residue	Badly worn tines	Replace worn tines.
	Slip clutch slipping	Adjust slip clutch or reduce load.
	Ground speed too fast for soil conditions	Reduce ground speed.
Smoke and/or hot smell from Rototiller	Debris wrapped around tines and/or rotor.	Remove debris.
	Low oil level in gearbox	Add oil.
	Slip clutch slipping	Reduce load to machine or adjust slip clutch.
Gearbox overheating	Low oil level	Add oil.
	Hard soil	Reduce ground speed.
Tines wear frequently	Muddy or sandy soil	Reduce ground speed.
Tines break frequently	Stony soil	Reduce ground speed.
Oil leaking from gearbox/ transmission case	Gearbox/transmission case overfilled	Drain to proper level.
	Loose filling/drain plug	Tighten filling/drain plug.
	Damaged breather plug	Replace breather plug.
	Damaged seals	Replace seals.
Tillage depth insufficient	Rototiller carried by tractor	Lower tractor 3–point arms.
	Tractor has insufficient power	Increase PTO speed.
	Skids need adjusting	Adjust skids.
	Tines worn or bent	Replace tines.
	Tines incorrectly installed	Install tines correctly.
	Tailgate too low	Raise tailgate.
	Soil too wet	Wait until soil dries.

4.8 *Troubleshooting Cont'd*

PROBLEM	CAUSE	SOLUTION
Soil texture too coarse	Tailgate too high	Lower tailgate.
	PTO speed too slow	Increase PTO speed.
	Ground speed too fast	Reduce ground speed.
Soil texture too fine	Tailgate too low	Raise tailgate.
	Ground speed too slow	Increase ground speed.
Rototiller choking up with soil	Tines worn or bent	Replace tines.
	Tines incorrectly installed	Install tines correctly.
	Tailgate too low	Raise tailgate.
	Soil too wet	Wait until soil dries.
Rototiller skipping on ground or leaving crop residue	Tines incorrectly installed (wrong helical arrangement, cutting edge in wrong direction, etc.)	Install tines correctly (replace helical arrangement, position cutting edge in front of rotation direction, etc.)
	Debris entangled in tines and/or rotor	Clear rotor and/or tines.
	Ground speed too fast	Reduce ground speed.
	Soil too hard	Reduce ground speed and till slower.
Tillage not uniform	Tines worn or damaged	Replace tines.
	Skid shoes not aligned	Align skid shoes.
	Rototiller left side not level with right side.	Adjust tractor 3–point arms.
Too heavy of a load on the tractor	Excessive working depth	Lower skid shoes.
	Excessive PTO speed	Reduce PTO speed.

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5. Parts

5.1 *Hull Components*

5.1 *Hull Components Cont'd*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	—	Main Frame	1
2	—	Right Top Mast	1
3	—	Left Top Mast	1
4	—	M16 x 2 mm x 100 mm Hex Head Bolt Class 8.8 Zinc Plated	2
5	—	Top Mast Bushing	2
6	—	M16 x 2 mm Nylock Nut Class 8 Zinc Plated	6
7	—	25 mm Diameter x 126 mm Length Top Hitch Pin, Category II	1
8	—	Top Hitch Pin, Category I Zinc Alloy Coated	1
9	—	10 mm Diameter x 45 mm Length x 10 mm Head Length Linch Pin Zinc Plated	6
10	—	M14 x 2 mm Pitch x 88 mm Inside Width x 115.4 mm Inside Height x 30 mm Threaded Length U–Bolt Class 8.8	2
11	529360	M14 x 2 mm Nylock Nut Class 8 Zinc Plated	4
12	—	M12 x 1.75 mm x 35 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	8
13	529214	M12 x 1.75 mm Nylock Nut Class 8 Zinc Plated	8
14	—	Lower Hitch Bracket	2
15	—	Lower Hitch Angle Bracket	2
16	—	M16 x 2 mm x 50 mm Hex Head Bolt Partially Threaded Class 8.8 Zinc Plated	4
17	—	28 mm Diameter x 129 mm Length Bottom Hitch Pin Category II	2
18	529357	22 mm Diameter x 129 mm Length Bottom Hitch Pin Category I	2

5.2 *Rotor Side Gear Drive Components*

5.2 *Rotor Side Gear Drive Components Cont'd*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	—	Left Rotor Side Gear Drive Assembly	1
2	—	Left Cover. Rotor Side Gear Drive	1
3	529216	Gasket, Chain Cover	1
4	—	M28 x 1.5 mm Nylock Nut	1
5	—	30 mm x 50 mm x 4 mm Spacer	1
6	529451	35 mm x 3.5 mm O–Ring	1
7	529378	Oil Level Gauge 3/8" BSP	1
8	—	Dowty Seal 3/8" BSP	1
9	—	1/4" BSP Threaded Sealing Hex Head Bolt with O–Ring (Hex Bolt 17 mm)	1
10	529455	Side Gear 17 Teeth	1
11	529324	M35 x 1.5 mm Nylock Nut	2
12	529456	Side Gear 26 Teeth	1
13	529379	Air Breather 1/2" BSP	1
14	—	0.5 mm Rotor Side Gear Drive Input Shaft Flange Gasket	1
15	529349	Dust Cover	1
16	—	M8 x 1.25 mm x 25 mm Flange Bolt Class 8.8 Zinc Plated	20
17	—	M8 x 1.25 mm x 30 mm Flange Bolt Class 8.8 Zinc Plated	2
18	529334	M12 x 1.75 mm x 30 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	10
19	—	M12 Spring Washer Zinc Plated	6
20	—	M8 Spring Washer Zinc Plated	22
21	503469	M8 x 1.25 Hex Nut Class 8 Zinc Plated	22
22	—	M10 x 1.5 mm x 35 mm Hex Head Bolt Partially Threaded Class 8.8 Zinc Plated	6
23	—	M10 x 1.5 mm Nylock Nut Class 8 Zinc Plated	6
24	—	M12 x 1.75 mm x 35 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	4
25	529214	M12 x 1.75 mm Nylock Nut M12 x 1.75 Class 8 Zinc Plated	4

5.3 *Rotor Side Plate Components*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	—	Weld Assembly, R D Plate	1
2	529450	Bearing 30307	2
3	529457	Side Gear, 36 Tooth	1
4	503168	80 mm Circlip Internal	1
5	529451	35 mm x 3.5 mm O–Ring	2
6	529452	Middle Shaft	1
7	—	85 mm Circlip Internal	1
8	—	Bearing 22209	1
9	529232	0.5 mm Shaft Housing Gasket	1
10	—	Rotor Shaft Housing	1
11	—	85 mm x 55 mm x 8 mm Oil Seal	1
12	—	Shaft	1
13	529349	Dust Cover	1
14	—	M10 x 1.5 mm x 35 mm Hex Head Bolt Partially Threaded Class 8.8 Zinc Plated	6
15	—	M10 x 1.5 mm Nylock Nut Class 8 Zinc Plated	6
16	—	M12 x 1.75 mm x 35 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	4
17	529214	M12 x 1.75 mm Nylock Nut Class 8 Zinc Plated	4
18	529325	M12 x 1.75 mm x 25 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	8
19	—	M12 Spring Washer Zinc Plated	8

5.4 *Stub Side Drive Components*

5.4 *Stub Side Drive Components Cont'd*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	—	Stub Side Drive Plate Assembly	1
2	—	Stub Side Drive Plate	1
3	529439	Dust Cover	1
4	529337	Stub Axle Shaft	1
5	—	Stub Axle Housing	1
6	529231	Bearing 6309	1
7	529230	55 mm x 90 mm x 10 mm Oil Seal	1
8	529332	45 mm Circlip External	1
9	529331	100 mm Circlip Internal	1
10	—	0.5 mm Stub Axle Housing Gasket	2
11	529333	Stub Axle End Cover	1
12	529335	1/8" BSP Grease Zerk 7.5 mm	1
13	—	M12 x 1.75 mm x 30 mm Allen Bolt Fully Threaded Class 12.9 Zinc Plated	8
14	—	M12 x 1.75 mm x 35 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	6
15	—	M12 Spring Washer Zinc Plated	6
16	—	M10 x 1.5 mm x 30 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	3
17	—	M10 x 1.5 mm Nylock Nut Class 8 Zinc Plated	3
18	503174	Manual Storage Tube	1
19	503466	M8 x 1.25 mm x 20 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	3
20	—	8 mm Plain Washer	3
21	503469	M8 x 1.25 mm Hex Nut Class 8 Zinc Plated	3
22	—	320 mm Driveline Hook	1
23	—	Driveline Hook Holder Plate	1
24	—	M4 x 0.7 mm x 15 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	1
25	—	M4 x 0.7 mm Nylock Nut Class 8 Zinc Plated	1

5.5 *Skid Shoe Components*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	—	Right Skid Shoe	1
2	—	Left Skid Shoe	1
3	—	M12 x 1.75 mm x 35 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	4
4	529214	M12 x 1.75 mm Nylock Nut Class 8 Zinc Plated	4
5	529381	Stand	1
6	503176	10 mm Diameter x 70 mm Length Square Snap Pin	1
7	529380	Stand Bracket	1
8	529382	40 mm Square Plastic Cap for Stand (Item #5)	1
9	—	M10 x 1.5 mm x 30 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	2
10	—	M10 x 1.5 mm Nylock Nut Class 8 Zinc Plated	2
11	—	M12 x 1.75 mm x 40 mm Hex Head Bolt Partially Threaded Class 8.8 Zinc Plated	2

5.6 *Rotor Components*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	—	Rotor	1
2	529219	Right C–Tine	AR
3	529218	Left C–Tine	AR
4	—	M14 x 1.5 mm x 40 mm Hex Head Bolt	AR
5	—	M14 x 1.5 mm Hex Nut Class 10	AR
6	—	M14 Spring Washer Zinc Plated	AR

5.7 *Gearbox Components*

5.7 Gearbox Components Cont'd

ITEM	PART NUMBER	DESCRIPTION	QTY
1	—	Gearbox Assembly	1
2	—	Gearbox	1
3	529390	Drain Cap 3/8" BSP	1
4	—	Dowty Seal 3/8" BSP	1
5	529386	40 mm Circlip External	1
6	—	Bearing 32207	1
7	529388	71.5 mm x 56 mm x 3 mm Spacer	1
8	529321	72 mm Circlip Internal	2
9	529389	72 mm x 8 mm Oil Seal	1
10	—	116 mm Dipstick with M16 x 1.5 mm Threaded Fitting	1
11	—	Full Housing	1
12	529334	M12 x 1.75 mm x 30 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	4
13	—	M12 Spring Washer Zinc Plated	4
14	—	Input Shaft	1
15	529385	Bearing 6207	1
16	529384	35 mm x 72 mm x 8 mm Oil Seal	1
17	—	M10 x 1.5 mm x 30 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	3
18	529394	Crown Washer	1
19	—	0.5 mm Top Housing Flange Gasket	3
20	—	Crown Gear 22 Teeth with Pinion 15 Teeth	1
21	—	M10 Spring Washer Zinc Plated	9
22	529453	Bearing 32208	2
23	529397	40 mm x 62 mm x 7 mm Oil Seal	2
24	—	1110.5 mm Jack Shaft	1
25	—	Jack Shaft Housing	1
26	—	Gearbox Lifting Hook	1
27	529402	M10 x 1.5 mm x 25 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	6
28	—	PTO Shaft Guard Assembly	1
29	—	PTO Shaft Guard	1
30	—	PTO Shaft Guard Mount Plate	1
31	—	M8 x 1.25 mm x 15 mm Hex Head Bolt Fully Threaded Class 8.8 Zinc Plated	7
32	—	8 mm Plain Washer	7

5.8 *Tailgate Components*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	—	Tailgate	1
2	—	Rod	1
3	529368	M12 x 1.75 mm x 24 mm x 87.5 mm x 25 Thread Length J–Bolt	2
4	529369	U–Bolt Spring	2
5	529214	M12 x 1.75 mm Nylock Nut Class 8 Zinc Plated	2
6	—	4 mm Diameter x 35 mm Length Cotter Pin	2
7	529367	Lift Chain	2
8	—	Hook for Lift Chain	2
9	—	M10 x 1.5 mm x 35 mm Hex Head Bolt Partially Threaded Class 8.8 Zinc Plated	4
10	—	M10 x 1.5 mm Nylock Nut Class 8 Zinc Plated	4

5.9 *Slip Clutch Driveline Components*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	529403	Tractor Yoke, 1 3/8" with Push Pin	1
2	529404	Push Pin Kit	1
3	—	Cross Kit	1
4	—	Outer Plastic Shield Bearing	1
5	—	Inner Plastic Shield Bearing	1
6	503037	Complete Safety Shield	1
7	529409	Safety Support Chains	2
8	503160	Clutch Lining (Pack of 2)	1
9	529010	Complete Slip Clutch	1
10	503159	Eccentric Pin Kit	1
11	529025	Complete SC Driveline	—

5.10 *Safety Decals*

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5.10 *Safety Decals Cont'd*

ITEM	PART NUMBER	DESCRIPTION	QTY
1	BD-060	2.4375” x 3.375” Decal, Blue Diamond Attachments	2
2	BD-114	10.35" x 8.08" Decal, Blue Diamond Attachments	1
3	BD-092	1.5” x 2.0” Decal, Warranty Registration QR	1
4	BD-008	Decal, See Owner's Manual for Lubrication Instructions	1
5	529301	Turn Off Tractor & Remove Key	1
6	529300	Warning: Always Read the Operator's Manual	1
7	529302	Hazard, Thrown or Flying Objects	2
8	529303	Hazard, Rotating Blades, Lower Limbs	2
9	529304	Hazard, Injury to Hands	2
10	529305	Hazard, Rotating Gears	1
11	529306	Crushing Hazard by Link Lifting	1
12	529308	Tractor PTO RPM & Rotation Direction	2
13	529307	Implement Input Driveline	2
14	529309	Crush Hazard, Fingers/Hands	1
15	529310	Safety Equipment	1
16	529311	Oil Filling Plug	1
17	529312	Grease	1
18	529313	Oil Drain Plug	1
19	529314	Maintain Oil Level	2
20	529315	Lifting Hook Joint	1
21	529316	Maintenance Guide	1

6. Specifications

6.1 *Attachment Specifications*

DESCRIPTION	429030
Overall Width (B)	90 1/4 in. (2292 mm)
Overall Length	31 1/2 in. (800 mm)
Overall Height (A)	41 3/4 in. / 1062 mm
Working Width (C)	84 1/4” (2,140 mm)
Recommended Horsepower	50 – 65 HP (37 – 48 Kw)
3–Point Hitch Type	Category I & II
Number of Tines	54
PTO Input Speed	540 RPM
Rotor Shaft Speed (GD)	241 (with 540 RPM)
Standard Tine Construction	Curved
Transmission Type	Gear
Maximum Working Depth	5 1/2 in. (140 mm)
Rotor Tube Diameter	3 1/2 in. (89 mm)
Rotor Swing Diameter	19 in. (480 mm)
Driveline Safety Device	Slip Clutch
Weight (Gear Drive)	961 lbs (436 kg)

6.2 *Torque Specifications – Metric*

Standard Hardware and Lock Nuts

BOLT TYPE	CLASS 4.8		CLASS 8.8 OR 9.8		CLASS 10.9		CLASS 12.9	
Size	Lubricated	Dry	Lubricated	Dry	Lubricated	Dry	Lubricated	Dry
M6	4.8 N•m	6 N•m	9 N•m	11 N•m	13 N•m	17 N•m	15 N•m	19 N•m
	3.5 lbf•ft	4.5 lbf•ft	6.5 lbf•ft	8.5 lbf•ft	9.5 lbf•ft	12 lbf•ft	11.5 lbf•ft	14.5 lbf•ft
M8	12 N•m	15 N•m	22 N•m	28 N•m	32 N•m	40 N•m	37 N•m	47 N•m
	8.5 lbf•ft	11 lbf•ft	16 lbf•ft	20 lbf•ft	24 lbf•ft	30 lbf•ft	28 lbf•ft	35 lbf•ft
M10	23 N•m	29 N•m	43 N•m	55 N•m	63 N•m	80 N•m	75 N•m	95 N•m
	17 lbf•ft	21 lbf•ft	32 lbf•ft	40 lbf•ft	47 lbf•ft	60 lbf•ft	55 lbf•ft	70 lbf•ft
M12	40 N•m	50 N•m	75 N•m	95 N•m	110 N•m	140 N•m	130 N•m	165 N•m
	29 lbf•ft	37 lbf•ft	55 lbf•ft	70 lbf•ft	80 lbf•ft	105 lbf•ft	95 lbf•ft	120 lbf•ft
M14	63 N•m	80 N•m	120 N•m	150 N•m	175 N•m	225 N•m	205 N•m	260 N•m
	47 lbf•ft	60 lbf•ft	88 lbf•ft	110 lbf•ft	130 lbf•ft	165 lbf•ft	150 lbf•ft	190 lbf•ft
M16	135 N•m	175 N•m	260 N•m	330 N•m	375 N•m	475 N•m	440 N•m	560 N•m
	100 lbf•ft	125 lbf•ft	195 lbf•ft	250 lbf•ft	275 lbf•ft	350 lbf•ft	325 lbf•ft	410 lbf•ft
M18	135 N•m	175 N•m	260 N•m	330 N•m	375 N•m	475 N•m	440 N•m	560 N•m
	100 lbf•ft	125 lbf•ft	195 lbf•ft	250 lbf•ft	275 lbf•ft	350 lbf•ft	325 lbf•ft	410 lbf•ft
M20	190 N•m	240 N•m	375 N•m	475 N•m	530 N•m	675 N•m	625 N•m	800 N•m
	140 lbf•ft	180 lbf•ft	275 lbf•ft	350 lbf•ft	400 lbf•ft	500 lbf•ft	460 lbf•ft	580 lbf•ft
M22	260 N•m	330 N•m	510 N•m	650 N•m	725 N•m	925 N•m	850 N•m	1075 N•m
	190 lbf•ft	250 lbf•ft	375 lbf•ft	475 lbf•ft	540 lbf•ft	675 lbf•ft	625 lbf•ft	800 lbf•ft
M24	330 N•m	425 N•m	650 N•m	825 N•m	925 N•m	1150 N•m	1075 N•m	1350 N•m
	250 lbf•ft	310 lbf•ft	475 lbf•ft	600 lbf•ft	675 lbf•ft	850 lbf•ft	800 lbf•ft	1000 lbf•ft
M27	490 N•m	625 N•m	950 N•m	1200 N•m	1350 N•m	1700 N•m	1600 N•m	2000 N•m
	360 lbf•ft	450 lbf•ft	700 lbf•ft	875 lbf•ft	1000 lbf•ft	1250 lbf•ft	1150 lbf•ft	1500 lbf•ft
M30	675 N•m	850 N•m	1300 N•m	1650 N•m	1850 N•m	2300 N•m	2150 N•m	2700 N•m
	490 lbf•ft	625 lbf•ft	950 lbf•ft	1200 lbf•ft	1350 lbf•ft	1700 lbf•ft	1600 lbf•ft	2000 lbf•ft
M33	900 N•m	1150 N•m	1750 N•m	2200 N•m	2500 N•m	3150 N•m	2900 N•m	3700 N•m
	675 lbf•ft	850 lbf•ft	1300 lbf•ft	1650 lbf•ft	1850 lbf•ft	2350 lbf•ft	2150 lbf•ft	2750 lbf•ft
M36	1150 N•m	1450 N•m	2250 N•m	2850 N•m	3200 N•m	4050 N•m	3750 N•m	4750 N•m
	850 lbf•ft	1075 lbf•ft	1650 lbf•ft	2100 lbf•ft	2350 lbf•ft	3000 lbf•ft	2750 lbf•ft	3500 lbf•ft

Warranty

MANUFACTURER'S LIMITED WARRANTY

BLUE DIAMOND® ATTACHMENTS, a manufacturer of quality attachments, warrants new BLUE DIAMOND® ATTACHMENTS products and/or attachments at the time of delivery to the original purchaser, to be free from defects in material and workmanship when properly set up and operated in accordance with the recommendations set forth by BLUE DIAMOND® ATTACHMENTS, LLC.

BLUE DIAMOND® ATTACHMENTS liability for any defect with respect to accepted goods shall be limited to repairing the goods at a BLUE DIAMOND® ATTACHMENTS designated location or at an authorized dealer location, or replacing them, as BLUE DIAMOND® ATTACHMENTS shall elect. The above shall be in accordance with BLUE DIAMOND® ATTACHMENTS warranty adjustment policies. BLUE DIAMOND® ATTACHMENTS obligation shall terminate after the specified time stated below for the Heavy Duty Tractor Rototiller after the delivery of the goods to original purchaser.

- Twenty–four (24) months for structure, parts, & labor
- Sixty (60) months for gearbox

This warranty shall not apply to any machine or attachment which shall have been repaired or altered outside the BLUE DIAMOND® ATTACHMENTS factory or authorized BLUE DIAMOND® ATTACHMENTS dealership or in any way so as in BLUE DIAMOND® ATTACHMENTS judgment, to affect its stability or reliability, nor which has been subject to misuse, negligence or accident beyond the company recommended machine rated capacity.

WARRANTY CLAIM

To submit a warranty claim, a claim must be filed with BLUE DIAMOND® ATTACHMENTS before work is performed. The BLUE DIAMOND® PRODUCT SUPPORT TEAM will advise repairs and applicable parts exchanges. Tampering with the failed part may void the warranty. This warranty does not include freight or delivery charges incurred when returning machinery for servicing. Dealer mileage, service calls, and pickup/delivery charges are the customers' responsibility.

EXCLUSIONS OF WARRANTY

Except as otherwise expressly stated herein, BLUE DIAMOND® ATTACHMENTS makes no representation or warranty of any kind, expressed or implied, AND MAKES NO WARRANTY OF MERCHANTABILITY IN RESPECT TO ITS MACHINERY AND/OR ATTACHMENTS ARE FIT FOR ANY PARTICULAR PURPOSE. BLUE DIAMOND® ATTACHMENTS shall not be liable for incidental or consequential damages for any breach or warranty, including but not limited to inconvenience, rental of replacement equipment, loss of profits or other commercial loss. Upon purchase, the buyer assumes all liability for all personal injury and property resulting from the handling, possession, or use of the goods by the buyer.

No agent, employee, or representative of BLUE DIAMOND® ATTACHMENTS has any authority to bind BLUE DIAMOND® ATTACHMENTS to any affirmation, representation, or warranty concerning its machinery and/or attachments except as specifically set forth herein.

This warranty policy supersedes any previous documents. Please see bluediamondattachments.com/warranty-policies for the most up to date warranty information.

NOTE: Blue Diamond® Attachments is a trademark of BLUE DIAMOND® ATTACHMENTS

QUALITY | DEPENDABILITY | INTEGRITY

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