# HTX417
# HTX419

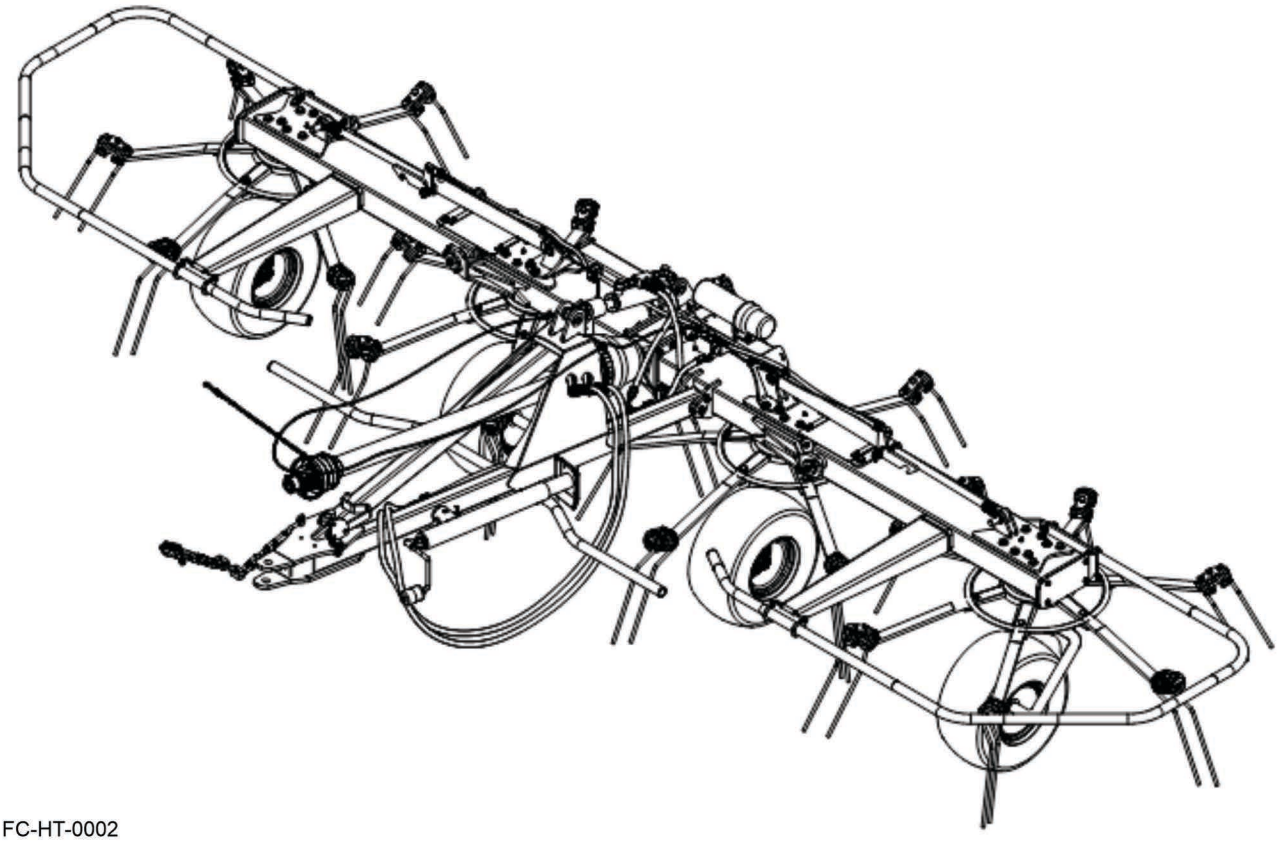
## HAY TEDDER

Published 03-26

Part No. 50085599

# OPERATOR'S MANUAL

This Operator's Manual is an integral part of the safe operation of this machine and must be maintained with the unit at all times. **READ,** **UNDERSTAND,** and **FOLLOW** the Safety and Operation Instructions contained in this manual before operating the equipment. *C01-Cover str*



FC-HT-0002


**BUSH HOG®**
2501 Griffin Ave.
Selma, AL 36703
334-874-2700
www.bushhog.com


Bush Hog Web Page

www.algqr.com/bwe

¡ATENCIÓN!
LEA EL INSTRUCTIVO
Si No Lee Ingles, Pida Ayuda a Alguien Que Se Lo Lea Para Que le Traduzca Las Medidas de Seguridad

A Member of the ALAMO GROUP

# To the Owner/Operator/Dealer

All implements with moving parts are potentially hazardous. There is no substitute for a cautious, safe-minded operator who recognizes the potential hazards and follows reasonable safety practices. The manufacturer has designed this implement to be used with all its safety equipment properly attached to minimize the chance of accidents.

BEFORE YOU START! Read the safety messages on the implement and shown in your manual. Observe the rules of safety and common sense!


WARRANTY INFORMATION:
Read and understand the complete Warranty Statement found in this Manual. Fill out the Warranty Registration Form in full and return it to within 30 Days. Make certain the Serial Number of the Machine is recorded on the Warranty Card and on the Warranty Form that you retain.

# Table of Contents

# Table of Contents

# Table of Contents

# SAFETY SECTION

# SAFETY

## SAFETY MESSAGES

A careful operator is the best operator. Safety is of primary importance to the manufacturer and should be to the owner/operator. Most accidents can be avoided by being aware of your equipment, your surroundings, and observing certain precautions. The first section of this manual includes a list of Safety Messages that, if followed, will help protect the operator and bystanders from injury or death. Read and understand these Safety Messages before assembling, operating, or servicing this Implement. This equipment should only be operated by those persons who have read the manual, who are responsible and trained, and who know how to do so responsibly.



The Safety Alert Symbol combined with a Signal Word, as seen below, is used throughout this manual and on decals which are attached to the equipment. The Safety Alert Symbol means: “ATTENTION! BECOME ALERT! YOUR SAFETY IS INVOLVED!” The Symbol and Signal Word are intended to warn the owner/operator of impending hazards and the degree of possible injury faced when operating this equipment.

Practice all usual and customary safe working precautions and above all---remember safety is up to YOU. Only YOU can prevent death or serious injury from unsafe practices.

**DANGER** Indicates a hazardous situation which, if not avoided, WILL result in DEATH OR SERIOUS INJURY.

**WARNING** Indicates a hazardous situation which, if not avoided, COULD result in DEATH OR SERIOUS INJURY.

**CAUTION** Indicates a hazardous situation which, if not avoided, COULD result in MINOR OR MODERATE INJURY.

***NOTICE*** Is used to address practices not related to physical injury.

**Important** Safety instruction (or equivalent) signs indicate specific safety-related instructions or procedures.

NOTE: Identifies points of particular interest for more efficient and convenient operation or repair.

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Death or serious injury may occur unless care is taken to follow the warnings and instructions stated in this Manual and in the Safety Messages on the implement. Always follow the instruction in this manual and use good common sense to avoid hazards.

Pictographs are used throughout this manual to help bring your visual attention to safety issues.

| SAFETY HAZARD | SAFETY AVOIDANCE | SAFETY PREVENTION |
|---|---|---|
| Pictograph surrounded by a triangle indicates a Safety Hazard that must be avoided.<br>*Example:*<br>  <br>Equipment contacting overhead electrical lines | Pictograph in a circle with blue or black background, by itself or inside a box, indicates an avoidance procedure or action that should be followed to prevent injuries.<br>*Example:*<br>  <br>Wear safety footwear.<br>  <br>Always shut off engine and remove key before working on equipment. | A circle with a slash through it indicates an action that is prohibited.<br>*Example:*<br>  <br>No Smoking |

***NOTE:*** *If you want a translation of this safety section in one of the following Languages, please contact: Translations at 1502 E. Walnut Street Seguin, TX 78155; Fax: (830) 372-9529; Safety Section Translations are available in Spanish, Portuguese, French, German, Russian. GS01str*

**DANGER** Never operate the Tractor or Implement until you have read and completely understand this Manual, the Tractor Operator's Manual, and each of the Safety Messages found in the Manual or on the Tractor and Implement. Learn how to stop the tractor engine suddenly in an emergency. Never allow inexperienced or untrained personnel to operate the Tractor or Implement without supervision. Make sure the operator has fully read and understood the manuals prior to operation.

(SG-4)str

**WARNING** The operator and all support personnel should wear hard hats, safety shoes, safety glasses, and proper hearing protection at all times for protection from injury including injury from items that may be thrown by the equipment. (SG-16)str

**CAUTION** PROLONGED EXPOSURE TO LOUD NOISE MAY CAUSE PERMANENT HEARING LOSS! Tractors with or without an Implement attached can often be noisy enough to cause permanent hearing loss. We recommend that you always wear hearing protection if the noise in the Operator's position exceeds 80db. Noise over 85db over an extended period of time will cause severe hearing loss. Noise over 90db adjacent to the Operator over an extended period of time will cause permanent or total hearing loss.

***NOTE:*** *Hearing loss from loud noise [from tractors, chain saws, radios, and other such sources close to the ear] is cumulative over a lifetime without hope of natural recovery.* (SG-I7)str

**WARNING** Always read carefully and comply fully with the manufacturer's instructions when handling oil, solvents, cleansers, and any other chemical agent. (SG-22)str

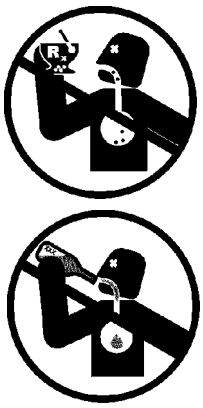
**DANGER** KEEP AWAY FROM ROTATING ELEMENTS to prevent entanglement and possible death or serious injury. (SG-24)str

**DANGER** Never allow children to play on or around Tractor or Implement. Children can slip or fall off the Equipment and be killed or injured. Inadvertent contact with controls can cause the Implement to shift or fall crushing themselves or others. (SG-25) str

# SAFETY

**⚠ DANGER**

DO NOT use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Death or serious injury to the operator or others could result if the operator is under the influence of drugs or alcohol. *(SG-27) str*



**⚠WARNING**

Prolonged operation may cause operator boredom and fatigue affecting safe operation. Take scheduled work breaks to help prevent these potentially impaired operating conditions. Never operate the Implement and Tractor in a fatigued or bored mental state which impairs proper and safe operation. (SG-32) str

**⚠WARNING**

Use extreme caution when getting onto the Implement to perform repairs, maintenance and when removing accumulated material. Only stand on solid flat surfaces to ensure good footing. Use a ladder or raised stand to access high spots which cannot be reached from ground level. Slipping and falling can cause serious injury or death. (SG-33) str

**⚠ DANGER**

DO NOT operate this Implement on a Tractor that is not properly maintained. Should a mechanical or Tractor control failure occur while operating, immediately shut down the Tractor and perform repairs before resuming operation. Serious injury and possible death could occur from not maintaining this Implement and Tractor in good operating condition. *(SG-36) str*

**⚠WARNING**

Extreme caution should be used by the Tractor operator when operating near passersby. Stop raking if anyone comes within 25 feet of the Implement to prevent possible passerby injury or death from being struck from a thrown object, entanglement with the rakes, or run over. (SRK-01) str

## EQUIPMENT OPERATION SAFETY INSTRUCTIONS AND PRACTICES

**⚠WARNING** Never leave the Tractor and Implement unattended while the Implement is in the lifted position. Accidental operation of lifting lever or a hydraulic failure may cause sudden drop of unit with injury or death by crushing. To properly park the implement when disconnecting it from the tractor, lower the stand and put the retaining pin securely in place, or put a secure support under the A-Frame. Lower the implement carefully to the ground. Do not put hands or feet under lifted components. (S3PT-01) str

**⚠ CAUTION** Do not back up with this implement. Backing could damage the machine or its components. *(S3PT-04) sstr*

**⚠WARNING** Use extreme care when lowering or unfolding the implement's wings. Make sure no bystanders are close by or underneath the wings. Allow ample clearance around the implement when folding or unfolding the wings. Use extreme caution around buildings or overhead power lines. *(S3PT-05) str*

**⚠ DANGER** There are obvious and hidden potential hazards in the operation of this implement as in all power-driven or pulled equipment. REMEMBER! This machine is often operated in rough terrain conditions that include tall grass, weeds, gullies, holes, slopes, hidden obstructions and the like. Serious injury or even death may occur unless care is taken to assure the safety of the operator and bystanders in the area. Do not operate this machine with anyone in the immediate area. (S3PT-07) str

**⚠ DANGER** This Implement may be wider than the Tractor. Be careful when operating or transporting this equipment to prevent the Implement from running into or striking sign posts, guard rails, concrete abutments or other solid objects. Such an impact could cause the Implement and Tractor to pivot violently resulting in loss of steering control, death, or serious injury. Never allow the Implement to contact obstacles. (S3PT-12)str

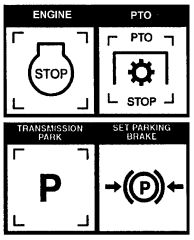
**⚠WARNING** Operate this Implement only in conditions where you have clear visibility in daylight or with adequate artificial lighting. Never operate in darkness or foggy conditions where you cannot clearly see at least 100 yards in front and to the sides of the tractor and implement. Make sure that you can clearly see and identify passersby, steep slopes, ditches, drop-offs, overhead obstructions, power lines, debris and foreign objects. If you are unable to clearly see these types of items discontinue operating this equipment. (S3PT-21) str

**⚠WARNING** Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Death or serious injury could result from falling off the tractor, particularly during a turnover when the operator could be pinned under the ROPS. (SG-7) str

**⚠WARNING** Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function. (SG-8)str

# SAFETY

**⚠ DANGER** BEFORE leaving the tractor seat lower the implement, set the parking brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)str




**⚠ DANGER** Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in death or serious injury. *(SG-10)str*

**⚠ DANGER** Never allow children to operate, ride on, or come close to the Tractor or Implement. Usually, 16-17 year-old children who are mature and responsible can operate the implement with adult supervision, if they have read and understand the Operator's Manuals, been trained in proper operation of the tractor and Implement, and are physically large enough to reach and operate the controls easily. *(SG-11) str*

**⚠ WARNING** Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completely stopped. Dismounting a moving power unit can result in a crushing hazard that can cause death or serious injury. *(SG-12) str*

**⚠ DANGER** Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in death or serious injury. Read the Tractor operators manual for proper starting instructions. (SG-13) str


**⚠ WARNING** Do not operate this Equipment with hydraulic oil or fuel leaking. Oil and fuel are explosive and their presence could present a hazard. Do not check for leaks with your hand! High-pressure oil streams from breaks in the line could penetrate the skin and cause tissue damage including gangrene. To check for a hose leak, SHUT the unit ENGINE OFF and remove all hydraulic pressure. Wear oil impenetrable gloves, safety glasses and use cardboard to check for evidence of oil leaks. If you suspect a leak, REMOVE the HOSE and have it tested at a Dealer. If oil does penetrate the skin, have the injury treated immediately by a physician knowledgeable and skilled in this procedure. *(SG-15) str*

**⚠ DANGER** Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23) str

**⚠WARNING** Do not exceed the rated PTO speed for the Implement. Excessive PTO speeds can cause Implement driveline or component failures resulting in serious injury or death. *(SG-26) str*

**⚠ DANGER** Operate the Tractor and/or Implement controls only while properly seated in the Tractor seat with the seat belt securely fastened around you. Inadvertent movement of the Tractor or Implement may cause death or serious injury. (SG-29)str

**⚠WARNING** In case of mechanical difficulty during operation, place the transmission in the park position, set the parking brake, shut down all power, including the PTO and the engine and remove the key. Wait until all rotating motion has stopped before dismounting. (SG-39) str

**⚠WARNING** Do Not operate this equipment in areas where insects such as bees, may attack you and/or cause you to lose control of the equipment. If you must enter into such areas, use a tractor with an enclosed Cab and close the windows to prevent insects from entering. If a tractor cab is not available, wear suitable clothing including head, face, and hand protection to shield you from insects. Attacking insects can cause you to lose control of the tractor, which can result in serious injury or death to you or bystanders. Never dismount a moving tractor. (SG-40) str

**⚠WARNING** Objects such as wire, cable, rope, and chain can become entangled in the rotating parts of the raking components causing mechanical damage. Entangled items caught in the rakes can sling outwards possibly injuring or entangling the operator or passersby. Any objects that might become entangled in a raking component should be removed from the area before operating the rake. (SRK-02) str


**⚠ DANGER** **DO NOT** allow any person under a folded wing unless the wing is securely locked up or supported. **DO NOT** approach the Implement unless the Tractor is turned off and all motion has ceased. Never work under the frame work, or any lifted component unless the implement is securely supported or blocked up. A sudden or inadvertent fall by any of these components could cause serious injury or even death. (STI-03) str

## CONNECTING OR DISCONNECTING IMPLEMENT SAFETY INSTRUCTIONS AND PRACTICES

**WARNING** The rotating parts of this machine continue to rotate even after the PTO has been turned off. The operator should remain in the operator's seat for 60 seconds after the brake has been set, the PTO disengaged, the tractor turned off, and all evidence of rotation has ceased. *(S3PT-10) str* **"Wait a minute. . . Save a life!"**

**DANGER** **DO NOT** use a PTO adapter to attach a non-matching Implement driveline to a Tractor PTO. Use of an adapter can double the operating speed of the Implement resulting in excessive vibration, thrown objects, and blade and implement failure. Adapter use will also change the working length of the driveline exposing unshielded driveline areas. Serious bodily injury and/or equipment failure can result from using a PTO adapter. Consult an authorized dealer for assistance if the Implement driveline does not match the Tractor PTO. *(S3PT-14) str*

**DANGER** Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15) str

**WARNING** When attaching the Implement input driveline to the Tractor PTO, it is important that the connecting yoke spring activated locking collar slides freely and the locking balls are seated securely in the groove on the Tractor PTO shaft. Push and pull the driveline back and forth several times to ensure it is securely attached. A driveline not attached correctly to the Tractor PTO shaft could come loose and result in personal injury and damage to the Implement. *(S3PT-17 str)*

**WARNING** Before operating the Implement, check to make sure the Implement input driveline will not bottom out or become disengaged. Bottoming out occurs when the inner shaft penetrates the outer housing until the assembly becomes solid-it can shorten no more. Bottoming out can cause serious damage to the Tractor PTO by pushing the PTO into the Tractor and through the support bearings or downward onto the PTO shaft, breaking it off. A broken driveline can cause personal injury. (S3PT-18 str)

**WARNING** Never unhitch without using the Tongue Jack. The Tongue is very heavy. Attempting to lift the Tongue without using the Tongue Jack could cause strains or other injury. Allowing the tongue to fall suddenly and unexpectedly could result in crushing injury. Use the Tongue Jack for lifting the Implement only. Overloading the Tongue Jack can cause failure with possible serious bodily injury or even death. (STI-04) str

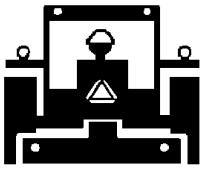
**CAUTION** On a fully assembled unit, do not remove the Wing Retaining Strap until hoses are attached to the tractor and the Wing Cylinders are filled with oil. Lower the Wings slowly and carefully. Keep bystanders away during operations. (STI-05) str

## TRANSPORTING SAFETY INSTRUCTIONS AND PRACTICES

**WARNING** Be particularly careful when transporting the Implement with the Tractor. Turn curves or go up hills only at a low speed and using a gradual steering angle. Rear mounted implements move the center of gravity to the rear and remove weight from the front wheels. Make certain, by adding front ballast, that at least 20% of the tractor's weight is on the front wheels to prevent rearing up, loss of steering control or Tractor tip-over. Slow down on rough or uneven surfaces to prevent loss of steering control which could result in property damage or possible injury. Do not transport unless 3-Point lift lever is fully raised and in the latched transport position. Dropping implement in transport can cause serious damage to the tractor and/or Implement and possibly cause the operator or others to be killed or injured. (S3PT-02)str

**WARNING** Allow sufficient clearance for the Implement to swing outward while turning. Implements carried behind the Tractor will swing outside the tire path when making turns. Contacting a solid object while turning will cause equipment damage and possible injury. (S3PT-20) str

**WARNING** Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor flashing warning lights and follow all local traffic regulations. (SG-6)str

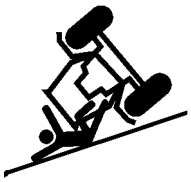


**WARNING** Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.

Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.



Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.

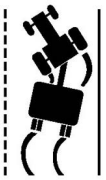
Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)str

**DANGER** Be particularly careful when transporting the Implement using the tractor. Turn curves or go up or down hills only at a low speed and at a gradual steering angle. Make certain that at least 20% of the tractor's weight is on the front wheels to maintain safe steerage. Slow down on rough or uneven surfaces. *(STI-01) str*

# SAFETY

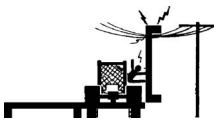
**⚠ DANGER** When the Wings are folded for transport, the center of gravity is raised and the possibility of overturn is increased. Drive slowly and use extreme caution when turning on hillsides. Overturning the Implement could cause the Implement to overturn the Tractor and vice versa resulting in serious injury or even death. Never fold wings on a hillside...the Implement or unit may overturn. *(STI-02) str*

**⚠WARNING** Only tow the Implement behind a properly sized and equipped Tractor which exceeds the weight of the Implement by at least 20%. DO NOT tow the Implement behind a truck or other type of vehicle. Never tow the Implement and another Implement connected in tandem. Never tow the Implement at speeds over 20 MPH. (STI-06)str



**⚠WARNING** Secure the Implement for transport before traveling on public roads. For pull-type Implements, secure the center axle using cylinder stops or transport pin and properly attach a safety chain between the Implement and Tractor. Secure wings in upright position on folding Implements using wing transport locks. (STI-7) str

**⚠WARNING** Always keep a careful lookout and use extreme care when working around overhead obstructions and electrical power lines. The Implement wing can be over 10 feet high. Never allow the Implement wing to come within 10 feet of any power line. (STI-8) str



**⚠WARNING** Your driving vision may be reduced or impaired by the tractor, cab, or implement. Before driving on public roadways identify any limited vision areas, and make adjustments to your operating position, mirrors, and the implement transport position so that you can clearly see the area where you will be traveling, and any traffic that may approach you. Failure to maintain adequate vision of the public roadway and traffic can result in serious injury or even death. (STI-10)

## MAINTENANCE AND SERVICE SAFETY INSTRUCTIONS AND PRACTICES

**⚠ DANGER** Make sure the PTO shield, integral driveline shields, and input shields are installed when using PTO-driven equipment. Always replace any shield if it is damaged or missing. (S3PT-8) str

**⚠WARNING** Relieve hydraulic pressure prior to doing any maintenance or repair work on the Implement. Place the Implement on the ground or securely blocked up, disengage the PTO, and turn off the tractor engine. Push and pull the Remote Cylinder lever in and out several times prior to starting any maintenance or repair work. (S3PT-09)str

**⚠ DANGER** Always disconnect the main PTO Driveline from the Tractor before performing service on the Implement. Never work on the Implement with the tractor PTO driveline connected and running. Rotating Parts, Blades or Drivelines could turn without warning and cause immediate entanglement, injury or death. (S3PT-11)str

**⚠WARNING** Keep fingers clear of adjusting holes. A sudden movement could cause injury or even amputate fingers. KEEP CHILDREN AWAY WHEN MAKING ADJUSTMENTS. (SBL-3)str

**WARNING** Always maintain the safety signs in good readable condition. If the safety signs are missing, damaged, or unreadable, obtain and install replacement safety signs immediately. (SG-5)str

**WARNING** Do not modify or alter this Implement. Do not permit anyone to modify or alter this Implement, any of its components or any Implement function. (SG-8)str

**DANGER** Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported and blocked up to prevent sudden or inadvertent falling which could cause death or serious injury. (SG-14)str

**WARNING** Never attempt to lubricate, adjust, or remove material from the Implement while it is in motion or while tractor engine is running. (SG-20)str

**WARNING** Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21 )str

**WARNING** Perform service, repairs and lubrication according to the maintenance section. Ensure the unit is properly lubricated as specified in the lubrication schedule and all bolts and nuts are properly torqued. Failure to properly service, repair and maintain this Implement in good operating condition could cause component failure and possible serious injury or even death. (SG-35str)

**WARNING** Use caution and wear protective gloves when handling sharp objects such as blades, knives, and other cutting edges. Be alert to worn component surfaces which have sharp edges. Sharp surfaces can inflict severe laceration injuries if proper hand protection is not worn. (SG-37) str

**WARNING** Cancer and Reproductive Harm www.P65Warnings.ca.gov

# SAFETY

## PARTS INFORMATION

Bush Hog products are designed utilizing specifically matched system components to ensure optimum equipment performance. These parts are made and tested to Bush Hog specifications. Non-genuine "will fit" parts do not consistently meet these specifications. The use of “will fit” parts may reduce equipment performance, void warranties, and present a safety hazard. Use genuine Bush Hog parts for economy and safety. *(SPBH-2)str*

**SEE YOUR BUSH HOG DEALER**



## Storage and Parking Safety Instructions and Practices

**⚠ DANGER** A rear Implement can fall if not properly supported. Always use the stand on the front hitch (if equipped) or block up securely to prevent falling and possible crushing injury and/or other injury from holding or lifting heavy components. Use the stand to stabilize the implement during storage. (S3PT-3) str

**⚠ CAUTION** To prevent tipping of Implement when stored in folded position, use carrying wheels or adequate stands on center frame. (S3PT-6) str

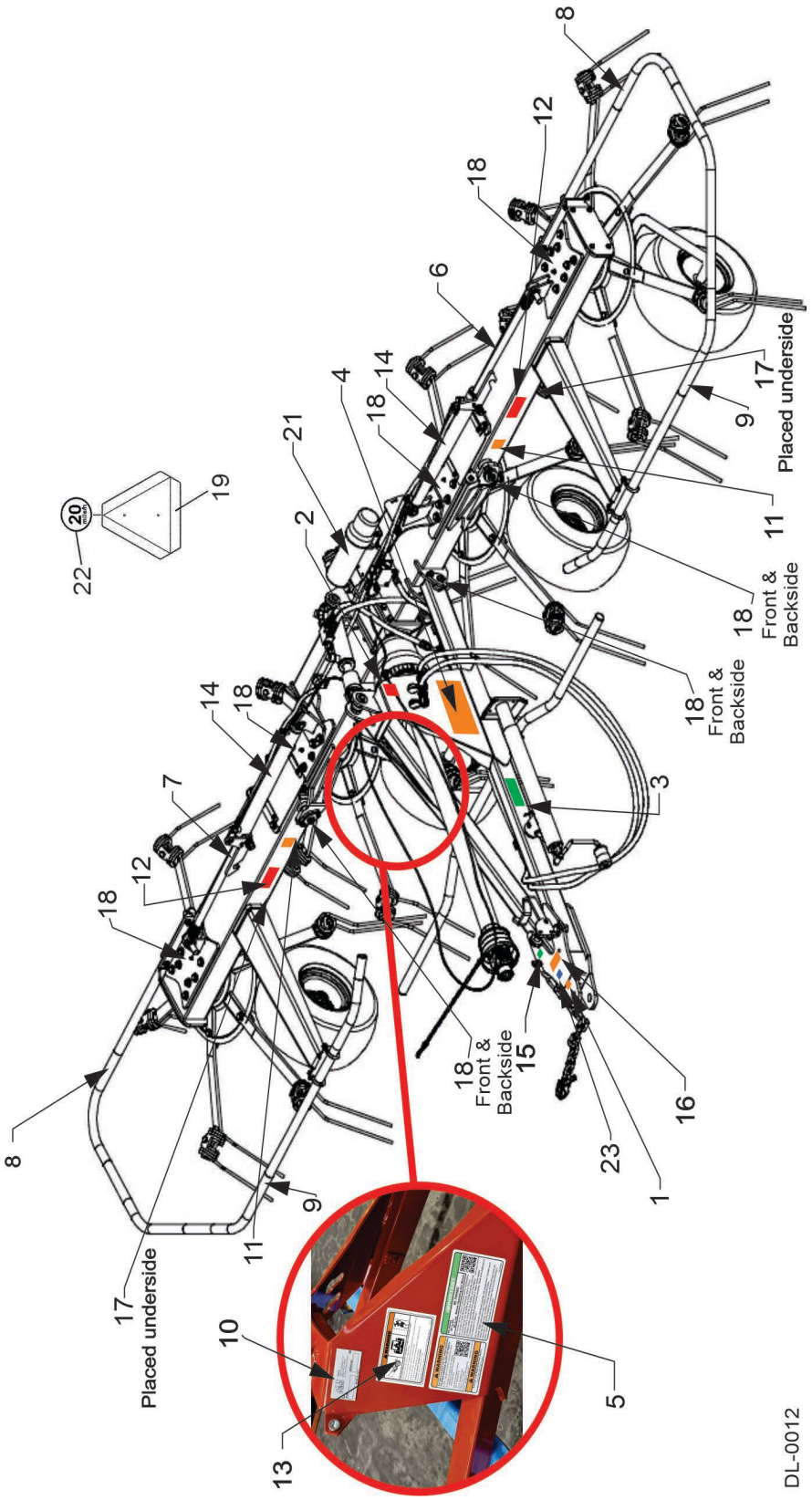
## Concluding Safety Instructions and Practices

In addition to the design and configuration of this Implement, including Safety Signs and Safety 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 the machine. Refer also to Safety Messages and operation instruction in each of the appropriate sections of the Tractor and Equipment Manuals. Pay close attention to the Safety Signs affixed to the Tractor and Equipment. (SG-18)str

## DECAL LOCATION

***NOTE:*** *Bush Hog supplies safety decals on this product to promote safe operation. Damage to the decals may occur while in shipping, use, or reconditioning. Bush Hog cares about the safety of its customers, operators, and bystanders, and will replace the safety decals on this product in the field, free of charge. Contact your Bush Hog dealer to order replacement decals.*

# SAFETY



| ITEM | PART NO. | QTY | TYPE | DESCRIPTION |
|---|---|---|---|---|
| 1. | 999001 | 1 | WARNING | Maintain Weight for Steerage |
| 2. | 00725746 | 1 | PELIGRO | Spanish - Get Translation |
| 3. | 00763977 | 1 | IMPORTANT | Notice to Owner |
| 4. | 999200 | 1 | WARNING | Multi-Hazard |
| 5. | D559 | 1 | WARNING | Use Genuine Bush Hog Parts |
| 6. | 50083391 | 1 | LOGO | Bush Hog |
| 7. | 50085591 | 1 | NAME | HTX417 Model |
| | 50085592 | 1 | NAME | HTX419 Model |
| 8. | 2738332 | 2 | REFLECT | Red Reflector |
| 9. | 2738333 | 2 | REFLECT | Yellow Reflector |
| 10. | NFS | 1 | SERIAL PLT | Serial Number Plate |
| 11. | D623 | 2 | WARNING | Pinch Points |
| 12. | 3678303 | 2 | DANGER | Keep Clear of Rotor |
| 13. | D910 | 1 | WARNING | Towing Hazard |
| 14. | D1160 | 2 | WARNING | Leak Detection |
| 15. | D544 | 1 | IMPORTANT | Transport Latch |
| 16. | D635 | 1 | WARNING | 540 RPM |
| 17. | D555 | 2 | DANGER | Crushing Hazard |
| 18. | 001.075 | 10 | INSTRUCT | Label, Grease |
| 19. | 94359 | 1 | REFLECT | SMV |
| 20. | 50085599 | 1 | --- | Operator’s Manual |
| 21. | 50035829 | 1 | --- | Canister, Operator’s manual |
| 22. | 50082007 | 1 | IMPORTANT | 20 MPH Speed |
| 23. | D1085 | 1 | NOTICE | Park on Level Ground<br>Max 10% Ground Slope |

## DECAL DESCRIPTION

**WARNING**

**To avoid serious injury or machine damage:**

- ALWAYS MAINTAIN 20% of tractor weight on front wheels. Add weight to front if needed.
- REDUCE SPEED on inclines, in turns and in poor weather conditions.
- DO NOT lift implement while on steep slopes.
- DO NOT start or accelerate suddenly.

999001

**PELIGRO**

**LEA EL INSTRUCTIVO**

Si No Lee Ingles, Pida Ayuda a Alguien Que Si Lo Lea Para Que le Traduzca las Medidas de Seguridad.

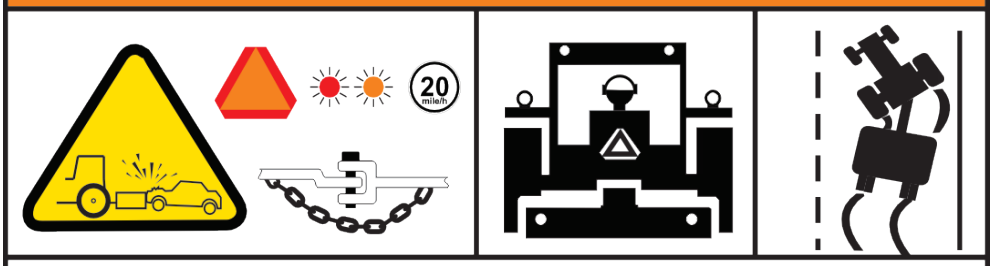
00725746

**WARNING**

**AVOID PINCH POINTS THAT CAN RESULT IN SERIOUS INJURY**

D623

**WARNING**




**TO AVOID DEATH OR SERIOUS INJURY WHEN TOWING EQUIPMENT:**

- DO NOT TOW with trucks or other vehicles.
- ONLY transport with properly sized and equipped tractor. (see Operator's Manual)
- ATTACH implement SAFETY CHAIN to tractor.
- CHECK SMV sign, reflectors and warning lights for visibility behind unit.
- TURN ON tractor flashing warning lights.

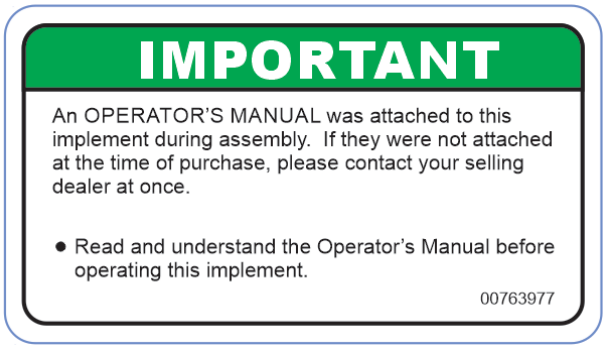
**TO AVOID LOSS OF TOWING CONTROL:**

- DO NOT tow at speeds over 20 mph.
- REDUCE SPEED on inclines, in turns and in poor towing conditions.

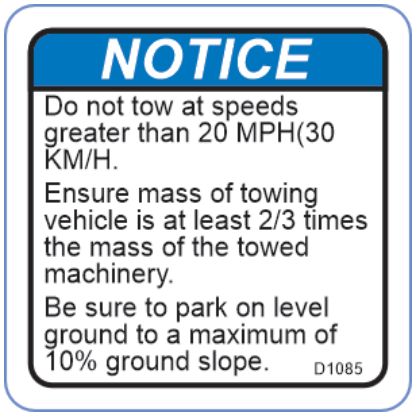
D910

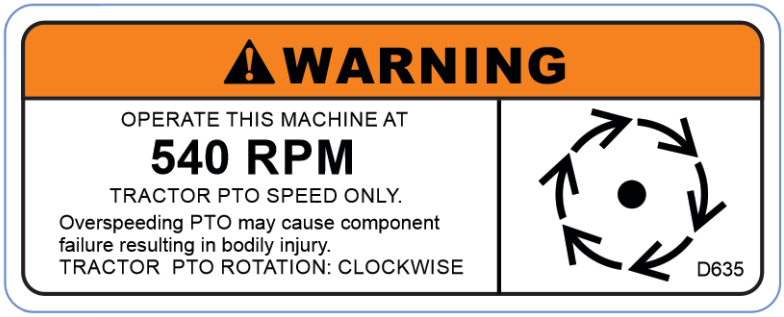






# SAFETY

## FEDERAL LAWS AND REGULATIONS

This section is intended to explain in broad terms the concept and effect of federal laws and regulations concerning employer and employee equipment operators. This section is not intended as a legal interpretation of the law and should not be considered as such.

**Employer-Employee Operator Regulations**

U.S. Public Law 91-596 (The Williams-Steiger Occupational and Health Act of 1970) OSHA

**This Act Seeks:**

"...to assure so far as possible every working man and woman in the nation safe and healthful working conditions and to preserve our human resources..."

DUTIES

Sec. 5 (a) Each employer-

(1) shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees;

(2) shall comply with occupational safety and health standards promulgated under this Act.

(b) Each employee shall comply with occupational safety and health standards and all rules, regulations and orders issued pursuant to this Act which are applicable to his own actions and conduct.

**OSHA Training Requirements**

***Title 29, Code of Federal Regulations Part 1928.57(a)(6).*** **www.osha.gov**

Operator instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee who operates an agricultural tractor and implements in the safe operating practices and servicing of equipment with which they are or will be involved, and of any other practices dictated by the work environment.

Keep all guards in place when the machine is in operation.

Permit no riders on equipment.

Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment.

Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

**Employer Responsibilities:**

To ensure employee safety during Tractor and Implement operation, it is the employer's responsibility to:

1. Train the employee in the proper and safe operation of the Tractor and Implement.
2. Require that the employee read and fully understand the Tractor and Implement Operator's Manual.
3. Permit only qualified and properly trained employees to operate the Tractor and Implement.
4. Maintain the Tractor and Implement in a safe operational condition and maintain all shields and guards on the equipment.
5. Ensure the Tractor is equipped with a functional ROPS and seat belt and require that the employee operator securely fasten the safety belt and operate with the ROPS in the raised position at all times.
6. Forbid the employee operator to carry additional riders on the Tractor or Implement.
7. Provide the required tools to maintain the Tractor and Implement in a good safe working condition and provide the necessary support devices to secure the equipment safely while performing repairs and service.
8. Require that the employee operator stop operation if bystanders or passersby come within 300 feet.

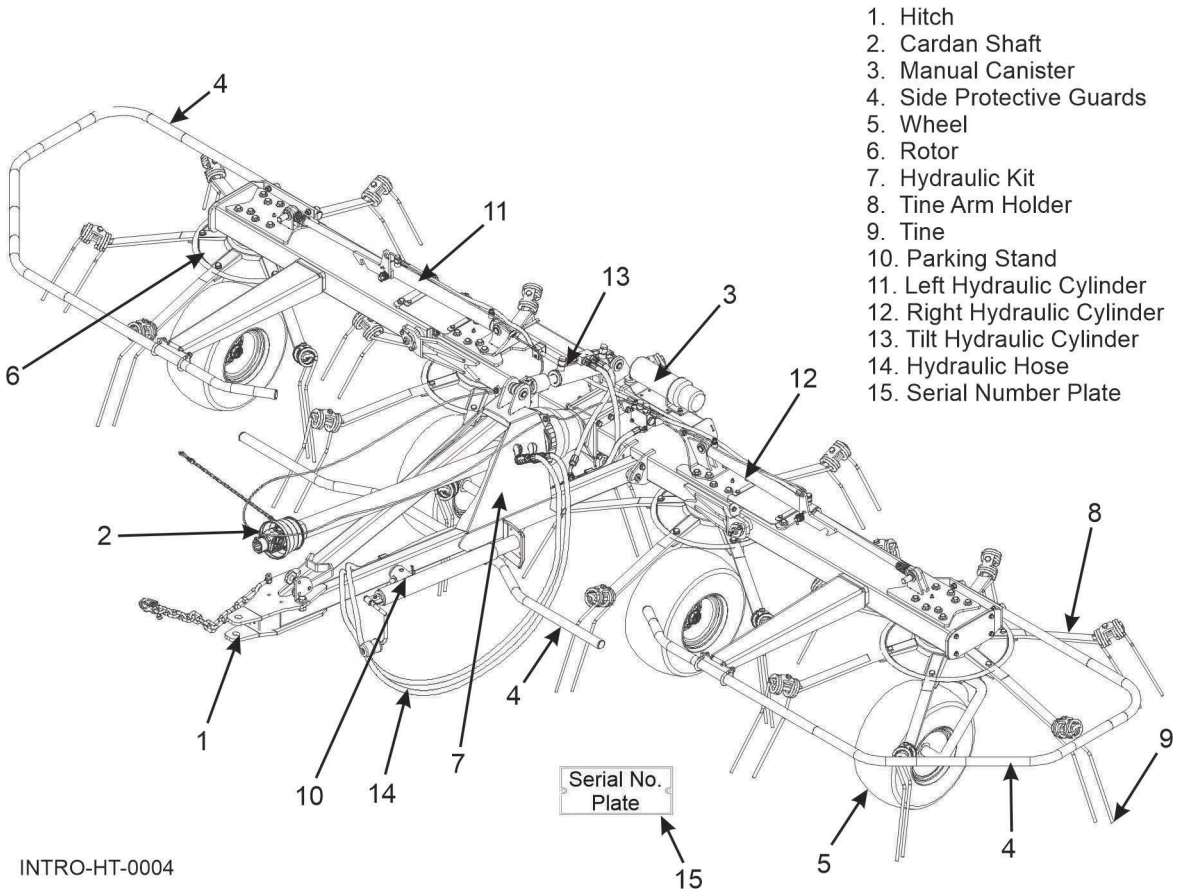
**Child Labor Under 16 Years of Age**

Some regulations specify that no one under the age of 16 may operate power machinery. It is your responsibility to know what these regulations are in your own area or situation. (Refer to U.S. Dept. of Labor, Employment Standard Administration, Wage & Home Division, Child Labor Bulletin #102.)

# INTRODUCTION SECTION

# INTRODUCTION

## PRODUCT IDENTIFICATION




| SPECIFICATION | HTX417 | HTX419 |
|---|---|---|
| **Number of Rotors** | 4 | 4 |
| **Tine Arms per Rotor** | 6 | 6 |
| **Working Width** | 17’ (5.20m) | 19’ (5.80m) |
| **Transport Width** | 9’-8” (3.m) | 9’-8” (3.m) |
| **Transport Height** | 8’-2” (2.5.m) | 8’-9” (2.7.m) |
| **Weight** | 1235 lbs (560 kg) | 1279 lbs (580 kg) |
| **Tire Size** | 18 x 8, 5-8 | 18 x 8, 5-8 |
| **Power Required** | 30 HP (22 kw) | 30 HP (22 kw) |
| **Rotor Rotation Speed** | 188 RPM | 161 RPM |
| **PTO Rotation Speed** | 540 RPM | 540 RPM |
| **Working Forward Speed** | 5-10 mph (8-16 km/h) | 5-10 mph (8-16 km/h) |
| **Tire Pressure** | 49 lbs. (3.2 bar) | 49 lbs. (3.2 bar) |

# INTRODUCTION

The HTX417/HTX419 Hay Tedder operates exclusively through a PTO shaft connected to the tractor's power take-off and requires a tractor equipped with a tow bar and double-acting hydraulic system, necessary to operate the simultaneous movements of the side frames and the tilt function of the drawbar.

This HTX417/HTX419 Hay Tedder is designed with care and built with quality materials by skilled workers. Proper assembly, maintenance, and operating practices, as described in this manual, will help the owner/operator get years of satisfactory service from the machine.

The purpose of this manual is to familiarize, instruct, and train. The Assembly Section instructs the owner/operator in the correct assembly of the tedder using standard and optional equipment.

Careful use and timely service saves extensive repairs and costly down time losses. The Operation and Maintenance sections of the manual trains the owner/operator how to work the tedder correctly and attend to appropriate maintenance.



# INTRODUCTION

## ATTENTION OWNER/OPERATOR

BEFORE OPERATING THIS MACHINE:

1. Carefully read the Operator's Manual, completely understand the Safety Messages and instructions, and know how to operate correctly both the tractor and implement.
2. Fill out the Warranty Card in full. Be sure to answer all questions, including the Serial Number of the implement. Mail within 30 days of delivery date of this implement.

**NOTE:** *Warranties are honored only if completed "Owner Registration and Warranty" forms are received by Bush Hog within thirty days of delivery of the implement.*

3. Record the Model and Serial Numbers on the Warranty page at the front of the Operator's Manual. Keep this as part of the permanent maintenance file for the implement.


# INTRODUCTION

## BUSH HOG LIMITED WARRANTY

**1. LIMITED WARRANTIES.**

1.01. Bush Hog warrants for one year from the purchase date to the original non-commercial, governmental, or municipal purchaser ("Purchaser") and warrants for six months to the original commercial or industrial purchaser ("Purchaser") that the goods purchased are free from defects in material or workmanship.

1.02. Manufacturer will replace for the Purchaser any part or parts found, upon examination at one of its factories, to be defective under normal use and service due to defects in material or workmanship.

1.03. This limited warranty does not apply to any part of the goods which has been subjected to improper or abnormal use, negligence, alteration, modification, or accident, damaged due to lack of maintenance or use of wrong fuel, oil, or lubricants, or which has served its normal life. This limited warranty does not apply to any part of any internal combustion engine, or expendable items such as blades, shields, guards, or pneumatic tires except as specifically found in your Operator's Manual.

1.04. Except as provided herein, no employee, agent, Dealer, or other person is authorized to give any warranties of any nature on behalf of Manufacturer.

**2. REMEDIES AND PROCEDURES.**

2.01. This limited warranty is not effective unless the Purchaser returns the Registration and Warranty Form to Manufacturer within 30 days of purchase.

2.02. Purchaser claims must be made in writing to the Authorized Dealer ("Dealer") from whom Purchaser purchased the goods or an approved Authorized Dealer ("Dealer") within 30 days after Purchaser learns of the facts on which the claim is based.

2.03. Purchaser is responsible for returning the goods in question to the Dealer.

2.04. If after examining the goods and/or parts in question, Manufacturer finds them to be defective under normal use and service due to defects in material or workmanship, Manufacturer will:

(a) Repair or replace the defective goods or part(s) or

(b) Reimburse Purchaser for the cost of the part(s) and reasonable labor charges (as determined by Manufacturer) if Purchaser paid for the repair and/or replacement prior to the final determination of applicability of the warranty by Manufacturer.

The choice of remedy shall belong to Manufacturer.

2.05. Purchaser is responsible for any labor charges exceeding a reasonable amount as determined by Manufacturer and for returning the goods to the Dealer, whether or not the claim is approved. Purchaser is responsible for the transportation cost for the goods or part(s) from the Dealer to the designated factory.

**3. LIMITATION OF LIABILITY.**

3.01. MANUFACTURER DISCLAIMS ANY EXPRESS (EXCEPT AS SET FORTH HEREIN) AND IMPLIED WARRANTIES WITH RESPECT TO THE GOODS INCLUDING, BUT NOT LIMITED TO, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

3.02. MANUFACTURER MAKES NO WARRANTY AS TO THE DESIGN, CAPABILITY, CAPACITY, OR SUITABILITY FOR USE OF THE GOODS.

3.03. EXCEPT AS PROVIDED HEREIN, MANUFACTURER SHALL HAVE NO LIABILITY OR RESPONSIBILITY TO PURCHASER OR ANY OTHER PERSON OR ENTITY WITH RESPECT TO ANY LIABILITY, LOSS, OR DAMAGE CAUSED OR ALLEGED TO BE CAUSED DIRECTLY OR INDIRECTLY BY THE GOODS INCLUDING, BUT NOT LIMITED TO, ANY INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES RESULTING FROM THE USE OR OPERATION OF THE GOODS OR ANY BREACH OF THIS WARRANTY. NOT WITHSTANDING THE ABOVE LIMITATIONS AND WARRANTIES, MANUFACTURER'S LIABILITY HEREUNDER FOR DAMAGES INCURRED BY PURCHASER OR OTHERS SHALL NOT EXCEED THE PRICE OF THE GOODS.

3.04. NO ACTION ARISING OUT OF ANY CLAIMED BREACH OF THIS WARRANTY OR TRANSACTIONS UNDER THIS WARRANTY MAY BE BROUGHT MORE THAN TWO (2) YEARS AFTER THE CAUSE OF ACTION HAS OCCURRED.

**4. MISCELLANEOUS.**

4.01. Proper Venue for any lawsuits arising from or related to this limited warranty shall be only in Guadalupe County, Texas.

4.02. Manufacturer may waive compliance with any of the terms of this limited warranty, but no waiver of any terms shall be deemed to be a waiver of any other term.

4.03. If any provision of this limited warranty shall violate any applicable law and is held to be unenforceable, then the invalidity of such provision shall not invalidate any other provisions herein.

4.04. Applicable law may provide rights and benefits to purchaser in addition to those provided herein.

**KEEP FOR YOUR RECORDS**

ATTENTION: Purchaser should fill in the blanks below for his reference when buying repair parts and/or for proper machine identification when applying for warranty.

Bush Hog Model _____ Serial Number _____

Date Purchased _____ Dealer _____

ATTENTION: READ YOUR OPERATOR'S MANUAL

BUSH HOG®
2501 Griffin Ave.
Selma, AL. 36703
www.bushhog.com

BUSH HOG®

# ASSEMBLY SECTION

# ASSEMBLY

## DELIVERY AND ASSEMBLY

### Checking the Machine on Delivery

All parts are carefully checked before dispatch or delivery.

On receiving the machine, ensure that it has not been damaged during transport. If damage has occurred, contact the dealer concerned.

Details of packing are given below.

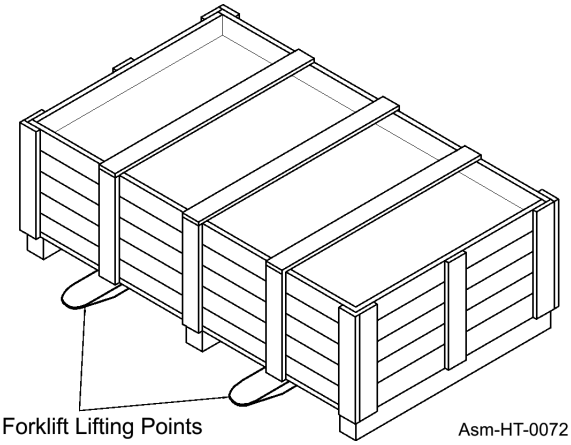
**⚠WARNING** Use caution and wear protective gloves when handling sharp objects such as blades, knives, and other cutting edges. Be alert to worn component surfaces which have sharp edges. Sharp surfaces can inflict severe laceration injuries if proper hand protection is not worn. (SG-37) str

**⚠ CAUTION** Make sure the area around the machine is clear before lowering the wings. Do not lower the tedder wings when people or pets are near the rotary tedder or folding mechanism. The tedder must be attached to the tractor when the wings are folded.

**⚠ DANGER** Never work under the Implement, the framework, or any lifted component unless the Implement is securely supported and blocked up to prevent sudden or inadvertent falling which could cause death or serious injury. (SG-14)str

### Unpacking the Machine

- Lift the machine using a forklift truck, crane or other suitable equipment of sufficient capacity after first checking the weight of the configurations in the table given below.
- Check the stability and positioning of the load on the forklift truck forks or crane hook.
- Keep the load as low as possible during movement for maximum stability and to ensure that the operator has maximum visibility.
- If a forklift truck is used, ensure that the forks are positioned as wide apart as possible.



Forklift Lifting Points Asm-HT-0072

| MACHINE | PACKING WEIGHT | MACHINE WEIGHT |
|---|---|---|
| HTX417 | 1433 lbs/650kg | 1234lbs/560 kg |
| HTX419 | 1499 lbs/680 kg | 1278lbs/580 kg |

# ASSEMBLY

***NOTE:***

1. The packing consists mainly of wood, which should be disposed of according to the laws in force in the country where the machine is used. The plastic film should also be disposed of according to the laws in force in the country where the machine is used.
2. When storing, it is permissible to stack 2-3 crates on top of each other. Make sure that they are perfectly aligned.
3. In the event of further transport, ensure that the machine went on the transporting vehicle.



## GENERAL ASSEMBLY

Assembly is highly dangerous and must be carried out in strict accordance with the following instructions. We recommend that qualified personnel perform assembly. It is highly recommended that assembly be carried out in a flat, solid surface, open area with no people (particularly children) nearby who could be severely be injured if they were to touch or move any parts of the machine.

When assembling the implement provide suitable lifting mechanisms and supports to stabilize the partially assembled implements. This will prevent them from falling and causing damage to the implement or serious injury. The steps for assembly are illustrated in the following pages. Depending on the experience of the assemblers and the tools available, it is not necessary that the instructions be followed in the exact order given here, but the safety precautions described above must always be followed carefully and scrupulously.

**⚠ CAUTION** Make sure the area around the machine is clear before lowering the wings. Do not lower the tedder wings when people or pets are near the rotary tedder or folding mechanism. The tedder must be attached to the tractor when the wings are folded.

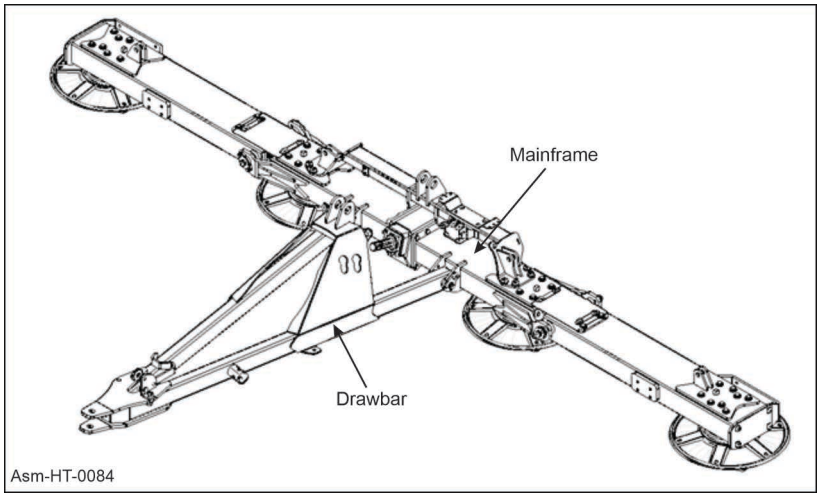
**⚠WARNING** Always use safety stands or blocking in conjunction with hydraulic jacks or joists. Do not rely on the jack or joist to carry the load. They could fail.

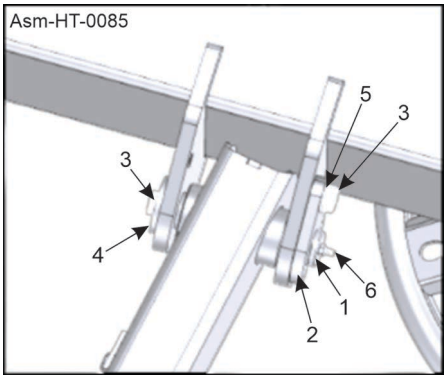
## ASSEMBLY

The assembly instructions illustrate each procedure only once, even when it must be performed on both sides of the machine.

### Drawbar Assembly to Mainframe

**Step A** - Align the drawbar with the mainframe and insert the pin ø25 (1), complete with flanges ø25 (2), into the designated supports. Secure each pin using the screws TE M10x20 (3) and washers ø40 (4) and ø21 (5) as shown in the figure. Install the grease fitting M6 (6) and lubricate the pin before use.

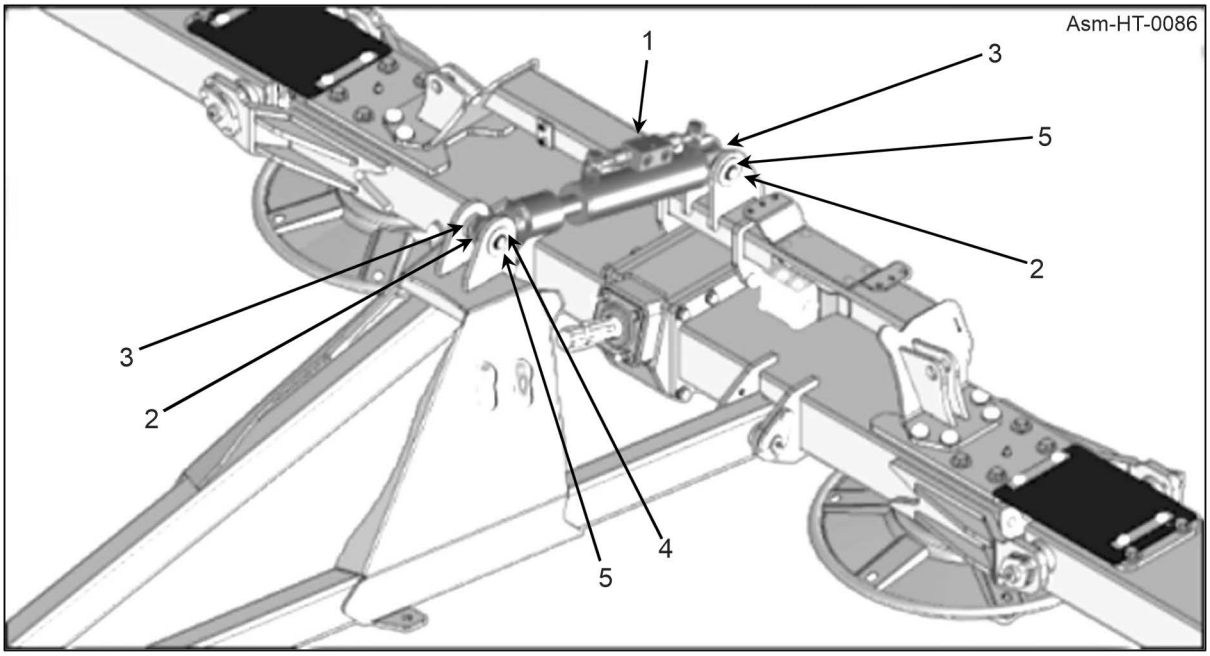


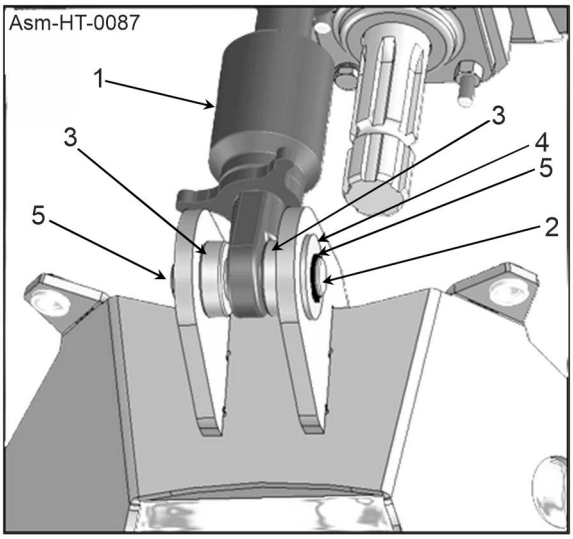




Procedure applied to both sides of unit.

## Tilt Hydraulic Cylinder Assembly

**Step B** - Position the hydraulic cylinder (1) between the supports on the frame and the drawbar, aligning the mounting holes. Insert the ø20 pins (2), complete with reduction bushings (3). Secure each pin with the ø45 washers (4) and Seeger rings (5) as shown in the figure, Ensure that the cylinder can pivot freely on its joints without play or interference.

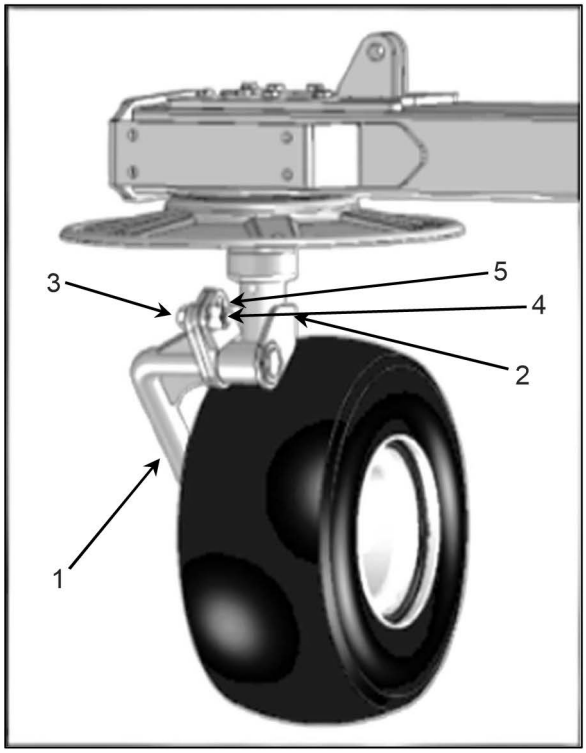


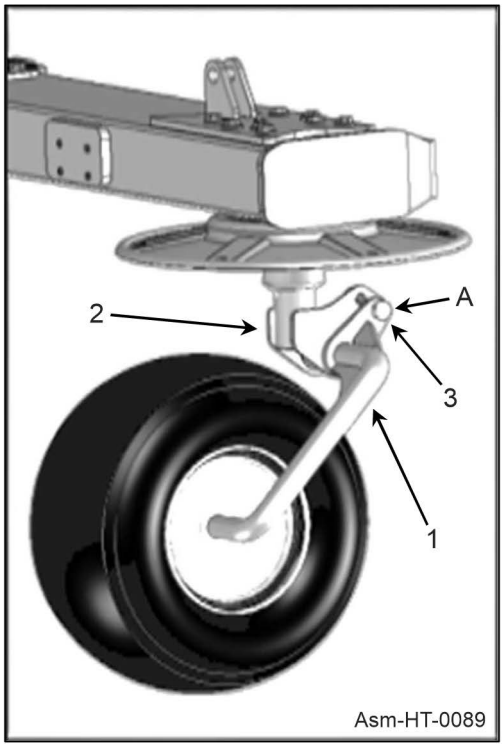



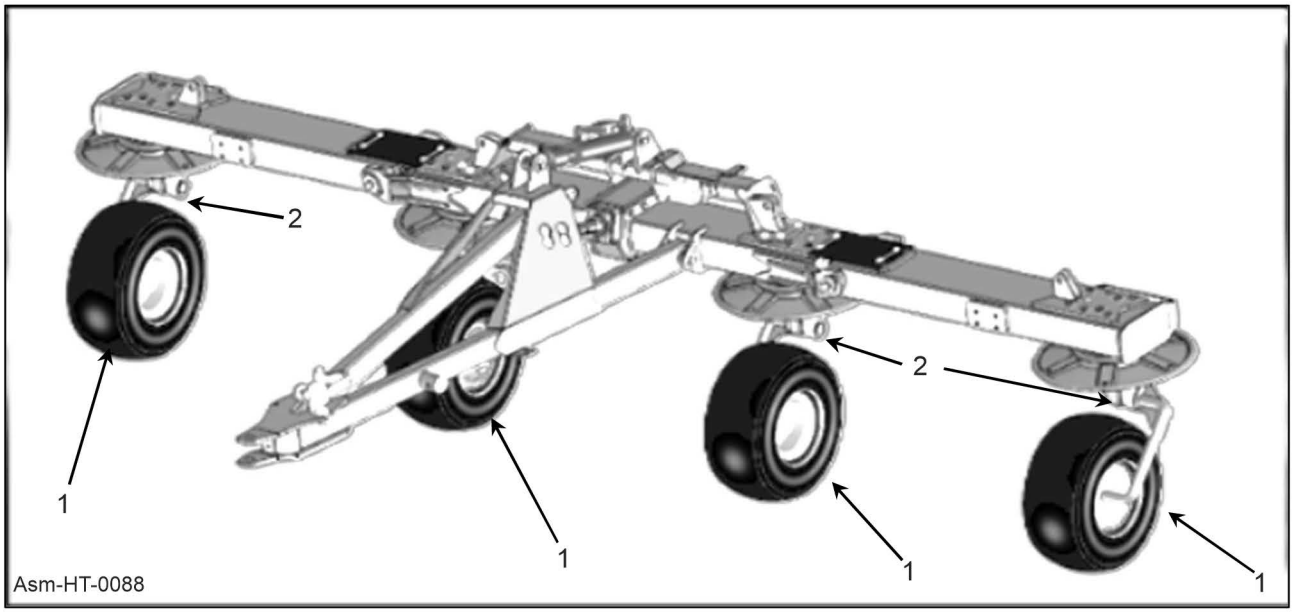
## Wheel Axle Assembly

**Step C** - Insert the wheel axles (1) complete with wheel (2), into the corresponding frame supports. Secure each axle using m16x50 bolts (3), ø30 washers (4), and M16 self-locking nuts (5).

The machine can be set to two different inclination positions. It is recommended to start by using the lower hole (A), as shown in figure.



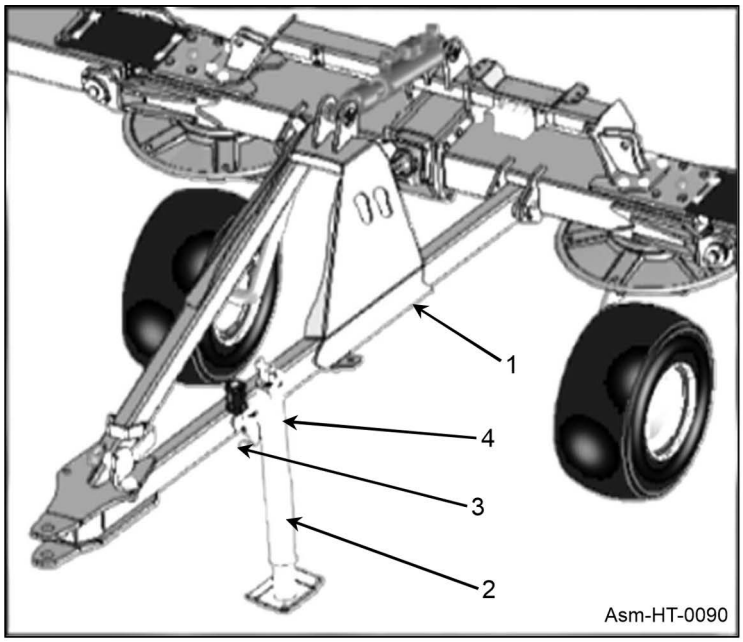



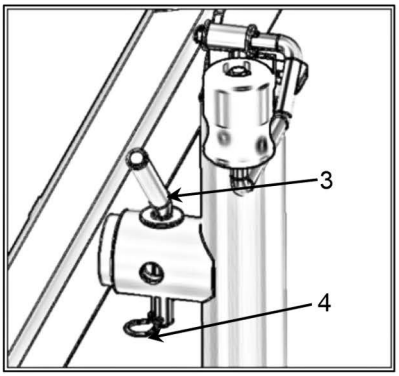
# ASSEMBLY

## Installation of Parking Stand

**Step C.2** - Raise the drawbar (1) until it reaches a horizontal position. Insert the parking stand (2) into its bracket on the drawbar and secure it with the ø15 handle pin (3) and the spring cotter (4).

Check that the stand is stable and moves freely to allow proper height adjustment.



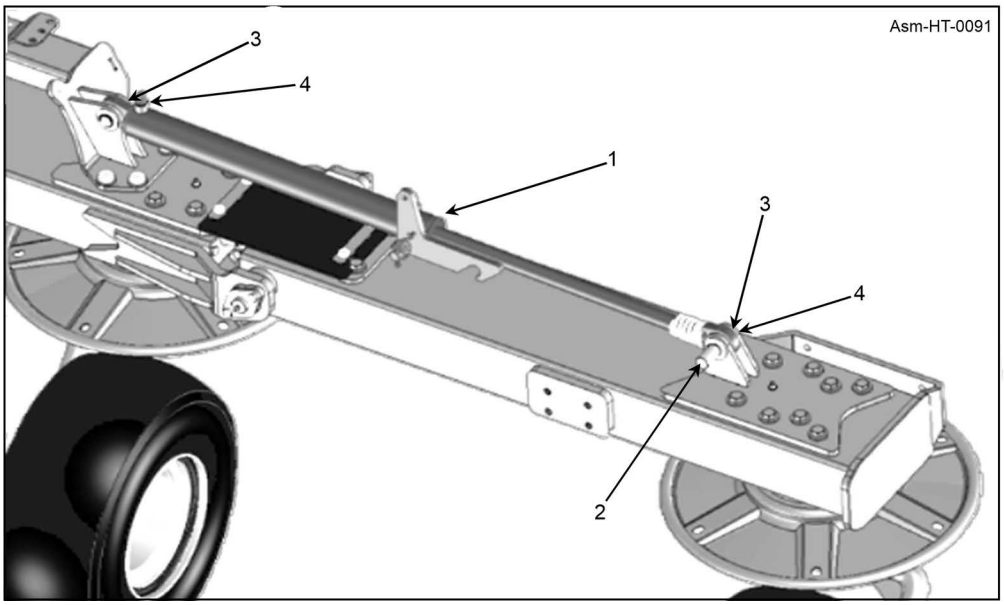




## Installation of the Lateral Hydraulic Cylinders

**Step D** - Install the left-hand and right-hand hydraulic cylinders (1) by securing the piston side with the ø20x50 mm pin (2), ø37 washers (3) and ø20 Seeger rings (4).

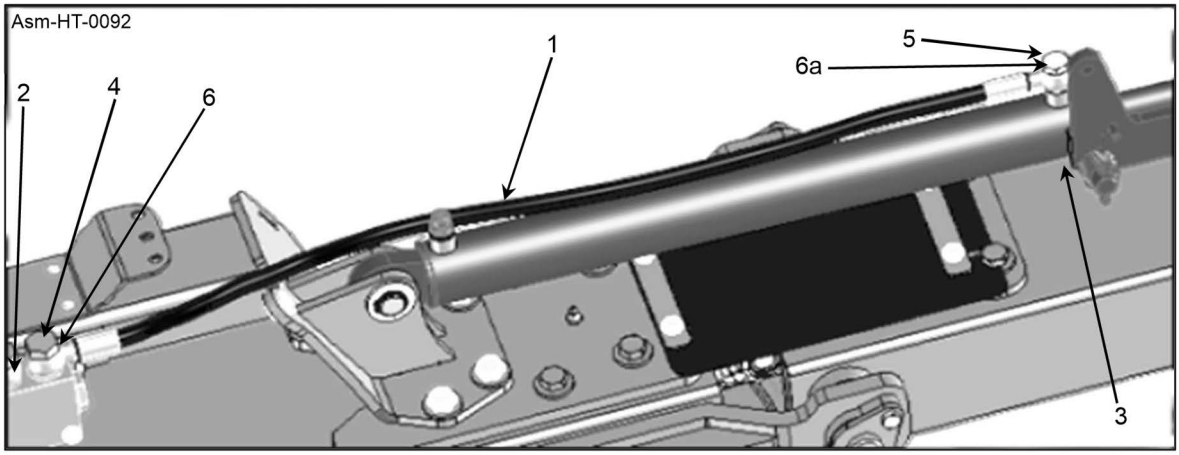
Secure the rod side using the ø20x84 mm pin (5), ø37 washers (3) and ø20 Seeger rings (4).

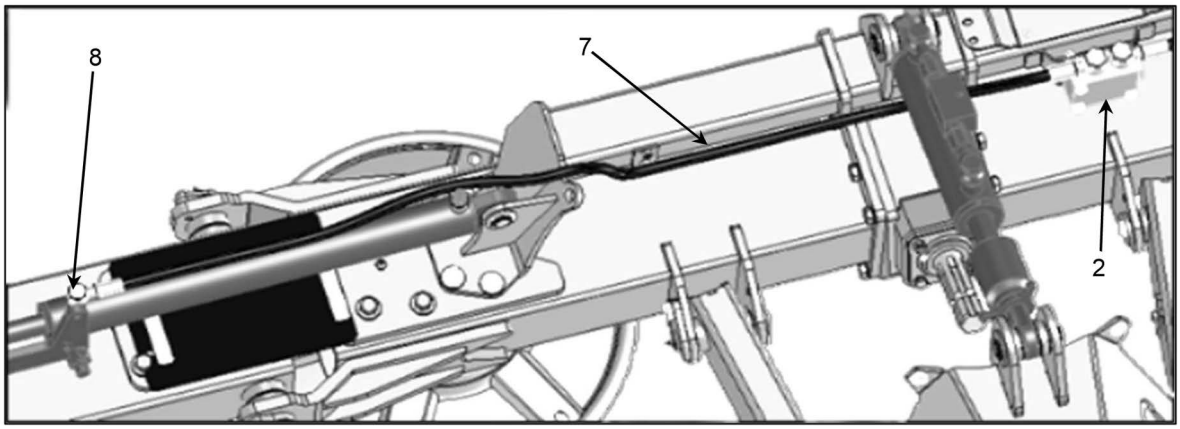
Repeat the procedure symmetrically on the opposite side of the machine.

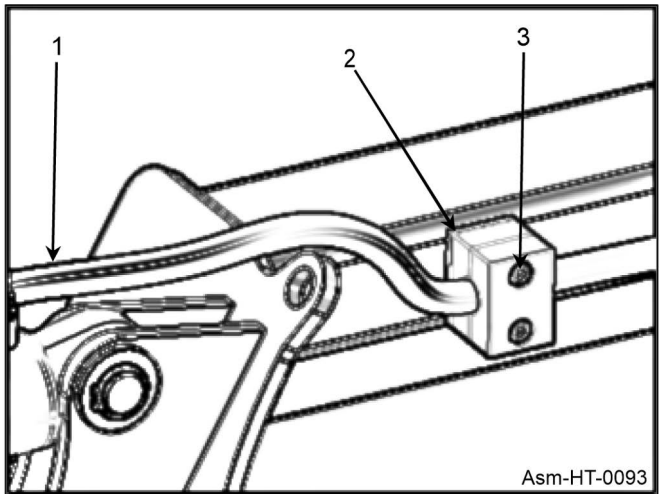


## Connection of Hydraulic Hoses too the Lateral Cylinders

**Step E** - Install the 2.5' (785 mm) hydraulic hose (1) between the flow-divider valve (2) and the left cylinder (3), using the 3/8" GAS banjo bolt (4) and the 1/4" GAS banjo bolt (5), each complete with bonded washers (6), and (6A). Install the 4' (1250 mm) hydraulic hose (7) between the flow-divider valve (2) and the right cylinder (8) following the same fastening procedure.




## Fastening of the Right-Hand Hydraulic Hose

**Step E2** - Secure the hydraulic hose (1) to the right side of the frame using the single clamp (2) and the M6x25 socket-head screws (3) as shown in the figure.

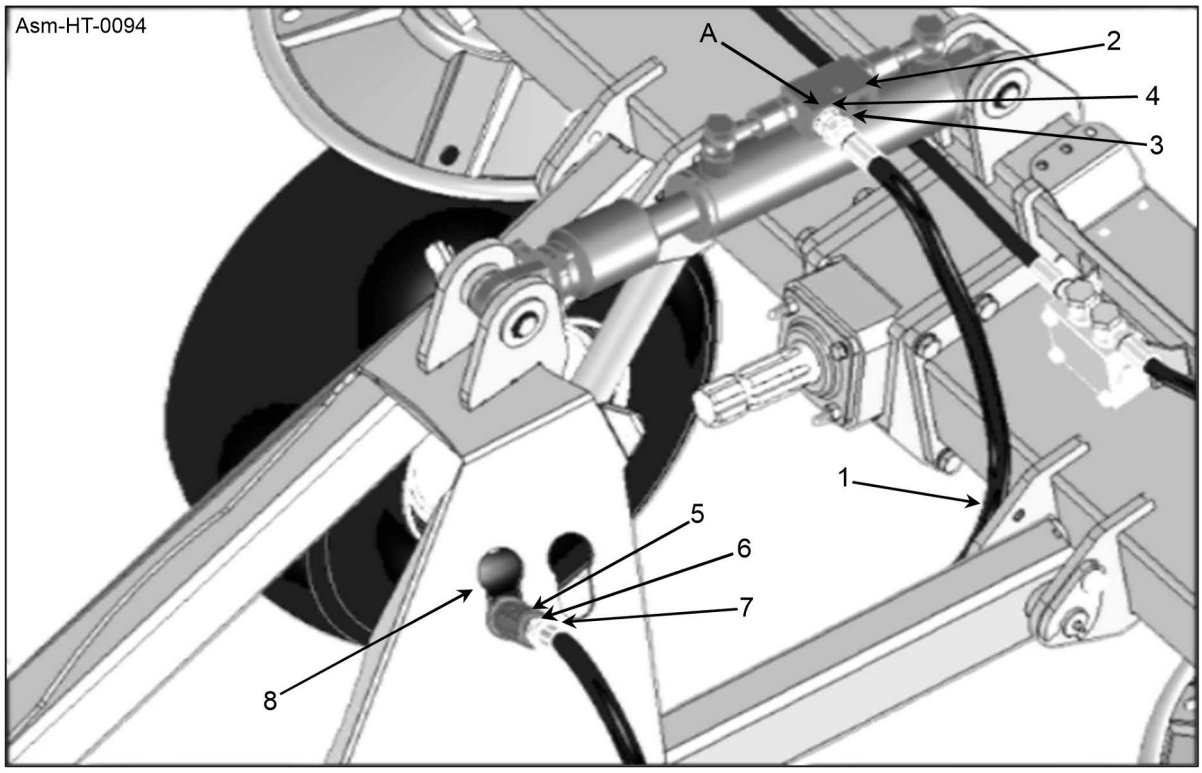
Ensure that the hose is not under tension and does not interfere with any moving parts.

## Connection of Tilt Cylinder Hydraulic Hose

**Step E3** - Connect the 11.5’ (3500 mm) hydraulic hose (1) to the tilt-cylinder lock valve (2) at position A using the 38” GAS nipple (3) and the 3/8” bonded washer (4)l

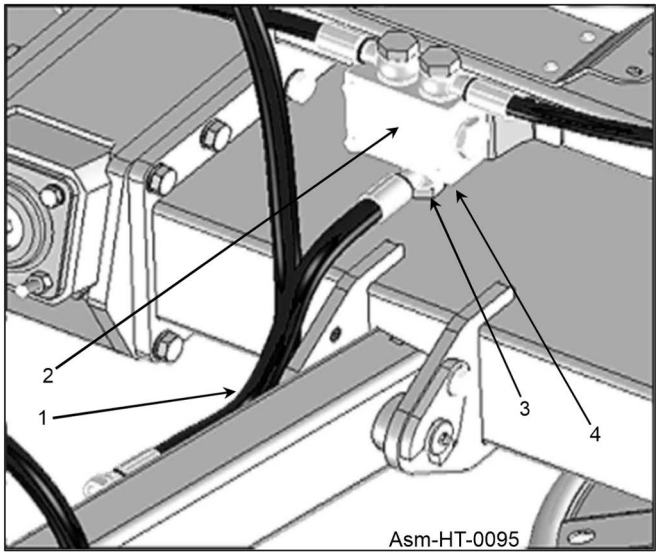
Install the 1/2” quick coupler (5) on the free end of the hose using the 1/2”-3/8” reducing nipple (6) and the 1/2” bonded washer (7).

Once the assembly is complete, place the hose end equipped with the quick coupler in its designated storage position (8).




## Connection of the Hydraulic Hose to the Lower Port of the Flow-Divider Valve

**Step E4** - Connect the 15-1/2” (400 mm) hydraulic hose (1) to the lower port of the flow-divider valve (2) using the 3/8” GAS banjo bolt (3) and two 3/8” bonded washers (4) as shown in figure.

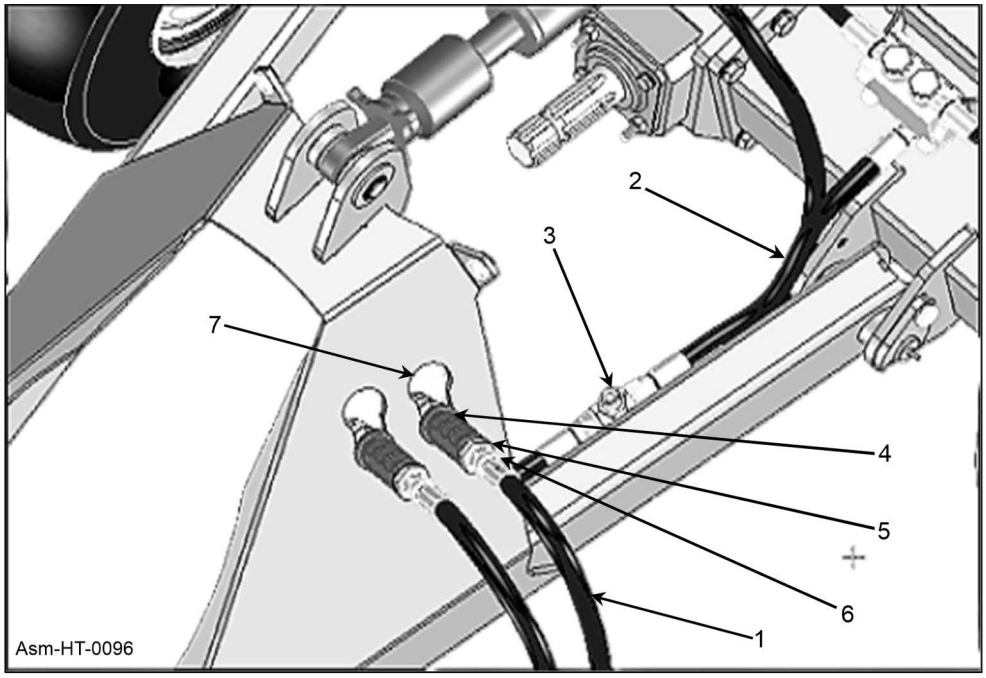


## Connection of the Main Supply Hose

**Step E5** - Connect the 10’ (3000 mm) hydraulic hose (1) to the 15-1/2” (400 mm) hose (2) installed in **STEP E4** using the 3/8” male T-fitting (3).

Install the 1/2” quick-coupler (4) on the opposite end of the hose using the 1/2”-3/8” reduction nipple (5) and the 1/2” bonded washer (6).

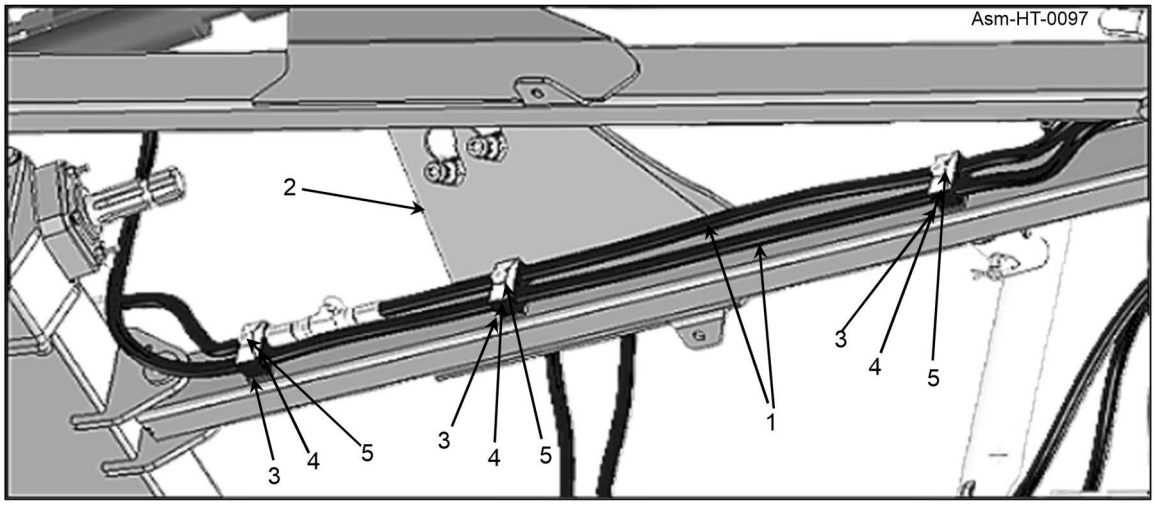
Place the hose end with the quick-coupler into its designated storage position (7).




## Securing the Hydraulic Hoses on the Drawbar

**Step E6** - Securing the hydraulic hoses (1) on the inner side of the drawbar (2) using the double clamps (3), upper plates (4), and M8x35 screws (5) as shown.

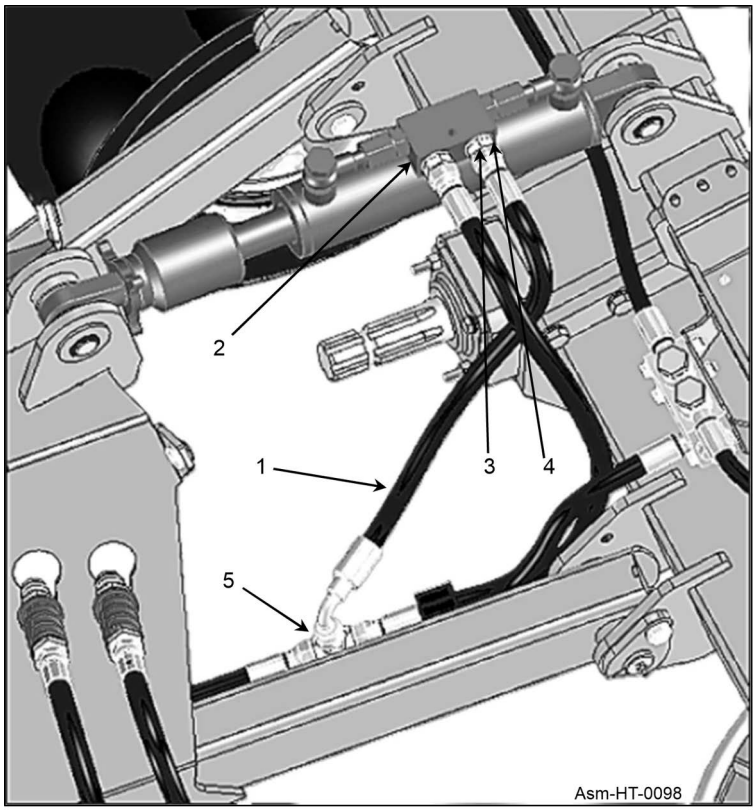
Check that the hoses are firmly fastened and do not interfere with any moving parts of the drawbar.



## Connection of the Hose between the Lock Valve and the “T” Fitting

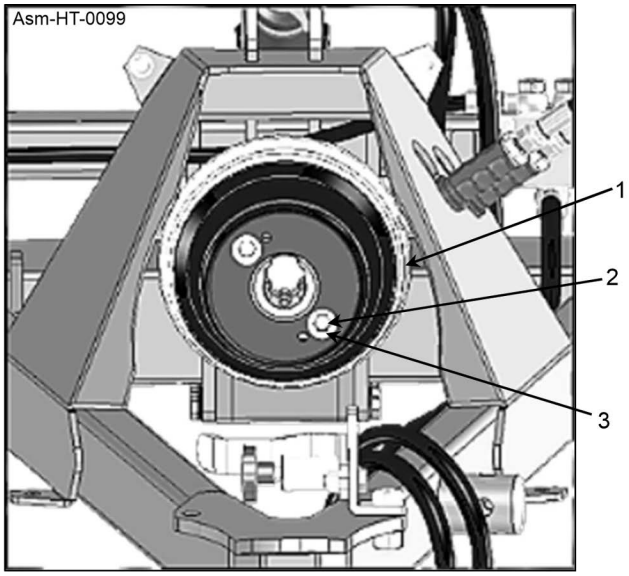
**Step E7** - Connect the 2’ hydraulic hose (1) to the tilt-cylinder lock valve (2) using a 3/8” GAS nipple with flow reduction calibrated hole (3) and a 3/8” bonded washer (4).

Connect the opposite end of the hose to the 3/8” male “T” fitting (5) as shown.



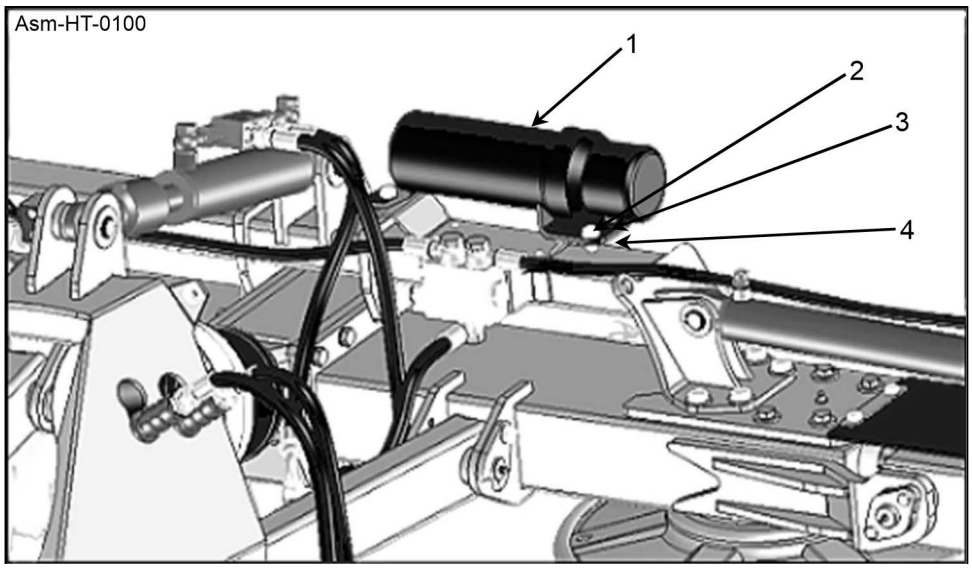

## PTO Guard Installation

**Step F** - Install the PTO guard (1) onto the front support of the frame using the ø24 washers (2) and M8 nuts (3) as shown in the figure. Ensure that the guard is properly centered and free to move without interfering with the PTO shaft.



## Document Holder Installation

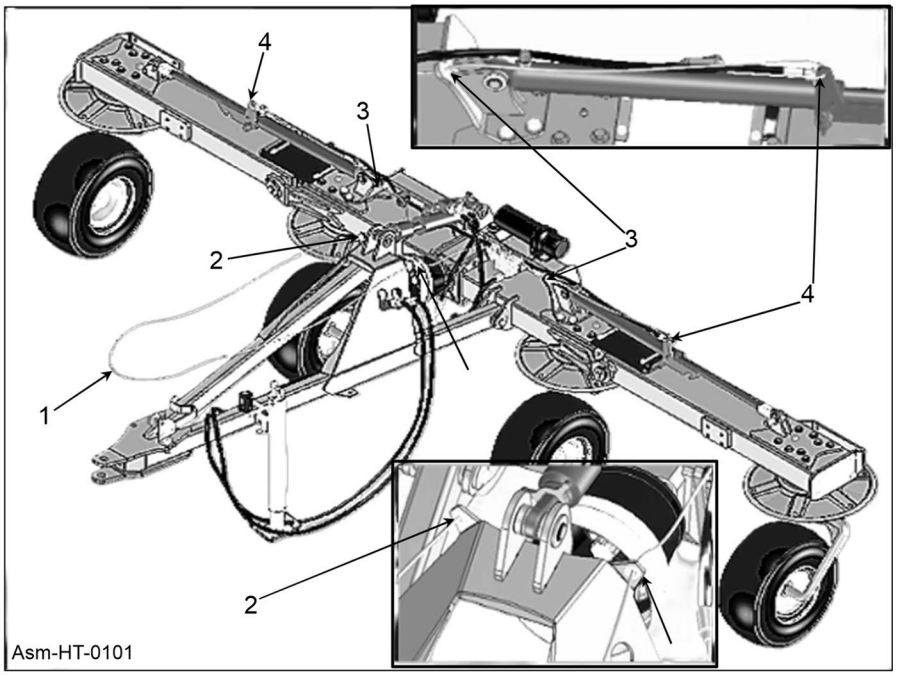
**Step G** - Install the document holder(1) on the upper section of the frame using three M8x20 bolts (2), six ø8 washers (3), and three M8 nuts (4), as shown in the figure. Ensure that the document holder is securely fastened and easily accessible.




## Control Rope Assembly

**Step H** - Assemble the control rope (1) by routing both ends through the guides on the drawbar (2), then through the guides on the crossbar (3), and finally fastening then to the hook on the hydraulic cylinder (4), as shown in the figure.

Ensure that the rope moves freely, without twists or interference with other components.



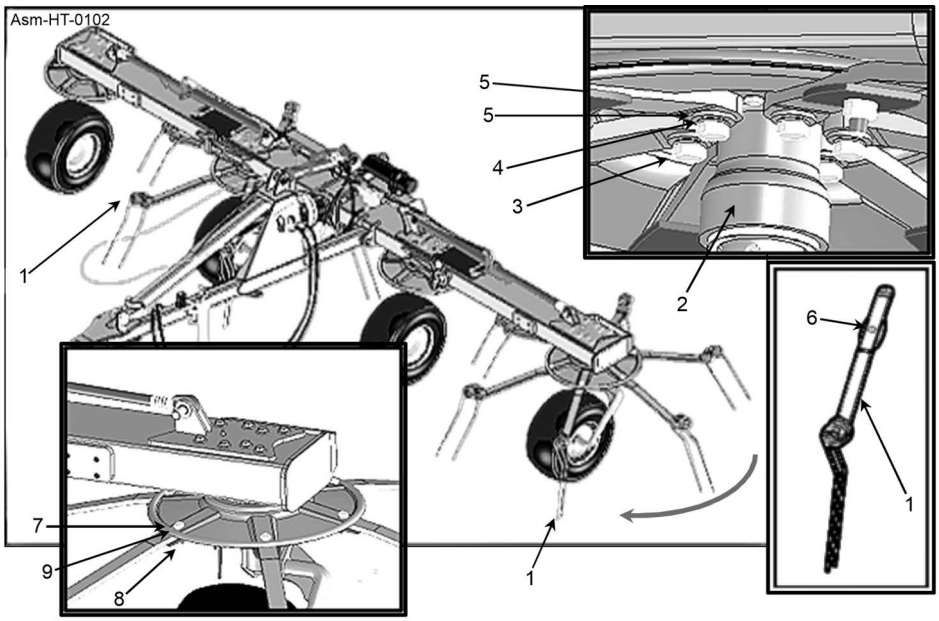
# ASSEMBLY

## Tine Arm Installation (Clockwise Rotation)

**Step I** - Assemble the 12 tine arms (1) onto the rotors indicated in the figure, oriented for clockwise rotation. Secure each arm to the hub (2) using the M12x30 hex-head bolts (3), ø13 Grower washers (4), and ø28.4x3 flatwashers (5).

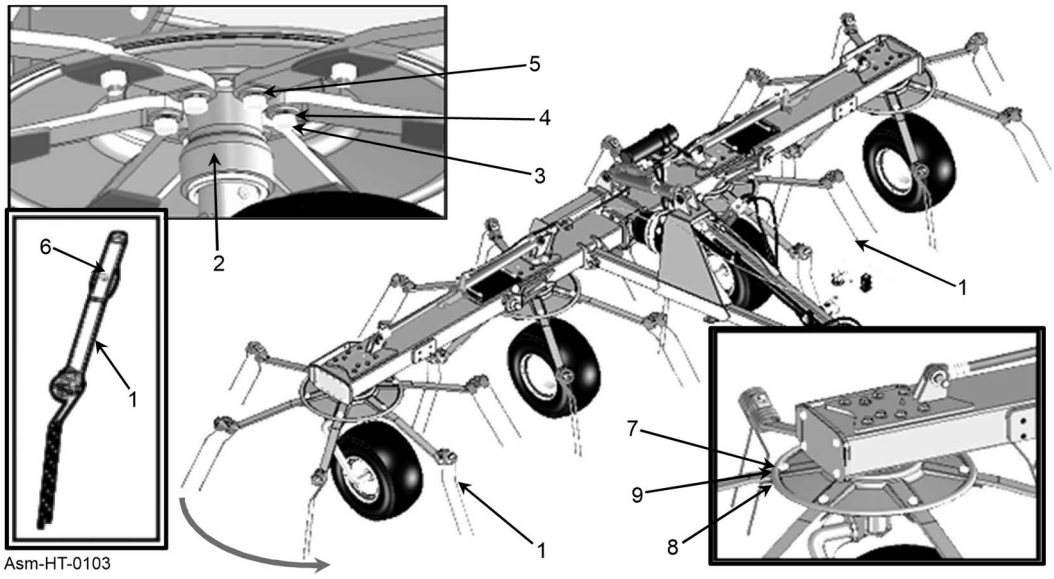
Fasten the second mounting point of each arm to the tine-holder disc (6) using the M12x40 hex-head bolts (7), M12 nuts (8), and ø13 washers (9).

Ensure that all tine arms are correctly oriented in the proper working direction.




## Tine Arm Installation (Counterclockwise Rotation)

**Step L** - Repeat the operations described STEP I, assembling the tine arms () onto the rotors indicated in the figure oriented for counterclockwise rotation.

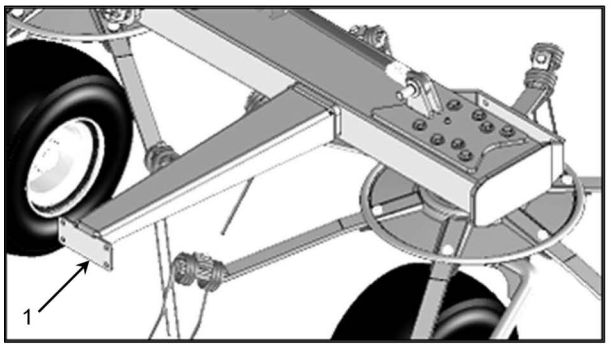


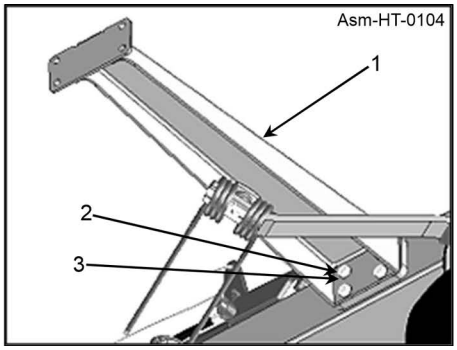
## Guard Support Installation

**Step M** - Install the two guard supports (1) by fastening them to the respective side frames using four M12x25 hex-head bolts (2) and ø21 washers (3) per side, as shown in the figure.

Ensure that both supports are properly aligned and securely anchored to the structure.

Repeat the procedure symmetrically on the opposite side of the machine.



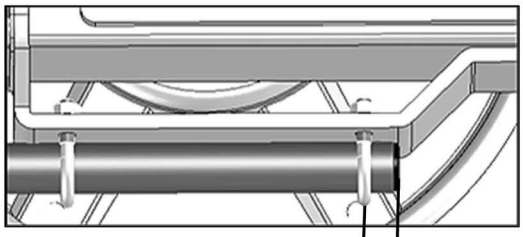

## Side Guard Support Installation

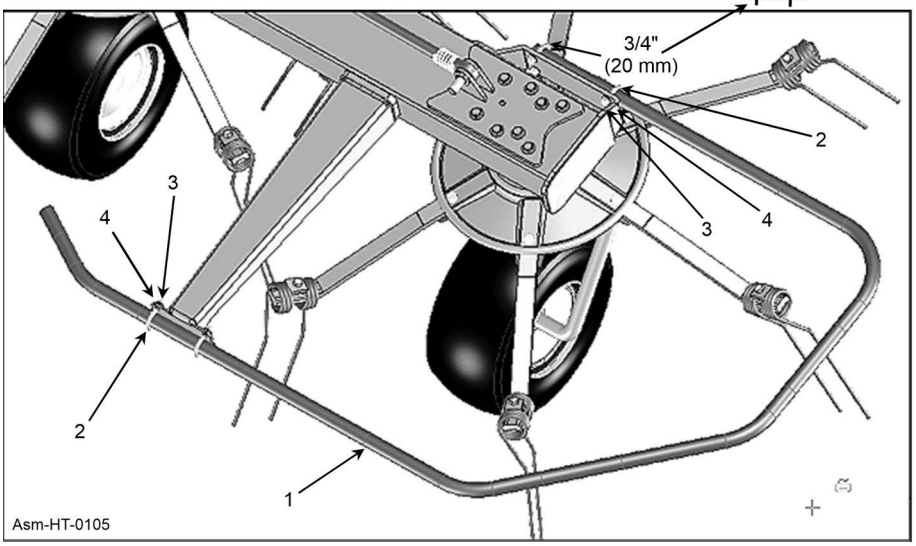
**Step N** - Install the two side guards (1) by fastening them to the supports using M10 round U-bolts (2), M10 nuts (3), and ø21 washers (4).

Adjust the position so that the rear end of each tube is approximately 3/4” (20 mm) from the U-bolt axis, as shown in the figure.

Finish the operation by installing the end caps (5) on both ends of the guards.

Repeat the procedure symmetrically on the opposite side of the machine.





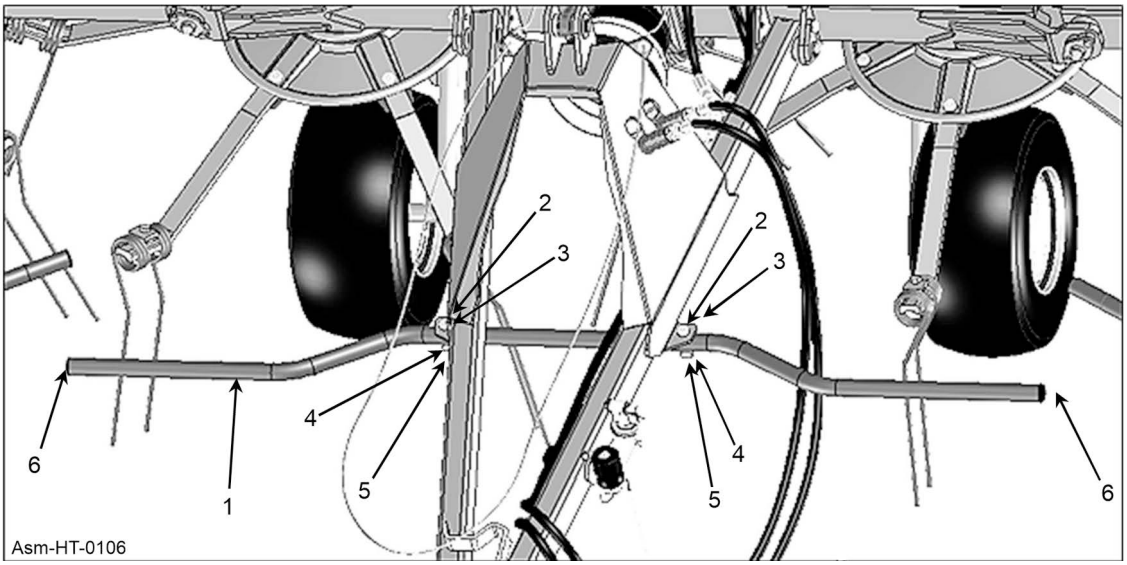
# ASSEMBLY



## Front Guard Installation

**Step N1** - Install the front guard (1) by fastening it to the drawbar using two M10x65 hex-head bolts (2), ø21 washers (3), tube-retaining plates (4), and M10 self-locking nuts (5).

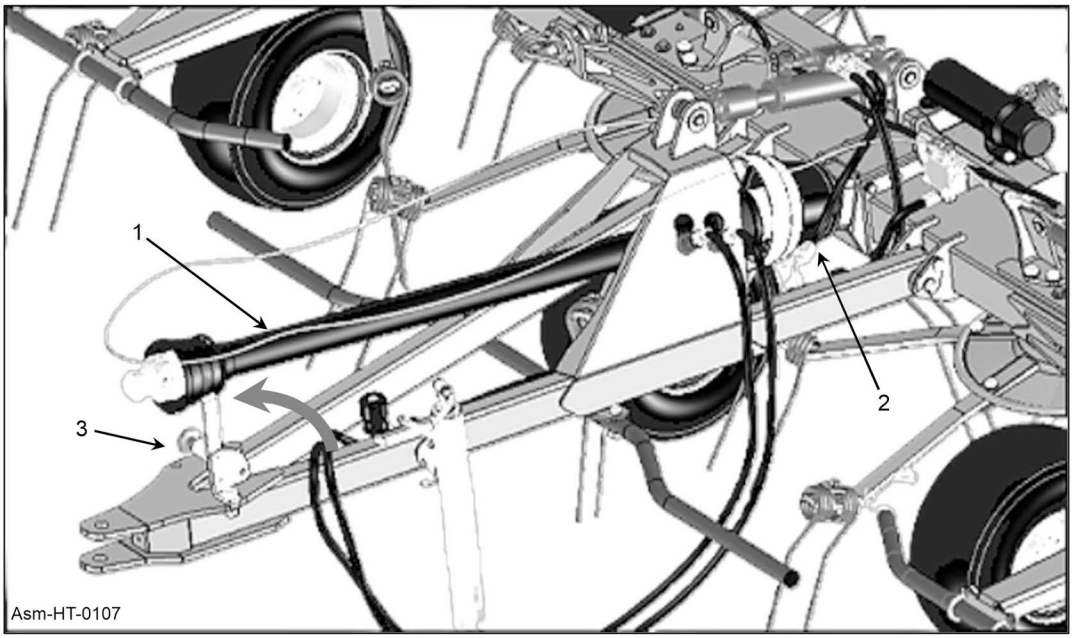
Finish the operation by installing the end caps (6) on both ends of the guard.




## PTO Shaft Installation

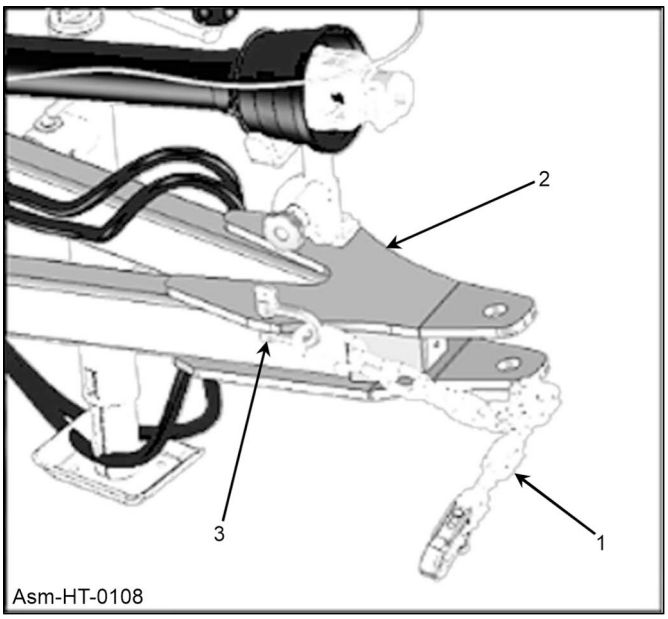
**Step O** - Attach the PTO shaft (1) to the output shaft of the central gearbox (2), ensuring that the coupling is fully engaged and securely locked.

Rotate the support bracket (3) into the parking position and rest the PTO shaft on it, checking that it is stable and properly seated.



## Safety Chain Attachment

**Step O1** - Attach the transport safety chain (1) to the drawbar (2) using the ø12 shackle (3), securing it in the designated mounting hole as shown in the figure.



# OPERATION SECTION

# OPERATION

## BUSH HOG HTX417/HTX419 HAY TEDDER OPERATING INSTRUCTIONS

Your Bush Hog Hay Tedder should now be assembled and inspected for any evidence of defective or damaged parts before use. Any evidence of damage should be reported to your dealer immediately. After Hydraulic Lines have been attached to tractor and drawbar hitch is attached, carefully raise parking jack

This section of the Operator's Manual is designed to familiarize, instruct, and educate safe and proper implement use to the operator. Pictures contained in this section are intended to be used as a visual aid to assist in explaining the operation of a Hay Tedder and are not necessarily of a HTX417 or HTX 419. Some pictures may show shields removed for purposes of clarity. NEVER OPERATE this implement without all shields in place and in good operational condition. The operator must be familiar with the implement and tractor operation and all associated safety practices before operating the implement and tractor. Proper operation of the implement, as detailed in this manual, will help ensure years of safe and satisfactory use of the hay tedder.

**READ AND UNDERSTAND THE ENTIRE OPERATING INSTRUCTIONS AND SAFETY SECTION OF THIS MANUAL AND THE TRACTOR MANUAL BEFORE ATTEMPTING TO USE THE TRACTOR AND IMPLEMENT.** If you do not understand any of the instructions, contact your nearest authorized dealer for a full explanation. Pay close attention to all safety signs and safety messages contained in this manual and those affixed to the implement and tractor. *OPS-U- 0001str*

READ, UNDERSTAND, and FOLLOW the following Safety Messages. Death or serious injury may occur unless care is taken to follow the warnings and instructions stated in the Safety Messages. Always use good common sense to avoid hazards. (SG-2str)

## 1. STANDARD EQUIPMENT AND SPECIFICATIONS

| SPECIFICATION | HTX417 | HTX419 |
|---|---|---|
| **Number of Rotors** | 4 | 4 |
| **Tine Arms per Rotor** | 6 | 6 |
| **Working Width** | 17’ (5.20m) | 19’ (5.80m) |
| **Transport Width** | 9’-8” (3.m) | 9’-8” (3.m) |
| **Transport Height** | 8’-2” (2.5.m) | 8’-9” (2.7.m) |
| **Weight** | 1235 lbs (560 kg) | 1279 lbs (580 kg) |
| **Tire Size** | 18 x 8, 5-8 | 18 x 8, 5-8 |
| **Power Required** | 30 HP (22 kw) | 30 HP (22 kw) |
| **Rotor Rotation Speed** | 188 RPM | 161 RPM |
| **PTO Rotation Speed** | 540 RPM | 540 RPM |
| **Working Forward Speed** | 5-10 mph (8-16 km/h) | 5-10 mph (8-16 km/h) |
| **Tire Pressure** | 49 lbs. (3.2 bar) | 49 lbs. (3.2 bar) |

## 2. OPERATOR REQUIREMENTS

Safe operation of the unit is the responsibility of a qualified operator. A qualified operator has read and understands the implement and tractor Operator's Manuals and is experienced in implement and tractor operation and all associated safety practices. In addition to the safety messages contained in this manual, safety signs are affixed to the implement and tractor. If any part of the operation and safe use of this equipment is not completely understood, consult an authorized dealer for a complete explanation.

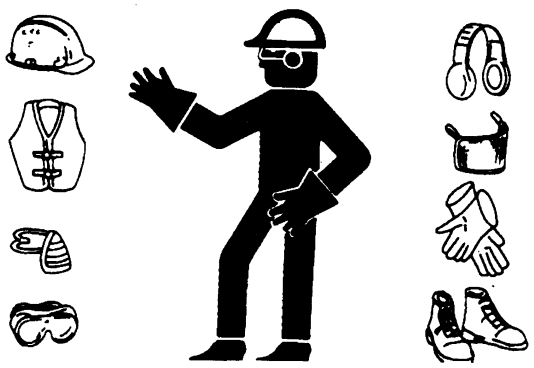
If the operator cannot read the manuals for themselves or does not completely understand the operation of the equipment, it is the responsibility of the supervisor to read and explain the manuals, safety practices, and operating instructions to the operator.

Safe operation of equipment requires that the operator wear approved Personal Protective Equipment (PPE) for the job conditions when attaching, operating, servicing, and repairing the equipment. PPE is designed to provide operator protection and includes the following safety wear:

**PERSONAL PROTECTIVE EQUIPMENT (PPE)**

- Always Wear Safety Glasses (with side shields marked to comply with ANSI Z87)
- Hard Hat
- Steel Toe Safety Footwear
- Gloves
- Hearing Protection
- Close Fitting Clothing
- Respirator or Filter Mask (depends on operating conditions)

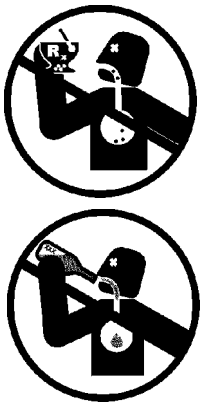
OPS-U- 0002str



**⚠ DANGER**

DO NOT use drugs or alcohol immediately before or while operating the Tractor and Implement. Drugs and alcohol will affect an operator's alertness and coordination and therefore affect the operator's ability to operate the equipment safely. Before operating the Tractor or Implement, an operator on prescription or over-the-counter medication must consult a medical professional regarding any side effects of the medication that would hinder their ability to operate the Equipment safely. NEVER knowingly allow anyone to operate this equipment when their alertness or coordination is impaired. Death or serious injury to the operator or others could result if the operator is under the influence of drugs or alcohol.

*(SG-27) str*



# 3. TRACTOR REQUIREMENTS

The tractor used to operate the tedder must have the power capacity to lift, pull, and operate the Power Take Off (PTO) at the tedder's rated speed while traveling at a ground speed between 2 and 5 PMPH. Operating the tedder with a tractor that does not meet the following requirements may cause tractor or tedder damage and be a potential danger to the operator and passerby.

## Tractor Requirements and Capabilities

- ASABE approved Roll-Over Protective Structure (ROPS) or ROPS cab and seat belt.
- Tractor Safety Devices ..... Slow Moving Vehicle (SMV) emblem, lighting, PTO master shield
- Tractor Horsepower..... 30 HP minimum
- Front End Weights..... As needed to maintain 20% weight on front axle

## 3.1 ROPS and Seat Belt

The tractor must be equipped with a Roll-Over-Protective-Structure (ROPS), tractor cab, or roll-bar and seat belt to protect the operator from falling off the tractor, especially during a roll over where the driver could be crushed and killed. Only operate the tractor with the ROPS in the raised position and seat belt fastened. Tractor models not equipped with a ROPS and seat belt should have these life saving features installed by an authorized dealer. OPS-U- 0003str

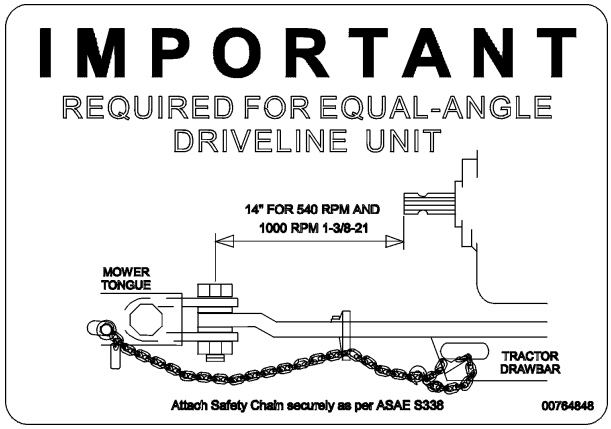
**WARNING** Operate this Equipment only with a Tractor equipped with an approved roll-over-protective system (ROPS). Always wear seat belts. Death or serious injury could result from falling off the tractor, particularly during a turnover when the operator could be pinned under the ROPS. (SG-7) str

## 3.2 Tractor Horsepower

The power required to operate a implement is determined by the tractor PTO horsepower. For most operating conditions, the HTX417/419 requires a tractor with at least 30hp. Operating the implement with a tractor that does not have adequate power may damage the tractor engine. Exceeding the recommended horsepower may cause damage by overpowering the unit in heavy operating conditions.

## 3.3 Drawbar - Pull-Type Mower

For pull-type mowers (540 and 1000 RPM) equipped with an equal-angle driveline, the tractor drawbar must be positioned at a 14" distance from the hitch point to the PTO shaft end for proper operation and minimal wear to the driveline and tractor.



## 3.4 Front End Weight

A minimum of 20% total tractor weight must be maintained on the tractor front end at all times. Front end weight is critical to maintain steering control and to prevent the tractor from rearing up while driving. If the front end is too light, add weight until a minimum of 20% total weight is reached on the front tires. Front weights and weight carriers can be purchased through an authorized tractor dealership. OPS-U-0005 str

# 4.GETTING ON AND OFF THE TRACTOR



Before getting onto the mower, the operator must read and completely understand the mower operator's manual. If any part of the manual is not completely understood, consult an authorized dealer for a complete explanation. OPS-U- 0007_B str

**⚠WARNING** Do not mount or dismount the Tractor while the tractor is moving. Mount the Tractor only when the Tractor and all moving parts are completely stopped. Dismounting a moving power unit can result in a crushing hazard that can cause death or serious injury. *(SG-12) str*

## 4.1 Boarding the Tractor

Use both hands and equipped handrails and steps for support when boarding the tractor. Never use control levers for support when mounting the tractor. Seat yourself in the operator's seat and secure the seat belt around you.

Never allow passengers to ride on the tractor or attached equipment. Riders can easily fall off and be seriously injured or killed from falling off and being ran over. It is the operator's responsibility to forbid all extra riders at all times. *OPS-U- 0008str*

**⚠ DANGER** Never allow children to operate, ride on, or come close to the Tractor or Implement. Usually, 16-17 year-old children who are mature and responsible can operate the implement with adult supervision, if they have read and understand the Operator's Manuals, been trained in proper operation of the tractor and Implement, and are physically large enough to reach and operate the controls easily. *(SG-11) str*

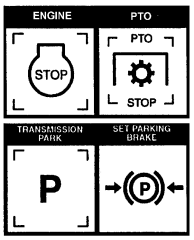
**⚠ DANGER** Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in death or serious injury. *(SG-10)str*

## 4.2 Dismounting the Tractor

Before dismounting, park the tractor and implement on a reasonably level surface, apply the parking brake, idle the engine down, disengage the PTO, and lower the implement to the ground. Shut down the tractor engine according to the operator's manual, remove the key, and wait for all motion to completely stop. Never leave the seat until the tractor, its engine and all moving parts have come to a complete stop.

Use hand rails and steps when exiting the tractor. Be careful of your step and use extra caution when mud, ice, snow or other matter has accumulated on the steps or hand rails. Use all handrails and steps for support and never rush or jump off the tractor. *OPS-U- 0009 str*

**DANGER** BEFORE leaving the tractor seat lower the implement, set the parking brake and/or set the tractor transmission in parking gear, disengage the PTO, stop the engine, remove the key, and wait for all moving parts to stop. Place the tractor shift lever into a low range or parking gear to prevent the tractor from rolling. Never dismount a Tractor that is moving or while the engine is running. Operate the Tractor controls from the tractor seat only. (SG-9)str






## 5.STARTING THE TRACTOR

The operator must have a complete understanding of the placement, function, and operational use of all tractor controls before starting the tractor. Review the tractor operator's manual and consult an authorized dealer for tractor operation instructions if needed.

**Essential Tractor Controls**:

- Locate the light control switch
- Locate the engine shut off control
- Locate the brake pedals and the clutch
- Locate the PTO control
- Locate the 3-point hitch control lever
- Locate the hydraulic remote control levers

**Before starting the tractor ensure the following:**

- Conduct all pre-start operation inspection and service according to the tractor operator's manual.
- Make sure all guards, shields, and other safety devices are securely in place.
- The parking brake is on.
- The PTO control lever is disengaged.
- The 3-point hitch control lever is in the lowered position.
- The hydraulic remote control levers are in the neutral position.
- The tractor transmission levers are in park or neutral.

Refer to the tractor owner's manual for tractor starting procedures. Only start the tractor while seated and belted in the tractor operator's seat. Never bypass the ignition switch by short circuiting the starter solenoid. After the tractor engine is running, avoid accidental contact with the tractor transmission to prevent sudden and unexpected tractor movement. OPS-U-0028str

**DANGER** Never run the Tractor engine in a closed building or without adequate ventilation. The exhaust fumes can be hazardous to your health. (SG-23) str

**DANGER** Start tractor only when properly seated in the Tractor seat. Starting a tractor in gear can result in death or serious injury. Read the Tractor operators manual for proper starting instructions. (SG-13) str

# 6. CONNECTING THE HAY TEDDER TO THE TRACTOR

Use extreme caution when connecting the hay tedder to the tractor. The hay tedder should be securely resting at ground level or setting on blocks. Keep hands and feet from under the hay tedder and clear of pinch points between the tractor hitch arms and lift side rotors. *OPS-HT-0011 str*

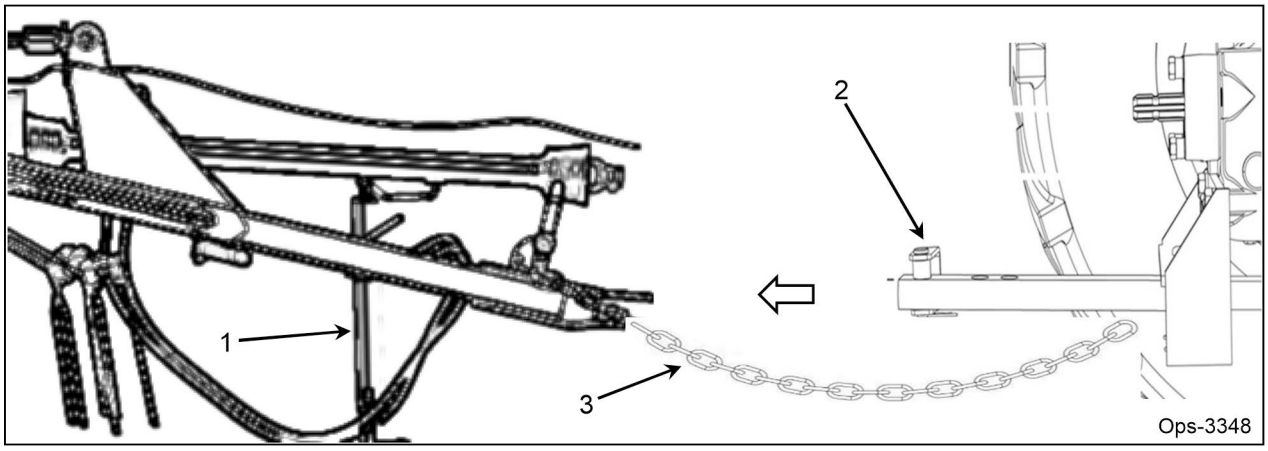
**⚠ DANGER** Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15) str



## 6.1 Connecting the Hay Tedder

Proper connection of the tedder to the tractor is essential for ensuring safe and effective operation. To connect the tedder safely, carefully follow the steps listed below.

Park the tractor and tedder on a firm, level surface. Align the tractor hitch system with the tedder hitch. Adjust the height of the tedder using the parking stand (1) to ensure safe, proper alignment. Make sure the hitch is centered for a secure, stable connection.



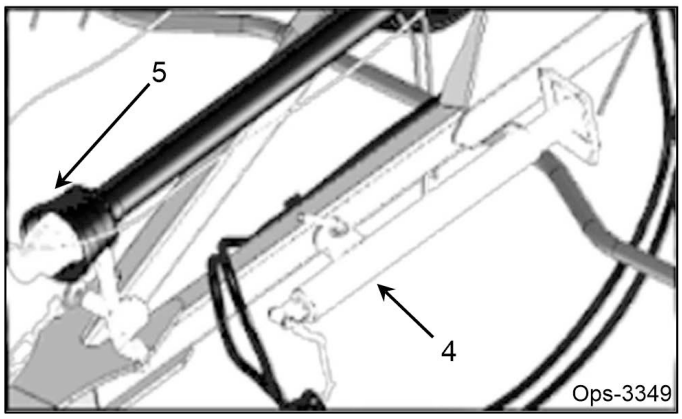

Insert the connecting pin (2) into the hitch and secure it firmly using the safety device provided to prevent accidental detachment during use.

## 6.2 Safety Tow Chain

If the implement is towed on a public roadway, a safety chain (3) with tensile strength equal to or greater than the gross weight of the implement must be connected between the tractor and implement. This will provide an additional degree of protection in case of the failure or malfunctioning of the connecting pin. Make sure the chain is attached to a secure location on the tractor and not to an intermediate support.

After connecting both ends of the safety chain, drive the tractor to the right and left to check for proper chain length. Adjust length as necessary and allow only enough slack in the chain to make a maximum turn in both directions. When not in use, store the safety chain to protect it from mud or standing water by wrapping the chain around the tongue. Replace the safety chain if one or more links or end fittings are broken, stretched or otherwise damaged or deformed. *OPS-U-0039_A str*

Once the connection has been completed, move the parking stand (1) into the stowed position (4) to keep it from getting in the way when using the tedder.




## 7.DRIVELINE ATTACHMENT

Connect the PTO shaft (5) to the tractor's Power take-off. It is essential to follow both the instructions in this manual and those provided in the specific PTO shaft manual, which forms an integral part of the safety documentation. In case of discrepancies, always refer to the PTO manufacturer's instructions.

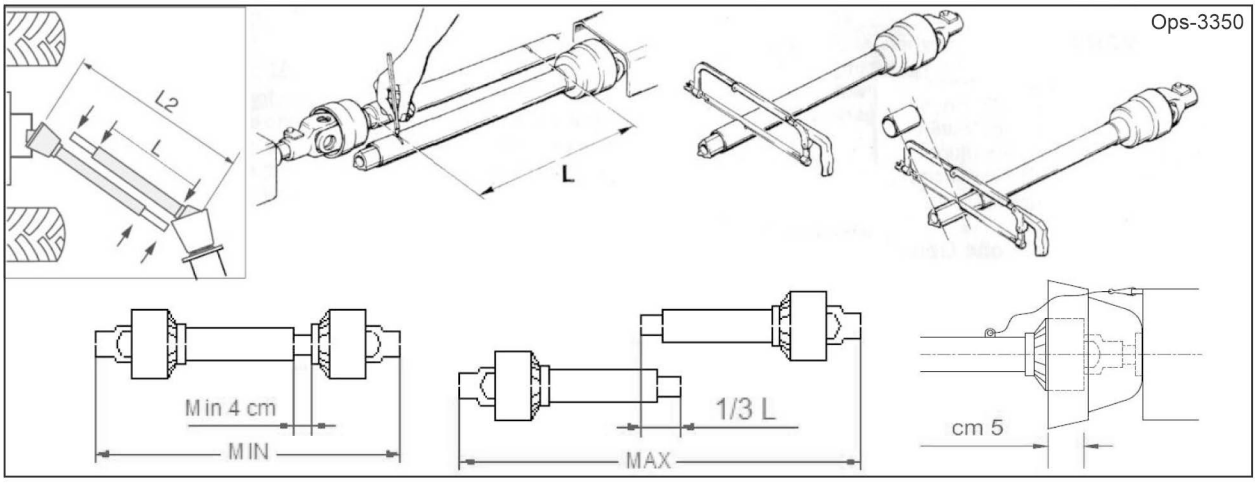
### 7.1 Driveline Length Check

Verify that the PTO shaft is correctly connected at both ends - tractor side and tedder side and that the safety locking pins are properly engaged in their seats. If necessary, the PTO shaft can be adapted to the tractor to prevent it from reaching its minimum working length during operation.

If the PTO shaft is too long, proceed as follows:

- Remove the outer guards
- Separate the two halves of the shaft
- Measure the shortest operational length
- shorten the external plastic tubes and the internal metal tubes by the same amount
- Deburr all cut edges and lubricate the internal sliding surfaces

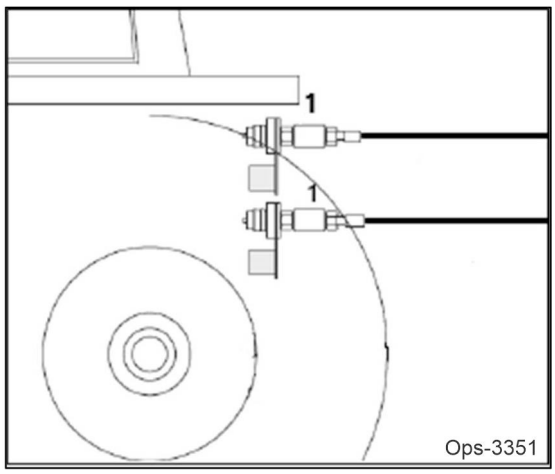
When the PTO shaft is fully extended, the tubes must overlap by at least one-third of their length. When fully compressed, there must be a minimum clearance of 1-1/2" (4 cm).




Ensure that the safety chains are correctly fastened to prevent rotation of the PTO guard. Verify that all protective devices are in perfect condition and properly installed.

## 8.HYDRAULIC CIRCUIT CONNECTION

Connect the two hydraulic hoses (1), identified by the red handles, to the tractor's double-acting hydraulic distributor. This hydraulic line simultaneously controls all three cylinders: the central cylinder for tilt function and the two side cylinders for opening the lateral frames.
Operating the hydraulic lever in one direction moves the machine from the transport position to the working position (frames open, machine tilted forward).
Operating the lever in the opposite direction returns the machine to the transport position (frames vertical, machine horizontal).
Before use, check that all fittings are tightened, clean, and free from leaks.




Make a final check before starting the tractor, perform a visual inspection to ensure that all connections (mechanical and hydraulic) are correctly installed and that no components are loose. Verify that all protective guards are in place and fully functional. Failure to follow these steps may result in equipment damage or pose a risk to operator safety. Always make sure that the connection is secure before beginning any operation.

## 9.PRE-OPERATION INSPECTION AND SERVICE

Before each use, a pre-operation inspection and service of the implement and tractor must be performed. This includes routine maintenance and scheduled lubrication, inspecting that all safety devices are equipped and functional, and performing needed repairs. DO NOT operate the unit if the pre-operation inspection reveals any condition affecting safe operation. Perform repairs and replacement of damaged and missing parts as soon as noticed. By performing a thorough pre-operation inspection and service, valuable down time and repair cost can be avoided. OPS-U-0029str

**⚠WARNING** Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21 )str

## 9.1 Tractor Pre-Operation Inspection/Service

Refer to the tractor operator's manual to ensure a complete pre-operation inspection and scheduled service is performed according to the manufacturer's recommendations. The following are some of the items that require daily service and inspection:


- Tire condition/air pressure
- Wheel lug bolts
- Steering linkage
- PTO shield
- SMV sign is clean and visible
- Tractor's lights are clean and functional
- Tractor Seat belt is in good condition
- Tractor ROPS is in good condition.
- ROPS is in the raised position
- No tractor oil leaks
- Radiator free of debris
- Engine oil level and condition
- Engine coolant level and condition
- Power brake fluid level
- Power steering fluid level
- Fuel condition and level
- Sufficient lubrication at all lube points
- Air filter condition *OPS-U-0030 str*

## 9.2 Hay Tedder Pre-Operation Inspection/Service

Before each use, a complete inspection and service is required to ensure the hay tedder is in a good and safe working condition. Damaged and/or broken parts should be repaired and/or replaced immediately. To ensure the hay tedder is ready for operation, conduct the following. *OPS-HT-0020 str*

The operator's manual and safety signs affixed on the unit contain important instructions on the safe and proper use of the equipment. Maintain these important safety features on the implement in good condition to ensure the information is available to the operator at all times.

- Ensure the manual canister is secured to the equipment with the operator's manual inside.
- Ensure all safety signs are in place and legible. Replace missing, damaged, and illegible decals. *OPS-U- 0011 str*

# OPERATION

## HAY TEDDER PRE-OPERATION INSPECTION

Mower ID# _____ Date:_____

Make: _____ Shift:_____

**WARNING** Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the tedder is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

| Item | Condition at Start of Shift | Specific Comments if not OK |
|---|---|---|
| The Operator's Manual is in the canister on the Hay Tedder | | |
| All safety decals are in place and legible | | |
| The Tongue/Hitch connection bolts & pins are tight | | |
| There are no cracks in the Tongue or Hitch | | |
| There are no cracks in Loader Arms or Mounts | | |
| The Tow Chain is secured to the Tractor & Hay Tedder | | |
| Driveline/Gearbox Shields are in good condition | | |
| Driveline Clutches are in good condition, not frozen | | |
| Driveline Telescoping Members & U-Joints are lubricated | | |
| Driveline Yokes are securely attached to PTO & Tiller | | |
| Gearbox Mounting Bolts are tight | | |
| Gearbox Oil is at the proper level | | |
| The Wing connection bolts & pins are tight | | |
| Transport locks & retaining chains are in good condition | | |
| Rake spokes are in good condition & securely | | |
| Rake Wheels are securely attached to the frame members | | |
| The Hydraulic Cylinders are in good condition | | |
| The Hydraulic Cylinder pins are in place & retained | | |
| There are no leaking or damaged hoses | | |
| There is no evidence of hydraulic leaks | | |
| The tires & wheel(s) are in good condition | | |
| Wheel lug nuts are tight | | |

Operator's Signature: _____

**DO NOT OPERATE an UNSAFE TRACTOR or IMPLEMENT**

## TRACTOR PRE-OPERATION INSPECTION

Tractor ID# _____ Make:_____

Date:_____ Shaft: _____

**WARNING** Before conducting the inspection, make sure the tractor engine is off, all rotation has stopped and the tractor is in park with the parking brake engaged. Make sure the implement is resting on the ground or securely blocked up and all hydraulic pressure has been relieved.

| Item | Condition at Start of Shift | Specific Comments if not OK |
|---|---|---|
| The flashing lights function properly | | |
| The SMV Sign is clean and visible | | |
| The tires are in good condition with proper pressure | | |
| The wheel lug bolts are tight | | |
| The tractor brakes are in good condition | | |
| The steering linkage is in good condition | | |
| There are no visible oil leaks | | |
| The hydraulic controls function properly | | |
| The ROPS or ROPS Cab is in good condition | | |
| The seatbelt is in place and in good condition | | |
| The 3-point hitch is in good condition | | |
| The drawbar pins are securely in place | | |
| The PTO master shield is in place | | |
| The engine oil level is full | | |
| The brake fluid level is full | | |
| The power steering fluid level is full | | |
| The fuel level is adequate | | |
| The engine coolant fluid level is full | | |
| The radiator is free of debris | | |
| The air filter is in good condition | | |

Operator's Signature: _____

**DO NOT OPERATE an UNSAFE TRACTOR or IMPLEMENT**

# OPERATION

## 10.DRIVING THE TRACTOR AND IMPLEMEMT

Safe tractor transport requires the operator possess a thorough knowledge of the model being operated and precautions to take while driving with an attached implement. Ensure the tractor has the capacity to handle the weight of the implement and the tractor operating controls are set for safe transport. To ensure safety while driving the tractor with an attached implement, review the following. OPS-U- 0012str

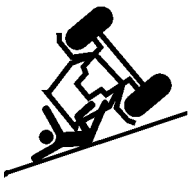
**⚠ DANGER** This Implement may be wider than the Tractor. Be careful when operating or transporting this equipment to prevent the Implement from running into or striking sign posts, guard rails, concrete abutments or other solid objects. Such an impact could cause the Implement and Tractor to pivot violently resulting in loss of steering control, death, or serious injury. Never allow the Implement to contact obstacles. (S3PT-12)str

**⚠WARNING** Transport only at speeds where you can maintain control of the equipment. Serious accidents and injuries can result from operating this equipment at high speeds. Understand the Tractor and Implement and how it handles before transporting on streets and highways. Make sure the Tractor steering and brakes are in good condition and operate properly.

Before transporting the Tractor and Implement, determine the proper transport speeds for you and the equipment. Make sure you abide by the following rules:

Test the tractor at a slow speed and increase the speed slowly. Apply the Brakes smoothly to determine the stopping characteristics of the Tractor and Implement. As you increase the speed of the Tractor the stopping distance increases. Determine the maximum transport speed not to exceed 20 mph (30 kph) for transporting this equipment.

Test the equipment at a slow speed in turns. Increase the speed through the turn only after you determine that the equipment can be operated at a higher speed. Use extreme care and reduce your speed when turning sharply to prevent the tractor and implement from turning over. Determine the maximum turning speed for you and this equipment before operating on roads or uneven ground.



Only transport the Tractor and Implement at the speeds which allow you to properly control the equipment.

Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes or worn tires. When operating down a hill or on wet or rain slick roads, the braking distance increases: use extreme care and reduce your speed. When operating in traffic always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. (SG-19)str

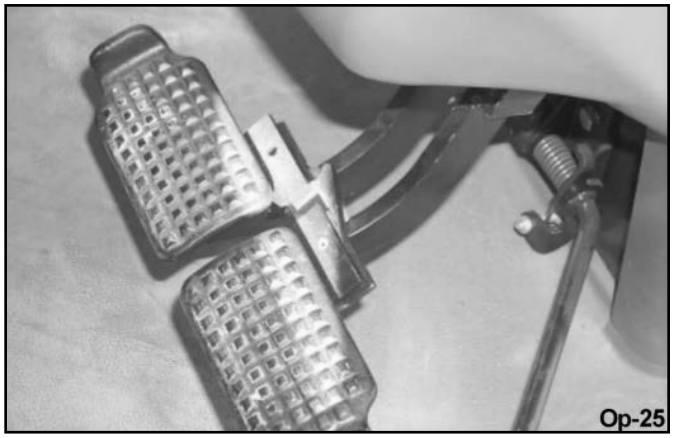
## 10.1 Starting the Tractor

The procedure to start the tractor is model specific. Refer to the tractor operator's manual for starting procedures for your particular tractor. Consult an authorized dealer if the starting procedure is unclear. Ensure the 3-point control lever is in the lowered position and the PTO is disengaged before starting the tractor. OPS-U-0033str


## 10.2 Brake and Differential Lock Setting

Make sure the tractor brakes are in good operating condition. Tractor brakes can be set to operate independently allowing single rear wheel braking action or locked together to provide simultaneous rear wheel braking. FOR MOST DRIVING AND OPERATING CONDITIONS, THE BRAKE PEDALS SHOULD BE LOCKED TOGETHER TO PROVIDE THE MOST EFFECTIVE BRAKING ACTION.

Always disengage the tractor differential lock when turning. When engaged the differential lock will prevent or limit the tractor from turning. During normal operating conditions, locking the differential provides no benefit and should not be used.




**WARNING** Be aware of the operating conditions. Do not operate the Tractor with weak or faulty brakes. When operating down a hill or on wet or rain slick roads, the braking distance increases. Use extreme care and reduce your speed in these conditions. When operating in traffic, always use the Tractor's flashing warning lights and reduce your speed. Be aware of traffic around you and watch out for the other guy. *OPS-U- 0013 str*

## 10.3 Driving the Tractor and Hay Tedder

Start off driving at a slow speed and gradually increase your speed while maintaining complete control of the tractor and implement. Moving slowly at first will also prevent the tractor from rearing up and loss of steering control. The tractor should never be operated at speeds that cannot be safely handled or which will prevent the operator from stopping quickly during an emergency. If the power steering or engine ceases operating, stop the tractor immediately as the tractor will be difficult to control.

Perform turns with the tractor and implement at slow speeds to determine how the tractor with an attached implement handles a turn. Determine the safe speed to maintain proper control of the tractor when making turns. When turning with a towed implement, the overall working length of the unit is increased. Allow additional clearance for the implement when turning.

To avoid overturns, drive the tractor with care and at safe speeds, especially when operating over rough ground, crossing ditches or slopes, and turning corners. Tractor wheel tread spacing should be increased when working on inclines or rough ground to reduce the possibility of tipping.

Use extreme caution when operating on steep slopes. Keep the tractor in a low gear when going downhill. DO NOT coast or free-wheel downhill. *OPS-HT-0037_A str*

# 11.OPERATING THE TRACTOR AND IMPLEMEMT

**THE OPERATOR MUST COMPLETELY UNDERSTAND HOW TO OPERATE THE TRACTOR AND IMPLEMENT AND ALL CONTROLS BEFORE ATTEMPTING TO OPERATE.**

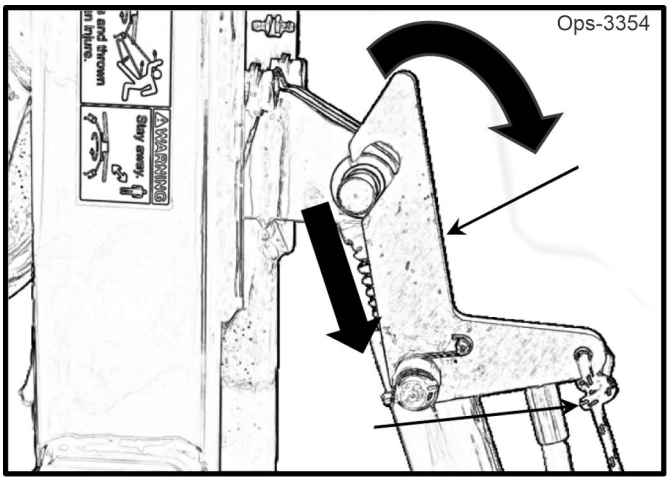
The operator must read and understand the Safety and Operation Sections of the implement and tractor operator's manuals. These manuals must be read and explained to any operator who cannot read. Never allow someone to operate the implement and tractor without complete operating instructions.

Before starting any operation, the operator must become familiar with the area to be worked in and any obstacles and hazards contained within to ensure safety to the operator, bystanders, and equipment. Special attention should be paid to foreign debris, rough terrain, steep slopes, and passersby and animals in the area. *OPS-U- 0015 str*

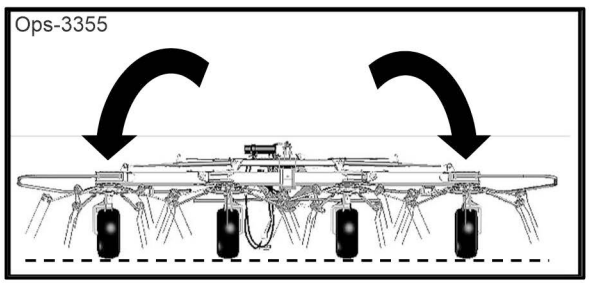
**⚠ CAUTION** Perform the transition from transport position to working position (and vice versa) only with the tractor stationary, on a flat and solid surface, and with the PTO disengaged.

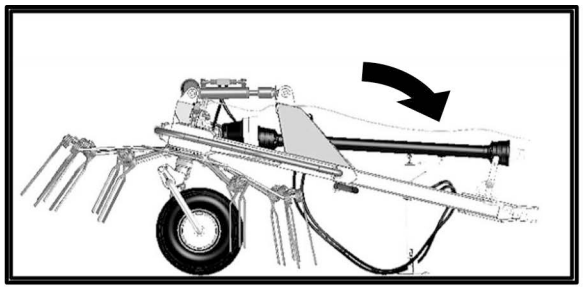
## 11.1 Working Configuration

**Releasing the safety locks of the side cylinders:** The hydraulic cylinders controlling the side frames are equipped with mechanical locking hooks (1) for transport mode. To release them, briefly operate the tractor's hydraulic lever in the closing direction to relieve pressure, then pull the release ropes of both hooks (2). Keep the ropes pulled and operate the hydraulic lever in the opening direction. The cylinder will begin to extend, allowing the side frames to open. Maintain tension on the ropes until the rod-side pin has moved completely pat the hook, then release the ropes.

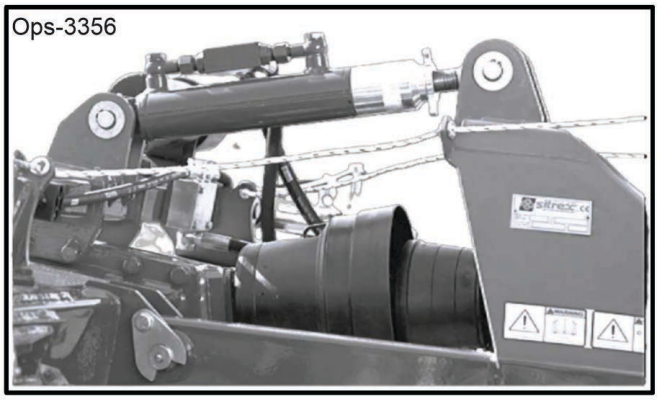



**Simultaneous opening and tilting:**
Continue operating the hydraulic lever to complete both the opening of the side frames and the tilting of the machine. These movements occur simultaneously, transitioning from the transport position where the side frames are vertical and the machine is horizontal to the working position, where the side frames are horizontal and the machine is tilted forward by approximately 15 degrees toward the tractor. Continue operating the hydraulic lever to complete both the opening of the side frames and the tilting of the machine. These movements occur simultaneously, transitioning from the transport position where the side frames are vertical and the machine is horizontal to the working position, where the side frames are horizontal and the machine is tilted forward by approximately 15 degrees toward the tractor.



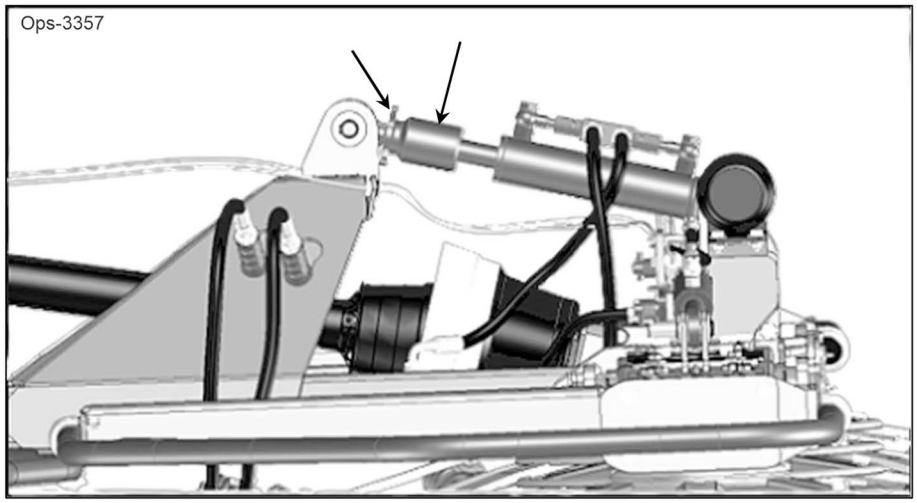
**Tilt cylinder end of stroke:** The working configuration is reached when the tilt cylinder is fully retracted and the threaded adjustment collar is seated against the cylinder hear. When the outer rotor wheels touch the ground, it is advisable to move the tractor slowly forward to allow the machine to settle and achieve uniform ground contact. Ensure that hydraulic pressure is fully released at the end of the operation.



## 11.2 Adjustments

**Working Height Adjustment**

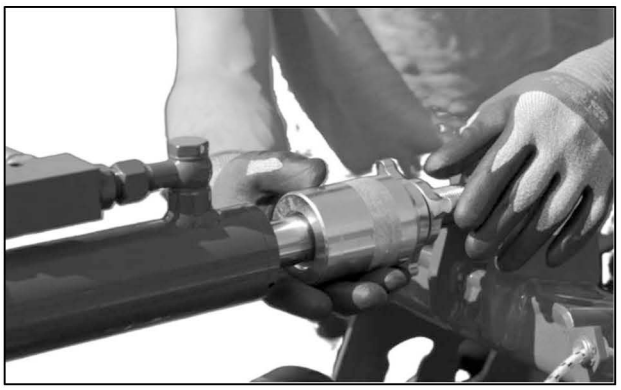
The working height and consequently the operating tilt angle of the machine is adjusted by acting on the threaded collar (1) located on the rod of the tilt cylinder, which serves as an adjustable stop, together with the corresponding locknut (2).

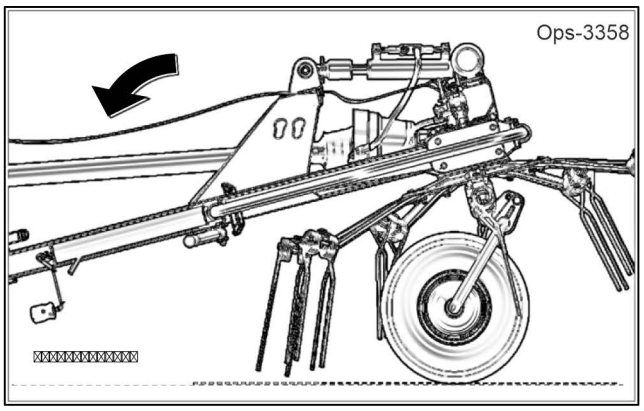



- **Preparation for adjustment:** The adjustment must be performed with the machine in a horizontal position, as the tilt cylinder must be fully extended to allow rotation of the threaded collar. To reach the desired position, proceed in steps, alternating short hydraulic movements with small adjustments of the collar.
- **Height adjustment:**
  - Turning the collar **CLOCKWISE** increases the tine height from the ground.
  - Turning the collar **COUNTERCLOCKWISE** decreases the tine height.

A recommended distance of approximately 3/4” (20 mm) should be maintained between the tine tips and the ground. The optimal distance may vary depending on forage and field conditions, For example:

- **Uneven terrain:** Increase tine height slightly to avoid direct ground contact.






- **Heavy forage:** Adjust tine height to ensure full material pickup without damaging the crop.

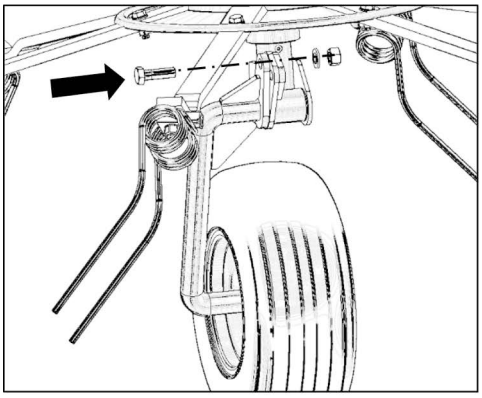
***NOTE:*** *A working height below 1” (5 mm) may cause excessive tine wear and contamination of the forage with soil. Conversely, a height above 1-1/2” (40 mm) may reduce spreading efficiency, leaving material in the field.*

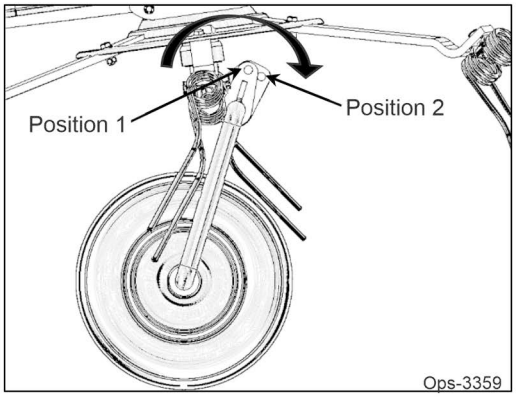
After completing the adjustment, ensure that the collar and its locknut (2) are firmly tightened to prevent unintentional movement during operation.

**Rotor Pitch Angle Adjustment**

The pitch angle of each rotor is adjusted by changing the angle between the wheel and its connection to the rotor support. To perform the operation:

- **Preparation:** Ensure that the machine is stationary, the tractor is switched off, and the PTO is disengaged.
- **Bolt removal:** Locate the M16 x 50 bolt shown in the figure. remove the bolt to enable repositioning of the axle.
- **Position adjustment:** Reposition the axle to obtain the desired pitch angle. Two selectable positions are available to optimize rotor performance depending on forage and ground conditions.
- **Reassembly:** Once the new position is selected, reinstall and securely tighten the M16 x 50 bolt to ensure a safe and stable setting.





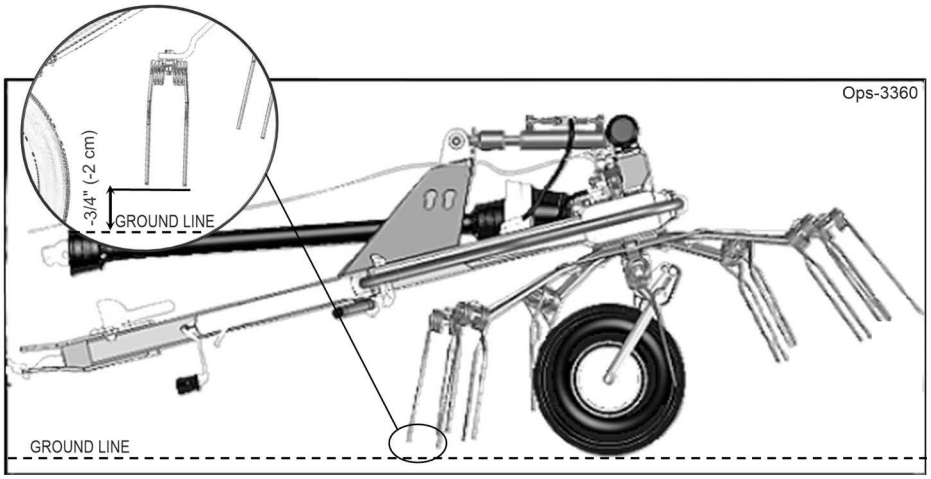

***NOTE:*** *This procedure must be performed on* ***ALL*** *rotor wheels of the machine.*

## 11.3 Working Process (Forage Spreading)

During the spreading process, the tedder must be operated carefully to ensure safe and efficient performance. Before beginning work, the operator must verify that the machine is correctly configured, as described in the previous sections, and that the adjustments to working height, pitch angle, and general configuration are appropriate for field and forage conditions.

**Preparation for work:**

Before starting the spreading process, ensure that all sections of the tedder are fully lowered into the working position. Lowering must be performed using the hydraulic lever described in the “Working Configuration” section. During lowering, it is advisable to move the tractor forward slowly so that the rotor wheels settle properly onto the ground, avoiding stress or damage to components.



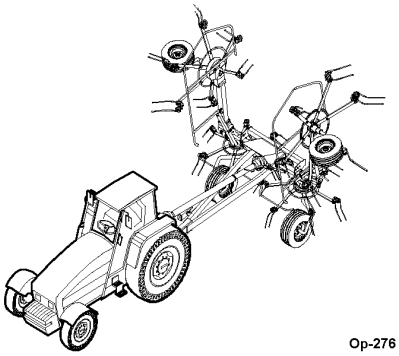
**Forward Speed:**
The tractor's forward speed must allow smooth and steady progress, typically between 3 and 6 mph (5 and 10 km/h), depending on ground conditions and forage volume. Excessive speed may compromise spreading quality and may damage the machine.

**Rotor Operation:**
During operation, the rotors lift and spread the forage evenly across the field. The tine height - adjusted using the threaded collar on the tilt cylinder must maintain a distance of approximately 3/4" (20 mm) from the ground. This prevents soil contamination and preserves forage quality. The optimal distance may vary depending on ground irregularities or forage density.

**Field Conditions:**
Pay close attention to obstacles, uneven terrain, or irregular areas. Adjust tractor speed and tine height when necessary to match field conditions, preventing machine damage and ensuring proper spreading quality.

## 11.4 Shutting Down the Implement

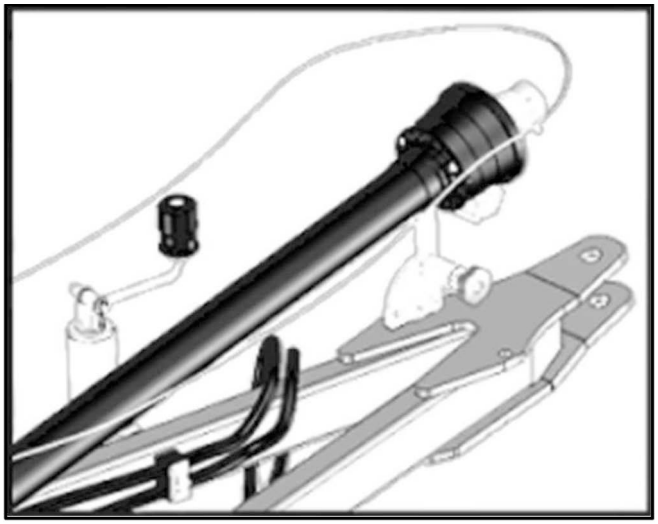
To shut down the implement, first bring the tractor to a complete stop. Then slow down the implement by reducing the engine speed before disengaging the PTO. Wait for all motion to stop before proceeding to drive or shut down the tractor.
Park the tractor on a level surface, place the transmission in park or neutral and apply the parking brake, lower the attached implement to the ground, shut down the engine, remove the key, and wait for all motion to come to a complete stop before exiting the tractor. *OPS-HT- 0016_A str*

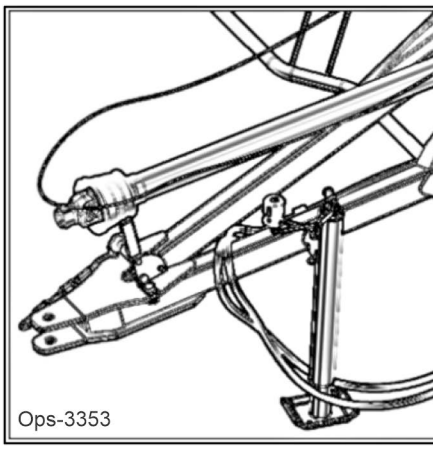
## 12. DISCONNECTING THE HAY TEDDER FROM THE TRACTOR

The process of disconnecting the tedder from the tractor must be carried out safely and following instructions.

**⚠ DANGER** Always shut the Tractor completely down, place the transmission in park, and set the parking brake before you or anyone else attempts to connect or disconnect the Implement and Tractor hitches. (S3PT-15) str



- **Disengage the PTO:** Before disconnecting the PTO shaft, disengage the PTO and wait until all rotating parts have come to a complete stop. Never attempt to disconnect the PTO shaft while it is in motion.
- **Disconnecting the PTO Shaft:** Disconnect the PTO Shaft from both the tractor PTO and the tedder. Place the PTO shaft on its designated support on the drawbar to prevent damage.
- **Disconnecting the Hydraulic Circuit:** Carefully disconnect the hydraulic hoses from the tractor. Ensure that the hydraulic circuits are depressurized before proceeding. Once disconnected, Place the hose couplings into their protective holders to prevent contamination by dust or dirt.




- **Positioning the Parking Stand:** Before disconnecting the tedder, move the stand from its storage position to the working (parking) position so it can support the machine once detached. Make sure the tedder is stable and securely supported by the stand.
- **Removing the Hitch Pin:** Remove the hitch pin connecting the drawbar to the tractor. Store the pin in a safe place to avoid loss or damage.
- **Moving the Tractor away:** Once disconnection is complete, slowly move the tractor away from the tedder, taking care not to strike the equipment.

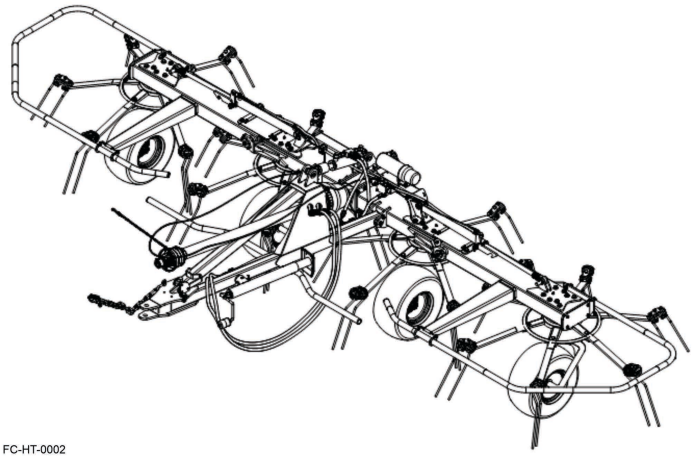
# OPERATION



## 13. HAY TEDDER STORAGE

Properly preparing and storing the hay tedder at the end of the season is critical to maintaining its appearance and to help ensure years of dependable service. The following are suggested storage procedures:

- Thoroughly clean all debris off the implement to prevent damage from decaying grass.
- Lubricate all grease points and fill gearbox oil levels as detailed in the maintenance section
- Tighten all bolts and pins to the recommended torque.
- Check worn and damaged parts. Perform repairs and make replacements immediately so that the implement will be ready for use at the start of the next season.
- Store the hay tedder in a clean, dry place with the housing resting securely on blocks or at ground level.
- Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the hay tedder.



FC-HT-0002

Store tedder with the wings lowered and the main transport wheels lowered. *OPS-HT-0053 str*

**⚠ DANGER** Never allow children to play on or around Tractor or Implement. Children can slip or fall off the Equipment and be killed or injured. Inadvertent contact with controls can cause the Implement to shift or fall crushing themselves or others. (SG-25) str

## 14.TRANSPORTING THE TRACTOR AND IMPLEMENT

Inherent hazards of operating the tractor and implement and the possibility of accidents are not left behind when you finish working in an area. Therefore, the operator must employ good judgment and safe operation practices when transporting the tractor and implement between locations. By using good judgment and following safe transport procedures, the possibility of accidents while moving between locations can be substantially minimized. *OPS-U- 0017str*

**⚠ DANGER** Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in death or serious injury. *(SG-10)str*

**⚠WARNING** Make sure the machine is stable and the tractor is stationary, with the parking brake engaged.

## 14.1 Transport Configuration

Before preparing the machine for road transport, it is essential to ensure that the surrounding area is clear of people, animals, and obstacles.

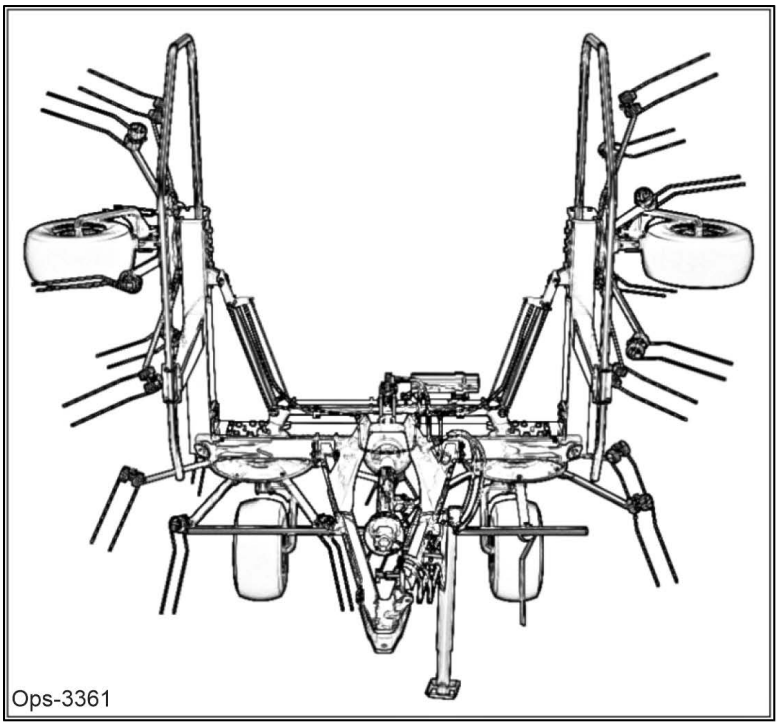
**Switching to the transport configuration:**

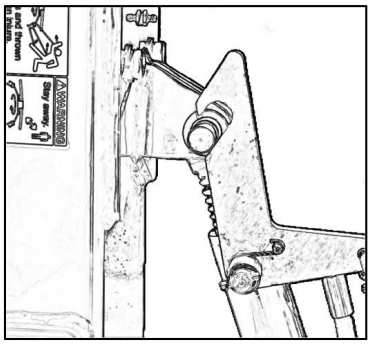
- Operate the tractor's hydraulic lever in the closing direction. This activates all three hydraulic cylinders (one central and two lateral) almost simultaneously. The side frames rise from the horizontal working position to the vertical transport position, while the tilt cylinder returns the machine to a horizontal attitude suitable for transport.
- When the side cylinders approach the end of their stroke, the mechanical locking hooks engage automatically. Once the cylinders are fully closed, keep the hydraulic lever activated for a few seconds in the opposite direction to press the hooks firmly against the pins, ensuring complete locking of the side frames (1).

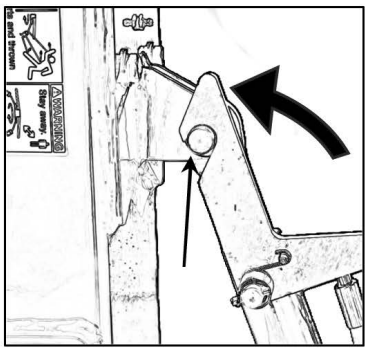
**Transport configuration check:**

- Ensure that the side sections are securely locked in their vertical position and that the machine is stable and ready for transport. Check that the hydraulic hoses and the PTO shaft are placed in their designated parking supports and that no components are protruding or unsecured.

During transport, maintain a speed within the limits prescribed by local regulations and appropriate for road and terrain conditions.

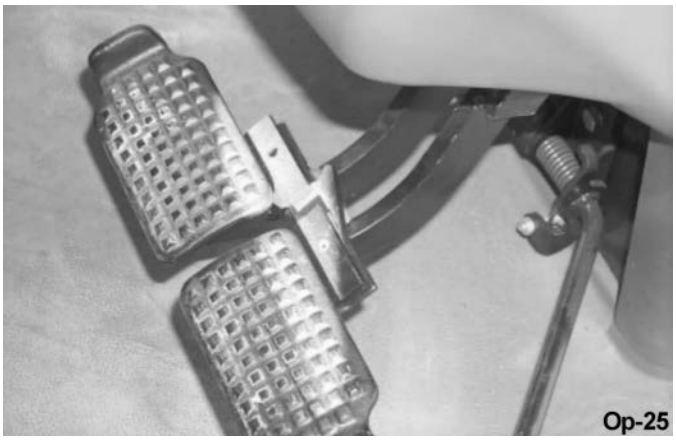

Ops-3361





Before transporting the tractor on a public roadway or boarding a trailer for transport, the tractor brake pedals should be locked together. Locking the pedals ensures that both wheels brake simultaneously while stopping, especially when making an emergency stop.

Use extreme caution and avoid hard applications of the tractor brakes when towing heavy loads at road speeds. Never tow the implement at speeds greater than 20 MPH (32 kph). *OPS-U- 0018 str*




## 15.TRANSPORTING ON PUBLIC ROADWAYS

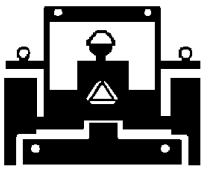
Extreme caution should be used when transporting the tractor and implement on public roadways. The tractor must be equipped with all required safety warning features including a SMV emblem and flashing warning lights to alert drivers of the tractor's presence. Remember that roadways are primarily designed for automotive drivers and most drivers will not be looking out for you, therefore, you must look out for them. Check your side view mirrors frequently and remember that vehicles will approach quickly because of the tractor's slower speed. Be extremely cautious when the piece of equipment that you are towing is wider than the tractor tire width and/or extends beyond your lane of the road.

Make sure that a proper size safety tow chain is secured between the tractor and implement before entering a public road. *OPS-U- 0019 str*

**⚠WARNING** Only tow the Implement behind a properly sized and equipped Tractor which exceeds the weight of the Implement by at least 20%. DO NOT tow the Implement behind a truck or other type of vehicle. Never tow the Implement and another Implement connected in tandem. Never tow the Implement at speeds over 20 MPH. (STI-06)str

**⚠ DANGER** Never allow children or other persons to ride on the Tractor or Implement. Falling off can result in death or serious injury. *(SG-10)str*

**⚠WARNING** Make certain that the "Slow Moving Vehicle" (SMV) sign is installed in such a way as to be clearly visible and legible. When transporting the Equipment use the Tractor flashing warning lights and follow all local traffic regulations. (SG-6)str



The SMV (Slow-Moving Vehicle) emblem is universal symbol used to alert drivers of the presence of equipment traveling on roadways at a slow speed. SMV signs are a triangular bright orange with reflective red trim for both easy day and night visibility. Make sure the SMV sign is clean and visible from the rear of the unit before transporting the tractor and implement on a public roadway. Replace the SMV emblem if faded, damaged, or no longer reflective. *OPS-U- 0020str*


Op-43

Make sure that all tractor flashing warning lights, headlights, and brake/tail lights are functioning properly before proceeding onto public roads. While newer model tractors have plenty of lighting to provide warning signals and operating lighting, most older models are only equipped with operating lights. Consult an authorized tractor dealer for lighting kits and modifications available to upgrade the lighting on older tractor models. *OPS-U- 0021str*


Op-595

When operating on public roads, have consideration for other road users. Pull to the side of the road occasionally to allow all following traffic to pass. Do not exceed the legal speed limit set in your country for agricultural tractors. Always stay alert when transporting the tractor and implement on public roads. Use caution and reduce speed if other vehicles or pedestrians are in the area. *OPS-U- 0022 str*


Op-596

Reduce speed before turning or applying the brakes. Ensure that both brake pedals are locked together when operating on public roads. *OPS-U-0023 str*


## 15.1 Hauling the Tractor and Implement

Before transporting a loaded tractor and implement, measure the height and width dimensions and gross weight of the complete loaded unit. Ensure that the load will be in compliance with the legal limits set for the areas that will be traveled through. *OPS-U-0024 str*


Use adequately sized and rated trailers and equipment to transport the tractor and implement. Consult an authorized dealer to determine the proper equipment required. Using adequately sized chains, heavy duty straps, cables and/or binders, securely tie down both the front and rear of the tractor utilizing the proper tie down locations as specified by the tractor manufacturer. *OPS-U- 0025 str*

## 16. TROUBLESHOOTING

| Problem | Possible Cause | Remedy |
|---|---|---|
| **Hydraulic cylinders have jerky movements** | Air in hydraulic lines. | Idle the tedder for a few minutes to bleed air from lines. Check the hydraulic oil level in the tank on the tractor and top up if necessary. |
| **A hydraulic cylinder moves without being activated by the control** | Worn cylinder seals. | Replace cylinder seals. |
| **Forage is picked up only partially or insufficiently.** | Tines raised too high above the ground. | Adjust the tines to a distance of about 3/4” (20mm) from the ground, as indicated in the settings section. |
| **Tines wear rapidly** | Tines continuously in contact with the ground. | Adjust the height of the tines correctly, maintaining a distance of about 3/4” (20mm) from the ground. |

# MAINTENANCE SECTION

# MAINTENANCE

## GENERAL MAINTENANCE

All cleaning, lubrication, and maintenance operations must be carried out with the machine disconnected from the tractor. In an emergency with the machine still connected to the tractor, turn engine off, apply parking brake, disengage the power takeoff, remove ignition key and wait for all motion to come to a complete stop.

Regular maintenance and proper operation are the basic essentials for a long-term efficiency and safe operation of the machine.

All maintenance should be carried out in an area having the proper equipment readily available and in good condition. This area needs to be always clean and dry and must have enough surrounding space to facilitate operations. Any work must be carried out by a trained person. Contact the dealer nearest you. Respect the warnings and procedures for maintenance and technical assistance given in this manual.

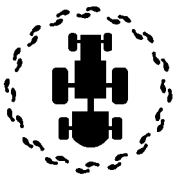
Do not use gasoline, solvents or other flammable liquids as detergents. Use commercial non-flammable and non toxic solvents, authorized by competent bodies.

Do not use compressed air or water at high pressure to clean the machine. If this is unavailable, then wear goggles with side protection and limit the pressure as much as possible. When the work is finished, and with the machine disconnected from the tractor, inspect the check the machine completely.

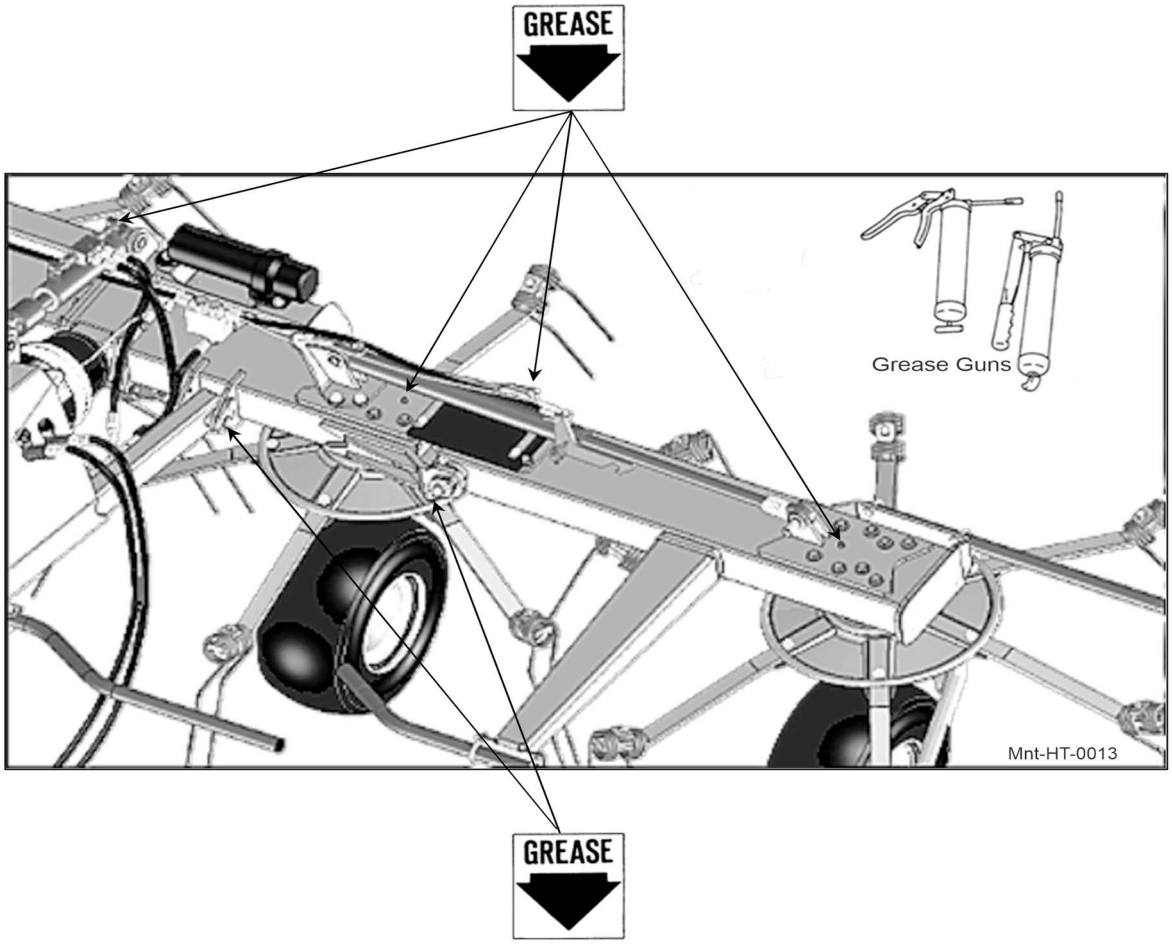
**⚠WARNING** Never attempt to lubricate, adjust, or remove material from the Implement while it is in motion or while tractor engine is running. (SG-20)str

**⚠WARNING** Relieve hydraulic pressure prior to doing any maintenance or repair work on the Implement. Place the Implement on the ground or securely blocked up, disengage the PTO, and turn off the tractor engine. Push and pull the Remote Cylinder lever in and out several times prior to starting any maintenance or repair work. (S3PT-09)str

**⚠WARNING** Periodically inspect all moving parts for wear and replace when necessary with authorized service parts. Look for loose fasteners, worn or broken parts, and leaky or loose fittings. Make sure all pins have cotter pins and washers. Serious injury may occur from not maintaining this machine in good working order. (SG-21 )str



## LUBRICATION POINTS




***NOTE:*** *Lubricate the corresponding points on the opposite side of the machine as well.*

Use only high quality multi-purpose grease suitable for agricultural machinery. A lithium-base grease of NLGI grade 2 is recommended.
Carry out lubrication regularly, following the intervals specified in the Scheduled Maintenance Table. In case of intensive use or particularly demanding working conditions, the lubrication frequency must be increased.

Pay particular attention to the following components:

- **PTO Driveshaft Joints:** Lubricate the joints and cross bearings to prevent premature wear and ensure smooth operation.
- **Rotating Joints:** Apply grease to the indicated points to reduce friction and maintain maximum mechanical efficiency.
- Rotor Bearings: These components are subject to heavy loads. Lubricate frequently to extend their service life.

Remove any excess grease to prevent the accumulation of dirt. Do not operate the machine immediately after lubrication. Allow the grease to distribute evenly.

Failure to perform lubrication or the use of unsuitable lubricants may impair machine functionality and cause irreversible damage to components.

## PERIODIC INSPECTIONS

Performing periodic inspections is essential to ensure that the tedder operates safely and efficiently. Checks must be carried out regularly, according to the operating hours and working conditions, as specified in the Scheduled Maintenance Table. Proper execution of these inspections helps prevent unexpected failures and keeps the machine in optimal working condition.

**Daily Checks**

Before each use, visually inspect the entire machine and ensure that there are no visible damages or worn components. In particular:

- Verify that all screws and bolts are tightened according to the torque values specified in following table.
- Check that all guards and protective covers are present, intact, and securely fastened.
- Inspect joints, welds, and hydraulic connections for any signs of cracks, fatigue, or fluid leaks.
- Ensure that the tractor's hydraulic oil level is adequate and that the tedder's hydraulic hoses are securely connected and free from abrasion or damage.

**Weekly Checks**

Every 40 working hours or once per week, perform the following inspections:

- Check the tires and ensure that inflation pressure complies with the recommended values.

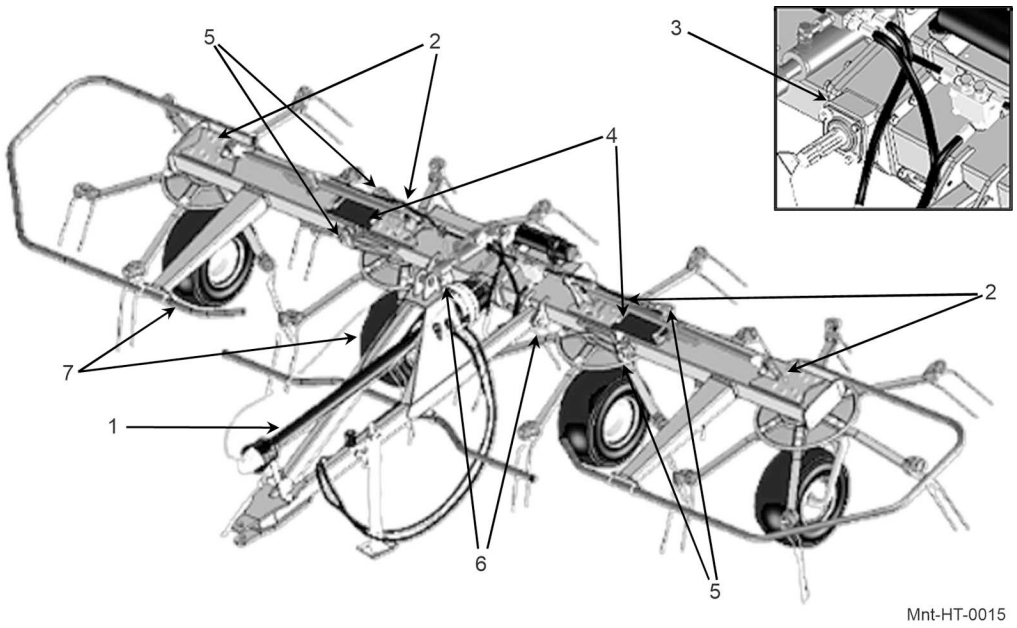
Mnt-HT-0014

| Tires | Max Pressure (psi/bar) | Operating Pressure (psi/bar) |
|---|---|---|
| 16 x 6, 5-8 | 70/ 4.8 | 46 / 3.2 |

**Extraordinary Checks**

After long periods of inactivity, or after working in particularly harsh conditions (such as very dusty or muddy environments), perform a thorough inspection of all mechanical and hydraulic components. Also verify that all safety decals are present and legible. Replace them if damaged.

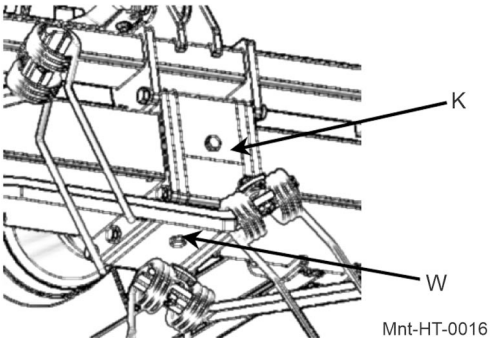
**⚠WARNING** All inspections must be carried out with the tractor stationary, the engine switch off, and the ignition key removed. For more in-depth inspections or complex interventions, contact qualified personnel or an authorized service center.




| SCHEDULED MAINTENANCE TABLE | | | | | | |
|---|---|---|---|---|---|---|
| **No.** | **Qty** | **Description** | **Operation** | **Every (Hours)** | **Product to Use** | **Notes** |
| 1 | 1 | PTO Shaft | Greasing | 20 | Grease | |
| 2 | 4 | Rotor Gears | Greasing | 40 | Grease | |
| 3 | 1 | Central Gearbox | Greasing | 80 | Grease | See Note A |
| 4 | 2 | Universal Joints | Greasing | 8 | Grease | |
| 5 | 6 | Pivot Pins | Greasing | 20 | Grease | |
| 6 | 2 | Drawbar Pins | Greasing | 50 | Grease | See Note C |
| 7 | 4 | Tires | Pressure Check | 40 | Air Compressor | |

**General Notes:**

- **A:** The complete lubrication of the central gearbox is performed for the first time at the factory. Thereafter, periodic topping-up is required according to the lubrication point chart. A full grease replacement is only necessary during repairs or when replacing the housing or internal components. In such cases, remove plug **K** and inject grease into the corresponding port until it begins to exit from the opening. Finally, reinstall the plug into the housing.




***NOTE:*** *Do Not Remove plug W during filling.*

- **C:** Check tire pressure every time the machine is attached to the tractor. Use additives compliant with anti-pollution regulation

## TIGHTENING TORQUES - (Nominal Values for Standard Assembly)

Metric Hex Head Bolts (without flange)

- Plain (PLN) finishing of parts without coating, with manufacturing oil residues.
- Zinc-dichromate (ZND) - finishing of parts with white chemical zinc plating.

| Nominal Size | Class (CL) 8.8 Bolt & Class (CL) 8 Nut | Class (CL) 10.9 Bolt & Class (CL) 10 Nut | Locknut CL 8 w/CL 8.8 Bolt | Locknut CL 10 w/CL 10.9 Bolt |
|---|---|---|---|---|
| | PLN and ZND | PLN and ZND | ZND | ZND |
| | N•m (lb•in) | N•m (lb•in) | N•m (lb•in) | N•m (lb•in) |
| M4 | 3.5 (31) | 5.0 (44) | 1.4 (13) | 2.8 (25) |
| M5 | 7.0 (62) | 10 (88) | 2.9 (26) | 5.5 (49) |
| M6 | 11.8 (104) | 17 (150) | 4.9 (43) | 9.4 (83) |
| M8 | 28.8 (255) | 41.3 (366) | 11.9 (105) | 23 (204) |
| | N•m (lb•ft) | N•m (lb•ft) | N•m (lb•ft) | N•m (lb•ft) |
| M10 | 57 (42) | 82 (60) | 24 (17) | 45 (33) |
| M12 | 100 (74) | 143 (105) | 41 (30) | 79 (38) |
| M14 | 159 (117) | 227 (168) | 66 (48) | 125 (92) |
| M16 | 248 (183) | 354 (261) | 102 (75) | 195 (144) |
| M18 | 352 (260) | 487 (359) | 145 (107) | 268 (198) |
| M20 | 500 (369) | 690 (509) | 206 (152) | 380 (280) |
| M24 | 865 (638) | 1195 (882) | 357 (263) | 657 (485) |

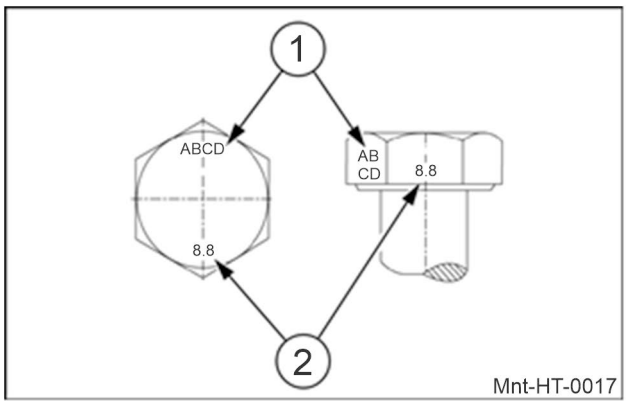
Metric Hex Head Flanged Bolts

- Plain (PLN) finishing of parts without coating, with manufacturing oil residues.
- Zinc-dichromate (ZND) - finishing of parts with white chemical zinc plating.

| Nominal Size | Class (CL) 8.8 Bolt & Class (CL) 8 Nut | Class (CL) 10.9 Bolt & Class (CL) 10 Nut | Locknut CL 8 w/CL 8.8 Bolt | Locknut CL 10 w/CL 10.9 Bolt |
|---|---|---|---|---|
| | PLN and ZND | PLN and ZND | ZND | ZND |
| | N•m (lb•in) | N•m (lb•in) | N•m (lb•in) | N•m (lb•in) |
| M4 | 3.8 (34) | 5.5 (49) | 4.2 (37) | 6.1 (54) |
| M5 | 7.7 (68) | 11 (97) | 8.5 (75) | 12 (106) |
| M6 | 13 (115) | 18.7 (166) | 14.3 (127) | 20.6 (182) |
| M8 | 31.7 (281) | 45.5 (403) | 35 (310) | 50 (453) |
| | N•m (lb•ft) | N•m (lb•ft) | N•m (lb•ft) | N•m (lb•ft) |
| M10 | 63 (47) | 90 (66) | 69 (51) | 99 (73) |
| M12 | 110 (81) | 157 (116) | 121 (89) | 173 (128) |
| M14 | 175 (129) | 250 (184) | 193 (142) | 275 (202) |
| M16 | 272 (201) | 389 (287) | 299 (221) | 428 (316) |
| M18 | 387 (286) | 535 (395) | 426 (315) | 589 (435) |
| M20 | 550 (406) | 759 (560) | 605 (447) | 835 (616) |
| M24 | 951 (702) | 1315 (970) | 1046 (772) | 1447 (1067) |

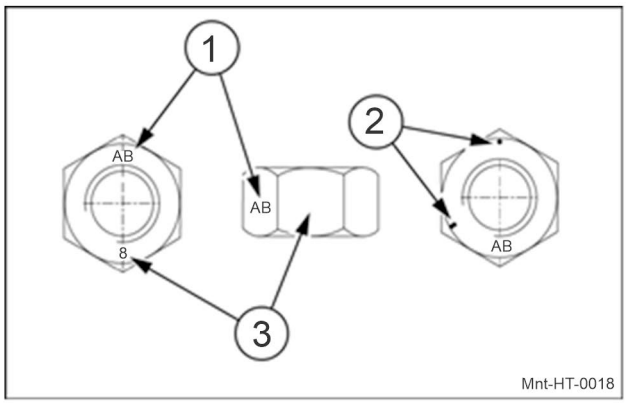
**Identification Markings**

- **Metric hex head bolts, hex head flanged bolts and nuts, class (CL) 5.6 and above.**




1. Manufacturer identification
2. Property Class

- **Metric hex nuts and locknuts, Classes (CL) 05 and above.**




1. Manufacturer identification
2. “Clock” markings indicate the property class and may include manufacturer identification (if applicable). Example: 240º markings (shown) at the eight o’clock position indicate a property class of 8, while 300º markings at the ten o’clock position indicate a property class of 10
3. Property Class.

# MAINTENANCE



## TORQUE SPECIFICATIONS - TORQUE DATA FOR HYDRAULIC SYSTEMS

### General Information

Hydraulic connections require a minimum torque to ensure that there are no leaks at rated pressure and there is adequate fatigue resistance, Over-torque may also cause leaks or failures. Some connections require torque values that are different from those specified in ISO and SAE standards.

Always follow the instructions given in this manual for specific torque values when servicing components. The information in this section is only a general guideline to be followed if specific torque values are lacking.

### Tolerance

The tolerance for all torque values is ±10%. This tolerance must take into consideration all assembly variations, not just the repeatability of the torque wrench.

### Lubrication

Avoid applying grease or other lubricants to hydraulic connectors. If there is already clean hydraulic oil on the connector, it is not necessary to remove it. In general, applying grease.

- May cause a significant change in the torque needed for proper tightening.
- May reduce the connector's resistance to vibration.
- Excessive grease may displace an elastomeric seal during tightening.
- The extruding of grease during tightening may be mistaken for a leak.

Lubrication is recommended only for connections made on aluminum manifolds or with stainless steel connectors. In these cases, it may be necessary to apply a lubricant to prevent seizing.

The use of thread-locking compounds is prohibited, because it:

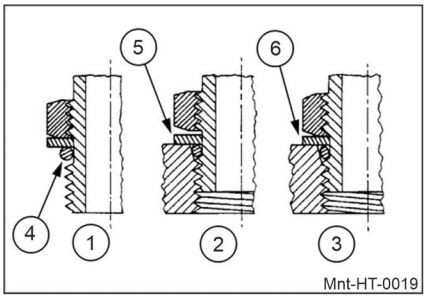
- May cause a significant change in the torque needed to tighten connections properly.
- Makes it difficult to service the joint
- Can prevent the O-ring from sealing properly if the compound comes into contact with the O-ring.

### Installing adjustable fittings on straight O-ring connectors.

1. Lubricate the O-ring with a light coat of oil or petroleum. Place the O-ring in the groove next to the metal backing washer, located at the end of the groove (4).
2. Insert the fitting into the SAE straight thread boss until the metal backing washer contacts the boss surface (5).

   **Do NOT over-tighten, to avoid deforming the metal backing washer.**

3. Position the fitting by rotating it counterclockwise up to one turn. Tighten the locknut and washer against the main surface (6), holding the fitting body with a wrench.



| SAE Dash Size | UN/UNF Thread Size | Metric OD (mm) | Inch Tube OD (mm) | Swivel Nut Torque N•m (lb ft) ± 10% |
|---|---|---|---|---|
| 2 | 5/16-24 | - | 3.18 | 8.25 (6.1) |
| 3 | 3/8 -24 | - | 4.76 | 11.5 (8.5) |
| 4 | 7/16-20 | 6 | 6.35 | 15.5 (11.4) |
| 5 | 1/2-20 | 8 | 7.94 | 20 (14.8) |
| 6 | 9/16-18 | 10 | 9.52 | 25 (18.4) |
| 8 | 3/4-16 | 12 | 12.7 | 52 (38.4) |
| 10 | 7/8-14 | 16 | 15.88 | 81 (59.7) |
| 12 | 1-1/16-12 | 20 | 19.05 | 112 (82.6) |
| 14 | 1-3/16-12 | - | 22.22 | 133 (98.1) |
| 16 | 1-5/16-12 | 25 | 25.4 | 155 (114.3) |
| 20 | 1-5/8-12 | 30/32 | 31.75 | 180 (132.8) |
| 24 | 1-7/8-12 | 38 | 38.1 | 225 (166) |
| 32 | 2-1/2-12 | 50 | 50.8 | 348 (256.7) |

**Torque values for British Standard Pipe Parallel (BSPP) connections for threaded ports and terminals.**

| | Metric Tube Outside Diameter (OD) mm (in) | | Ferrous | | Non-Ferrous | |
|---|---|---|---|---|---|---|
| **BSPPThread** G-Gas: A-Medium coarse threads | **S- Series*** | **L-Series*** | **S-Series N•m (lb ft) ± 10%** | **L-Series N•m (lb ft) ± 10%** | **S-Series N•m (lb ft) ± 10%** | **L-Series N•m (lb ft) ± 10%** |
| G 1/8 A | - | 6 (0.236) | - | 21 (15.5) | - | 12.5 (9.2) |
| G 1/4 A | 6 (0.236) or 8 (0.315) | 8 (0.315) or 10 (0.394) | 63 (46.5) | 53 (39.1) | 38 (28) | 32 (23.6) |
| G 3/8 A | 10 (0.394) or 12 (0.472) | 12 (0.472) | 95 (70.1) | 84 (62) | 57 (42) | 50(36.9) |
| G 1/2 A | 13 (0.630) | 15 (0.591) or 18 (0.709) | 136 (100.3) | 105 (77.4) | 82 (60.5) | 63 (46.5) |
| G 3/4 A | 20 (0.787) | 22 (0.866) | 210 (154.9) | 210 (154.9 | 126 (92.9) | 126 (92.9) |
| G 1 A | 25 (0.984) | 28 (1.102) | 400 (295) | 400 (295) | 240 (177) | 240 (177) |
| G 1 1/4 A | 30 (1.181) | 35 (1.378) | 525 (387.2) | 525 (387.2) | 315 (232.3) | 315 (232.3) |
| G 1 1/2 A | 38 (1.496) | 42 (1.654) | 660 (486.8) | 660 (486.8) | 396 (292.1) | 396 (292.1) |

* S - Series connectors are used with O-Ring Face Seals (ORFS)
** L - Series connectors are used with 37º flare

**Torque values for metric connection ports (metric flat face seal ports and terminals)**

| | Metric Tube Outside Diameter (OD) mm (in) | | Ferrous | | Non-Ferrous | |
|---|---|---|---|---|---|---|
| Metric Thread | S- Series* | L-Series* | S-Series N•m (lb ft) ± 10% | L-Series N•m (lb ft) ± 10% | S-Series N•m (lb ft) ± 10% | L-Series N•m (lb ft) ± 10% |
| M10 x 1 | - | 4 (0.157) | - | 21 (15.5) | - | 12.5 (9.2) |
| M12 x 1.5 | 4 (0.157) | 6 (0.236) | 47 (34.7) | 32 (23.6) | 28 (20.7) | 19 (14) |
| M14 x 1.5 | 5 (0.197) | 7 (0.276) | 63 (46.5) | 53 (39.1) | 38 (28) | 32 (23.6) |
| M16 x 1.5 | 7 (0.276) | 9 (0.354) | 84 (62) | 63 (46.5) | 50 (36.9) | 38 (28) |
| M18 x 1.5 | 8 (0.315) | 11 (0.433) | 105 (77.4) | 84 (62) | 63 (46.5) | 50 (36.9) |
| M20 x 1.5 | 10 (0.394) | - | 147 (108.4) | - | 88 (64.9) | - |
| M22 x 1.5 | 12 (0.472) | 14 (0.551) | 158 (116.5) | 147 (108.4) | 95 (70.1) | 88 (64.9) |
| M26 x 1.5 | - | 18 (0.709) | - | 210 (154.9) | - | 126 (92.9) |
| M27 x 1.2 | 16 (0.630) | - | 210 (154.9) | - | 126 (92.9) | - |
| M33 x 2 | 20 (0.787) | 23 (0.906) | 400 (295) | 400 (295) | 240 (177) | 240 (177) |
| M42 x 2 | 25 (0.984) | 30 (1.181) | 525 (387.2) | 525 (387.2) | 315 (232.3) | 315 (232.3) |
| M48 x 2 | 32 (1.260) | 36 (1.417) | 630 (464.7) | 630 (464.7) | 396 (292.1) | 396 (292.1) |

* S - Series connectors are used with O-Ring Face Seals (ORFS)
** L - Series connectors are used with 37º flare

## STORAGE

Properly preparing and storing the hay tedder at the end of the season is critical to maintaining its appearance and to help ensure years of dependable service. The following are suggested storage procedures

- Thoroughly clean all debris off the implement to prevent damage from decaying grass.
- Lubricate all grease points and fill gearbox oil levels as detailed in the maintenance section using Multi-Purpose Gear Oil.
- Tighten all bolts and pins to the recommended torque.
- Check worn and damaged parts. Perform repairs and make replacements immediately so that the implement will be ready for use at the start of the next season.
- Store the hay tedder in a clean, dry place with the housing resting securely on blocks or at ground level.
- Use spray touch-up enamel where necessary to prevent rust and maintain the appearance of the hay tedder.
- Store tedder with the wings lowered and the main transport wheels lowered.

## SCRAPPING THE MACHINE

The machine consists mainly of ferrous material, a small amount of plastic and a very small amount of residual grease which must be disposed of according to the regulations in force in the country concerned.

BUSH HOG®

# TO THE OWNER/OPERATOR/DEALER

To keep your implement running efficiently and safely, read your manual thoroughly and follow these directions and the Safety Messages in this Manual. The Table of Contents clearly identifies each section where you can easily find the information you need.

The OCCUPATIONAL SAFETY AND HEALTH ACT (1928.51 Subpart C) makes these minimum safety requirements of tractor operators:

REQUIRED OF THE OWNER:

1. Provide a Roll-Over-Protective Structure that meets the requirements of this Standard; and
2. Provide Seat belts that meet the requirements of this paragraph of this Standard and SAE J4C; and
3. Ensure that each employee uses such Seat belt while the tractor is moving; and
4. Ensure that each employee tightens the Seat belt sufficiently to confine the employee to the protected area provided by the ROPS

REQUIRED OF THE OPERATOR:

1. Securely fasten seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments, and holes.
3. Reduce speed when turning, crossing slopes, and on rough, slick, or muddy surfaces.
4. Stay off slopes too steep for safe operation.
5. Watch where you are going - especially at row ends, on roads, and around trees.
6. Do not permit others to ride.
7. Operate the tractor smoothly - no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by the tractor manufacturer.
9. When the tractor is stopped, set brakes securely and use park lock, if available.

**X** Keep children away from danger all day, every day…

**X** Equip tractors with rollover protection (ROPS) and keep all machinery guards in place…

**X** Please work, drive, play and live each day with care and concern for your safety and that of your family and fellow citizens.

BUSH HOG®

# HTX417/ HTX419
# HAY TEDDER

HTX417/HTX419-SOM 03-26
Printed U.S.A

P/N 50085599