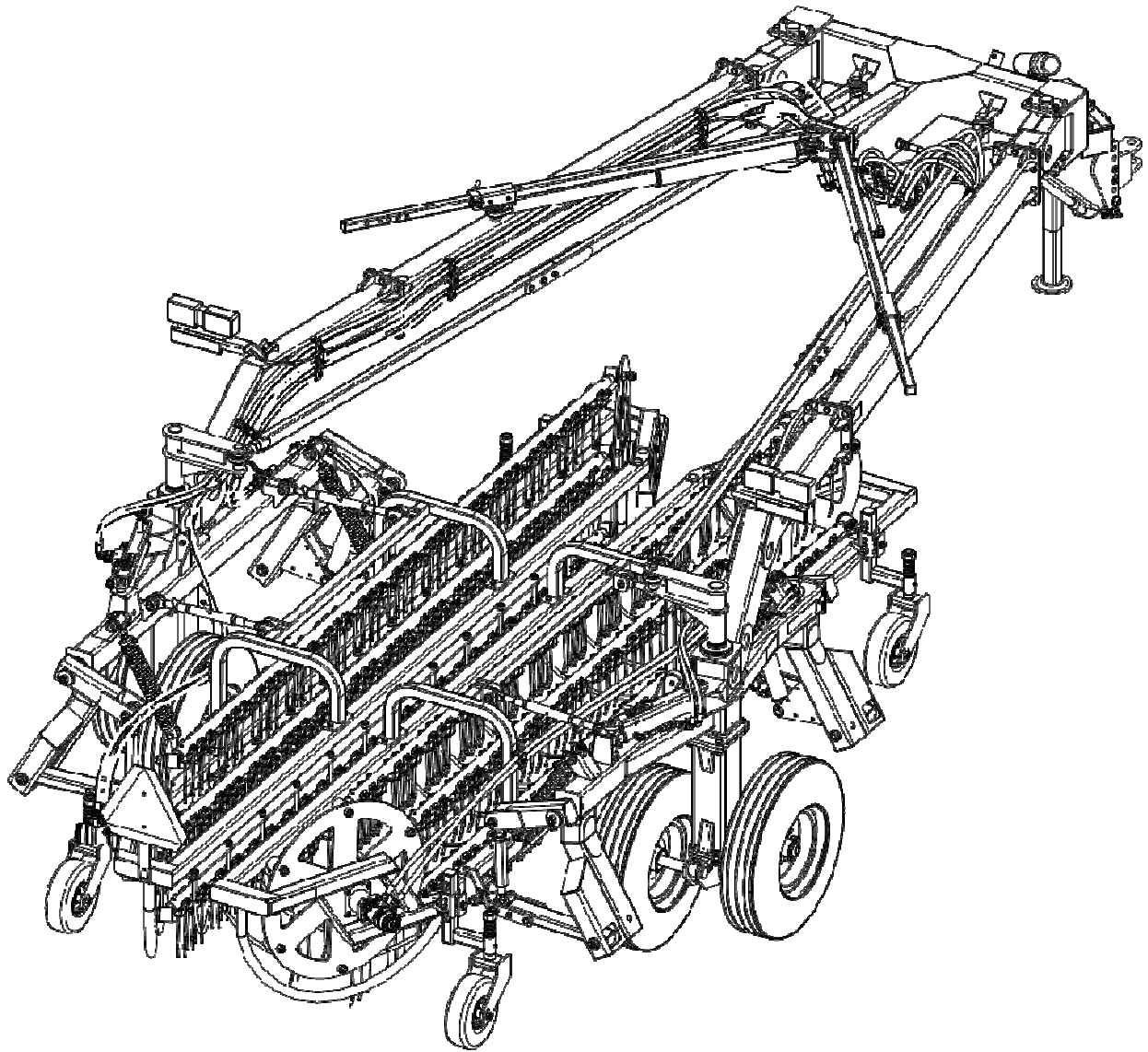


AGRICULTURAL MACHINERY

sitrex®
Spa

OPERATOR'S MANUAL

BR 2030/6 Basket Rake 6 bars
BR 2030/7 Basket Rake 7 bars



CONTENTS

SECTION 1	GENERAL INFORMATION	1
1.1	NOTE TO THE OWNER	1
1.2	DEALER AND SERVICE	1
1.3	INTENDED USE	2
1.4	ELECTRO MAGNETIC COMPATIBILITY (EMC)	2
1.5	PRODUCT IDENTIFICATION	3
1.6	MACHINE ORIENTATION	4
SECTION 2	SAFETY INFORMATION	5
2.1	SAFETY RULES AND SIGNAL WORD DEFINITIONS	5
2.2	GENERAL SAFETY RULES	5
2.3	ECOLOGY AND THE ENVIRONMENT	9
2.4	MAINTENANCE SAFETY	10
2.5	SAFETY SIGNS	11
2.6	ROAD TRAVEL SIGNS AND INFORMATIONAL DECALS	17
SECTION 3	TECHNICAL SPECIFICATIONS	21
SECTION 4	CONTROLS AND INSTRUMENTS	23
4.1	CONTROLLER LAYOUT	23
4.2	CONTROLLER STORAGE	24
SECTION 5	OPERATING INSTRUCTIONS	25
5.1	TRACTOR REQUIREMENTS	25
5.2	POWER REQUIREMENTS	26
5.3	TRACTOR DRAWBAR DIMENSIONS	28
5.4	CONNECTING THE UNIT TO THE TRACTOR	29
5.5	DISCONNECTING THE UNIT FROM THE TRACTOR	30
SECTION 6	TRANSPORT OPERATIONS	31
6.1	BEFORE TRANSPORTING	31
6.2	TRANSPORT LIGHTING	33
6.3	DRIVING ON ROADS	35
SECTION 7	WORKING OPERATIONS	37
7.1	RAKING WIDTH AND WINDROW WIDTH	37
7.2	FOLD AND UNFOLD THE RAKE	38
7.3	BASKET ANGLE SETTING	39
7.4	WHEEL TRACK ADJUSTMENT	40
7.5	BASKET TILT	41
7.6	TINE HEIGHT	41
7.7	CASTER WHEEL HEIGHT	42
7.8	FLOTATION SPRING TENSION	43
7.9	BASKET SPEED ADJUSTMENT	44
7.10	FIELD OPERATIONS	46
SECTION 8	MAINTENANCE	49
8.1	MAINTENANCE ADVICE	49
8.2	LUBRICATION	49
8.3	HYDRAULIC DIAGRAM	50
8.4	TORQUE SPECIFICATIONS – NOMINAL TIGHTENING VALUES FOR NORMAL ASSEMBLY	51
8.5	TORQUE SPECIFICATIONS – STANDARD TORQUE DATA FOR HYDRAULICS	53
8.6	MAINTENANCE PLANNING	56
8.7	MAINTENANCE EVERY 10 HOURS OF OPERATION OR DAILY	57
8.8	MAINTENANCE EVERY 50 HOURS OF OPERATION OR WEEKLY	59
8.9	MAINTENANCE EVERY 200 HOURS OF OPERATION	60
8.10	MAINTENANCE AS REQUIRED	60
8.11	END OF SEASON SERVICE	62
8.12	PRESEASON SERVICE	62
SECTION 9	TROUBLESHOOTING	63

SECTION 1 GENERAL INFORMATION

1.1 NOTE TO THE OWNER

This manual contains important information concerning the adjustment and maintenance of your new equipment.

Please have all operators read this manual carefully and keep this manual available for ready reference. Read this manual to make sure that you have a complete understanding of how to operate this machine safely, correctly, and for the most effective performance of the machine.

Keep this manual protected and accessible on the machine whenever towing, transporting, or operating.

1.2 DEALER AND SERVICE

Your dealer has performed a pre-delivery setup, inspection, and testing to make sure that your machine operates at its best performance level and will instruct you in the general operation of your new equipment.

Use only approved accessories and attachments designed for your machine.

Do not make any unauthorized modifications to your machine.

Be prepared to give your dealer the following data when ordering parts:

Model	
Product Identification Number (PIN)	
Date purchased	

Sitrex reserves the right to make improvements or changes when improvements or changes become practical and possible to do so, without incurring any obligation to make changes or additions to the equipment sold previously.

1.3 INTENDED USE

The basket rake is intended to be used for raking hay, straw, or similar organic material into windrows for pickup by a forage harvester, baler, or other crop processing device.

The rake speed and performance may depend on several limiting parameters such as weather, terrain conditions, crop variety, yield, and crop maturity.

This machine is designed to perform in most crops and conditions, however there may be several combinations of limiting parameters that can cause severe degradation of performance of the machine or systems thereof.

Do not use this machine for any purpose or in any manner other than as described in the manual, decals, or other product safety information provided with the machine.

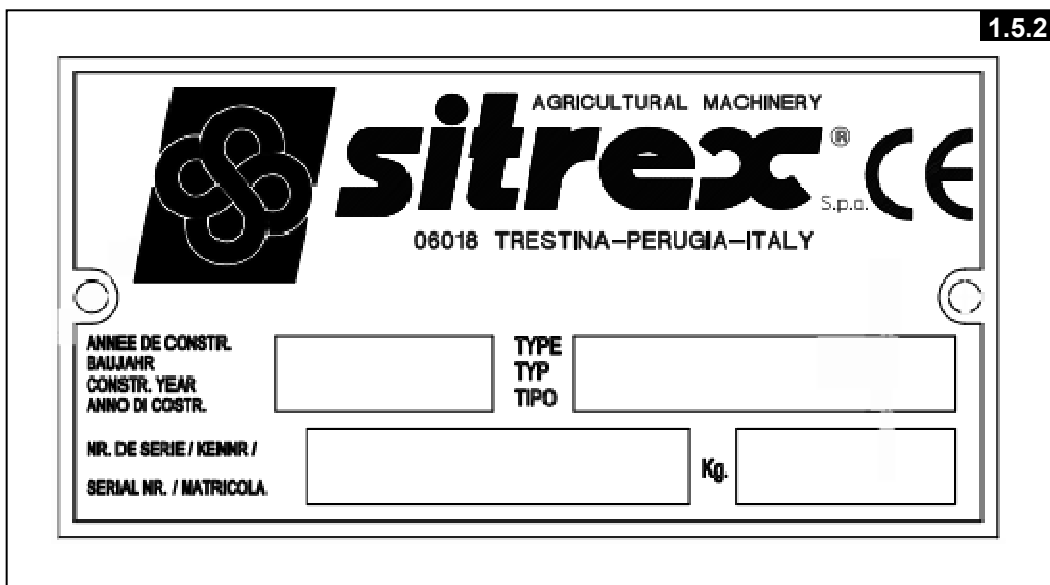
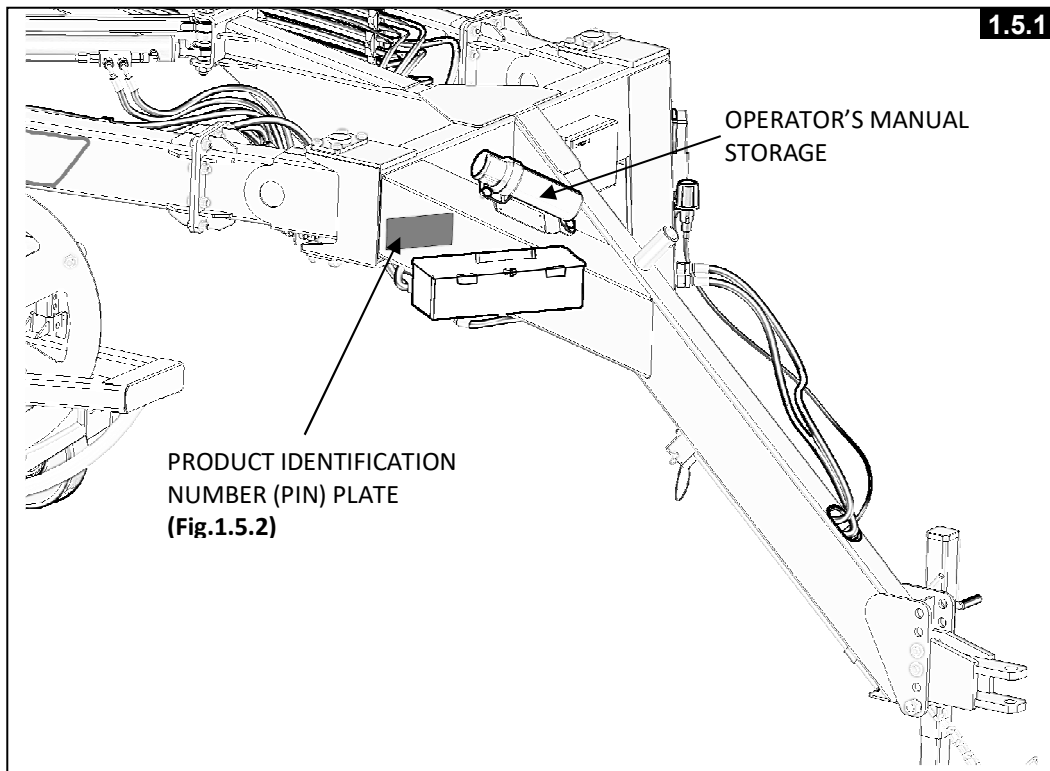
1.4 ELECTRO MAGNETIC COMPATIBILITY (EMC)

Interference may arise as a result of add-on equipment that may not necessarily meet the required standards. As such interference can result in serious malfunction of the unit and/or create unsafe situations, you must observe the following:

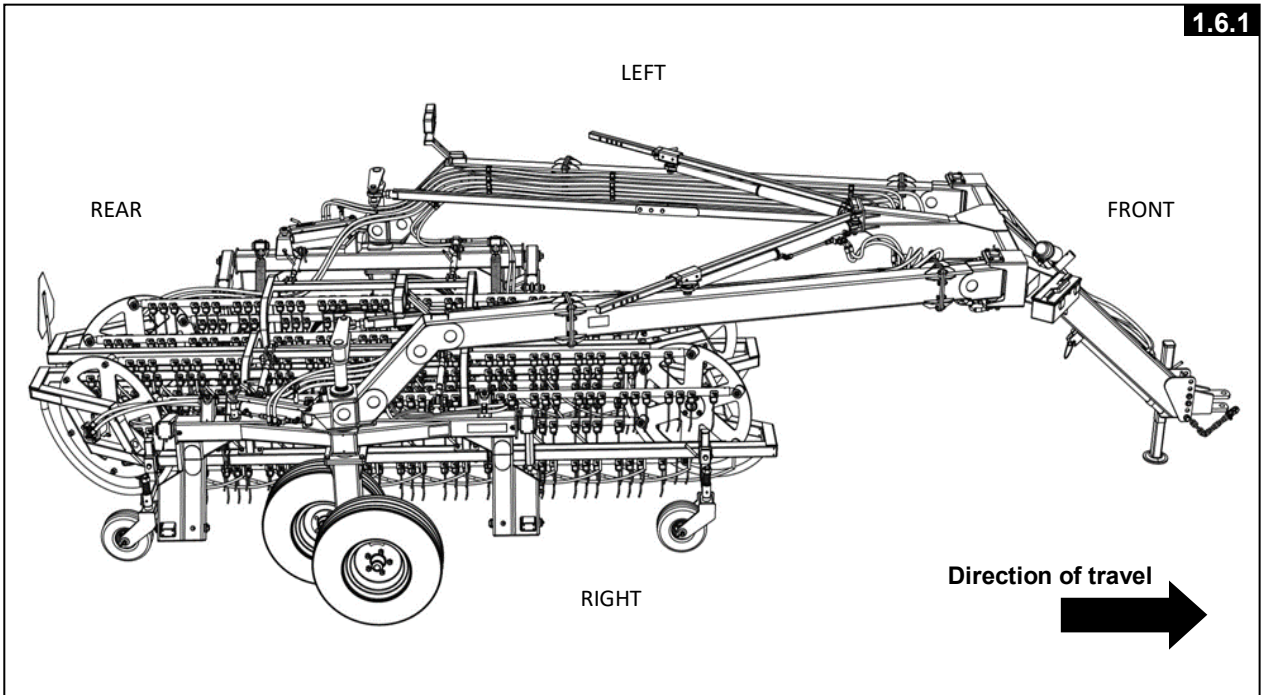
- The maximum power of emission equipment (radio, telephones, etc.) must not exceed the limits imposed by the national authorities of the country where you use the machine.
- The electro-magnetic field generated by the add-on system should not exceed 24 V/m at any time and at any location in the proximity of electronic components.
- The add-on equipment must not interfere with the functioning of the on-board electronics.

Failure to comply with these rules will render the warranty null and void.

1.5 PRODUCT IDENTIFICATION



1.6 MACHINE ORIENTATION



SECTION 2 SAFETY INFORMATION

2.1 SAFETY RULES AND SIGNAL WORD DEFINITIONS



This is the safety alert symbol.

It is used to alert you to potential personal injury hazards.

Obey all safety messages that follow this symbol to avoid possible death or injury.

Read and understand all the safety messages in this manual before you operate or service the machine.

⚠ DANGER indicates a hazardous situation that, if not avoided, will result in death or serious injury.

⚠ WARNING indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

Failure to follow DANGER, WARNING and CAUTION messages could result in death or serious injury.

2.2 GENERAL SAFETY RULES

General safety

Use caution when you operate the machine on slopes. Raised equipment, full tanks and other loads will change the center of gravity of the machine. The machine can tip or roll over when near ditches and embankments or uneven surfaces.

Never permit anyone other than the operator to ride on the machine.

Never operate the machine under the influence of alcohol or drugs, or while you are otherwise impaired.

Pay attention to overhead power lines and hanging obstacles. High voltage lines may require significant clearance for safety.

Keep clear of moving parts. Loose clothing, jewelry, watches, long hair, and other loose or hanging items can become entangled in moving parts.

Wear protective equipment when appropriate.

DO NOT attempt to remove material from any part of the machine while it is being operated or while components are in motion.

Dirty or slippery steps, ladders, walkways, and platforms can cause falls. Make sure these surfaces remain clean and clear of debris.

A person or pet within the operating area of a machine can be struck or crushed by the machine or its equipment. DO NOT allow anyone to enter the work area.

Hydraulic oil or diesel fuel leaking under pressure can penetrate the skin, causing serious injury or infection.

- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
- Stop the engine, remove the key, and relieve the pressure before you connect or disconnect fluid lines.
- Make sure that all components are in good condition. Tighten all connections before you start the engine or pressurize the system.
- If hydraulic fluid or diesel fuel penetrates the skin, seek medical attention immediately.
- Continuous long-term contact with hydraulic fluid may cause skin cancer. Avoid long term contact and wash the skin promptly with soap and water.

Make sure that all guards and shields are in good condition and properly installed before you operate the machine. Never operate the machine with shields removed. Always close access doors or panels before you operate the machine.

Raised equipment and/or loads can fall unexpectedly and crush persons underneath. Never allow anyone to enter the area underneath raised equipment during operation.

General maintenance safety

Keep the area used for servicing the machine clean and dry. Clean up spilled fluids.

Service the machine on a firm, level surface. Install guards and shields after you service the machine. Close all access doors and install all panels after servicing the machine.

Do not attempt to clean, lubricate, clear obstructions, or make adjustments to the machine while it is in motion or while the engine is running.

Always make sure that working area is clear of tools, parts, other persons and pets before you start operating the machine.

Unsupported hydraulic cylinders can lose pressure and drop the equipment, causing a crushing hazard. Do not leave equipment in a raised position while parked or during service, unless the equipment is securely supported.

Jack or lift the machine only at jack or lift points indicated in this manual.

Incorrect towing procedures can cause accidents. When you tow a disabled machine follow the procedure in this manual. Use only rigid tow bars.

Stop the engine, remove the key, and relieve pressure before you connect or disconnect fluid lines.

Stop the engine and remove the key before you connect or disconnect electrical connections.

Replace damaged or worn tubes, hoses, electrical wiring, etc.

The engine, transmission, exhaust components, and hydraulic lines may become hot during operation. Take care when you service such components. Allow surfaces to cool before you handle or disconnect hot components. Wear protective equipment when appropriate.

Wheels and tires

Make sure that tires are correctly inflated. Do not exceed any recommended load or pressure. Follow the instructions in the manual for proper tire inflation.

Tires are heavy. Handling tires without proper equipment could cause death or serious injury.

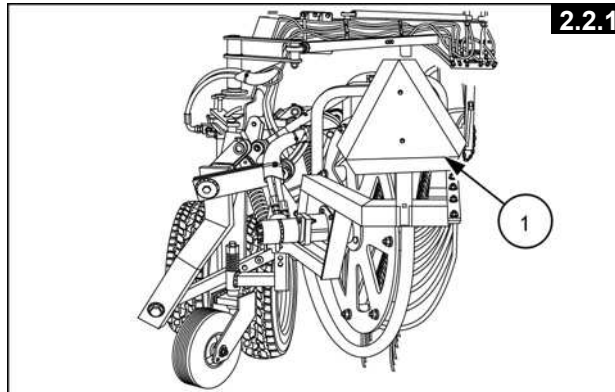
Always have a qualified tire technician service the tires and wheels. If a tire has lost all pressure, take the tire and wheel to a tire shop or your dealer for service. Explosive separation of the tire can cause serious injury.

DO NOT weld to a wheel or rim until the tire is completely removed. Inflated tires can generate a gas mixture with the air that can be ignited by high temperatures from welding procedures performed on the wheel or rim. Removing the air or loosening the tire on the rim (breaking the bead) will NOT eliminate the hazard. This condition can exist whether tires are inflated or deflated. The tire MUST be completely removed from the wheel or rim prior to welding the wheel or rim.

Driving on public roads and general transportations safety

Comply with local laws and regulations.

Make sure that the SMV emblem (1) is visible.



Use safety chains for trailed equipment when safety chains are provided with machine or equipment.

Lift implements and attachments high enough above ground to prevent accidental contact with road.

When you transport equipment or a machine on a transport trailer, make sure that it is properly secured. Be sure the SMV on the equipment or machine is covered while being transported on a trailer.

Be aware of overhead structures or power lines and make sure that the machine and/or attachments can pass safely under.

Travel speed should be such that you maintain complete control and machine stability at all times.

Slow down and signal before turning. Pull over to allow faster traffic to pass. Follow correct towing procedure for equipment with or without brakes.

Fire and explosion prevention

Fuel or oil that is leaked or spilled on hot surfaces or electrical components can cause a fire.

Crop materials, trash, debris, bird nests, or flammable material can ignite on hot surfaces. Always have a fire extinguisher on or near the machine. Make sure that the fire extinguisher(s) is maintained and serviced according to the manufacturer's instructions.

At least once each day and at the end of the day, remove all trash and debris from the machine especially around hot components such as the engine, transmission, exhaust, battery, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

At least once each day, remove debris accumulation around moving components such as bearings, pulleys, belts, gears, cleaning fans, etc. More frequent cleaning of your machine may be necessary depending on the operating environment and conditions.

Inspect the electrical system for loose connections and frayed insulation. Repair or replace loose or damaged parts.

Do not store oily rags or other flammable material on the machine.

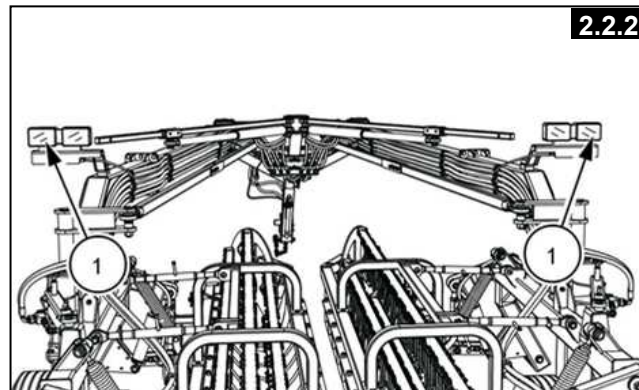
Do not weld or flame cut any items that contain flammable material. Clean items thoroughly with non-flammable solvents before welding or flame-cutting.

Do not expose the machine to flames, burning brush, or explosives.

Promptly investigate any unusual smells or odors that may occur during operation of the machine.

Reflectors and warning lights

You must use flashing amber warning lights (1) when you operate equipment on public roads.



Personal Protective Equipment (PPE)

Wear Personal Protective Equipment (PPE) such as hard hat, eye protection, heavy gloves, hearing protection, protective clothing, etc.

Do Not Operate tag

Before you start servicing the machine, attach a 'Do Not Operate' warning tag to the machine in an area that will be visible.

Hazardous chemicals

If you are exposed to or come in contact with hazardous chemicals you can be seriously injured. The fluids, lubricants, paints, adhesives, coolant, etc. required for the function of your machine can be hazardous. They may be attractive and harmful to domestic animals as well as humans.

Material Safety Data Sheets (MSDS) provide information about the chemical substances within a product, safe handling and storage procedures, first aid measures, and procedures to take in the event of a spill or accidental release. MSDS are available from your dealer.

Before you service your machine check the MSDS for each lubricant, fluid, etc. used in this machine. This information indicates the associated risks and will help you service the machine safely. Follow the information in the MSDS, and on manufacturer containers, as well as the information in this manual, when you service the machine.

Dispose of all fluids, filters, and containers in an environmentally safe manner according to local laws and regulations. Check with local environmental and recycling centers or your dealer for correct disposal information.

Store fluids and filters in accordance with local laws and regulations. Use only appropriate containers for the storage of chemicals or petrochemical substances.

Keep out of reach of children or other unauthorized persons.

Applied chemicals require additional precautions. Obtain complete information from the manufacturer or distributor of the chemicals before you use them.

Electrical storm safety

Do not operate the machine during an electrical storm.

If you are on the ground during an electrical storm, stay away from machinery and equipment. Seek shelter in a permanent, protected structure.

If an electrical storm should strike during operation, remain in the cab. Do not leave the cab or operator's platform. Do not make contact with the ground or objects outside the machine.

2.3 ECOLOGY AND THE ENVIRONMENT

Soil, air, and water quality is important for all industries and life in general. When legislation does not yet rule the treatment of some of the substances that advanced technology requires, sound judgment should govern the use and disposal of products of a chemical and petrochemical nature.

Familiarize yourself with the relative legislation applicable to your country, and make sure that you understand this legislation. Where no legislation exists, obtain information from suppliers of oils, filters, batteries, fuels, anti-freeze, cleaning agents, etc., with regard to the effect of these substances on man and nature and how to safely store, use, and dispose of these substances.

Helpful hints

- Avoid the use of cans or other inappropriate pressurized fuel delivery systems to fill tanks. Such delivery systems may cause considerable spillage.
- In general, avoid skin contact with all fuels, oils, acids, solvents, etc. Most of these products contain substances that may be harmful to your health.
- Modern oils contain additives. Do not burn contaminated fuels and or waste oils in ordinary heating systems.
- Avoid spillage when you drain fluids such as used engine coolant mixtures, engine oil, hydraulic fluid, brake fluid, etc. Do not mix drained brake fluids or fuels with lubricants. Store all drained fluids safely until you can dispose of the fluids in a proper way that complies with all local legislation and available resources.
- Do not allow coolant mixtures to get into the soil. Collect and dispose of coolant mixtures properly.
- Do not open the air-conditioning system yourself. It contains gases that should not be released into the atmosphere.
- Repair any leaks or defects in the engine cooling system or hydraulic system immediately.
- Do not increase the pressure in a pressurized circuit as this may lead to a component failure.

Battery recycling

Batteries and electric accumulators contain several substances that can have a harmful effect on the environment if the batteries are not properly recycled after use. Improper disposal of batteries can contaminate the soil, groundwater, and waterways.



Mandatory battery recycling

Batteries are made of lead plates and a sulfuric acid solution. Because batteries contain heavy metals such as lead, CONAMA Resolution 401/2008 requires you to return all used batteries to the battery dealer when you replace any batteries. Do not dispose of batteries in your household garbage.

Points of sale are obliged to:

- Accept the return of your used batteries
- Store the returned batteries in a suitable location
- Send the returned batteries to the battery manufacturer for recycling.

2.4 MAINTENANCE SAFETY

⚠ WARNING

Entanglement hazard!

Disengage the hydraulic system, turn off the engine, and remove the key. Wait for all movement to stop before you leave the operator's position. Never adjust, lubricate, clean, or remove a blockage of crop material when the engine is on.

Failure to comply could result in death or serious injury.

⚠ WARNING

Improper operation or service of this machine can result in an accident.

Read and understand the SAFETY INFORMATION chapter before you perform any maintenance, service, or repairs. Read and understand the specific service procedures for the components you plan to work with before you start servicing the machine.

Failure to comply could result in death or serious injury.

⚠ WARNING

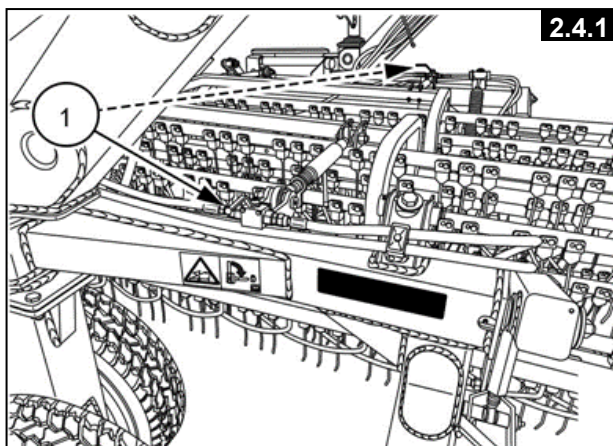
Crush and/or impact hazard!

Always engage the safety locks and the cylinder lockout before you enter any area under the machine or perform any inspection or maintenance procedures. Before you operate the machine, always make sure that the safety locks and the cylinder lockout are correctly retracted.

Failure to comply could result in death or serious injury.

The baskets will fall rapidly if the hydraulic system should fail. Always engage the basket lockout valve on each basket when working around a raised basket.

1. Apply the tractor parking brake.
2. Raise the baskets and engage the lockout valves (1) to the closed position (handle faces out).
3. Shut off the tractor engine.



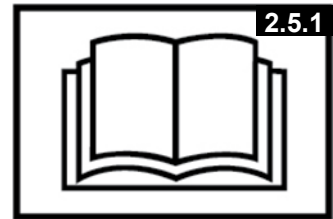
2.5 SAFETY SIGNS

The following safety signs are on your machine as a guide for your safety and for the safety of those working with you. Walk around the machine and note the content and the location of all safety signs before you operate your machine.

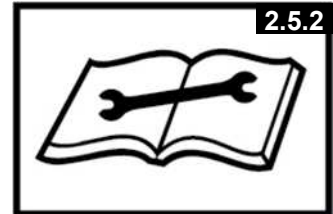
Keep all safety signs clean and legible. Clean safety signs with a soft cloth, water, and gentle detergent.

Replace all safety signs that are damaged, missing, painted over, or illegible. If a safety sign is on a part you or your dealer replaces, make sure that you or your dealer install the safety sign on the new part. See your dealer for replacement safety signs.

Safety signs that display the “Read operator’s manual” symbol direct you to the operator’s manual for further information regarding maintenance, adjustments, or procedures for particular areas of the machine.

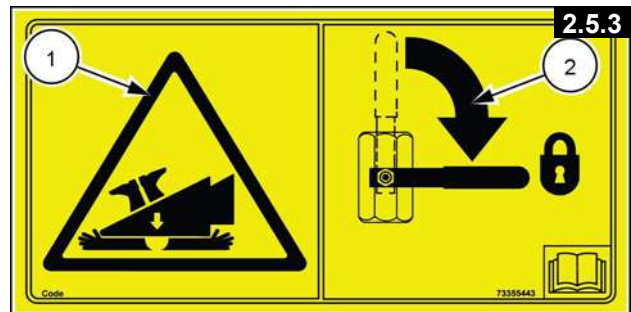


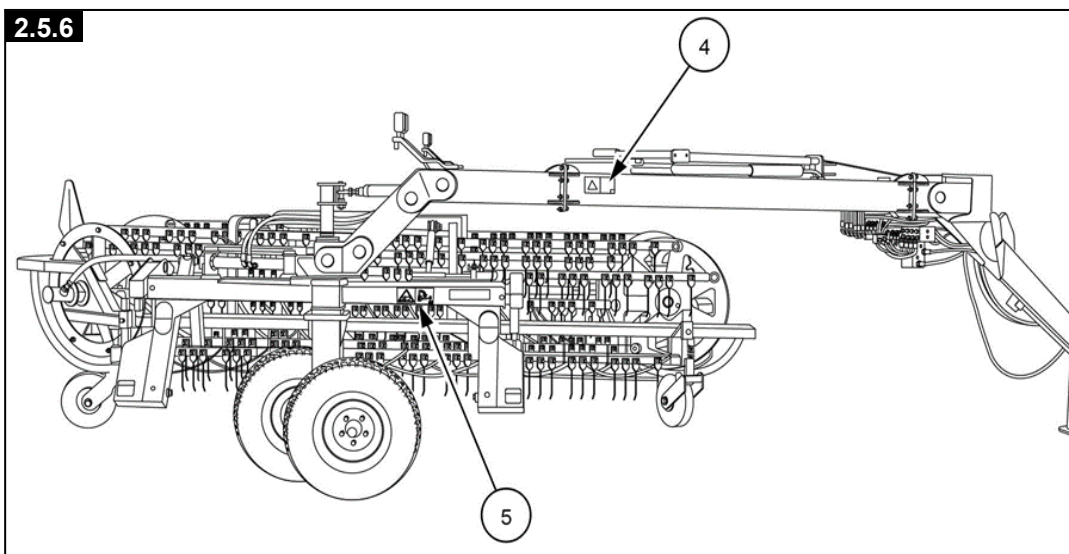
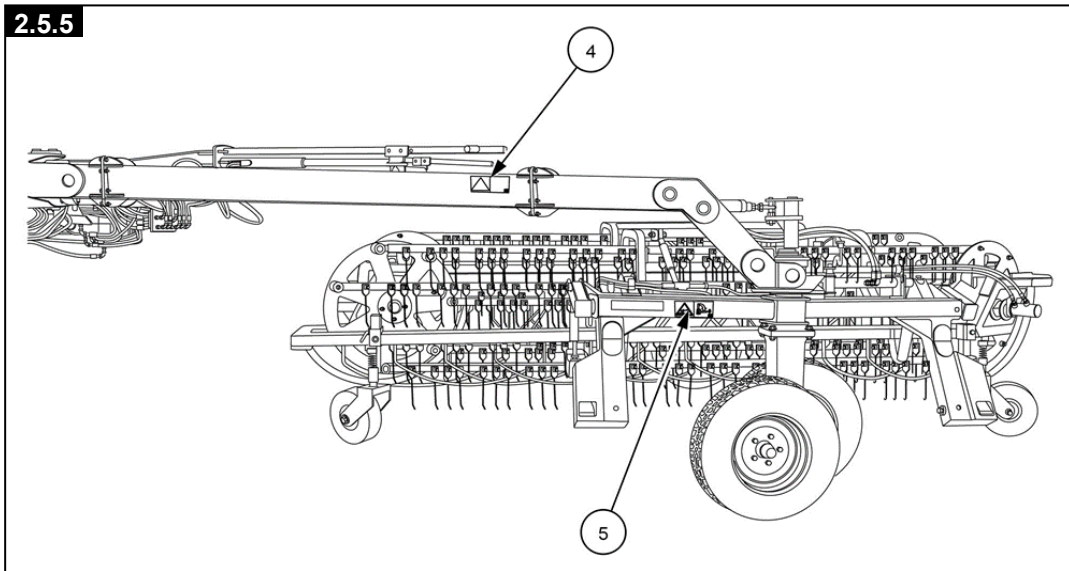
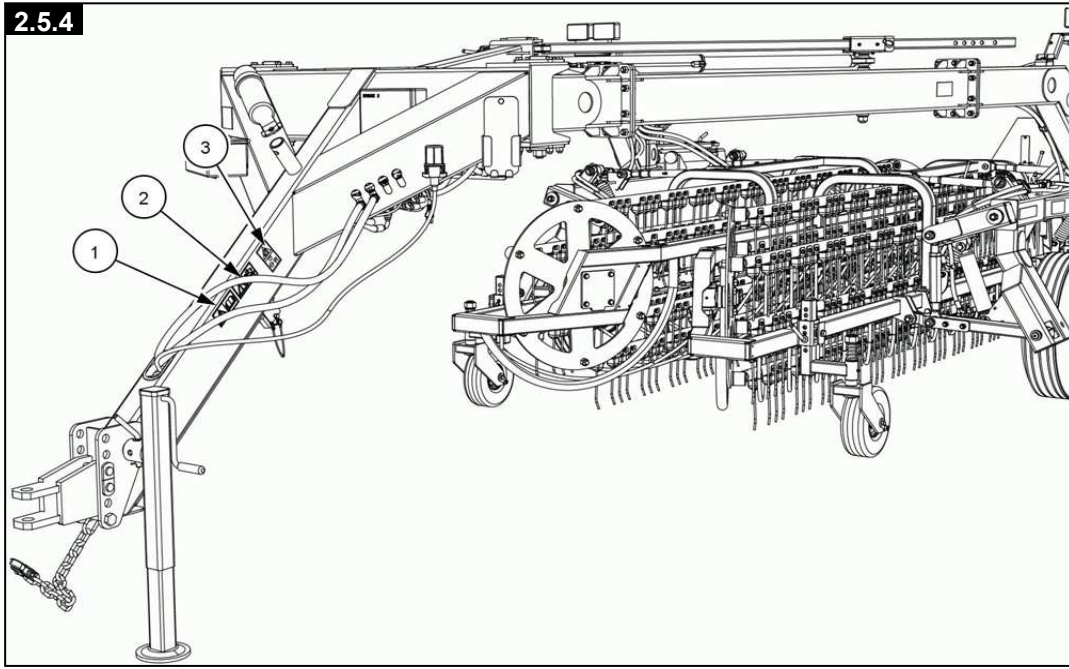
Safety signs that display the “Read service manual” symbol direct you to the service manual.



ISO two panel pictorial symbol safety signs are defined as follows:

- The first panel (1) indicates the nature of the hazard.
- The second panel (2) indicates the appropriate avoidance of the hazard.
- Background color is YELLOW.





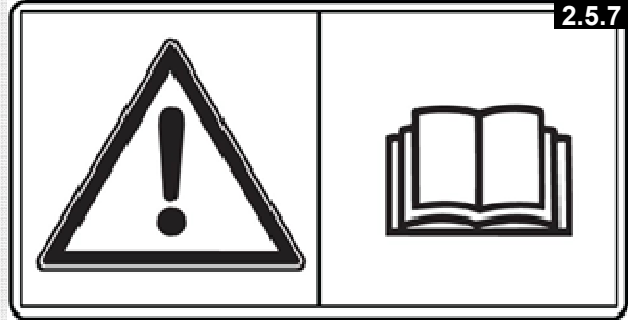
WARNING

RISK OF HARM POSSIBLE WHILE MACHINE IS OPERATING OR WHEN PERFORMING ROUTINE MAINTENANCE OPERATIONS ON MACHINE!

Before operating machine, read operator's manual and all safety instructions.

If manual is missing, contact your dealer or service department.

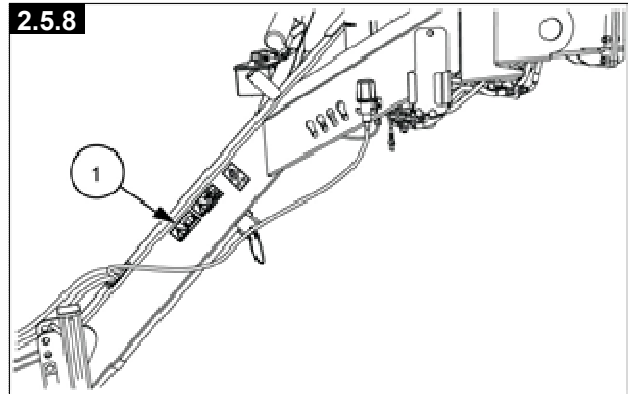
1. Before starting engine or operation, clear area of bystanders.
2. Disengage drives including hydraulics. Stop engine, wait for all movement to stop before leaving operator's position.
3. Keep all shields in place, keep hands, feet, clothing and hair away from moving parts.
4. Keep riders off machines.
5. Use Slow-Moving Vehicle (SMV) identification emblem and flashing warning lights when operating on highways, except when prohibited by law.
6. Never adjust, lubricate, clean or unplug machine with engine running.



Failure to comply could result in death or serious injury.

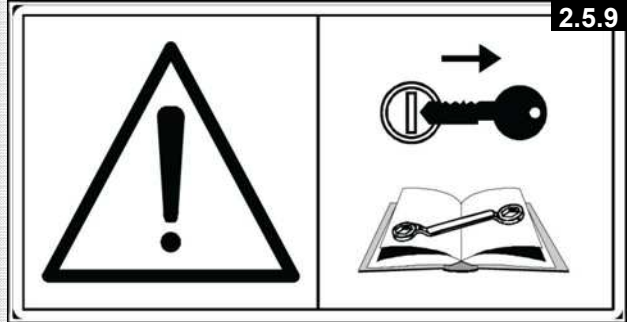
Quantity: 1

(1) Located on the left-hand side of the drawbar.



WARNING
INADVERTENT OPERATION HAZARD!

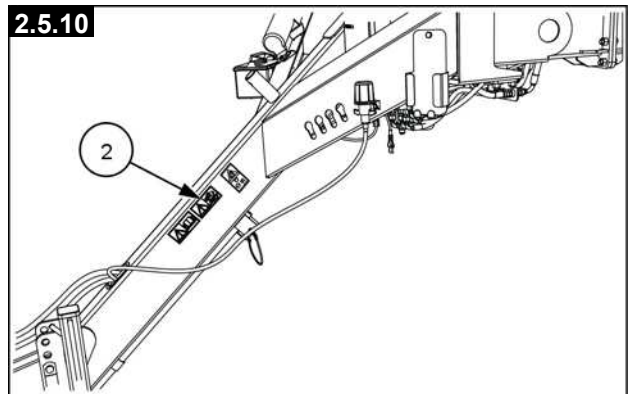
- Always stop the engine and remove the key before you perform maintenance service or repairs.
- Always wait for all movement to stop before leaving the operator's position.
- Never adjust, lubricate, clean, or clear crop blockages with the machine running.



Failure to comply could result in death or serious injury.

Quantity: 1

(2) Located on the left-hand side of the drawbar.



WARNING
LOSS OF CONTROL HAZARD!

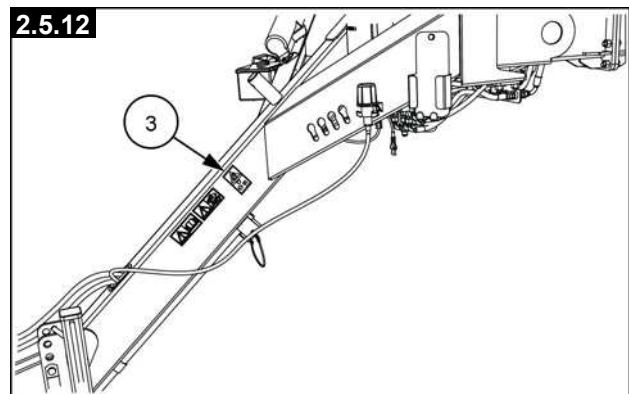
- Properly prepare machine for transport / roading.
- 20 mph [32 kph] - MAX. road speed.
- Towing unit must be equipped with compatible electrical connections to operate lights.
- Towing unit must weigh at least .67 x weight of towed machine.
- Use caution when making turns to avoid loss of control.
- See operator's manual for information.



Failure to comply could result in death or serious injury.

Quantity: 1

(3) Located on the left-hand side of the drawbar.



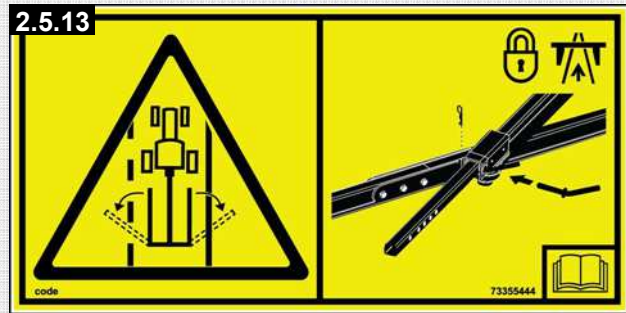
WARNING COLLISION HAZARD!

LOCK BASKETS IN TRANSPORT POSITION BEFORE TOWING

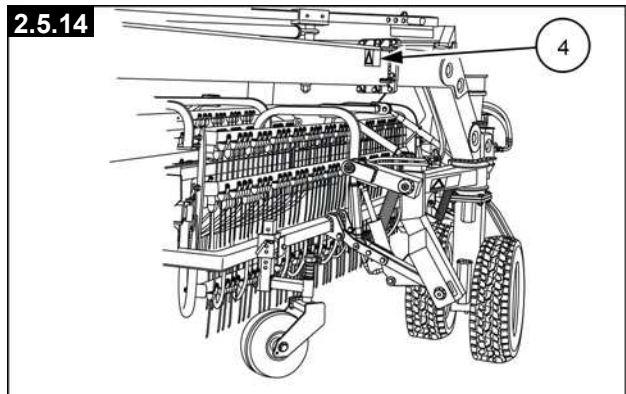
- Fully FOLD each basket rake.
- Engage the unfold stops into the transport positions.

Failure to comply could result in death or serious injury.

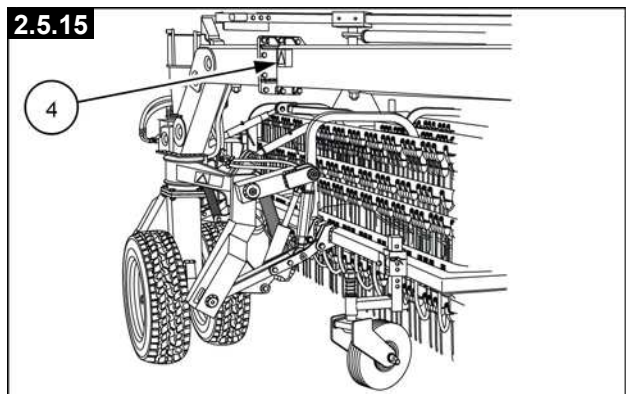
Quantity: 2



(4) Located on the left-hand frame section.



(4) Located on the right-hand frame section.

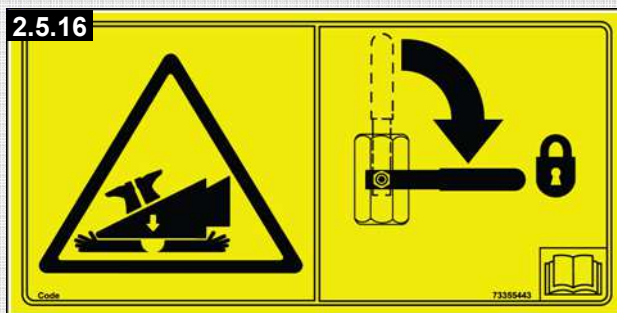


WARNING CRUSHING HAZARD!

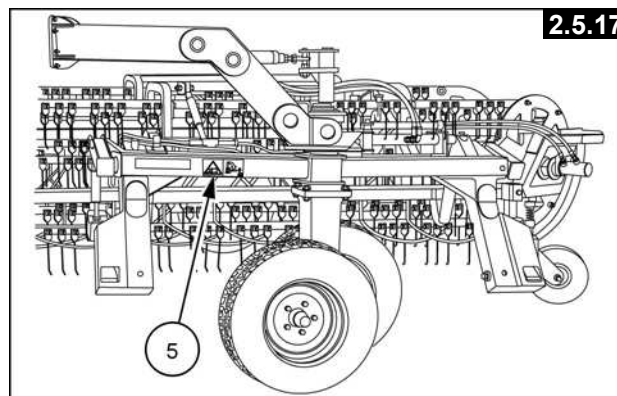
- Basket will fall rapidly if the hydraulic system should fail.
- Engage the basket lockout valve when working around a raised basket.

Failure to comply could result in death or serious injury.

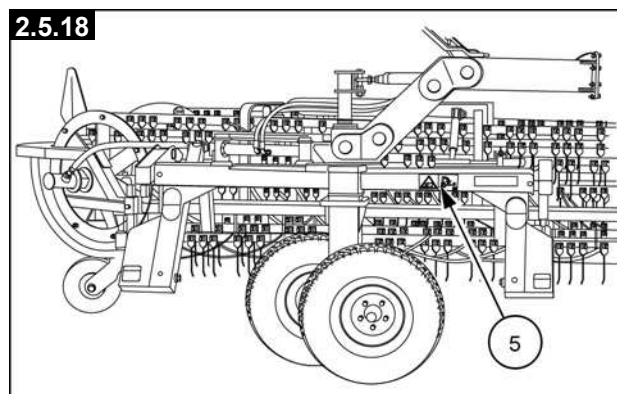
Quantity: 2



(5) Located on the left-hand basket support.



(4) Located on the right-hand basket support



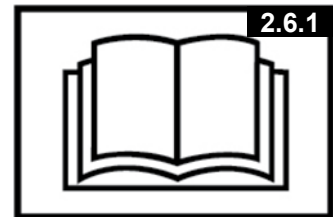
2.6 ROAD TRAVEL SIGNS AND INFORMATIONAL DECALS

Informational decals on your machine serve as a guide to service location points, service information, operational indicators, adjustments, and settings. The placements of the informational decals to the machine may have application to one or more locations. Each informational decal description includes the decal locations on the machine. Walk around the machine and note the intent and/or content and location of these informational decals before operating your machine.

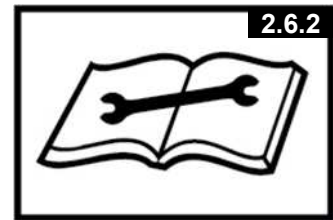
Keep all informational decals clean and legible.

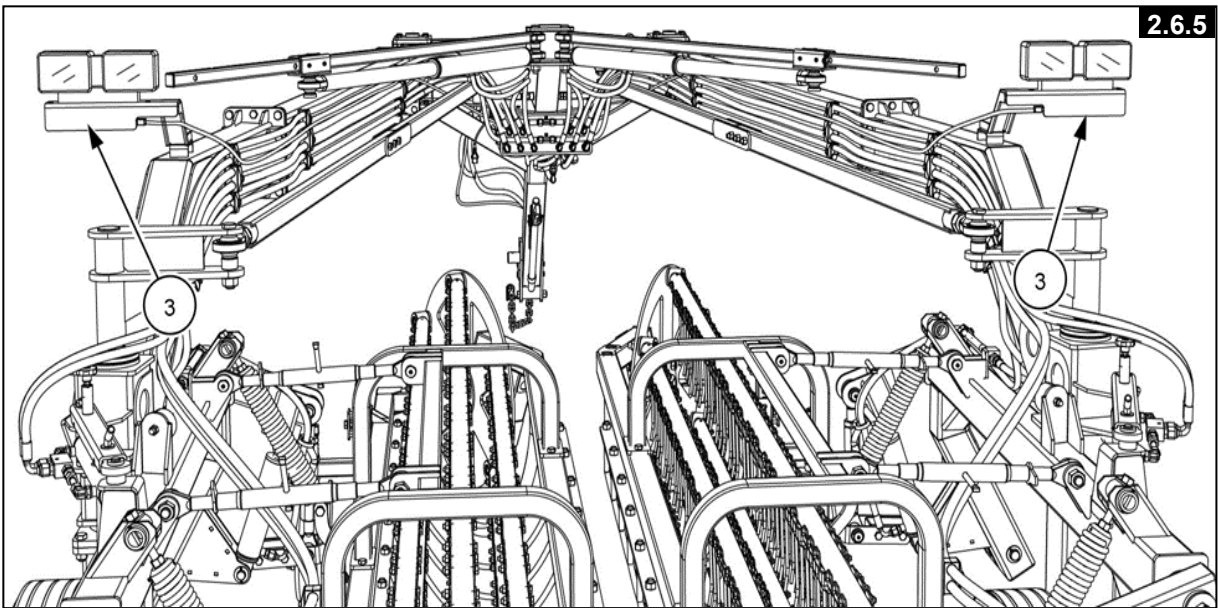
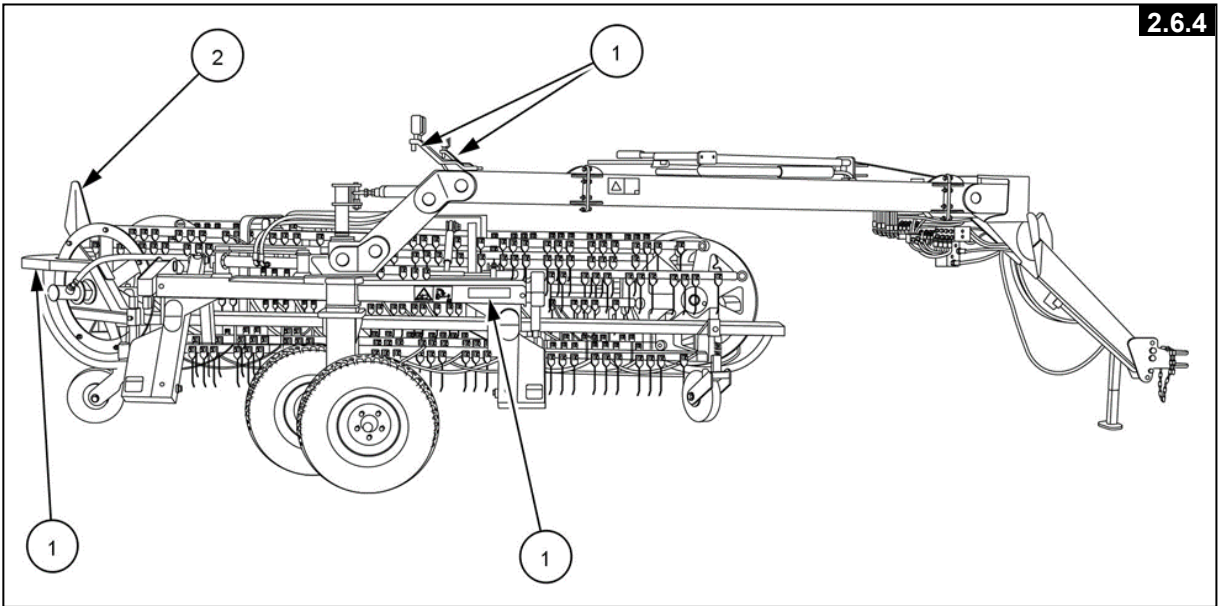
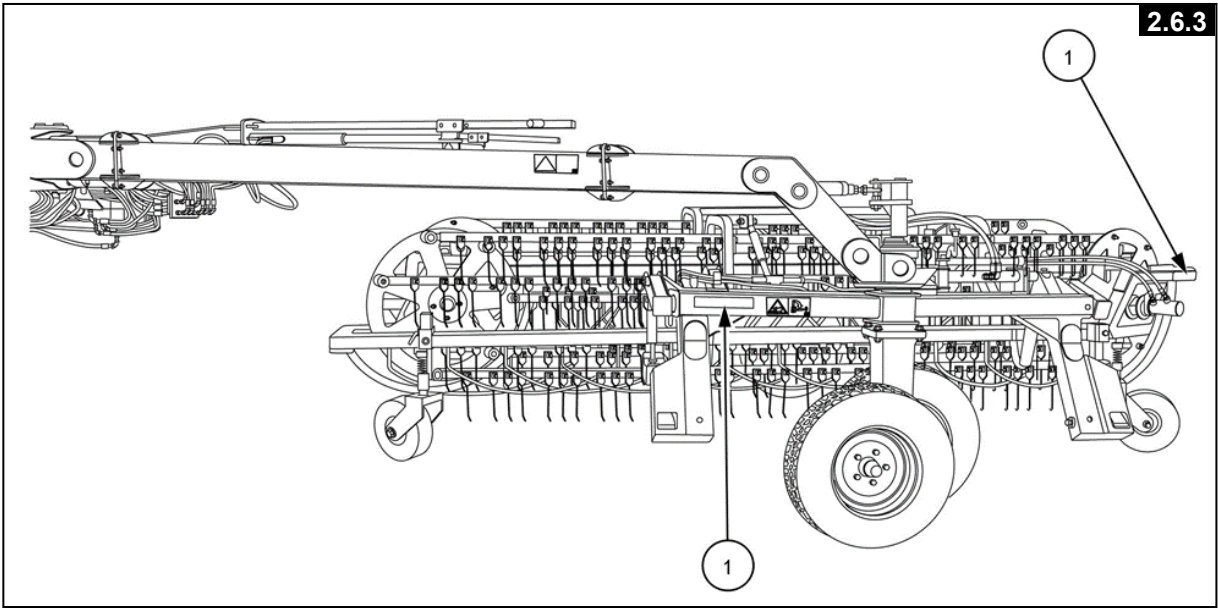
Replace all road travel signs and informational decals that are damaged, missing, painted over, or illegible. If a road travel sign or informational decal is on a part that you or your dealer replaces, make sure that you or your dealer installs the road travel sign or informational decal on the new part. See your dealer for replacement decals.

Informational decals that display the “Read operator’s manual” symbol direct you to the operator’s manual for further information regarding maintenance, adjustments, or procedures for particular areas of the machine. When an informational decal displays this symbol, consult the appropriate page of the operator’s manual.



Informational decals that display the “Read service manual” symbol direct you to the service manual. If you doubt your ability to perform service operations, contact your dealer.





Tape, yellow reflective
Used for extra visibility to oncoming vehicles.

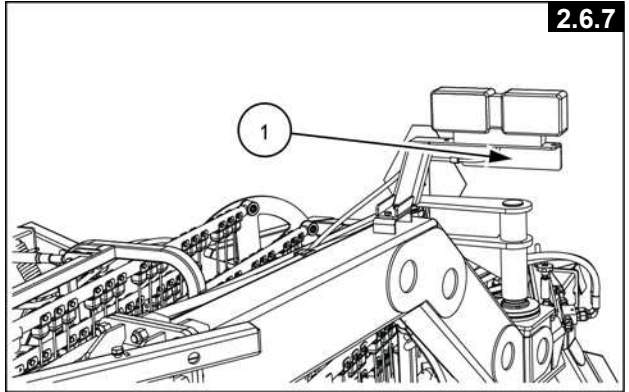
Quantity: 6

2.6.6



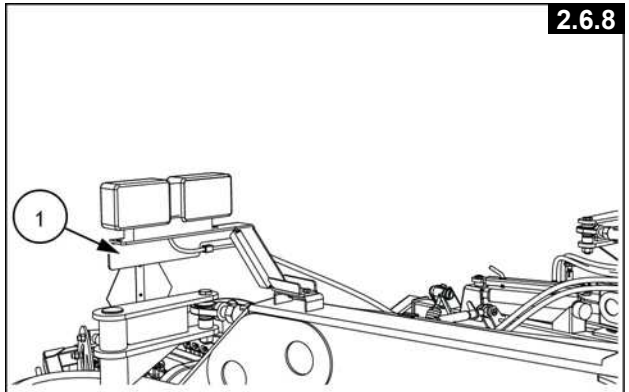
(1) Located on the front side of the left-hand lamp assembly bracket.

2.6.7



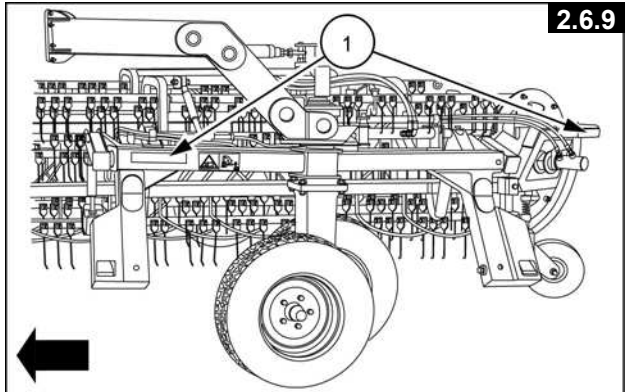
(1) Located on the front side of the right-hand lamp assembly bracket.

2.6.8



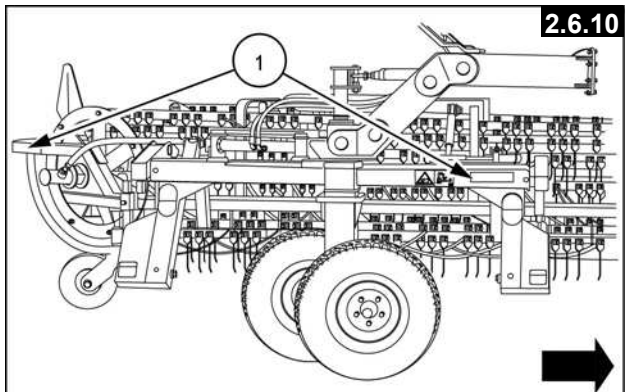
(1) Located on left-hand basket support and the left-hand basket rake.

2.6.9



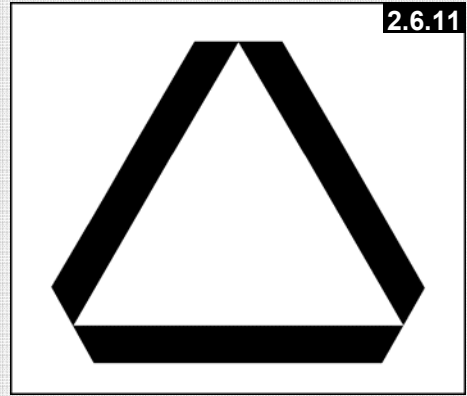
(1) Located on right-hand basket support and the left-hand basket rake.

2.6.10

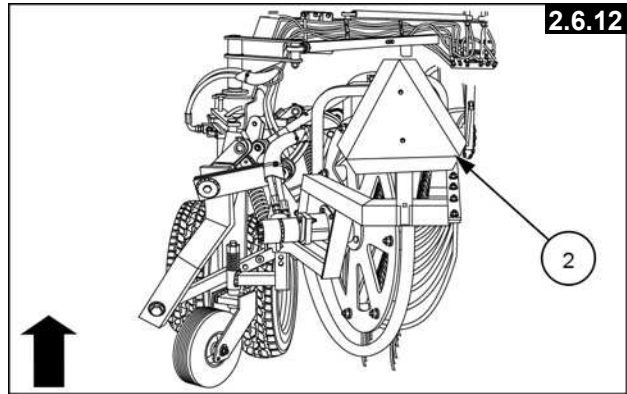


Slow-Moving Vehicle (SMV) sign
Used to indicate low vehicle speeds to oncoming traffic.

Quantity: 1



(2) Located left-hand basket rake.

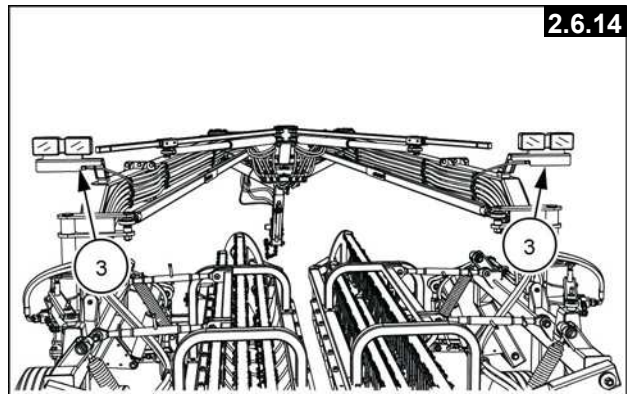


Tape, Red reflective
Used for extra visibility to oncoming vehicles.

Quantity: 2

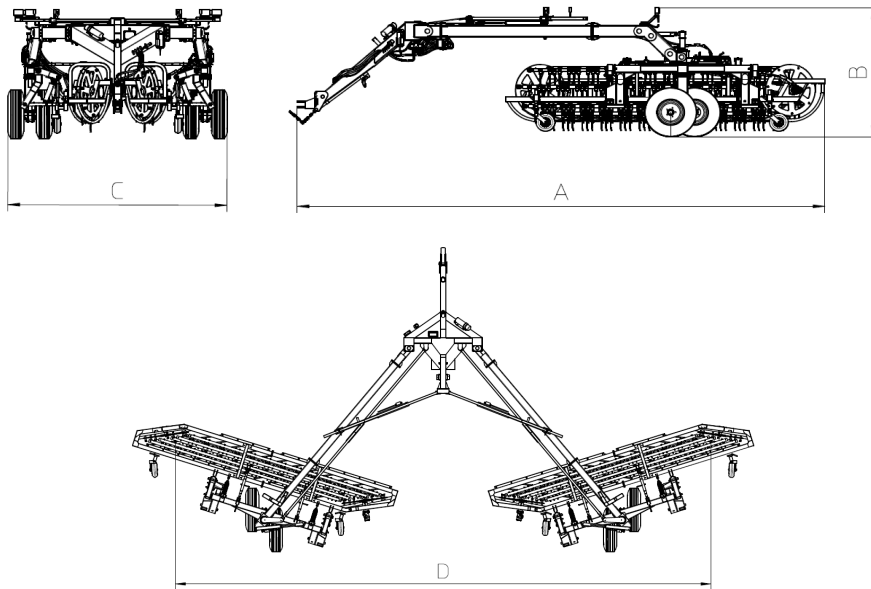


(3) Located on the back side of the left-hand and right-hand lamp assembly brackets.



SECTION 3 TECHNICAL SPECIFICATIONS

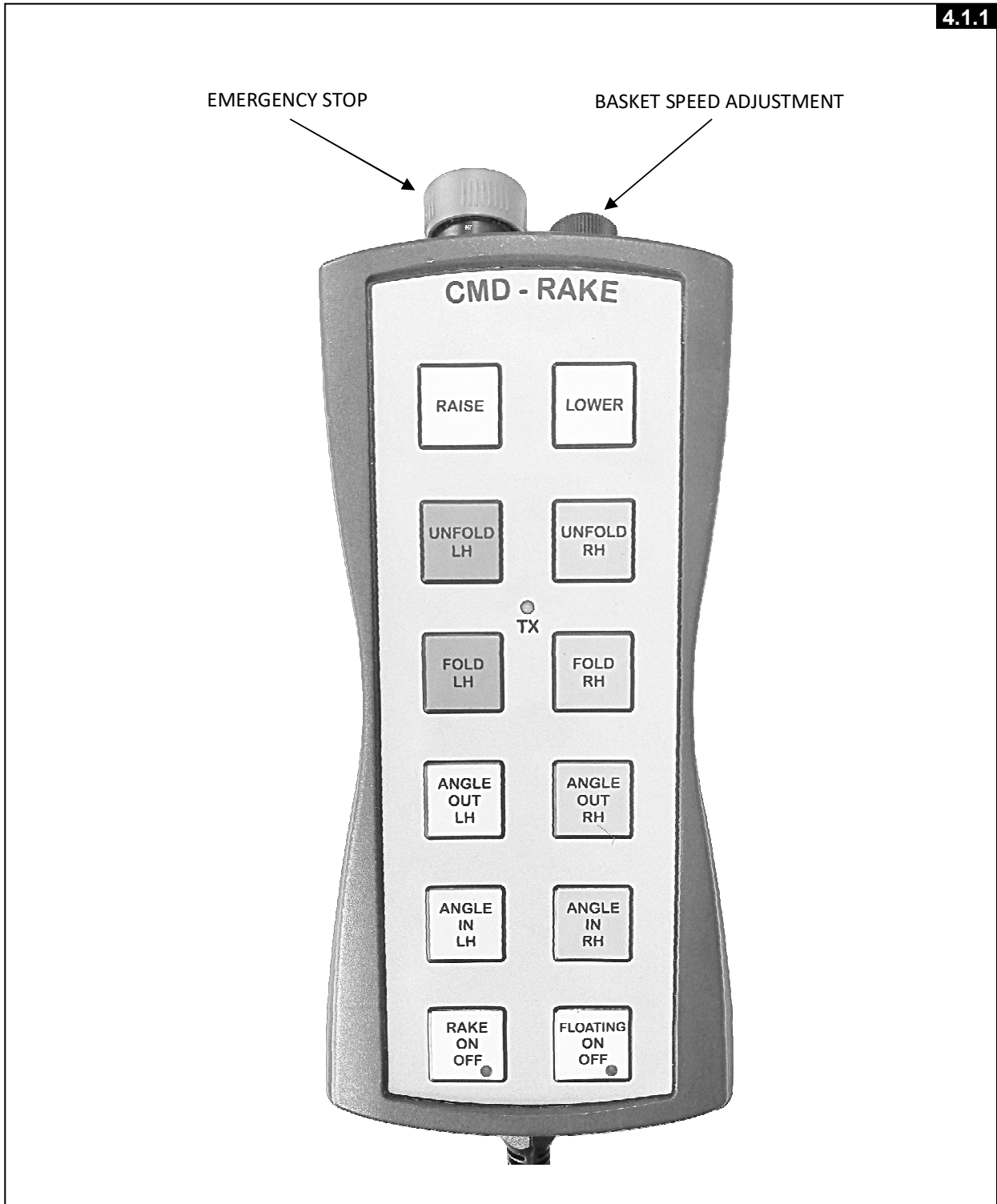
3.1.1



Description	BR 2030/6	BR 2030/7
Raking width (D)	7 – 9.2 m (23 – 30 ft)	
Windrow delivery	Center	
Overall height (B)	2 m (6.6 ft)	
Overall length (A)	7.8 m (25.6 ft)	
Transport width (C)	3.25 m (10.7 ft)	
Weight	2800 kg (6173 lb)	2860 kg (6305 lb)
Transport speed	32 km/h (20 mph)	
Operating speed	3 – 16 km/h (2 – 10 mph)	
Rake control	Electronic control box; electro-hydraulic block	
Drive	Hydraulic	
Control box	Functions: <i>Basket Raise/Lower; Unfold left-hand/right-hand; Fold left-hand/right-hand; Angle Out left-hand/right-hand; Angle In left-hand/right-hand; Rake on/off; Flotation on/off; Basket speed (rotary knob)</i>	
Mainframe	Tubular steel construction	
Overall basket length	4.7 m (15.5 ft)	
Basket drive	Hydraulic with variable speed	
Tine bars	6 per basket	7 per basket
Tines	Rubber mounted	
Number of tines per basket	37 per bar with 222 total	37 per bar with 259 total
Tine bar bearings	Double ball bearing	
Basket tilt	Mechanically adjustable	
Gauge wheels	Standard front and rear, solid rubber, adjustable height, rigid with basket frame for the flotation feature	
Basket flotation	Spring flotation, float mode enabled from the control box	
Axle	Tandem	
Spindle diameter	45 mm (1.8 in)	
Tire size	235/75-R15 (4)	
Tire pressure	2.5 bar (36 psi)	
Tractor power require	48 kW (65 Hp)	
Hydraulic flow required	Range of 34 – 75.7 l/min (9 – 20 US gpm)	
Maximum hydraulic pressure	17000 kPa (2465 psi)	
Hitch type	Standard drawbar, adjustable height clevis on rake; Optional ball hitch	
Standard safety equipment	Transport lights, safety tow chain, Slow Moving Vehicle (SMV)	

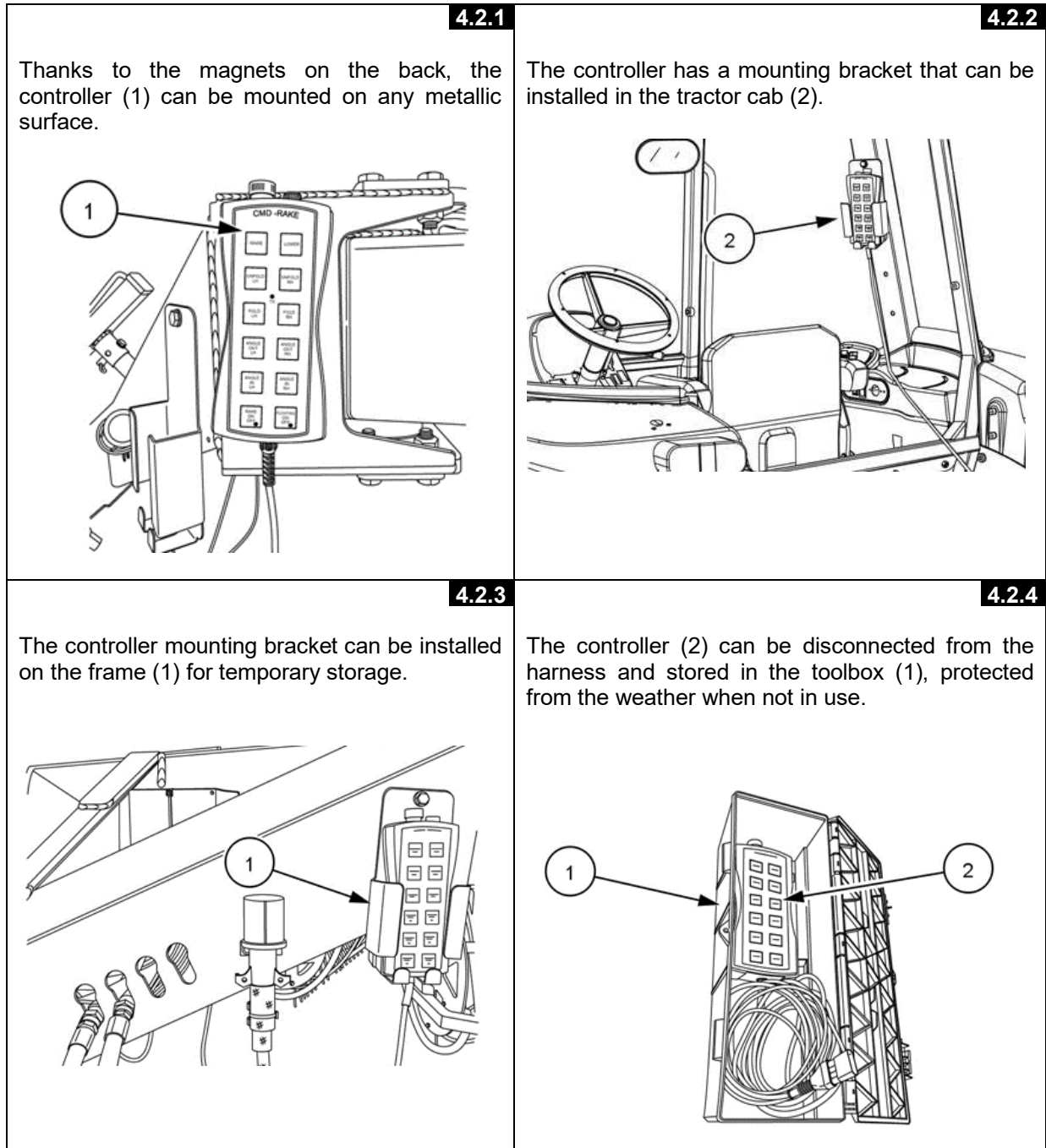
SECTION 4 CONTROLS AND INSTRUMENTS

4.1 CONTROLLER LAYOUT



4.2 CONTROLLER STORAGE

The controller must to be stored and protected from the weather when not in use.



SECTION 5 OPERATING INSTRUCTIONS

5.1 TRACTOR REQUIREMENTS

⚠ WARNING
IMPROPER OPERATION OF THIS MACHINE CAN CAUSE DEATH OR SERIOUS INJURY. MAKE SURE THAT EVERY OPERATOR:

- Learns and practices the safe use of machine controls in a safe and clear area before operating on a job site.
- Clears the work area of all bystanders.
- Observes pertinent laws and regulations.
- Follows the instructions in this operator's manual.

Failure to comply could result in death or serious injury.

The following requirements are valid either for the 6 bars version of the unit or for the 7 bars.

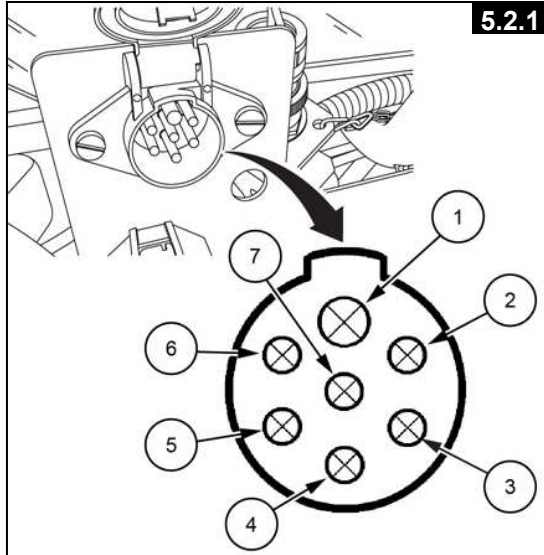
Attachment	Drawbar is the standard Ball hitch is optional
Power	48 kW (65 Hp)
Hydraulic	Minimum 30 l/min (9 US gpm) Maximum 75.7 l/min (20 US gpm)
	Recommended 61 l/min (16 US gpm)
	<i>Using more than 75.7 l/min (20 US gpm) will result in the hydraulic oil overheating.</i>
	Open center or closed center hydraulic system One set of hydraulic outlets
Electrical connections	See chapter 5.2 Power requirements

5.2 POWER REQUIREMENTS

The rake can be powered by either of the two methods described below (Option A and option B).

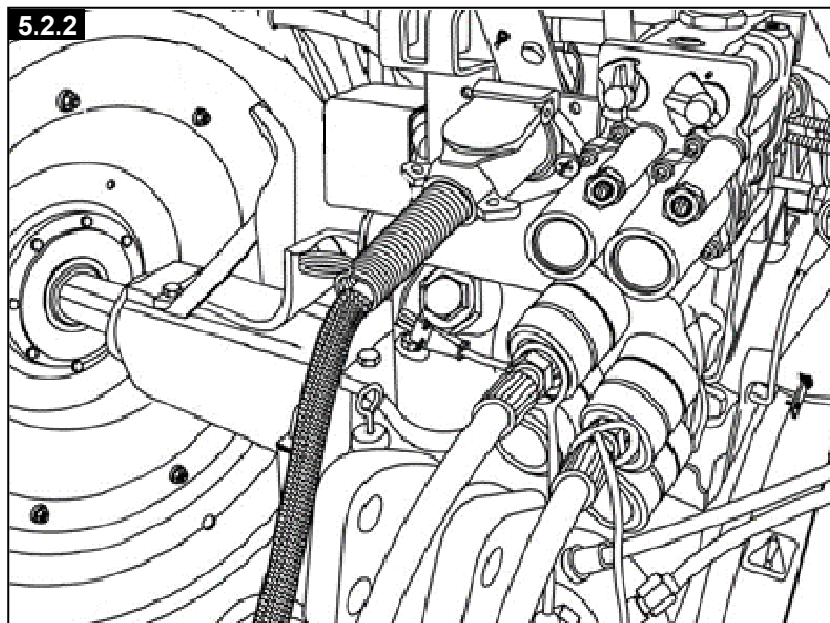
Option A – Lighting connector

SAE J560 standard connection:



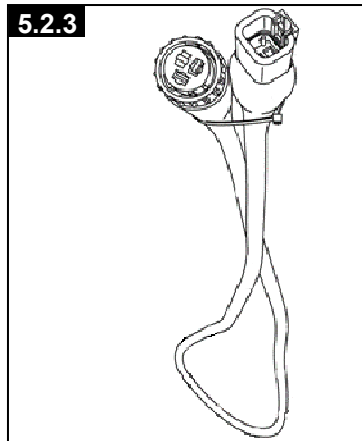
Pin number	Function
1	Ground
2	NOT USED
3	Left-hand hazard / turn signal (Amber)
4	Brake lights (Red)
5	Right-hand hazard / turn signal (Amber)
6	Tail lights (Red)
7	12 V (30 A) Auxiliary power

If the tractor is equipped with a seven-way receptacle that meets the SAE J560 standard, the rake lights and the control box will work properly with only the lighting connector attached to the tractor (**Fig.5.2.2**).



Option B – Auxiliary power wiring harness

The rake can be also powered through the three-way power connector on the tractor using the auxiliary power wiring harness which provides the proper three-way connector to attach to the tractor and the 4-way connector to attach to the wiring harness of the rake at the tongue.

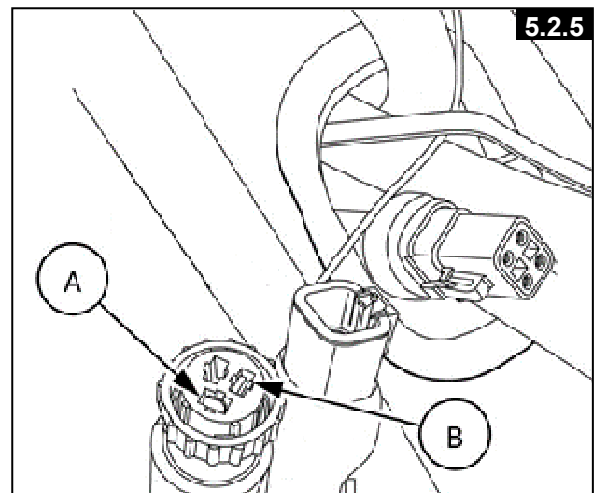
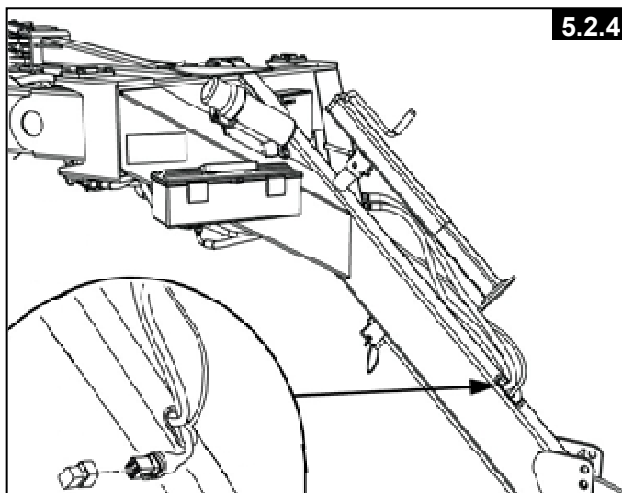


If the auxiliary power wiring harness is used to power the rake, pull the four-way connector on the rake wiring harness out of the tongue and remove the cap (**Fig.5.2.4**).

Store the cap in a safe place, as you must install the cap again if the rake is powered using the seven-way receptacle on the tractor.

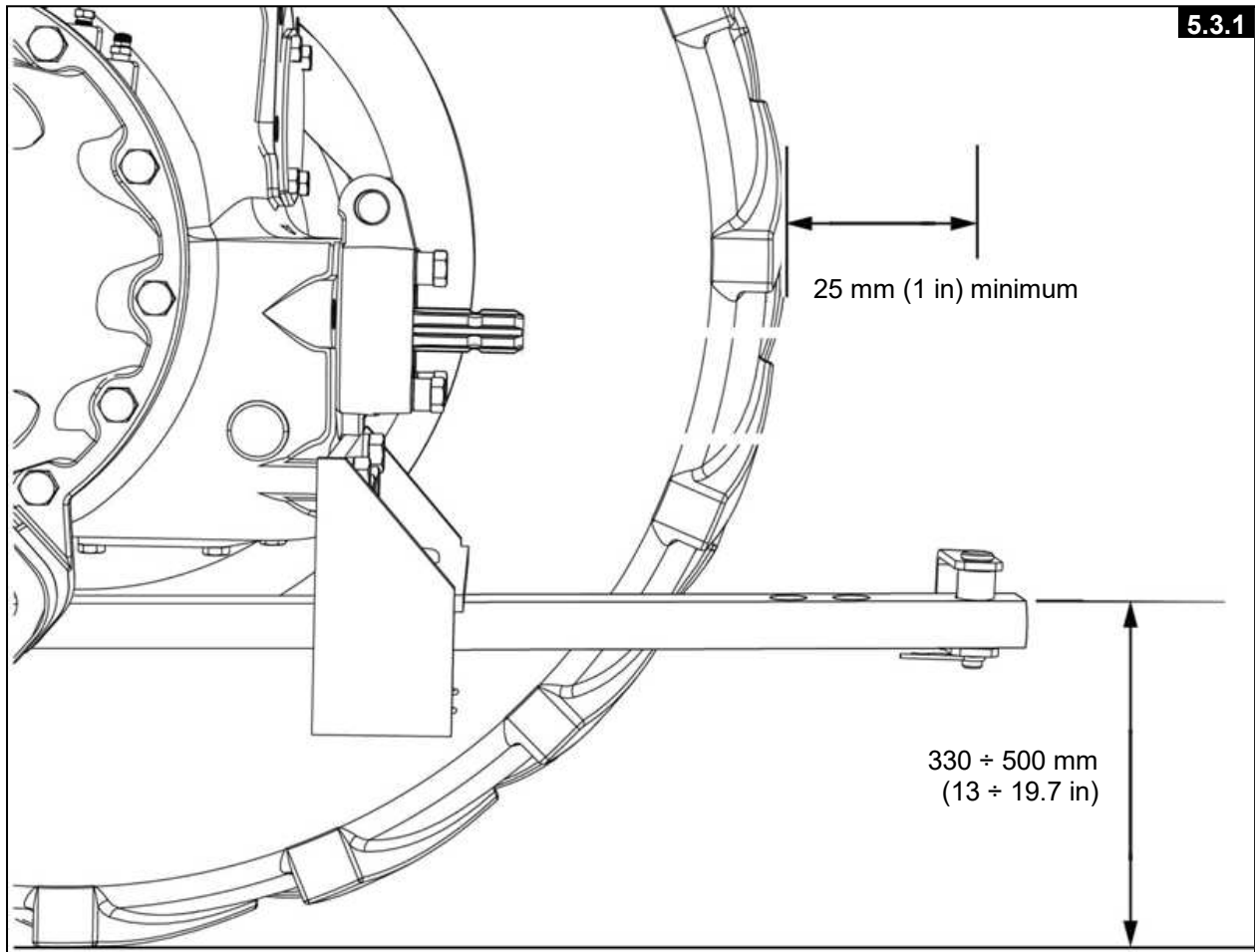
Attach the four-way connector on the auxiliary power wiring harness to the connector on the rake, then attach the three-way power connector on the auxiliary power wiring harness to the receptacle on the tractor (**Fig.5.2.5**).

The rake requires 12 V at pin (B) (blue wire) and a ground source at pin (A) (white wire). It is recommended that the tractor is configured for switched power for pin (B) to avoid draining the battery when the tractor is off.



5.3 TRACTOR DRAWBAR DIMENSIONS

Adjust the drawbar to meet the ASAE/ASABE standard specifications.
On some tractors with an offset drawbar, it may be necessary to turn the drawbar over.



Irregular drawbar heights, resulting in a low or high drawbar, will affect the racking angle.

5.4 CONNECTING THE UNIT TO THE TRACTOR

⚠ WARNING

Moving parts!

Some components may continue to run after disengaging the drive systems.

Make sure all drive systems are fully disengaged and all movement has stopped before servicing the machine.

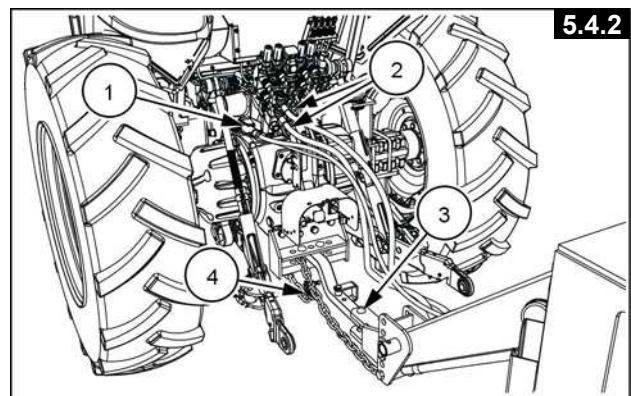
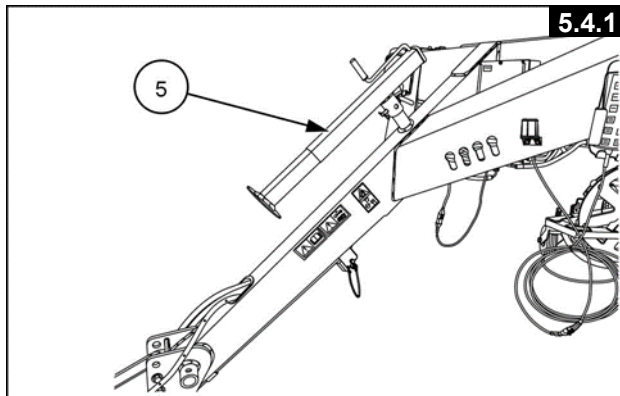
Failure to comply could result in death or serious injury.

If the tractor has a three-point hitch, adjust the lower links either as high as possible, as low as possible, or remove them to prevent them from hitting the tongue when turning.

Locate the drawbar directly underneath the tractor PTO shaft and secure the drawbar so it cannot move from side to side.

Attach the rake hitch to a tractor drawbar as follows:

1. Install a hitch pin (3) that can be securely fastened.
2. Move the jack (5) to its storage location.
3. Attach the safety chain (4) to the tractor.
4. Connect the hydraulic hoses (2) to the hydraulic remote outlets on the tractor.
*There is a check valve that goes to tank which prevents operation in reverse.
If the rake does not run, switch the hoses on the tractor.*
5. Connect the 7-pin electric plug (1) to the implement receptacle on the tractor.
Is it possible to electrically connect the rake by also the three-way plug, as explained at chapter 5.2 Power requirements.



5.5 DISCONNECTING THE UNIT FROM THE TRACTOR

⚠ WARNING

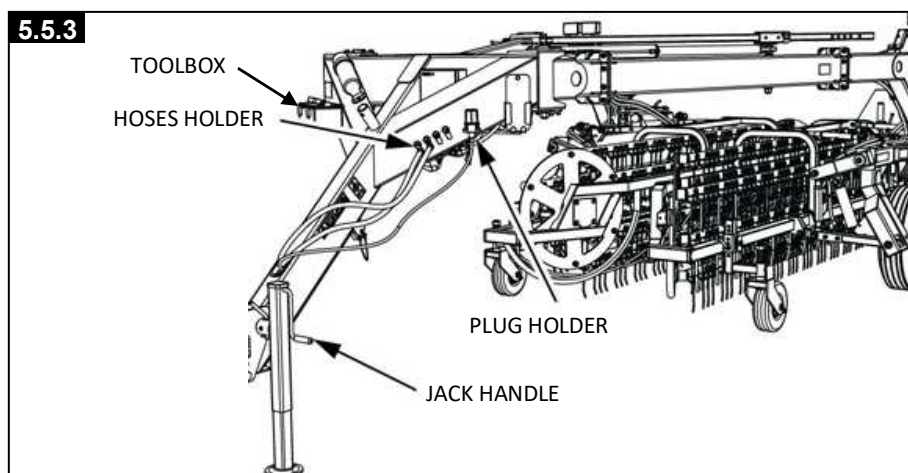
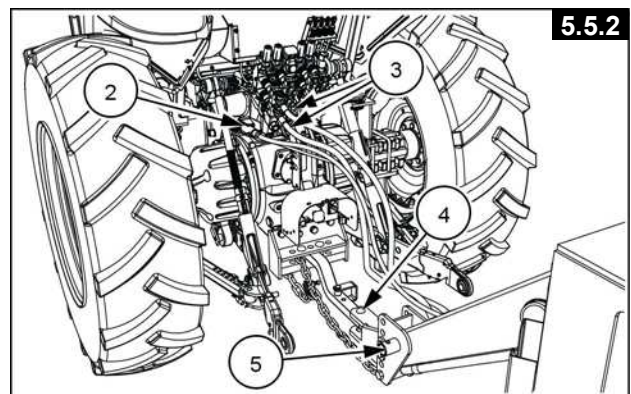
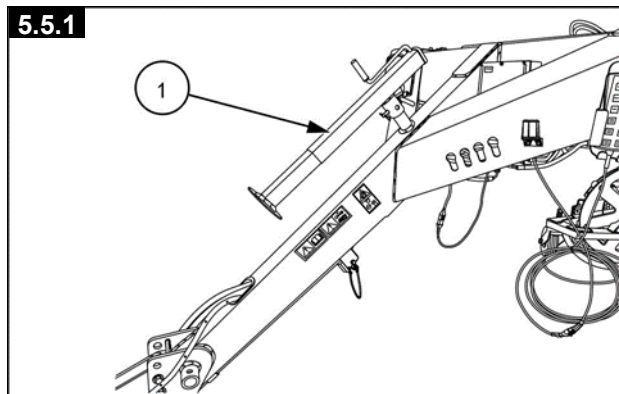
Moving parts!

Some components may continue to run after disengaging the drive systems.

Make sure all drive systems are fully disengaged and all movement has stopped before servicing the machine.

Failure to comply could result in death or serious injury.

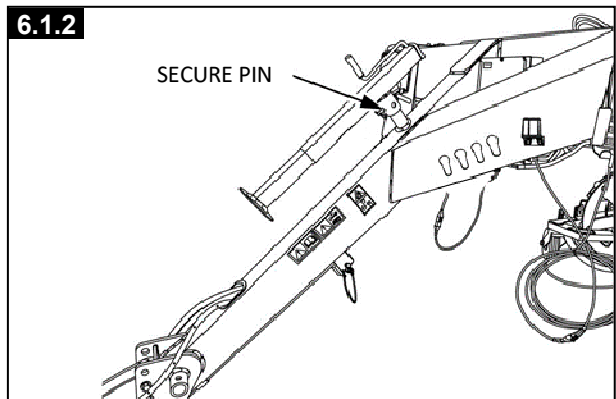
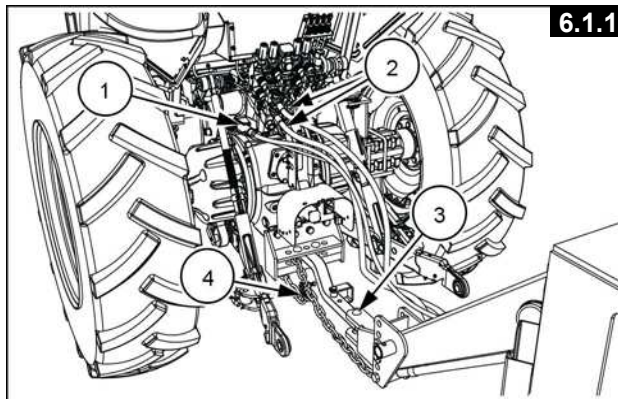
1. Park the rake on level ground and block the wheels.
2. Lower the basket assemblies.
3. Shut off the tractor and operate the remote-control valve control levers on the tractor to relieve pressure from the system.
4. Remove the jack (1) from its storage position and install it vertically on its jacking position (5).
5. Remove the hitch pin (4).
6. Disconnect the hydraulic hoses (3) from the tractor.
7. Disconnect the electric connector (2).
8. Turn the jack handle to lift the hitch off the tractor drawbar.
9. Remove the safety chain.
10. Store the hydraulic hoses from the tractor in the holder provided.
11. Store the light connector in the plug holder.
12. Disconnect the controller from the harness and store the controller in the toolbox or store where it would be protected from the elements.



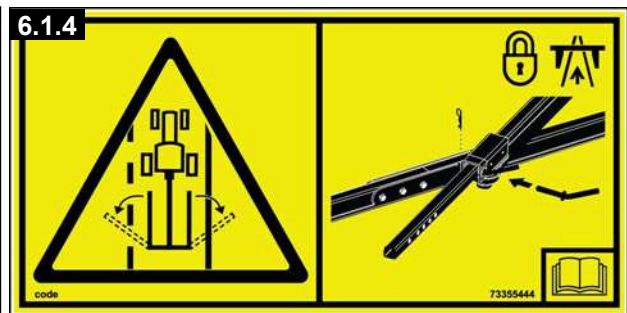
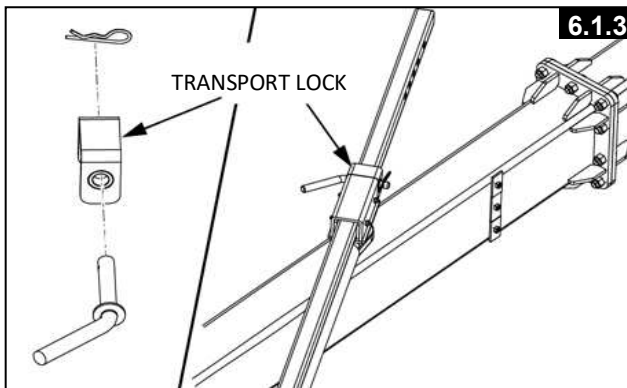
SECTION 6 TRANSPORT OPERATIONS

6.1 BEFORE TRANSPORTING

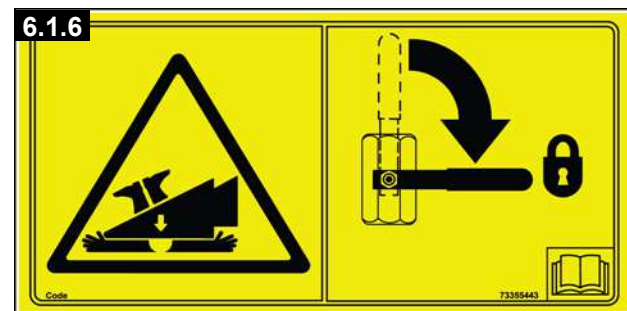
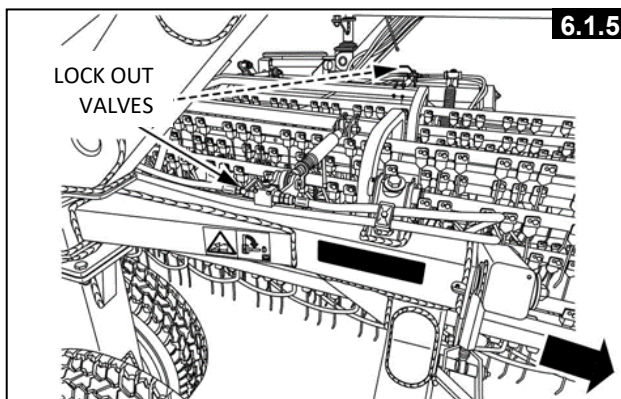
1. Ensure that the tractor is rated to tow the unit.
2. Secure the drawbar to the tractor with the correct pin (3).
3. Attach the safety chain (4) to the tractor.
4. Connect the hydraulic (2) and electrical (1) connections.
5. Ensure that all are functioning as expected.
6. Store the jack stand on the transport mount, and secure it with provided pin and hairpin cotter.



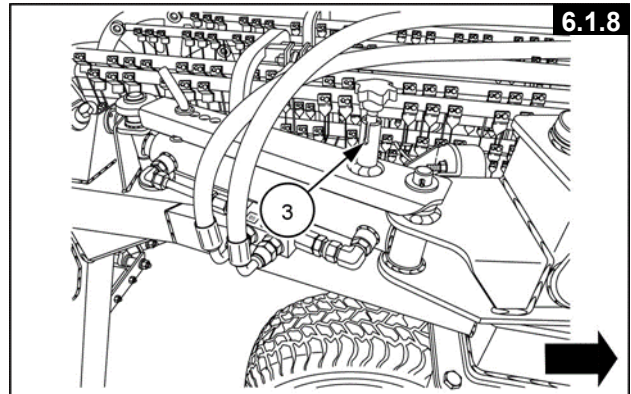
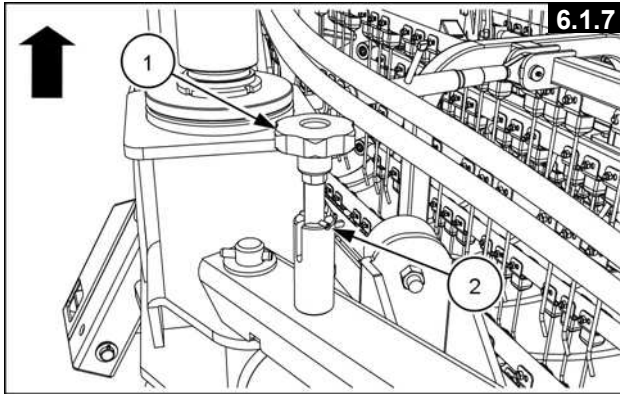
7. Engage the transport locks.



8. Raise the baskets and engage the lockout valves (1) to the closed position (handle faces out).



9. Engage the left-hand and the right-hand swing frame lock pins as follows:
- Pull up on the knob (1) until the pin (2) is out of the top slot.
 - Turn the knob until the pin (2) is aligned with the larger slot (3).
 - Release the knob to engage the locks.



6.2 TRANSPORT LIGHTING

⚠ WARNING

Transport hazard!

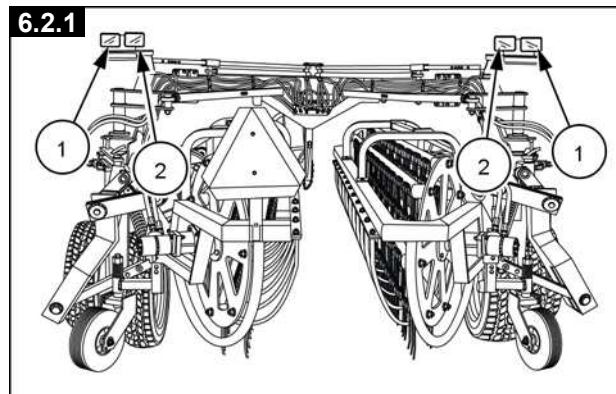
Make sure the machine trailing lights fully function.

Use the recommended testing equipment, testing procedures, and repair part(s) or actions in this manual when connecting the machine to a specific towing tractor.

Failure to comply could result in death or serious injury.

On some tractor models and older tractors, the electrical connection may not provide some of the functions described below, so the installation of an implement lighting control module may be required.

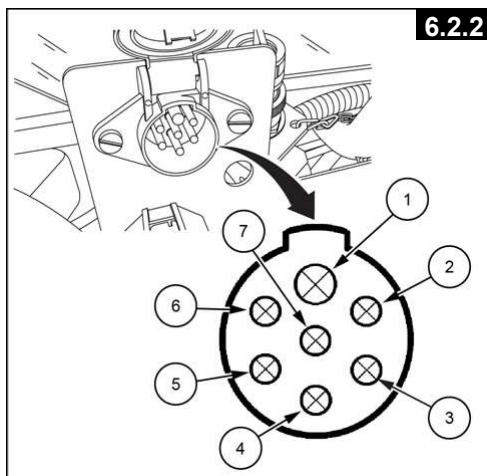
The trailing lights consist of two red tail/brake lights (2) and two hazard/turn signal amber lights (1).



For proper lighting function, the towing tractor must have a standard seven-way receptacle that conforms to the SAE J560 standard. If your tractor does not have a seven-way receptacle, obtain the correct part from your authorized dealer.

On some tractors, the number four conductor in the receptacle is utilized for other functions. Therefore, this circuit may be on all the time or any time the key switch is on. This will cause the brake lights to illuminate all the time. If you have one of these tractors, disconnect the bullet connector (1) located in the wiring harness under the front of the rake frame.

You must reconnect the bullet connector if you attach the implement to a propelling vehicle with a standard SAE J560 receptacle.



Pin number	Function
1	Ground
2	NOT USED
3	Left-hand hazard / turn signal (Amber)
4	Brake lights (Red)
5	Right-hand hazard / turn signal (Amber)
6	Tail lights (Red)
7	12 V Auxiliary power

LIGHTING FUNCTIONS				
TRACTOR LIGHTS	Left-hand AMBER	Left-hand RED	Right-hand RED	Right-hand AMBER
Headlights "OFF"	-	Off	Off	-
Headlights "ON"	-	Dim	Dim	-
Amber flashing lights "OFF"	Off	-	-	Off
Amber flashing lights "ON"	Flashing (same rate as right-hand light)	-	-	Flashing (same rate as left-hand light)
Brake lamps* (brakes applied)	-	Bright*	Bright*	-
Amber flashing lamps "ON" -no turn indicated (tractor with brake lamps)	Flashing (same rate as right-hand light)	Bright*	Bright*	Flashing (same rate as left-hand light)
Amber flashing lamps "ON" -no turn indicated (no tractor brake lamps)	Flashing (same rate as right-hand light)	Off	Off	Flashing (same rate as left-hand light)
Left-hand turn indicated	Increased flash rate	Off, dim, or flashing in unison with left-hand light	Off or dim	Illuminated, no flashing
Right-hand turn indicated	Illuminated, no flashing	Off or dim	Off, dim, or flashing in unison with right-hand light	Increased flash rate

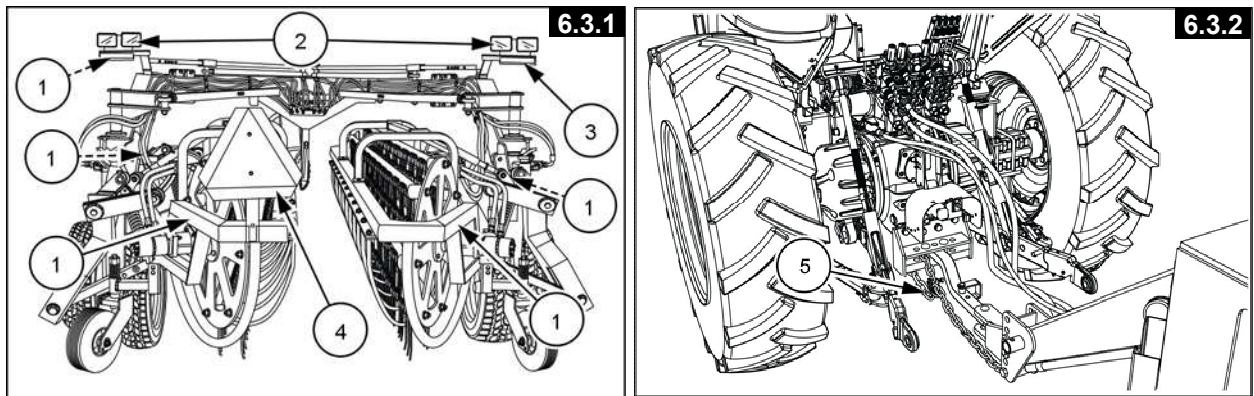
6.3 DRIVING ON ROADS

⚠ WARNING
Transport hazard!
Before towing the rake on a public highway:

1. Raise the baskets and engage the lockout valves.
2. Engage the basket angle transport lock pins.
3. Check to be sure that the swing frame lock pins are engaged.

Failure to comply could result in death or serious injury.

The Sitrex Basket Rake complies with ASAE/ASABE standard recommendation for safety when transporting slow-moving vehicles on the public highways.



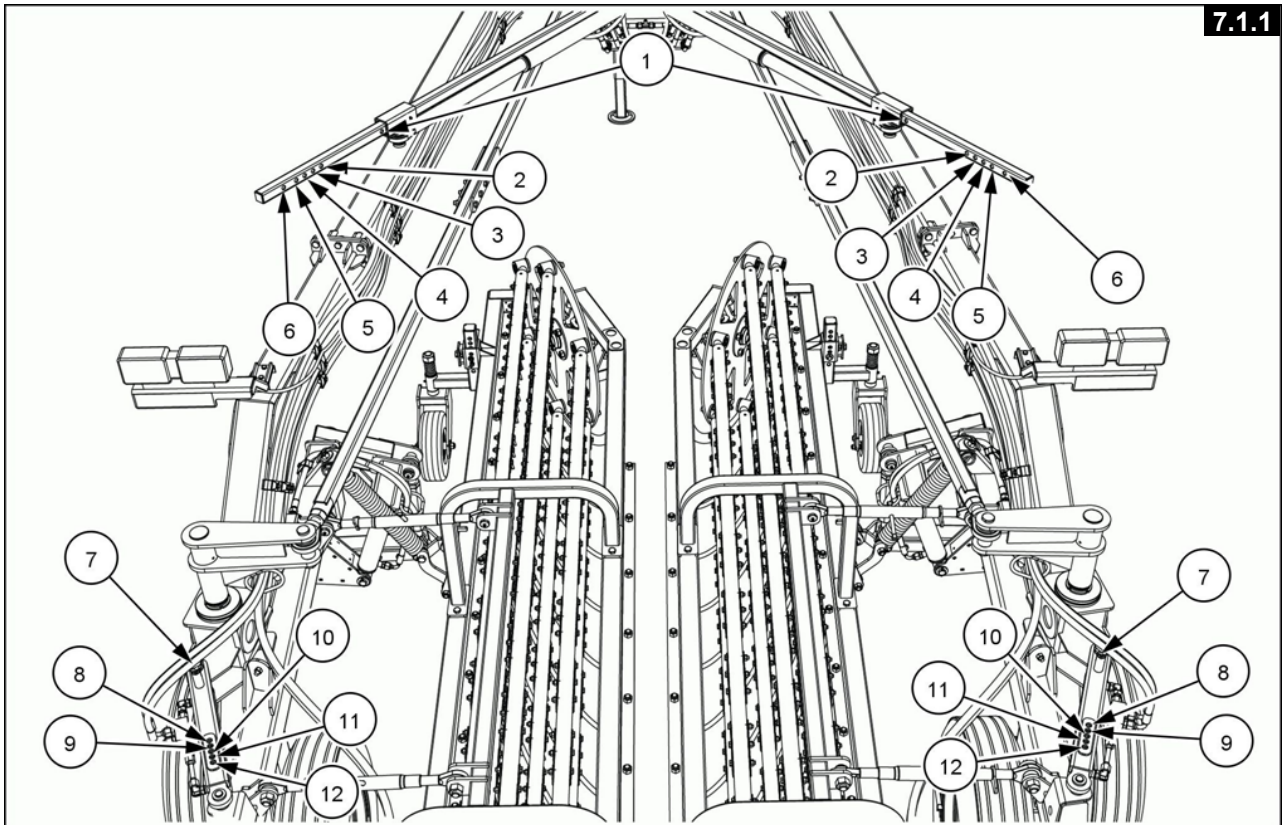
- 1) REFLECTIVE TAPE RED
- 2) LIGHTS
- 3) REFLECTIVE TAPE YELLOW
- 4) SLOW MOVING VEHICLE SIGN (SMV)
- 5) SAFETY CHAIN

When towing equipment without brakes on public highways, do not travel at speeds over 32 km/h (20 mph).



SECTION 7 WORKING OPERATIONS

7.1 RAKING WIDTH AND WINDROW WIDTH



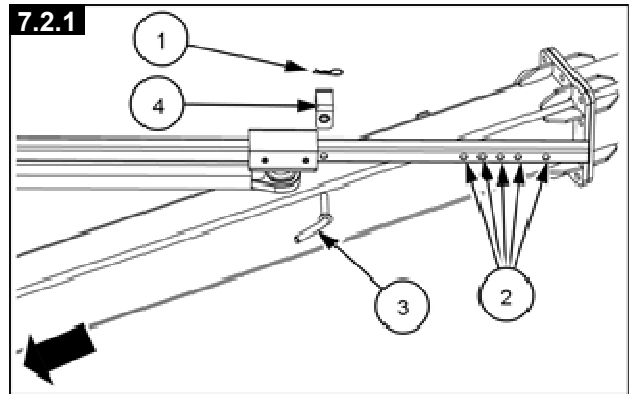
Operation	Overall width	Frame fold/unfold position		Basket angle position	
		Left-hand	Right-hand	Left-hand	Right-hand
Transport	3.2 m (10.5 ft)	1	1	7	7

Operation	Windrow width	Raking width	Frame fold/unfold position		Basket angle position	
			Left-hand	Right-hand	Left-hand	Right-hand
Raking	0.6 m (2 ft)	7 m (23 ft)	2	2	8	8
Raking	0.9 m (3 ft)	7.5 m (24.6 ft)	3	3	9	9
Raking	1.2 m (4 ft)	8 m (26.2 ft)	4	4	10	10
Raking	1.5 m (5 ft)	8.5 m (27.9 ft)	5	5	11	11
Raking	2 m (6.6 ft)	9.2 m (30.2 ft)	6	6	12	12

7.2 FOLD AND UNFOLD THE RAKE

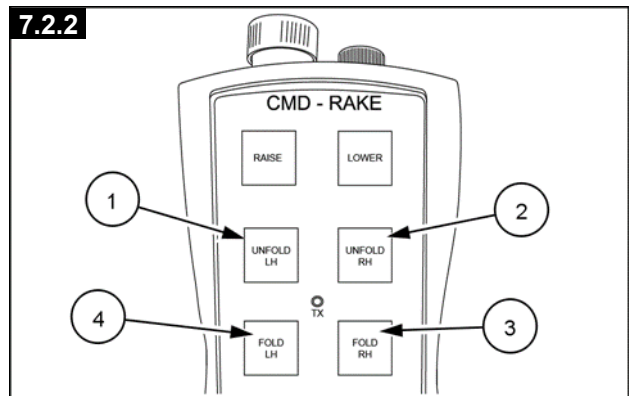
1. Remove the hairpin cotter (1), pin (3), and retrieve the adjustment stop (4).
2. Place the adjustment stop (4) in the desired position (2) and secure with the pin (3) and hairpin cotter (1).

Each arm must be adjusted since the arms are independent of each other.



3. Connect the two hydraulic connections and the power plug to the tractor.
4. Start the tractor to energize the electrical system of the rake.
5. Move the remote lever on the tractor to supply oil to the rake.
6. Move the tractor (forward or rearward) and push the buttons "UNFOLD" (1) and (2) or "FOLD" (3) and (4) on the command rake to move the arms until the position desired.

The hydraulic system will not fold or unfold the rake unless the unit is moving.

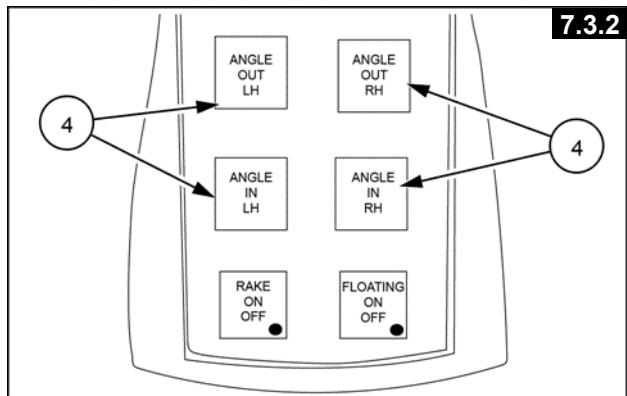
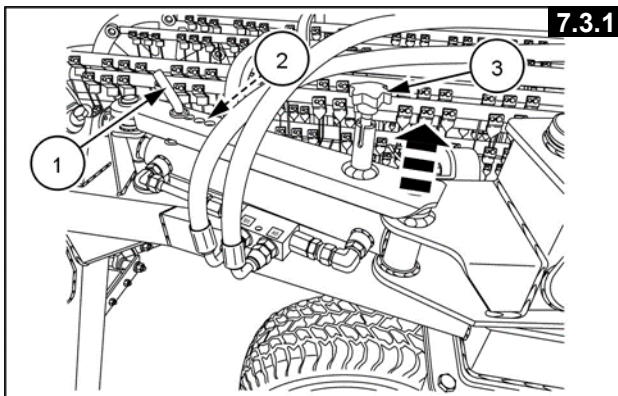


7.3 BASKET ANGLE SETTING

Before changing the basket rake angles, make sure the arms are moved apart far enough to keep the baskets from contacting each other.

The left-hand and right-hand baskets move independent one to each other.

1. Pull up and rotate the pin (3) 90° and release the pin into the disengaged position.
2. Remove the pin (1) and reposition in the desired hole (2).
3. Connect the two hydraulic connections and the power plug to the tractor.
4. Start the tractor to energize the electrical system of the rake.
5. Move the remote lever on the tractor to supply oil to the rake.
6. Press the appropriate button (4) to angle the baskets.



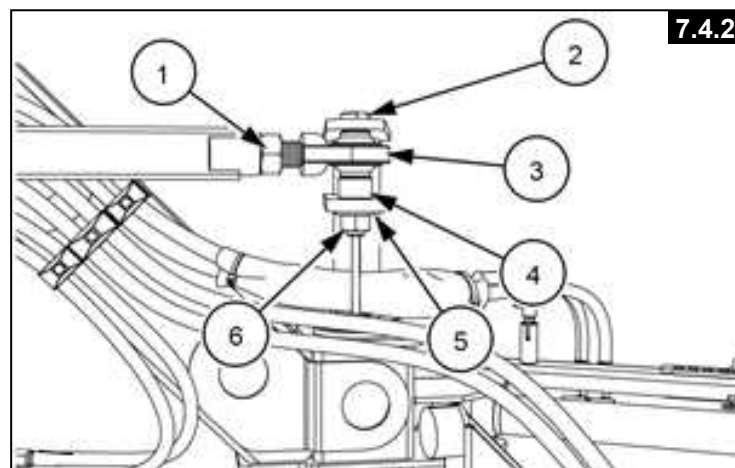
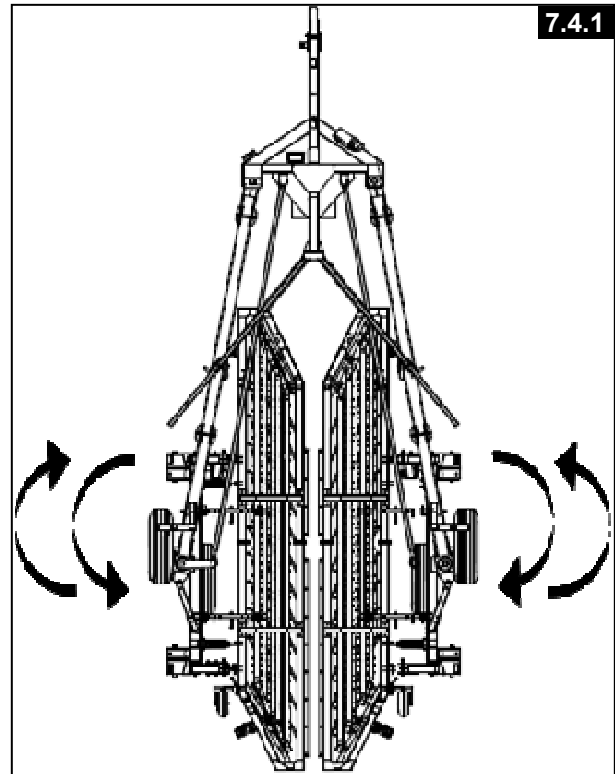
7.4 WHEEL TRACK ADJUSTMENT

Failure to check and/or adjust the wheel tracking will result in premature tire wear.

There should be approximately 0 – 3 mm (0 – 1/8 in) of wheel toe-in for proper operation.

Adjust the length of the rod (3) to set the correct angle of the tandem wheels as follows:

1. Drive the rake until it is on a level surface and positioned straight.
2. Measure the distance between the center of the inner tires at axle height.
The distance at the front should be 0 – 3 mm (0 – 1/8 in) less than the distance at the back of the tire.
3. Loosen the jam nut (1).
4. Remove the lock nut (6), washer (5), bolt (2), and retrieve the spacer (4).
5. Remove the rod end from the mount.
6. Carefully raise the side being adjusted and pivot the tandem wheels as required.
7. Shorten or lengthen the rod until the rod can be engaged back into the mount.
Each 1/2 turn of the tie rod will change the toe approximately 1.5 mm (1/16 in).
8. Reinstall the bolt (2), the spacer (4), washer (5), and secure with the lock nut (6).
9. Lower the side being adjusted to the ground.
10. Drive the unit again, set straight on a level service, and confirm the adjustment.



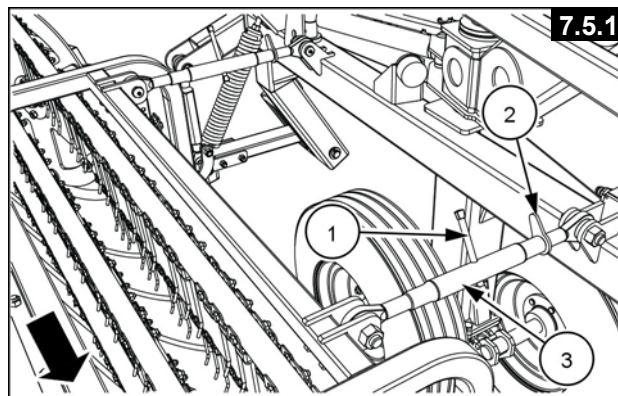
7.5 BASKET TILT

Set the upper turnbuckles (3) of each basket as follows:

1. Loosen the locking plate (2) on each turnbuckle.
2. Rotate the lever (1) to shorten or lengthen the turn-buckle (3).

Shorten	For high humidity forage that doesn't drying well. The baskets will collect the forage into a fluffy windrow for grater airflow.
Lengthen	For forage that dries too quickly, causing excessive leaf loss. The baskets will push down the forage into a tight windrow so air doesn't penetrate and the forage doesn't blow around on windy days.

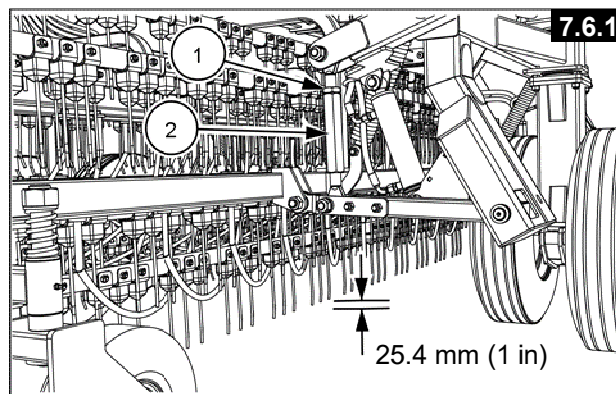
3. Tighten the locking plate (2) to secure the adjustment.



7.6 TINE HEIGHT

Adjust the tine height so that the tines clear the ground without missing crop.

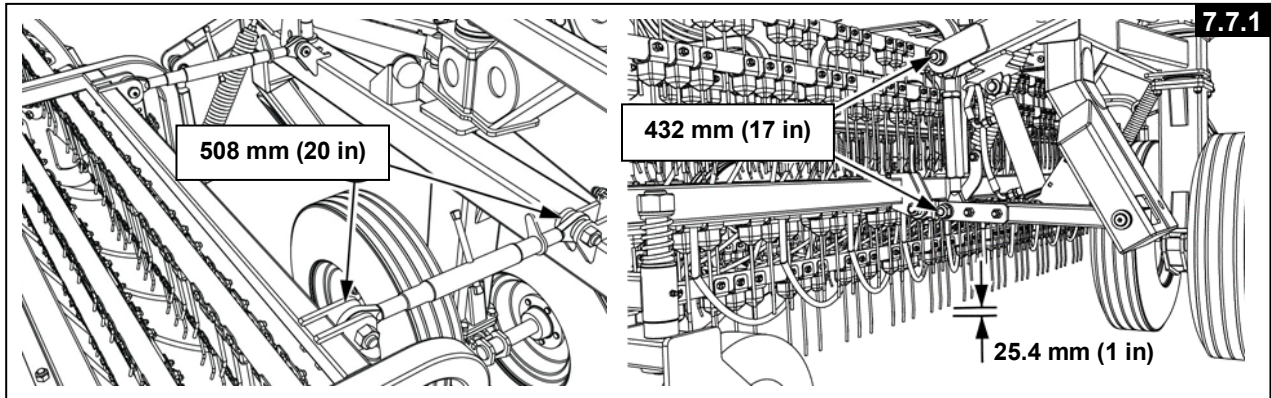
1. Lower the baskets until the lift cylinders are fully retracted.
2. Loosen the lower turnbuckle jam nut (1) with a 46 mm wrench.
3. Adjust the turnbuckle (2) with a 46 mm wrench until the tines are 25.4 mm (1 in) from the ground. *Approximately, the center-to-center on each end of the turnbuckle bolts will be approximately 432 mm (17 in).*
4. Adjust tine height at each end of the baskets.
5. Tighten the jam nut.



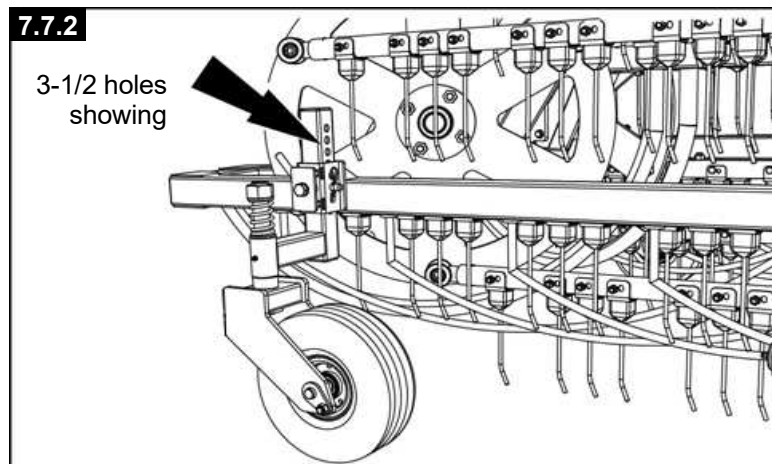
Check the tine height and readjust as needed after adjusting raking width, basket angle, basket tilt.

7.7 CASTER WHEEL HEIGHT

Fig.7.7.1 shows indicative setting to have the unit with the baskets parallel to the ground and with the tines at 25 mm (1 in) far from it.

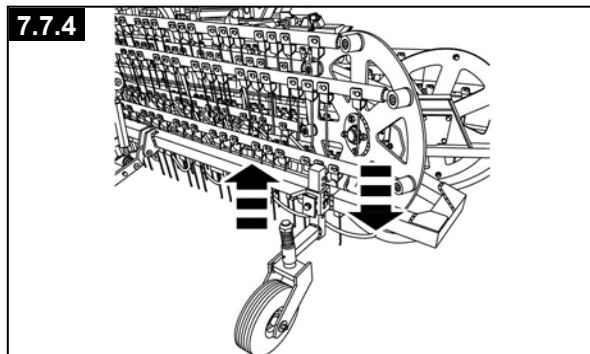
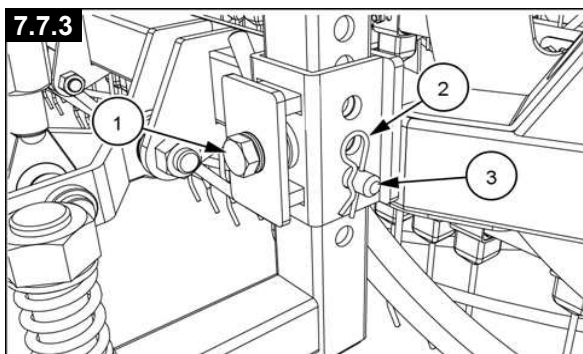


In this configuration, the caster wheels are adjusted as shown here below:



If adjustment is needed, adjust each caster wheel as follows:

1. Raise the basket end in need of adjustment.
2. Loosen the bolt (1) to allow the caster wheel assembly to move.
3. Remove the hairpin cotter (2), then pull the pin (3) from the adjustment holes.
4. Adjust the caster wheel assembly, up or down (**Fig.7.7.4**), then reinsert the pin (3) to lock in the adjustment.
5. Secure pin with the hairpin cotter (2).
6. Tighten the bolt (1) to remove the free-play.
7. Lower the basket end to check the adjustment.

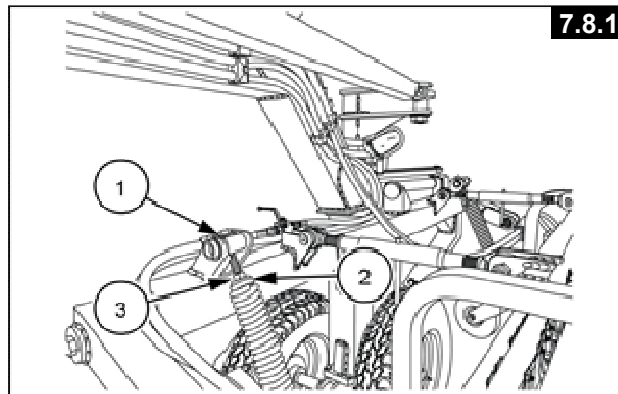


7.8 FLOTATION SPRING TENSION

1. Loosen the jam nut (3) on the top side of the spring (2).
2. To increase the flotation tension, turn the bolt (1) clockwise.
To decrease the flotation tension, turn the bolt (1) counter-clockwise.

High flotation tension	Advantages: Baskets very reactive, also the smallest obstacles will be overcome. Disadvantages: The bumpy mode could let too much crop on the ground if driving fast during the operations.
Low flotation tension	Advantages: Only the biggest obstacles will activate the flotation feature. The tines are most of the time very close to the ground. Disadvantages: The basket frame and the caster wheels get the maximum stress during the operations. Possible tilling with the caster wheels if the ground is moisture.

3. Tighten the jam nut (3) after the flotation is adjusted.



The initial recommended dimension is 127 mm (5 in) from the top of the washer (1) to the top of the spring nut (2).

7.9 BASKET SPEED ADJUSTMENT

⚠ WARNING

Unexpected machine movement!

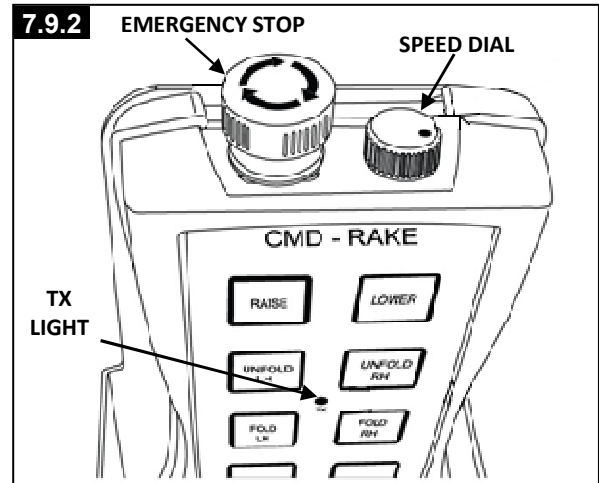
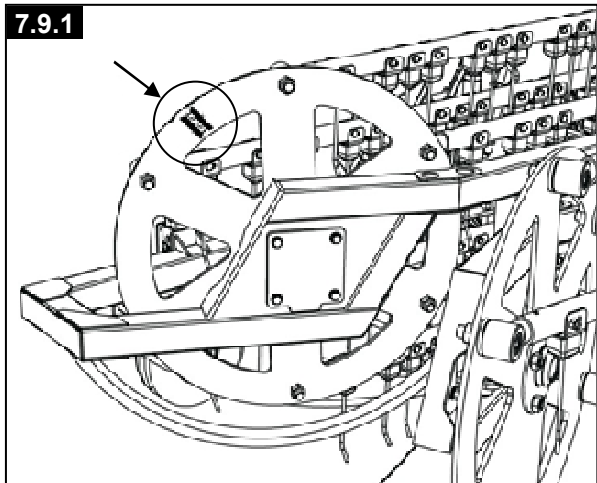
The machine could move automatically during calibration. Park on a flat surface, engage the parking brake, and be sure that the area around the machine is clear before starting the calibration process.

Failure to comply could result in death or serious injury.

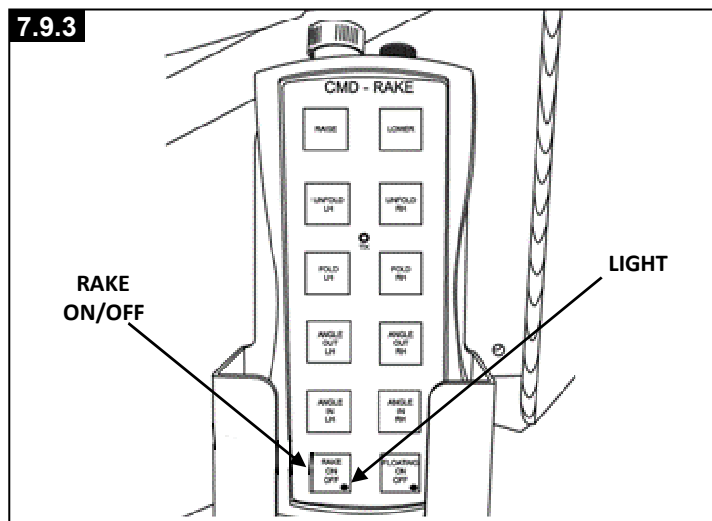
Adjusting the rpm above 90 RPM will cause damage to the basket rake bars (a photo tachometer is required to properly adjust the basket rake speed).

Tractor must have a minimum of 34 l/min (9 US gpm) to a maximum of 75.7 l/min (20 US gpm) of hydraulic flow.

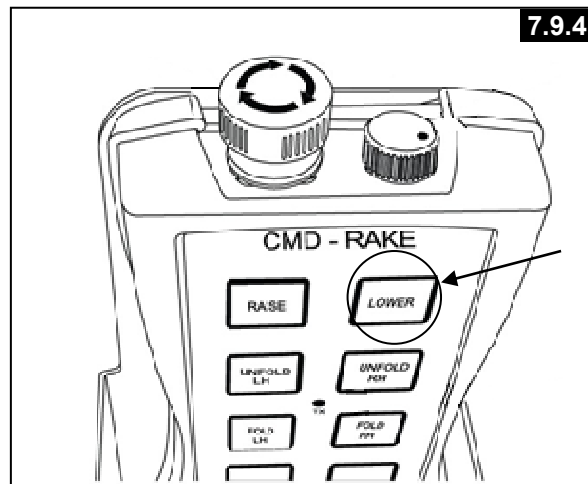
1. Apply a piece of reflective tape on the basket reel (**Fig.7.9.1**).
2. Start the tractor and set the park brake.
3. Make sure the speed dial is fully turned counter-clockwise (**Fig.7.9.2**).
4. Engage the emergency stop switch by pushing the knob down, now the “TX” light in the center of the controller will start to blink (**Fig.7.9.2**).



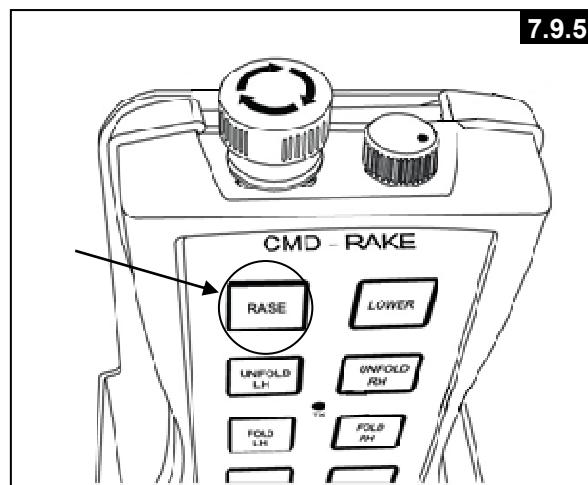
5. Engage the selective hydraulic control valves on the tractor.
6. Press and hold the “RAKE ON/OFF” button for 3 s, until the light over the button comes on (**Fig.7.9.3**).



7. Turn the emergency stop switch clockwise to disengage and allow the unit to function (**Fig.7.9.2**).
8. Press and hold the “LOWER” button while slowly turning the speed dial clockwise until **50 RPM** is achieved using a photo tachometer (**Fig.7.9.4**).



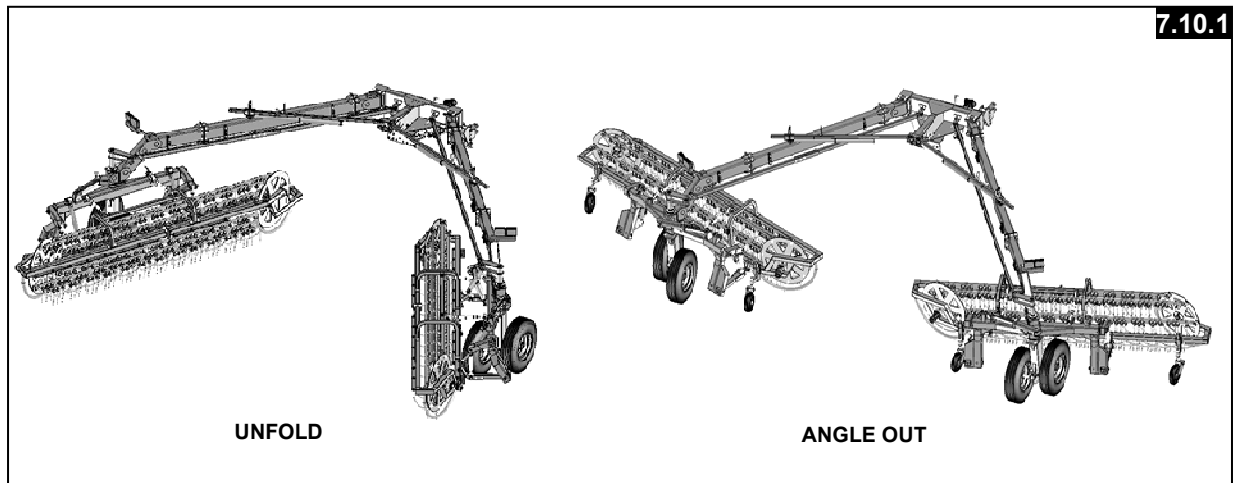
9. Release the “LOWER” button to save the setting.
10. Turn the speed dial fully counter-clockwise (**Fig.7.9.2**).
11. Press and hold the “RAISE” button while slowly increasing the speed dial clockwise until **90 RPM** is achieved using a photo tachometer (**Fig.7.9.5**).
12. Release the “RAISE” button to save the setting.



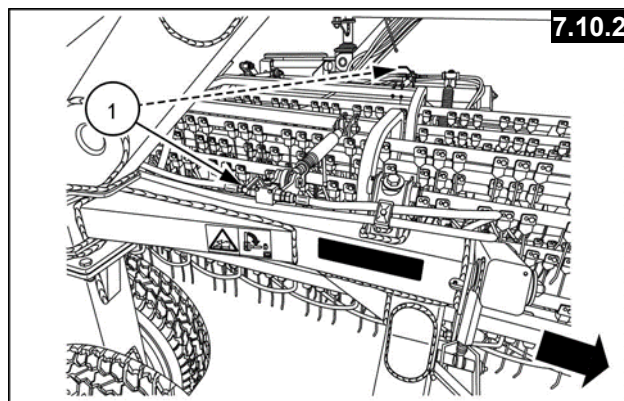
13. Press the “RAKE ON/OFF” button to turn off the rake and finish the setup; the light comes off (**Fig.7.9.3**).

7.10 FIELD OPERATIONS

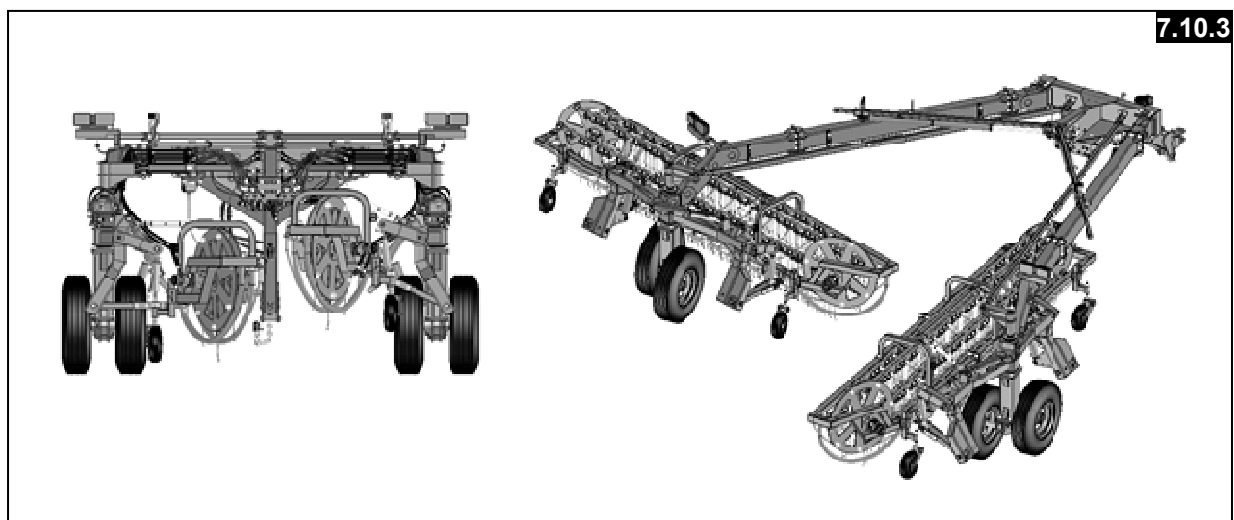
After all adjustment of the previous paragraphs, the unit is ready for the operations.



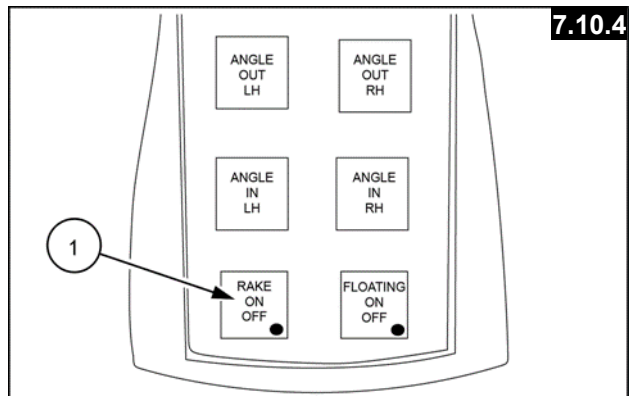
1. Disengage the lockout valve (1) (handles will be parallel to hoses).



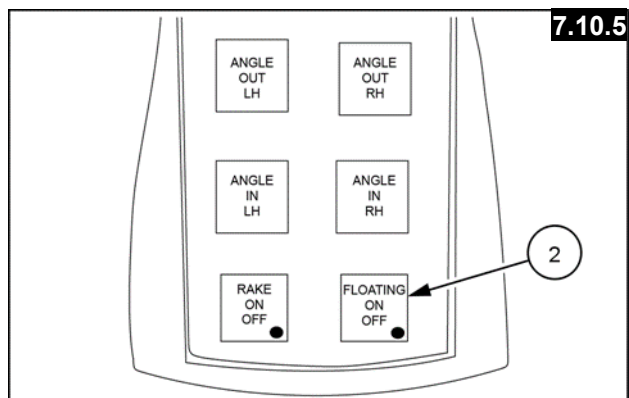
If desired, only one basket can be used simply by leaving one of the valves closed while the basket is fully raised (Fig.7.10.3).



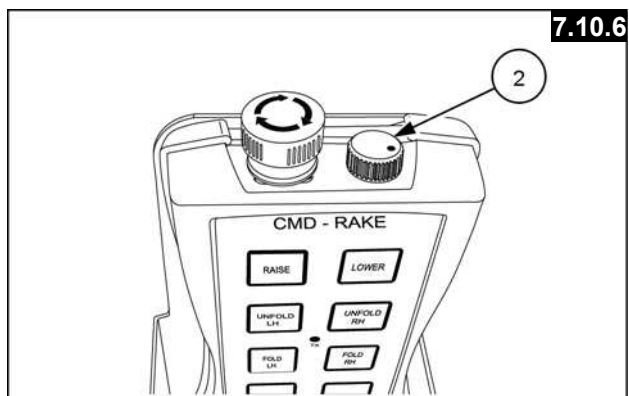
2. Press the “RAKE ON/OFF” button (1) until the reels start to turn on (the light on the button will illuminate).



3. Push the “FLOATING ON/OFF” button (2) on the controller to activate the *floating mode* (floating mode is active when light is illuminated).



4. Rotate the speed dial (2) clockwise to increase the speed of the reels and counter-clockwise to decrease the speed of the reels (the range of speed is 60 – 90 RPM).

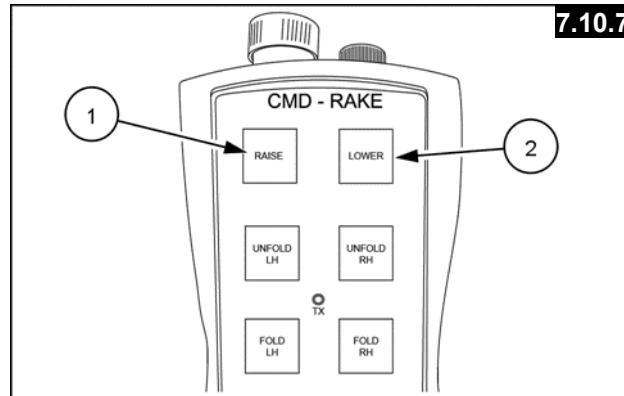


5. Begin raking as required.

Raise and lower the baskets while in floating mode

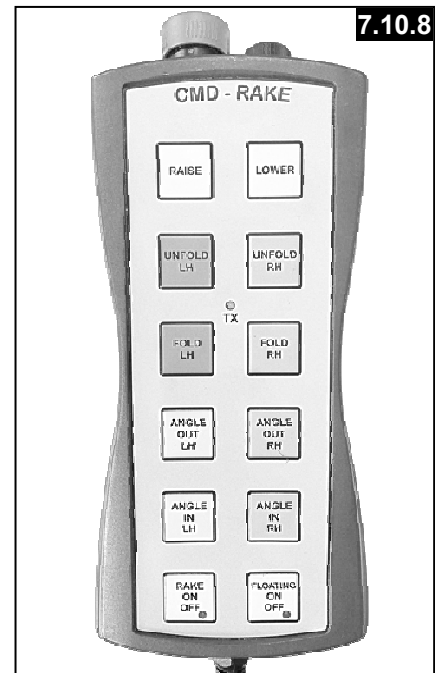
While in the field raking, if you encounter an obstacle the baskets can be raised and lowered without exiting float mode, as follows:

1. Press the “RAISE” button (1) (the light on the button “FLOATING ON OFF” will turn off).
2. After the obstacle is passed, press the “LOWER” button (2) to resume float mode (light on the button “FLOATING ON OFF” will turn back on).



Additional operations while the baskets are rotating

- “RAISE” or “LOWER” the baskets.
- “FOLD” or “UNFOLD” the left-hand side of the implement.
- “FOLD” or “UNFOLD” the right-hand side of the implement.
- “ANGLE IN” or “ANGLE OUT” the left-hand basket.
- “ANGLE IN” or “ANGLE OUT” the right-hand basket.



SECTION 8 MAINTENANCE

8.1 MAINTENANCE ADVICE

For MAINTENANCE SAFETY rules, see chapter 2.4 Maintenance safety.

Adequate lubrication and maintenance on a regular schedule are vital to maintaining your equipment. To ensure long service and efficient operation, follow the MAINTENANCE PLANNING chart outlined at chapter 8.6. The intervals listed in the maintenance chart are guide-lines to be used when operating in normal conditions. Adjust the intervals for operating in adverse environmental and working conditions. The intervals should be shortened for sandy, dusty and extremely hot operating conditions.

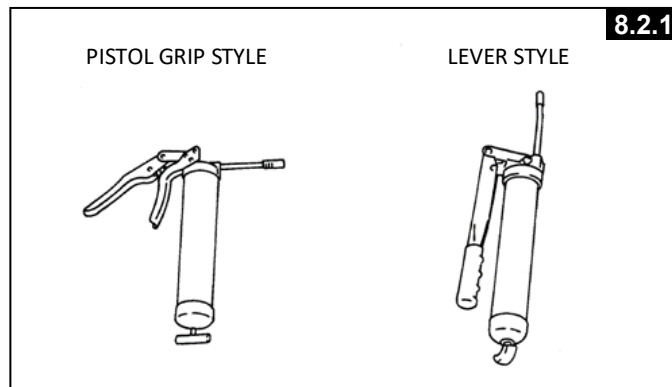
Regular lubrication is the best insurance against delays and repairs. Proper lubrication will extend machine life. The use of proper oils and grease, as well as keeping the systems clean, will also extend machine and component life.

Complete all checks and services in this section at the hour interval shown. The rake should be checked daily for hydraulic leaks and any leak should be fixed immediately.

8.2 LUBRICATION

Grease guns

Different types of grease guns provide a different amount of grease per pump of the handle. Here following there are the two commonly used types:



In general, a pistol grip-style grease gun injects half of the amount of grease per pump as a lever-style grease gun. If you use a lever-style grease gun, use only half of the indicated number of pumps of grease.

Grease fittings

On new machines, the grease fitting may be covered with paint. Remove the paint to ensure the grease fitting can accept grease.

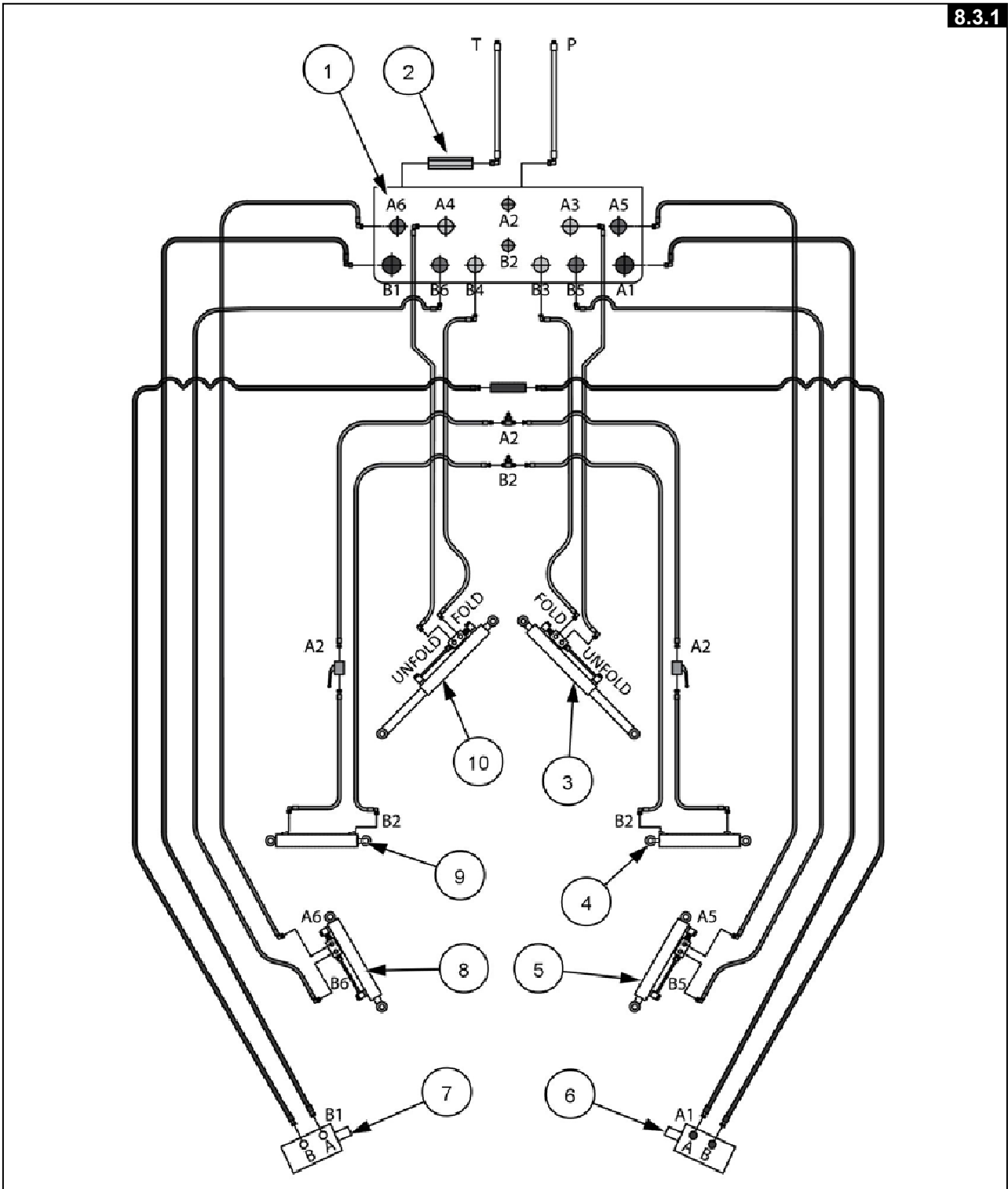
Wipe the dirt from all of the fittings and from the grease gun nozzle before you grease the machine to minimize the chance of contamination.

Pump fresh grease into the fitting to adequately lubricate the component and force out any contamination from the grease passage. Wipe off any excess grease.

Use grease NEW HOLLAND AMBRA HI TEMP EP GREASE or an equivalent lubricant.

8.3 HYDRAULIC DIAGRAM

8.3.1



Item	Description	Item	Description
(1)	Hydraulic panel	(6)	Right-hand basket rake motor
(2)	Check valve	(7)	Left-hand basket rake motor
(3)	Right-hand unfold cylinder	(8)	Left-hand angle cylinder
(4)	Right-hand lift cylinder	(9)	Left-hand lift cylinder
(5)	Right-hand angle cylinder	(10)	Left-hand unfold cylinder

8.4 TORQUE SPECIFICATIONS – NOMINAL TIGHTENING VALUES FOR NORMAL ASSEMBLY

Metric hex head (non-flange) hardware

Plain (PLN) – an unplated hardware finish with residual manufacturing oils

Zinc-dichromate (ZND) – a yellow colored chemical plating formula yellow applied to the hardware

Nominal size	Class (CL) 8.8 bolt and Class (CL) 8 nut	Class (CL) 10.9 bolt and 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 flange head hardware

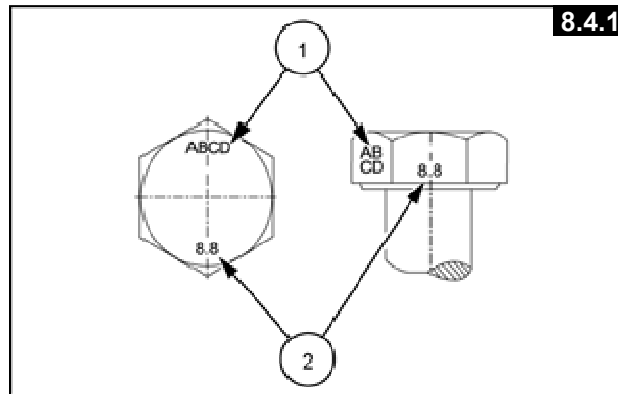
Plain (PLN) – an unplated hardware finish with residual manufacturing oils

Zinc-dichromate (ZND) – a yellow colored chemical plating formula yellow applied to the hardware

Nominal size	Class (CL) 8.8 bolt and Class (CL) 8 nut	Class (CL) 10.9 bolt and Class (CL) 10 nut	Flange locknut CL 8 w/CL 8.8 bolt	Flange 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 (443)
	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)

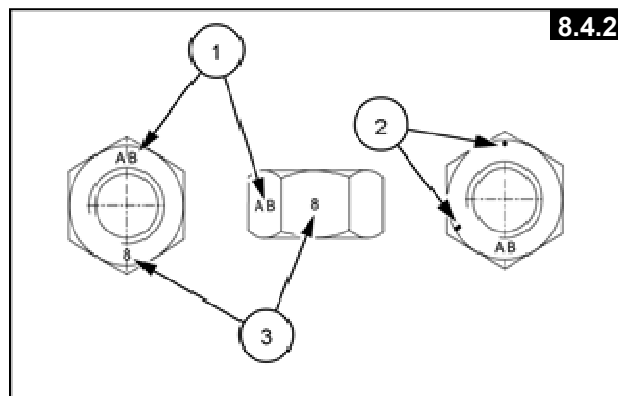
Identification markings

- Metric hex head, flange hex head and carriage bolts, Classes (CL) 5.6 and upward



1. Manufacturer's identification
2. Property class

- Metric hex nuts and locknuts, Classes (CL) 05 and upward



1. Manufacturer's identification
2. Clockwise type markings indicate property class and may include manufacturer identification (if applied), Example: property marks 240° apart (shown) at the eight o'clock position indicate a Class 8 property, and marks 300° apart at the ten o'clock position indicate a Class 10 property.
3. Property class

8.5 TORQUE SPECIFICATIONS – STANDARD TORQUE DATA FOR HYDRAULICS

General information

Hydraulic connections require a minimum assembly torque in order to provide zero leakage at rated pressure with adequate fatigue resistance. Over-torqueing of a hydraulic connection can also lead to leakage or failure. For some connections, CNH Industrial requires a different torque value than is listed in the ISO and SAE standards.

Always follow the instructions in this manual for specific torque values when you service components. The information in this section is for general guidance only when a procedure contains no specific torque value.

Tolerance

The tolerance for all torque values is $\pm 10\%$. This tolerance must include all assembly variation, not only the torque wrench repeatability.

Lubrication

Application of grease or other lubricants to hydraulic connectors should be avoided. If clean hydraulic oil is already on the connection, it is not required to remove the oil. Generally, application of grease:

- May cause a significant change in the torque required to properly tighten the connection.
- May reduce the connection's resistance to vibration.
- Excessive grease may displace an elastomer seal during tightening.
- Grease extrusion when connection is tightened may be mistaken for leakage.

The lubrication is recommended only for connections which are made into aluminum manifolds or with stainless steel connectors, it may be required to apply a lubricant to prevent galling.

Use of thread-locking compounds is prohibited because:

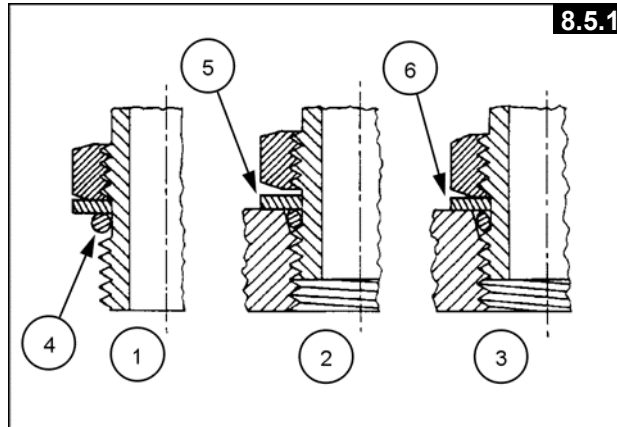
- May cause a significant change in the torque required to properly tighten the connections.
- Reduce the serviceability of the joint.
- May prevent the O-ring from properly sealing if the compound gets on the O-ring.

Installation of adjustable fittings in straight thread O-ring bosses

1. Lubricate the O-ring by coating it with a light oil or petroleum. Install the O-ring in the groove adjacent to the metal backup washer which is assembled at the extreme end of the groove (4).
2. Install the fitting into the SAE straight thread boss until the metal backup washer contacts the face of the boss (5).

Do not over tighten and distort the metal backup washer.

3. Position the fitting by turning out (counterclockwise) up to a maximum of one turn. Holding the pad of the fitting with a wrench, tighten the locknut and washer against the face of the boss (6).



SAE dash size	UN/UNF thread size	Metric tube 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 port connections (British Standard Pipe Parallel (BSPP) thread ports and stud ends)

BSPP thread G- Gas; A- medium coarse threads	Metric tube Outside Diameter (OD) mm (in)		Ferrous		Non-Ferrous	
	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	16 (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 37° flare.

Torque values for metric port connections (Metric face-seal ports and stud ends)

Metric thread	Metric tube Outside Diameter (OD) mm (in)		Ferrous		Non-Ferrous	
	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 37° flare.

8.6 MAINTENANCE PLANNING

EVERY 10 HOURS OF OPERATION OR DAILY	
Maintenance	Action
Grease points	GREASE
Inspect tine clearance with stripper bars	CHECK
Check for hydraulic leaks	CHECK
Inspect and tighten hardware	CHECK

Note:

EVERY 50 HOURS OF OPERATION OR WEEKLY	
Maintenance	Action
Grease points	GREASE
Tire pressure and wheel hardware torque	TIRE INFLATING

Note:

EVERY 200 HOURS OF OPERATION	
Maintenance	Action
Wheel bearings greasing	GREASE

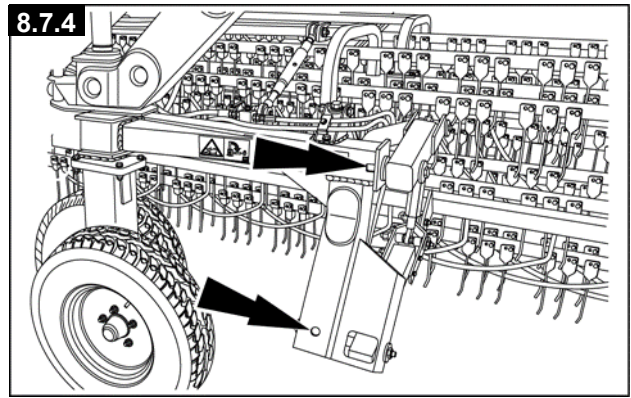
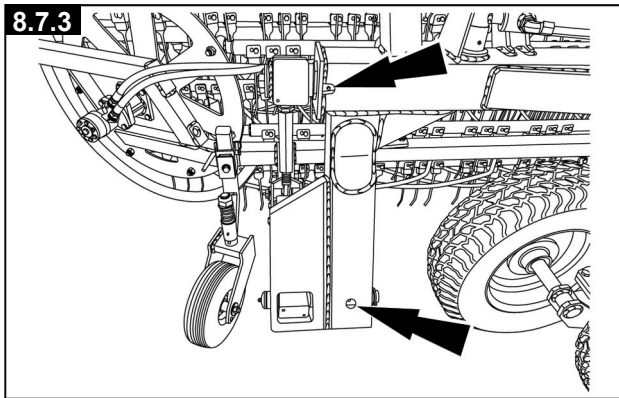
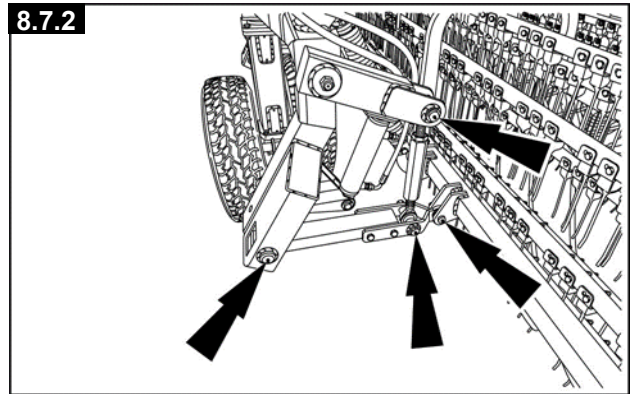
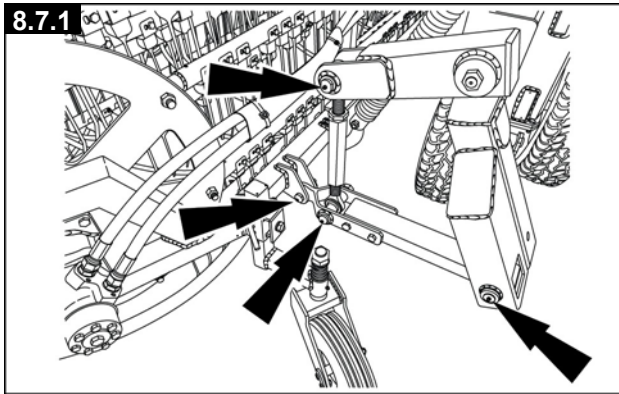
Note:

AS REQUIRED	
Maintenance	Action
Replace damaged or missing tines	REPLACE
Tine bar replacement	REPLACE
Stripper bar replacement	REPLACE

Note:

8.7 MAINTENANCE EVERY 10 HOURS OF OPERATION OR DAILY

Grease points – 12 fittings in total per basket



Inspect tine clearance with stripper bars

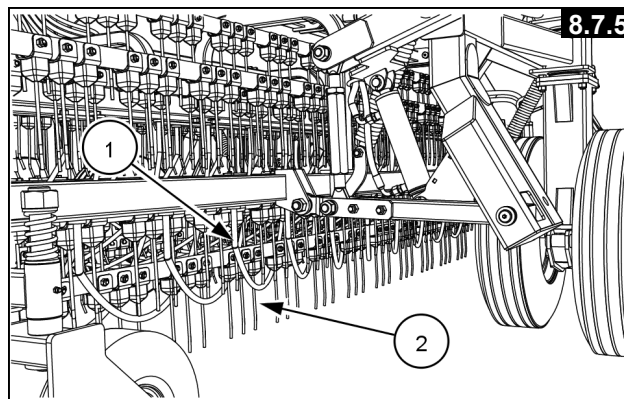
▲ WARNING

Entanglement hazard!

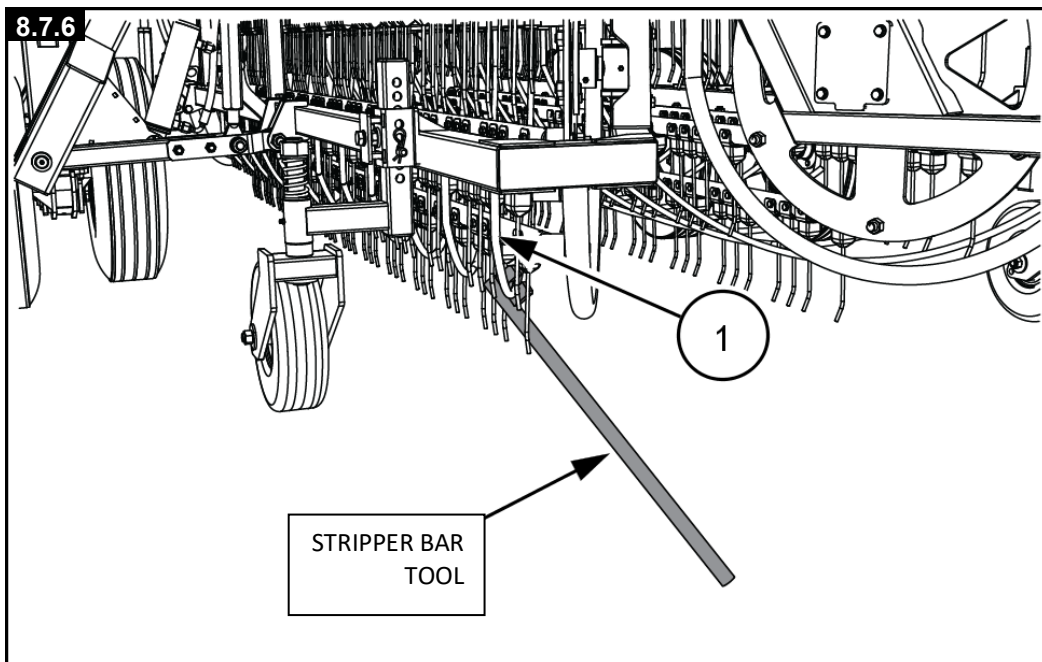
Disengage the hydraulic system, turn off the engine, and remove the key. Wait for all movement to stop before you leave the operator's position. Never adjust, lubricate, clean, or remove a blockage of crop material when the engine is on.

Failure to comply could result in death or serious injury.

1. Keep the stripper bars (1) aligned so the tines (2) do not contact them at any point as the basket rotates.



2. Maintain a minimum clearance of 12.7 mm (0.5 in) at all points.
3. Straighten the stripper bars (1) as needed with the provided tool mounted under the tongue.
4. Replace excessively damaged stripper bars (check forward on this manual for the correct procedure).



Check for hydraulic leaks



WARNING

Escaping fluid!

Hydraulic fluid or diesel fuel leaking under pressure can penetrate the skin and cause infection or other injury. To prevent personal injury, relieve all pressure before disconnecting fluid lines or performing work on the hydraulic system. Before applying pressure, make sure all connections are tight and all components are in good condition. Never use your hand to check for suspected leaks under pressure. Use a piece of cardboard or wood for this purpose. If injured by leaking fluid, see your doctor immediately. Failure to comply could result in death or serious injury.

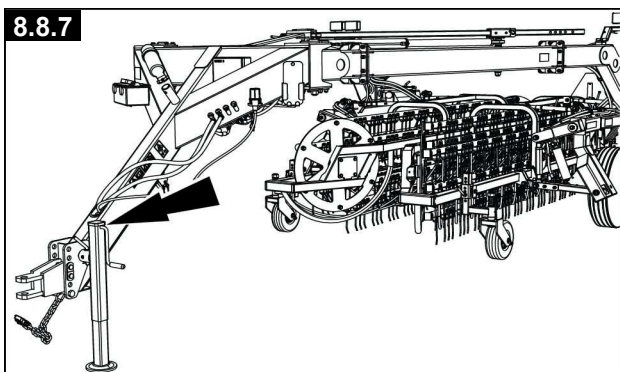
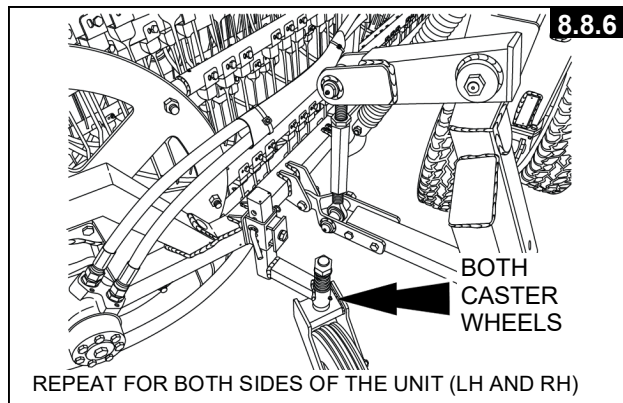
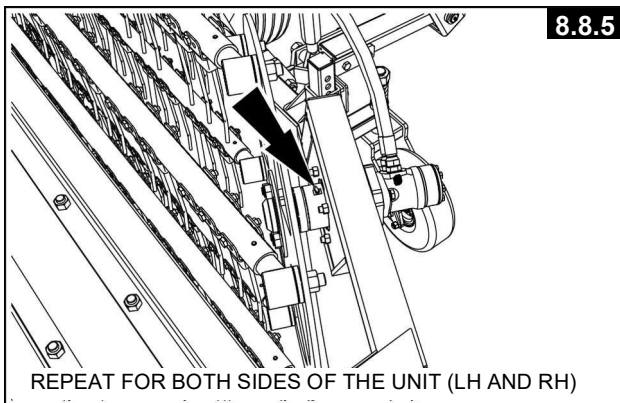
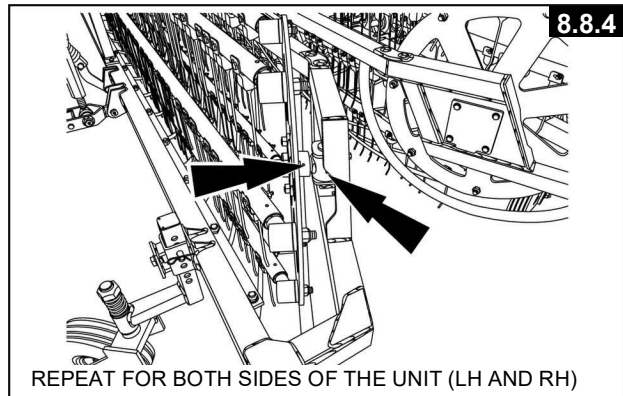
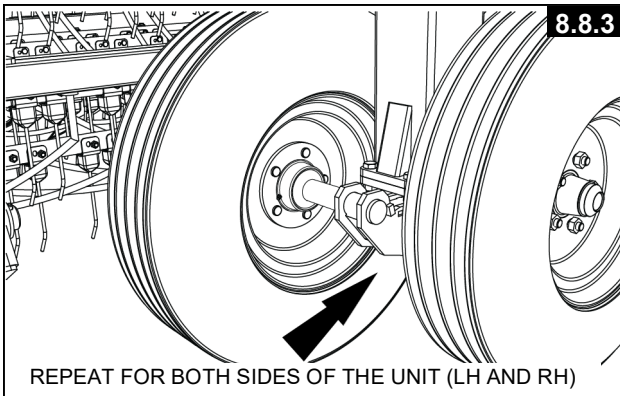
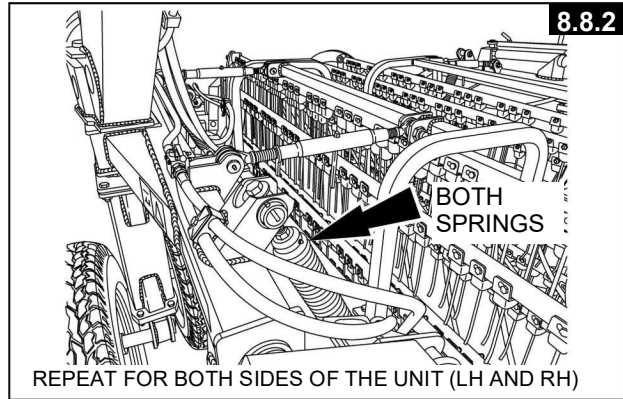
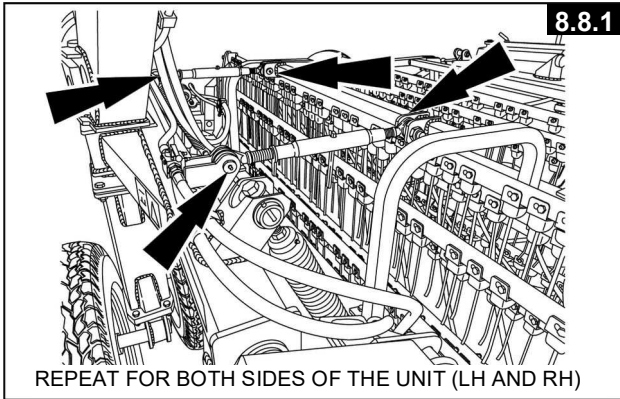
Check for hydraulic leaks and repair as needed (chapter 8.5 for torque specifications).

Inspect and tighten hardware

Check for loose hardware and tighten as required (chapter 8.4 for torque specifications).

8.8 MAINTENANCE EVERY 50 HOURS OF OPERATION OR WEEKLY

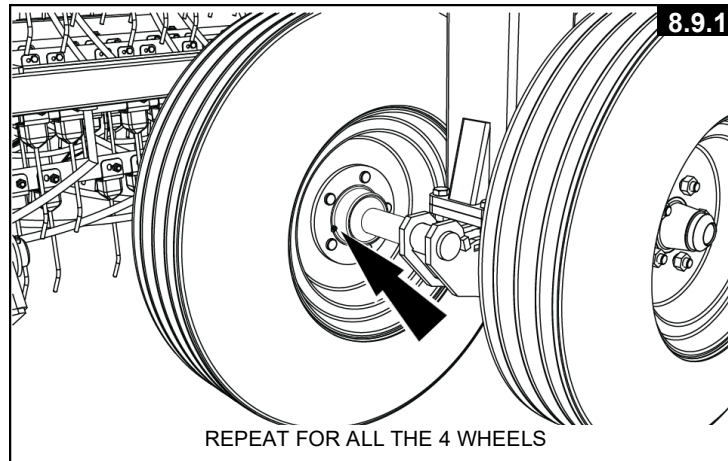
Grease points



Tire pressure and wheels hardware torque

- Pressure: 2.5 bar (36 psi)
- Wheel hardware torque: 190 - 217 N·m (140 - 160 lb ft).

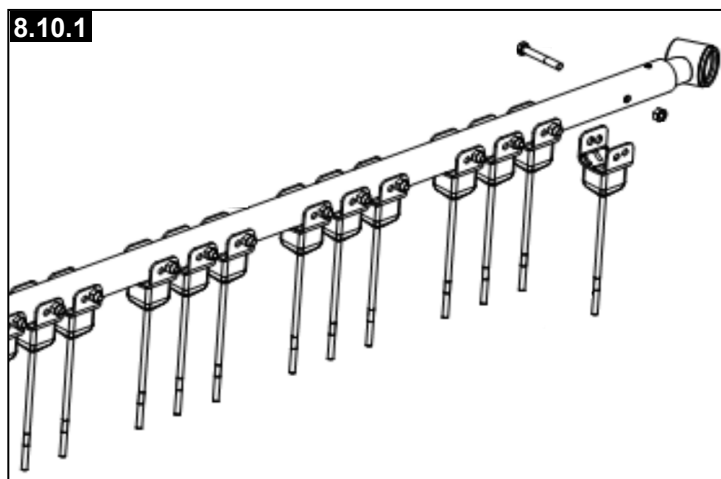
8.9 MAINTENANCE EVERY 200 HOURS OF OPERATION



8.10 MAINTENANCE AS REQUIRED

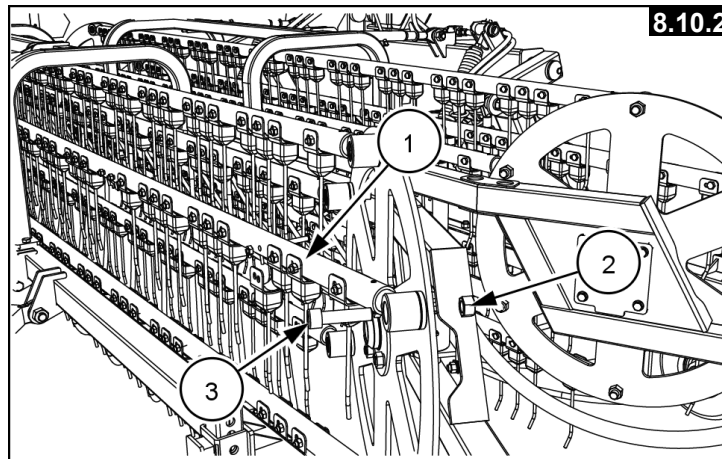
Replace damaged or missing tines

The left and right baskets use different tines.
The bend at the bottom of the tines should be facing toward the center of the basket end support.



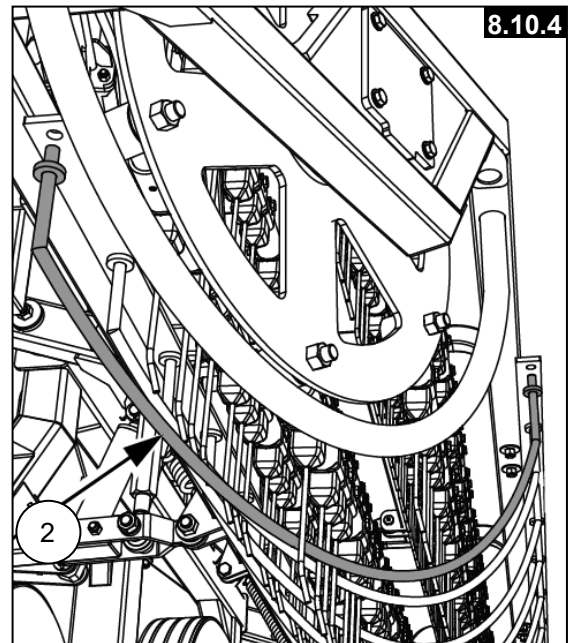
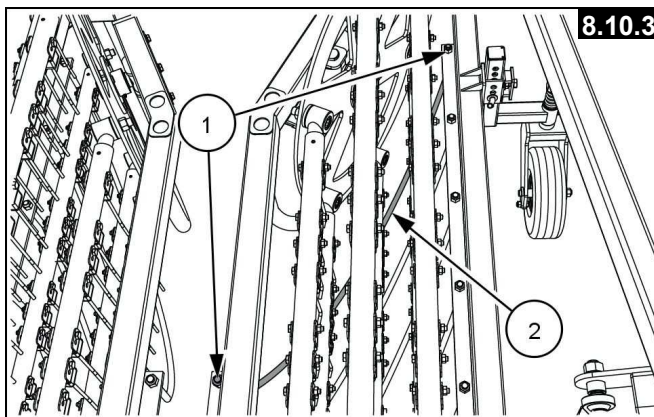
Tine bar replacement

1. Remove the bolt (3) and nut (2) at each end to remove the tine bar (1).
2. Inspect each tine for damage and remove the tines that are reusable from the tine bar (1).
3. Install the reused tines and any new tines onto the tine bar assembly.
4. Back the tine bar assembly (1) into the basket.
5. Secure each end of the tine bar with the bolt (3) and nut (2) from removal.
Torque the hardware to 300 N·m (221 lb ft).



Stripper bar replacement

1. Remove the two M16 locknuts (1) from the top side of the basket.
2. Remove the stripper bar (2) from the basket.



3. Install the new stripper bar (2) into the basket frame holes
4. Secure the stripper bar with a M16 locknut (1) on each end.

Keep the stripper bars aligned so the tines do not contact them at any point as the basket rotates. Maintain a minimum clearance of 12.7 mm (0.5 in) at all points.

8.11 END OF SEASON SERVICE

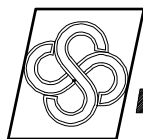
1. Lubricate the whole rake.
2. Clean the components.
3. Check the stripper bar to tine clearance.
4. Replace any missing or damaged tines.
5. Lower the baskets to collapse the cylinders.
6. Close the rake into transport position to collapse the fold/unfold cylinders.
7. Coat all exposed hydraulic cylinder rods with grease to prevent rusting.

8.12 PRESEASON SERVICE

1. Lubricate the whole rake.
2. Check the stripper bar to tine clearance.
3. Replace any missing or damaged tines.
4. Check the tire pressure.
5. Attach the rake to a tractor and change into the operating position.
6. Check operation of the basket motors.

SECTION 9 TROUBLESHOOTING

PROBLEM	POTENTIAL CAUSE	CORRECTIVE ACTION
Hydraulic oil overheating	Tractor flow is greater than 76 l/min (20 US gpm).	Reduce the tractor flow to max 61 l/min (16 US gpm).
Controller not operating.	No power at pin #7.	Refer to "Power requirements" chapter.
	Harness connectors not fully seated.	Check connections and fix as needed.
	Fuse blown.	1. Check fuse and replace as needed. 2. Contact the dealer for additional diagnostics if the fuse is OK.
Bent or broken tines.	Tines are digging into ground or striking stripper bars.	Raise basket so tines clear the ground by at least 13 mm (0.5 in). Adjust or bend stripper bars for proper clearance.
Rake baskets stalling.	Insufficient tractor hydraulic oil flow.	Tractor oil flow must be a minimum of 34 l/min (9.0 US gpm).
	Basket speed below minimum 50 RPM.	Refer to "Basket rake speed - Adjustment" chapter.
Tractor hydraulic lever will not stay in detent on closed center hydraulic system.	Excessive hydraulic oil flow from the tractor.	Reduce hydraulic oil flow from the tractor to be within specifications listed above.
Basket angle cylinder spongy.	Air in hydraulic lines and cylinders.	Bleed air from hydraulic system.
Basket rake bars hitting the frame.	Speed set too fast.	Use a photo tachometer to properly adjust the basket rake speed. See "Basket speed adjustment" chapter.



AGRICULTURAL MACHINERY
sitrex® SpA .

Zona Industriale-Viale Grecia, 8
06018 TRESTINA-(Perugia)-ITALY
Tel. +39.075.8540021-Telefax +39.075.8540523
e-mail: sitrex@sitrex.it www.sitrex.com

