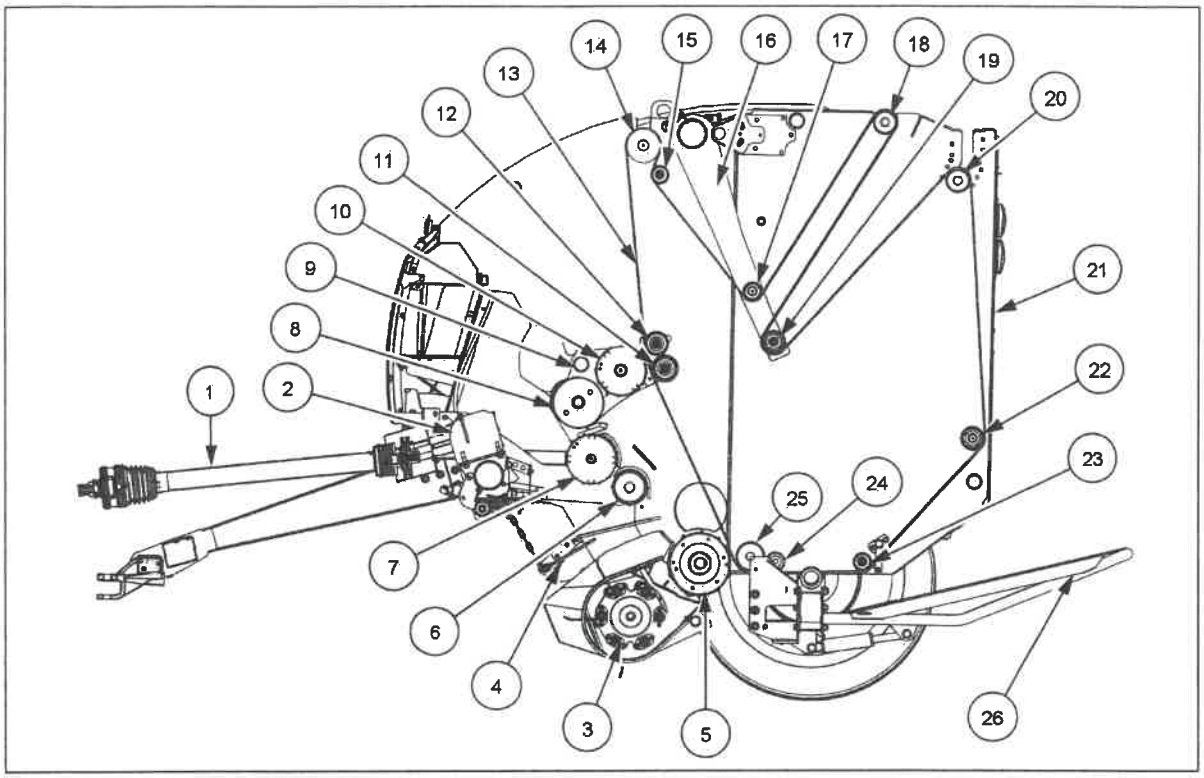
THE BALING PROCESS

Basic bale formation components



NHIL18RB00480FA 1

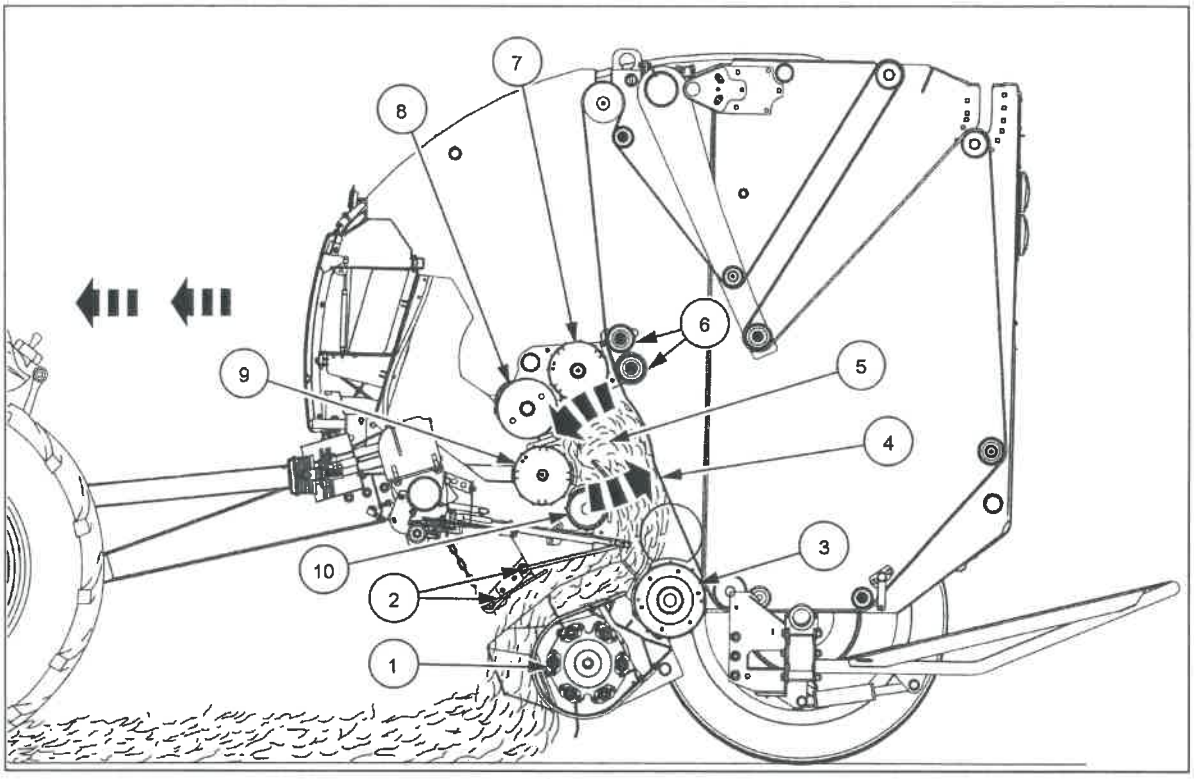
Basic bale formation components

Basic bale formation components

NOTE: *In this left-hand cross-section view, the pickup reel* ***(3)****, the bale-forming rolls* ***(5) – (10)****, and the bale-forming belts* ***(12)*** *all rotate in a clockwise direction.*

- **(1)** Power Take-Off (PTO)
- **(2)** Gearbox
- **(3)** Pickup
- **(4)** Windguard
- **(5)** Floor roll
- **(6)** Starter roll
- **(7)** Stationary roll
- **(8)** Sledge / Pivot roll
- **(9)** Sledge / Pivot arm
- **(10)** Stripper roll
- **(11)** Sledge follower roll, smooth
- **(12)** Sledge follower roll, looped (if equipped)
- **(13)** Bale-forming belts
- **(14)** Bale forming belt drive roll
- **(15)** Back wrap roll
- **(16)** Belt tension serpentine arm
- **(17)** Front serpentine roll
- **(18)** Top front tailgate idler roll
- **(19)** Rear serpentine roll
- **(20)** Top rear tailgate idler roll
- **(21)** Tailgate
- **(22)** Middle tailgate idler roll (belt tracking)
- **(23)** Bottom tailgate idler roll (select models only)
- **(24)** Tailgate chopping roll (if equipped)
- **(25)** Tailgate nose roll
- **(26)** Bale ramp (if equipped)

Starting the bale



NHIL18RB00444FA 1

Bale core formation

Bale core formation begins with the baler moving forward over the crop windrow creating a steady and continuous feed of crop material.

A. The pickup **(1)** starts the feeding process by lifting the crop material.

B. The windguard (tine or roller type) **(2)** holds down and slightly compresses the crop material for positive feeding.

C. If the pickup is equipped with centering augers, the two augers move the crop material from the ends of the pickup to center of the pickup, and then compresses the crop material as the crop material moves toward the floor roll. If the baler is equipped with an Over Shot Feeder (OSF), the crop material moves from the pickup, and then the Over Shot Feeder (OSF) compresses the crop material that passes over the feeder to the floor roll.

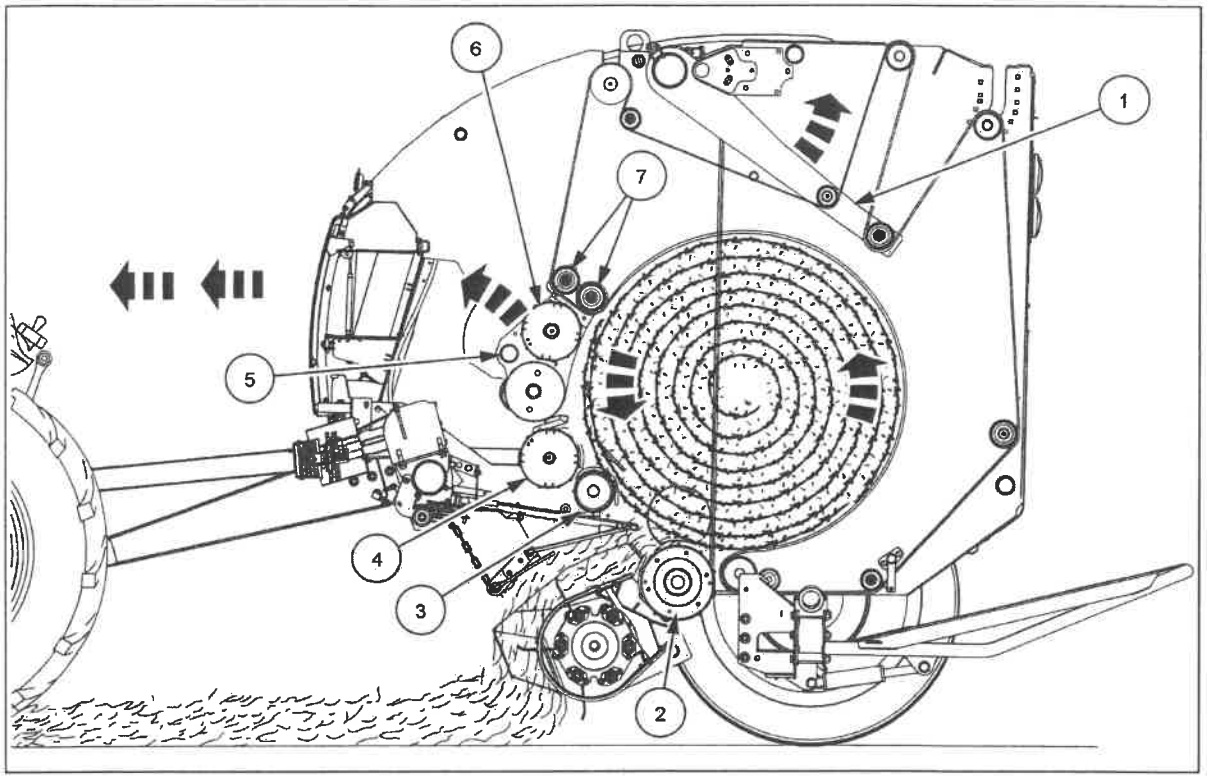
D. As the crop material contacts the floor roll **(3)**, it drives the crop material into contact with the bale-forming belts **(4)**.

E. The rough textured surface of the bale-forming belt grips the crop material to carry it upward to the bale core forming area **(5)**.

F. The dual sledge follower rolls **(6)**, the stripper roll **(7)**, and the pivot roll **(8)** assist in curling the material to start the core.

G. The stationary roll **(9)** helps to continue to curl the crop material and move the crop material to the starter roll **(10)**. The starter roll then completes the full rotation of the crop and creates the bale core.

Bale formation



NHIL16RB00478FA 1

Bale formation

With the bale core formed, the steady and continuous feeding of crop material forms the bale size (diameter) and shape.

A. The operator monitors the bale shape of the forming bale with the bale shape bar graphs on the operator's panel.

B. The operator drives the tractor to guide the baler along the windrow to maintain an equal height of the bale shape bar graphs for the left-hand and right-hand sides of the bale. The operator must adjust the driving along the windrow when bale shape bar graphs are uneven; for example or .

C. As the bale diameter increases, the hydraulic bale density system controls the bale-forming belt tension as the serpentine arm **(1)** rotates upward. The upward rotation of the serpentine arm allows the bale diameter to expand within the chamber area.

D. The floor roll **(2)** continues to feed the crop material to the expanding bale and also supports most of the bale weight to reduce stress on the bale-forming belts.

E. The starter roll **(3)** and the stationary roll **(4)** assist in rotating the bale within the bale chamber.

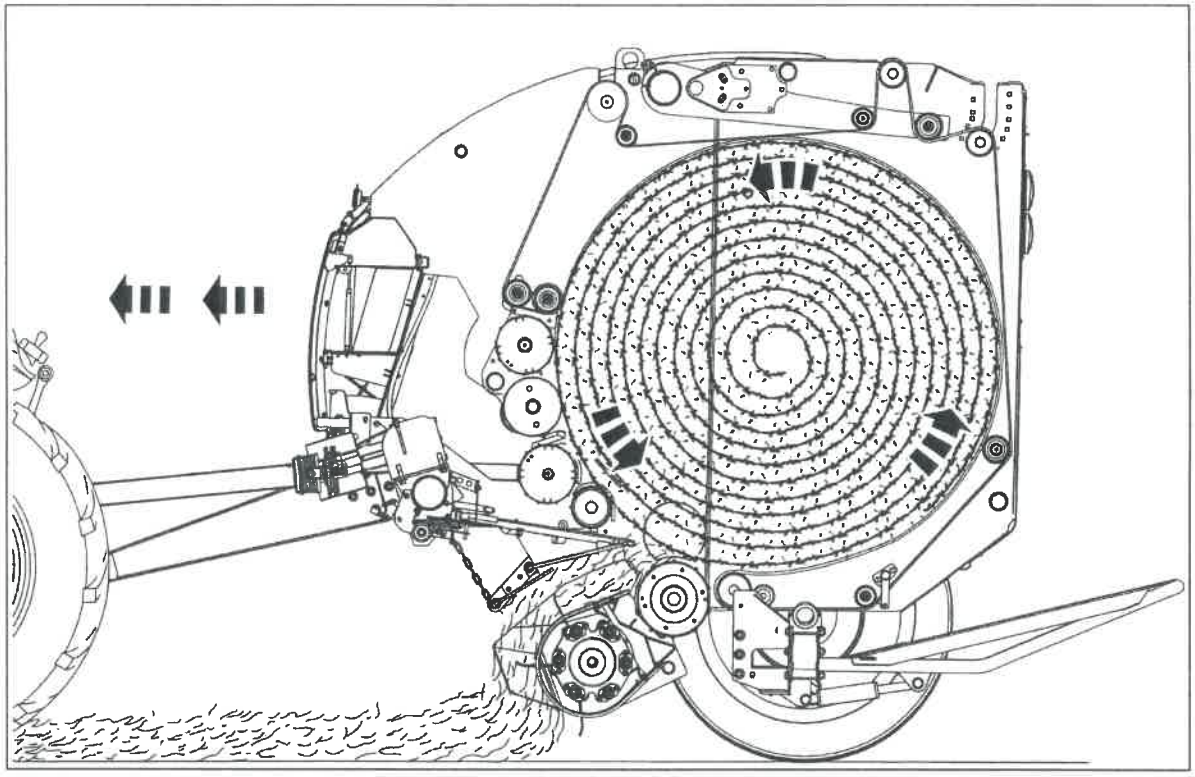
F. Additionally, as the bale diameter increases, the stripper roll **(6)** and the dual sledge follower rolls **(7)** rotate forward on the sledge pivot arm assembly **(5)**.

G. The ribbed construction on the stripper roll **(6)** strips the crop material off of the bale-forming belts and packs the crop into the bale.

H. The combined action of the bale-forming belts and the forming rolls produces the optimum bale shape. Initially, reduced bale-forming belt tension ensures positive core formation, and then increasing bale-forming belt tension during bale formation ensures the desired bale density.

I. If the "near full bale" size alarm was preset on the operator's panel, the "near full bale" icon appears on the operator's panel display and the alarm will sound with two brief tones when the bale size reaches the preset "near full bale" size setting.

Bale completion



NHIL18RB00479FA 1

Bale completion

When the bale reaches the selected size:

A. The "full bale" icon appears on the operator's panel display and the alarm sounds a three second tone.

B. The operator stops forward travel of the baler.

C. The bale wrapping mechanism starts automatically, if the operator's panel is set to the AUTO mode.

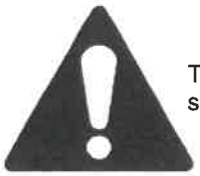
D. When the baler completes the wrapping cycle, the operator's panel "wrap cycle completed" alarm sounds a one second tone.

E. The "bale eject" icon appears on the operator's panel display.

2 - SAFETY INFORMATION

Safety rules and signal word definitions

Personal safety



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.

Throughout this manual you will find the signal words DANGER, WARNING, and CAUTION followed by special instructions. These precautions are intended for the personal safety of you and those working with you.

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.

Machine safety

NOTICE: *Notice indicates a situation that, if not avoided, could result in machine or property damage.*

Throughout this manual you will find the signal word Notice followed by special instructions to prevent machine or property damage. The word Notice is used to address practices not related to personal safety.

Information

NOTE: *Note indicates additional information that clarifies steps, procedures, or other information in this manual.*

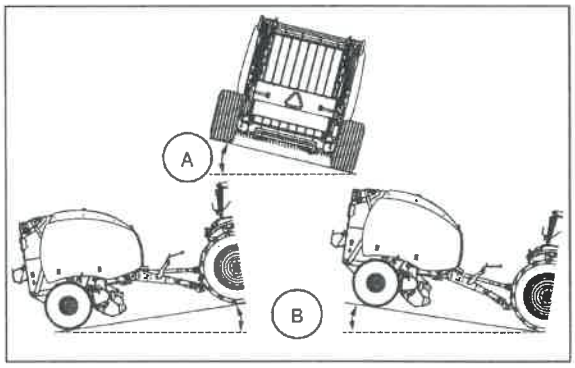
Throughout this manual you will find the word Note followed by additional information about a step, procedure, or other information in the manual. The word Note is not intended to address personal safety or property damage.

Safety rules

⚠ General safety rules ⚠

Do NOT operate the baler on the terrain conditions as follows:

- On a side slope that is greater than **(A)** = 25% (14°)
- On an uphill or downhill slope of **(B)** = 15% (8.5°) on solid terrain.



NHIL18RB00454AA 1

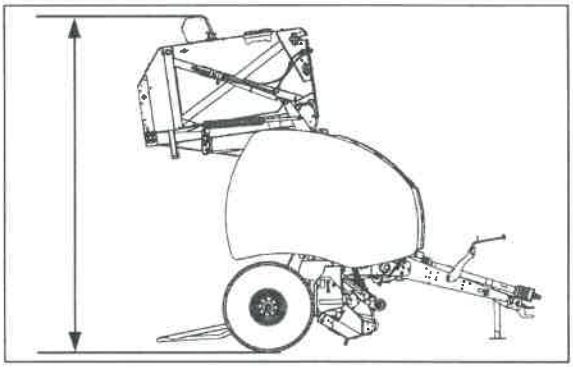
Operation on sloping or uneven terrain:

- Use caution when operating the machine on any sloping terrain.
- A raised tailgate or full bale in the bale chamber will change the center of gravity of the machine.
- The machine can tip or roll over when near ditches, embankments, or uneven surfaces.

High voltage power lines may require additional and significant clearance for safety due to the possibility of arcing between the power line and the baler.

Pay attention to overhead power lines and hanging obstacles.

When determining the needed clearance below obstacles and power lines, understand that when the baler is in the configuration described and shown, the distance **(A)**, from a level ground surface to the highest point of the spare net roll storage box may be up to **4.8 m (16 ft)**.



NHIL18RB00380AA 2

- Equipped with large diameter wheels and tires
- Equipped with a spare net roll storage box
- The tailgate fully raised.
- The bale chamber is empty.

As the tractor driver and baler operator, never permit ride-along passengers on the tractor, in the tractor cab, or anyone to ride on the baler while being towed or operated.

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

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

- DO NOT use your hand to check for leaks. Use a piece of cardboard or paper.
- Stop engine, remove the key and relieve the pressure before connecting or disconnecting fluid lines.
- Make sure all components are in good condition and tighten all connections before starting the engine or pressurizing 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 with hydraulic fluid.
  - Wash the skin promptly with soap and water after contact with hydraulic fluid.

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

Wear protective equipment when appropriate.

DO NOT attempt to remove material from any part of the machine while the machine is operating, any of the baler components are in motion, or while the tractor engine is running.

Before you operate the machine, install and securely close all of the machine guards and shields. Make sure that all the guards and that all the shields are in good condition. Never operate the machine with shields open or removed. Always close the access doors and/or access panels before operating the machine.

Make sure that no bystanders or pets are within the machine operating area. The machine and/or moving component on the machine can strike or crush bystanders or pets. DO NOT allow anyone to enter the work area.

A raised tailgate can fall unexpectedly and crush persons underneath. Never allow anyone to enter the area underneath a raised tailgate during operation.

⚠ General maintenance safety ⚠

⚠ DANGER

Risk of harm during maintenance of the machine!
Observe the following safety precautions before performing any lubrication or maintenance. 1. Shut off tractor engine and remove key. 2. Disengage PTO drive. 3. Engage tractor parking brake. 4. Engage tailgate lockout valve if tailgate is raised. 5. Make sure all guards and shields are installed.
Failure to comply will result in death or serious injury.

D0129B

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

Only service the machine on a firm level surface.

⚠ DANGER

Fall hazard!
Remove wrapped crop debris from the forming rollers by clearing the bale chamber, removing belt tension, and engaging the tailgate lockout valve. Remove wrapped debris from inside the bale chamber or tailgate. Do not climb on the exterior of the baler to remove wrapped debris.
Failure to comply will result in death or serious injury.

D0153B

If you cannot reach certain areas of the machine from ground level, use a suitable ladder or other appropriate means to gain access. Do not climb on the machine for any reason. To access and clean the bale forming rolls, see "Bale formation rollers – Remove debris – Cleaning" (**5-1**).

Install and close all the removed or opened guards and all the removed or open shields after servicing the machine.

Close all the access doors and install all panels after servicing the machine.

Do not attempt to clean, lubricate, clear obstructions, or adjust the machine while the machine operating, any of the baler components are in motion, or while the tractor engine is running.

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

Always engage the tailgate lockout valve when the tailgate is open for service. A disengaged tailgate hydraulic lockout valve or unsupported hydraulic cylinders can lose pressure and drop the tailgate causing a crushing hazard. Do not leave the machine in a raised tailgate position while parked or during service, unless the tailgate is securely supported and/or the tailgate lockout valve engaged.

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

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

Stop the engine, remove the key, and relieve pressure before disconnecting or connecting fluid lines.

Stop the engine and remove the key before disconnecting or connecting electrical connections.

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

Some electrical components and/or some hydraulic lines may become hot during operation. Take care when servicing such components. Allow the component surfaces to cool before handling the components or disconnecting hot components. Wear protective equipment when appropriate.

When welding on or in close proximity to this machine, follow the instructions in this operator's manual. See "Wheels and tires" safety rules that follow in this chapter.

Always disconnect the battery before welding on the machine. Always wash your hands after handling battery components.

⚠ Tailgate ⚠

⚠ DANGER

Crush and/or impact hazard!
Make sure the area surrounding the tailgate is clear of all persons and domestic animals before opening or closing the tailgate.
Failure to comply will result in death or serious injury.

D0061A

⚠ DANGER

Risk of harm during maintenance of the machine!
Observe the following safety precautions before performing any lubrication or maintenance. 1. Shut off tractor engine and remove key. 2. Disengage PTO drive. 3. Engage tractor parking brake. 4. Engage tailgate lockout valve if tailgate is raised. 5. Make sure all guards and shields are installed.
Failure to comply will result in death or serious injury.

D0129B

⚠ DANGER

Crush hazard! The tailgate may close faster than you can move away.
ALWAYS make sure the tailgate lockout valve is engaged in the locked position before working under a raised tailgate. In the event of a sudden loss of hydraulic pressure, the tailgate will fall if the lockout valve is not engaged. Stand clear of the tailgate before disengaging the lockout valve.
Failure to comply will result in death or serious injury.

D0003B

See "Safety features; Tailgate lockout valve" (**2-12**).

Description:

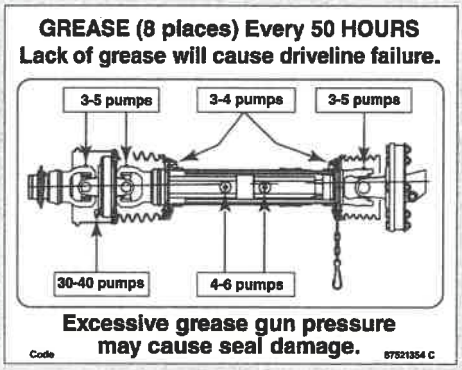
Power Take-Off (PTO) lubrication

GREASE (8 places) EVERY 50 HOURS
Lack of grease will cause driveline failure.
[3–5 pumps] — [3–4 pumps] — [3–5 pumps]
[30–40 pumps] — [4–6 pumps]
Excessive grease gun pressure may cause seal damage.

Quantity: 1

Part number:

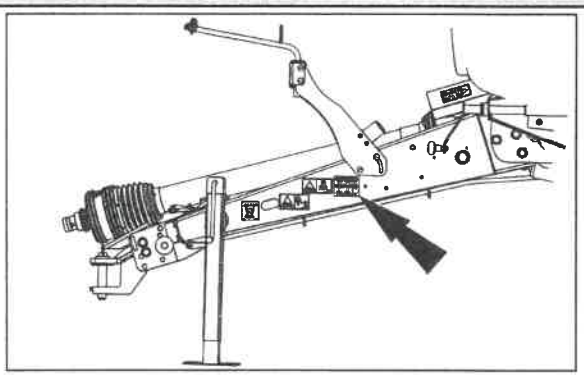
87521354 – English
87539934 – French
47612359 – Brazilian Portuguese



87521354_C 9

Location:

Located on the left-hand side of the baler tongue/hitch.



NHIL18RB00573AA 10

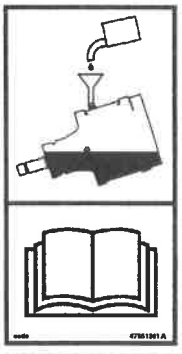
Description:

Gearbox oil level

Oil level check by removing a port plug on the left-hand side of the gearbox.
Quantity: 1

Part number:

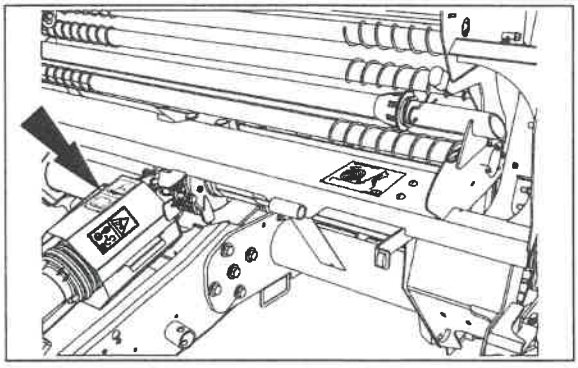
47551341



47551341_A 11

Location:

Located on the top of the gearbox input shaft shield.



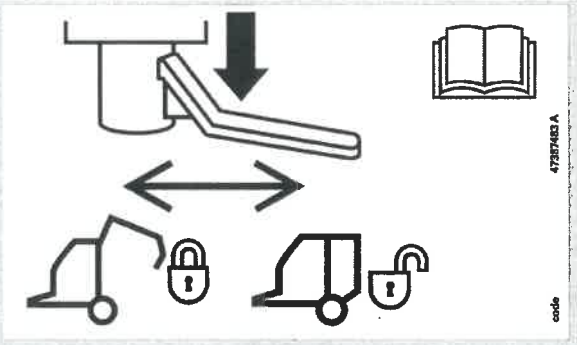
NHIL18RB00369AA 12

Description:

Tailgate lockout valve

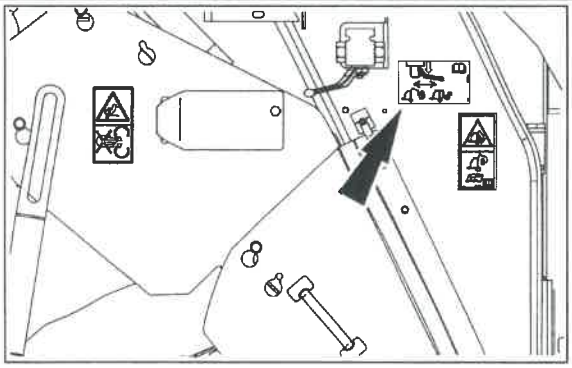
Quantity: 1

Part number:
47387483



47387483_A 13

Location:
Located on the left-hand outrigger frame adjacent to the hydraulic lockout valve assembly.



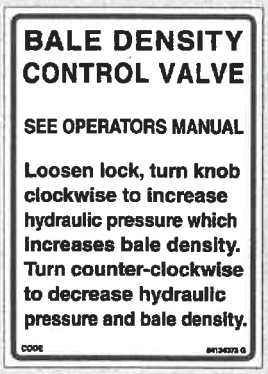
NHIL13RB03035AA 14

Description:

NOTE: Applicability only to balers with the mechanical adjustable bale density control valve.

Bale density control valve
See operators manual
Loosen lock, turn knob clockwise to increase hydraulic pressure which increases bale density. Turn counter-clockwise to decrease hydraulic pressure and bale density.

Quantity: 1



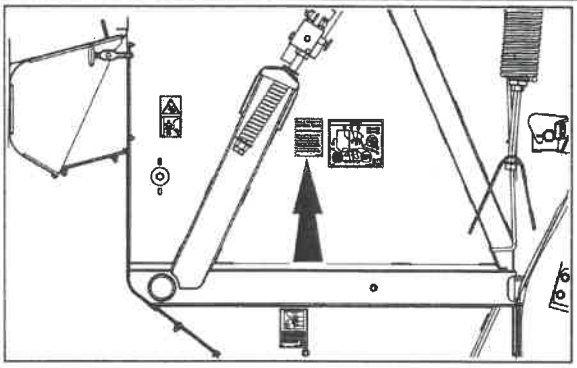
84134373_G 15

Part number:

84134373 – English
9827447 – French
87479032 – Spanish
47612354 – Brazilian Portuguese

Location:

Located on the right-hand side of the tailgate at the bale density control valve.



NHIL18RB00564AA 16

Description:

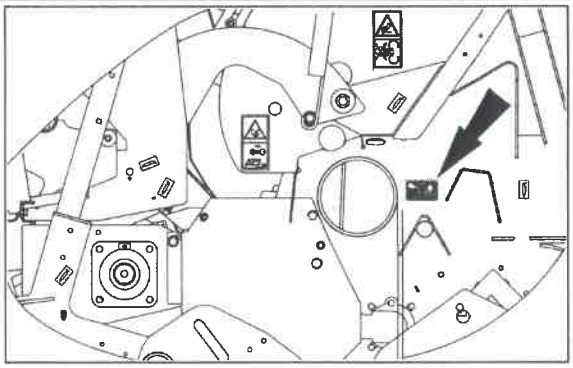
Attention – Every 10 hours, oil the roller chain

Quantity: 2

Part number:
718861

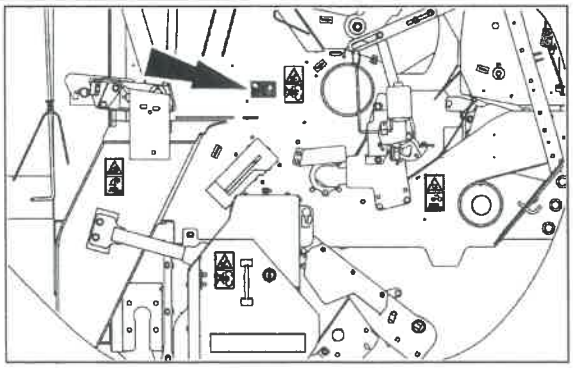
718861_B 17

Location 1:
Located behind the left-hand door shield, on frame side sheet behind the floor roll drive chain.



NHIL13RB00834AA 18

Location 2:
Located behind the right-hand door shield, on the frame side sheet at the sledge roll drive chain.



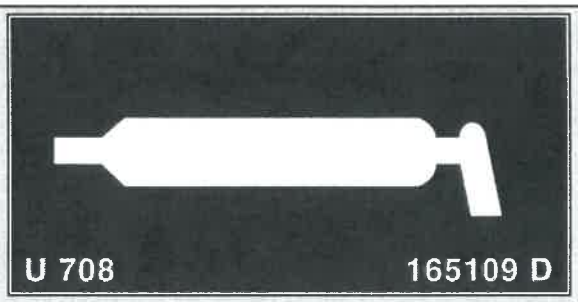
NHIL13RB00837AA 19

Description:

Grease gun – Grease fitting location indicator

Quantity: Variable dependent on model and configuration

Part number:
165109



165109_D 20

Location:
Located adjacent to or in the vicinity of a grease fitting that is not readily visible or may be obscured by surrounding components. The tip of the grease gun symbol points toward the grease fitting.

NOTE: *Not all grease fittings are indicated by the grease gun decal.*

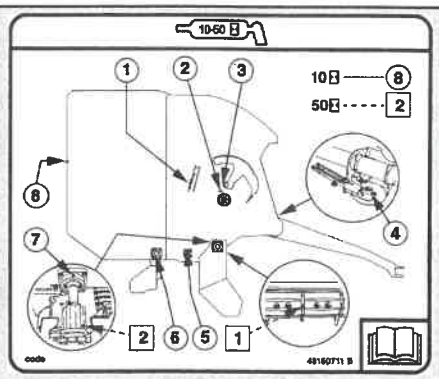
Description:

Grease locations and hourly intervals – Right-hand side

- **10 h (hours) – Eight grease locations**
- **50 h (hours) – Two grease locations**

Quantity: 1

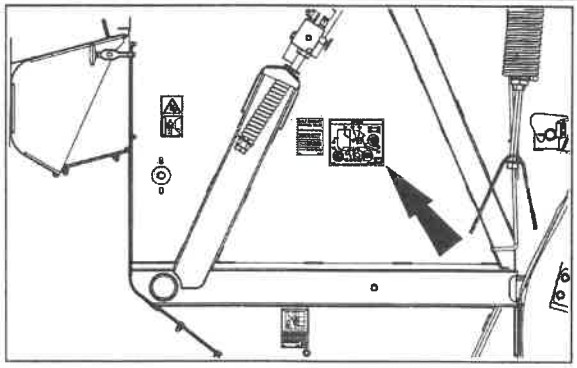
Part number:
48150711



48150711_B 21

Location:

Located on the right-hand side of the tailgate adjacent to the density control valve decal.



NHIL18RB00564AA 22

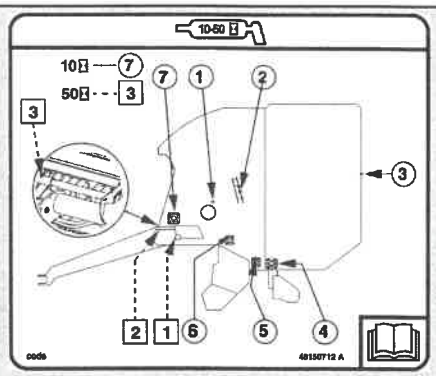
Description:

Grease locations and hourly intervals – Left-hand side

- **10 h (hours) – Seven grease locations**
- **50 h (hours) – Three grease locations**

Quantity: 1

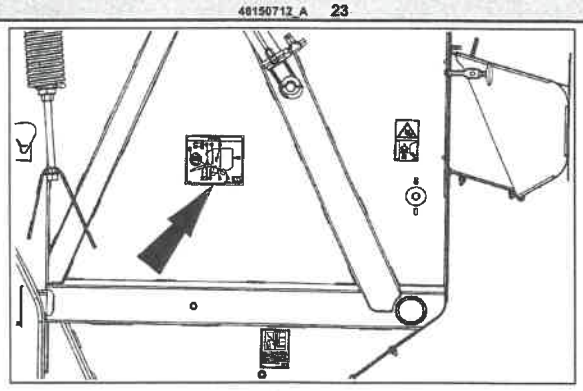
Part number:
48150712



48150712_A 23

Location:

Located on the left-hand side of the tailgate.



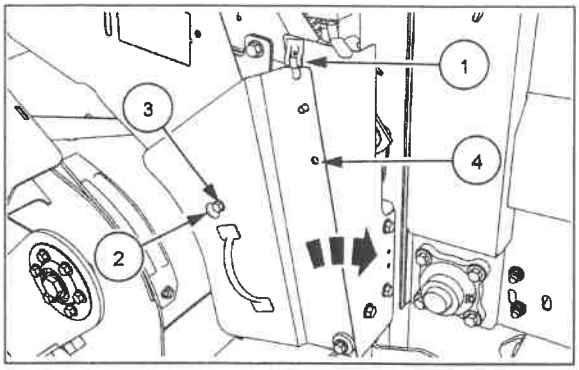
NHIL18RB00423AA 24

Floor roll drive chain – Adjust

1.5 m (5 ft) diameter balers

1. Disengage the clip latch **(1)**, and then move the shield rearward so that the shield hole **(2)** clears the bolt head **(3)**.

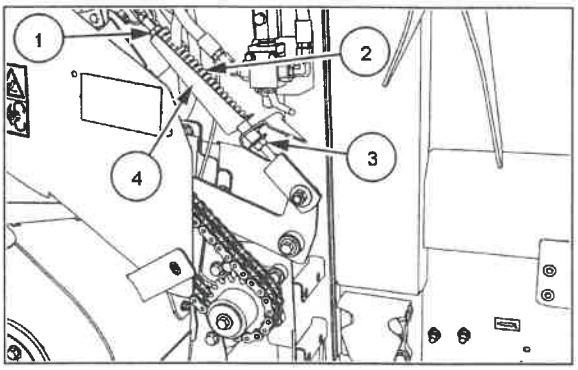
NOTE: *Machines shipped to Brazil will have a bolt **(4)** that secures the shield.*



NHIL14RB00278AA 1

2. Loosen the jam nut **(3)** a distance that is slightly greater than the distance required to compress the spring into alignment with the spring gauge.
3. Adjust the hex nut **(1)** until the length of the spring **(2)** is equal to the length of the spring gauge **(4)**.

NOTE: *If the chain was previously adjusted, removal of the offset chain link may be required in order to tension the chain sufficiently on **1.5 m (5 ft)** diameter balers that use an Over Shot Feeder (OSF). With the offset link removed, the chain can then be used for the maximum life of 3% chain stretch. See "Chain stretch" **(6-51)**.*

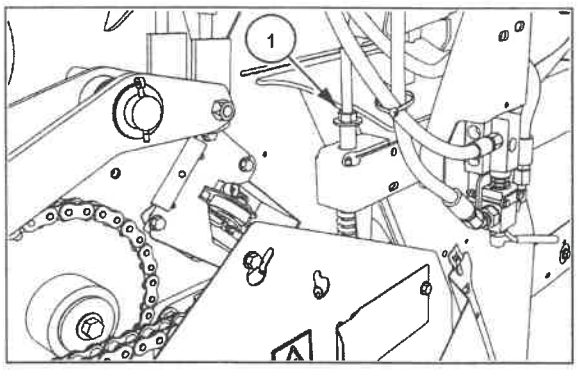


NHIL14RB00186AA 2

4. When the adjustment is complete, tighten the jam nut.
5. Pivot the shield forward to the operating position.
6. Engage the clip latch.

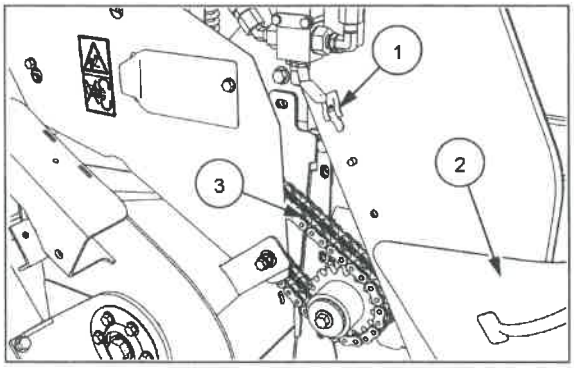
1.8 m (6 ft) diameter balers

1. On the left-hand side of the baler, loosen the jam nut **(1)** a distance that is slightly greater than the distance required to compress the spring into alignment with the spring gauge.



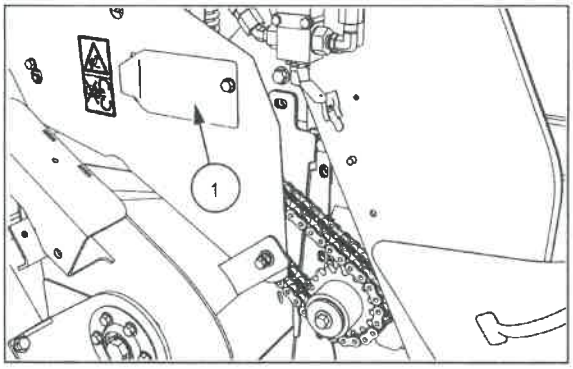
NHIL14RB00162AA 3

2. Disengage the clip latch **(1)**.
3. Pivot the shield **(2)** rearward to identify the floor roll drive chain **(3)**.



NHIL14RB00149AA 4

4. Pivot the access door **(1)** down to access the floor roll drive chain tensioner.



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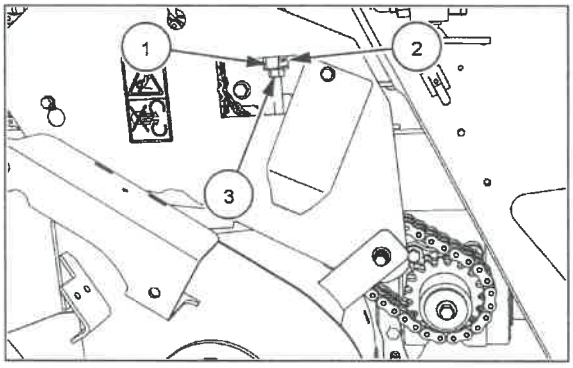
5. Adjust the hex nut **(3)** until the spring **(2)** is the same length as the spring gauge **(1)**.
6. When the adjustment is complete, tighten the jam nut **(1)**, Figure **3**.
7. Pivot the access door up to the closed position.
8. Pivot the shield forward to the operating position.
9. Engage the clip latch.



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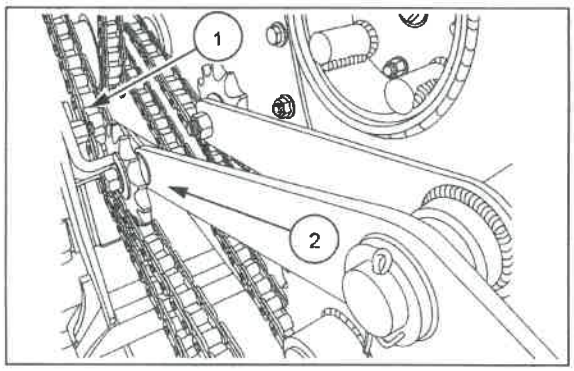
Starter roll drive chain – Adjust

The starter roll drive chain **(1)** has a spring-loaded idler **(2)** to keep the chain tight.



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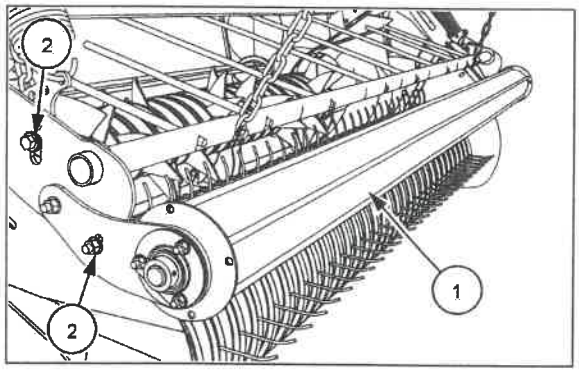
Windguard – Adjust

The roller windguard **(1)** improves feeding in short crops and in large-volume, high-tonnage windrows by compressing the crop mat for improved pickup feeding.

The roller windguard downstop is not adjustable, but the windguard height can be set by adjusting the lengths of the chains. The roller windguard position is set to help feed the windrow relative to the type of crop, height, and width of the windrow.

1. Adjust the windguard pipe as low as possible with the bolt **(2)**. Make sure that the tines clear the OSF fingers and the starter roll.
2. Adjust the position of the end plates by adjusting the position of the bolt **(3)**. The end plates can be set in the high or low position.



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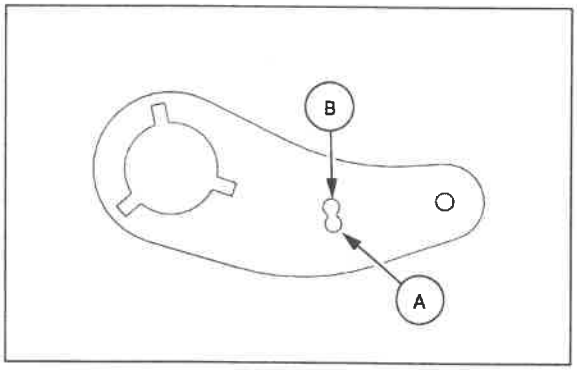
- The high position, bolt hole **(A)**, will allow the maximum distance between the roller and the pickup tines.
- The low position, bolt hole **(B)**, will reduce the distance between the roller and pickup tines for more compression of the crop.

  NOTE: *Make sure that you use the same hole on both end plates.*

3. Install the bolt and nut.
4. Tighten the nut to the nominal torque specification.



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