PALOMINO

Discs harrow « X » design - Semi mounted

Vertical folding - Central carriage

OPERATOR'S MANUAL
MAINTENANCE INSTRUCTIONS

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Original version
February 2010

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1. INTRODUCTION

READ CAREFULLY THIS MANUAL

To properly start, operate and service your equipment, follow all instructions given in this manual.

THIS MANUAL SHOULD BE CONSIDERED AS A PART OF THE EQUIPMENT AND SHOULD FOLLOW IT WHEN YOU SELL IT.

LEFT HAND SIDE AND RIGHT HAND SIDE, FRONT AND REAR are determined looking from equipment towards tractor when in work.

ALL INFORMATIONS, PICTURE, SPECIFICATIONS in this manual are based on the newer information available at the time of publication. Pictures and drawings might not represent standard equipment and show optional attachments.

Manufacturer reserves right to make any changes at all time **without any obligation to notice or to modify any delivered or already sold machine.**
If the machine has been modified in any way from the original design without written agreement from Grégoire-Besson, the manufacturer does not accept any liability for injury or warranty. Warranty would become void.

This symbol is used in the following manual to **catch your attention on warnings concerning your safety.**
So please when you see it in this manual or on the equipment, **strictly follow given information**.

Grégoire-Besson equipments are exclusively designed to be used by professionals for regular farm tillage in farmed fields. Manufacturer shall not be responsible for damage or injury resulting from any other use.

Grégoire-Besson machines are designed according to European Directive 2006/42/CE and have the CE logo. The certificate of conformity attests that machines comply with essentials health and safety requirements for users.

PRODUCT IDENTIFICATION

Please record here purchasing date, model and serial number of your equipment (refer to identification plate on hitch). Always refer to these information to get prompt and good service.
Fill and send back machine registration form for warranty.

Purchasing date : ……..

Model : ……..

Serial number : ……..

Salesman's phone : ……..

2. SAFETY INSTRUCTIONS

2.1. SAFETY STICKERS

Reference : UI 1980

READ OPERATOR'S MANUAL

Read operator 's manual and safety instructions before starting the use of your equipment and follow them while using.

Reference : UI 1978

STAY IN A SAFE POSITION

Do not climb on the machine. Do not strand between machine and tracor.

Reference : UI 127

MOVE AWAY FROM THE MACHINE

Danger in the working area, stay clear from the machine.

Reference : UI 126

UNFOLDING AREA

Stay clear of equipment when folding or unfolding.

Reference : UI 131

SECURE THE MACHINE BEFORE ACTION

Always install all lockup devices to secure machine before any intervention on it.

Reference : UI 1979

MOVING PARTS

Always stay far away from parts in movement.

Reference : UI 128

HYDRAULIC LEAK AND MAINTENANCE

Caution, high pressure fluids can cause injury. Follow safe practices.

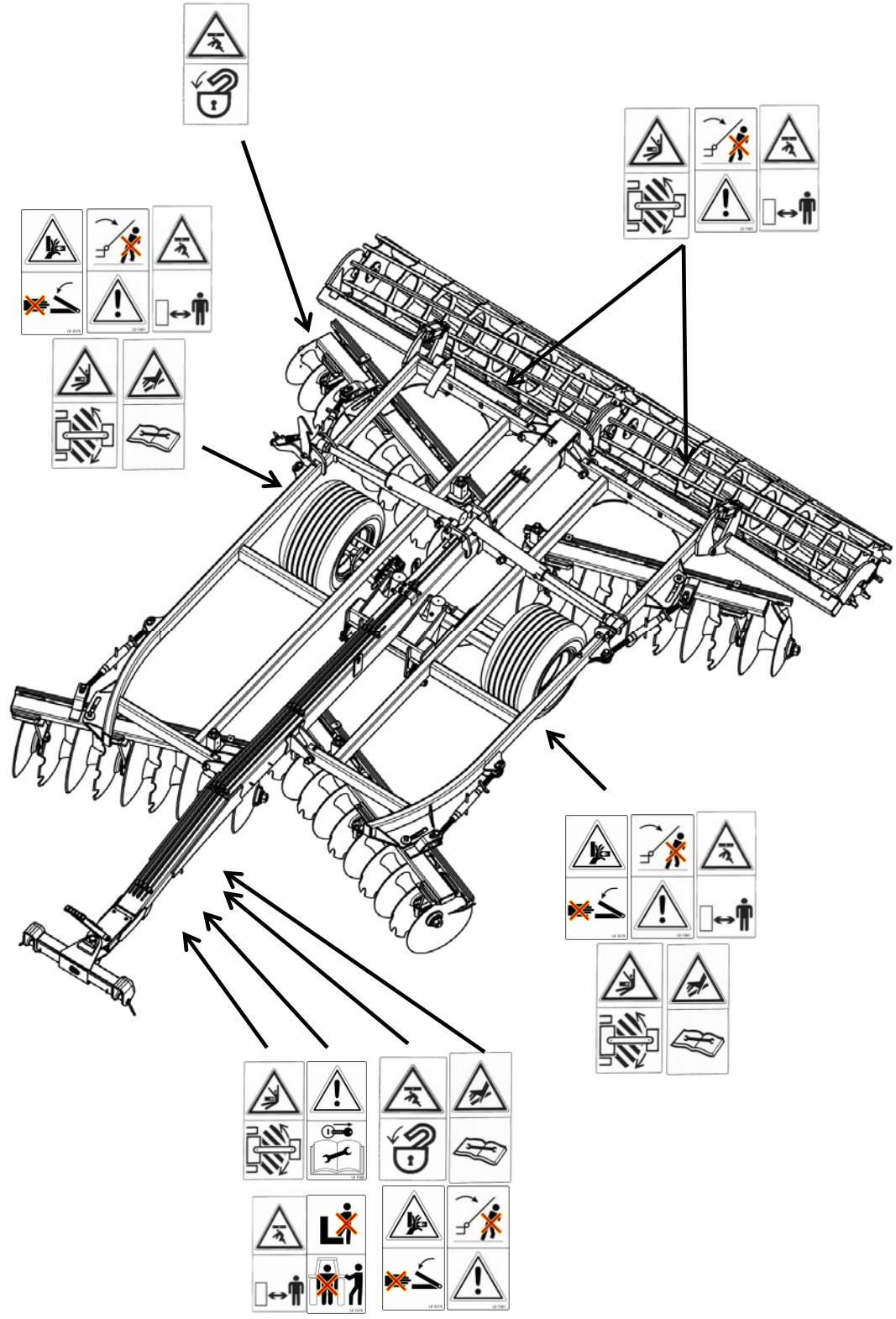
Reference : UI 1981

MACHINE UNFOLDING

Never stand under machine lateral sections.
Always store machine unfolded.

Positioning safety stickers on the machine

When cleaning the machine, do not damage stickers.
Replace any damaged or missing sticker.



2.2. SAFETY WHILE ATTACHING AND DETACHING

- Do not let **anyone to stand between the machine and the tractor** when you back up to hitch.
- Before leaving the tractor to hitch or unhitch, set tractor parking brakes.
- Never attempt to attach the machine if pins, tractor hitching balls, tractor drawbar, or machine linkage are worn, cracked or not compatible.
- Completely lower the machine to the ground before unhitching. Make sure it is on a level and firm surface.
- Remove pressure from hydraulic lines before disconnecting them.
- Before leaving the machine for storage, make sure it is in a safe place and that there is no risk to damage whether anything or anyone.

2.3. SAFETY WHILE CONNECTING HYDRAULIC LINES

- Hydraulic circuit might be highly pressurised.
- **Never use your hands to locate a hydraulic leak.** Hydraulic fluids escaping under pressure have sufficient force to penetrate the skin, causing severe injury. In case of any injury, **see a doctor immediately.**
- For equipments loaded with several hydraulic connectors, **make logical and appropriated connections**.
- Before connecting hydraulic circuit, **make sure that there is no pressure on both sides (tractor and machine)**.
- Regularly check hydraulic lines and connections. **Replace any damaged or leaking component** by an original part with the same specifications.
- Before any intervention on hydraulic circuit, **lower machine to the ground and release pressure moving control lever in the tractor's cab.**

2.4. SAFETY WHILE OPERATING MACHINE

- **Never attempt** any intervention on the machine while it is in motion.
- Do **not** allow anyone to **stand close to pivot points** : bottoms safety device (shearing bolt or non-stop), all pivoting linkage.
- Wear close **fitting clothing** and **appropriate safety devices** for the job you have to do (heavy leather gloves, safety shoes, earplugs, …).
- Do not allow anyone to stand close to the machine.
- Do not attempt to do any adjustment if you have not perfectly understood its procedure.
- Always use tools or equipments appropriate to the job you are doing. All Grégoire-Besson equipments are metric standards.
- Learn how to operate your machine and how to use its controls. Do not let anyone operate without instruction.
- Do not extend turnbuckle adjusters too much to avoid any threads damaging or intempestive pulling out.
- Only one person (the operator) should be in the tractor's cab when it is in operation. **No one on the machine while working or travelling on the road.**
- When earring or feeling unusual vibrations, stop the machine. Find the problem and solve it before starting operating again.

If your machine is equipped with a hydraulic folding mechanism, **always use it from tractor's cab**, once you are sure that folding area is free from spectators or obstacles.

2.5. SAFETY FOR MAINTENANCE

- Maintenance area shall be **clean, dry, with enough light and ventilation**.
- For any intervention on the machine in raised position, **always securely support all components** before starting maintenance.
- **Maintenance operations on elements under pressure or under tension** (resorts, accumulators, …) require specific procedure and equipments. **Only qualified persons shall perform them in appropriate conditions.**
- After servicing remove all tools, components and parts you used.
- Regularly **check tightness of wheel studs, wearing parts bolts, and all other bolts and nuts**.
- **Always use genuine parts corresponding to manufacturer's technical specification requirements.**

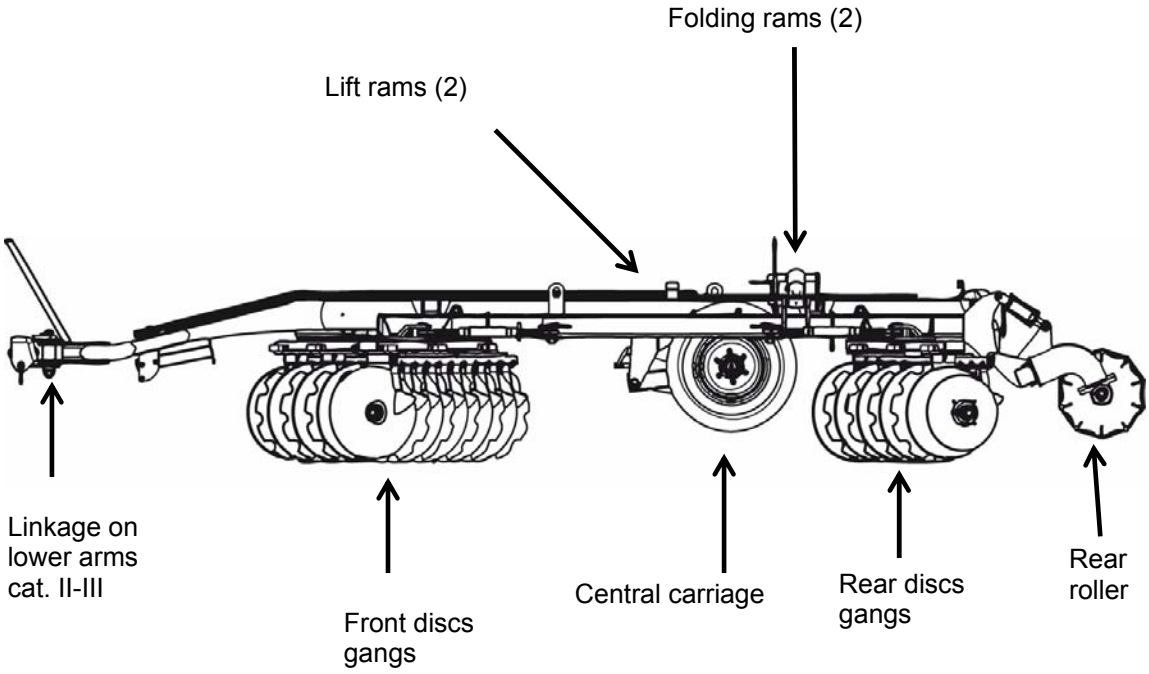
2.6. SAFETY FOR ON HIGHWAY TRANSPORT

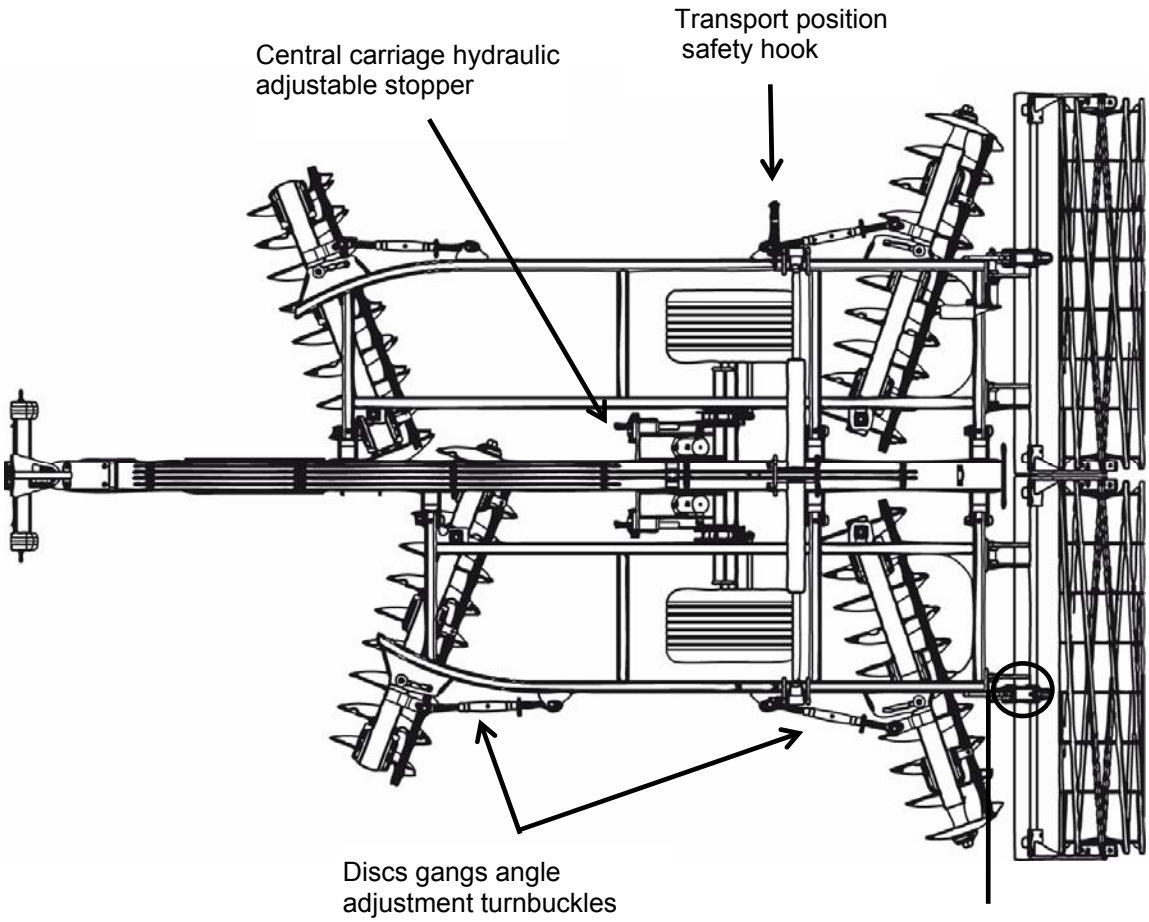
FOR YOUR OWN SAFETY AND THE ONE OF THE OTHER, RESPECT THE FOLLOWNG RULES :

- All Grégoire-Besson equipments shall be used **complying with area's current rules and laws** concerning **safety instructions, accident prevention** and **provision of Highway Code**.
- Before road transport, always **check for wheels studs** and wheels mounting brackets carriage bolts **tightness** ; **check tyres general state and pressure** : do not drive with low pressure, cuts or damaged tyres or rims.
- **Use all devices required by your area's current laws** (lights, reflectors, signs, …). They might be removed during field operation to prevent from any damage.
  It is the operator's responsibility to comply with current law and to follow its evolutions.
- Regularly check hitching pins, change them if necessary. Tractor's ball join may also wear, do not hesitate to replace them with new ones having at least Waltersheild fabrication quality.
- Drive **at reasonable speed** complying with local laws **to always keep control** of tractor and equipment. Pay special attention on irregular or rough roads. **Do not attempt to drive down a hill faster than it could be possible to drive it up**.
- Tractor used for road transport shall have the same power rating and weight as the one used for field operations.
- **Never attempt any manoeuvre if area is not free from spectators.**
- If your machine is equipped with a **folding mechanism** (manual or hydraulic), **use it making sure folding area is free from spectators** and obstacles.
- Follow all **safe driving practices** when travelling, moreover **on corners, rough or narrow roads.**
- When **leaving tractor** even for a short period, **shut off engine**, **remove ignition key** and **set parking brakes**.
- Forbid anyone to stand between tractor and machine or on the machine travelling on the road.

3. MACHINE DESCRIPTION

3.1. IDENTIFICATION VIEWS





3.2. TECHNICAL SPECIFICATIONS

Specification	Standard equipment	Optional equipment
Hitch	• Pivoting hitch on lower link arms cat. II-III	
Chassis	• Main frame single tube 200 x 200 x 10 mm • Lateral frames 140 x 70 x 8 mm • Hydraulic vertical folding, 2 parts, 2.50 m transport width, 2 rams, automatic locking device	
Discs gangs	• Front discs gangs overlapping each other • Rear discs gangs face to face • Square shaft 40 mm • Cast iron housing with 2 conical bearings and triple seal protection • Discs assembly Ø 660, thick. 6, spacing 230 mm notched front and plain rear or alternated • Anti-projection discs on front gangs • Outrigger discs on rear gangs	• Discs assembly full notched • Discs Ø 660, thick. 7 mm • Roll'Coup flat profile discs Ø 680, thick. 7 mm • Bearing protection plates
Train porteur	• 2 DA lift rams with hydraulic adjustable depth stopper • Square shaft 70 mm • 2 wheel with low pressure tyres 400/60/15 14 plys	• Hydraulic brakes • Wheels 19.0/45x17 18 plys
Roller	• Crumbler roller, Ø 500 mm, 9 square bars section 25 mm • Mechanical height adjustment by turnbuckles	• Crumbler roller, Ø 600 mm, 10 square bars section 25mm • Hydraulic height adjustment by rams

A large choice of options is available to improve machine's job.
Grégoire-Besson authorized dealers know area and working conditions.
They may give information according to technical choices and latest equipments evolutions.
Grégoire-Besson is also represented on farm equipment shows.

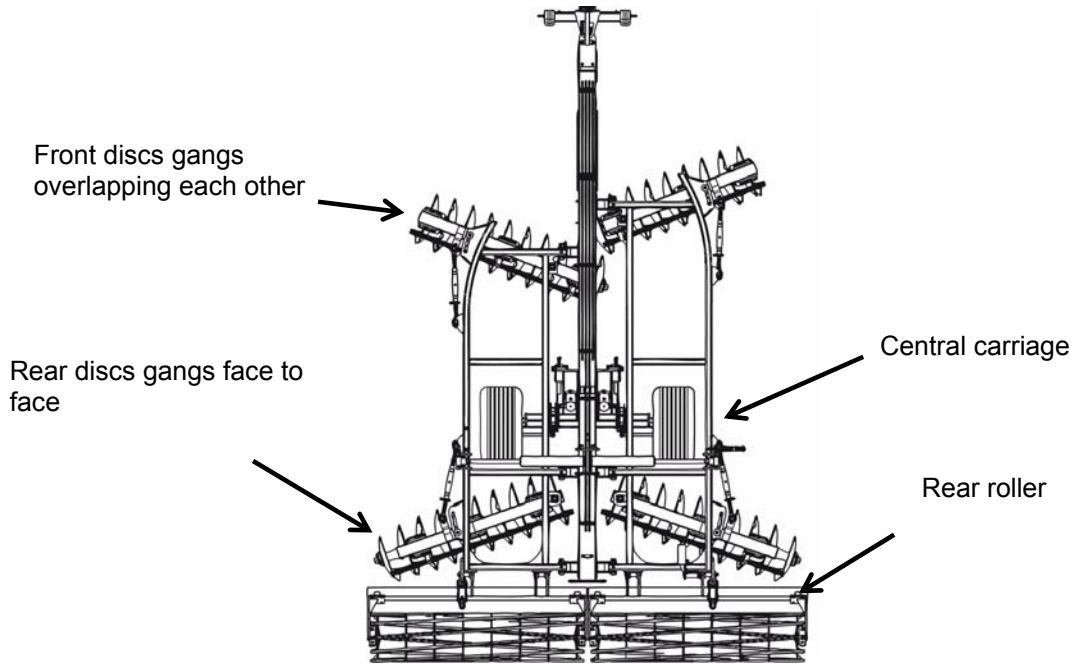
3.3. DIMENSIONS AND WEIGHTS

Discs spacing	Number of discs	Number of bearing	Working width	Transport width	Transport over all length	Transport over all height	Approx. weight
200 mm	29	8	3.00 m	2.50 m	8.00 m	2.70 m	3 820 kg
	33		3.60 m			2.90 m	4 220 kg
	37		4.10 m			3.10 m	4 820 kg
230 mm	29	8	3.60 m	2.50 m	8.00 m	3.00 m	4 040 kg
	33		4.00 m			3.20 m	4 540 kg
	37		4.50 m			3.40 m	5 040 kg

Dimensions and weights are indicative and subject to variations according to equipments and options.

Note : after use, ground or residue accumulations may increase machine's weight.

3.4. DISCS HARROW « X » DESIGN WITH CENTRAL CARRIAGE



3.4.1. Front discs gangs

At the front, two discs gangs overlapping each other with adjustable angle.
It gives penetration power to the machine and so adaptability to work in all conditions.
The overlapping design allows complete width disking without unworked central strip.

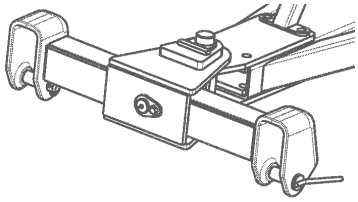
3.4.2. Rear discs gangs

At the rear, two discs gangs face to face with adjustable angle
They ensure finishing and levelling.

3.4.3. Central carriage wheels and rear roller

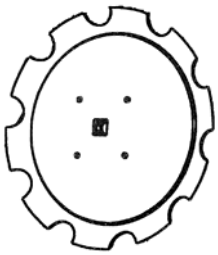
This configuration leads to a machine compact and drivable. This design allows depth control 100% by rear roller or shared between rear roller and central carriage.
It gives perfect stability to the machine at work.

3.5 HITCH ON TRACTOR LOWER LINK ARMS



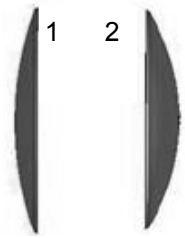
Hitch on tractor lower link arms allows safe hitching and unhitching operations from the cab. It allows sharp turns, improving machine drivability.
Used with a drawbar compensating ram, it contributes to a good weight transfer from the machine to the rear of the tractor.
This hitch is dedicated to tractors equipped with locking devices (lateral and vertical).
For any transport on public road, follow hitch height recommendation (refer to operator's manual) and lock hitch position.

3.6 ANTI-PROJECTION DISCS



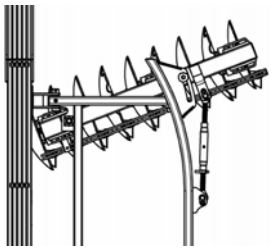
This device set on the external discs on front gangs reduces projections (less ground entering into the disc).
It prevents from ridging.

3.7 ROLL'COUP FLAT PROFILE DISCS



Roll'Coup flat profile discs (1) have less concavity than standard discs (2). They are easier to pull. They have a good penetration power. They have a very good cutting power (decreasing the size of residues). They are throwing less than standard discs.
They are standard discs on duo-discs assembly.

3.8. DISCS GANGS ANGLE



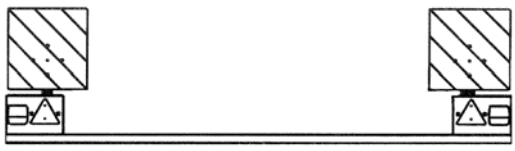
Discs gang angle is set with a mechanical arm.

3.9 HYDRAULIC BRAKES

A hydraulic braking device is available as an option.

Note : it is the operator's responsibility to comply with local current applicable law before any transport on public road.

3.10 LIGHTS AND SIGNS KITS



Light and signs kits are available for all Grégoire-Besson equipments. Contact an authorized dealer.

Note : it is the operator's responsibility to comply with local current applicable law before any transport on public road.

4. PREPARING THE TRACTOR

Follow recommendations given in the safety section of this manual. They are not restrictive.

4.1. REQUIRED HORSE POWER

Tractor requirements may vary according to ground and working conditions (type of soil, type of tractor, type of tyres, …). Following data are only indicative. Ask an authorized Grégoire-Besson dealer for any further information.

Number de discs	Required horse power
29	80 - 100 HP
33	100 - 120 HP
37	115 - 130 HP

4.2. TRACTOR WHEELS

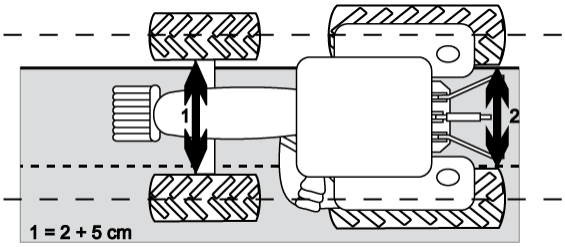
4.2.1. Tractor tyres

Check tractor tyres general state and pressure. Pressure should be the same on both sides of the tractor for a nice drivability in the field and on the road.

IMPORTANT : inflate tyres following manufacturer's recommendations.

4.2.2. Distance between tractor tyres

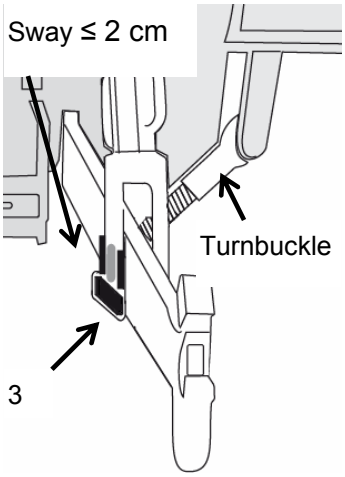
Generally, using a large tillage equipment, the wider is the distance between tyres, the better is the drivability.



To be able to steer the tractor, the middle of the front axle shall be lined up with the middle of the rear axle.

In sloping fields, a large distance will provide good stability.

4.3. POSITIONING STABILIZERS

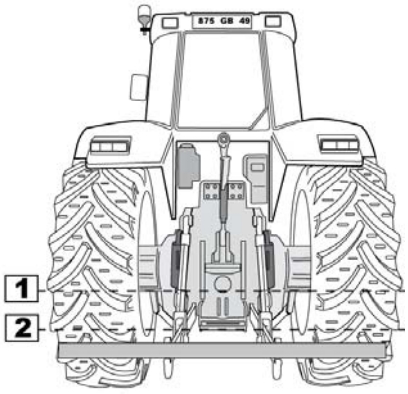


To hitch any tillage equipment on lower link arms, stabilizers shall be set so that arms have minimum lateral sway (≤ 2 cm) and are centered with tractor traction line. This will both prevent from any risk of shock during operation or road transport and keep machine lined up behind tractor at work.

Note : it is easier to adjust and / or service stabilizers bolts and threads before hitching the machine.

Horizontal lift links pins (3) shall be in fixed position to avoid any loose and / or damageable shock.

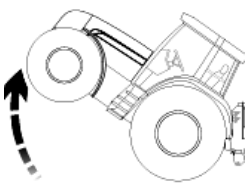
4.4. LIFT LINKS LENGTH



Lift link arms length determines tractor hitch levelling and lift cylinder position at working depth.

- Set lift links length so that tractor hitch is level (refer to picture).
- Set lift links length to have at least 30 mm clearance on lift cylinder rod when machine is working at desired depth. This will give adjustment possibilities for front gang depth from tractor's cab and allow efficient tractor draft control

4.5. FRONT END WEIGHTING



Wheels weights (front and rear) and front end weights may be required to avoid excessive slippage and to increase stability in rough and sloppy grounds.
Weights shall not be added once all slippage is eliminated. Refer to tractor operator's manual and to tractor's dealer. Follow tyre manufacturer's recommendations.

5. ATTACHING AND DETACHING

Follow recommendations given in the safety section of this manual. They are not restrictive.

IMPORTANT : always make sure that hitching never leads to :

- overload : respect maximum admissible hitch load,
- unbalance: load tractor front end if necessary. Refer to point 4.5.

5.1. ATTACHING MACHINE TO TRACTOR

Before any operation, check for diameter and length compatibility between hitch pins and tractor tie rods.

5.1.1. Tractor equipped with tie rods lower links

- Remove safety bolts and hitch pins.
- Back up tractor to line up tie rods and machine hitch holes.
- Install pins and secure them with their safety clips.
- If holes are difficult to line up : extend telescopic arms as indicated in tractor operator's manual. Once hitch pins are inserted and secured with their safety clips, slowly back up tractor to lock back lift arms. Check for lift arms locking.
- Raise parking stand in working position.

5.1.2. Tractor equipped with automatic hooks lower links

- Remove safety bolts and hitch pins.
- Remove balls from tractor lift link automatic hooks.
- Install balls on pins through lower machine hitching holes. Secure with safety bolts.
- Slowly back up tractor till automatic hooks are lined up underneath hitch balls.
- Raise tractor hitch about 5 cm above ground surface till automatic hooks are locked.
- Check for automatic hooks latch handles good locking.
- Raise parking stand in working position.

IMPORTANT : **make sure to have enough clearance between machine yoke hitch and tractor lower lift links to avoid any possibility of contact from working to raised position. A second verification shall be done once machine is in the field in truth working conditions.**

Connect hydraulic lines.

5.2. DETACHING THE MACHINE

Before detaching, make sure that ground is flat and firm enough to support the machine. Use safety blocks to support machine components and / or parking stand if necessary.

DANGER : do not let any part of your body underneath the machine when lowering it to the ground.
Crushing may lead to death.

Proceed in the logical attaching opposite way :

1) Put machine in working position = it shall stay on its discs
2) Put parking stand in detaching position = lower it
3) Completely lower the machine to the ground,
4) Remove pressure and disconnect hydraulic lines
5) Detach lower lift links.

NOTES

6. HYDRAULIC CONNEXIONS

Follow recommendations given in the safety section of this manual. They are not restrictive.

6.1. REQUIRED HYDRAULIC REMOTES

- **1 DA** for **central carriage lift**.
- **1 DA** for vertical hydraulic **folding**.
- **1 DA** for hydraulic adjustment of **rear roller height** (optional).

6.2. REQUIRED HYDRAULIC PRESSURE

Required tractor hydraulic pressure is 180 to 200 bars.

6.3. HYDRAULIC CONNECTIONS

- Always wipe hydraulic couplers with a clean rag on both tractor and machine sides before connecting circuits.
- Always check for machine hydraulic connectors and tractor remotes compatibility.
- Logically connect hydraulic lines for the user :

⇨ Put most frequently used functions on closest lever

⇨ Watch for the way hydraulic flow is delivered : pull the lever to put machine in transport position (raise up / fold), push it to put machine in working position (lower / unfold).

⇨ Identify hoses using colour collars and signs (+ to extend rods, - to retract them).

- Check for hydraulic hoses length : too short they may break during sharp turns, too long they may interfere with tractor lift arms or tyres.

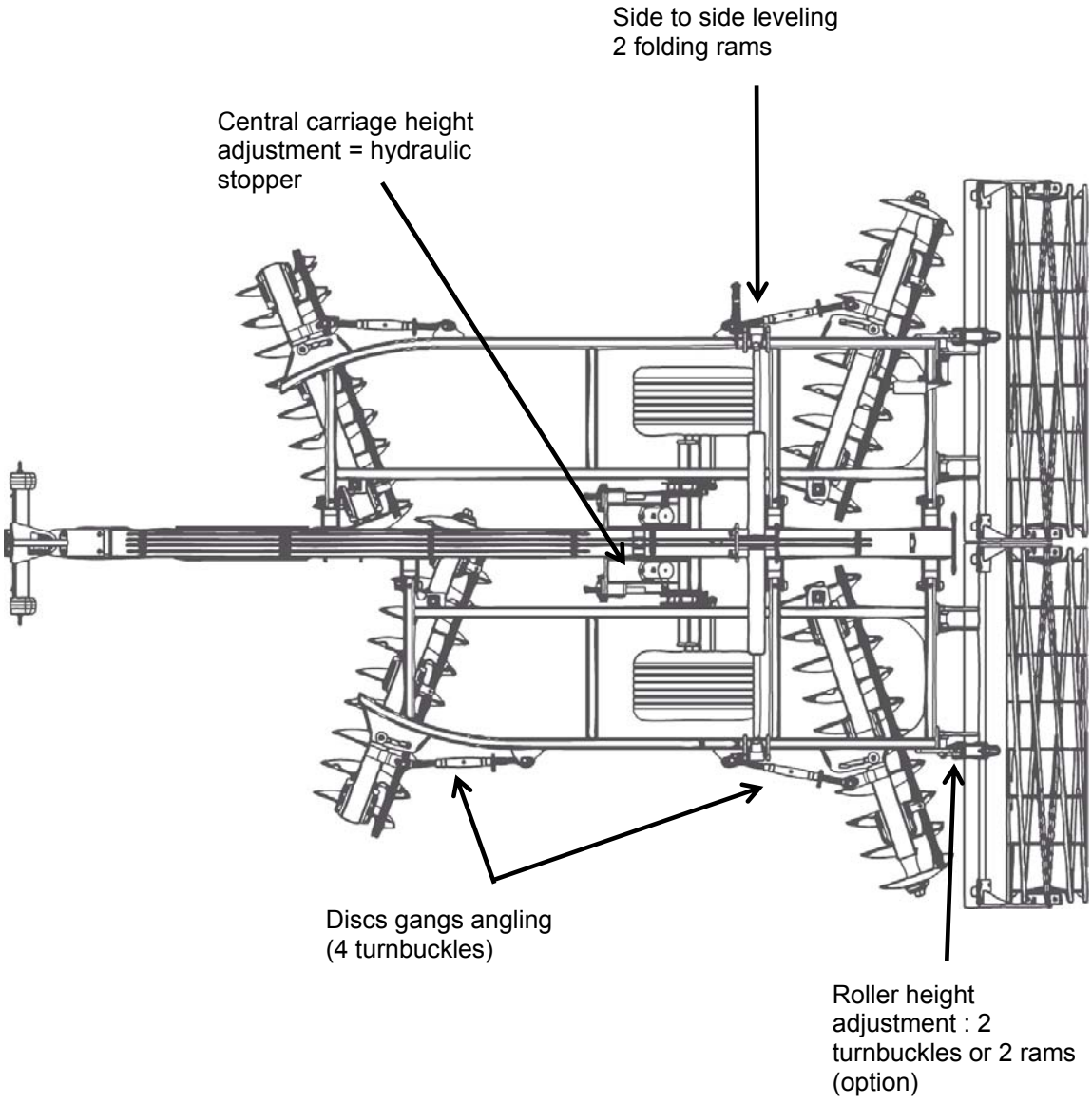
In case of any problem, do not hesitate to contact an authorized Grégoire-Besson dealer.

7. PREPARING THE MACHINE

Follow recommendations given in the safety section of this manual. They are not restrictive.

7.1. ADJUSTING POINTS LOCALIZATION

Find adjusting points and check their lubrication and work. Doing this checking task close from a machine shop is better than doing it in the field.



7.2. MACHINE WHEELS

7.2.1. Tyre inflation

Air pressure shall be checked every week.

Tyre dimension	Recommended pressure	Maximum speed
400 / 60 x 15 - 14 plys	4.8 bars	25 km/h - 15 mph
19.0 / 45 x 17 - 18 plys	3.0 bars	25 km/h - 15 mph

Follow tyre manufacturer recommendations (written on tyre side)

Tyre « above - inflation » = exploding risk.
Tyre « below - inflation » = rim come off risk.

7.2.2. Wheel studs

Check wheels general state and studs tightness every day.
Tread types tires may need more checking than conventional tires (more vibrations).
Always check for studs tightness before driving on public road. Tight them if necessary.

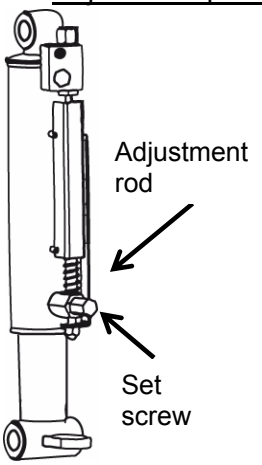
7.3. CENTRAL CARRIAGE HEIGHT

Machine carriage wheels are situated in the centre.
This central carriage is used for road transport and for headlands manoeuvres.
At work, it can be used to carry part of the weight of the machine (adjustable stoppers) or it can be totally raised (depth is then 100 % controlled by rear roller).

Working depth 100% controlled by rear roller : at work, machine wheels shall be raised to the maximum. Working depth is then 100% controlled with rear roller height (set adjustment arms length).
Unscrew mechanical stoppers (1) to maximize carriage stroke.
Carriage wheels may be used punctually (wet spots, rocky points, …).

Using central carriage for depth control : at work, central carriage height controls working depth. It is set through an hydraulic adjustable stopper situated on a lift ram.

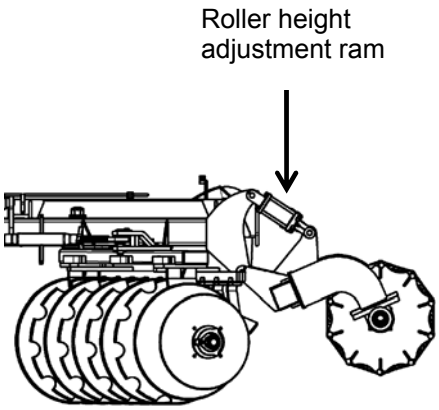
Adjustment procedure



- Raise machine to release adjustment rod
- Loose set screw
- Slide adjustment rod to the desired position
  => lower rod to decrease working depth
  => raise rod to increase working depth
- Tight set screw back
- Put machine into the ground a work a few meters. Change adjustment if necessary.

7.4. ROLLER HEIGHT

Machine is equipped with a rear roller in 2 sections with vertical folding. It may be used for all or part of depth control in the field.



- To **increase working depth**, raise roller shortening turnbuckles or rams (option).
- To **decrease working depth**, lower roller lengthening turnbuckles or rams (option).
- **Both turnbuckles or rams (options) shall have the same length for the machine to work the same depth on both sides.**
- Machine with optional rams for rear roller height : regularly purge rear roller height hydraulic circuit to make sure that both rams have the same length. Raise the machine, completely lower the roller extending rams and wait for a few seconds before removing control lever in the cab. Keep purging to chase air away till both rams have the

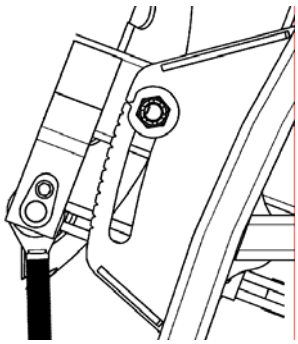
7.5. DISCS GANGS ANGLE

Guide line for "X" designed discs harrow use :

- the more discs gangs angle is important, the more the machine tends to work deeper, the harder it is to pull
- the more discs gangs angle is slight, the more the machine tends to work shallower. A too slight angle may lead to poor penetration and to difficulties working the full spacing between two discs
- machine shall be set with **front gangs angle 2° to 3° more important than rear gangs angle**
- machine shall be set with **same gangs angles on both sides**

<u>Adjusting discs gangs angle</u>

- Lengthen turnbuckles to increase discs gangs angle.
- Shorten turnbuckles to decrease discs gangs angle.



<u>Adjusting tips</u>

- A notched sector allows visualization of discs gang angle
- Each sector has 12 marks

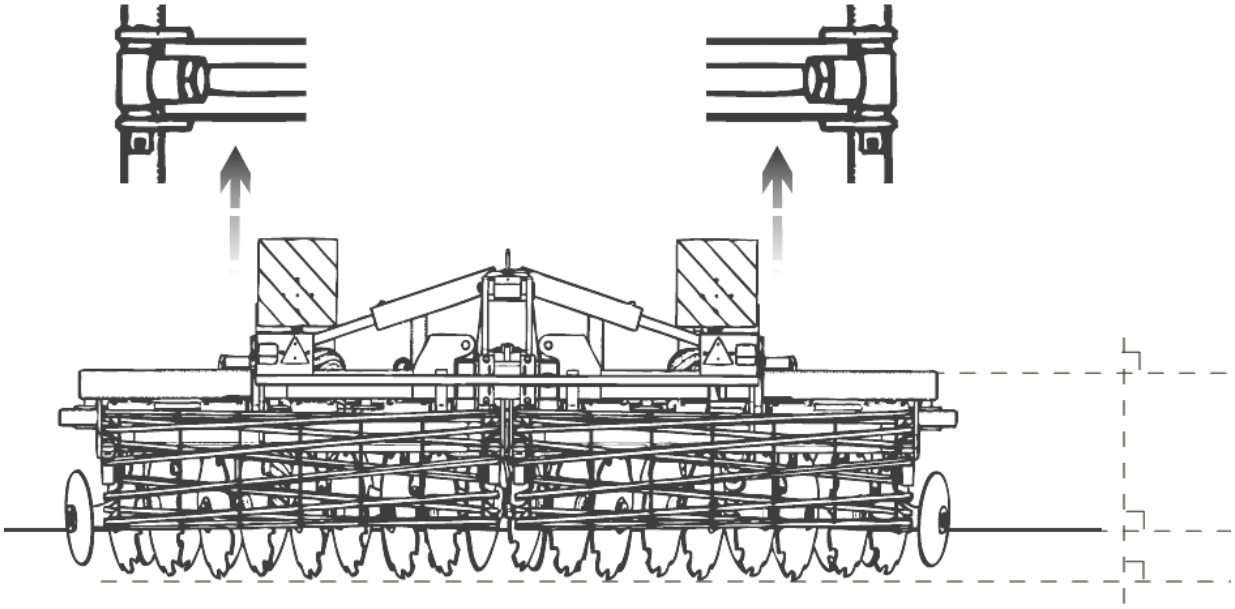
=> front : angle mini = 10° angle maxi = 21° (refer to drawing)
=> rear : angle mini = 8° angle maxi = 19°

- Machine shall be set with the same axle to axle distance for all turnbuckles to have

=> same angle on L.H. and R.H. sides
=> 2° more on front discs gangs

- This adjustment may be changed in the field according to conditions.

7.6. SIDE TO SIDE LEVELING (= L.H SIDE TO R.H. SIDE)



Side to side levelling is done adjusting folding rams screw type heads. Once unfolded in working position, machine shall be levelled. This adjustment is done at the manufacture and shall be changed only exceptionally.

Before any modification of standard manufacture's adjustment :

- Put the machine on a surface flat and firm enough to support its weight.
- Check tyres : they must be all the same, inflated the same, having the same general state.

Side to side adjustment procedure :

- Unfold machine in working position. Raise it so that discs do not touch the ground.
- Check for machine levelling (getting a reasonable distance will help).
- If a lateral wing is too low, raise it shortening folding cylinder = screwing head on threaded rod.
- If a lateral wing is too high, lower it lengthening folding cylinder = unscrewing head on threaded rod.

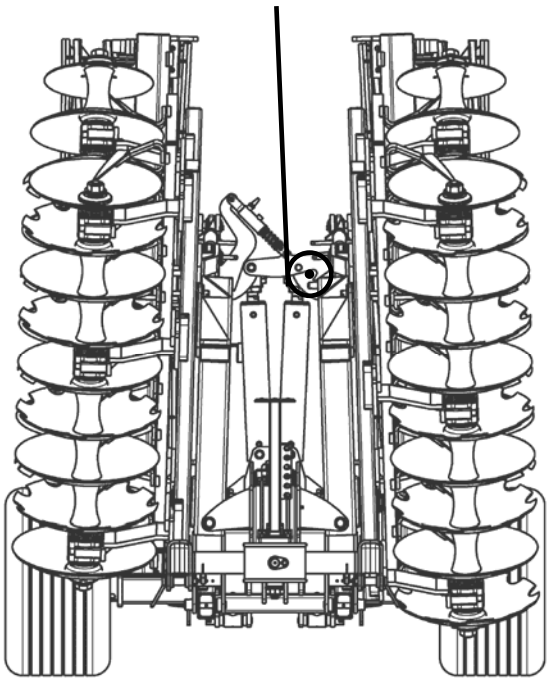
Note : lowering the machine on its discs may help for this adjustment.

8. TRANSPORTING

Follow recommendations given in the safety section of this manual. They are not restrictive.

8.1. CHANGING TO TRANSPORT POSITION

Transport position
locking device



Before driving on a public road with the machine, put it in transport position :

- **Raise machine to the maximum.**
- **Fold lateral wings and put lever control on float position**. Check for transport locking device proper positioning = hook shall come in its position once pressure falls down.
- **In the cab lock all control levers** (hydraulic remotes, hitch, …), to prevent any unforeseen movement and potential accident.
- **Install all lights, reflectors and signs required by current applicable law.**

Transporting machine hooked on tractor lower link arms :

- Respect hitch height recommendation (refer to tractor operator's manual).
- Lock hitch position.

8.2. CHANGING TO WORKING POSITION

Follow here above described procedure in the opposite way.
Remove lights and signalization kits if necessary.

To unfold machine in working position :

- act on control lever to **completely fold machine** : when pressure increases, hook raises to release lateral frames
- then act on control lever to **lower lateral frames** in working position

8.3. DRIVING ON PUBLIC ROAD

Before driving on a public road :

- **Be sure all signs, reflectors and lights required by local current law are in place, clean and visible to traffic.**
- Make sure there are no interferences between tractor and machine.
- Adopt a gentle attitude towards other public road users.

On public road, comply with local applicable laws :

- Tractor required for road transport shall equal the size and the horse power rating of the tractor used to work in the field.
- Do not drive over 25 km/h (= 15 mph).
- Drive at a reasonable speed to maintain complete control of both tractor and machine.
- Reduce speed on corners and on rough grounds.
- Do not drive down a hill faster than it could be possible to drive it up.
- Do not apply the tractor brakes to attempt a sharp turn.
- Always check wheel studs tightness before driving on a public road. They may get loose because of vibrations.
- Respect authorized maximum size for transport load (width, weight, length). For over sized loads, comply with current law taking all necessary precautions (signs, lights, escort, authorizations, …).
- Respect the maximum wheel axle load and the maximum total driving load. Make sure front axle carries at least 20% of tractor's tare. Use front end weights if necessary.

ATTENTION : **driving on public roads, operator is responsible for both tractor and equipment. He has to comply with current applicable law** (getting in conformity with it and following its evolutions).

9. FIELD ADJSUTMENT

Follow recommendations given in the safety section of this manual. They are not restrictive.

9.1. FIELD UTILIZATION

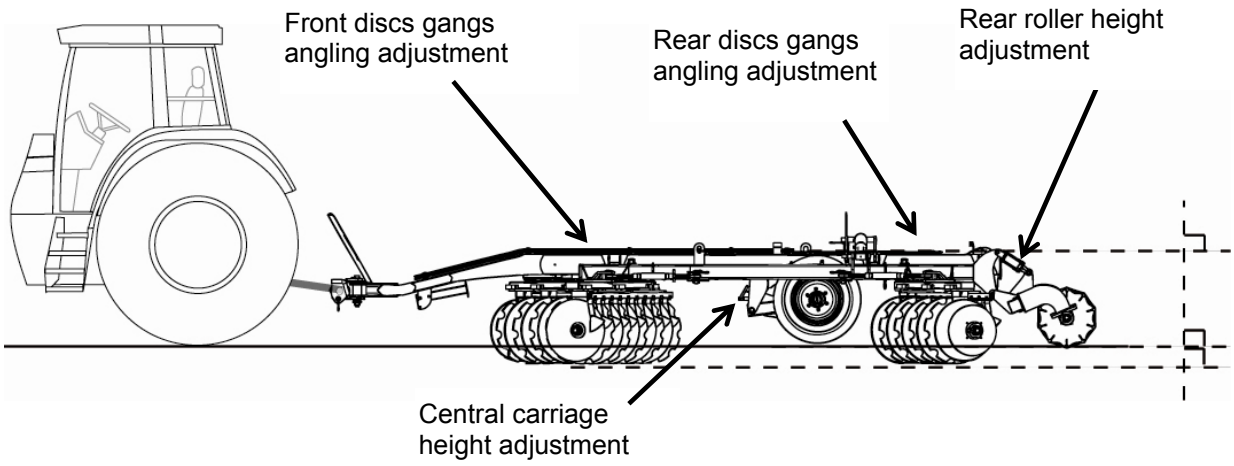
Put machine in working position (refer to previous section).
To reach a decent finish, operating speed shall be between 6 and 10 km / h (= 3.7 to 6 mph).
Higher speed may lead to over wearing of wearing parts.
Always lift up machine before manoeuvring or turning on headlands.
Never attempt a sharp turn with the machine in the ground.
Reduce speed before manoeuvring or crossing obstacles (ditch, ridge, rocky spots, …).

IMPORTANT : before beginning field utilization, entirely read this chapter to understand all adjustments, their order and procedure.

IMPORTANT : always do one adjustment at a time. Then it is easier to check its performance and to change it if necessary.

9.2. FIELD ADJUSTMENT

9.2.1. Depth control and front to rear levelling



Working depth is controlled by :

- discs gangs angle,
- tractor hydraulic lift height,
- central carriage height : hydraulic adjustable stopper,
- roller height : turnbuckles or hydraulic rams.

At work, depth control can be done using rear roller alone or in combination with central carriage wheels. If roller has to entirely control working depth, in working position raise central carriage to the maximum.

In working position, make sure that :

- main frame is parallel to the ground
- gangs angles shall be the same on both sides of the machine
- gangs angles shall be more important at the front than at the rear (2° to 3° difference).

To increase working depth

- Increase discs gangs angle = lengthen mechanical arms.
- Raise roller = shorten turnbuckles or rams.
- Raise central carriage = adjust hydraulic stopper.

To decrease working depth

- Decrease discs gangs angle = shorten mechanical arms.
- Lower roller = lengthen turnbuckles or rams.
- Lower central carriage = adjust hydraulic stopper.

9.2.2. If ground is not levelled

If machine leaves a hole in the middle
Front discs gangs remove more ground than what rear discs gangs can bring back.

Possible solutions for this problem :

- reduce front discs gangs angle or increase rear discs gangs angle
- reduce front discs gangs working depth (tractor hydraulic lift height)
- increase rear discs gangs working depth (roller height / central carriage height)

If machine leaves a ridge in the middle
Rear discs gangs bring back more ground than what front discs gangs removed.

Possible solutions for this problem :

- increase front discs gangs angle or decrease rear discs gangs angle
- increase front discs gangs working depth (tractor hydraulic lift height)
- decrease rear discs gangs working depth (roller height / central carriage height)

If machine leaves a mark between two passes
Front discs gangs throw ground too far for rear discs gangs to bring it back.

Possible solutions for this problem :

- reduce operating speed

10. MAINTENANCE

Follow recommendations given in the safety section of this manual. They are not restrictive.

10.1. GENERAL INSTRUCTIONS

Operator and owner are responsible for good machine maintenance.

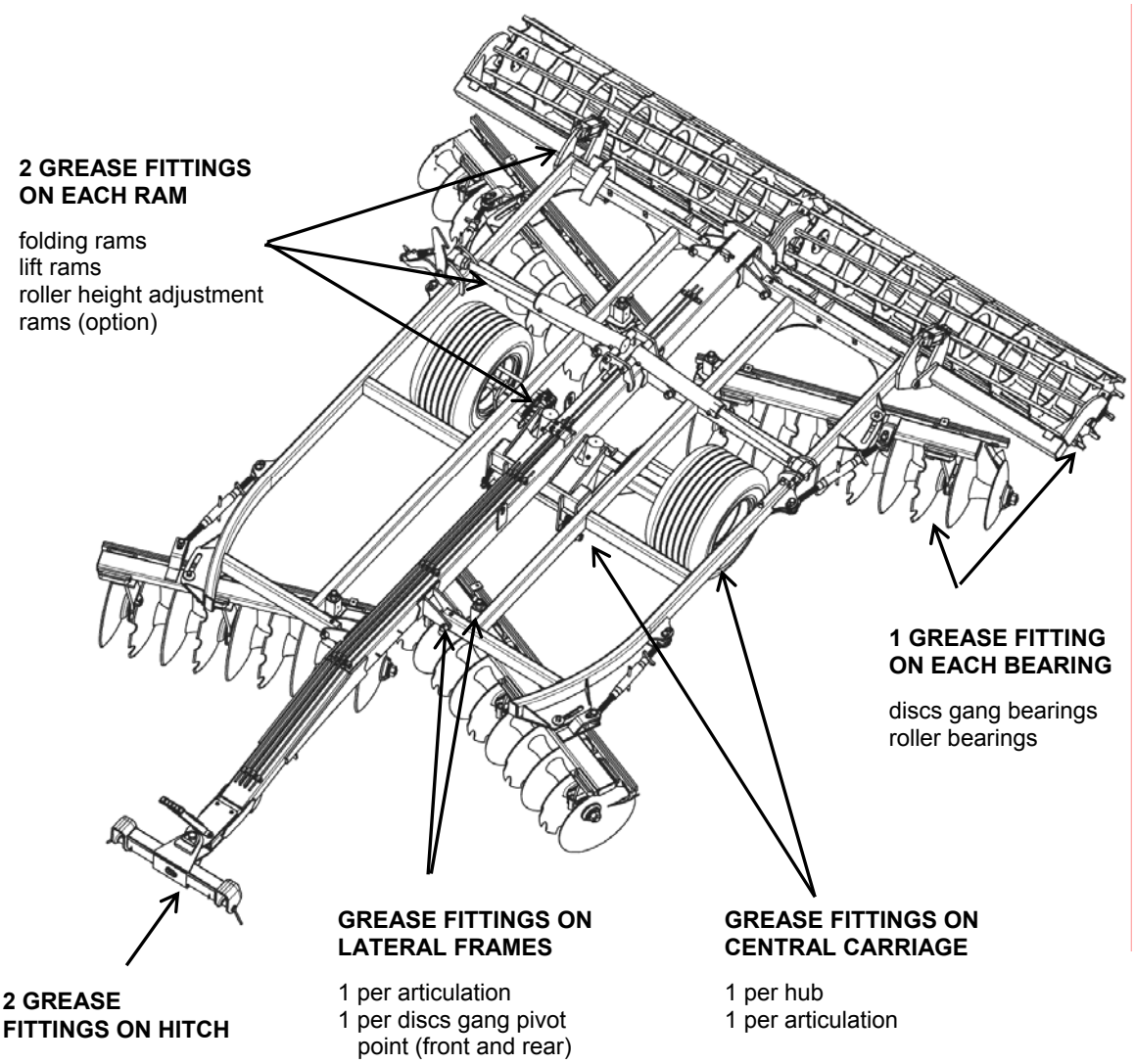
Inspect machine before and after each use. Repairs and service have to be done immediately so that they are not forgotten. Always leave the machine in a good state.
Cleaning the machine facilitates inspection. Check general state of machine, weldings, wheels studs, tyres, …
Be careful with hydraulic lines : frictions may lead to excessive wearing and lines may leak. Never search a leak with your hands. Immediately replace any defective component. Spare components shall have the same characteristics.
Parts working in the ground may be sharpened and cause severe injury. Take particular care and use heavy leather gloves to remove them.
Never attempt any intervention on the machine while tractor engine is running.
Always properly secure all components before starting any maintenance operation underneath the machine.
Before using the machine for the first time, check all bolts tightness. Verify after 50 working hours and then at the beginning of each season. Pay special daily attention on :

- wheel studs tightness
- wearing parts bolts and nuts tightness in rocky or dry conditions (lots of vibrations).

Wrong waste management is a danger for environment : collect waste oil, paint removers, accumulators, worn tyres … Bring them back to a distributor or to an authorized collector. Do not let them in the nature.

10.2. LUBRICATION

A good lubrication of all moving parts will both allow the machine to work fine and insure its long-lasting.
Grease fittings are installed on all pivot points. Grease both lubricates moving parts and chases away abrasive dust or water that could come into pivot points.
Use quality grease, type Unil – Opal MS02 or equivalent.
Always wipe grease fittings with a clean rag before introducing grease. Do not hesitate to change any worn or broken grease fitting. Check for good grease course.
Remove all grease accumulation around grease fittings or moving parts.
Refer to grease fittings placement and frequency on the following drawing. Hard or intense conditions would require more.
The best is to grease regularly with regular quantity. Do not over grease.



Grease fitting placement	Frequency
Lateral frames pivot point	50 h
Folding cylinder (1 grease fitting on each end)	50 h
Lift cylinder	50 h
Discs gangs bearings (4 shots)	50 h
Carriage articulations and hitch articulations	50 h
Rear roller bearings (4 shots)	50 h

10.3. SPARE PARTS

Genuine Grégoire-Besson parts have been specially designed and developed. Only the use of these parts will ensure proper fit, longevity and field quality work of the machine.

Using any other spare part than certified from Grégoire-Besson will void warranty.

Changing wearing parts too late may be source of poor quality work (penetration troubles, poor mixing …) and may damage structure parts°.

10.4. STORAGE SAFETY

- Before detaching the machine for storage, make sure ground is clean, flat and firm enough.
- Use parking stand and all other locking devices to prevent from any unforeseen movement during detachment or later on.
- Always store machine in working position (= unfolded).
- Block machine wheels to avoid any unforeseen movement.
- During storage, wheels shall not carry any weight.
- NEVER detach machine in raised position.
- Remove pressure from hydraulic circuit (engine shut off, shake hydraulic control lever in the cab).
- Store machine away from human activity.
- Store machine in a dry and dust free area (shed). Protect ram rods that cannot be retracted from rust using grease or oil.

CAUTION : never let children play around farm equipment.

11. QUICKLY STARTING - PALOMINO

Take all precautionary measures. Respect safety recommendations.

PREPARING THE TRACTOR

1. Check tyre pressure

It should be the same on both sides on each axle.
Always follow tyre manufacturer recommendations.

2. Adjust tractor hitch levelling

Set lift links length for tractor hitch to be perfectly level with the ground.
Arms shall be long enough so that working at desired depth there is still 30 mm chrome visible on lift ram.

3. Adjust lift links sway

Lateral sway minimum (≤ 2 cm)
No vertical sway (0 cm)

HITCHING

4. Attach lower links

5. Connect hydraulic lines

6. Make sure there are no interferences between machine and tractor from raised position to working position

Machine shall never come in contact with tractor : hitch points, drawbar, hydraulic hoses, electric wires …

7. Transport / working positions

Transport position	lateral wings folded, transport safety locking device positioned rear carriage lowered = machine raised
Working position	lateral wings unfolded rear carriage raised = machine lowered

FIELD ADJUSTMENT

8. Set working depth using

Roller height adjustment
Central carriage height adjustment
Discs gangs angle adjustment
Tractor hydraulic lift height adjustment

9. At work machine shall run parallel with the ground

MAINTENANCE

10. Follow recommendations given in this manual according to lubrication and maintenance of the machine

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