

GRÉGOIRE  **BESSON**

R W 4

**Fully mounted light reversible plough
hydraulic variable width**

OPERATOR'S MANUAL MAINTENANCE INSTRUCTIONS



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Any use and / or reproduction of all or part of this manual without written authorization from Grégoire-Besson is strictly prohibited.

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.

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 stand between machine and tractor.



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.



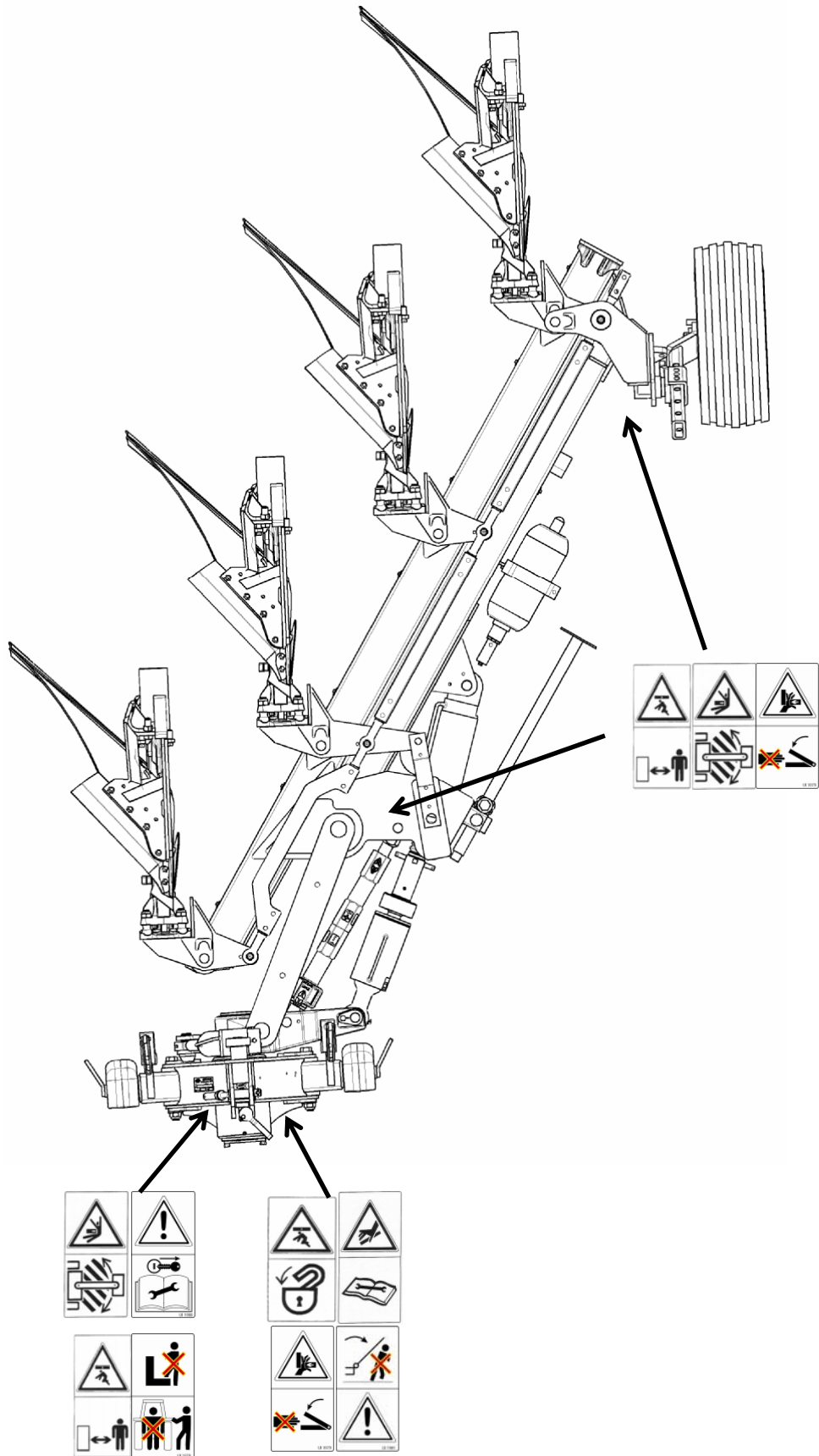
Reference : UI 1981

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

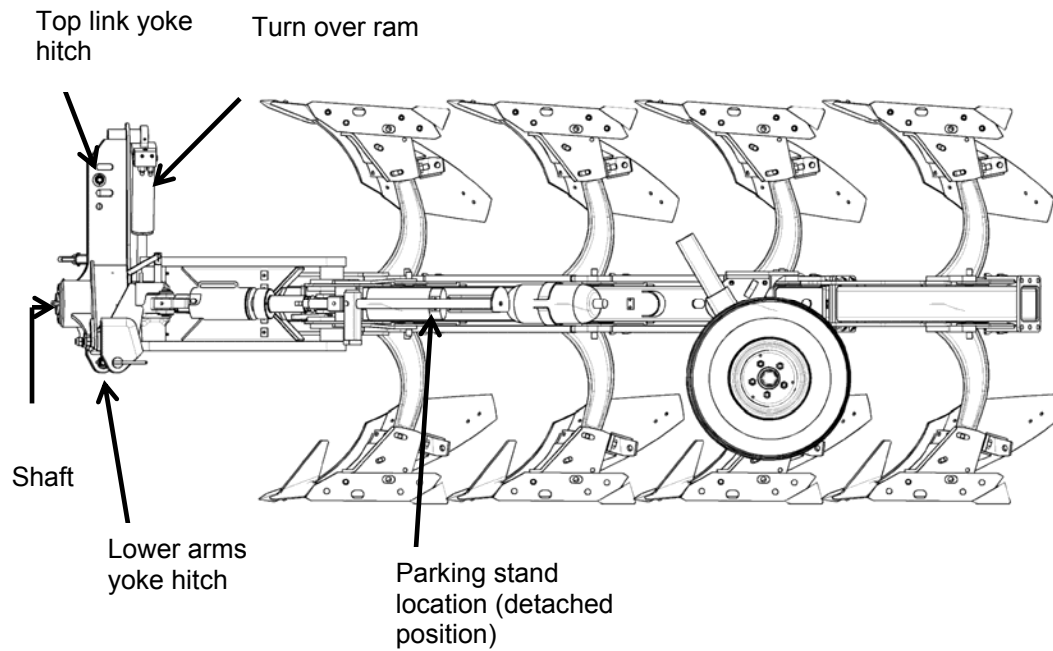
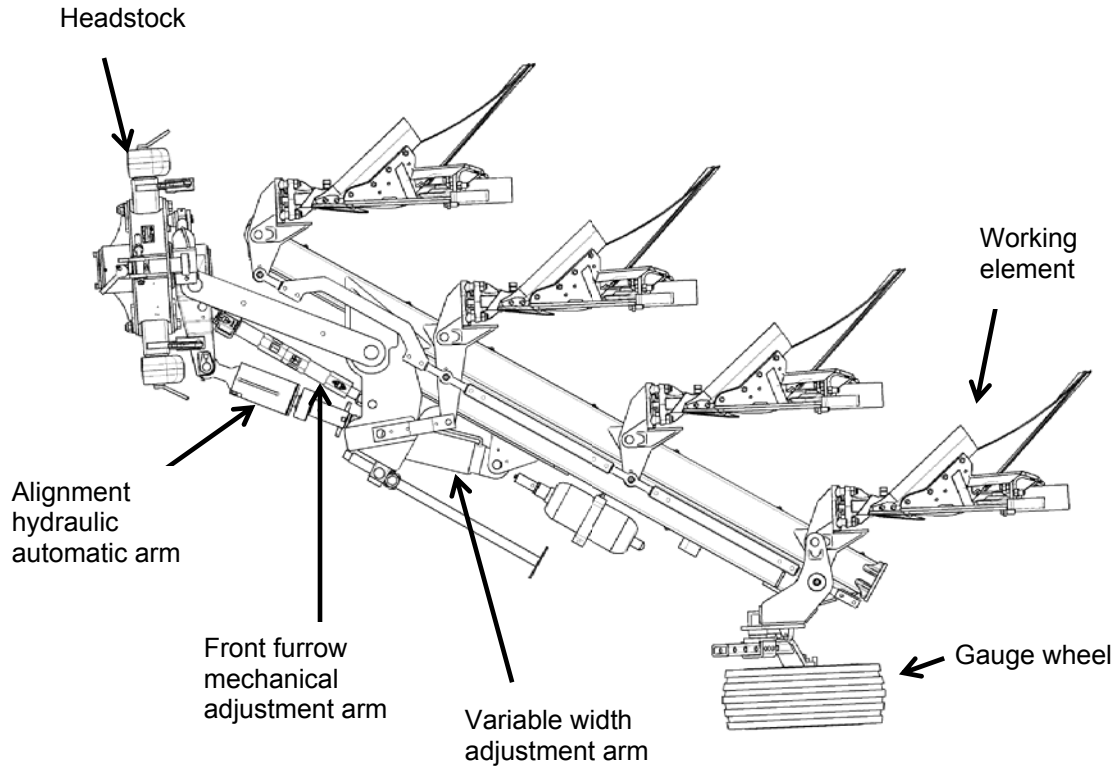


FOR YOUR OWN SAFETY AND THE ONE OF THE OTHER, RESPECT THE FOLLOWING RULES :

- 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 joint may also wear, do not hesitate to replace them with new ones having at least Waltersheid 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
Turn over	<ul style="list-style-type: none"> Hydraulic with ram type RHAD 100 Screw type inclination adjustment Automatic plough alignment before turn over through alignment arm (bloc valve RA6) 	<ul style="list-style-type: none"> Reinforced headstock type RHAS 100 Automatic plough alignment before turn over through variable width ram (bloc valve RA6-2M-2M)
Frame	<ul style="list-style-type: none"> Main frame 120 x 120 mm doubled up to last but one furrow Possible addition of 1 extra bottom on 3 furrows model 	
Working width	<ul style="list-style-type: none"> Hydraulic variable width from 12" to 20" 	
Alignment adjustment	<ul style="list-style-type: none"> With hydraulic automatic arm 	<ul style="list-style-type: none"> With mechanical turnbuckle
Front furrow adjustment	<ul style="list-style-type: none"> With mechanical turnbuckle 	<ul style="list-style-type: none"> With hydraulic independent arm
Inter body clearance	<ul style="list-style-type: none"> 90 cm (= 35") 	<ul style="list-style-type: none"> 100 cm (= 39")
Point to point height	<ul style="list-style-type: none"> 160 cm 	<ul style="list-style-type: none"> 170 cm
Safety device	<ul style="list-style-type: none"> Shear bolts (B) Non-Stop Hydraulic (Y) 	<ul style="list-style-type: none"> Light shear bolt reinforced (CW)
Hydraulic requirements	<ul style="list-style-type: none"> 1 DA turn over + automatic realignment through alignment arm 1 DA working width adjustment 	<ul style="list-style-type: none"> 1 DA turn over + automatic realignment through working width ram 1 DA working width adjustment 1 DA independent 1st furrow adjustment
Wheel	<ul style="list-style-type: none"> Choice of depth wheels (optional transport kit) or combined wheels, rear or laterally positioned 	
Bottoms	<ul style="list-style-type: none"> 16" self sharpening shares with reversible points or square bar point 30 mm Mouldboards helicoïdal short (H4 / H5), or American (3A / 5A), or Cylindrical standard (C 14 / C 16) or Cylindrical flat (P 14 / 16) Landside wearing plates Pitch adjustment Knife coulter 	<ul style="list-style-type: none"> Choice for mouldboards : helicoïdal long, plastic, scattered Mouldboard extensions Choice for share width : 14", 16", 18"
Skimmers	<ul style="list-style-type: none"> Adjustable front to rear & up and down Shear bolt safety device Type mixed, manure or trash covers instead of skimmers 	<ul style="list-style-type: none"> Type maize, euro, universal or pasture

A large choice of options is available to improve machine 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

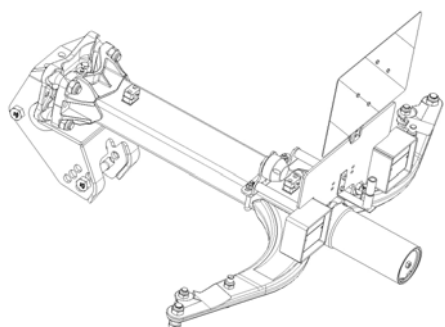
Nb of furrows	Inter body clearance	Working width	Over all height	Over all length	Indicative weight (B)	Indicative weight (Y)	Indicative weight (Z)
3	90 cm	0.9 à 1.5 m	1.60 m à 1.70 m	3.40 m	1 160 kg	1 400 kg	1 490 kg
4		1.2 à 2.0 m		4.30 m	1 450 kg	1 600 kg	1 820 kg
3	100 cm	0.9 à 1.5 m	1.60 m à 1.70 m	3.60 m	1 180 kg	1 420 kg	1 510 kg
4		1.2 à 2.0 m		4.60 m	1 480 kg	1 630 kg	1 850 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.

Type of wheel	Type of tyre		
	600x9	200x14.5	10.0/75-12
RL93	60 kg	71 kg	75 kg
RJL	55 kg	65 kg	70 kg

3.4. LIGHT 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.

3.5. WORKING WIDTH



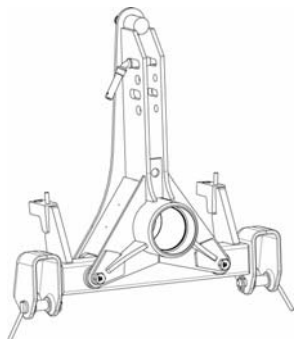
Plough working width can be set at any time thanks to an adjustment ram. It controls a double rod mechanism positioned outside the beam.

Working width range : 12" to 20" = 30 cm to 50 cm.

3.6. HEADSTOCK

There are two types of headstock available on this range of ploughs : regular type RHAD 100 and reinforced type RHAS100.

3.6.1. Headstock type RHAD 100

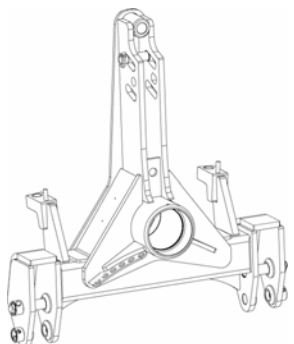


Regular headstock type RHAD 100 is standard assembly.

It is designed with :

- a shaft diameter 100 mm assembled on two taper roller bearings having the same size,
- mechanical inclination adjustment (screws), L.H. side and R.H. sides independent,
- bolted crossbar hitch, different models available (fixed high or low, automatic, ...).

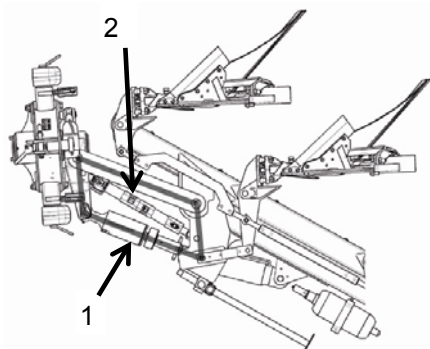
3.6.2. Headstock reinforced type RHAS 100



Reinforced headstock type RHAS 100 is optional assembly. It is fully welded and reinforced, dedicated to intense use. It is designed with :

- a shaft diameter 100 mm assembled a reinforced shaft holder (thickest steel) with two taper roller bearings having the same size,
- mechanical inclination adjustment (screws with diameter more important), L.H. side and R.H. sides independent,
- reinforced and fully welded crossbar for hitching in yoke, width II-III, Ø III. Two heights are available, for an optimal tractor + plough behaviour, hitch as low as possible.

3.7. HEADSTOCK TO MAIN FRAME LINKAGE



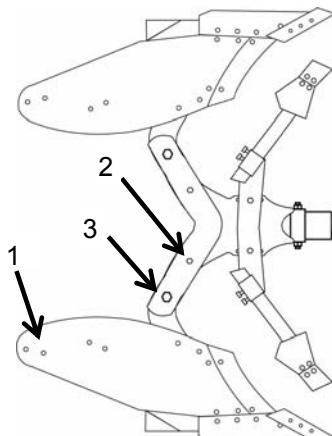
The headstock is connected to the main frame via a parallelogram (refer to picture).

Two independent arms allow plough adaptation to all conditions :

- alignment arm (1) : to line up the plough behind the tractor.
- front furrow width adjustment arm (2) : to adjust front furrow width of cut.

3.8. SAFETY DEVICES

3.8.1. Shear bolt light reinforced safety device type « CW »



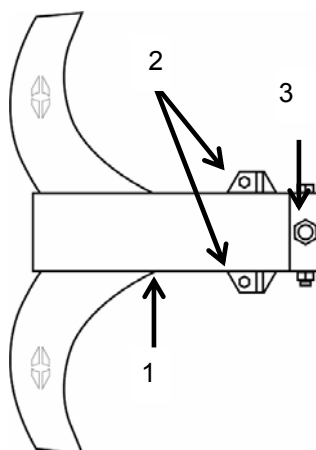
Two bolts carry every single element (1) in working position. When hitting an obstacle, bolt (2) shears for element (1) to trip, pivoting around its articulation (3).

In case of safety bolt shearing, replace it by a new one, certified genuine Grégoire-Besson.

Point to point height	VI 30 10 + VJ 323 Screw HM14x70 grade 8.8 Nyloc nut H M14
160 cm	3 800 kg
170 cm	3 500 kg

Pressure on point for CW safety device tripping.

3.8.2. Shear bolt safety device type « B »



Two bolts (2) hold element (1) in position. When hitting an obstacle, both bolts shear for the complete bottom to trip, pivoting around its articulation (3).

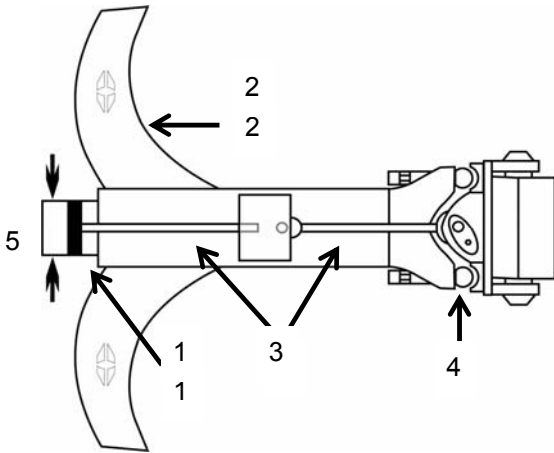
In case of safety bolts shearing, replace them by a new ones, certified genuine Grégoire-Besson.

Point to point height	VI 31 06 + VJ 324 Screw HM16x50 grade 8.8 Nyloc nut H M16	VI 31 07 + VJ 324 Screw HM16x50 grade 10.9 Nyloc nut H M16
160 cm	4 800 kg	6 000 kg
170 cm	4 500 kg	5 700 kg

Pressure on point for B safety device tripping.

3.8.3. Non-Stop Hydraulic safety device type « Y »

3.8.3.1. Principle



At the rear each element (2) has a safety ram (1). This ram is linked to the frame by a two parts rod (3), allowing 850 mm as ground clearance.

At the front, each element has four ball bearings (4) to hold it on the frame.

All safety rams are connected on the same hydraulic circuit also composed by a gas accumulator and a gauge to be able to check pressure at any time.

Hitting an obstacle, when pressure at the point becomes higher than pressure in the circuit, bottom will trip, sending oil into the accumulator. When obstacle is gone, pressure at the point

decreases, accumulator releases oil and bottom comes back to its position.

Pressure in the hydraulic circuit is adjustable. **Always stay in the green zone on the gauge.**

If it is necessary, there are two ways to reach higher resistance :

- using safety rams with larger diameter (5) : diameter is measured at the rear of the ram,
- using accumulator with larger pressure capacity : capacity is written on accumulator whether on a sticker or on a plate.

Note : it might be more interesting to choose an accumulator with larger pressure capacity : wider utilization flexibility, changing is fast and easy on an already delivered machine, no price difference between the two accumulators.

3.8.3.2. Safety device type « Y »

Safety device type « Y » allows under point height 850 mm approx.

	Standard assembly	Optional assembly
Ram Ø on 1st bottom	100 mm	110 mm
Ram Ø on other bottoms	90 mm	100 mm
Accumulator	4litres - 100 bars	6 litres - 100 bars

Components of Y Non-Stop Hydraulic safety device circuit.

Point to point height	Safety ram Ø	Accumulator 100 bars	
		Pressure min 110 bars	Pressure max 150 bars
160 cm	90 mm	624 kg	850 kg
	100 mm	806 kg	1 110 kg
	110 mm	1 008 kg	1 375 kg
170 cm	90 mm	591 kg	806 kg
	100 mm	764 kg	1 042 kg
	110 mm	955 kg	1 302 kg

Pressure on point for Y Non-Stop Hydraulic safety device tripping.

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 of furrows	Indicative HP requirements
3	80 - 110 HP
4	90 - 125 HP
5 (RCW4 only)	100 - 125 HP

4.2. TRACTOR WHEELS

4.2.1. Tractor tyres

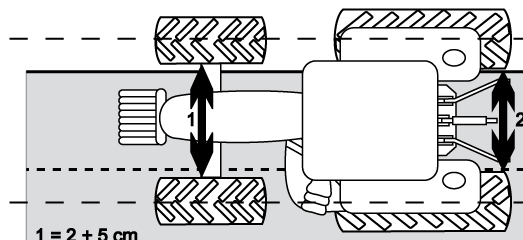
Check tractor tyres general state and pressure. Pressure should be the same on both sides of the tractor for a nice drivability in the field and on the road.



IMPORTANT : inflate tyres following manufacturer's recommendations.

4.2.2. Distance between tractor tyres

Generally, using a plough with large number of bottoms, the wider is the distance between tyres, the better is the drivability.



To be able to steer the tractor in the furrow, the middle of the front axle shall be lined up with the middle of the rear axle. This would also prevent from useless friction of front wheel on the furrow wall.

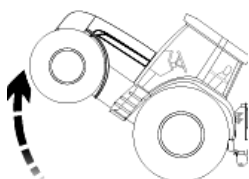
Front furrow width of cut adjustment arm will allow adaptation to all conditions.

Inter tyre distance is related to the front furrow arm adjustment and to the ploughing width. In sloping fields, larger distance will provide better stability.

Inter rear tyre distance (2) minimum : 1.30 m

Inter rear tyre distance (2) maximum : 1.70 m

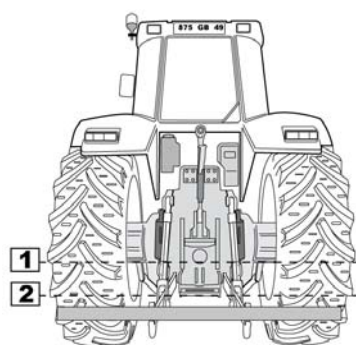
4.3. FRONT END WEIGHTING



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.

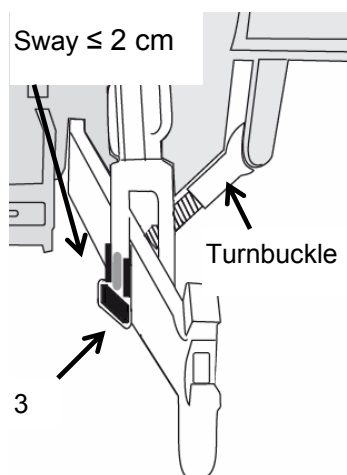
4.4. LIFT LINKS LENGTH



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. POSITIONING STABILIZERS



To hitch a fully mounted equipment; stabilizers shall be positioned so that :

- **in transport position** : lift links arm have **minimum sway (≤ 1 cm)**. This will prevent from chocks between machine and tractor during manoeuvres or transport
- **in working position** : lift links arms shall have **2 to 5 cm** loose.

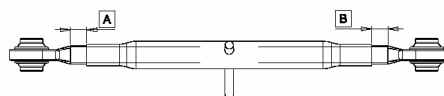
If necessary, install bushings to avoid lateral movement of hitch arms on hitch pins. Always check for compatibility between hitch pins and bushings (\varnothing and length).

Note : it is easier to adjust and / or service stabilisers 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.

4.6. TOP LINK

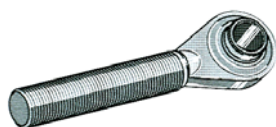
Before attaching the machine, make sure that thread length is the same on both sides of top link. Refer to picture, A shall equal B.



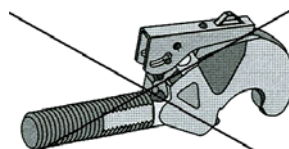
NOTE : an excess of grease inside top link tube may make it impossible to shorten. Remove grease fitting to let grease free to go out.

IMPORTANT : connection between machine and top link shall be done through a tie rod and never through an automatic hook.

- Automatic hooks sizes and designs change according to models and manufacturers and may cause interference with machine hitch in particular conditions.
- Spring shutter may block hitch ball which may wear or break. This is particularly true for hitches cat III: pin diameter is larger giving less quantity of matter for the ball becoming less strong.



Tie rod
CORRECT



Automatic hook
DO NOT USE

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 hitch capacity
- unbalance: load tractor front end if necessary. Refer to point 4.3.

5.1. ATTACHING MACHINE TO TRACTOR

5.1.1. Tractor equipped with tie rods lower links

- Before any manoeuvre, check for diameter and length compatibility between hitch pins and tractor tie rods.
- 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.
- Hitch top link.

5.1.2. Tractor equipped with automatic hooks lower links

- Remove safety bolts and hitch pins.
- Remove balls from tractor lift link automatic hooks.
- Check for balls and pins general state and compatibility.
- 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.
- Hitch top link.



IMPORTANT : before hitching top link, **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.**

5.1.3. Hitching top link

Connexion between top link and machine has to be done through a tie rod (refer to previous section).

Once tractor lift links are correctly hooked up, check top link general state and compatibility with tie rod. Then attach top link in one of the three available slots.

Raise machine to the maximum and make sure there are no interference with tractor. Final top link adjustments (length and position) will be made in the field.

Put parking stand in working position : remove safety clip and pivot it into horizontal position. Do not forget to install safety clip back.



IMPORTANT : make sure to have enough clearance between machine yoke hitch and top link to avoid any contact from working to raised position. A second verification shall be done once machine is in the field in truth working conditions.

Connect hydraulic hoses.

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 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 bottoms L.H. or R.H. side
- 2) Put stand in parking position = vertical
- 3) Completely lower the machine to the ground
- 4) Detach top link
- 5) Remove pressure, disconnect hydraulic lines
- 6) Detach lower lift links

Always operate with care.

6. HYDRAULIC CONNEXIONS

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

6.1. REQUIRED HYDRAULIC PRESSURE

Required tractor hydraulic pressure is 180 to 200 bars.

6.2. 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.

6.3. REQUIRED HYDRAULIC REMOTES – TURNOVER CYCLE HANDLING

6.3.1. Turnover with automatic alignment (standard assembly)

Plough is equipped as follows :

- front adjuster : mechanical arm
- alignment : hydraulic automatic arm
- variable width : hydraulic ram directly connected to the tractor
- automatic bloc valve : type RA6 for realignment before turnover through alignment arm.

Turnover cycle is done without modification of working width following the three steps given hereafter :

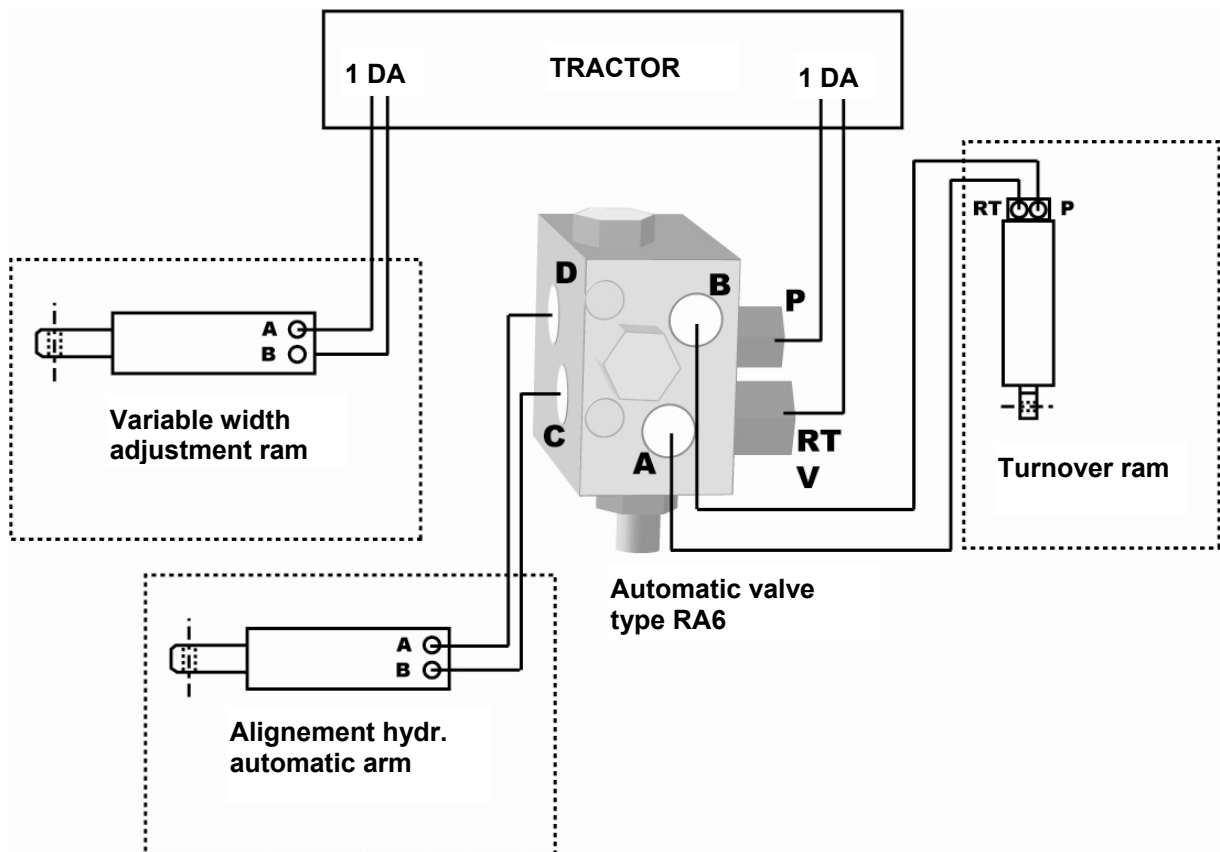
- realignment through hydraulic automatic alignment arm opening
- turnover
- opening back : hydraulic automatic alignment arm closing brings plough back to its working position.

Two DA remotes are required to use the plough :

- **1 DA** for turnover with realignment
- **1 DA** for working width adjustment.

It is impossible to have an hydraulic arm on front adjuster.

Connection drawing



6.3.2. Turnover with variable width memory ram (option assembly)

Plough is equipped as follows :

- front adjuster : mechanical arm or hydraulic independent ram connected directly to the tractor (option)
- alignment : mechanical arm
- variable width : hydraulic memory ram
- automatic bloc valve : type RA6-2M-2M for realignment before turnover through variable working width.

Turnover cycle is done following the three steps given hereafter :

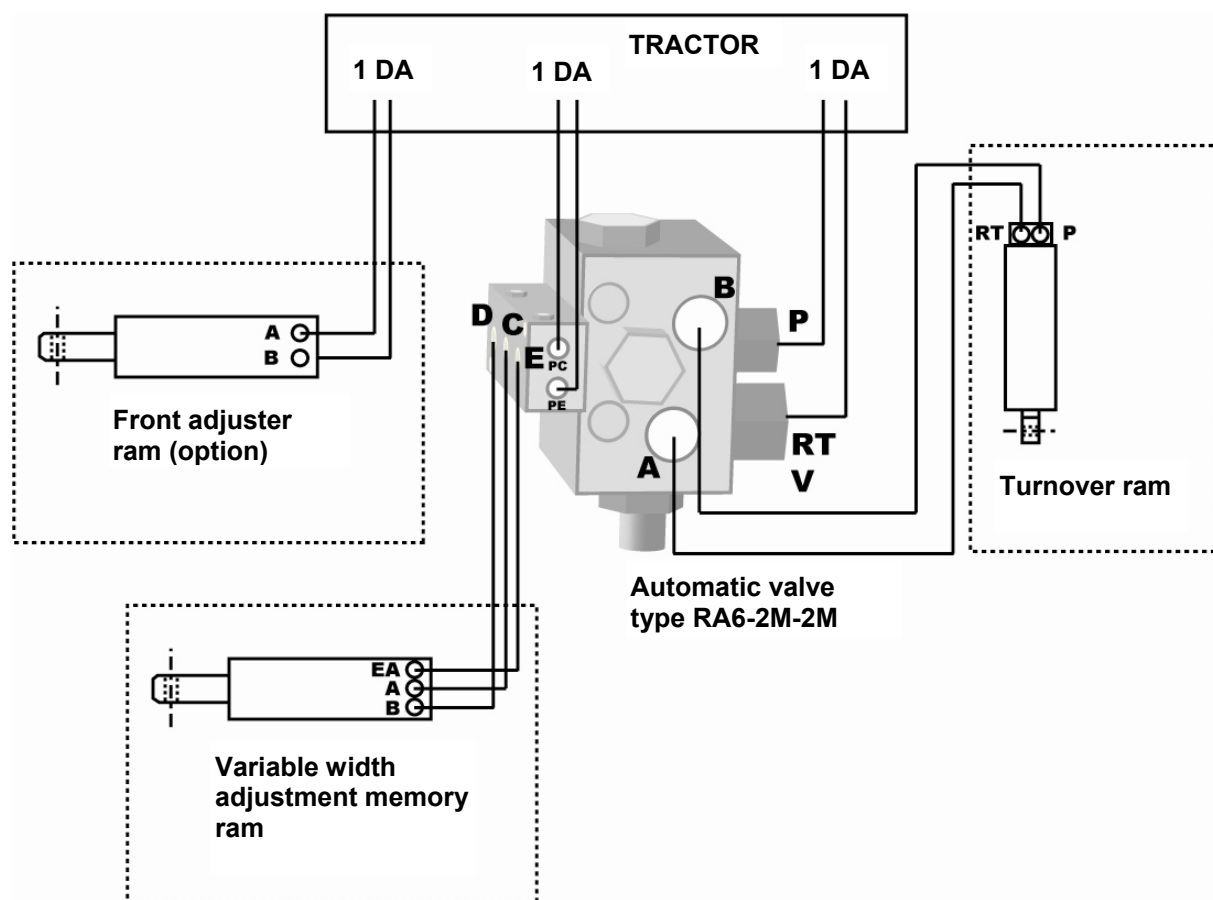
- realignment through variable width = plough closes to 12" its minimal width
- turnover
- opening back : variable width memory ram comes back to its previously adjusted ploughing position.

Three DA remotes are required to use the plough :

- **1 DA** for turnover with realignment
- **1 DA** for working width adjustment
- **1 DA** for hydraulic front adjuster independent adjustment (option)

It is impossible to have an hydraulic arm for alignment adjustment.

Connection drawing

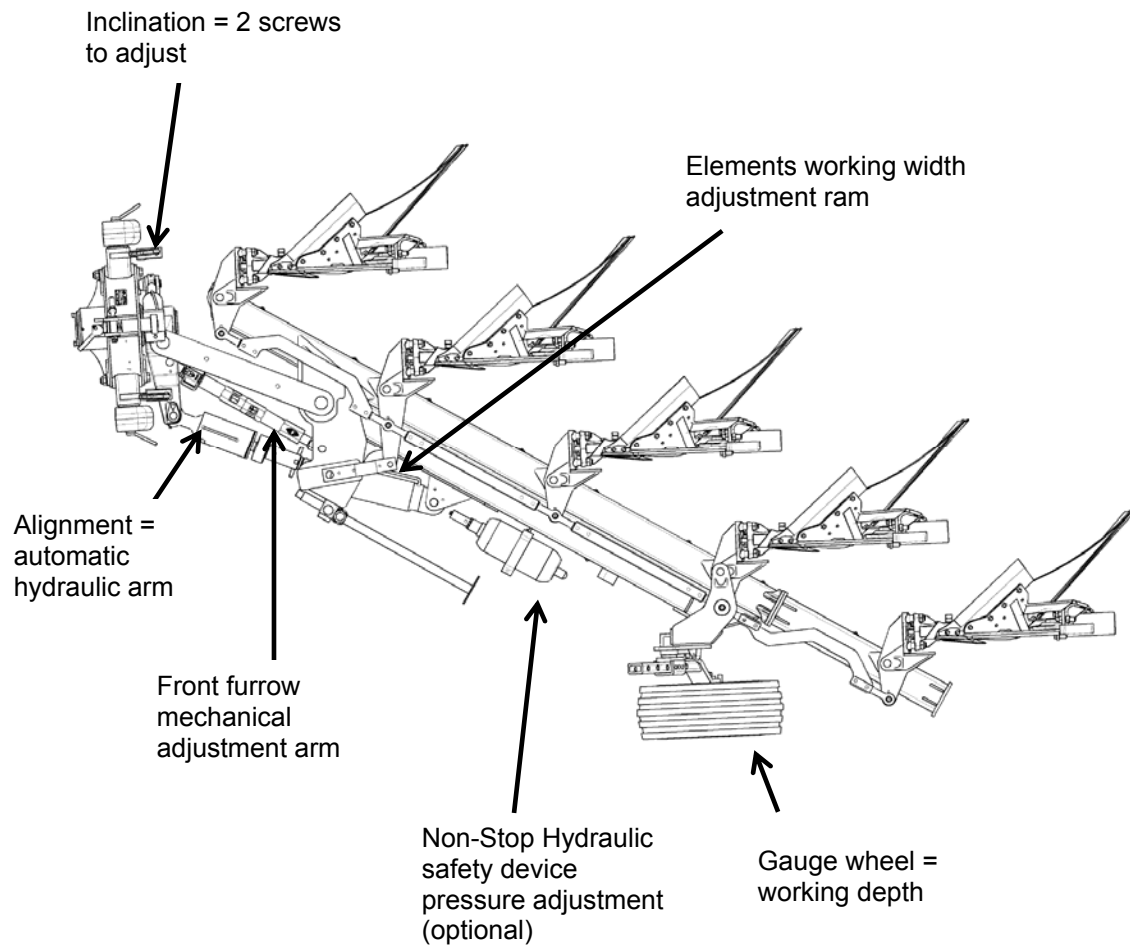


7. PREPARING THE MACHINE

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. PREPARING PLOUGH BOTTOMS

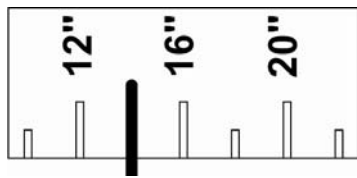
Grégoire-Besson plough bottoms are protected before leaving the factory to prevent rusting. Good field work can not be accomplished until this coating is removed : mouldboards do not shine, ground is stuck to the steel.

If necessary, use a solvent, such as paint remover to take the protective black paint off.



CAUTION : keep work area well ventilated when using solvent such as paint remover to remove protective paint. Wear eye and hand protection.

7.3. WORKING WIDTH ADJUSTMENT



Plough is equipped with a mechanism for uninterrupted adjustment of working width according to conditions : type of soils, available horse power, type of ploughing desired (width / depth ratio, ...). Each bottom can plough from 12" to 20" wide (= 30 to 50 cm).

Refer to indicator on main frame to see bottom's individual working width.

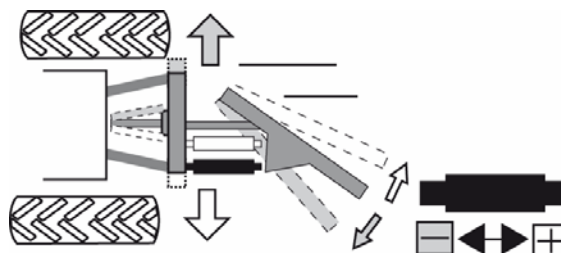
Thanks to headstock to main frame linkage through parallelogram, once front furrow width of cut is set according to tractor inter rear tyre distance, it moves following the others = acting on working width ram changes all elements working width.

7.4. ALIGNMENT ADJUSTMENT

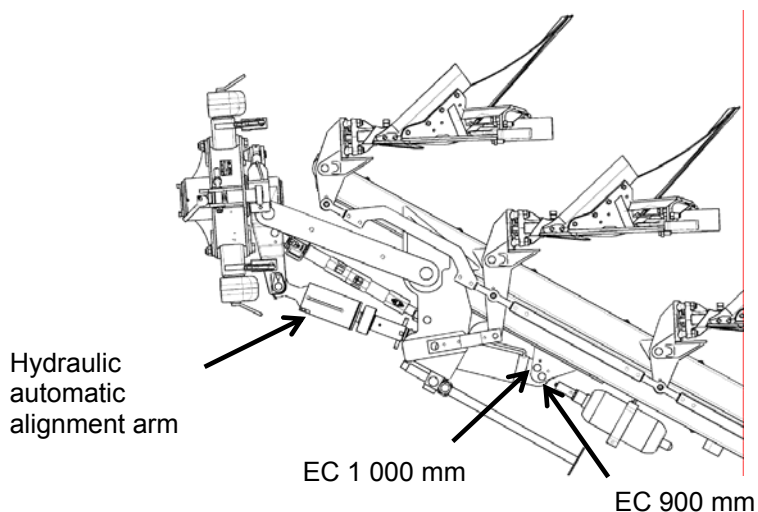
7.4.1. Principle

Alignment adjustment allows plough positioning behind tractor (rotation movement).

Main frame shall pivot so that traction line of both bottoms and tractor are lined up. Then useless side draft is minimum and plough steering is easy.



7.4.2. Adjustment



Ploughing at desired depth and width, if **alignment arm is properly set**, **top link shall be strictly lined up behind tractor**. Therefore, final adjustment shall be done in the field.

However, check for alignment pre-adjustment before beginning field operations :

- check variable width adjustment ram position according to machine inter body distance (EC),
- set alignment arm axle to axle length : **610 mm** for whether EC 900 mm or 1 000 mm.

7.4.2.1. Hydraulic alignment adjustment arm

Hydraulic arm : lg. mini = 560 mm lg. maxi = 625 mm
 adjustment shall be done ram closed
 ram stroke : 60 mm

7.4.2.2. Mechanical alignment adjustment arm

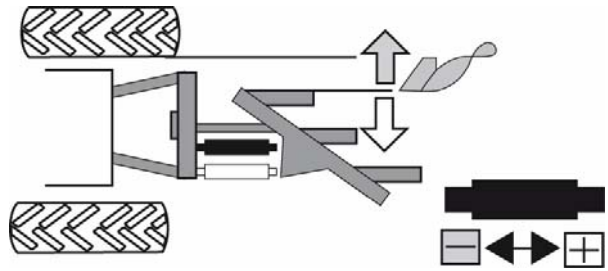
Mechanical arm : lg. mini = 552 mm lg. maxi = 652 mm

7.5. FRONT FURROW ADJUSTMENT

7.5.1. Principle

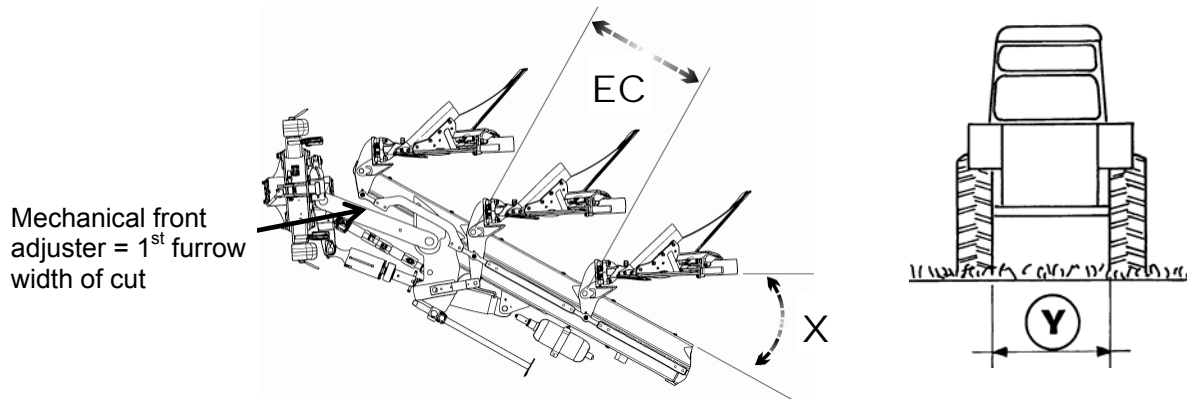
Front furrow adjustment allows width adaptation of first furrow according to the others (translation movement).

All bottoms working the same width will provide an even ploughing.



7.5.2. Adjustment

Front adjuster settlement is related to tractor inter rear tyres distance (Y) and to interbody distance (EC).



7.5.2.1. Mechanical front adjuster arm

Mechanical arm : lg. mini = 552 mm lg. maxi = 652 mm

Set mechanical front adjuster arm axle to axle distance according to hereafter given theoretical data. Final adjustments will be done in the field, in real working conditions.

Shear bolt light reinforced safety device type CW

Inter body distance EC 900 mm	
Inter rear tyre distance (Y)	Arm axle to axle length
1.30 m	614 mm
1.40 m	605 mm
1.50 m	596 mm
1.60 m	587 mm
1.70 m	578 mm

Inter body distance EC 1000mm	
Inter rear tyre distance (Y)	Arm axle to axle length
1.30 m	623 mm
1.40 m	615 mm
1.50 m	606 mm
1.60 m	597 mm
1.70 m	588 mm

Shear bolt safety device type B or non-stop hydraulic safety device type Y

Inter body distance EC 900 mm	
Inter rear tyre distance (Y)	Arm axle to axle length
1.30 m	623 mm
1.40 m	614 mm
1.50 m	605 mm
1.60 m	596 mm
1.70 m	586 mm

Inter body distance EC 1000mm	
Inter rear tyre distance (Y)	Arm axle to axle length
1.30 m	632 mm
1.40 m	624 mm
1.50 m	615 mm
1.60 m	606 mm
1.70 m	597 mm

7.5.2.2. Hydraulic front adjuster arm

Hydraulic arm : lg. mini = 560 mm lg. maxi = 625 mm
 adjustment shall be done ram opened to the maximum
 ram stroke : 60 mm

Set hydraulic front adjuster arm axle to axle distance, ram opened to the maximum, according to hereafter given data.

Inter body distance EC 900 mm Inter rear tyre distance (Y) 1.30 m to 1.70 m	
Safety device	Axle to axle length
Type CW	622 mm + / - 5 mm
Type B or Y	630 mm + / - 5 mm

Inter body distance EC 1000mm Inter rear tyre distance (Y) 1.30 m to 1.70 m	
Safety device	Axle to axle length
Type CW	630 mm + / - 5 mm
Type B or Y	636 mm + / - 5 mm

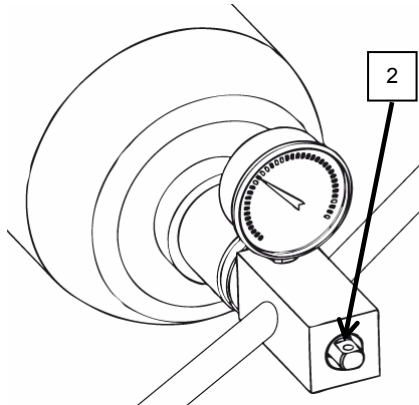


CAUTION : make sure there is no contact possibility with alignment and / or mobile arm from opened to closed position. If so, reduce hydraulic arm length.

7.6. NON-STOP HYDRAULIC SAFETY DEVICE PRESSURE ADJUSTMENT

Plough is equipped with a 100 bars accumulator. For regular working conditions, pressure in non-stop hydraulic safety device shall be set between **110 and 150 bars**, which corresponds to the green zone on the gauge. **Always stay in this range.**

Adjustment procedure :



- Non-stop safety device is linked to hydraulic variable width adjustment circuit
- Open set screw (2) on accumulator.
- To **increase NSH safety device resistance**, increase hydraulic pressure in the system, **adding oil** acting on hydraulic control lever.
- To **decrease NSH safety device resistance**, decrease hydraulic pressure in the system, **removing oil** acting on hydraulic control lever.
- Once desired pressure is reached, close set screw (2). NSH safety device circuit is now independent from hydraulic variable width circuit.

Clever way for an operator alone in the field :

- Open valve (2) and add more pressure than required in the circuit. Shut valve (2).
- In tractor's cab, put hydraulic control lever on "Float position".
- Slightly open valve (2) so that oil slowly goes back to tractor.
- Once desired pressure is reached, close valve (2). Then hydraulic hose (1) may be disconnected.

7.7. MACHINE WHEELS

7.7.1. Tyre inflation

Air pressure shall be checked every week. Do not let it drop below recommended pressure.

Tyre dimension	Recommended pressure	Maximum speed
600 x 9	4 bars	25 km/h
200 x 14.5	5 bars	25 km/h
10.0 / 75 x 12	3.5 bars	25 km/h

Follow tyre manufacturer recommendations (written on tyre side).



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

7.7.2. 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.

7.10. RL 93 = DEPTH WHEEL ON SHOCK ABSORBER

RL 93 is a depth wheel rear positioned.

As an option, a transport kit allows its using as a transport wheel.

7.10.1. Working position

Adjusting depth control :

- to increase working depth, screw the two adjusters (2),
- to decrease working depth, unscrew the two adjusters (2).

Adjusting wheel alignment :

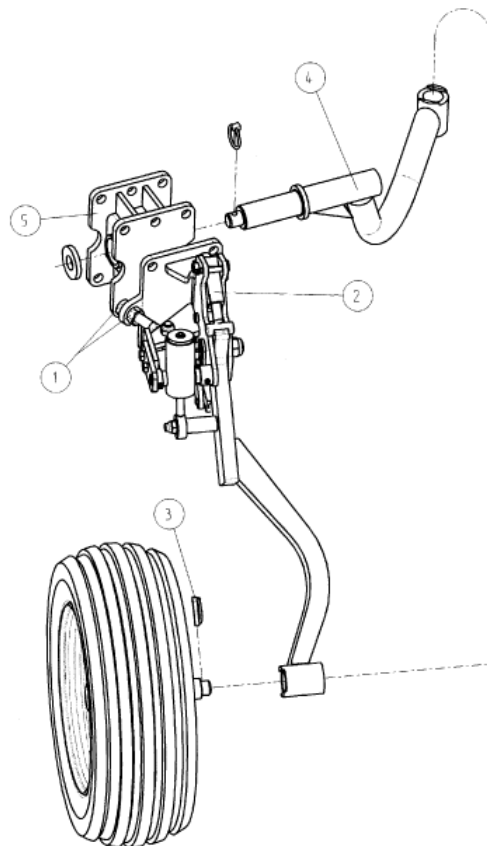
- loose the two jam nuts (1)
- set wheel angle : it shall run parallel with elements
- tight back the two jam nuts (1)

7.10.2. Transport position

As an option, a transport arm (4) is available to turn RL 93 into a transport wheel.

Turning wheel into transport position :

- install transport arm (4) on mounting bracket (5), do not forget the safety clip
- raise machine, remove clip (3) then remove wheel from its working arm
- turn plough over 90°
- insert wheel on the transport arm (4),do not forget its safety clip
- put machine in transport position (refer to section 8)



7.12. RJL = LATERAL DEPTH WHEEL

RJL is a depth wheel laterally positioned.

As an option, a transport kit allows its using as a transport wheel.

7.12.1. Working position

Depth control adjustment is done positioning pin (1).

To change ploughing depth :

- remove safety clip and pin (1)
- to increase working depth, raise the wheel
- to decrease working depth, lower the wheel
- insert pin (1) in the appropriate hole and install back safety clip

For a more precise adjustment, set length of both screws (3).

- loose jam nuts (2)
- set length of screw (3)
- tight back jam nuts (2).

This adjustment is independent R.H. and L.H.

Wheel alignment adjustment : wheel shall run lined up with elements

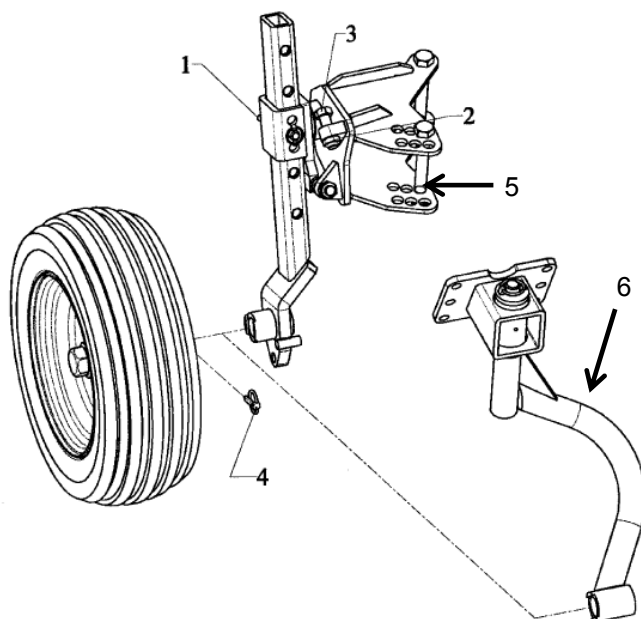
- plough with mechanical bolt adjustable width : wheel alignment is done positioning bolt (5). The angle between wheel and frame shall be the same as the angle between elements and frame. This adjustment is done at the manufacture, it shall be changed if machine working width is changed
- plough with hydraulic variable width : wheel mounting bracket is linked to variable width device so that wheel stays lined up with elements.

7.12.2. Transport position

As an option, a transport arm (6) is available to turn RJL into a transport wheel. It is set at the rear of the machine.

Turning wheel into transport position :

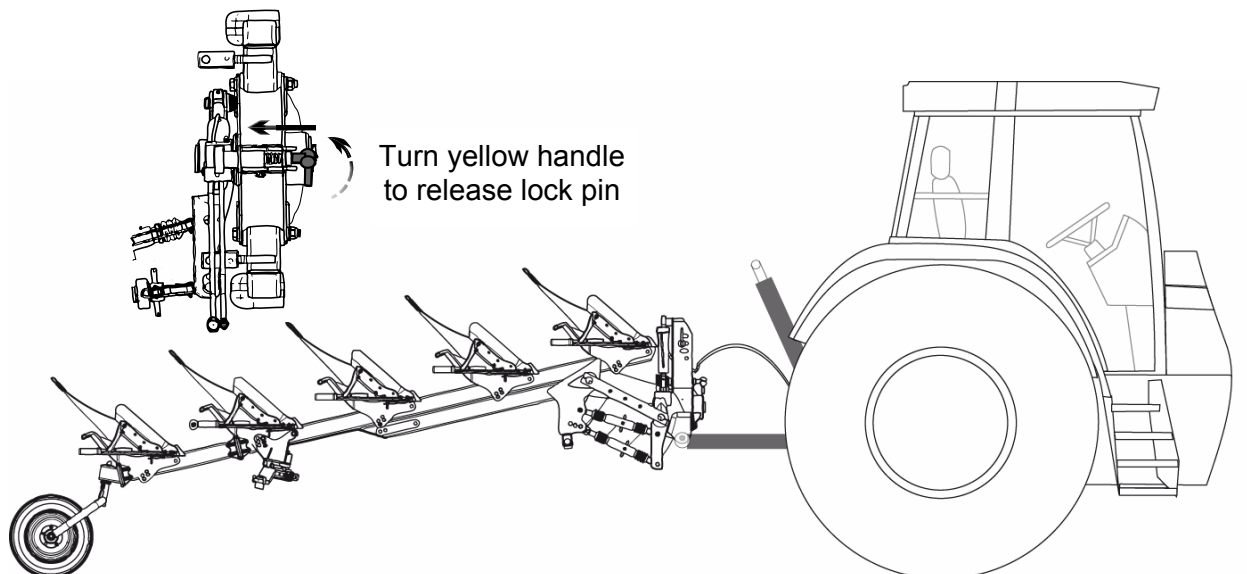
- raise machine, remove clip (4) then remove wheel from its working arm
- pivot plough 90°
- install wheel on its transport arm (6), do not forget its safety clip
- put machine in transport position (refer to section 8)



8. TRANSPORTING

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

8.1. CHANGING TO TRANSPORT POSITION



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

- **Lower the machine to the ground in working position** : it shall stand on its elements
- **Put wheel in transport position** : refer to wheel section (shall not apply for machines equipped with depth wheel only)
- **Install lock pin** : install transport safety lock pin turning yellow handle. Lubricate spring if pin is hard to move
- **Raise the machine and start turn over manoeuvre** : plough lines up and automatically locks in transport position
- For machines equipped with a transport wheel :
 - lower the machine** so that wheel touches the ground
 - detach top link**
- **Lower tractor hydraulic hitch** : to lower machine centre of gravity, improving its stability in transport
- **In the cab lock all control levers** : lock all control levers (hydraulic remotes, hitch, ...) to avoid any unforeseen movement, and potential accident.
- If tractor is equipped with a stabilizers locking system, install it to prevent any useless movement.
- **Install all lights, reflectors and signs required by current applicable law.**

8.2. CHANGING TO WORKING POSITION

To put machine in working position, follow here above described procedure in the opposite way.

Make sure top link is correctly connected to the machine before removing transport locking pin.

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 ploughing, operating speed shall be between 6 and 8 km / h (= 3.7 to 5 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, ...).

As long as possible, regularly change field opening side to avoid rolling ground always the same way. This could result in creating a ridge on one side of the field and a ditch on the other side.

Several up and down passes might be necessary before reaching an optimum ploughing, moreover with a new plough or at the beginning of a new season. During each pass, mouldboards get more polished, soil flow gets better and adjustments can be improved.

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. FIRST PASS

First pass differs from the others since there is no furrow to fill. This interferes with several adjustments : inclination and front furrow (width and depth).

9.2.1. Entering into the ground

Adjust working width using width adjustment ram hydraulic control lever. Refer to section 7.3. Drive slowly and lower the machine to have a smooth entering into the ground.

9.2.2. Alignment adjustment

This is the first adjustment to do ploughing with a fully mounted roll over plough. Stabilizers shall be free (2 to 5 cm loose). Refer to section 7.4.

- **Top link** shall be **strictly lined up** behind tractor.
- If **top link** looks **towards ploughed ground**, plough shall be lined up with tractor traction line **extending alignment arm**.
- If **top link** looks **towards non ploughed ground**, plough shall be lined up with tractor traction line **shortening alignment arm**.

9.2.3. Ploughing depth adjustment

Ploughing depth is controlled by :

- tractor hydraulic hitch height for the front end of the plough,
- gauge wheel height for the rear end of the plough.

9.2.3.1. Tractor hydraulic hitch height adjustment

Tractor hitch height is controlled from the cab. For the first pass first bottom cannot fill any furrow with ground. So set hitch height so that there is no formation of an excessive ridge.

9.2.3.2. Tractor draft control adjustment

To begin, set draft control on a minimum sensibility. Therefore front furrow depth will be easier to check and / or to adjust.

Later on, once plough is properly adjusted, draft control sensibility may be increased to improve tractor's adhesion.

Note : in bad conditions (wet fields, low horse power reserve, ...) it is impossible to work with minimum draft control. Hitch reactions to the load shall then be taken in account for average front furrow working depth estimation.

9.2.3.3. Gauge wheel height adjustment

Gauge wheel height may be approximately adjusted during first pass. Checking and / or readjustments will be done on the following passes.

- to increase working depth, raise the wheel
- to decrease working depth, lower the wheel

Refer to section concerning gauge wheel

9.2.4. Side to side levelling = inclination adjustment

Final side to side levelling has to be done once tractor runs in the furrow.

For the first pass, set elements perpendicular with the ground (better penetration, easier pulling, ...).

9.2.5. Front furrow width adjustment

Final front furrow width adjustment has to be done once tractor runs in the furrow.

For the first pass, set front furrow maximum offset from the tractor to plough as close as possible from the fence.-

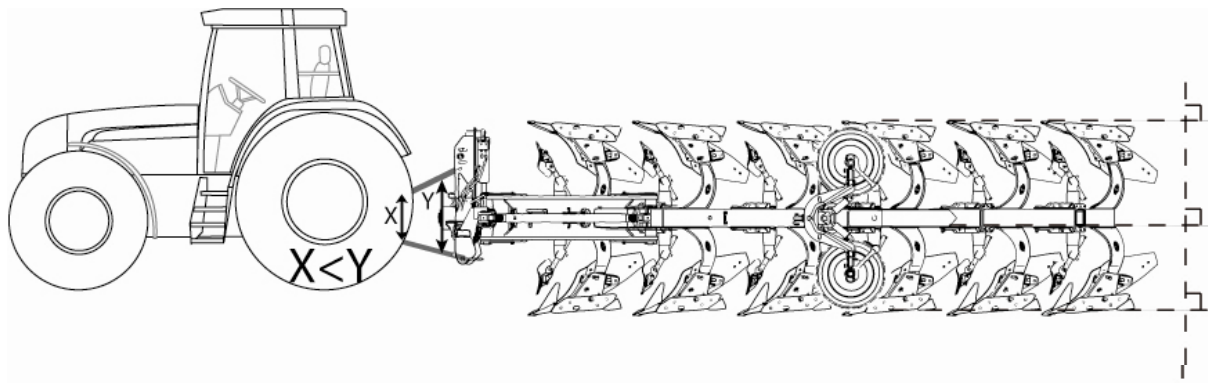
9.3 SECOND PASS

Before any final adjustment, make sure mouldboards are scoured. Ground shall slide along steel and never stick. In heavy conditions, removing bolted points for the first working hours might help scouring mouldboards. Do not hesitate to contact an authorized Grégoire-Besson dealer in case of problem.

9.3.1. Alignment adjustment

Check for good alignment adjustment. Plough shall be properly lined up behind tractor, top link strict. Landsides shall slide along furrow wall, without excessive pressure.

9.3.2. Front to rear levelling

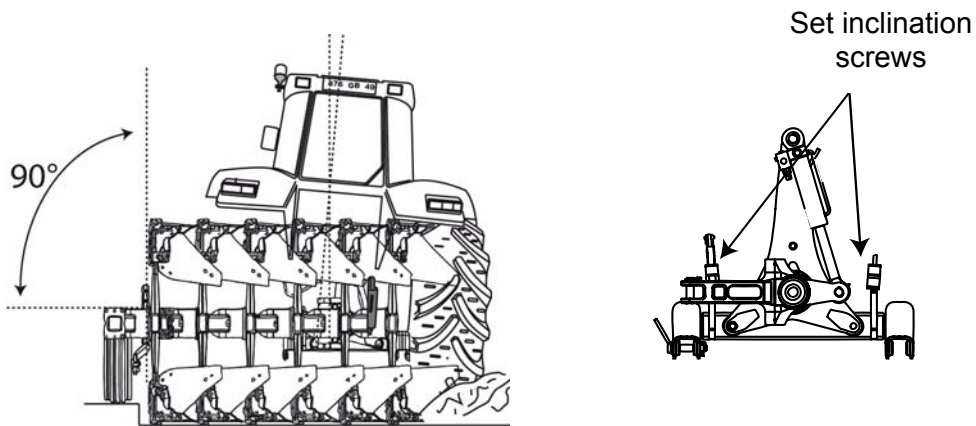


Once tractor runs in the furrow, plough has to be levelled from front to rear so that all bottoms work at the same depth (refer to picture).

Adjustment procedure

- For the desired ploughing depth, find the right balance between tractor hydraulic hitch height, gauge wheel height and top link length.
- **Top link position** : at work, top link shall always be positioned higher on machine side than on tractor side. This will allow a good weight transfer on front axle. Refer to picture, $X < Y$. Change top link fixing on tractor if necessary.
- **Top link length** : top link length shall be adjusted so that working at desired depth top link pin stays free to move in the slot.
- Any modification of ploughing depth (wheel height) leads to tractor hitch and top link length modification.

9.3.3. Side to side levelling



Plough shall be levelled laterally (= from side to side). Elements shall work perpendicular with the ground. Refer to picture.

In specific conditions (sloping fields, heavy clay, ...) plough may be slightly tilted towards ploughed ground to increase mouldboard action on the soil.

Adjustment procedure

- Raise plough out if the ground
- Act on control lever, start turning the plough to remove pressure from inclination screw
- Adjust inclination screw length
- Put machine back in working position, plough a short distance and check adjustment performance
- Start adjustment again if necessary.

Note : inclination adjustment is independent R.H. and L.H.

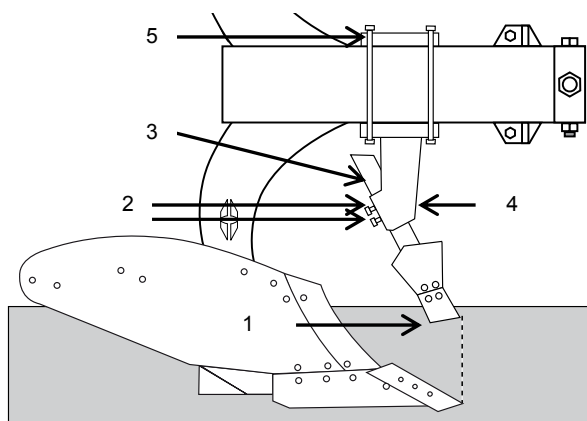
Note : for in the furrow ploughing, final adjustment shall be done once tractor runs in the furrow at desired depth.

9.3.4. Front furrow width adjustment

Final front furrow width adjustment shall be done once plough is correctly lined up both front to rear and side to side. For ploughs equipped with an hydraulic ram, this adjustment can be done "on the go". Refer to section 7.5.

- **If front furrow leaves a ridge**, it ploughs too much ground. **Its width shall be reduced shortening front furrow arm.**
- **If front furrow leaves a hole**, it does not plough enough ground. **Its width shall be increased extending front furrow arm.**
- **Particular case** : => if front furrow ploughs excessive width, a hole may appear : mouldboard is so far from its theoretical position that it cannot bring ground far enough to fill the furrow,
=> working on sloping fields, it may be necessary to re-adjust front furrow width for each pass to leave a really levelled surface

9.4. SKIMMER ADJUSTMENT



Skimmers provide good trash coverage. They are protected by a shear bolt safety device

Grégoire-Besson skimmers have been specially designed to be adjustable by an operator alone in the field.

9.4.1. Shear bolt safety device

Each skimmer is protected by a shear bolt. When hitting an obstacle, this bolt would break for skimmer to raise up.

In case of bolt shearing

- Remove all broken parts
- Install a new safety bolt

=> standard : screw ref. VI 29 08, H M12x45, grade 8.8 + nut ref. VJ 322.

=> reinforced : screw ref. VI 29 09, H M12x45, grade 10.9 + nut ref. VJ 322.

9.4.2. Skimmer height adjustment

In general, skimmer share (1) should work the ground for half of its height to be efficient (refer to picture).

Guideline for adjustment

- Skimmer height adjustment is linked to ploughing depth, so it shall be checked after each ploughing depth changing.
- If skimmer is set too high : there is a plugging risk behind it, if there is still too much residue on the surface.
- If skimmer is set too low : there is a plugging risk ahead it, if there is too much material coming in. In this case, plough is hard to pull.

=> Both situations lead to poor trash coverage.

Adjustment procedure

- Loose the two pointed screws (2).
- Move skimmer arm (3) through its mounting bracket (4) to reach the desired height.
- Tight both pointed screws (2) inside marks of arm (3).
- In a first time, adjust 1 or 2 skimmers and make a try. If it is better, then adjust all other skimmers. If not, go back and try another adjustment.
- **All skimmers shall be set the same on both sides so that plough works evenly.**
- Special long arms (3) for shallow ploughing are available. Contact an authorized Grégoire-Besson dealer.

9.4.3. Skimmer front to rear adjustment

In general, skimmers are pre-adjusted at the manufacture for its share to be lined up with bottom's point (refer to picture on previous page).

Guideline for adjustment

- If skimmer is ahead from the point, crop residue is ploughed down in the furrow.
- If skimmer is behind the point, crop residue is ploughed higher in the furrow.
- In heavy trash conditions, it might be necessary to set skimmer behind the point.

Adjustment procedure

- Loose the four carriage bolts (5).
- Move skimmer mounting bracket (4) to the desired position.
- Tight all four carriage bolts (5).
- In a first time, adjust 1 or 2 skimmers and make a try. If it is better, then adjust all other skimmers. If not, go back and try another adjustment.
- **All skimmers shall be set the same on both sides so that plough works evenly.**

9.5. SAFETY DEVICE ADJUSTMENT

9.5.1. Shear bolt safety device type « CW »

In case of safety bolt shearing :

- Raise plough to replace broken bolt.
- Pivot element to line up holes.
- Install new safety bolt removing all broken parts.



IMPORTANT : respect safety bolts specifications. Only use certified genuine Grégoire-Besson spare parts.

9.5.2. Shear bolt safety device type « B »

In case of safety bolt shearing :

- Put plough in transport position, elements shall be horizontal to replace bolts without crushing risks.
- Pivot element to line up holes.
- Install new safety bolt.



IMPORTANT : respect safety bolts specifications. Only use certified genuine Grégoire-Besson spare parts.

9.5.3. Non-Stop Hydraulic safety device type « Y »

In case of excessive tripping

Ploughing is not even.

Pressure shall be increased in the circuit. Refer to section 7.6.



CAUTION : always stay in the green zone on the gauge. If maximum pressure is not high enough, contact an authorized Grégoire-Besson dealer. Larger diameter safety rams may be required.

In case of insufficient tripping

Bottoms hit rocks and bring them up. There is a risk for wearing and / or structure parts breaking. Useless pressures may damage the plough and affect its life time.

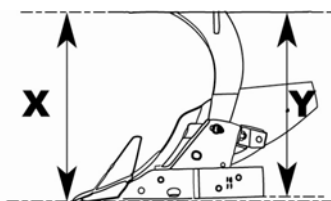
Pressure shall be reduced in the circuit. Refer to section 7.6.



CAUTION : never reduce too much the pressure in the circuit. Elements could fall down and cause severe injury or death by crushing.

9.6. BOTTOM PITCH ADJUSTMENT

$$Y = X - 15 \text{ mm}$$



Grégoire-Besson bottom's pitch is adjustable. At the manufacture, it is set so that in working conditions front part (point) is 15 mm lower than rear part (end of landside). This adjustment is adapted to most ploughing conditions.

Before any modification of standard adjustments

Check wearing parts general state

Wearing parts worn out may lead to poor ploughing and / or poor penetration.

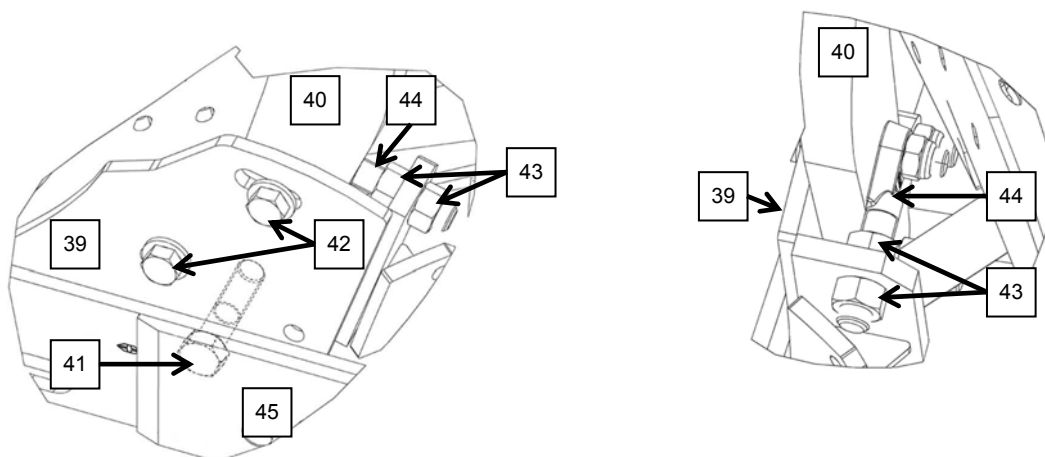
Think ahead for possible consequences

Pitch augmentation	better penetration (specially in dry grounds) plough harder to pull (more fuel consumption) excessive pressure on safety device stone climbing ground escaping underneath mouldboard
Pitch reduction	opposite effects poor penetration

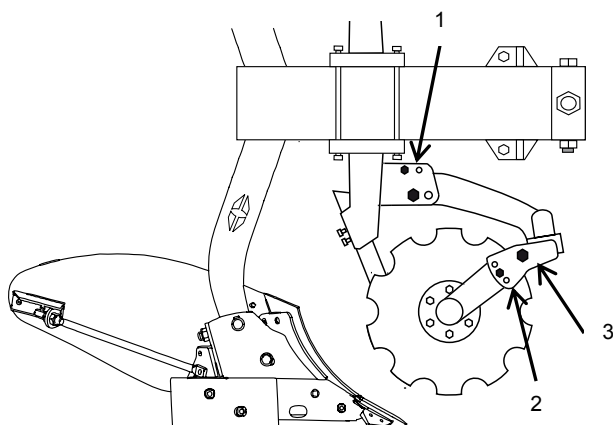
FOR ALL CONDITIONS NEVER HAVE X < Y

Adjustment procedure

- Remove dirt from all bolts, nuts and threads.
- Remove wear plate (45) to reach bolt (41).
- Loose bolts (41) and (42), and both jam nuts (43) located on eye bolt (44).
- To increase the pitch, screw rear nut (43) on eye bolt (44).
- To decrease the pitch, unscrew front nut (43) on eye bolt (44).
- Once desired pitch is set, tight all bolts and install back wear plate (45).
- **All bottoms on both sides shall have the same pitch for the plough to work evenly.**



9.7. CCR 99 DISC COULTER ADJUSTMENT



Disc coulters CCR 99 are fixed on skimmer mounting bracket through a welded plate.

They are available on both bolt safety device (B) and non-stop hydraulic safety device (Y).

They have 500 mm diameter disc, notched or plain.

9.7.1. Front to rear adjustment

There are two ways to adjust distance between disc coulters and plough bottom. :

- positioning skimmer mounting bracket on element,
- positioning disc coulters support on the welded plate (bolts 1), two positions are available.

Ploughing in heavy trash conditions, coulters shall be ahead from element to prevent plugging.

9.7.2. Depth adjustment

Coulters depth is pre-adjusted at the manufacture for disc to cut slightly higher than the point (bolt 2 position). This adjustment shall be checked in the field. Once ploughing at desired depth, disc shall be :

- deep enough to cut all residues and / or roots (ploughing hay fields) = at least 7 or 8 cm ,
- high enough to prevent any contact of coulters hub on the ground and avoid wearing and / or plugging = 5 cm clearance between coulters hub and the ground.

Adjustment procedure

- Loose bolt 3
- Remove bolt 2
- Change coulters position
- Install bolt 2 in appropriate position
- Tight back bolt 3

10. MAINTENANCE

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

10.1. GENERAL INSTRUCTIONS



Operator and user 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 on the following drawing. Grease every 50 working hours on a regular use. Hard or intense conditions would require more.

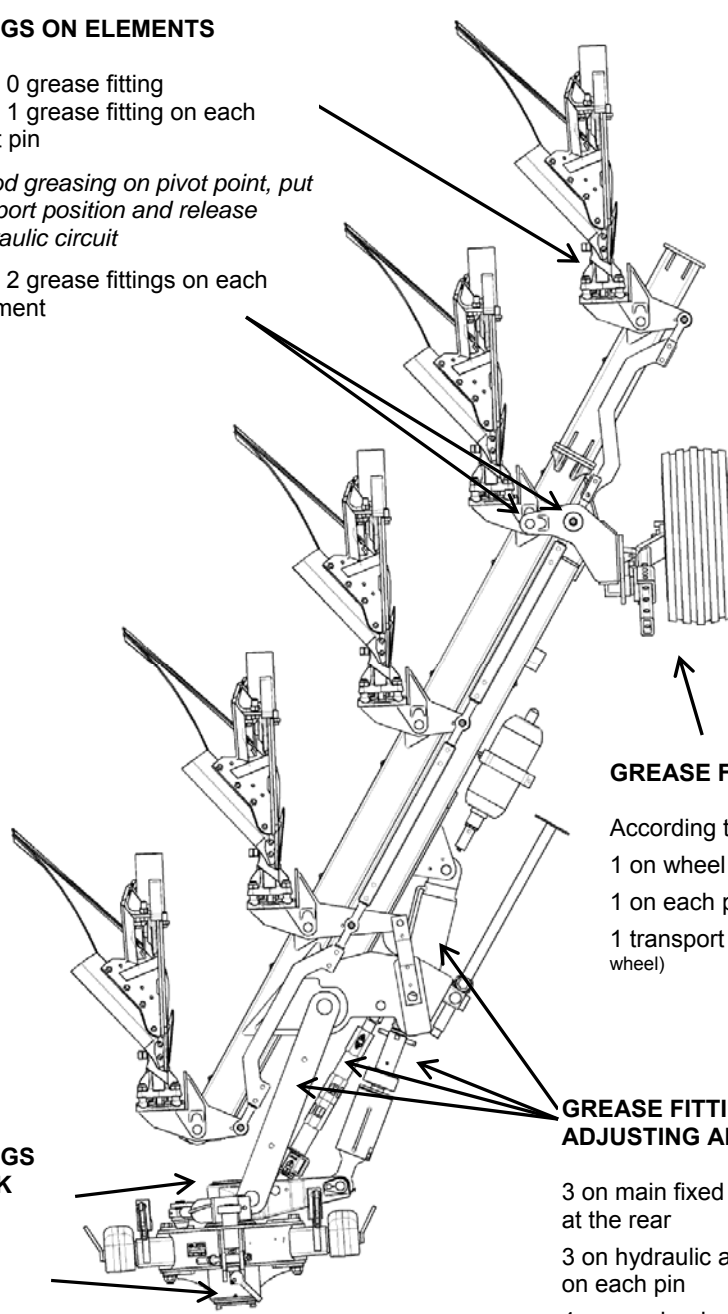
The best is to grease regularly with regular quantity. Do not over grease.

GREASE FITTINGS ON ELEMENTS

Safety B, C 0 grease fitting
 Safety Y 1 grease fitting on each
 element rod pivot pin

*Safety Y : for good greasing on pivot point, put
 machine in transport position and release
 pressure on hydraulic circuit*

Variable width 2 grease fittings on each
 side on each element



GREASE FITTINGS ON WHEEL

According to model
 1 on wheel hub
 1 on each pivot point
 1 transport position axle (combined
 wheel)

**GREASE FITTINGS ON
 ADJUSTING ARMS**

3 on main fixed arm : 1 on front + 2
 at the rear
 3 on hydraulic arm : 1 threads + 1
 on each pin
 4 on mechanical arm : 1 each
 threads + 1 on each pin
 3 on variable width adjustment ram

**GREASE FITTINGS
 ON HEADSTOCK**

2 on the shaft
 1 on each end of
 turn over ram

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 cause of poor quality work (penetration troubles, poor mixing ...) and may damage structure parts°.

10.4. WORKING BOTTOMS MAINTENANCE

Protect all parts working into the ground (mouldboards, shares, shins, disc blades) from rust whenever the plough is not used by applying a light coating of oil or grease.

While working in sticky grounds, even for a short stop, cover mouldboard with a coat of light oil (WD 40 in spray).

For longer stops, heavier oil will stay longer on mouldboards. Dry spray type graphite also, this one being removed faster.

10.5. 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.
- 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. MOUNTING AN ADDITIONAL FURROW

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

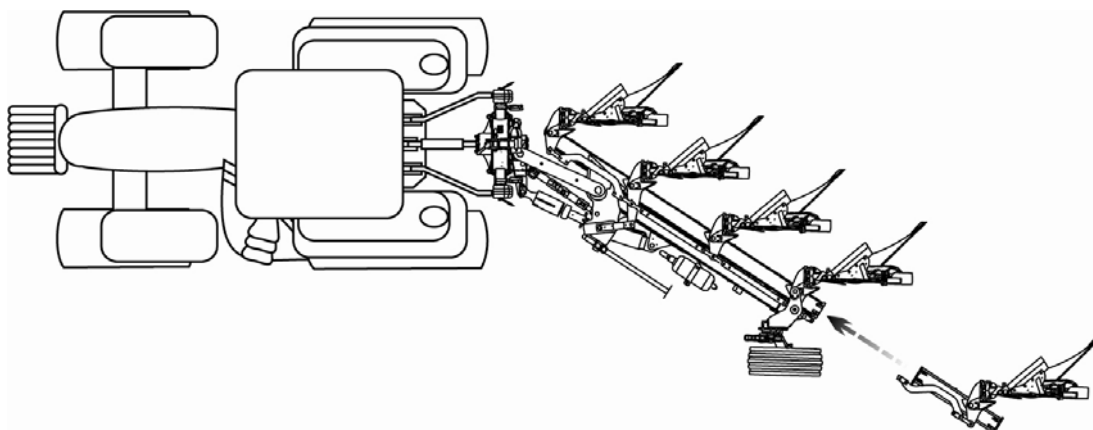


ATTENTION : never attempt to install an additional furrow without appropriate equipments in a good shape (loader, chain lock, gloves, ...)

Do not hesitate to contact an authorized Grégoire-Besson dealer.

11.1. MOUNTING AN ADDITIONAL FURROW

Before starting operation, plough shall be properly attached to a tractor having the same specifications of the one used in the field (size, horse power rating, weight, ...).



- Park tractor + machine on a surface flat and firm enough to support its weight.
- Put machine in working position, elements straight up and down, and lower it to the ground. It shall not touch the ground, leave a 10 to 15 cm distance approx.
- Stop tractor engine and remove ignition key.
- Remove rear plate and rear light kit (if machine is equipped).
- Approach additional furrow using a loader. Line up holes, insert all bolts and firmly tight them.
- Detach additional furrow from loader.
- Bolt variable width external double rod.
- For machine equipped with Non-Stop Hydraulic safety device, connect rear furrow to hydraulic circuit :

=> remove cap on additional furrow hose,

=> connect the hose to machine hydraulic circuit.

IMPORTANT : coupler shall be firmly tight to allow a good work for additional furrow safety device. Male collar shall come in contact with female flange.

- Install back rear plate and rear light kit (if machine is equipped).

Note : if machine is not equipped with a coupler at the rear of hydraulic non-stop safety device circuit, specify it when ordering additional furrow. Put machine in transport position and release pressure to install coupler.

11.2. HYDRAULIC CONNECTION VERIFICATION (ONLY FOR MACHINE EQUIPPED WITH NON-STOP HYDRAULIC SAFETY DEVICE)

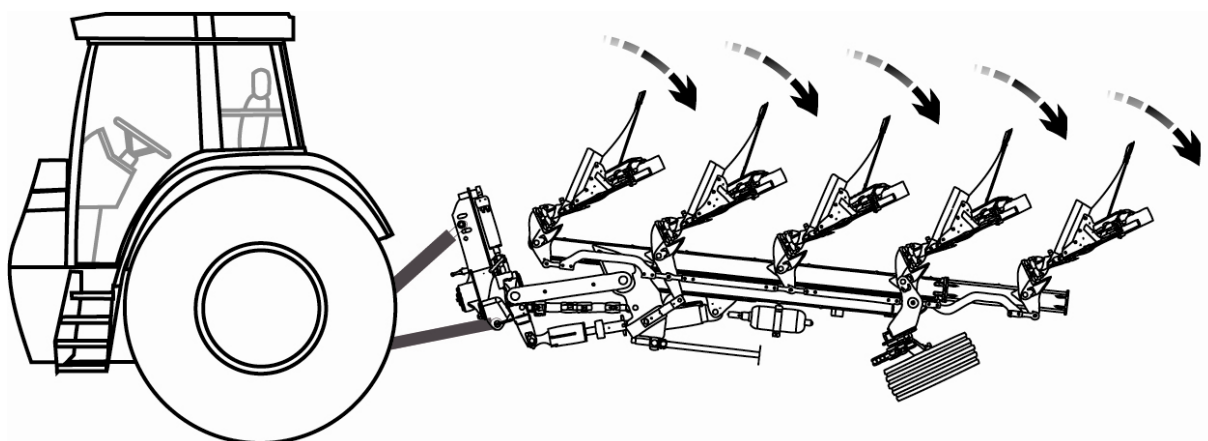
- Put machine in transport position and install safety lock pin.
 - Release pressure from safety device hydraulic circuit :
- => open set screw on accumulator
=> in the cab put hydraulic control lever on float position to remove pressure in the circuit (refer to tractor operator's manual).



ATTENTION : releasing pressure in safety device rams, elements are not held any more and may fall down.

Do not move machine or tractor.

- Indicator on the gauge shall be on "zero".
- All elements shall fall down one after the other.
- When hydraulic connection is good, additional furrow also fall down. If not, check for coupler tightness.
- Put pressure back in circuit acting on hydraulic control lever in the cab. When desired pressure is reached, all elements shall come back to their original position and indicator shall be on the green zone on the gauge.
- Close set screw on accumulator.



NOTES

12. QUICKLY STARTING - R W 4

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.
- 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 lateral sway**
Transport position minimal sway (≤ 1 cm)
Working position lateral sway 2 to 5 cm
- 4. Check top link**
Connexion between top link and machine must be done through a tie rod and not through an automatic hook.

HITCHING

- 5. Attach lower links**
- 6. Attach top link**
- 7. Make sure there are no interferences between machine and tractor from raised position to working position**
Machine shall never come in contact with tractor.
There should be no contact between tractor lift links and machine yoke hitch from raised position to working position.
- 8. Connect hydraulic lines**
- 9. Transport / working positions**
Transport position wheel in transport position, elements in horizontal position, safety lock pin installed, top link detached.
Working position wheel in working position, safety lock pin unlocked, top link properly attached.

FIRST PASS

- 10. Adjust working width**
- 11. Adjustment alignment**
Top link shall be lined up with tractor.
- 12. Adjust + / - working depth with wheel height**

SECOND PASS

- 13. Adjustment alignment**
- 14. Front to rear levelling**
Top link shall be positioned higher on machine side than on tractor side and shall be free in the slot while ploughing (adjust length).
Adjust both tractor hydraulic lift height and wheel height so that plough works in horizontal position at desired depth.
Check draft control adjustment and visible chrome visible on lift ram (30 mm minimum).
- 15. Side to side levelling**
Elements shall be perpendicular with the ground.
- 16. Adjust front furrow width of cut**
Once plough is levelled, adjust front furrow width of cut so that ploughing is even, without formation of ridge or hole between two passes.

MAINTENANCE

- 17. Follow recommendations given in this manual according to lubrication and maintenance of the machine**

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