

SPMFW 9

**Semi-mounted single wheel reversible plough
In the furrow ploughing - Hydraulic variable width**

OPERATOR'S MANUAL MAINTENANCE INSTRUCTIONS



GRÉGOIRE-BESSON S.A.

Rue Victor Grégoire
49 230 MONTFAUCON – MONTIGNÉ
France

Phone : 33 (0) 2 41 64 72 67
Fax : 33 (0) 2 41 64 67 73

Web : www.gregoire-besson.com
Email : Contactfr@gregoirebesson.com

April 2009

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NOTES

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.

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 :

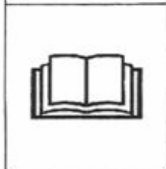
2. SAFETY INSTRUCTIONS

2.1. SAFETY STICKERS



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 129



UNFOLDING AREA

Stay clear of equipment when folding or unfolding.

Reference : UI 126



MOVE AWAY FROM THE MACHINE

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

Reference : UI 127



SECURE THE MACHINE BEFORE ACTION

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

Reference : UI 131



HYDRAULIC LEAK AND MAINTENANCE

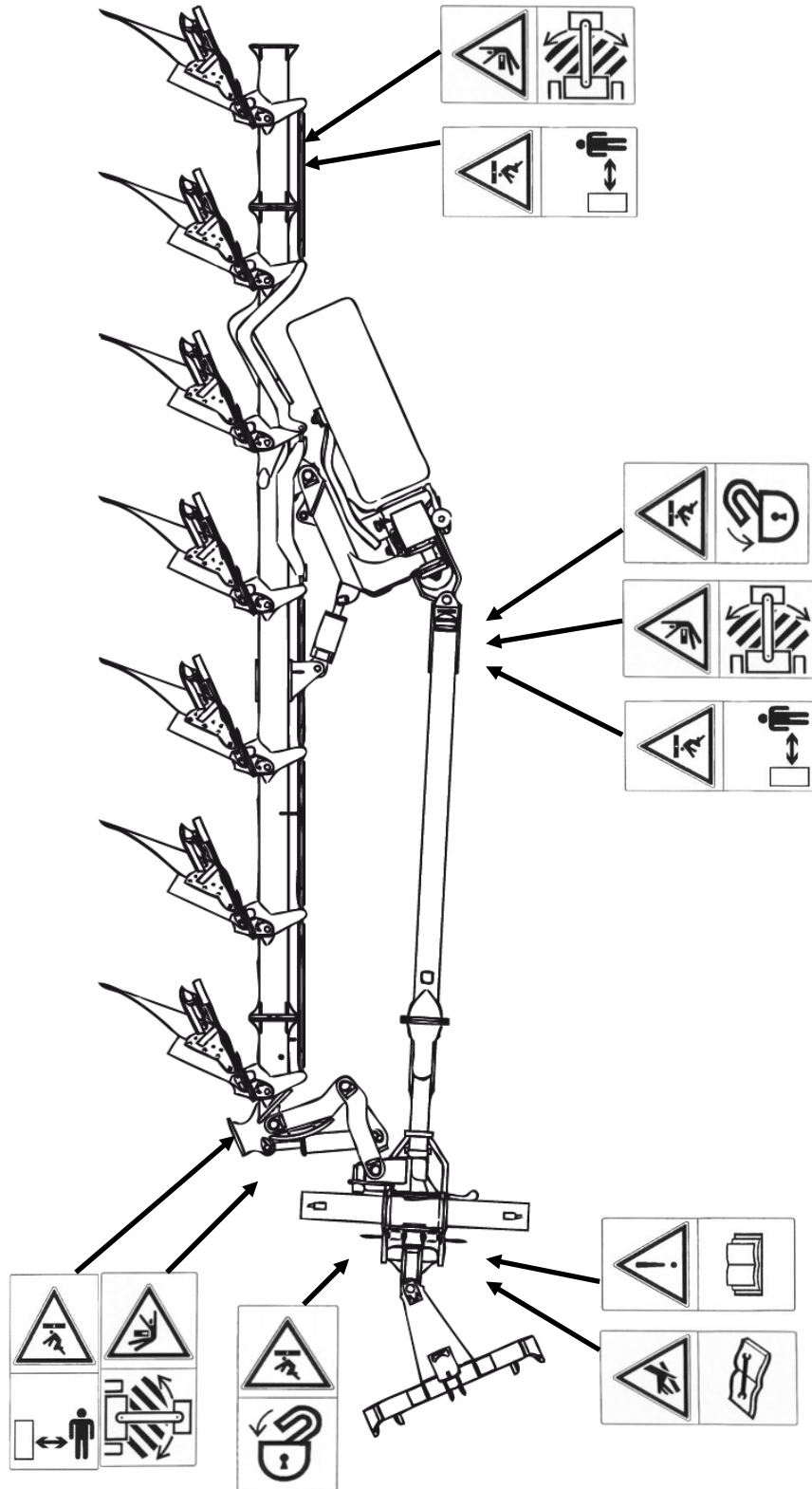
Caution, high pressure fluids can cause injury. Follow safe practices.

Reference : UI 128



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 intempesive 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

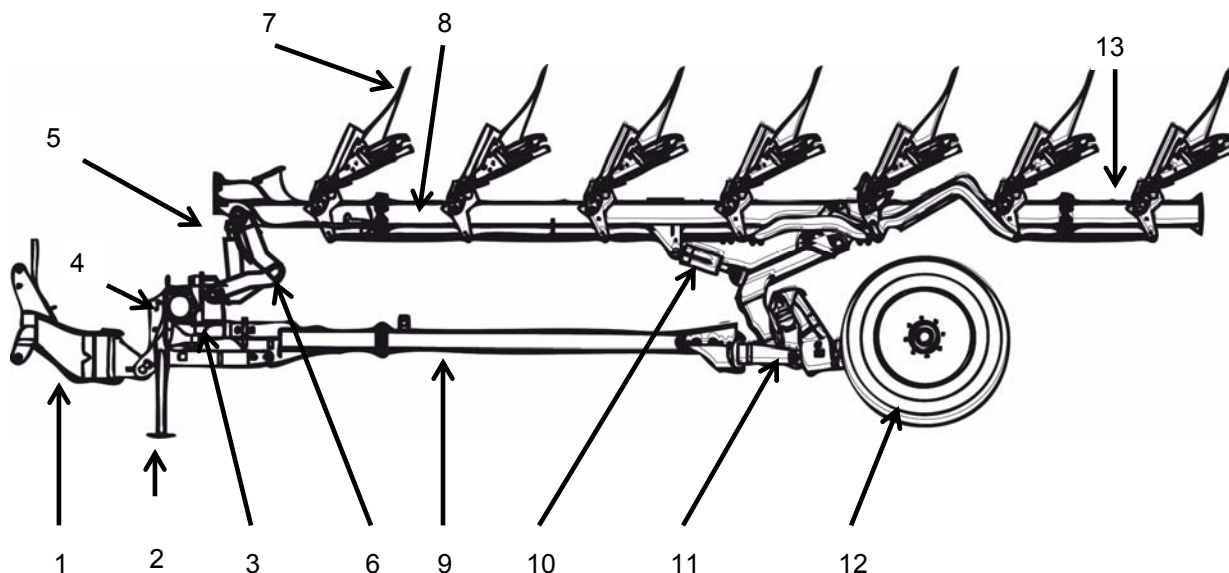


FOR YOUR OWN SAFETY AND THE ONE OF THE OTHER, RESPECT THE FOLLOWING RULES :

- 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 fabrication quality required by manufacturer.
- 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 VIEW



1. Hitch
2. Parking stand
3. Turn over rams
4. Transport position locking handle
5. Front furrow ram
6. Front furrow adjuster
7. Ploughing elements
8. Main frame
9. Stabilization bar
10. Hydraulic variable width adjustment ram
11. Wheel mounting bracket with lift ram and shock absorber
12. Wheel
13. Rear additional bottom

3.2. SPECIFICATIONS TECHNIQUES

Specification	Standard equipment	Optional equipment
Headstock	<ul style="list-style-type: none"> Pivoting headstock 110° Fixed hitch cat. II-III 	<ul style="list-style-type: none"> Reinforced hitch Quick Coupler compatible cat. II-III or cat. III-IV Hydraulic weight transfer control
Frame	<ul style="list-style-type: none"> Square tube 180 x 180 mm with possible extensions Rear frame « Z » designed 	
Working width	<ul style="list-style-type: none"> « On the go » adjustable by hydraulic ram from 12" to 20" with 100 cm inter body clearance from 14" to 22" with 114 cm inter body clearance 	
Front furrow adjustment	<ul style="list-style-type: none"> « On the go » adjustable by hydraulic ram 	
Inter body clearance	<ul style="list-style-type: none"> 100 cm (= 39") 	<ul style="list-style-type: none"> 114 cm (= 45")
Point to point height	<ul style="list-style-type: none"> 160 cm (= 63") 170 cm (= 67") 	<ul style="list-style-type: none"> 180 cm (= 71")
Safety device	<ul style="list-style-type: none"> Shear bolt (B) Non-Stop Hydraulic (Y) Non-Stop Hydraulic reinf. (Z) 	<ul style="list-style-type: none"> Non-Stop Mechanical with leaves spring (P)
Hydraulic	<ul style="list-style-type: none"> 1 SA for wheel lift and non stop hydraulic safety device circuit 1 DA for turn over 1 DA for front furrow adjuster 	
Wheel	<ul style="list-style-type: none"> Lift by SA ram Alignment adjustment by mechanical arm Tyre Ø 1220 mm, width 440 mm, tractor profile 	<ul style="list-style-type: none"> Tyre Ø 1090 mm, width 410 mm, tractor profile
Bottoms	<ul style="list-style-type: none"> 16" self sharpening shares with reversible points or square bar point 35 mm Mouldboards helicoidal 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 coulters 	<ul style="list-style-type: none"> Choice for mouldboards : helicoidal 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'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.

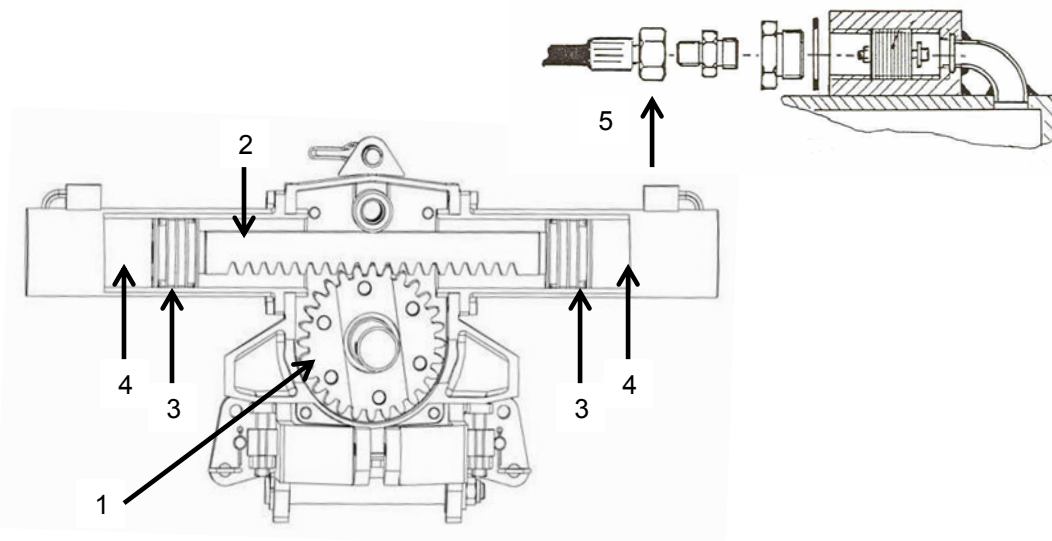
3.3. DIMENSIONS AND WEIGHTS

Nb of furrows	Inter body clearance	Working width		Over all length (approx.)	Indicative weight (B)	Indicative weight (Y)
5	100 cm	12" to 20"	1.5 to 2.5 m	6.80 m	3 820 kg	3 950 kg
6		=	1.8 to 3.0 m	7.80 m	4 170 kg	4 920 kg
7		30 to 50 cm	2.1 to 3.5 m	8.80 m	4 520 kg	4 690 kg
8			2.4 to 4.0 m	9.80 m	4 870 kg	5 060 kg
5	114 cm	14" to 22"	1.7 to 2.7 m	7.40 m	3 860 kg	4 990 kg
6		=	2.1 to 3.3 m	8.60 m	4 220 kg	4 370 kg
7		35 to 55 cm	2.4 to 3.8 m	9.80 m	4 680 kg	4 750 kg
8			2.8 to 4.4 m	11.0 m	4 980 kg	5 170 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. RACK AND PINION TURN OVER SYSTEM



3.4.1. Principle

Pinion (1) is under rack (2).

On both sides of the rack, single acting rams are set to work in horizontal position on opposite way. Their pistons (3) are screwed on the rack. Following oil flow direction (4), there is a rack translation from the right to the left or from the left to the right.

This movement is given to the pinion leading to main frame rotation.

On each SA ram entry a "parachute" valve prevents from quick main frame falling in case of leak or break on hydraulic turnover circuit.

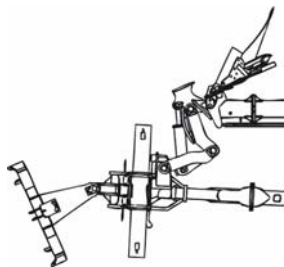
3.4.2. Advantages

Smooth utilization : no shocks during turnover which can be stopped and / or reversed at any time with no risks for machine or tractor.

Wheel steering : acting on turnover system, operator may control wheel angle and so "steer" the machine. This is useful to back up the plough to store it in a shed or to finish a field.

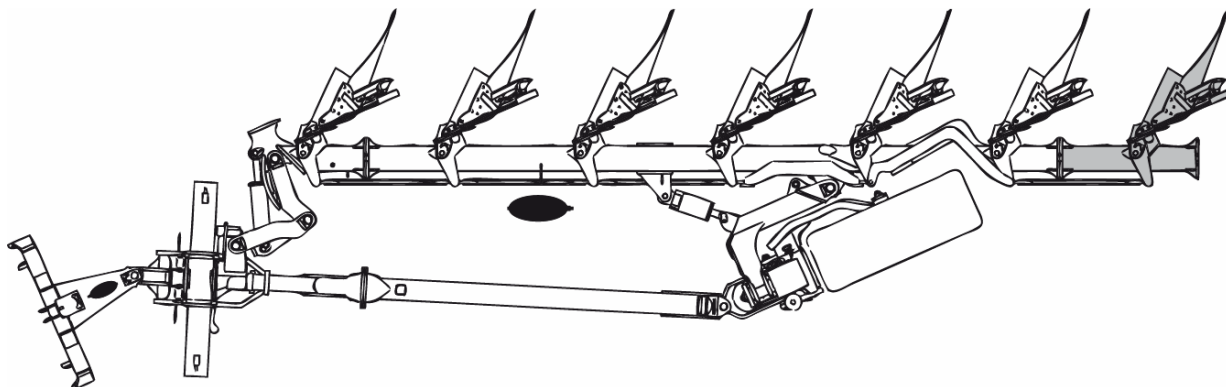
Reliability : both rams are in horizontal position and under pressure. There are no risks for getting loose. This device equips ploughs from 5 to 14 bottoms.

3.5. FRONT FURROW ADJUSTER



Machine is equipped with a two arms front furrow adjuster. An hydraulic ram (1) controls its opening and closing.

3.6. MAIN FRAME « COMPACT » DESIGN



3.6.1. Rear end « Z » designed

Main frame has its rear end « Z » designed for an optimal wheel position. It is both :

- rear positioned : to have the best weight transfer on tractor,
- integrated to the frame : wheel is close from rear bottom, letting narrow unploughed strip an the end of the field.

3.6.2. Extension possibilities

In **standard configuration**, plough is available in **5, 6 or 7 bottoms without extension** (**white colour** on here above picture). Wheel is next to the last bottom, its track is not taken out by last bottom.

It is possible to add :

- **an additional rear furrow**, behind the last bottom (**grey colour on picture** here above). This is a main frame extension. Wheel's position is changed, it becomes more "in the middle" of the plough and its track is partly taken out by added bottom,
- **an additional front furrow**, between 1st and 2nd bottoms (not shown on here above picture). This extension includes a main frame extension and requires stabilization bar replacement. Wheel's position stays the same.

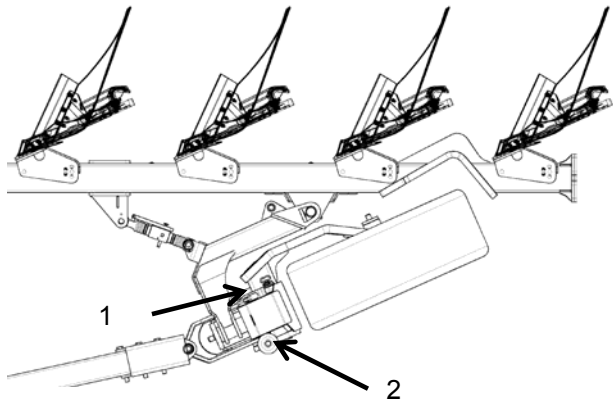
Maximum admissible number of bottoms :

- 9 on machines equipped with shear bolt safety device (B),
- 8 on machines equipped with non-stop safety device (Y, Z, P).

Adding more bottoms may lead to turn over incapacity.

Note : adding a front extension is a delicate operation. Only specifically trained person shall do it. Contact an authorized Grégoire-Besson dealer.

3.7. WHEEL MOUNTING BRACKET



Single wheel on land ploughs have a wheel mounting bracket with lateral arm. This assembly allows a large diameter tyre combination and easy eventual change (in case of flat for example).

Acting on turn over system, operator may control wheel angle and so "steer" the plough.

Wheel is used for transport and depth control.

At work : working depth is set adjusting a screw (1).

For transport : a safety block shall be installed to prevent any risk of main frame falling on the wheel because of a leak or a break on hydraulic circuit. An accumulator (2) protects main frame from shocks when driving on rough roads.

3.8. WORKING WIDTH

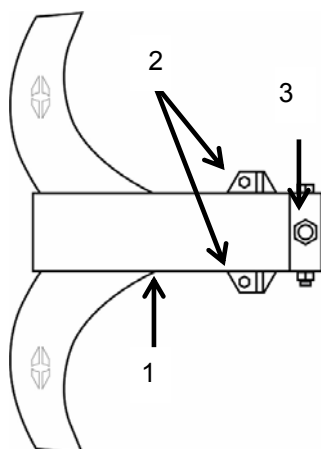


Machine working width is « on the go » adjustable. This adjustment is done by a double acting ram and an external double rod linking elements all together.

Individual working width goes from 12" to 20" for inter body clearance 100 cm, 14" to 22" for inter body clearance 114 cm.

3.9. SAFETY DEVICES

3.9.1. 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).

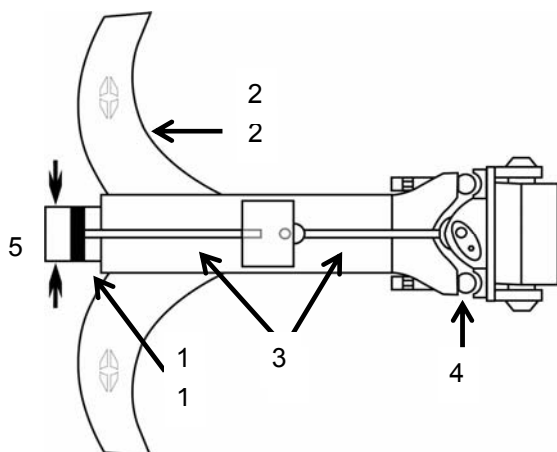
In case of safety bolts shearing, replace them by a new ones, certified genuine Grégoire-Besson.

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
180 cm	4 200 kg	5 400 kg

Pressure on point for B safety device tripping.

3.9.2. Non-Stop Hydraulic safety device

3.9.2.1. 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.

3.9.2.2. Safety device type « Y »

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

	Standard assembly	Optional assembly (standard for height 180 cm)
Ram Ø on 1st bottom	100 mm	110 mm
Ram Ø on other bottoms	90 mm	100 mm
Accumulator	6 litres - 100 bars	6 litres - 150 bars

Components of Y Non-Stop Hydraulic safety device circuit.

Point to point height	Safety ram Ø	Accumulator 100 bars		Accumulator 150 bars	
		Pressure min 110 bars	Pressure max 150 bars	Pressure min 160 bars	Pressure max 200 bars
160 cm	90 mm	624 kg	850 kg	907 kg	1 135 kg
	100 mm	806 kg	1 110 kg	1 173 kg	1 466 kg
	110 mm	1 008 kg	1 375 kg	1 466 kg	1 832 kg
170 cm	90 mm	591 kg	806 kg	860 kg	1 075 kg
	100 mm	764 kg	1 042 kg	1 110 kg	1 390 kg
	110 mm	955 kg	1 302 kg	1 390 kg	1 730 kg
180 cm	90 mm	561 kg	766 kg	817 kg	1 020 kg
	100 mm	726 kg	990 kg	1 055 kg	1 320 kg
	110 mm	907 kg	1 237 kg	1 320 kg	1 650 kg

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

3.9.2.3. Reinforced safety device type « Z »

Safety device type « Y » allows under point height 700 mm approx.

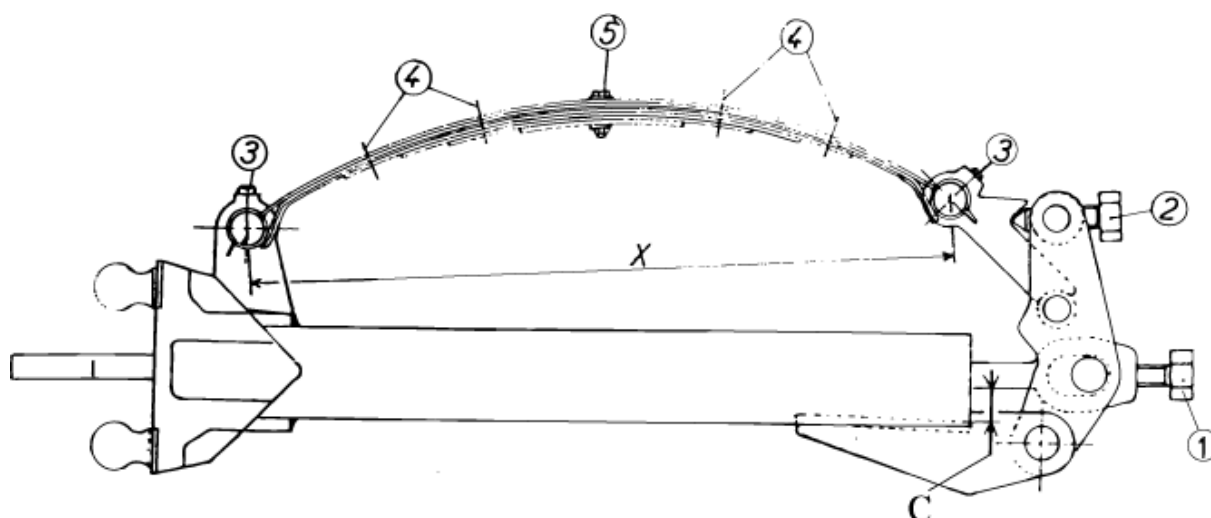
	Standard assembly	Optional assembly (standard for height 180 cm)
Ram Ø on 1st bottom	100 mm	110 mm
Ram Ø on other bottoms	90 mm	100 mm
Accumulator	6 litres - 100 bars	6 litres - 150 bars

Components of Z Non-Stop Hydraulic safety device circuit.

Point to point height	Safety ram Ø	Accumulator 100 bars		Accumulator 150 bars	
		Pressure min 110 bars	Pressure max 150 bars	Pressure min 160 bars	Pressure max 200 bars
160 cm	90 mm	706 kg	962 kg	1 026 kg	1 284 kg
	100 mm	912 kg	1 244 kg	1 327 kg	1 658 kg
	110 mm	1 140 kg	1 555 kg	1 658 kg	2 073 kg
170 cm	90 mm	670 kg	912 kg	973 kg	1 217 kg
	100 mm	865 kg	1 179 kg	1 258 kg	1 572 kg
	110 mm	1 081 kg	1 474 kg	1 572 kg	1 965 kg
180 cm	90 mm	636 kg	868 kg	925 kg	1 157 kg
	100 mm	822 kg	1 121 kg	1 196 kg	1 495 kg
	110 mm	1 028 kg	1 401 kg	1 495 kg	1 869 kg

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

3.9.3. Mechanical safety device type « P »



3.9.3.1. Principle

Leaf spring resets like a tape measurer when it is being bent. At start, it is hard to bend. It remains hard till it "clicks", then it becomes much smoother.

When the bottom hits something at first it is hard to bent the leaf spring. If pressure on the point increases, leaf spring keeps bending and "clicks". Then bottom may lift up quickly leaving obstacle under the ground and resets immediately, even if fast ploughing, to keep working depth even. Grégoire-Besson safety devices have been designed to work in the harder conditions.

For a nice working, only bolt 5 shall be tight. The other ones shall hold leaves springs leaving them the possibility to slide one along the others.

3.9.3.2. Trip pressure adjustment

Standard manufacture assembly corresponds to maximum pressure resistance, $C = 3 \text{ mm}$
And $X = 83 \text{ cm}$.

Distance C shall stay between 3 mm and 10 mm.

Distance X shall stay between 82 cm and 84 cm.

To reduce safeties resistance to ground pressure

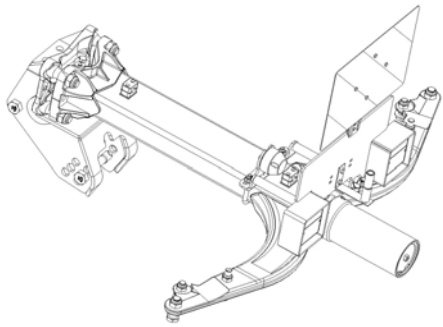
- Increase distance C : loose screw 2, tight screw 1 to increase distance C, then tight back screw 2 to come back to previous distance X. Never exceed 10 mm for distance C.
- Decrease distance X : tight screw 2. Never decrease distance X under 82 cm.
- Remove leaf springs.

To increase safeties resistance to ground pressure

- Increase distance X : loose screw 2. Never increase distance X above 84 cm.
- Install additional leaves springs : 1 leaf sprig ref 131 622 and another ref 131 624.

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

3.10. LIGHT AND SIGNS KITS



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

3.11. HYDRAULIC WEIGHT TRANSFER CONTROL

Hydraulic weight transfer is a device patented by Grégoire-Besson. It allows maximum efficiency of front axle on four wheels drive tractors.

It leads to a better weight distribution, reducing front wheels slippage and front axle rearing up. Draft control is also improved.

Principle

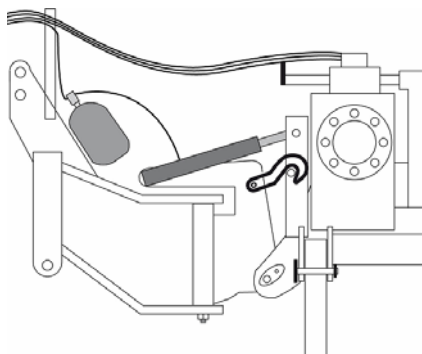
Working with a semi-mounted turnover plough, there is always pressure going through top link (pin is never loose). This pressure takes load out of front axle, then tractor tends to rear up and front wheels are slipping.

With hydraulic weight transfer, a ram situated on headstock voids this pressure.

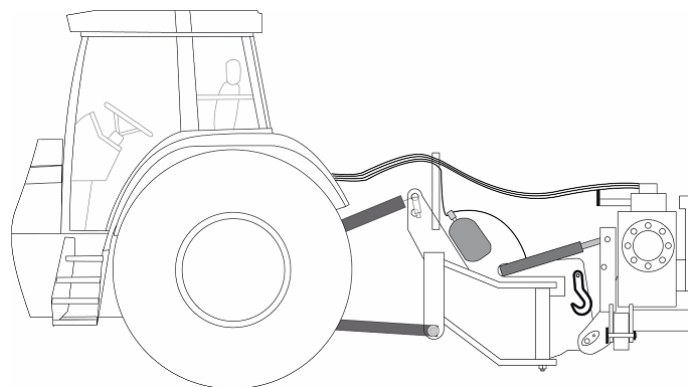
Advantages for user

Hydraulic weight transfer can be set on all Grégoire-Besson semi-mounted ploughs ranges 8 or 9. it leads to :

- a positive utilization of the weight of the plough with better distribution on tractor's wheels = up to 30 % slippage reduction,
- better draft control reactions since there are no more interferences of forces through top link,
- savings on fuel consumption and tyre wearing.



Detached position



Attached position

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	Medium type soils (15 to 30 % clay)	Heavy type soils (> 50 % clay)
5	140 - 180 HP	160 - 200 HP
6	180 - 220 HP	200 - 240 HP
7	220 - 260 HP	240 - 280 HP
8	260 - 290 HP	280 - 320 HP

4.2. TRACTOR WHEELS

4.2.1. Tractor tyres

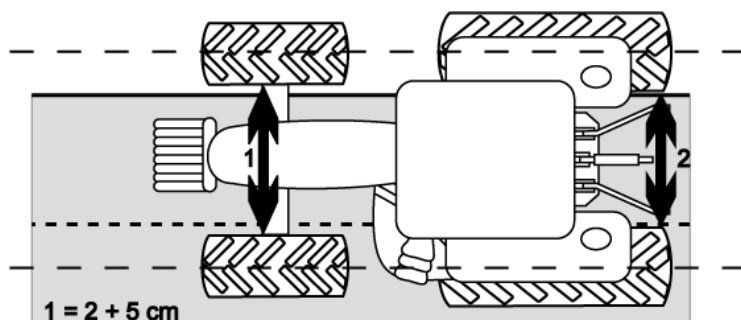
Check tractor tyres general state and pressure. Pressure should be the same on both sides of the tractor for a nice drivability in the field and on the road.



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.



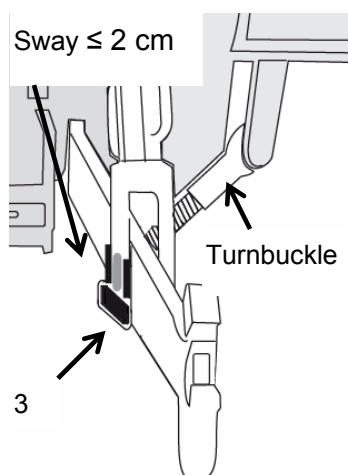
To be able to steer the tractor in the furrow, the middle of the front axle shall be lined up with the middle of the rear axle. This would also prevent from useless friction of front wheel on the furrow wall. Hydraulic ram for front furrow width of cut adjustment will allow adaptation to all conditions.

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.

Minimum inter tyre distance (2) : 1.20 m.

Maximum inter tyre distance (2) : 1.80 m.

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 centred with tractor traction line. This will both prevent from any risk of shock during manoeuvre or road transport and keep machine lined up behind tractor at work.

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

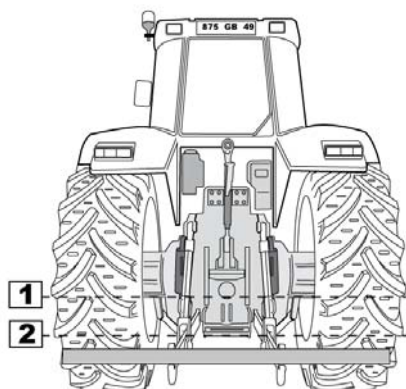
Horizontal lift links pins (3) shall be in fixed position to avoid any loose and / or damageable shock.

4.4. LIFT LINKS LENGTH

Lift links length determines :

- tractor hitch levelling, so machine side to side levelling,
- lift cylinders position at working depth, so draft control efficiency.

4.4.1. Tractor hitch levelling



Set lift links length so that tractor hitch is perfectly level (refer to picture). This way, once attached, machine will work perfectly level, at the same depth on each side.

Procedure for this adjustment :

- check that the two lift link arms have the same length,
- put a flat bar on lower links, back up a few meters and check for its alignment with other points on the tractor as rear wheels spindle (1) or lift links support brackets (2) (refer to picture),
- if flat bar is not strictly level, adjust lift links length to level it.

4.4.2. Lift cylinders position

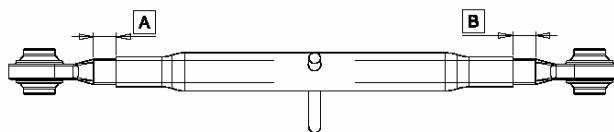
Lift cylinders position at working depth is related to lift links length. Tractor depth control will work better if lift cylinder rods have enough clearance to move (= to extend or to retract according to pressure).

Set lift links length to have at least **30 mm clearance on lift cylinder rod when machine is working at desired depth.**

Pay particular attention on this point when using a tractor equipped with large diameter wheels.

4.5. 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.

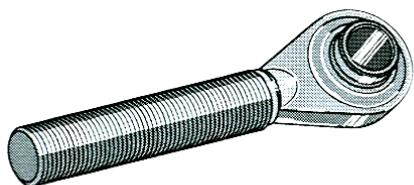


Top link length will be adjusted in the field.

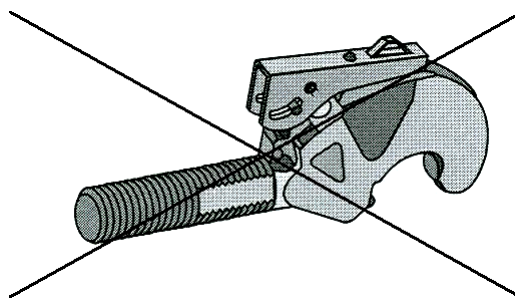
NOTE : an excess of grease inside top link tube may make it impossible to shorten. Remove grease fitting to let grease free to go out.

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.



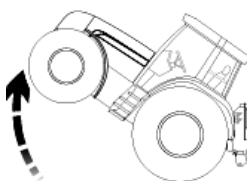
Example of tie rod
CORRECT



Example of automatic hook
DO NOT USE

Do not hesitate to contact an authorized Grégoire-Besson dealer for any further information.

4.6. 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 hitch capacity
- unbalance: load tractor front end if necessary. Refer to point 4.2.

5.1. ATTACHING MACHINE TO TRACTOR

Before any manoeuvre, 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 headstock to release latch. Refer to section 5.1.3.

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 headstock to release latch. Refer to section 5.1.3.



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. Latch releasing

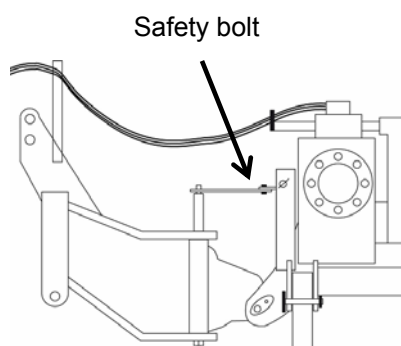
- All Grégoire-Besson semi-mounted ploughs headstock are held by a latch in detached position.
- Once lower arms are correctly attached, raise headstock with tractor hydraulic hitch to release latch.
- Once latch is free in its slot, raise it and lock it in upper position (remove R clip and pin, raise latch, install back R clip and pin to hold latch in upper position).
- Hitch top link. Refer to section 5.1.4.



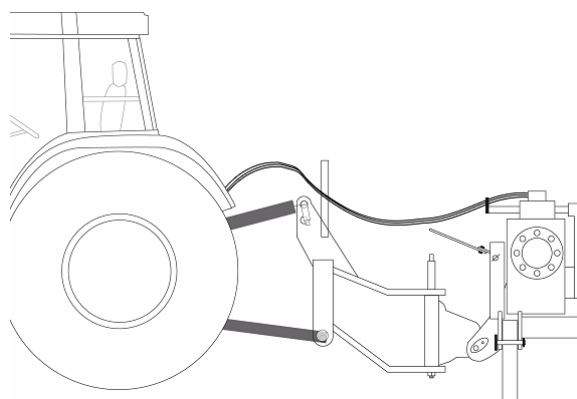
ATTENTION : a safety bolt breaks when raising headstock if latch is forgotten.



IMPORTANT : never stand in front of this bolt during hitching operations. Projection caused by its breaking may lead to serious accidents.



Latch in detached position



Latch in attached position

5.1.4. 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.

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 stands in working position : remove safety clips and pivot stands into horizontal position. Do not forget to install safety clips 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 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 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 stands in parking position = vertical
- 3) Lower the machine to the ground
- 4) Remove pressure from hydraulic lines
- 5) Detach top link
- 6) Install headstock latch
- 7) 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 REMOTES

- 1 SA for hydraulic **lift** + non-stop hydraulic safety device (if plough is equipped)
- 1 DA for **turn over**
- 1 DA for hydraulic **front adjuster**
- 1 DA for hydraulic **variable width adjustment**

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.

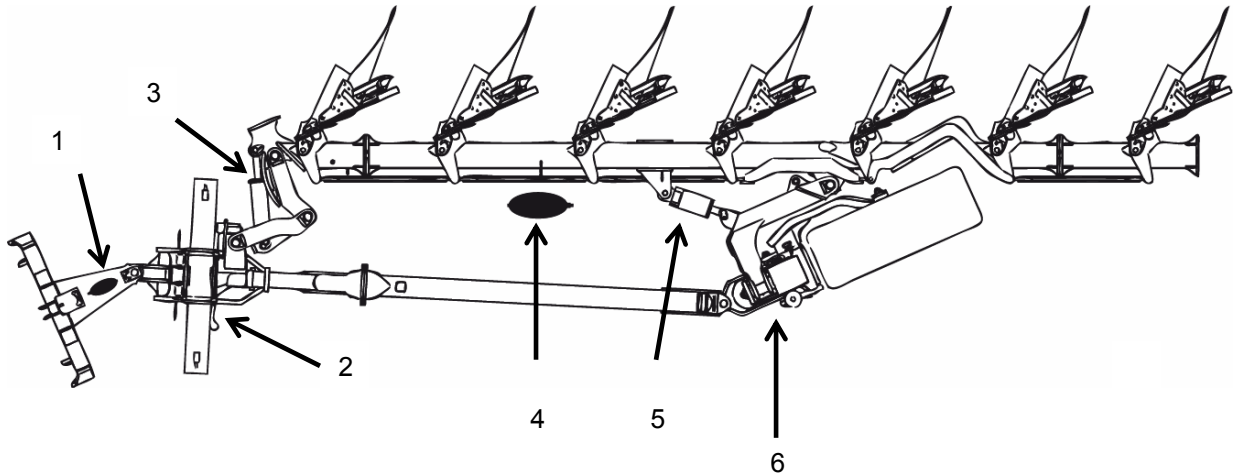
In case of any problem, do not hesitate to contact an authorized Grégoire-Besson dealer.

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.



1. Hydraulic weight transfer control (optional)
2. Side to side levelling adjustment screw (1 on each side)
3. Front furrow width adjustment ram
4. Non-Stop Hydraulic safety device adjustment (if machine is equipped)
5. Elements working width adjustment ram
6. Working depth adjustment

7.2. MACHINE WHEELS

7.2.1. Tyre inflation

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

Tyre dimension	Recommended pressure	Minimum pressure	Maximum pressure	Maximum Speed
400/70-R20	2.5 bars	2.5 bars	3.5 bars	25 km/h
17.5/24	3.0 bars	3.0 bars	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.

7.2.2. 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.

7.2.3. Wheel height adjustment

The single wheel is used for both depth control and transport. Height adjustment is done with a SA ram. Refer to section 3.7.

At work : a mechanical stopper (screw) limits ram shortening, then machine lowering and so working depth.

For transport : machine shall not be let in maximum raised position but slightly lowered to improve its stability. An accumulator is set on hydraulic lift circuit as a shock absorber. A safety block is installed to prevent any risk of main frame falling on the wheel. Machine shall not stand on the block for accumulator to work.

7.3. WORKING WIDTH ADJUSTMENT

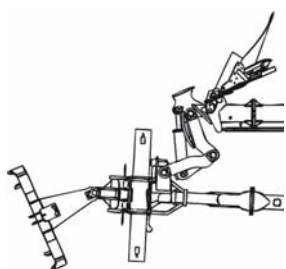


Working width is adjusted by a double acting ram and an external double rod linking elements all together. On main frame an indicator allows operator to visualize adjustment.

This adjustment can be made on the go :

- from 12'' to 20'' for inter body clearance 100 cm,
- from 12'' to 20'' for inter body clearance 100 cm.

7.4. FRONT FURROW WIDTH ADJUSTMENT



At work, front adjuster shall be opened so that 1st bottom ploughs the same width as the others.

Minimum inter tyre distance : 1.30 meter.

Maximum inter tyre distance : 1.80 meter.

Note : front adjuster is wide enough to allow front furrow erasing up to 1.50 m tractor inter tyre distance.

7.5. 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.

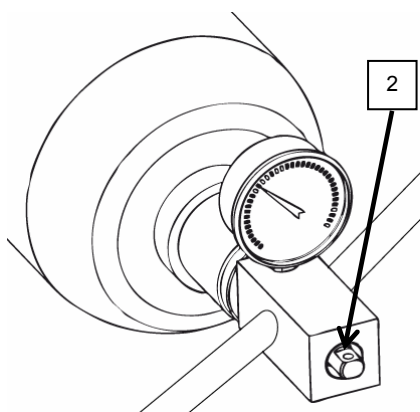


CAUTION : keep work area well ventilated when using solvent such as paint remover to remove protective paint. Wear eye and hand protection.

7.6. 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 Hydraulic safety device circuit is linked to machine lift circuit.
- Open set screw (2) on accumulator.
- To **increase Non-Stop Hydraulic safety device resistance**, increase hydraulic pressure in the system, **adding oil** acting on hydraulic control lever.
- To **decrease Non-Stop Hydraulic 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 front furrow width adjustment.

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.

8. TRANSPORTING

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

8.1. CHANGING TO TRANSPORT POSITION

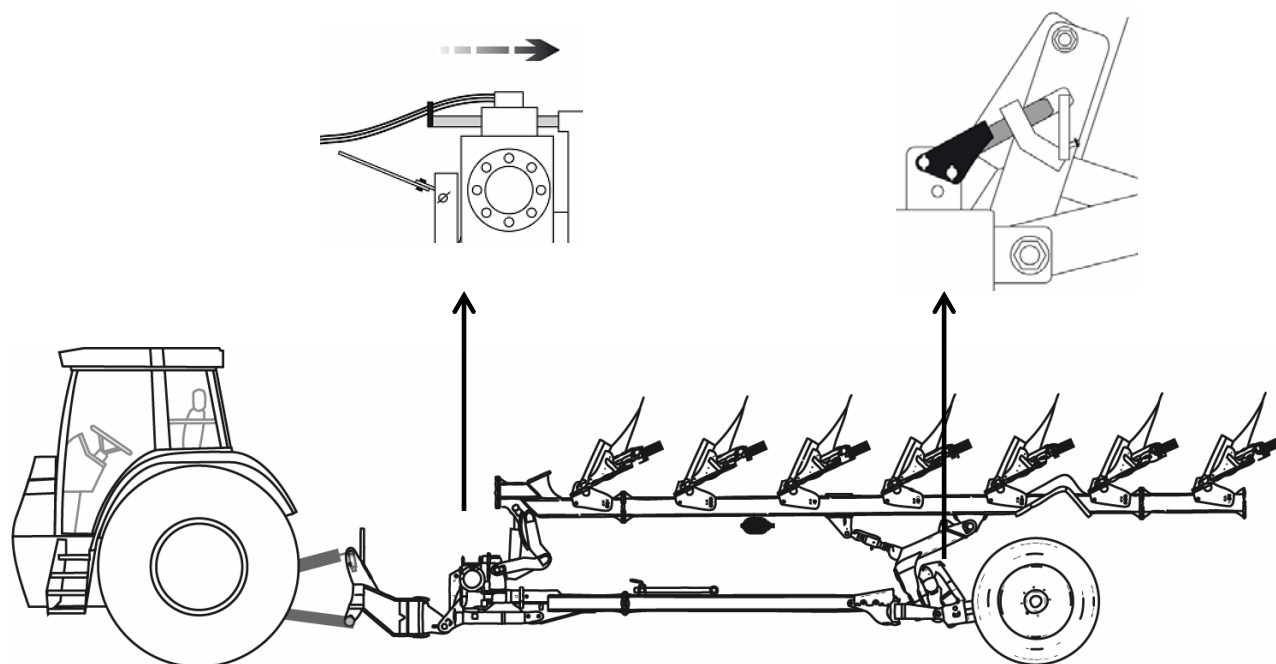
Before driving on a public road with the machine, put it in transport position :

- **Close front adjuster** : retract ram to the maximum.
- **Pivot plough ¼ turn, mouldboard towards the sky and lock it in transport position** : install transport lock pin.
- **Install safety block on wheel mounting bracket** : this will prevent from any risk of contact between main frame and wheel in case of any leak or break on hydraulic lift circuit.
- **Slightly lower the machine** : to lower its centre of gravity and so improve its stability for transport.

=> keep enough clearance with the ground to avoid any risk of contact.

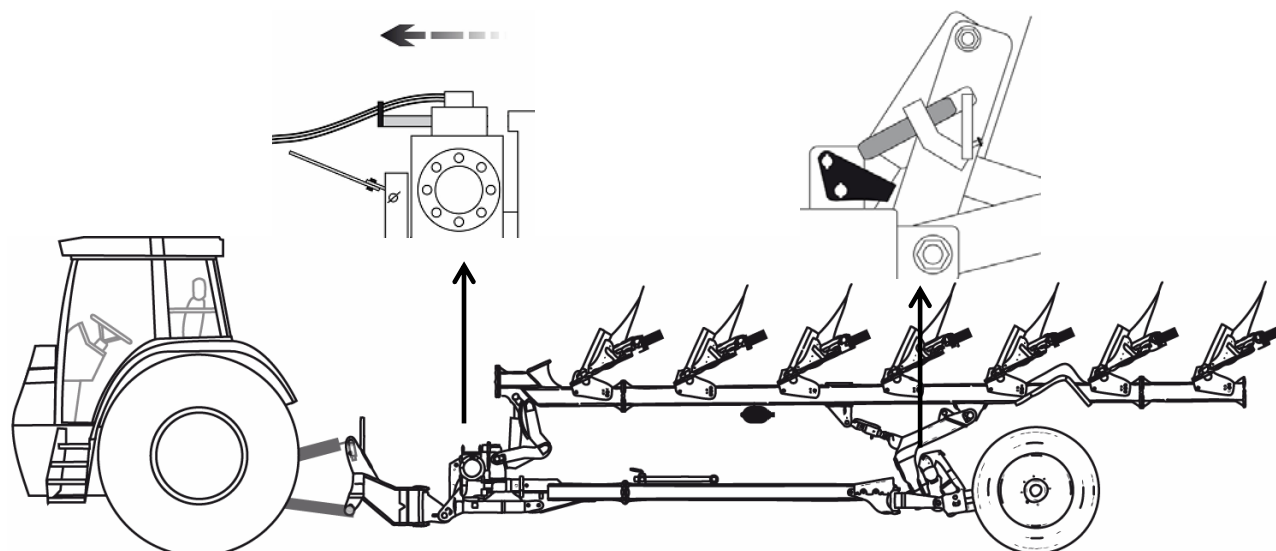
=> at the rear, keep 2 to 3 cm distance between safety block and depth screw support : this loose will allow accumulator to work, absorbing shocks on hydraulic lift circuit.

- **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.



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.

For the following sections, a difference will be done between on land ploughing and in the furrow ploughing.

9.2. FIRST PASS

First pass is different from the others since there is no furrow to fill.

9.2.1. Front adjuster opening

Front furrow ram shall be attached on “In the furrow” position. Refer to section 7.5.1. Open front adjuster to the maximum to plough as close as possible from field beginning.

9.2.2. Ploughing depth adjustment

Ploughing depth is controlled by :

- tractor hydraulic lift height on the front end of the plough,
- single wheel (adjustment screw) on the rear end of the plough.

9.2.2.1. Front end height adjustment for first pass

Lower tractor hydraulic lift so that 1st bottom enters into the ground and ploughs without creating an excessive ridge.

9.2.2.2. Wheel height adjustment

Working depth is set on wheel mounting support with a screw.

- **To increase working depth, turn screw counter clockwise**, ram stroke is increased, main frame getting lower,
- **To decrease working depth, turn screw clockwise**, ram stroke is shorter, main frame staying higher,

9.2.3. Entering into the ground

Drive slowly and lower the machine to have a smooth entering into the ground.

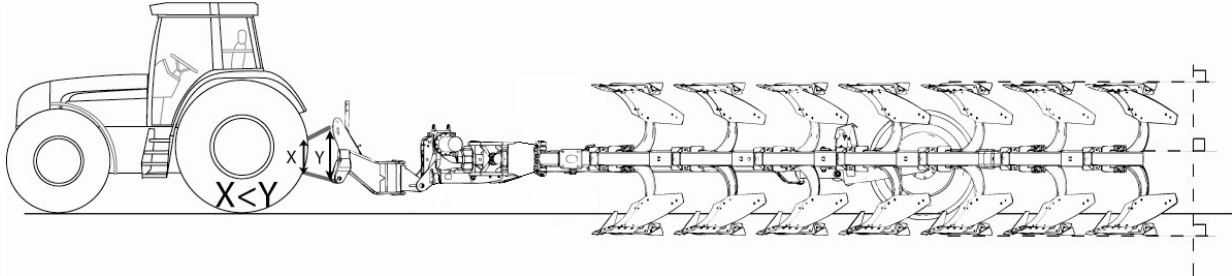
9.2.4. Side to side levelling = inclination adjustment

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

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. Front to rear levelling

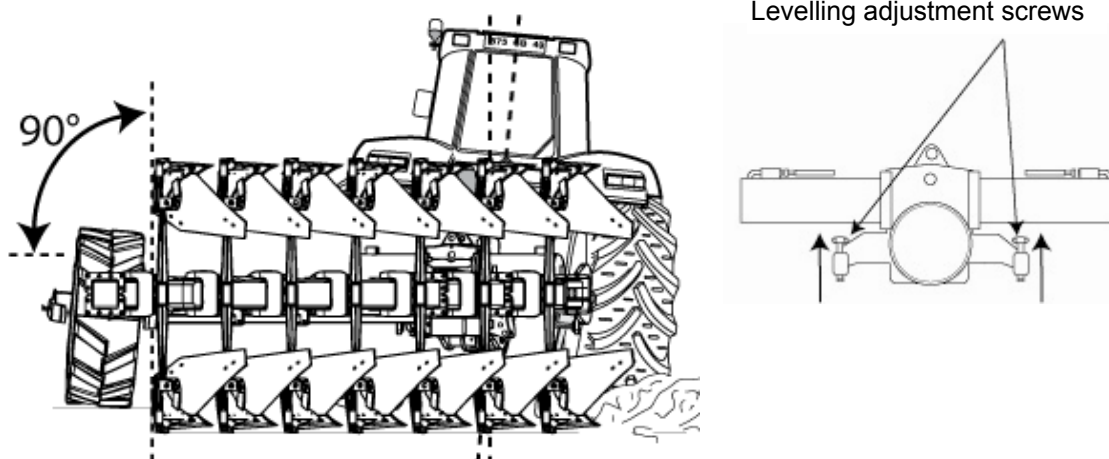


Starting at the second pass, tractor runs in the furrow. Plough shall be levelled front to rear so that all furrows work at the same depth.

Adjustment procedure

- Set working depth with adjusting screw on wheel mounting bracket.
- Find the right height for tractor hitch so that plough works level.
- Top link shall be positioned higher on machine side than on tractor side.
- Top link length shall be set so that working at desired depth headstock is parallel with the ground.

9.3.2. Side to side levelling



Starting at the second pass, tractor runs in the furrow. Plough shall be levelled side to side, elements shall work perpendicular with the ground.

Adjustment procedure

- Set levelling screw length individually. They are located under turn over rams, they shall be turned heads up.
- Loose jam nut before each levelling screw adjustment.
- Tight jam nut after each levelling screw adjustment.

9.3.3. Draft control adjustment

Use draft control or position control function with minimum sensibility (10% à 20%).

9.3.4. Front furrow width adjustment

Front furrow width adjustment shall be done once plough is correctly lined up both front to rear and side to side.

- **If front furrow leaves a ridge**, it ploughs too much ground. **Its width shall be reduced lengthening front furrow ram.**
- **If front furrow leaves a hole**, it does not plough enough ground. **Its width shall be increased shortening front furrow ram.**
- **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. SAFETY DEVICE ADJUSTMENT

9.4.1. 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.

9.4.2. Non-Stop Hydraulic safety device type « Y » or « Z »

In case of excessive tripping

Ploughing is not even.

Pressure shall be increased in the circuit. Refer to section 7.7.



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.

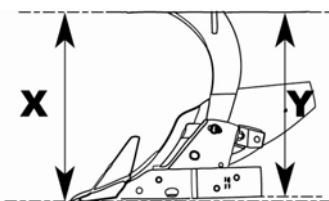
Pressure shall be reduced in the circuit. Refer to section 7.7.



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

9.5. 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.

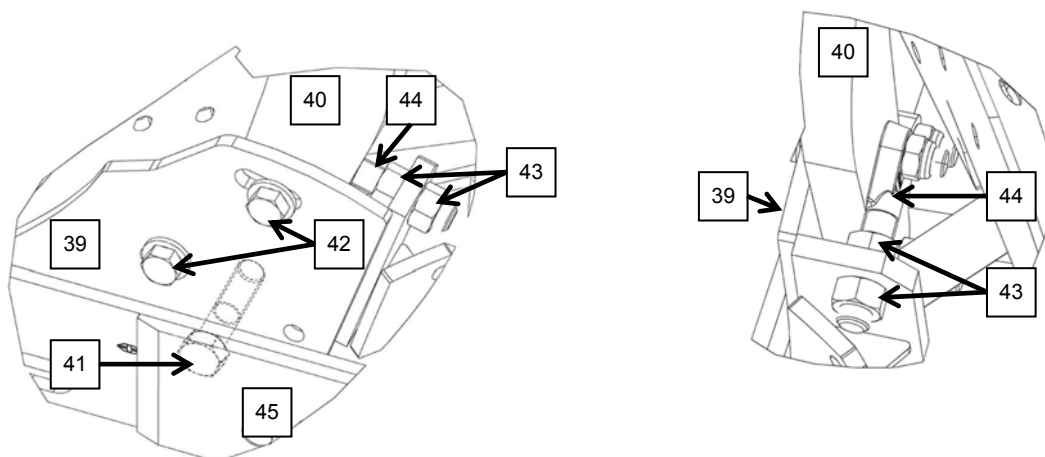
Think ahead for possible consequences

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

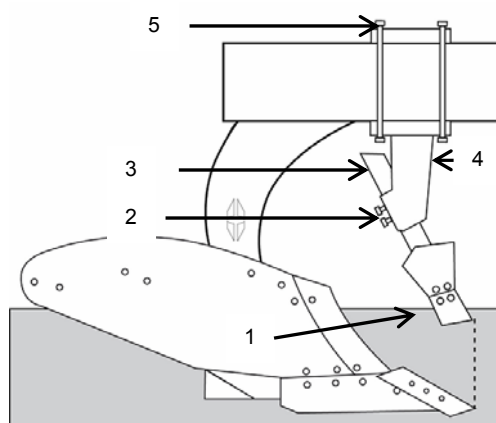
FOR ALL CONDITIONS NEVER HAVE $X < Y$

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.**



9.6. 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.

9.6.1. 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.

9.6.2. 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.

9.6.3. 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.**

10. MOUNTING AN ADDITIONAL FURROW

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

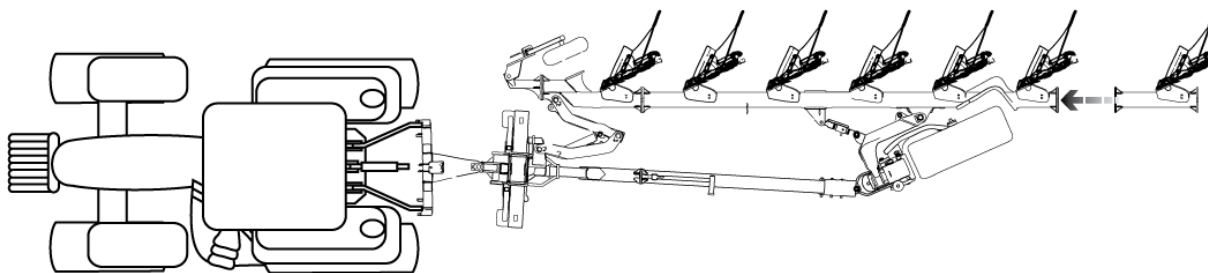


ATTENTION : never attempt to install an additional furrow without appropriate equipments in a good shape (loader, chain lock, gloves, ...)

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

10.1. MOUNTING AN ADDITIONAL REAR 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 12 bolts and 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.

10.2. MOUNTING AN ADDITIONAL FRONT FURROW

This is a delicate operation, only specially trained people shall do it. Contact an authorized Grégoire-Besson dealer.

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

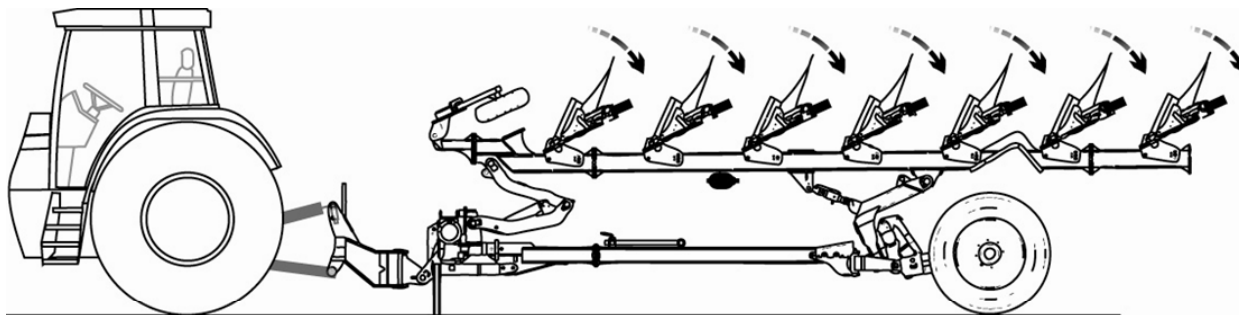
- Put machine in transport position and install safety lock pin.
- Release pressure from safety device hydraulic circuit :
=> open set screw on accumulator
=> in the cab put hydraulic control lever on float position to remove pressure in the circuit (refer to tractor operator's manual).



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.



11. MAINTENANCE

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

11.1. 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.

11.2. 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 0 grease fitting
- Safety Y, Z or P 1 grease fitting on each element rod pivot pin
- Safety Y or Z : *for good greasing on pivot point, put machine in transport position and release pressure on hydraulic circuit*
- Variable width 1 grease fitting on element support
1 grease fitting on external double rod

GREASE FITTINGS ON WHEEL MOUNTING BRACKET

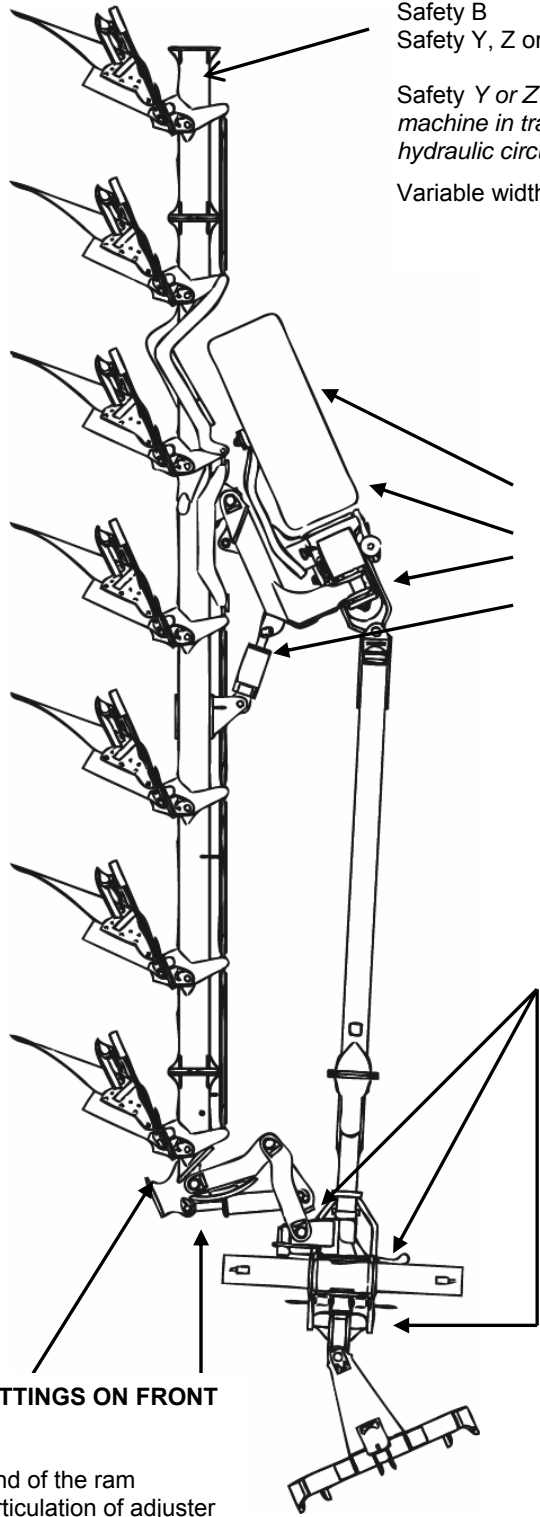
- 2 on alignment arm
- 2 on lift ram (offsets)
- 1 on wheel hub
- 1 on articulation main frame / wheel mounting bracket (offset)
- 3 on wheel mounting bracket horizontal pin
- 2 on turn over cardan joint

GREASE FITTINGS ON HEADSTOCK

- 2 on pinion support
- 3 on turn over support
- 2 on cardan join horizontal pin
- 1 on cardan join vertical pin

GREASE FITTINGS ON FRONT ADJUSTER

- 1 on each end of the ram
- 1 on each articulation of adjuster (3)



11.3. 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°.

11.4. 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.

11.5. 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.

NOTES

12. QUICKLY STARTING - SPMFW 9

Take all precautionary measures. Respect safety recommendations

PREPARING THE TRACTOR

- 1. Check tyre distance**
Over all tractor width (on land ploughing) or inter rear tyre distance (in the furrow ploughing)
- 2. Check tyre pressure**
It should be the same on both sides on each axle.
- 3. Adjust tractor hitch levelling**
Set lift links length for tractor hitch to be perfectly level with the ground.
Use a spirit bar to verify lift links length alignment with the ground and / or rear axle.
Arms shall be long enough so that working at desired depth there is still 30 mm chrome visible on lift ram.
- 4. Adjust lift links lateral sway**

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

ATTACHING

- 6. Attach lower links**
- 7. Raise headstock to release latch**
- 8. Attach top link**
- 9. 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.
- 10. Connect hydraulic lines**
- 11. Transport / working positions**

Transport position	elements in horizontal position and main frame locked, front adjuster folded, safety block installed on wheel mounting bracket (3 to 5 cm clearance), machine lowered without possibility of contact with the ground.
Working position	main frame unlocked, front adjuster opened and ram properly attached (on land or in the furrow position), safety block removed on wheel mounting bracket

DETACHING

- 12. Follow here above described procedure. Do not forget to install back headstock latch.**

MAINTENANCE

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

FIRST PASS

15. Lower machine to the ground

15. Adjust + / - working depth with tractor hydraulic lift height and adjustment screw on wheel mounting bracket

SECOND PASS

16. Set working depth with adjustment screw on wheel mounting bracket

17. Front to rear levelling

Adjust tractor hydraulic lift height and depth screw wheel mounting bracket so that machine ploughs in horizontal position at desired depth

18. Top link

It shall be positioned higher on machine side than on tractor side

Set its length so that headstock is levelled when ploughing at desired depth

19. Side to side levelling

Elements shall be perpendicular with the ground = set inclination screws length.

20. 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.

GRÉGOIRE  **BESSON**

**49230 MONTFAUCON-MONTIGNÉ-SUR-MOINE
FRANCE**

**TÉL. (+33) (0)2 41 64 72 67
FAX (+33) (0)2 41 64 67 73**

GRÉGOIRE-BESSON UK

Bourne Road, Carlby - STAMFORD LINCS PE9 4 NG – ENGLAND
phone (44) 01 778 590 223 - Fax (44) 01 778 590 645

GRÉGOIRE-BESSON CANADA INC

4480, Rue Martineau - ST-HYACINTHE (P. Québec) - CANADA J2R 1V1
TÉL. (1) 450 799 56 15 - FAX (1) 450 799 56 29

GRÉGOIRE-BESSON POLSKA

Ul. Obornicka 1a - PL - 64 600 OBORNIKI - Polska
TEL/FAX : (061) 29 77 530
gbesson@poczta.onet.pl
Ruda 12 - PL - 64610 ROGOZNO – TÉL / FAX (48) (67) 261 97 79

ООО «ГРЕГУАР-БЕССОН ВОСТОК»

Россия 308018 г. Белгород,
ул. Корочанская, 132а
Тел/факс: +7(4722) 58 70 36, 58 70 35
E-mail: info@gbvostok.ru

法国格力格尔 - 贝松公司北京代表处
北京市朝阳区延静里中街3号长信大厦220室
邮编：100025

WEB : www.gregoire-besson.fr E.MAIL : Contactfr@gregoirebesson.fr