



# Triplex Plus



**GB**  
**300/410 cm solid frame**  
**470 cm hydraulic folding**



# Triplex Plus

## Type 300/410/470 cm

Congratulations on the purchase of your new Triplex Plus. To ensure **safe operation** and to obtain optimal use of the machine, read the rules and instructions of the following operator's manual carefully before **operating the machine**.

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Your Triplex Plus:

Type No.: \_\_\_\_\_ Serial No.: \_\_\_\_\_

Month of manufacture: \_\_\_\_\_ Net weight (kg): \_\_\_\_\_

For prompt service, always quote your machine serial number when making enquiries regarding spare parts or service. A comprehensive index of spare parts can be found in the back of this manual to give you an overview of Triplex Plus components and to facilitate ordering.

## EU DECLARATION OF CONFORMITY

DAL-BO A/S  
DK-7183 Randbøl

Hereby declare that the above-mentioned machine has been manufactured in compliance with the provision of the Council Directive on the approximation of the laws of the Member States relating to machinery 98/37/EC, which replaces Council Directive 89/392/EEC and amendments 91/368/EEC, 93/44/EEC and 93/68/ECC concerning the Essential Health and Safety Requirements for the design and manufacture of Machinery.

**CE**

This machine complies with the safety requirements stipulated by the European safety regulations.

DAL-BO A/S

Date: \_\_\_\_\_

Director Kaj Pedersen



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## Safety



The safety alert symbol is used throughout this manual to identify important safety warning messages concerning your safety, the safety of other users or the functional safety of the implement. Observe all safety instructions and make them readily accessible to all users of the equipment.

### General

The operator must be thoroughly familiar with all safety precautions and operations of this equipment prior to using.

The safety signs on the Triplex Plus contain important instructions concerning your safety, the safety of those around you, and the correct operation of the machinery.

Never allow anyone to ride on the implement during operation or transport.

Never allow bystanders within the operating radius of the Triplex Plus, when the implement is in operation. Operate the Triplex Plus only while seated in the driver's seat of the tractor.

Before performing any adjustments, maintenance or repairs on the machinery, always unfold the Triplex Plus and lower the implement to the ground or secure in transport position, set the tractor brakes, turn off the engine and remove the ignition key.

Remember to secure the top link and the lift arms with lynch pins.

Operate the tractor and Triplex Plus only while seated in the driver's seat.

Always drive according to conditions.

Do not use the Triplex Plus unless all safety signs are installed. Replace defective safety signs immediately.

## Hydraulic System

Never allow bystanders within the operating radius of the Triplex Plus when the hydraulic system is activated, to avoid the danger of an individual being crushed or pinched between the equipment.

Before performing maintenance or repairs on the hydraulic system, lower the implement to the ground, relieve pressure in the system, turn off the engine and remove the ignition key.

Clean the hydraulic fittings thoroughly before connection. Ensure that the pressure is relieved in the hydraulic system before connecting the hydraulic hoses to the tractor's hydraulic services.

After making repairs to the hydraulic system, thoroughly bleed air out of the system.

Regularly check hydraulic hoses for defects such as cracks, bends, chafing or leaks.

Avoid spilling oil on the ground. In case of spills, collect the oil and dispose of it properly.

In case skin should come in contact with hydraulic oil or grease or in case clothing should become stained with oil, remove the stained clothes immediately and wash the affected skin areas thoroughly. Oil and grease are harmful to the skin.

Escaping hydraulic oil under high pressure can penetrate the skin and cause severe injury. If an accident occurs, see a doctor immediately.

## Hitching

An individual is in danger of being crushed during the hitching process. Never place yourself or anyone else between the tractor and the Triplex Plus, or between parts that must be attached or connected.

## Maintenance and Repairs

Before servicing or making adjustments to the machine, securely block or unfold the machine, engage the tractor and machine brakes, stop the engine and remove the keys.

Tighten all nuts, bolts hydraulic fittings or any other fastened assemblies after a few hours' use. Check often to make sure that they remain thoroughly tightened. Inspect all pins, screws and bolts for wear or damage and make sure that all are securely in place to avoid any possible damage or breakdown of the machine.

Dispose of oil, grease and filters according to applicable environmental regulations.

## Transport

All safety and warning signs and devices required by law must be displayed, mounted and tested for public road use. The driver is responsible for the correct use of lights and markings in compliance with the present Traffic Act and Highway Code of the local traffic legislation.

It is the responsibility of the driver to consult with local traffic authorities in order to ensure that the size, weight and load of the machinery may be transported on public roads.

When towing the implement, the total weight of the tractor and the maximum allowed axle load must not be exceeded. The weight on the front axle must not be less than 20 percent of the total mass of the tractor. If it is less than 20 percent, extra weight must be added to the front of the tractor.

## Correct Use

Correct use of the Triplex Plus includes adherence to the instructions of the manufacturer concerning operation, maintenance and repair, as well as the use of genuine factory replacement parts.

Do not allow anyone to operate, maintain or repair the Triplex Plus unless they are familiar with the implement and they are thoroughly aware of the possible hazards.

The manufacturer does not accept any liability for injury or warranty if the equipment has been altered in any way without prior authorization from the manufacturer or if the injury is a result of incorrect use of the implement. The user accepts complete responsibility in these cases.

Never load extra weight onto the Triplex Plus.



## Technical Data

### Triplex Plus

Size (cm)	300	410	470
HP (recommended)	130	170	200
Gross weight kg:	2000	2700	3700
T-ringe	X	X	X
<b>Options:</b>			
crumbler	X	X	
Terra-cut	X	X	X

### Delivery

Triplex Plus is delivered fully assembled on a flatbed lorry.

If the Triplex Plus needs to be lifted, it is recommended that you lift with straps around the middle section, raising the machine so that it hangs in balance.

## How to Use This Manual

If the order of points described under the main subject areas of the manual seems confusing or illogical, refer to the Table of Contents where all subject headings can be found.

The main points of the operator's manual are placed into five main categories:

- Safety
- Set-up and Operation
- Options
- Maintenance
- Repairs

The following safety alert symbols are used throughout this manual to indicate:



Points that are extremely important for the function and life of the machinery.



Points that involve safety.

## Application

Triplex Plus is a heavy-duty cultivator, which has been designed to work down stubble and crop residues. Owing to the large ground clearance and the distance between the tines great amounts of crop residues can be worked down.

Fig. 1



Triplex Plus has been designed to obtain complete cutting by which the growth of both crop and weeds is stopped. The shape of the tines causes the top soil and crop residues to be thrown in the air and mixed into a homogeneous mass.

Triplex Plus consists of a harrow with 3 rows of tines to which an arm with inclined discs has been mounted to level the tracks after the cultivating tines. At the very back you will find the rear roller which is used to control the working depth and to crush clods and level the surface. The rear roller comes as a packer roller or with 60 cm. T-rings.

As extras a 400 mm. crumbler can be fitted behind the compulsory rear roller. Moreover, a seeddrill can be fitted to the Triplex Plus for direct sowing of catch crops.

### Advantages of using Triplex Plus

- Exact adjustment of working depth between 4-20 cm.
- No supporting wheels causing compaction in the field.
- Complete cutting thus making less drives in the field necessary.
- Homogeneous mixing of crop residues.
- Keeps the soil moist.

Triplex Plus is particularly suitable for working in the topsoil where the majority of plant transformation takes place. For that reason Triplex Plus is an effective tool in a minimum tillage-strategy as Triplex Plus with only one drive provides a complete cutting of the field and a homogeneous mixing of crop residues and micro-organisms in the soil. To keep the soil moist and thereby optimise the microclimate for the organisms, the working of the soil is completed by a packing.

# Hitching and Unhitching

## Hitching

Attach the lift arms first and then the top link. Adjust the top link so that the frame is horizontal.

Fig. 2



Remember to secure with lynch pins.

## Hydraulic System

Depending on the type of Triplex Plus different requirements for hydraulic services on the tractor are necessary.

### Hose markings

Model	Output	Colour	Function
300	1 single acting	white	Hydraulic stone breakaway
410	1 single acting	white	Hydraulic stone breakaway
470	1 single acting	white	Hydraulic stone breakaway
	1 double acting	Red	Hydraulic folding for wings



Check the hydraulic hoses for kinks or pinches.

## Unhitching



Triplex Plus can be unhitched folded or unfolded. Position the Triplex Plus on solid, even ground

Remember to relieve the pressure in the hydraulic system before disconnecting the hoses.

The ball plug valve for hydraulic stone breakaway should be closed (see fig. 8).

Fig. 3



Disconnect hoses, the top link and then lift arms to unhitch the Triplex Plus.

## Adjustments and Settings

The Triplex Plus is preset in the factory, but it will always be necessary to make some fine adjustments before use. Numerous adjustment possibilities make your Triplex Plus more versatile and allow you to obtain optimum performance from the implement.

### Depth

The operating depth is controlled by the rear T-ring roller.

The working depth of the tines is adjusted with pins in the hole plate (A). The upper pin (B) determines the working depth while the lower pin (C) is a supporting pin, which carries the rear roller when the implement is lifted.

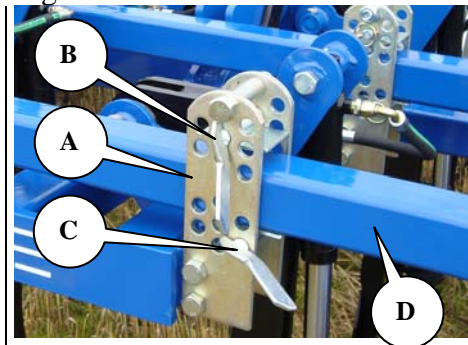


When changing working depth it may be necessary to readjust the topline as the frame should always be level during operation.

### Deeper tillage

Deeper tillage can be obtained by lifting the implement from the ground, so the lift arm (D) does not press against the upper pin (B). In that way the pin can be removed from the hole plate and be placed in a higher hole. The lower pin (C) is similarly moved up, so that the support is as close to the lift arm (D) as possible.

Fig. 4



When Triplex Plus has been adjusted to deeper tillage it may be necessary to drive the tines in the soil (or support the rear roller) in order to add pressure to the rear roller. After this the lower pin (C) can easily be fitted in to the hole closest to the lift arm (D).



If a very deep tillage is wanted, the bolts for the arms of the rear roller, can be moved in hole (A).

It is very important, that Triplex Plus is lowered on to the grown and that the rear roller is supported before dismounting.

Fig. 5



### Level tillage

More level tillage can be obtained by moving the pin down. By this the cultivating frame and thereby the tines, are lifted, to a more level tillage. It may be necessary to drive the cultivating tines in the soil, in order to loosen the lower pin (C, fig. 4). After having placed the lower pin (C) in a lower hole, Triplex Plus must be lifted and the upper pin (B, fig. 4) placed as close to the lift arm (D, fig. 4) as possible.

### Depth adjustment of discs

The correct adjustment of the discs, leaves the field level, with no visible traces of the harrow tines. Fine adjustment of the discs, is done with the spindle (A), and not until actually in the field. Discs must be adjusted to work the top soil, so that a suitable quantity of earth, is thrown back after the harrow tine.

Fig. 6





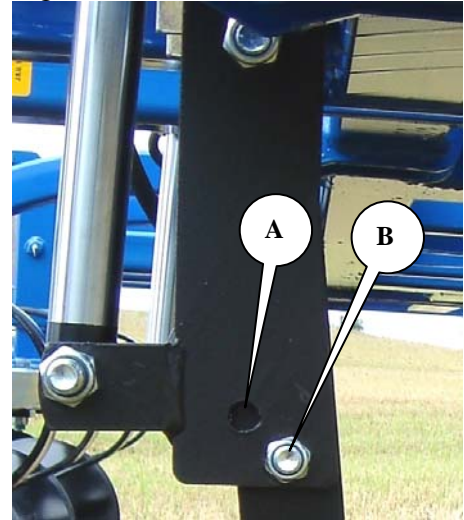
## The angle of the tine

Adjusting the penetration angle in two different positions (A or B) makes it possible to have a soil-searching tine all the time.

On dry and hard soil, use the most soil-searching/aggressive adjustment (A). On light and moist soil use the front hole (B).

Due to wear and tractive force, the penetration angle should not be larger than necessary, to obtain a satisfactory outcome.

Fig. 7

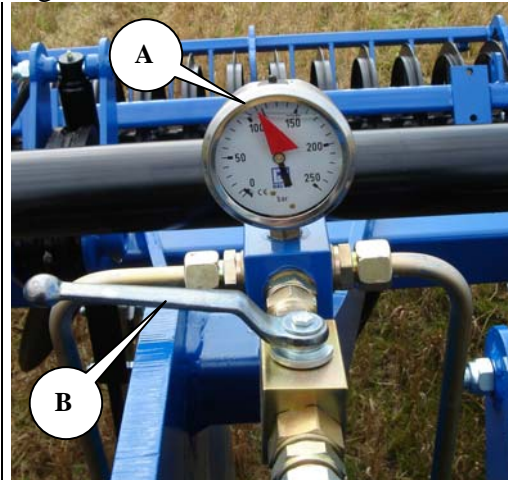


## Hydraulic stone breakaway

Adjust the working pressure to 120 bar.

During adjustment, the pressure can be read on the manometer (A) at all times. When adjustment is done, close the shut off valve (B) and the hydraulic hose can be disconnected from the tractor. If the shut off valve is not closed, oil can slowly ooze back to the tractor and pressure on the system will fall, if the tractor output is not tightly shut.

Fig. 8

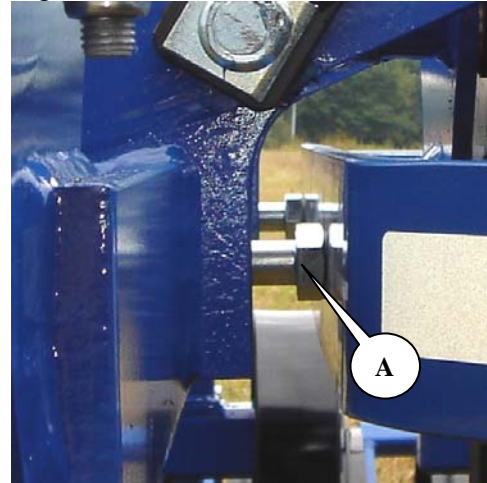


Don't load the hydraulic stone breakaway system with more than 140 bar.

## Hydraulisk sammenklappelige modeller

On 470, adjust the side sections with the bolts (A), so that the frames on the side sections and the main frame, are level (An adjustment bolt can be found on each side of the main frame).

Fig. 9



## Operating and Driving Instructions

Proper operation is essential for optimum performance of your Triplex Plus. Proper operation concerns both the carrying out of tillage operations in the field, as well, as the following of safety precautions. Make sure that you have a thorough understanding of all safety precautions.

Best results will be achieved, by driving slightly diagonally to the sowing direction.

Triplex Plus should be adjusted, so that it is carried by the rear roller. The handle for the tractor lift, must be lowered completely when driving in the field, so that the lift is floating and can move with the terrain. The cultivation depth will thus be controlled by the rear roller in the back and by the topline in the front.

When changing the working depth, a readjustment of the discs is necessary. The discs are designed to work in the topsoil, however, they do not perform any real tillage except levelling out the field after the tines, so that a suitable quantity of earth, is thrown back after the harrow tine.

### Folding/ unfolding

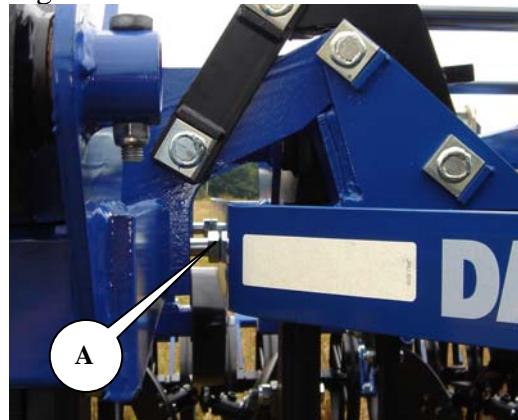
There is no transport lock on the folding model, as the side sections move right in over the main frame, where they will rest on the supporting structure.

Fig. 10



Unfolding is done by activating the hydraulic handle in the unfolding position. It is important, that the side sections are completely unfolded and press against the adjustment bolts (A). The main frame and the side sections should be a rigid unit.

Fig. 11



## Travel Speed

To obtain optimal tillage a working speed of 6-7 mph (10-12 kph) is recommended. **However, one should always drive according to conditions.**

Please note that wear is heavily increased when speed is increased. Points and wearing parts may be lost or damaged, when driving too fast under unfavourable conditions.



When driving at high speed, especially under dry conditions, wear on the tines will increase considerably.



Always drive according to conditions.

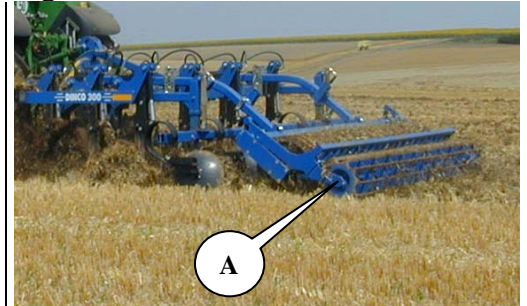
## Options

Your Triplex Plus can be equipped with various types of optional equipment, depending on individual needs.

### Crumbler

The crumbler (A) is mounted behind the rear roller, and gives an extra working of the field. The crumbler is designed as a roller, with a smaller diameter than the rear roller, which means a faster rotation, and thereby a more effective crushing of clods. At the same time the crumbler packs the topsoil to preserve the moistness of the soil.

Fig. 12

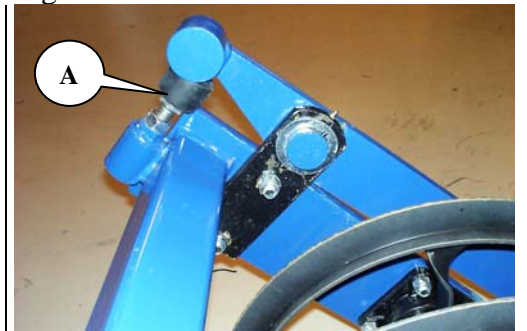


#### Driving and adjusting

The crumbler is not designed to carry Triplex Plus. Its only job is to crush, cultivate and level after Triplex Plus, as the working depth is determined by the rear roller.

The crumbler should be working in the topsoil. The pressure is adjusted by the bolts (A). If the bolts are loosened, the pressure of the crumbler on the ground will increase. If the bolts are tightened the pressure will decrease.

Fig. 13



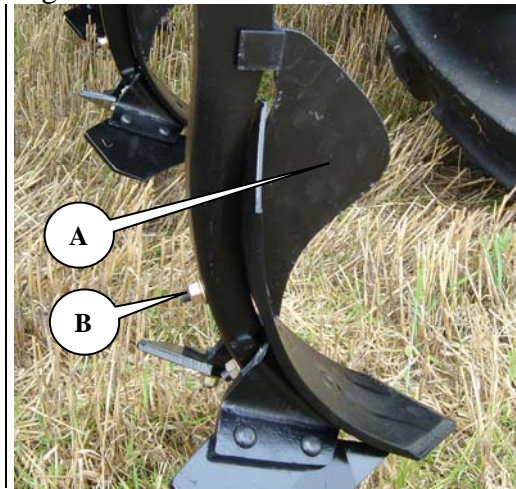
The crumbler should **not** be set to carry Triplex Plus.

## Terra-cut

To split the flow of soil, that comes from the points, a Terra-cut (A) can be mounted on the tine.

The Terra-cut is mounted in the middle hole (B) of the tine and is supported higher on the shank.

Fig. 14



# Maintenance

Proper maintenance ensures a long life for the Triplex Plus, and optimum performance from the implement. To facilitate maintenance, grease fittings have been mounted on those locations, where wear on the equipment is the greatest.



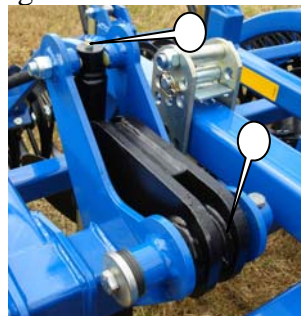
Tighten all nuts, bolts, hydraulic fittings or any other fastened assemblies after the first workday. Inspect all pins and bolts for wear or damage, and make sure, that all are securely in place, to avoid any possible damage or breakdown of the machine. Check for leaks in the hydraulic system.



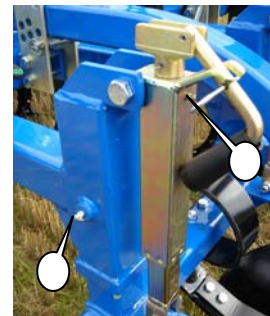
Before servicing the machine, always lower the implement, engage the tractor brakes, stop the engine and remove the ignition key to avoid unintentional operation and personal injury.

## Lubrication

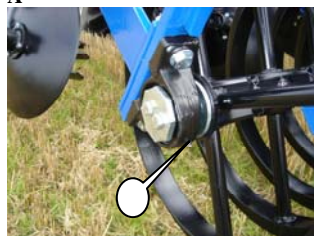
Fig. 15



A



B



C



D

Lubrication points	Lubrication interval (hours)	Photo
Tine	8	A
Spindle / telescope	100	B
Rear roller	50	C
Dice	50	D



Lubricate all lubrication points at least once a year.

## Hydraulic System



Inspect all hydraulic hoses for chafing or leaks. Check hoses for pinching.



To avoid rust, any projecting piston rods should be coated with oil or grease, if the Triplex Plus is to be parked for a long period of time. Remember to remove the oil or grease prior to operation.

## Disc hubs

Tighten the disc hubs once a year or as needed.

1. Remove the disc and plastic cover.
2. Remove the split cotter pin from the nut.
3. Tighten the nut  $\frac{1}{4}$  turn or until there is no play in the hub.
4. Mount the split, the plastic cover and disc.

Fig. 16



## Wearing points

The points on Triplex Plus are reversible, and should be turned before the console to which the points have been clamped, starts to wear down.

Wings should be changed, when they are worn down to the extent, that the work result is no longer satisfactory, or before the console starts to wear down.



## Replacements and Repairs



Safety is important in connection with **all** repair work on the Triplex Plus. The following safety precautions and the precautions listed in the beginning of this manual must be observed.



Before performing any adjustments, maintenance or repairs on the machinery, always unfold the Triplex Plus, and lower the implement to the ground or secure in transport position, engage the tractor brakes, turn off the engine and remove the ignition key, to avoid unintentional operation.



Pay careful attention to safety, when performing repair work on the hydraulic system. Remove hydraulic pressure, prior to doing any maintenance.



After replacing a cylinder, always fill up the cylinder with oil, before putting load on. It is recommended, that the cylinder first is mounted in the solid part on the frame. Then the hydraulic hoses is mounted and the cylinder is filled up with oil, after which the other part is mounted.



After making repairs to the hydraulic system, always bleed air out of the system before operating the Triplex Plus, to avoid any possible personal injury, or mechanical breakdown or damage.

### Hydraulic System

#### Changing wing fold cylinders

When performing repairs, make sure the Triplex Plus is unfolded and resting on the ground.

Fig. 17



1. Relieve the pressure in the cylinders.
2. Disconnect the hoses.
3. Remove the split cotter pins and the other pins. The cylinders are now free.
4. Install new or repaired cylinders. Remember to make sure, that the pin is engaged in the stop and that the pins are secured with split cotter pins.
5. Connect the hoses. After connection, make sure that there is no danger of the hoses becoming ripped off or pinched.



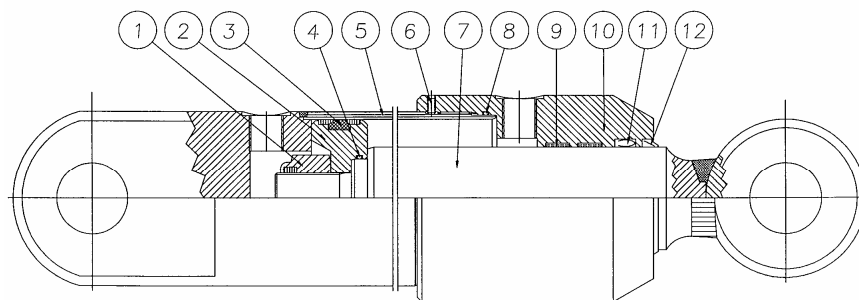
After mounting the cylinder, activate the wing fold cylinders until the piston rods begin to move in the cylinders. Next, activate the cylinders in the opposite direction until the cylinder is back in the starting position. Move the cylinders several times in this way.



Never allow bystanders within the operating radius of the implement.

### Replacing wing fold cylinder seals

Fig. 18



1. Empty the cylinder of oil by moving the piston gently back and forth.
2. Move the piston to a middle position and unscrew the end cap (pos. 10) of the cylinder tube (pos. 5). Special tools are required for removing the end cap. If the end cap is very tight, try heating up the front part of the socket. When the end cap has been removed from the cylinder tube, pull out the piston towards the end cap whereupon the piston rod (pos. 7) can be pulled from the cylinder tube (pos. 5).
3. Remove the bolt that fastens the piston (pos. 2).
4. Pull the piston (pos. 2) from the piston rod (pos. 7).
5. Pull the end cap (pos. 10) from the piston rod (pos. 7).
6. Remove the seals in the end cap and the piston (pos. 1+3+4+6+8+9+11+12)
1. Clean all parts and check for chips, burrs etc. Check for corrosion around the scraper ring (pos. 4) in the end cap. If corrosion is found it should be removed.

### Mounting

1. Mount new seals (pos. 1+3+4+6+8+9+11+12) in the end cap and the piston.
2. Lubricate the thread on the end cap (pos. 10) and the cylinder tube (pos. 5) with fat or oil.
3. Mount the end cap (pos. 10) on the piston rod (pos. 7).
4. Mount the piston (pos. 2) and remount the bolt. **Secure it with Loctite**  
Please take care that the thread is completely clean and free of oil and other impurities. **Oil should not be used until 12 hours after using Loctite.**
5. Lubricate the outermost seal on the piston touching the cylinder tube and the inside of the cylinder tube with oil and push the piston rod into the middle position.
6. Mount the end cap on the cylinder tube and tighten.
7. Mount the cylinder.
8. Mount the hoses. Please note that hoses are not squeezed and that all connections are tight.

### Replacing hoses for hydraulic stone breakaway

Connect the hydraulic-system to the single-acting service on the tractor to remove the pressure from the system. Then open the shut up valve and set the service on the tractor in floating position. The pressure on the system will disappear, as oil will leak back to the tractor. The pressure can be read on the manometer at all times.

The defect hose can be removed and a new one can be mounted.

### Replacing cylinders for hydraulic stone breakaway

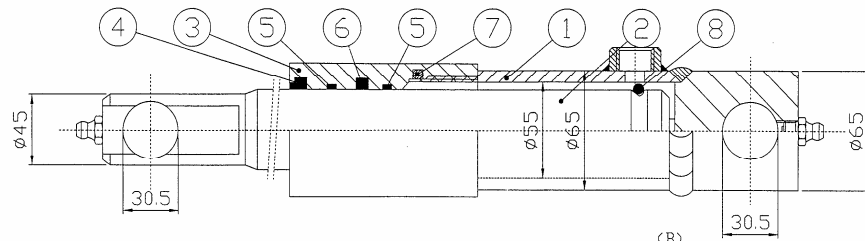
1. Support Triplex Plus according to instructions with tines just lifted from the ground.
2. Remove pressure from the hydraulic system.
3. Remove the hoses and bolts.
4. Mount the new cylinder and remount the pins and split pins.
5. Mount the hoses.

Fig. 19



### Replacing seals for hydraulic stone breakaway

Fig. 20



2. Empty the cylinder for oil by moving the piston gently back.
3. Move the piston to the middle position and unscrew the end cap (pos. 3) of the cylinder pipe (pos. 1). Special tools are required for removing the end cap. If the end cap is very tight try heating up the front part of the socket. When the end cap has been removed from the cylinder pipe pull out the piston towards the end cap whereupon the piston rod (pos. 2) can be pulled from the cylinder pipe (pos. 1).
4. Pull the piston rod backwards from end cap. There is now access to the seals in the end cap.
5. Remove the metal ring (pos. 8) from the piston rod.
6. Remove the seals (pos. 4+5+6+7) from the end cap.
7. Clean all parts and check for chips, burrs etc. Check for corrosion around the scraper ring (pos. 4) in the end cap. If corrosion is found it should be removed. Moreover the piston rod should be completely clean.

### Mounting

1. Mount new seals in the end cap and fit a new metal ring on the piston rod.
2. Lubricate the thread on the end cap (pos. 3) along with the seals and the piston rod (use hydraulic oil) to facilitate the mounting.
3. Mount the end cap (pos. 3) on the piston rod (pos. 2) by pushing the piston rod eye first through the end cap.
4. Lubricate the cylinder pipe on the inside and push the piston rod into middle position.
5. Mount the end cap and tighten.
6. Mount the cylinder. Mount the hoses. Please note the hoses are squeezed and that the connections are not worn down.

### Replacing shaft, bearings and T-rings



- Lower the Triplex Plus to the ground. Securely support and block the roller if necessary.
- Watch out for unintentional rolling movement, when the bolts in the bearings have been removed.

- 1 Remove the bolts in the bearings.
- 2 Roll the shaft with the T-rings away from the frame.
- 3 Loosen the set screws in the bearings and slide the bearings off the shaft.
- 4 Pull the T-rings of the shaft. Mount in reverse order.

Fig. 21



- Apply Loctite to the set screws in the bearings
- When mounting the shaft with bearings, make sure to position the bearings with the grease fittings facing towards the back, enabling easier access for lubrication and protecting them from stones.

### Replacing wearing parts

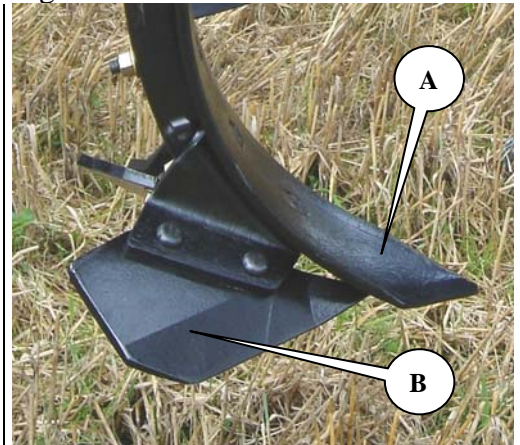


Support the Triplex Plus, to avoid the danger of being trapped underneath, and to avoid the machine falling.

The point (A) are reversible and bolted with three bolts. The points should be turned before the console to which points and wings (B) are clamped, start to wear down.

When turning points, reuse the old bolts, but when changing points, new bolts should be used. If dirt or the like is present, it should be removed.

Fig. 22



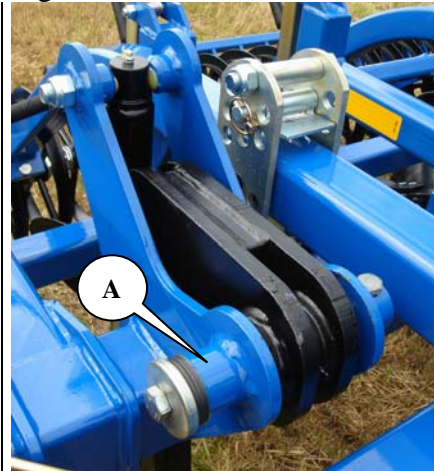
12x70 mm carriage bolt St. 10,9 for fastening point.  
12x35 mm carriage bolt St. 10,9 for fastening wings.

Wings should be changed when they are worn down, to the extent that the work result is no longer satisfactory, or before the console start to wear down.

## Replacing bushings

If play arises in the point (A), it is a sign of worn down bushings.

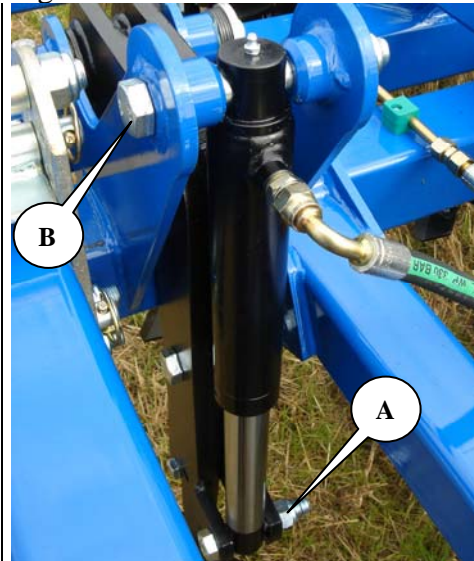
Fig. 23



Support Triplex Plus with the tines just lifted from the ground. Remove pressure from the hydraulic system and make sure, that the hydraulic stone break-away can be released by hand.

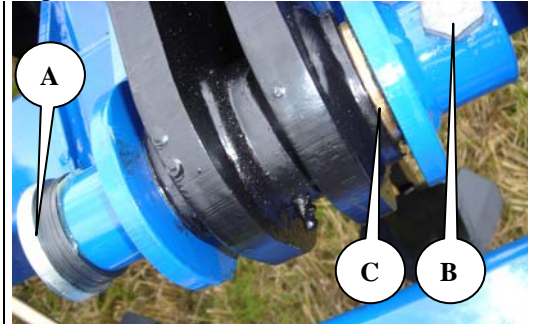
Remove the bolt (A) and (B) and the cylinder can be removed.

Fig. 24



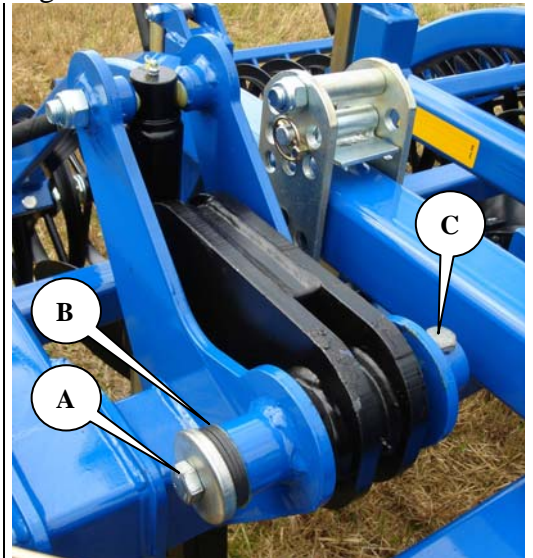
1. Remove bolt, washer and the spring washers (A). Please note how the spring washers are mounted.
2. Remove the bolt (B).
3. Remove the pin. Please knock on the pin from the side where the bolt (B) was mounted. Otherwise the thread can be destroyed.
4. Remove the bushings (C). Bushings can be pulled or knocked out. Mount the new bushings.

Fig. 25



1. Mount the pin from the side of bolt (C).
2. Mount the bolt (C)
3. Mount the spring washers (B), so that the spring effect is obtained. Mount the first spring washers, so the rest side turns towards the tine. Turn the other two spring washers the other way
4. Mount the washer and bolt (A). Tighten the bolt with ca. 100 Nm. Please remember to secure the bolt with Locktite.

Fig. 26



## Scrapping



Relieve the pressure in the hydraulic system.



When dismantling/mounting components, always pay attention to the weight of the part, that you are about to handle. It is **important** to support or secure the part, so that it cannot fall.

Dismount all hydraulic hoses and cylinders and empty the oil. To avoid pollution of the ground and the surrounding area, collect the oil. Dispose of the oil and the hoses properly.

All iron used in the machine is recyclable.





# Spare Parts