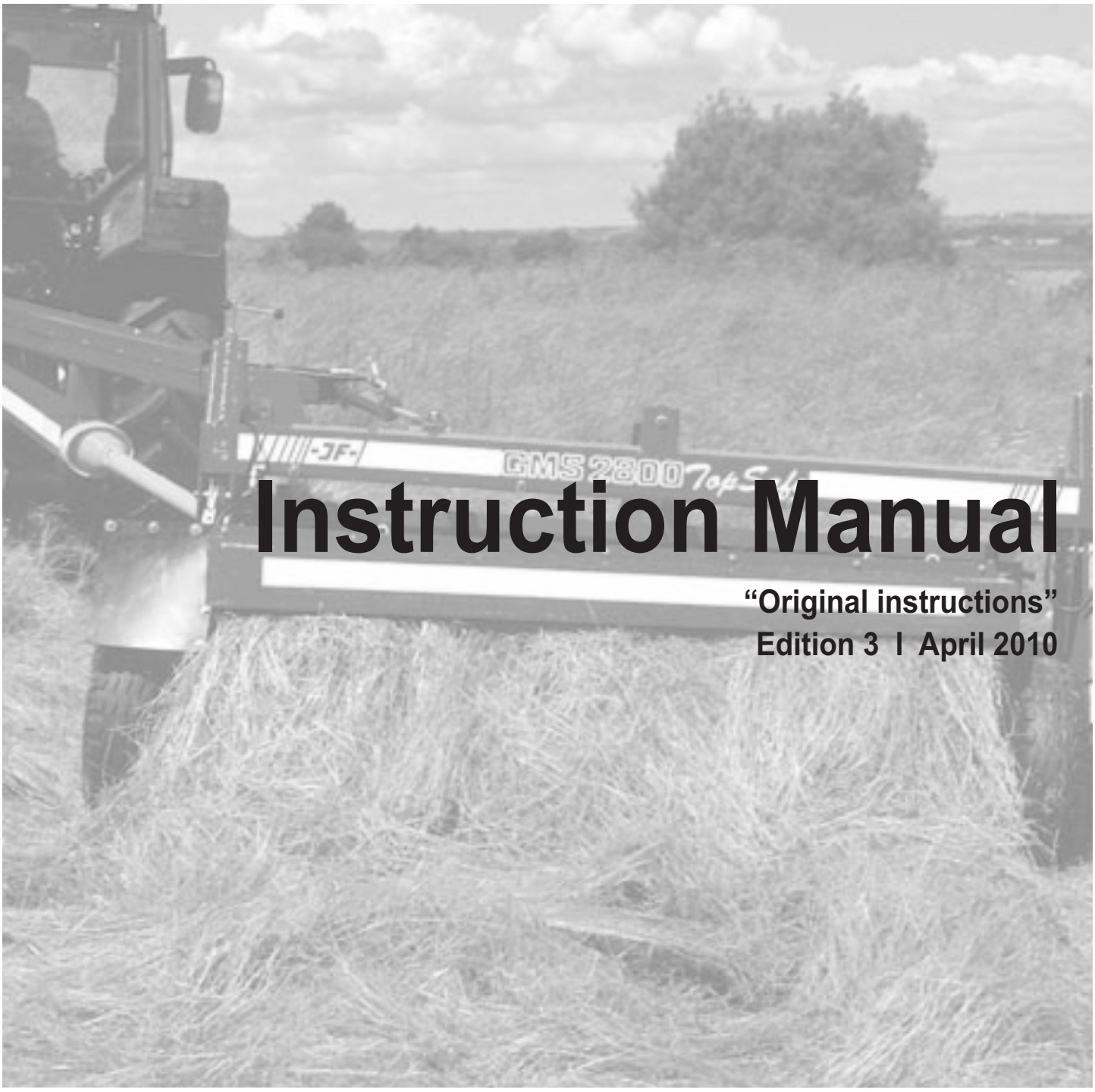
JF-STOLL

# Disc Mower

GMS/GCS 2400 TS I GMS/GCS 2800 TS I GMS/GCS 3200 TS




# Instruction Manual

**"Original instructions"**

**Edition 3 I April 2010**

JF-STOLL

**EN EC-Declaration of Conformity**
**according to Directive 2006/42/EC**

**DE EG-Konformitätserklärung**
entsprechend der EG-Richtlinie 2006/42/EC

**IT Dichiarazione CE di Conformità**
ai sensi della direttiva 2006/42/EC

**NL EG-Verklaring van conformiteit**
overeenstemming met Machinerichtlijn 2006/42/EC

**FR Déclaration de conformité pour la CEE**
conforme à la directive de la 2006/42/EC

**ES CEE Declaración de Conformidad**
según la normativa de la 2006/42/EC

**PT Declaração de conformidade**
conforme a norma da C.E.E. 2006/42/EC

**DA EF-overensstemmelseserklæring**
i henhold til EF-direktiv 2006/42/EC

**PL Deklaracja Zgodności CE**
wedlug Dyrektywy Maszynowej 2006/42/EC

**FI EY : N Vaatimustenmukaisuusilmoitus**
täyttää EY direktiivin 2006/42/EC

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**EN We,**
DE Wir,
IT Noi,
NL Wij,
FR Nous,
ES Vi,
PT Me,
DA Vi,
PL Nosotros,
FI Nós,


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**Tel. +45-74125252**


**EN declare under our sole responsibility, that the product:**
DE erklären in alleiniger Verantwortung, dass das Produkt:
IT Dichiara sotto la propria responsabilità che il prodotto:
NL verklaren als enig verantwoordelijken,dat het product:
FR déclarons sous notre seule responsabilité que le produit:
ES declaramos bajo resposibilidad propia que el producto:
PT declaramos com responsabilidade próqria que o produto:
DA erklærer på eget ansvar, at produktet:
PL deklarujemy z pełną odpowiedzialnością, iż produkt:
FI ilmoitamme yksin vastaavamme, että tuote:

**EN Model:**
DE Typ :
IT Tipo :
NL Type :
FR Modèle :
ES modelo :
PT Marca :
DA Typ :
PL Model :
FI Merkki :

**GMS 2400 TS**
**GMS 2800 TS**
**GMS 3200 TS**
**GCS 2400 TS**
**GCS 2800 TS**
**GCS 3200 TS**

**EN to which this declaration relates corresponds to the relevant basic safety and health requirements of the Directive:**

**2006/42/EC**

DE auf das sich diese Erklärung bezieht, den einschlägigen grundlegenden Sicherheits- und Gesundheitsanforderungen der EG
2006/42/EC

IT E' Conforme ai Requisiti Essenziali di Sicurezza a di tutela della Salute di cui alla Direttiva e sue successive modificazioni:
2006/42/EC

NL waarop deze verklaring betrekking heeft voldoet aan de van toepassing zijnde fundamentele eisen inzake veiligheid en gezondheid van de EG-machinerichtlijn no:
2006/42/EC

FR faisant l'objet de la déclaration est conforme aux prescriptions fondamentales en matière de sécurité et de santé stipulées dans la Directive de la:
2006/42/EC

ES al cual se refiere la presente declaración corresponde a las exigencias básicas de la normativa de la y referentes a la seguridad y a la sanidad:
2006/42/EC

PT a que se refere esta declaração corresponde às exigencias fundamentais respectivas à segurança e à saúde de norma da
2006/42/EC

DA som er omfattet af denne erklæring, overholder de relevante grundlæggende sikkerheds- og sundhedskrav i EF-direktiv sam:
2006/42/EC

PL dla którego się ta deklaracja odnosi, odpowiada właściwym podstawowym wymogom bezpieczeństwa i ochrony zdrowia Dyrektywy Maszynowej:
2006/42/EC

FI johon tämä ilmoitus liittyy, vastaa EY direktiivissä mainituja perusturvallisuus- ja terveysvaatimuksia (soveltuvin osin) sekä muita siihen kuuluvia EY direktiivejä:
2006/42/EC

CE

Konstruktion (Design) + Produktion (Production)
Sønderborg, 15.12.2009 Jørn Freudendahl

# FOREWORD

## DEAR CUSTOMER!

We appreciate the confidence you have shown our company by investing in a JF machine. Of course, it is our wish that you will experience a complete satisfaction with the investment.

This instruction manual contains information about correct and safe use of the machine.

When buying the machine you will receive information about use, adjustment and maintenance.

**However, this first introduction** cannot replace a more thorough knowledge of the different tasks, functions and the technically correct use of the machine.

**Therefore you should read this instruction manual very carefully** before using the machine. Pay special attention to the safety instructions.

This instruction manual is made so that the information is mentioned in the order you will need it, i.e. from the necessary operation conditions to use and maintenance. Besides this there are illustrations with text.

"Right" and "Left" is defined from a position behind the machine facing the direction of travel.

All the information illustrations and technical specifications in this instruction manual describe the latest version at the time of publication.

JF-Fabriken reserves the right to make changes or improvements in the design or construction of any part without incurring the obligations to install such changes on any unit previously delivered.

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# 1. INTRODUCTION

## INTENDED USE

The disc mowers type GMS/GCS 2400 TS, GMS/GCS 2800 TS and GMS/GCS 3200 TS are solely made for normal effort in agricultural work. They are only intended for cutting growing grass and straw crops on the ground and may only be mounted on tractors and run by the PTO drive shaft of tractors.

**Any use beyond the above-mentioned does not make JF-Fabriken responsible for any possible secondary damages; the user bears that risk.**

It is assumed that the work is performed under reasonable conditions, including that the fields have been cultivated normally and to a reasonable extent been cleaned of foreign matter and the like.

Intended use also means that the information prescribed by JF-Fabriken in the instruction manual and the spare parts book is observed.

**The disc mowers type** GMS/GCS 2400 TS, GMS/GCS 2800 TS and GMS/GCS 3200 TS **must only be used, maintained, and repaired by persons who after reading this instruction manual are confident with the machines in question and thereby informed about possible risks.**

It is absolutely necessary to observe the following instructions to prevent injuries and damages. Also common technical safety rules and road safety rules **must** be observed.

If changes are made on the machine without permission from JF-Fabriken, JF-Fabriken cannot be held responsible for any injuries or damages.

# SAFETY

Generally much damage can occur in consequence of misuse and insufficient instruction. The safety of persons and machines is therefore an integrated part of JF-Fabriken's development work. **We wish to secure you and your family in the best possible way**, but this also demands an effort from your side.

A mower cannot be constructed in such a way that it guarantees the full safety of persons and at the same time performs an efficient piece of work. This means that it is very important that you as user of the machine pay attention and use the machine correctly and thereby avoid exposing yourself and others to unnecessary danger.

The machine demands a skilled operation, which means that ***you should read the instruction manual before you connect the machine to the tractor***. Even though you have been driving a similar machine before, you should read the manual - this is a matter of your own safety!

Your should **never** leave the machine to others before you have made sure that they have the necessary knowledge to operate the machine safely.

## DEFINITIONS

The safety decals and the instruction manual of the machine contain a line of safety notes. The safety notes mention certain measures, which we recommend you and your colleagues to follow as to increase the personal safety as much as possible.

We recommend that you take the necessary time to read the safety instructions and inform your possible staff to do the same.

**In this instruction manual this symbol is used with reference to personal safety directly or indirectly through maintenance of the machine.**

**CAUTION:** The word CAUTION is used to secure that the operator follows the general safety instructions or the measures mentioned in the manual instruction of how to protect himself and others against injuries.

**WARNING:** The word WARNING is used to warn against visible or hidden risks, which might lead to serious personal injuries.

**DANGER:** The word DANGER is used to indicate measures, which according to legislation must be followed to protect oneself and others against serious injuries.

## GENERAL SAFETY INSTRUCTIONS

The following is a short mentioning of the measures, which should be a matter of common knowledge to the operator.

1. Always disengage the PTO drive shaft, activate the parking brake of the tractor and stop the tractor engine before you:
   - lubricate the machine
   - clean the machine
   - disassemble any part of the machine
   - adjust the machine.

2. Always lower the cutting unit to the ground or engage the transport safety device when the machine is parked.

3. Remember to activate the transport safety device of the cutting unit and the stop valves of the hydraulic cylinders when transporting the machine.

4. Never work under a raised cutting unit, unless it has been secured by means of stop blocks or other mechanical securing device.

5. Always block the wheels before you work under the machine.

6. Never start the tractor until all persons are safely away from the machine.

7. Make sure that all tools have been removed from the machine before starting the tractor.

8. Never work before all guards have been mounted correctly.

9. During work never wear loose clothes, which can be pulled in by the movable parts of the machine.

10. Do not replace the guards or work with the machine if some of the guards are missing.

11. Always drive with the statutory lights and safety marking during transport on public road.

12. Limit the transport speed to max 30 km/h, unless the machine has been marked otherwise.

13. Never stay near the machine while it is working.

14. When mounting the PTO drive shaft check that the number of RPM of the tractor matches those of the machine.

15. Always use hearing protectors if the noise from the machine is trying or if you are working with the machine for a considerable period in a tractor cabin, which has not been silenced sufficiently.

16. Before the cutting unit is raised or lowered it should be checked that nobody is near the machine or touching it.

17. Do not stay near the guards of the cutting unit and do not lift the guard before all revolving parts have stopped moving.

18. Never use the machine for other purposes than what it has been constructed for.

19. Do not allow any children to be near when you are working with the machine.

20. Never stay between the tractor and the mower during connection and disconnection.

**CHOICE OF TRACTOR**

Always follow the recommendations specified in the manual instruction of the tractor. If this is not possible, technical assistance must be sought.

Choose a tractor with a suitable power on the PTO drive shaft. If the power of the tractor is considerably larger than the normal demand of the machine make sure that the machine is secured against overload with a suitable clutch on the PTO drive shaft.

Considerable or long lasting overload can damage the machine and at worst result in parts being thrown out.

Choose a tractor with a suitable own weight and track width so that it can drive steadily with the machine. Also make sure that the lift arms of the tractor are intended to work with the weight in question.

Always choose a tractor with a closed cabin if you are going to work with a disc mower.

**CONNECTION AND DISCONNECTION**

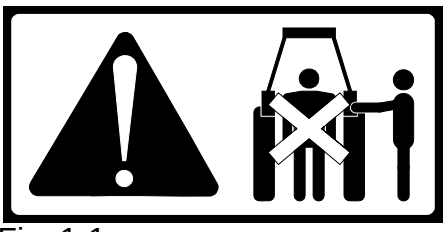


Fig. 1-1

Always make sure that nobody is standing between the tractor and the machine during connection and disconnection. An unintentional manoeuvre with the tractor might jam persons (see fig. 1-1).

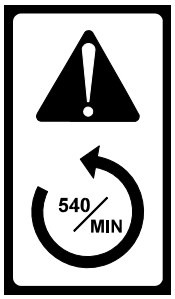



Fig. 1-2

Check that the machine is intended for the number and the direction of rotations of the tractor (see fig. 1-2). A wrongly chosen RPM for a considerable period can damage the machine and at worst lead to parts being damaged.

Make sure that the PTO drive shaft has been mounted correctly. This means that the shear pin is in mesh and that the support chain has been fastened at both ends.

The PTO drive shaft must be correctly protected. If the guard is defect it must be replaced immediately.

Check that the hydraulic couplings are tight and that all hoses and fittings are undamaged before the hydraulic system is activated. When the engine of the tractor has stopped also make sure that there is *no* pressure in the hydraulic hoses by activating the hydraulic tractor valve.

Fig. 1-3

Hydraulic oil under pressure can penetrate the skin and cause serious infections. You should always protect the skin and your eyes against oil splashes. If the hydraulic oil under pressure hits you consult a doctor immediately (see fig. 1-3).

Check that the drawbar and the cutting unit can move freely before you activate the hydraulic cylinders. Make sure that no persons are near the machine when starting, as there might be air in the hydraulic system, which might lead to sudden movements.

**ADJUSTMENT**

Never adjust the mower while the PTO drive shaft is engaged. Disengage the PTO drive shaft and stop the engine of the tractor before you adjust the machine. Do not lift the guard until all the revolving parts have stopped moving.

Before working, check that blades and discs do not have any breaks or other damages. Damaged blades and discs must be replaced (see the section about maintenance).

Check periodically if blades and blade bolts are worn as mentioned in the instruction manual (see the section about maintenance).

**TRANSPORT**

Never drive faster than the conditions allow, and max 30 km/h.

It is important to block the hydraulic transport adjustment. Unintentional operation of the drawbar cylinder can cause the mower to move to the roadway of oncoming traffic, the cycle path or the footpath. Always check that the mechanical transport safety devices are engaged before transporting the machine.

The same might happen if there is air in the hydraulic cylinders or by a sudden loss of oil from the hydraulic hoses.

To remove possible air in the oil, check all the hydraulic cylinders after the connection to the tractor. Especially before driving on a public road.

**WORKING**

During the daily work it should be considered that loose stones and foreign matter on the ground might get in contact with the revolving parts and get thrown out again at a very high speed.

Therefore, all guards must always be correctly mounted and intact when you are working with the machine.

Worn and damaged canvases should of course be replaced.

On stony ground the stubble height is adjusted to maximum and the cutting angle must be as small as possible.

If the cutting unit or the conditioner stops unintentionally you must stop the engine of the tractor, activate the parking brake and wait until all the revolving parts have stopped moving before you try to remove the foreign matter.

Never allow anybody to stay near the mower during work and especially not children.

Gear down if the machine is working on steep slopes.

When working with a trailed mower there must be a safe distance to the hillsides and the like. The earth can slide down and pull the mower and the tractor down. Also remember to adjust the speed to the sharp turns when driving in uplands.

**PARKING**

Never leave the tractor before the cutting unit is resting on the ground, the engine of the tractor has stopped, and the parking brake has been activated. This is the only way to perform a stable parking.

Always make sure that the jack of the drawbar has been fastened correctly and locked when parking the machine.

**LUBRICATION**

When lubricating or maintaining the machine the cutting unit must rest on the ground or the lifting cylinders must be blocked by means of the stop valves.

Never clean, lubricate or adjust the machine before the PTO has been disengaged, the engine of the tractor has been stopped, and the parking brake has been activated.

## MAINTENANCE

It is important that the cutting unit is correctly relieved to ensure a perfect operation and to make sure that the cutter bar is not damaged.

Always make sure that the spare parts have been tightened to the correct torque.

When replacing parts in the hydraulic system make sure that the cutting unit is resting on the ground or that the lifting cylinders are blocked.

## MACHINE SAFETY

JF-Fabriken has balanced all the revolving parts by means of a special machine with electronic sensors. If it appears that a part has an unbalance some small counter weights are fastened.

As the discs work with up to 3000 RPM even a minor unbalance will cause vibrations, which might lead to fatigue fractures.

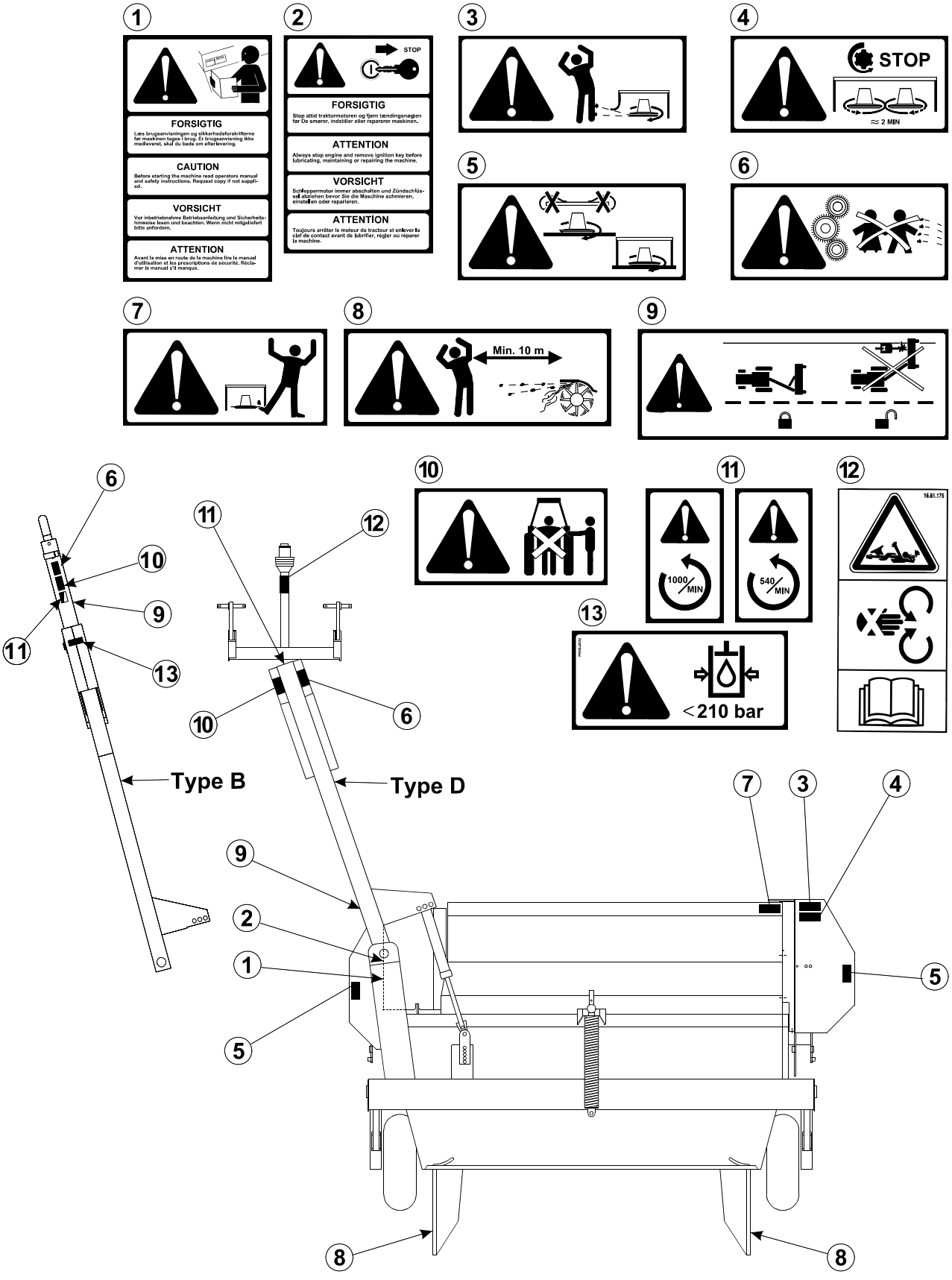
If the vibrations or the noise of the machine increases considerably during a period you should stop working immediately. Do not continue the work before the fault has been corrected.

When blades are replaced all the blades on the disc in question must be replaced as not to create an unbalance.

During the season you should check daily that no blades, carriers or bolts are missing. If any of these are missing you should mount the parts immediately.

At regular intervals clean the hats and flow intensifiers by removing earth and grass.

Also check and “air” the friction clutch at regular intervals to make sure that it does not rust.


1
FORSIGTIG
Læs brugsanvisningen og sikkerhedsforskrifterne før maskinen tages i brug. Er brugsanvisning ikke medleveret, skal du bede om efterlevering.
CAUTION
Before starting the machine read operators manual and safety instructions. Request copy if not supplied.
VORSICHT
Vor inbetriebnahme Betriebsanleitung und Sicherheitshinweise lesen und beachten. Wenn nicht mitgeliefert bitte anfordern.
ATTENTION
Avant la mise en route de la machine lire le manuel d'utilisation et les prescriptions de sécurité. Réclamer le manuel s'il manque.
2
STOP
FORSIGTIG
Stop altid traktormotoren og fjern tændingsnøglen før De smører, indstiller eller reparerer maskinen.
ATTENTION
Always stop engine and remove ignition key before lubricating, maintaining or repairing the machine.
VORSICHT
Schleppermotor immer abschalten und Zündschlüssel abziehen bevor Sie die Maschine schmieren, einstellen oder reparieren.
ATTENTION
Toujours arrêter le moteur de tracteur et enlever la clef de contact avant de lubrifier, régler ou réparer la machine.
3
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STOP
≈ 2 MIN
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540 MIN
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8

# SAFETY DECALS

The safety decals shown on the previous page are positioned as shown on the drawing at the bottom of the page. Before using the machine check that all the decals are present, if not, require those missing. The decals have the following meaning:

**1 Read the manual instruction and the safety instructions.**
This is to remind you to read the delivered documents to ensure the machine is operated correctly and to avoid unnecessary accidents and machine damages.

**2 Stop the tractor engine and remove the ignition key before touching the machine.**
Always remember to stop the tractor engine before lubricating, adjusting, maintaining or repairing. Also remember to remove the ignition key to ensure that nobody starts the engine before the work is completed.

**3 Risk of stones being thrown.**
Almost the same as decal no. 5. But even though all canvases and guards are in the right place there is still a risk of stones being thrown out. Nobody should therefore be allowed to stay near the machine during the operation.

**4 Rotating blades.**
After the tractor's PTO drive shaft has stopped the blades keep rotating for up to 2 minutes. Wait until the blades have come to a complete stop before you remove the canvas and the guards for inspection and maintenance.

**5 Operation without canvas.**
Do not start the machine unless canvases and guards are intact and in their right place. The machine can throw stones and other foreign matter out during the operation. The purpose of the canvases and the guards is to reduce such danger.

**6 Children.**
Never let children stay near the machine during the operation. Especially not small children as they have a tendency to do unforeseen things.

**7 Rotating blades.**
Do not under any circumstances let anybody get near or stay near the machine during operation. The rotating blades of the machine can without difficulty cause serious injury on any part of the body hit by such a blade.

**8 Stones being thrown from the conditioner.**
The conditioner rotor revolves at a very high number of RPM and stones on the ground can be thrown up to 10 m backwards at a very high speed. Therefore, always make sure that nobody is standing near the machine when it is working.

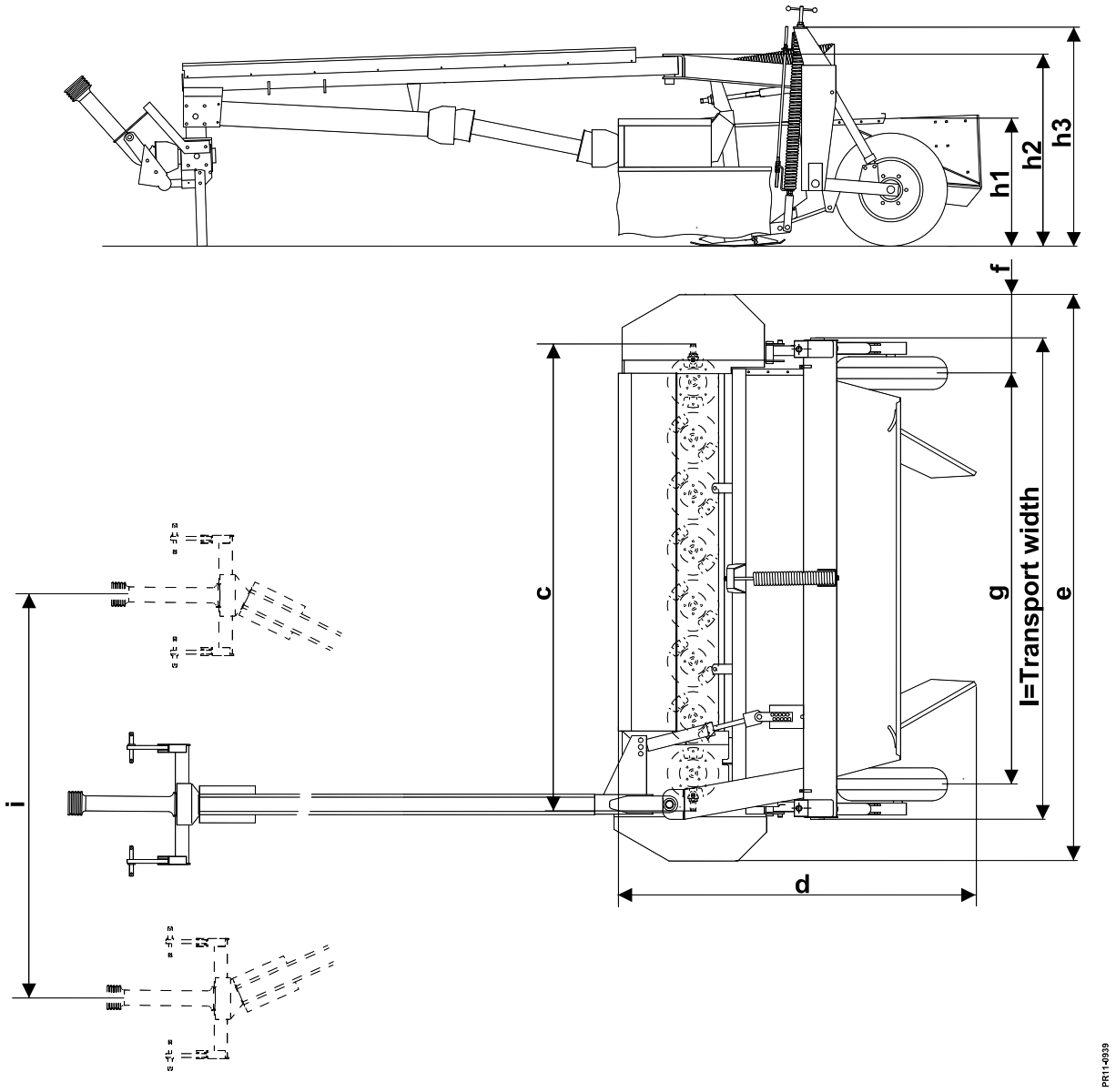
**9 Remember the transport lock.**
Always remember to activate the transport lock before transporting the machine on public road. Defects in the hydraulic system and unintentional manoeuvres can make the machine swivel into working position during transport and thereby cause serious machine damage and personal injury.

**10 Risk of getting jammed during the connection.**
Never let anybody stay near the machine and the tractor during connection to the tractor. An unintentional manoeuvre can result in unauthorised persons getting jammed.

**11 The number and the direction of rotations.**
Check that the PTO drive shaft runs with the right RPM and in the right direction. A wrong number of rotations and/or direction of rotation can damage the machine with the risk of personal injury as a result.

**12 The PTO drive shaft.**
This decal has the purpose to remind you of how dangerous the PTO drive shaft can be if it is not correctly mounted or protected.

**13 Maximum 210 bar.**
Make sure that all hydraulics are not exposed to more pressure than 210 bar, as there could be a risk of explosive damages of parts. Hereby you expose yourself and other persons to the danger of getting hit by metal parts with high speed or oil under high pressure.




| | GMS/GCS 2400 TS | GMS/GCS 2800 TS | GMS/GCS 3200 TS |
|---|---|---|---|
| c | 2400 | 2800 | 3150 |
| d | 2600 | 2600 | 2600 |
| e | 3000 | 3400 | 3800 |
| f | 550 | 550 | 550 |
| g | 1950 | 2350 | 2700 |
| h1 | 1000 | 1000 | 1000 |
| h2 | 1350 | 1350 | 1350 |
| h3 | 1450 | 1450 | 1450 |
| i, max. | 2200 | 2400 | 2700 |
| l | 2500 | 2900 | 3200 |

All dimensions are in mm, and stated with the approx. value.
The i, max. statement appeared by moving the position of the drawbar shift cylinder in the holes on the main frame and drawbar as described in "Adjustment of the swing of the drawbar" on page 33

# TECHNICAL DATA

| Type | | | GMS/GCS 2400 TS | GMS/GCS 2800 TS | GMS/GCS 3200 TS |
|---|---|---|---|---|---|
| Conditioner system | **GMS** | | PE-Fingers in Y-shape | | |
| | **GCS** | | Steel rollers with rubber profiles | | |
| Working width | | | 2.4 m | 2.8 m | 3.2 m |
| Capacity at 10 km/h, effectively | | | 2.5 ha/t | 2.8 ha/t | 3.2 ha/t |
| Power requirement, minimum PTO | | | 40 kW/54 HP | 50 kW/68 HP | 60 kW/82 HP |
| Power take-out *) | | | 1000 RPM | 1000 RPM | 1000 RPM |
| Oil take-out | | | 1 double acting + 1 single acting | | |
| Drawbar | | | Swivel headstock / swing drawbar | | |
| Number of discs | | | 6 | 7 | 8 |
| HD discs and HD blades | | | Standard | | |
| Floating suspended cutter bar | | | Standard | | |
| Finger conditioner | Width of rotor | | 1.99 m | 2.37 m | 2.7 m |
| | Fingers | | 96 PE-fingers | 120 PE-fingers | 152 PE-fingers |
| | Speeds | | 2 speeds | | |
| | - for grass, standard | | 900 RPM | 900 RPM | 900 RPM |
| | - for clover and the like | | 670 RPM | 670 RPM | 670 RPM |
| Roller conditioner | Width of rollers | | 1940 mm | 2350 mm | 2680 mm |
| | Diameter | | 225 mm | 225 mm | 225 mm |
| | Speeds | | 900 RPM | 900 RPM | 900 RPM |
| Swath width | | | 0.8 – 1.6 m | 0.8 – 2.0 m | 0.9 – 2.2 m |
| Transport width | | | 2.5 m | 2.9 m | 3.2 m |
| Tyre dimension | | | 10.0/75-15.3 | 10.0/75-15.3 | 10.0/75-15.3 |
| Weight, approx. | | | 1275 kg | 1470 kg | 1640 kg |
| Weight transmitted to the tractor | | | 410 kg | 490 kg | 550 kg |
| Noise level in the tractor cabin | Machine connected | Window closed | 76,5 dB(A) | 76,5 dB(A) | 76,5 dB(A) |
| | | Window open | 92 dB(A) | 92 dB(A) | 92 dB(A) |

*) Can be changed from 1000 RPM to 540 RPM by inversing 2 pulleys, see page 23

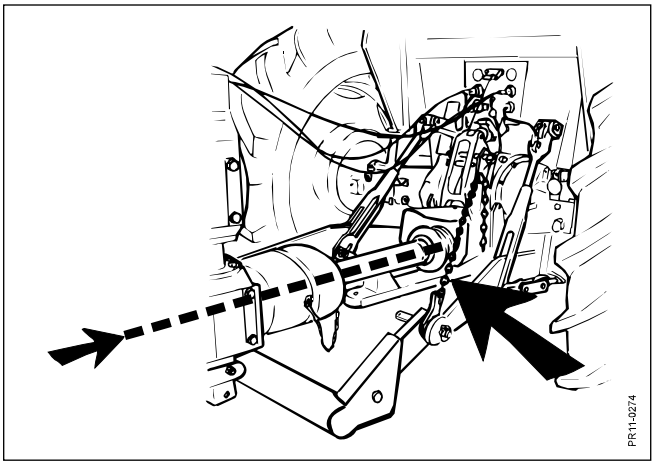



Fig. 2-1

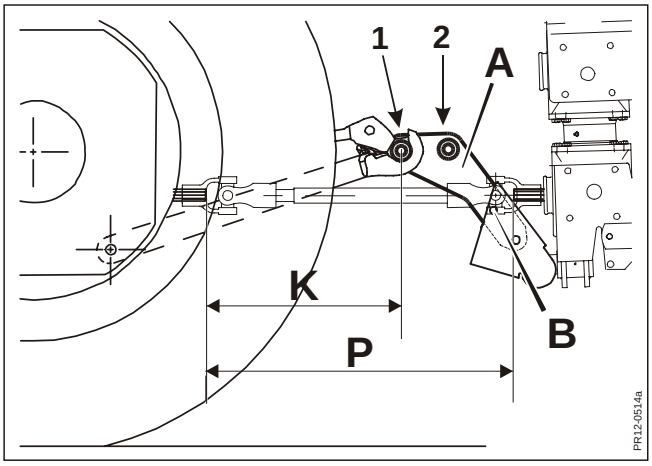



Fig. 2-2

# 2. CONNECTION AND TEST DRIVING

## CONNECTION TO THE TRACTOR

**Fig. 2-1** The **GMS/GCS** machines are connected to the lower links of the tractor. The dowels are intended for category II. Bushings can be supplied for category III.
The machine can be delivered with different types of drawbars. The D-drawbar with swivel gearbox up front (considered to be standard) and B-drawbar with direct PTO transmission.

D-drawbar: Adjust the lower links to the same height. Fasten the limiting chains to the lift dowels at the wanted category as shown on the figure. The lower lift arms of the tractor can now be connected to the machine and then **raised to a height where the input shaft of the power take-out (called the PTO shaft) and the input shaft of the machine (called the PIC shaft) are in line.** The lower links must be **locked** in this position to prevent a sideways travel so that **the PTO shaft and the PIC shaft are in line seen from above**. An straight PTO drive shaft absolutely gives the longest life on axle universal joint and the other rotating parts of the machine.

B-drawbar: See "Adjusting and driving with the B-drawbar", page 21.

Attach the upper end of the limiting chains at the top link fix point of the tractor. The limiting chains are not intended to carry the weight of the machine drawbar but to prevent unintentional lowering of the lower links, which will pull the PTO drive shafts away from each other.

### PTO DRIVE SHAFT ON THE D-DRAWBAR

**Fig. 2-2** The shock absorbers of the TOP SAFE system (extension links **A** Fig. 2-2 and 2-3), with two possibilities for placing of draw pins, are now standard on the GMS/GCS machines.

**IMPORTANT:** Do not shorten your new PTO drive shaft before you are sure it is necessary. The PTO drive shaft is, from factory, adjusted to fit the distance **P**, from PTO dowel to PIC dowel, that is standard on most tractors. Still you have to be aware of:

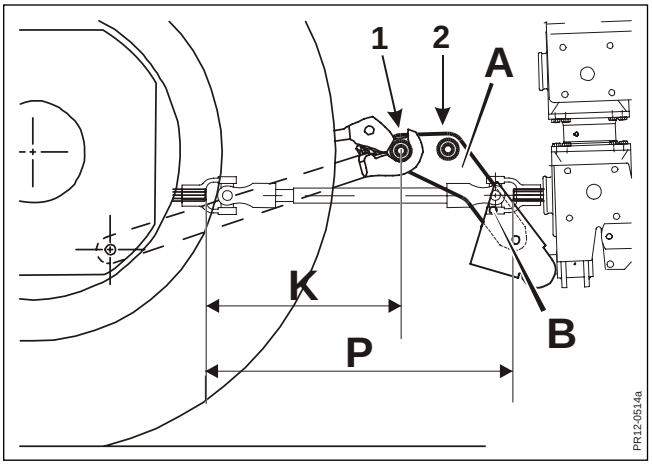



Fig. 2-2

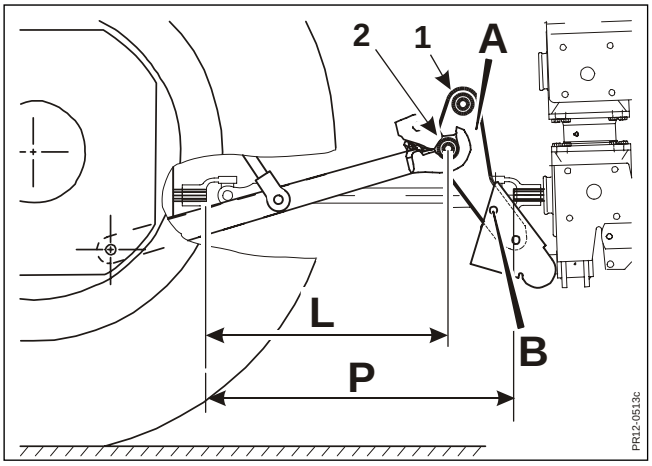



Fig. 2-3

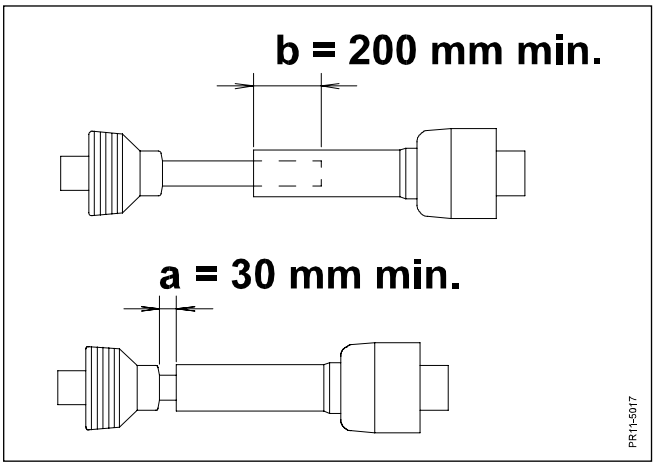



Fig. 2-4

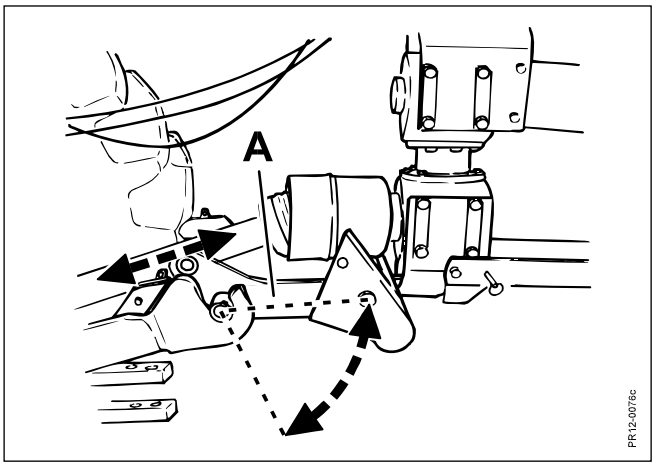



Fig. 2-5

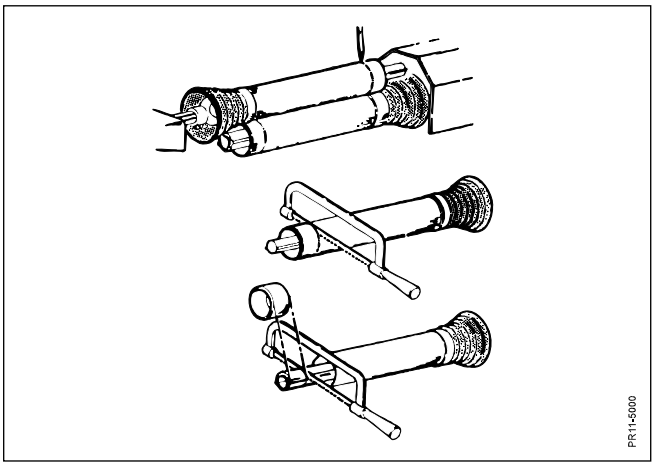



Fig. 2-6

**Fig. 2-2** SHORT LOWER LINKS:
On tractors where the distance **K** between the PTO pin and the coupling eyes of the lower links are **short**, the draw pins are to be assembled at position **1**.

**Fig. 2-3** LONG LOWER LINKS:
On tractors where the distance **L** between the PTO pin and the coupling eyes of the lower links are **long**, placing of the draw pins at position **2** would be preferable.

**NB:** By assembling at position 2 the right and left extension link should be reversed, and turned as shown on Fig. 2-3.
Always drive at position **2**, if possible.
If required, the shock absorber of the TOP SAFE system can be blocked with a bolt at **B**.

**IMPORTANT:** The profile tube of the PTO drive shaft absolutely has to observe the overlap dimensions as shown on Fig. 2-4.

BY POSSIBLE SHORTENING:

**Fig. 2-4** Adjust the PTO drive shaft so that it:

**Fig. 2-5**

- has the biggest possible overlapping
- has more than 200 mm overlapping in any position (referring to situations where the safety drive (shock absorbers of the TOP SAFE system) will be released e.g. by collision with partly buried stones, see Fig. 2-5).
- is not compressed more than the prescribed 30 mm in order not to bottom the shaft.

**Fig. 2-6** Fasten the PTO drive shaft half parts to PTO and PIC, respectively, when these are at the same horizontal level and opposite each other (this by the shortest distance of this machine).
Keep the shaft ends parallel to each other and mark the 30 mm (min).
Shorten all 4 tubes equally much. The profile tube ends must be rounded and any burrs must be removed carefully.

**WARNING:** **Grease the tubes carefully before they are re-assembled, as they are exposed to big friction forces if the shock absorbing system is activated during the transmission of heavy load!**

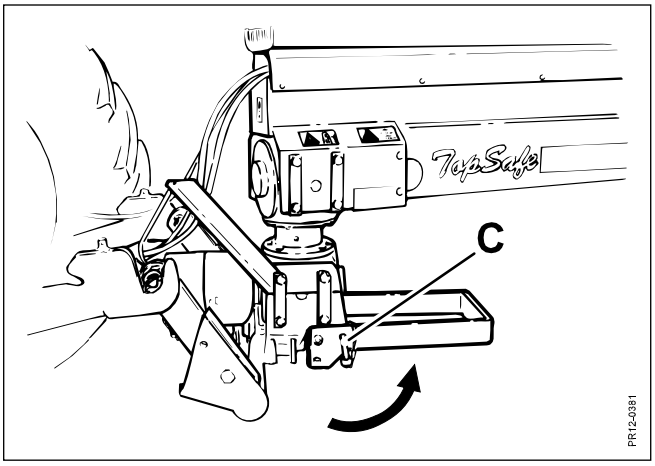



Fig. 2-7

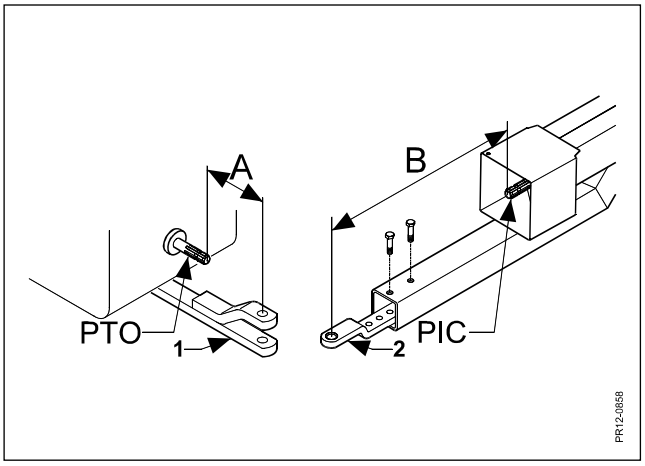



Fig. 2-8

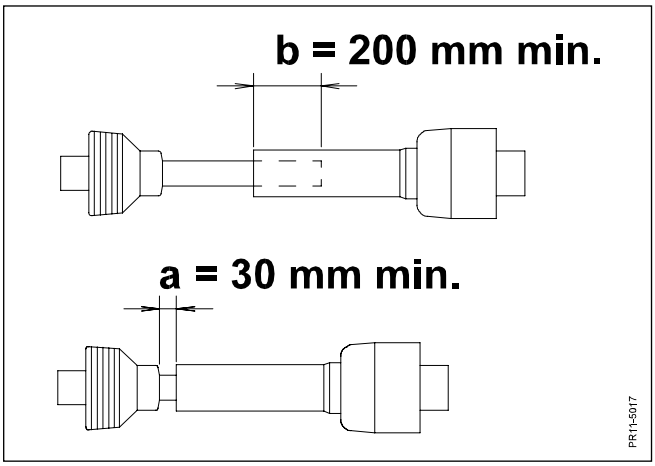



Fig. 2-9

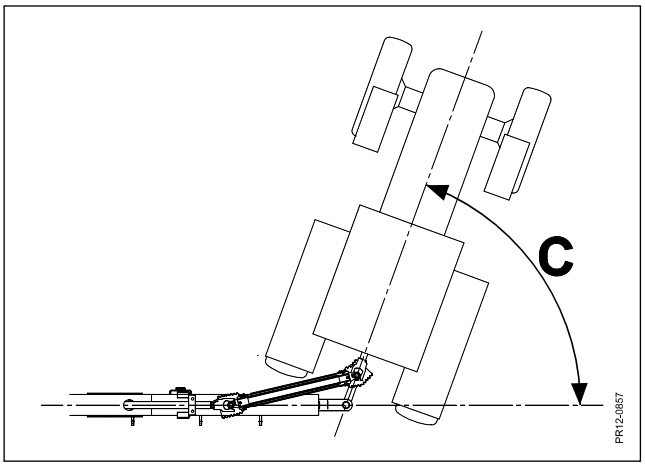



Fig. 2-10

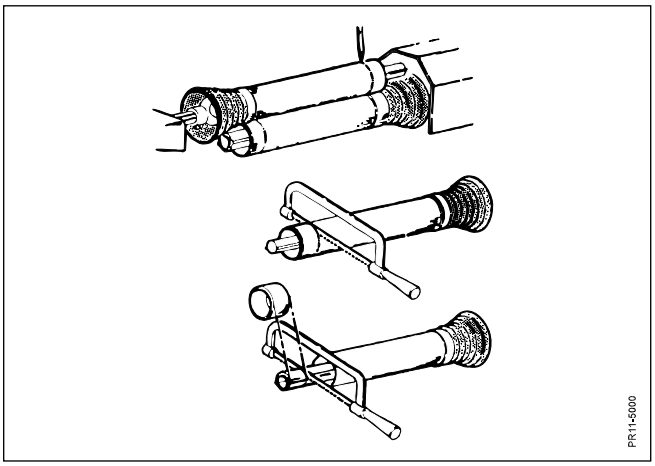



Fig. 2-11

**JACK**

**Fig. 2-7** The jack under the swivel gearbox is swivelled to the rear and locked with pin **C** and spring pin.

# ADJUSTMENT AND DRIVING WITH THE B-DRAWBAR

**Fig. 2-8** Adjust the drawbar of the tractor (1), so that the distance "**A**" will be as small as possible. Adjust the drawbar of the machine (2), so that the distance "**B**" will be as large as possible. The drawbar of the machine (2) must be turned, so that the PTO shaft is as close to a horizontal position as possible. (NB: Fittings for drawbar **must** always be mounted with 2 bolts).

**Fig. 2-9** Check the maximum turning angle "**C**" with the machine in raised position. Because of the position of the PTO shaft the turning angle "**C**" is limited by the fact that the PTO shaft is not pushed any further together than the prescribed 30 mm distance to the block.

**Fig. 2-10** In certain cases it is possible to increase the turning angle "**C**" by shortening the PTO drive shaft. The PTO drive shaft must only be shortened if the overlapping is more than 200 mm when driving straightforward with the machine in working position.

**SHORTENING THE PTO DRIVE SHAFT**

**Fig. 2-11** Fasten the PTO drive shaft half parts to the PTO and the PIC, respectively, when these are at the same horizontal level and opposite each other and the machine is in working position (as regards this machine the longest distance). Keep the shaft ends parallel to each other and mark the wanted shortening, however with min. 200 mm overlapping. Shorten all 4 tubes equally much. The profile tube ends must be rounded and any burrs must be removed carefully. It is very important that the tubes are completely smooth and clean before they are greased. Grease the tubes before they are re-assembled.

**WARNING: Never turn more than the maximum turning angle "C".**
**On some tractor types the PTO drive shaft can "bottom the shaft", and hereby destroying the shaft and/or other machine parts.**

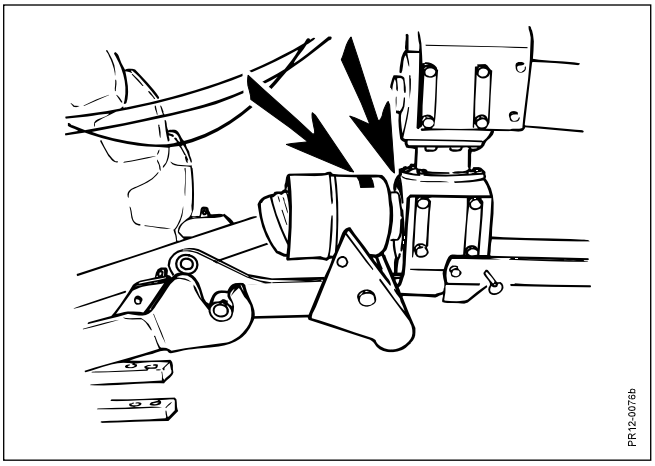



Fig. 2-12

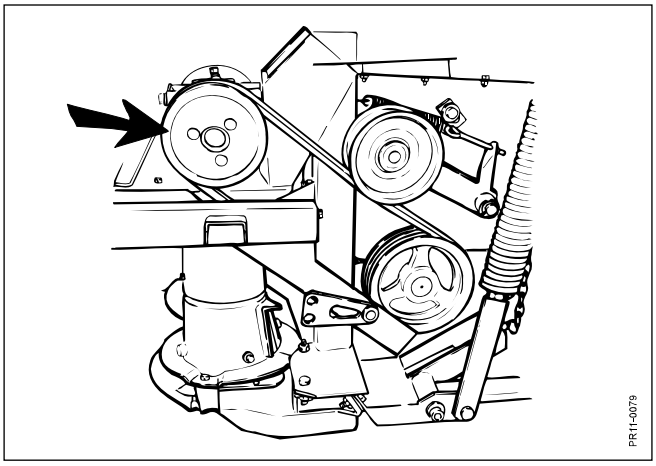



Fig. 2-13

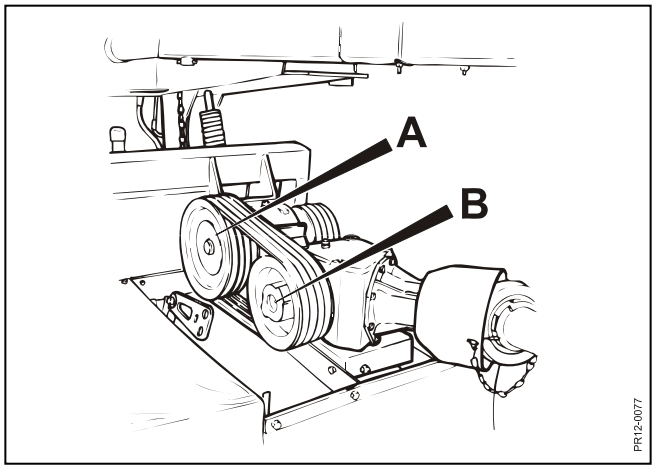



Fig. 2-14

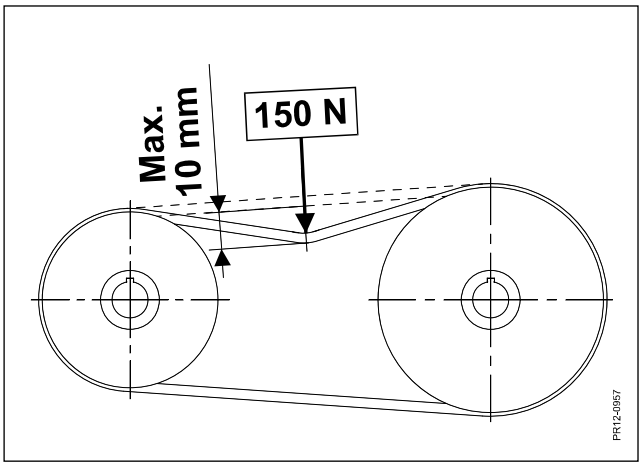



Fig. 2-15

**CONTROL OF THE CORRECT PTO SPEED**

**Fig. 2-12** The machine is marked so that the actual gearing is shown clearly on the front part of the swivel gearbox and the protection guard at the PIC shaft (see the decal on the machine on page 13, pos. 12). If, for some reason, this decal is missing the gearing should be re-checked.

**Fig. 2-13 Control, PTO 1000 RPM:**
1 rotation on the driving pulley for conditioner = **1 rotation on** the PIC shaft.

**Control, PTO 540 RPM:**
1 rotation on the driving pulley for conditioner = **½ rotation** the PIC shaft.

**PTO, 540 OR 1000 RPM**

**Fig. 2-14**

From the factory the machine is mounted for **1000 RPM on the PTO.** This can be changed to 540 RPM by reversing the two pulleys.

Instructions:

1. Dismount the guards above the V-belt drive.

2. Loosen the V-belts. This is made by loosening the bolts at the front gearbox.

3. Reverse the pulleys (A and B).
   (When the pulley with the largest diameter is closest to the tractor the machine is adjusted to 1000 RPM, test it according to Fig. 2-13).

**Fig. 2-15**

4. Assemble the parts again. Make sure that the V-belts are tightened sufficiently.
   **When pushing with a force of 150 N (15 kg) at the centre of these V-belts, they shall move max. 10 mm.**

5. Having converted the machine to drive with another number of revolutions the PTO drive shaft at the tractor is turned, so that the marking with the correct number of revolutions is upwards and legible, when you are standing in front of the machine (see page 13, pos. 11).

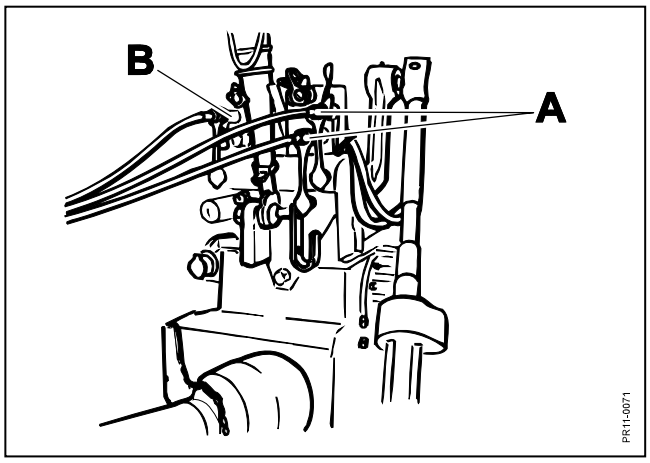



Fig. 2-16

### FRICTION CLUTCH

See section **5. MAINTENANCE – friction clutch** before you start.

### OVERRUN CLUTCH

The machine is equipped with overrun clutch on the PTO drive shaft **in front of** the rear swivel gearbox. If the PTO drive shaft is turned upside down this will have **no** influence on the effect of the overrun clutch.

### HYDRAULIC CONNECTION

**Fig. 2-16**

The hydraulic hoses for the drawbar shift cylinder is connected to the double-acting oil take-out **A** and the wheel cylinders are connected in a single acting oil take-out **B** on the tractor. See the **HYDRAULIC DIAGRAM** page 77 in this instruction manual.

**DANGER:** **The hydraulic components must not be exposed to a greater pressure than 210 bar as a higher pressure might cause parts to be damaged. Hereby the risk of personal injury occurs.**

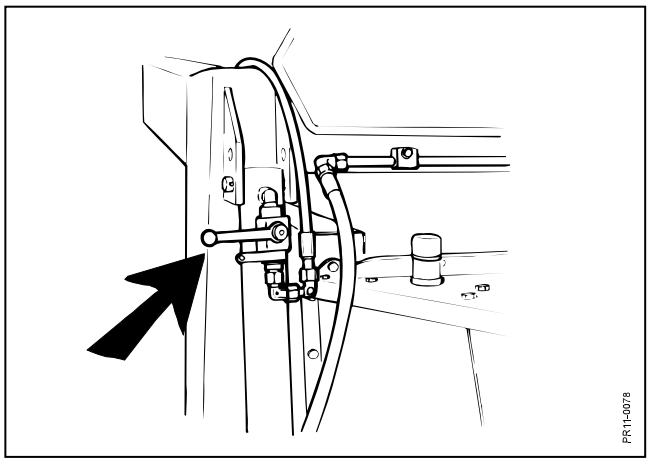



Fig. 2-17

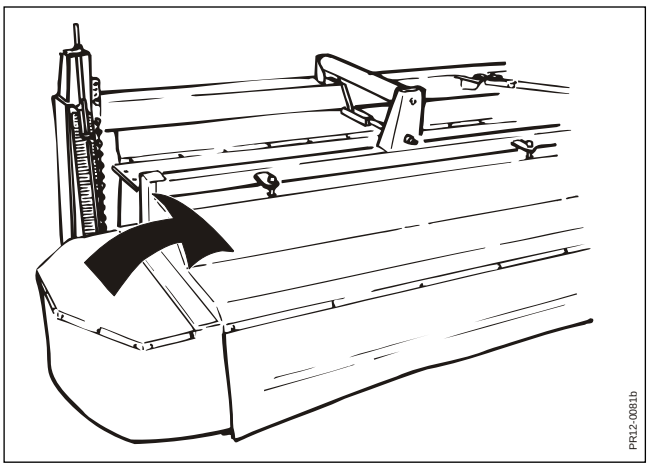



Fig. 2-18

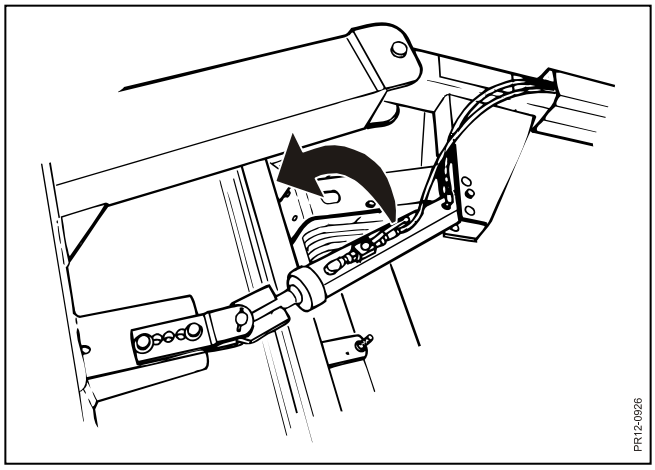



Fig. 2-19

# TRANSPORT ON PUBLIC ROAD!

The machine is only intended for suspension in the lower links of the tractor, as mentioned in the section **CONNECTION TO TRACTOR** page 17. The transport speed **ought not to be more than 30 km/h**.

**Fig. 2-17** The single-acting oil take-out of the tractor performs the lifting and the lowering of the machine.

**The machine is lifted from the ground until the cylinders are fully stretched out.**

When there is air in the system the machine cannot stay in lifted position. Any air in the cylinders is removed by pushing the pistons in and out a few times.

**DANGER – ALWAYS REMEMBER:**

**TO LOCK THE SAFETY TAP** positioned at the cylinder of the left wheel. The safety tap is locked in the shown position.

With the double-acting oil take-out the machine is swivelled to a **central position behind** the tractor.

**Fig. 2-18** Lift up the safety canvases to reduce the transport width as much as possible.

**DANGER – TRAFFIC MARKING:**

**The owner is always obliged to ensure that the machine is equipped with the correct lighting system and other traffic marking in accordance with the country's present laws in the area.**

**Fig. 2-19** Having put the machine in transport position, ball valve at the cylinder for the drawbar must be closed. This must be done in connection with leaking hoses or unintended use of the hydraulic handle during transport, so that the machine does not swing into working position during transport. Move the handle on the ball valve in the direction of the arrow in order to close the oil feed, as shown on the figure.

# CHECK BEFORE USE

Before you use your new machine you ought to:

1. Read this instruction manual carefully!

2. Check that the machine has been assembled correctly and is undamaged.

3. Check with the instruction manual of the machine and (possibly) the tractor that the PTO speed is correct. Too high PTO speed can be dangerous. Too low PTO speed will cause an unclean cut, blocking of the disc mower and a high torque on the drive shafts. Find the correct speed in the section **“CONTROL OF THE CORRECT PTO SPEED”** on page **Fejl! Bogmærke er ikke defineret.**.

4. Check the movements of the PTO drive shaft. If these are too short or too long it might damage the tractor as well as the machine considerably.
   Check that the protection tubes do not get jammed or damaged in any position.
   Check that the safety chains of the protection tubes have been secured properly and that they do not in any position get too tight or damaged.

5. Make sure that the hydraulic hoses have been mounted in such a way that they are long enough for the movements of the cylinders.

6. Re-tighten the wheel bolts. After a few hours of operation with your new machine all bolts must be tightened up. Especially fast revolving parts, parts at the drive device and at the suspension of the shift cylinder. See the torque specification in the section **"5. MAINTENANCE"**.
   Also re-tighten after servicing the machine.

7. Check the tyre pressure. See the section **"5. MAINTENANCE"**.

8. Check that the machine is greased sufficiently and check the oil level in the gearbox and the cutter bar. See the section **“4. GREASING”**.

9. Air the friction clutch as described in the section **“5. MAINTENANCE"**.

From the factory the revolving parts of the machine have been tested and found correct. However, you should:

10. Start the machine with a low number of RPM. If there are no unusual scratching or knocking sounds the number of RPM may be increased. At the correct number of RPM any noticeable vibrations must be observed (check the guards for unusual vibrations).

In case of doubt stop the tractor and the machine as described in the section about **"SAFETY"**.

Turn the revolving parts with manual power to check if the machine is turning independently. Check the machine visually to find any possible errors (for instance burned paint or paint that has been scratched off). Then contact authorised assistance.

**NB:** Note that because of the smaller centrifugal force at a low number of RPM the blades can touch the protection plates on the cutter bar. This sound must disappear at the normal number RPM during work.

Also note that the cutter bar under the discs gets very warm. The colour of the cutter bar gets darker after some hours of operation.

Item 10. should be made with an open rear window and without hearing protector.

**CAUTION: If the machine is tested for a long period, close the rear window or wear hearing protector!**

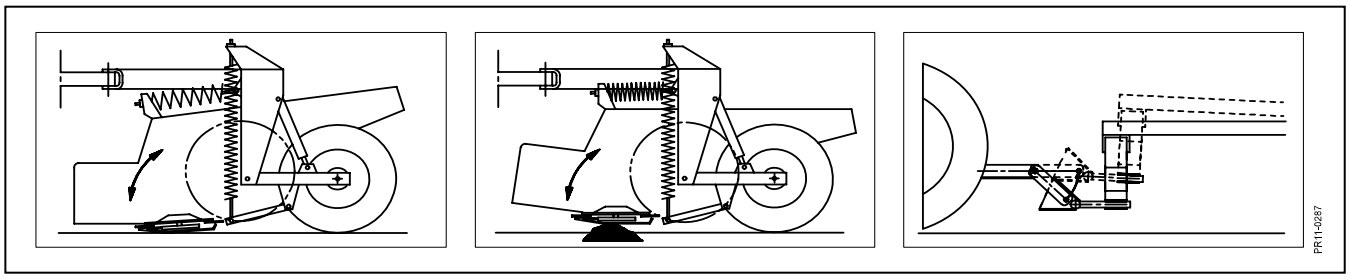



Fig. 3-1

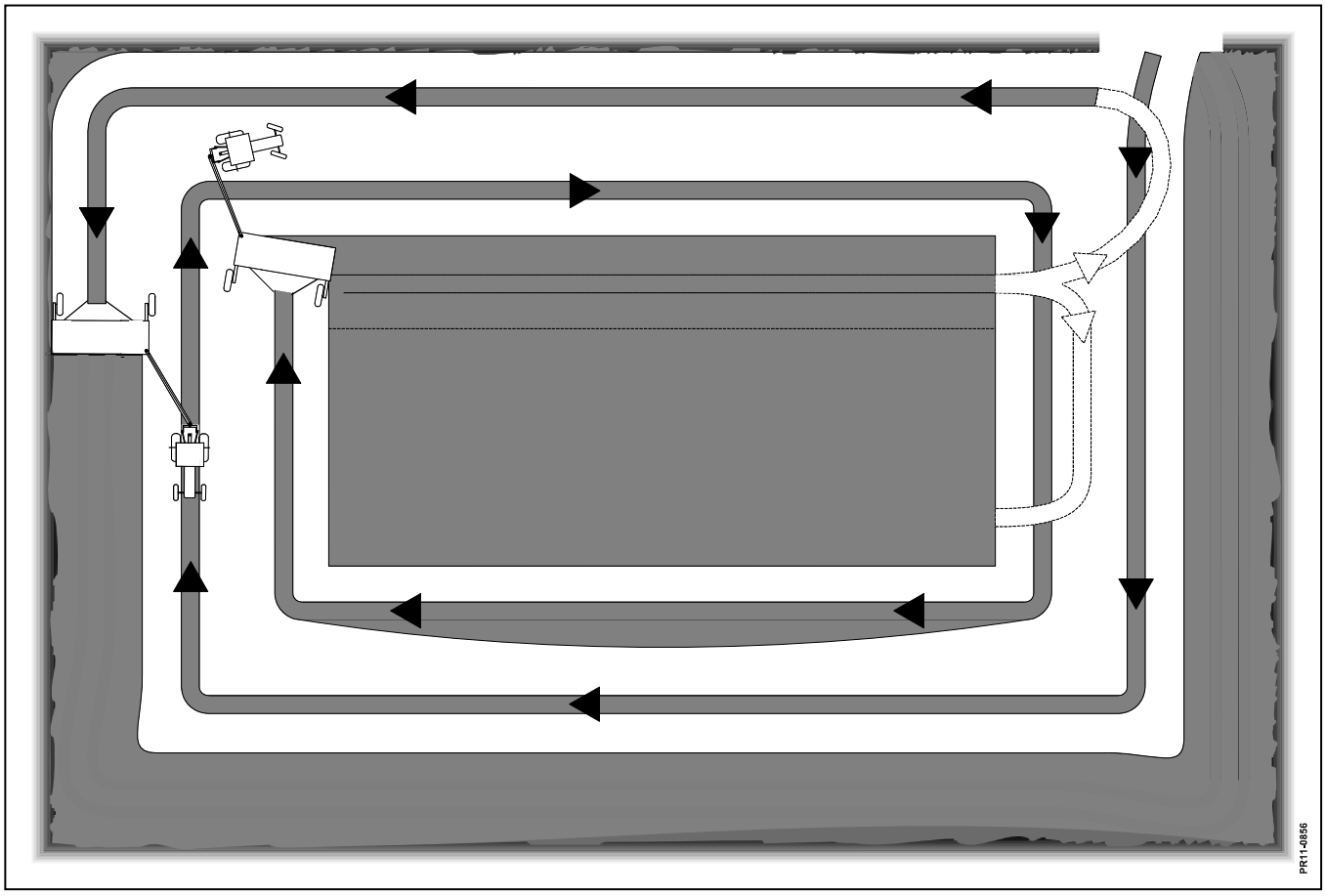



Fig. 3-2

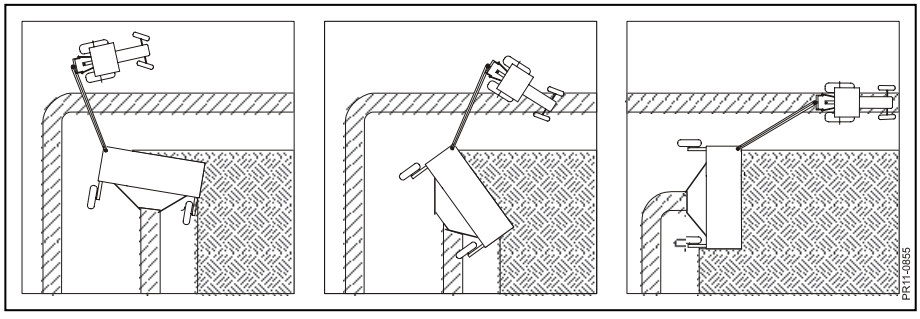



Fig. 3-3

# 3. ADJUSTING AND WORKING

## STRUCTURE AND OPERATION

The cutter bar cuts and throws the crop against the conditioner fingers or the conditioner rollers (for **GCS**). These lift and throw the crop to the rear to the swath boards, which gather the crop in a 0.9 - 2.2 m wide swath.

The conditioning degree can be adjusted in 2 ways. The distance between the conditioner plate/rotor is adjustable and the rotor can work with two numbers of revolutions (for **GMS**). The roller pressure of **GCS** can be changed.

**Fig. 3-1** The machine is equipped with the Top Safe safety system.
The machine frame (conditioner frame) with cutter bar is floating suspended in two strong springs for vertical movements and two horizontal springs, which provide the cutter bar with an easy swivelling movement when meeting stones or the like. Simultaneously the drawbar is extended and the machine is hereby lifted. This reduces the impact significantly.

The stubble height is continuously adjustable by adjusting the inclination of the cutter bar and the adjustable guide shoes (Fig. 3-10).

The machine can without problems manoeuvre round obstacles by means of the hydraulic shift cylinder.

## WORKING IN THE FIELD

**Fig. 3-2** Place the machine in working position. In this position you drive clock-wise for some rounds, so that there is space to turn at the end of the field. The pre-harvesting is ended with making swath of the outer turn, driving counter clock-wise. Then the field is ready to be harvested in one piece, or divided into sections as required. The speed varies from 6 - 19 km/h depending on the crop and the working conditions.

**Fig. 3-3** The swivel gearbox allows a turn of $90^{o}$ – and more – without vibrations in the transmission. Turning in the corners of the field is reduced from the usual approx. 12 sec. to only approx. 3, because the machine practically is turning around its own centre line.

**Connect carefully and increase to the correct number of RPM** (standard 1000 RPM), **before working in the crop.** When placing the swaths the single-acting hydraulic take-out of the tractor (for raising/lowering the machine) must be in the **floating position.**

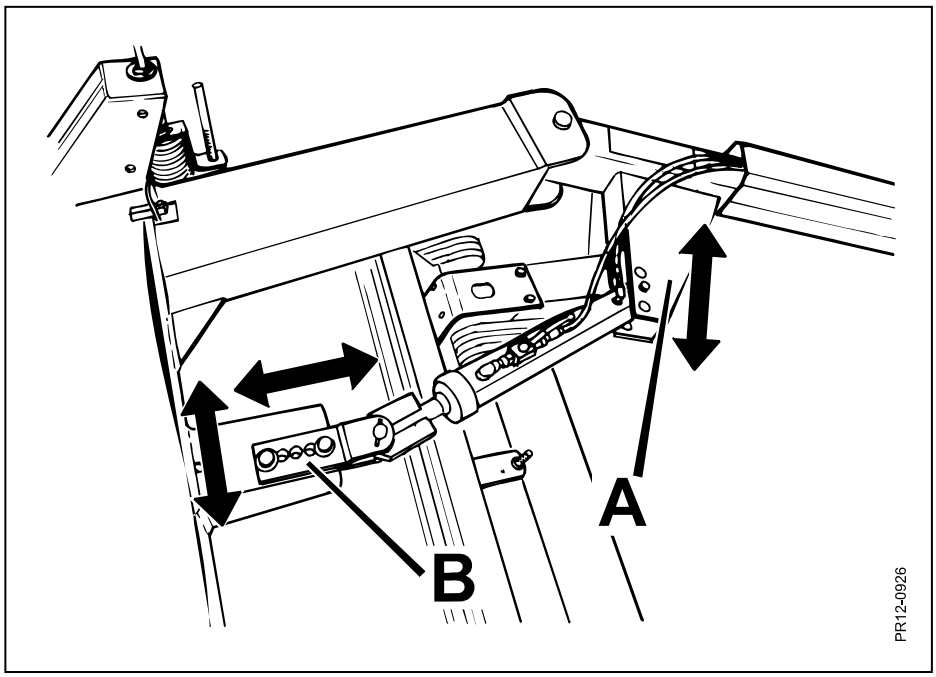



Fig. 3-5

# ADJUSTMENT OF THE SWING OF THE DRAWBAR

An adjustment of the swing of the drawbar is made, so that it is possible to use the two positions of the shift cylinder for transport and working, respectively.
In transport position the machine must be centred around the tractor.
In working position a position must be found, where the previous swath is between the wheels of the tractor and at the same time a position in which the cutter bar has the full working width in the uncut crop.

**Fig. 3-5** The adjustment can be made either at pos. **A** or pos. **B**, or at both if it is necessary. Make sure that the bracket at pos. **B** always is fixed with 2 bolts.

**IMPORTANT: The bolts at B are checked and if necessary tightened after every 50 working hours.**

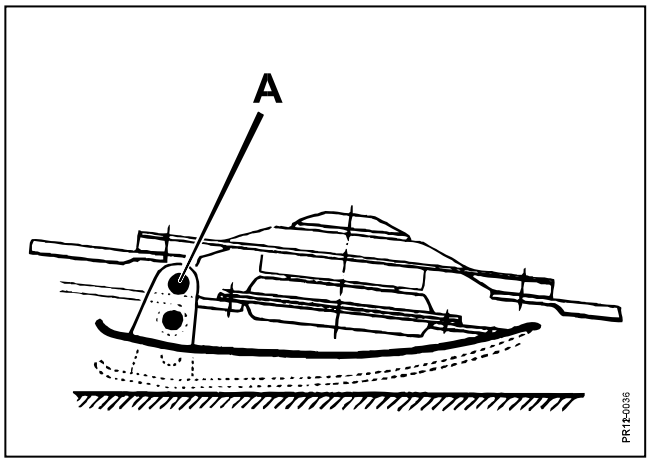



Fig. 3-8

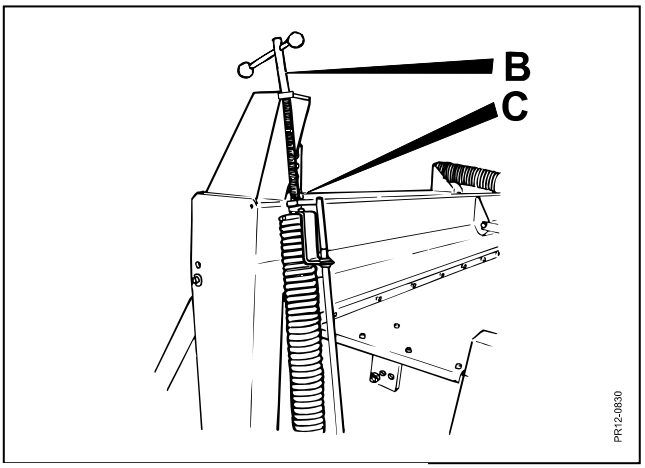



Fig. 3-9

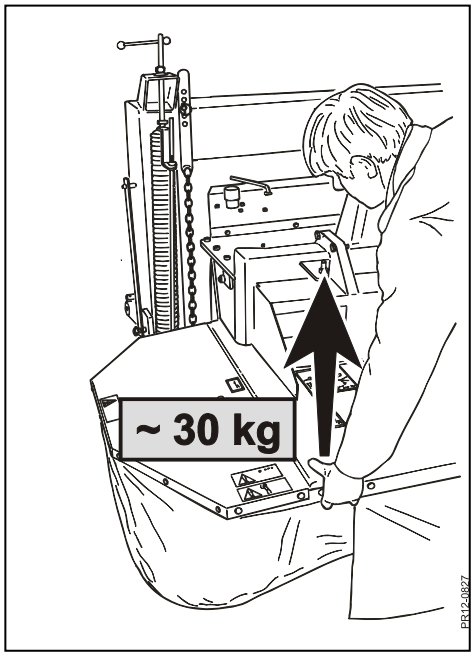



Fig. 3-10

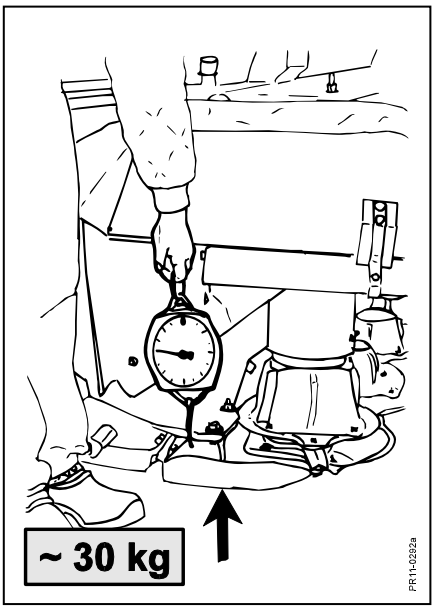



Fig. 3-11

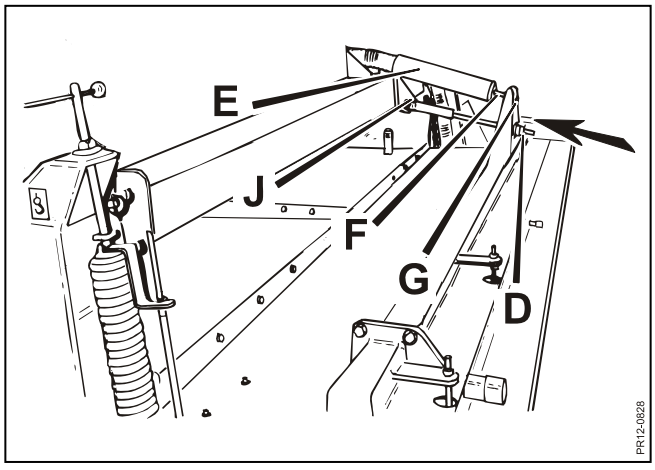



Fig. 3-12

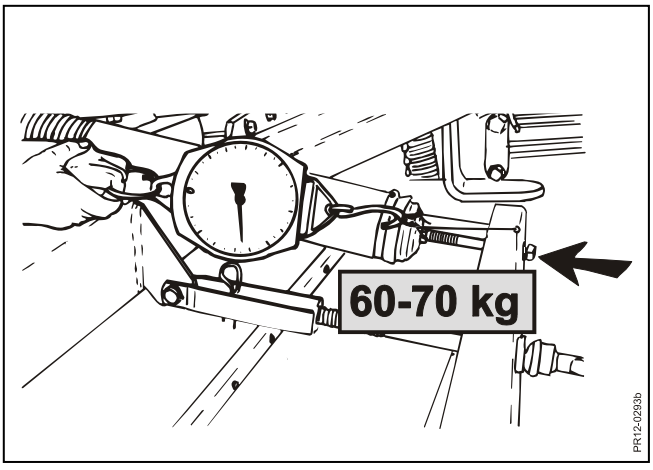



Fig. 3-13

# STUBBLE HEIGHT AND RELIEF OF THE CUTTER BAR

**Unload the cutter bar in the <u>right</u> order:**

1) The machine is swivelled to **working position**.

The machine must be mounted correctly in the lower links of the tractor, see the section about **Connection**. The **cutter bar must be lowered to rest on an even surface.**

**Fig. 3-8** 2) Adjust **the stubble height** by means of the guide shoes and by adjusting the inclination of the cutter bar.

Theoretical cutting height:
The upper hole 55 mm => corresponding to a stubble height of 110 mm.
The lower hole 30 mm => corresponding to a stubble height of 60 mm.
(Usually the stubble height is 2 x theoretical cutting height).

**Fig. 3-12** The vernier adjustment is made by adjusting the inclination of the cutter bar on the spindle at **D**. A spring cotter **J** secures the adjustment.
Adjustment is made in both sides!

**Fig. 3-9** 3) The height relief springs are adjusted with the handle **B**, until the cutter bar **has** a suitable ground pressure**.**

**Fig. 3-10** In principle the spring adjustments can be adjusted in such a way that the cutter bar is floating.
**Fig. 3-11** For instance first you tighten the springs adjusting the lift power of the cutter bar to **30-40 kg on each side**. (See Fig. 3-10, or Fig. 3-11 where a spring weight is used as help).
**Fig. 3-9** A counter nut **C** secures the adjustment.

**<u>Note</u>:** **It is seldom that the height relief springs are to be tightened equally much**.

**Fig. 3-12** 4) The **Top Safe** spring **E** is adjusted until the cutting platform can be moved in the direction of the arrow, with a **suitable pressure.**

The counter nut **F** is loosened and the adjustment is made by means of **G**.
**Fig. 3-13** Start with **approx. 60-70 kg** in each side.

**NB!** The **TOP SAFE** spring has not been adjusted from the factory because of the transport and after adjustment it should be checked by weight.

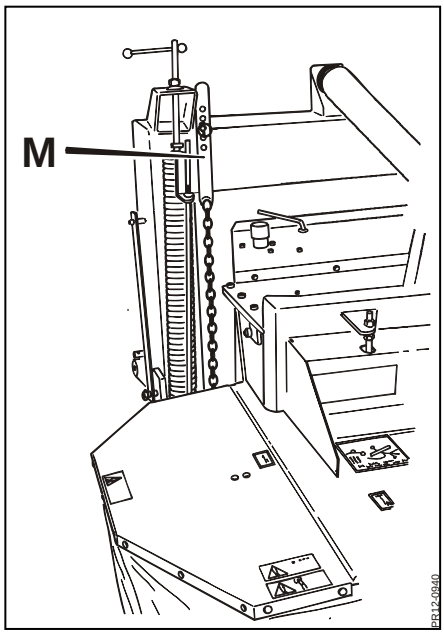



Fig. 3-14

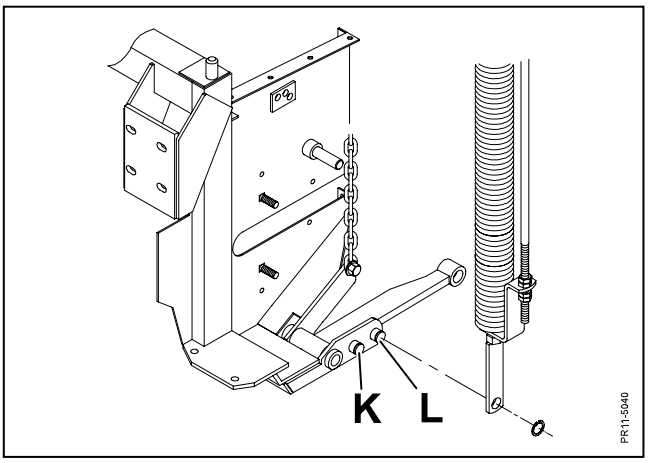



Fig. 3-16

**Fig. 3-14** 5) **The safety chains, M,** are adjusted with approx. **1½** chain link's clearance downwards.

The safety chains ensure that the cutter bar has a stable suspension during transport and when working in the headland and they also ensure a maximum bottom position/depth.

6) **Any modification** of the stubble height demands a re-adjustment of the relief (item 3 -5).

7) **Working in the field** - ensure less possible load on the cutter bar. If the stubble is wavy the springs have been tightened too much.

**The extension of the adjustment is only intended as a guide and must be adapted to the individual need and situation.**

**Note:** **At intervals it must be checked that the machine is working with the correct relief. Earth and grass on the cutter bar and in the swath boards can change the relief considerably!**

**To small relief** can cause **great wear** on the guide shoes and **damage the grass roots.** There is also an increased risk that the machine will **"pick-up stones"**, which means an increased risk of damage to material and injury to persons.

**Fig. 3-16** If the cutting platform has a marked tendency to tip over the problem can be solved in two ways:

A) By loosening the horizontal top springs a little (Fig. 3-12) page 32, and tightening the vertical height relief springs a little (Fig. 3-9).

B) Or by displacing the fix point of the vertical height relief springs on the lower part of the cutter bar from **K** to **L**. Thereby the centre of gravity of the cutting platform is moved forward resulting in greater ground seeking qualities.

And vice versa, if the cutting platform seems to be too ground seeking A) or B) is performed in the opposite direction.

From the factory the **GCS** models are mounted at **K**, and the **GMS** models at **L**. This is the optimum adjustment in most cases.

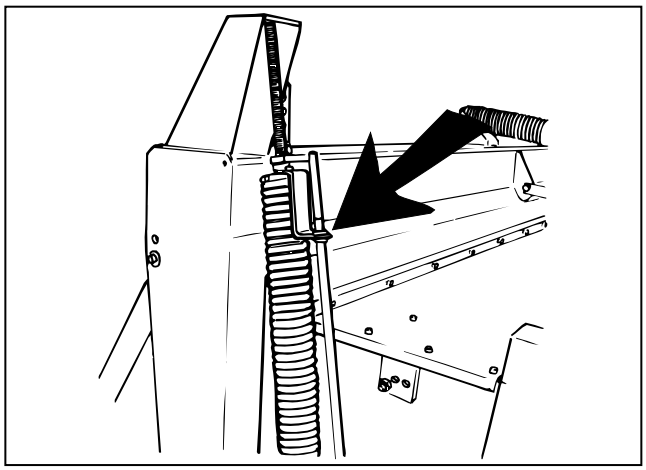


Fig. 3-17

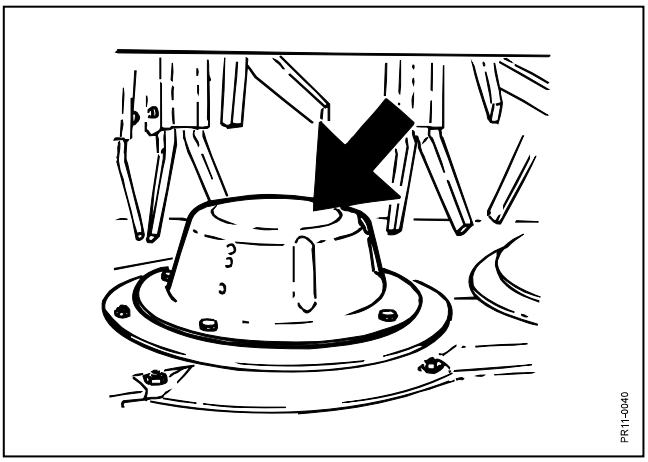



Fig. 3-18

**NB! THE CONNECTION BETWEEN CUTTER BAR AND RELIEF SPRING**

It is essential to pay attention to the important connection between the following elements:

**a)** The distance from the PIC shaft to the ground and the inclination of the cutter bar.

**b)** The tension of the Top Safe springs and of the height relief springs.

If one thing is changed under **a**, the other things under **b** must be checked/adjusted to obtain optimum working conditions.

**WARNING:** **Remember! After the adjustment it must be checked that all the counter nuts have been tightened and any tools must be removed from the machine.**

# SPRING INDICATOR

The machine must be connected to the tractor as described in the section 'Connection and test driving'. The stubble height and the relief must be performed as described on page 35.

**Fig. 3-17** Having connected the machine to the tractor in a fixed height decided by the length of the support chain and having balanced the machine in both sides the spring indicator is adjusted.
The rod is adjusted in the height so that the indicator is positioned straight in front of the marking on the rod. When driving check that the indicator stays at the marking.

The spring indicator will then **show** how large the actual relief is compared to the original adjustment.

This is useful information when working with an (alternative) smaller/larger tractor. The tractor driver does not have to perform the fundamental adjustment of the stubble height nor relief from one tractor to another.
The relief is then adapted by adjusting the height of the lower links until the indicators show the right relief. In return the tractor driver must accept a displacement of the angle of the PTO drive shaft.
A larger angle of the PTO drive shaft will reduce the life and cannot be recommended on a long view.

# FLOW CAPS

**Fig. 3-18** The discs are equipped with low flow caps to enable them to lift the crop away from the blades. This reduces the risk of stripes and re-cutting.

If the power requirement seems too high the flow caps can be dismounted. The crop and the driving technique decide the need of flow caps.

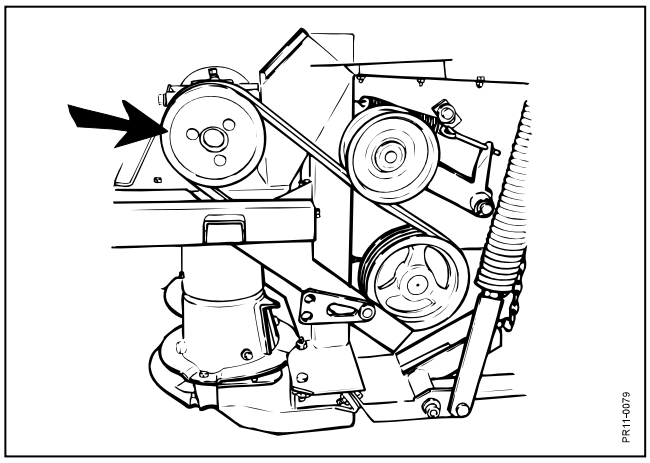



Fig. 3-19

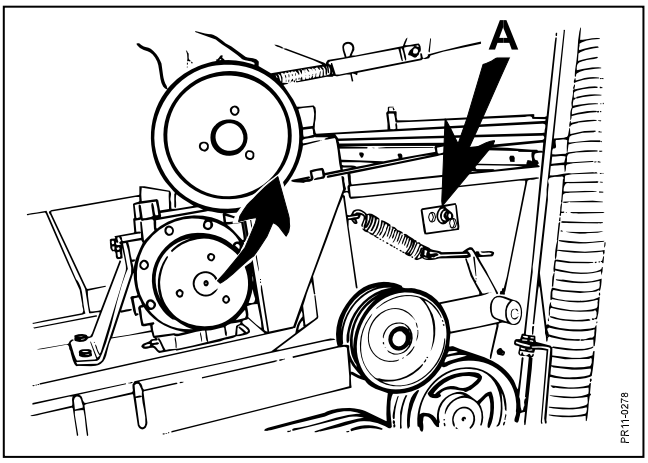



Fig. 3-20

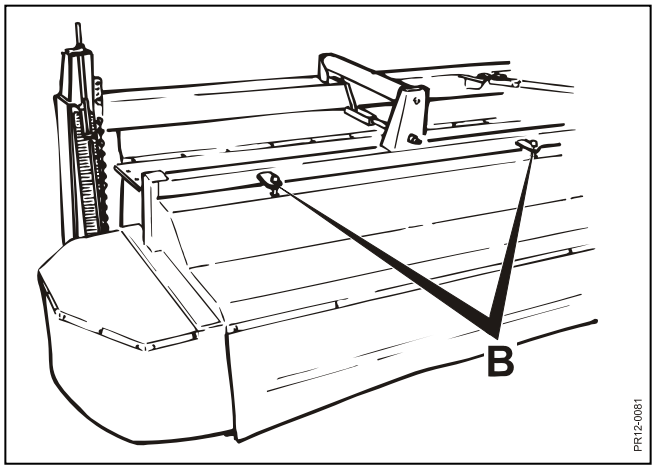



Fig. 3-21

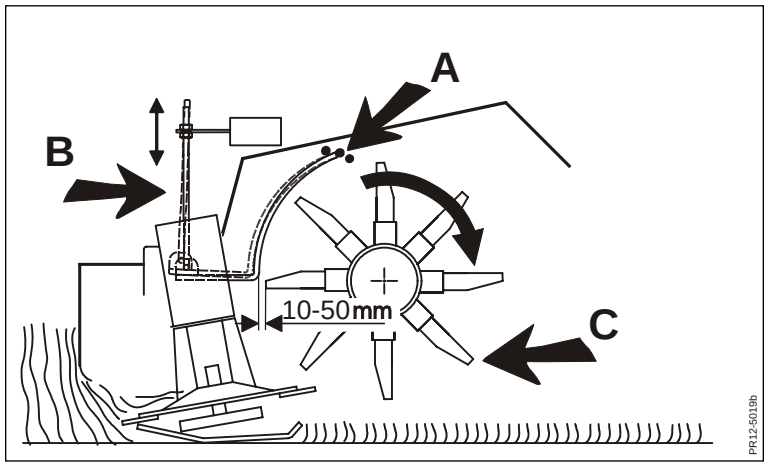



Fig. 3-22

# THE CONDITIONER (GMS)

The conditioner rotor has 2 speeds: **670 - 900 RPM.**

**Fig. 3-19** From the factory the gearbox is equipped with a pulley for a conditioner speed of **900 RPM**.

**Fig. 3-20** When changing to **670 o/min**. the outer big pulley on the gear is removed. (The big pulley is mounted on top of the small one). The 3 supplied belts must be used.

In general: **High speed – stronger conditioning**
**Low speed – weaker conditioning**

**Fig. 3-21** The conditioning can also be varied by changing the distance between the conditioner
**and 3-22** plate and the rotor. Adjustment is made by moving the conditioner plate in the holes at **A**, (right and left side are adjusted equally much) and adjustment of the screws at **B** (right and left side are adjusted equally much.

In general: **Small distance – strong conditioning**
**Large distance – weak conditioning**

**The adjustment should be adapted to the forwarding speed and the state of the crop. As a basic adjustment it is recommendable to start up with a small distance up front (15-20 mm) and a larger distance at the rear.**

**OPTIMAL CONDITIONING** can be obtained with the following positions:

| You have a: | Succulent, green crop | | | or | strawy, more ripe crop | |
|---|---|---|---|---|---|---|
| You want to drive: | above 10 km/h | below 10 km/h | | | above 10 km/h | below 10 km/h |
| The following adjustment of **GMS** is recommended: | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Conditioner rotor speed | high | | | | X | X |
| | low | X | X | | | |
| Distance between conditioner plate and rotor | big | | X | | | |
| | medium | X | | | | X |
| | small | | | | X | |

Finally the PE-fingers at **C** can be turned for a more aggressive attack on the crop.

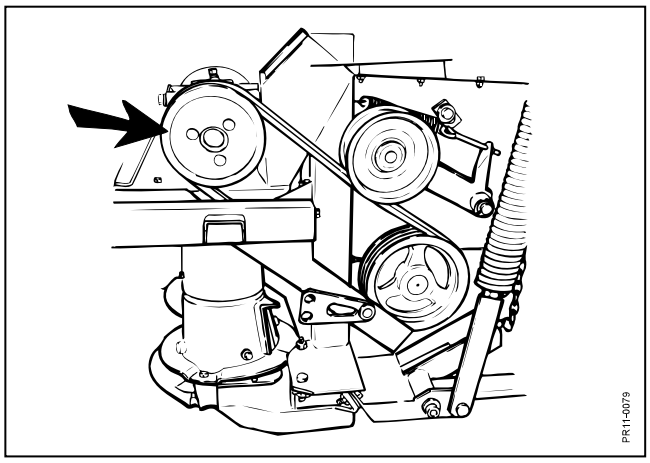



Fig. 3-23

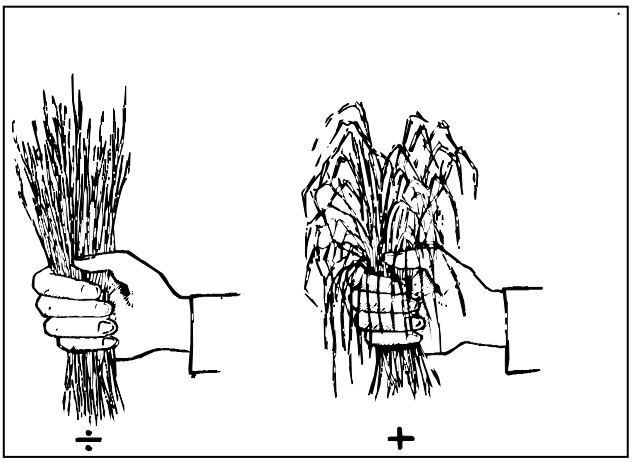



Fig. 3-24

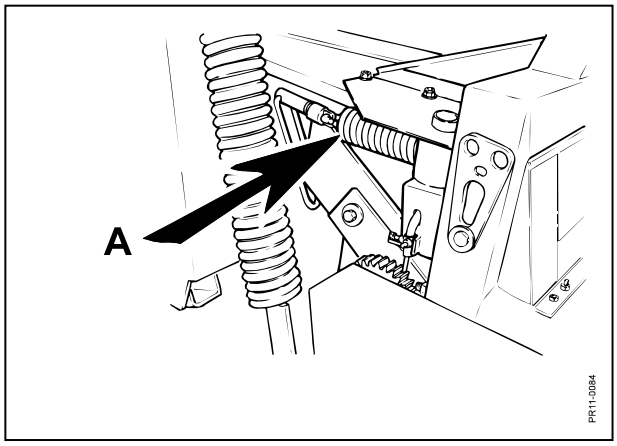



Fig. 3-25

# THE CONDITIONER (GCS)

**Fig. 3-23** From the factory the gearbox is equipped with a pulley for a conditioner speed of 900 RPM. This is the standard speed on the **GCS** machines.

## CONDITIONING

The conditioning should not be stronger than what is required to obtain a quick drying.
The correct degree of conditioning may be difficult to judge, especially in grass crop.
The straws must be broken, but not crushed. Crushed leaves and stems give unnecessary waist.

**Too strong conditioning** results in stems having a dark green colour and giving off liquid.

**The reason may be:**
- that the rollers are too close
- that the roller pressure is too high and
- that the driving speed is possibly too low.

**Fig. 3-24** Too light conditioning is characterised by the straws keeping upright, when a bunch is held in the hand.

**The reason may be:**
- that the roller distance is too big
- that the roller pressure is too low
- that the driving speed is possibly too high.

It may be difficult to decide if the conditioning is suitable, but do not be tempted to exaggerate the conditioning. Normally it is sufficient, even if it cannot immediately be seen on the grass.

## ROLLER PRESSURE

**Fig. 3-25** In order to ensure a suitable roller pressure, both by large and small quantities of grass, the upper roller is spring-loaded and the springs also give the rollers the possibility of receding when foreign matter get between the rollers.

The roller pressure is adjusted on both sides of the machine at the springs **A**.

**The following lines of direction can be given:**

- In grass crops **the springs** are tightened.

- In clover, lucerne and other leafy crops the springs are **loosened**

**Attention:** The springs must be equally adjusted in both sides.

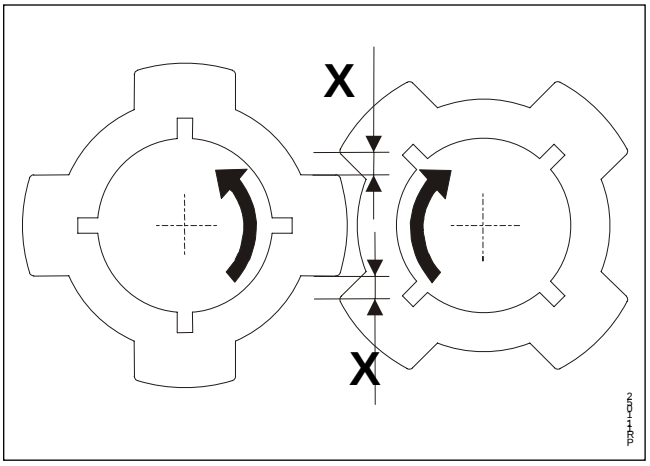



Fig. 3-26

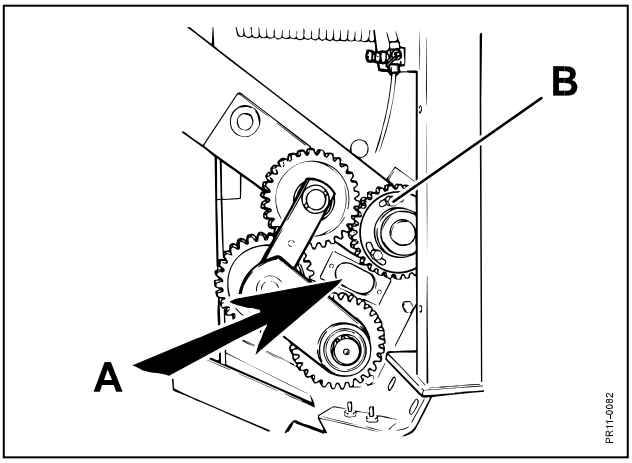



Fig. 3-27

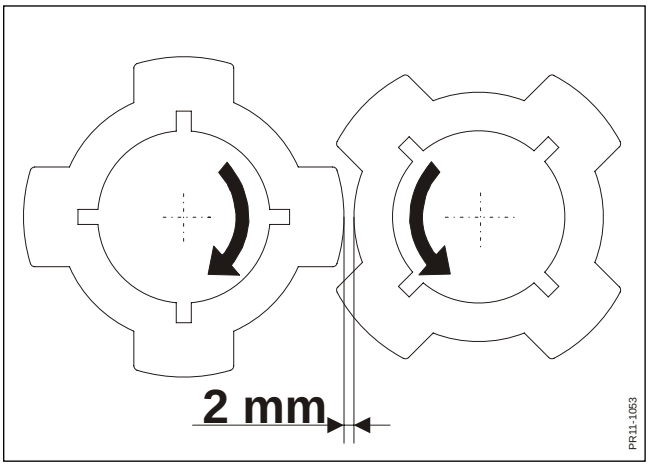



Fig. 3-28

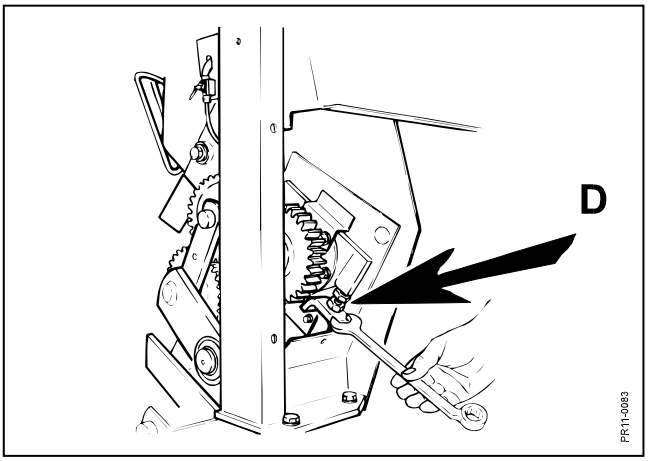



Fig. 3-29

### SYNCHRONIZATION OF THE ROLLERS

**Fig. 3-26** The rollers **must never** touch each other, this will give a poor result and many vibrations in the machine.

The rollers must always be correctly synchronised, i.e. be in time with each other, so that the roller profiles on one roller go precisely into the roller profiles on the other roller. the rollers are correctly synchronized when the distance **X** is approximately the same in both sides.

**Fig. 3-27** The synchronisation can be checked through the peephole **A** between the rollers. For readjustment the 4 bolts **B** are loosened, and the roller is turned into the correct position. The bolts are tightened with 200 Nm (20 kgm).

### DISTANCE BETWEEN ROLLERS

**Fig. 3-28** The distance between the rollers must be minimum 2 mm. and the rollers must run without considerable noise.

**SAFETY:** The distance should be checked before starting and is measured from the rear between the rollers where the dimension 2 mm is indicated in the figure. Check the distance at several places on the roller.

**Fig. 3-29** Adjustment of the distance, if required, is made at the screw **D** which is equipped with a counter nut that must be retightened properly after the adjustment. Adjustment is made at both sides of the machine.

**IMPORTANT:** If there are jarring sounds or vibrations it may be due to the rollers being too close or the synchronisation being incorrect.

**Check the above adjustments frequently.**

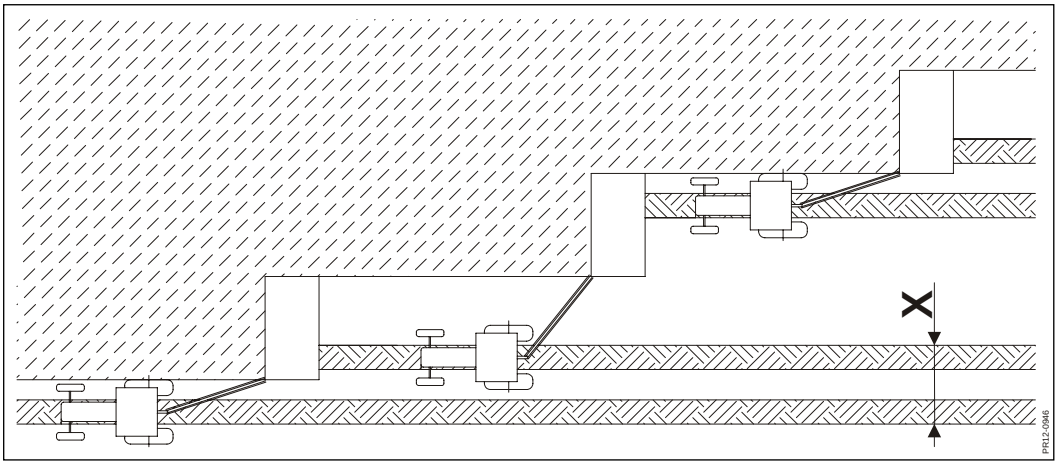



Fig. 3-33

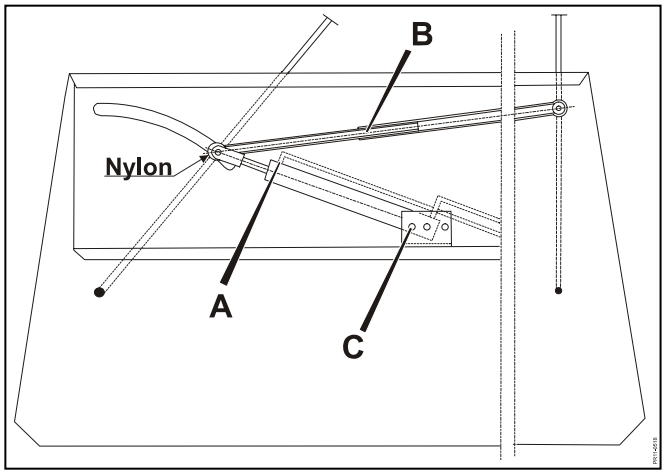



Fig. 3-34

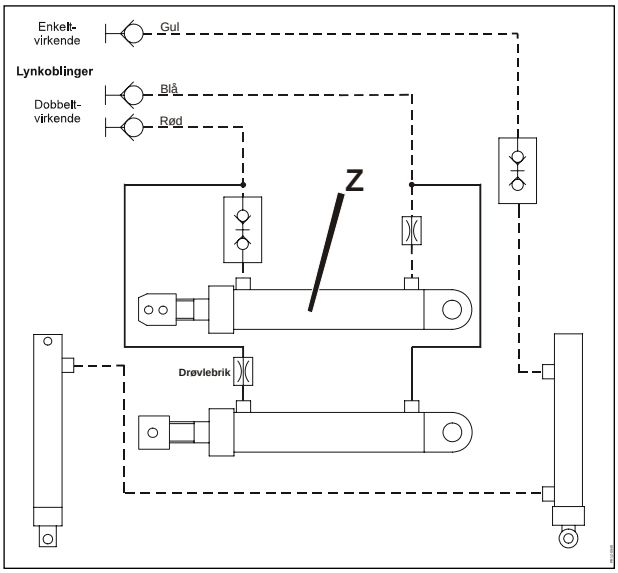



Fig. 3-35

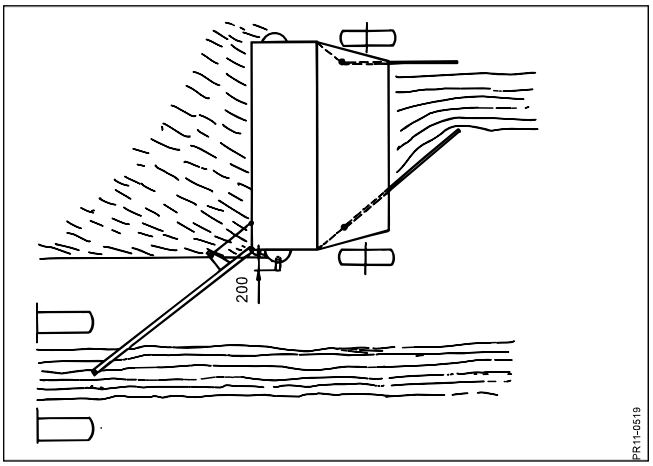



Fig. 3-36

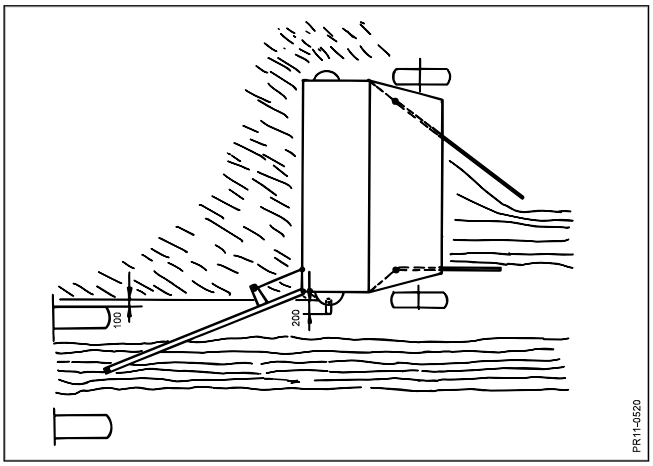



Fig. 3-37

# ASYMMETRIC SWATHING (additional equipment)

**Fig. 3-33** The equipment for double swathing makes it possible to place two swaths at such a small distance **X** that in most cases a 3 m pick-up can pick up two swaths at a time.

The equipment consists of parts for hydraulic swivelling of the swath guards and a longer drawbar with a device for asymmetric swing of the drawbar in order to avoid driving in the already laid swath with the tractor's rear wheels.

The swath guards are swivelled to the right or the left side by two successive drivings. The drawbar is swung out for adaptation of the position of the swaths, as the swing of the hydraulic cylinder is adjusted by an adjustable stop.

## ADJUSTMENT AND DRIVING

The equipment is mounted according to the delivered mounting instructions. Make sure that the guards are easily movable and that the nylon discs are positioned between the connecting rod and the top plate. Also make sure that the oil take-out from the tractor has been adjusted to a minimum oil flow.

**Fig. 3-34** At **A** a throttle valve is placed to reduce the speed of movement. At pos. **B** and **C** the turning angle of the swath guards can be adjusted.

**Fig. 3-35** The diagram shows the connection of the extra cylinder **Z** with the standard hydraulic system.

**Fig. 3-36** We recommend that the adjustment of the equipment is made in the field. This is
**Fig. 3-37** made during 3 drivings:

1st driving: The swath plates are adjusted to place the grass to the left.

2nd driving: The swath plates are adjusted to put the grass to the right side. The machine is driven into the uncut grass, so that the point of the knife on the left rotor juts out by 200 mm. The hydraulic cylinder for lateral adjustment is pulled out into full length.

3rd driving: The swath guards are adjusted to place the swath to the left side. The machine is driven into the uncut grass as described previously. The right tractor wheel is placed about 100 mm from the uncut grass by activating the hydraulic cylinder. In this position stop **C** is mounted. Stop **C** is asymmetric so that vernier adjustment can be made by turning the stop.

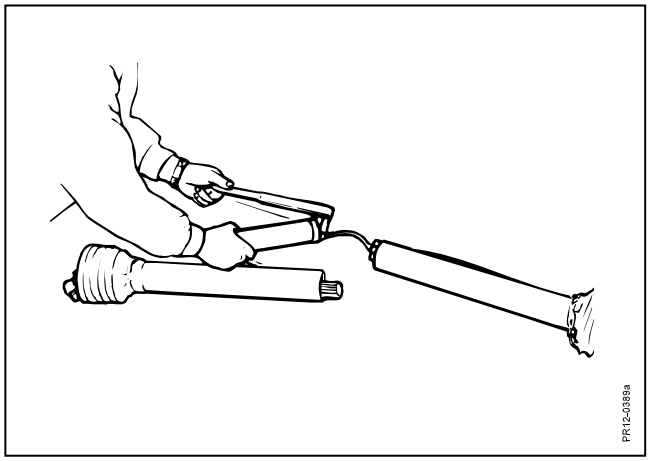



Fig. 4-1

# 4. GREASING

## GREASE

Always ensure that the machine has been properly greased before it starts operating.

Go through the greasing chart.

**TYPE OF GREASE:** Universal grease of good quality.

Rotating mechanical connections are greased with grease or oil as required.

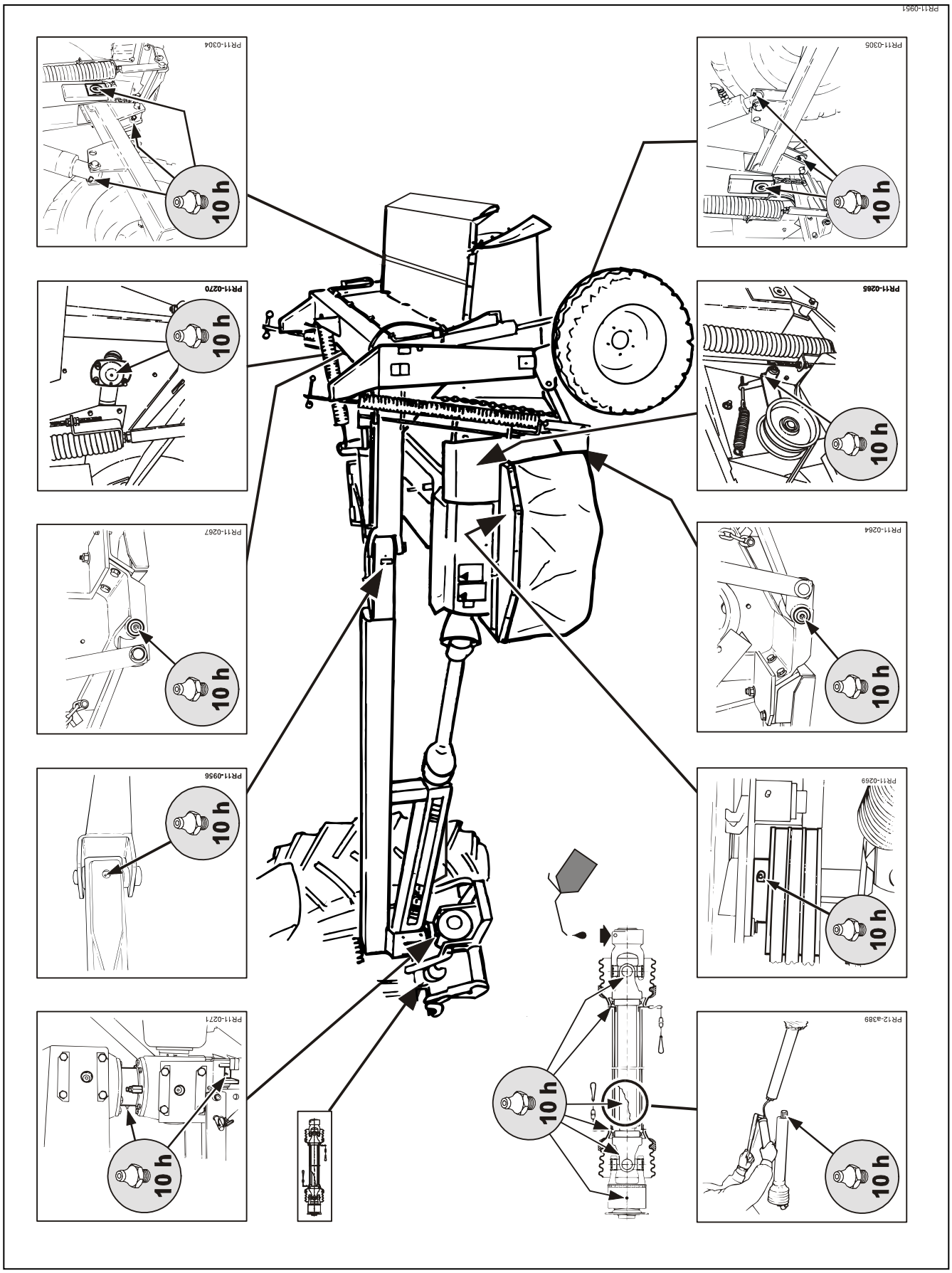
**WARNING - REMEMBER:**

**PTO DRIVE SHAFTS ARE GREASED EVERY 10. OPERATING HOUR**

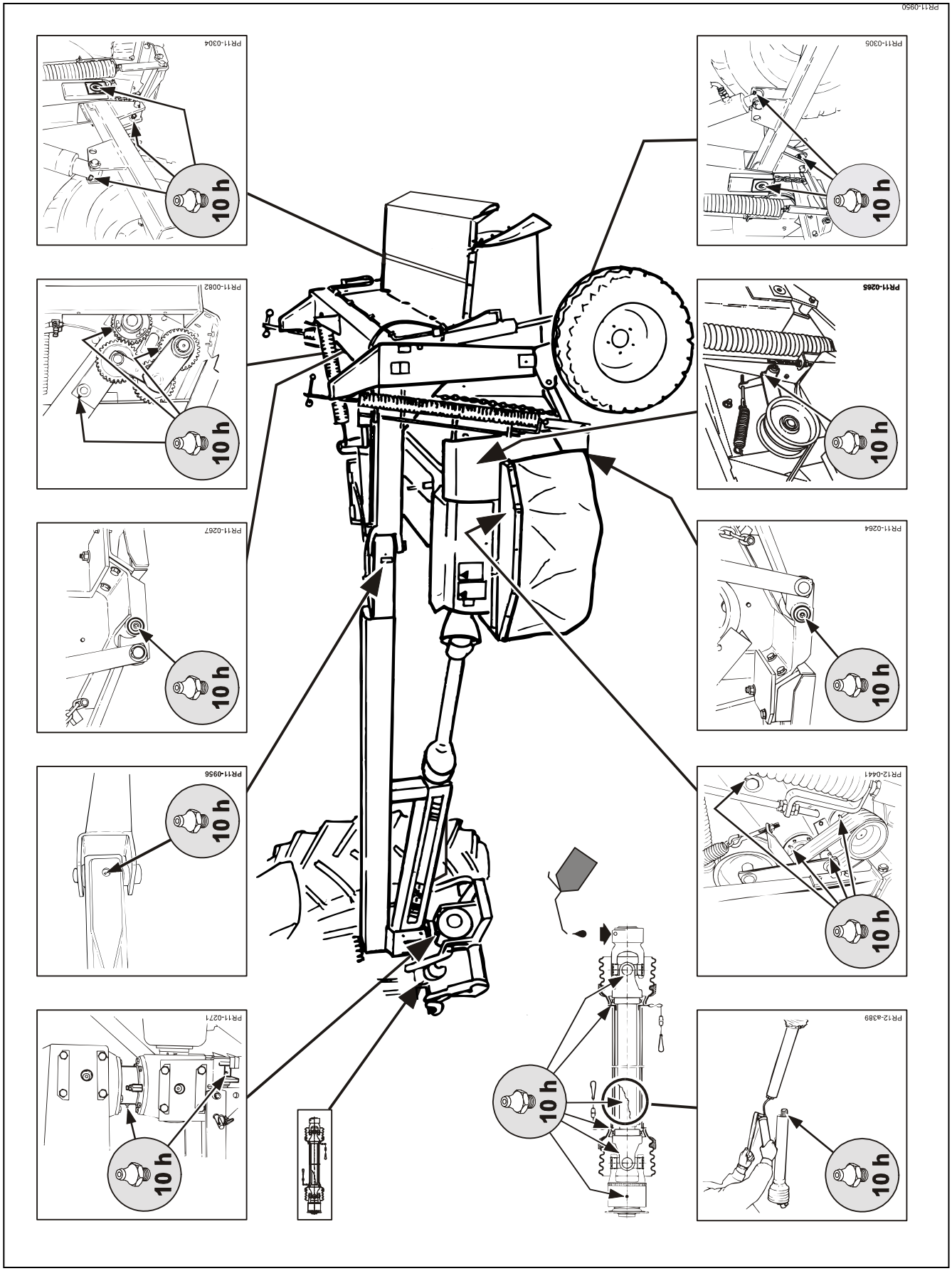
Pay special attention to the **sliding PROFILE TUBES**. They must be able to slide back and forth even when the torque is heavy**. If you neglect to grease the profile tubes sufficiently, it will result in high axial forces, which will damage the profile tubes, and in time also connecting** shafts and gearboxes.

**Fig. 4-1 This especially goes for the main PTO drive shaft and the traversing PTO drive shaft that operates the bevel gearbox above the cutter bar.**

**Greasing chart for disc mowers <u>GMS 2400 TS, GMS 2800 TS and GMS 3200 TS</u>**
Below grease spots **must** be greased according to the operation time intervals indicated.



**Greasing chart for disc mowers type <u>GCS 2400 TS, GCS 2800 TS and GCS 3200 TS</u>**
Below grease spots **must** be greased according to the operating time intervals indicated.



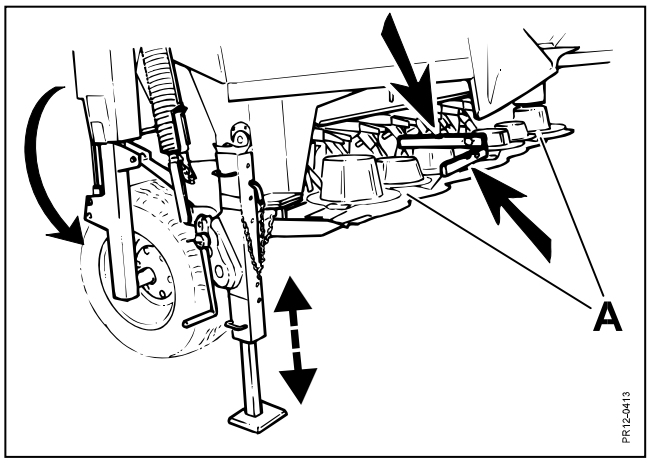



Fig. 4-2

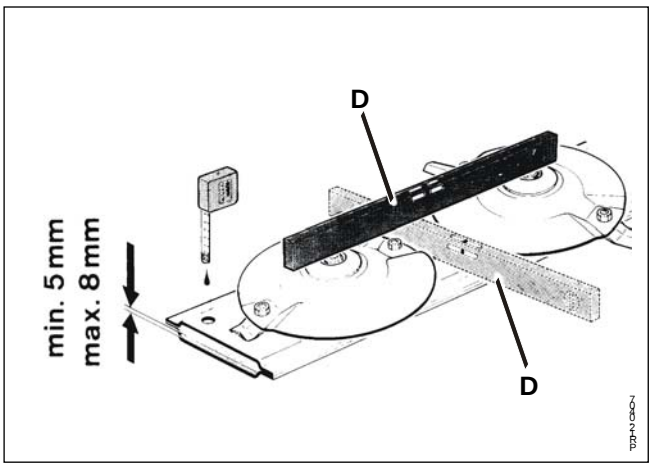



Fig. 4-3

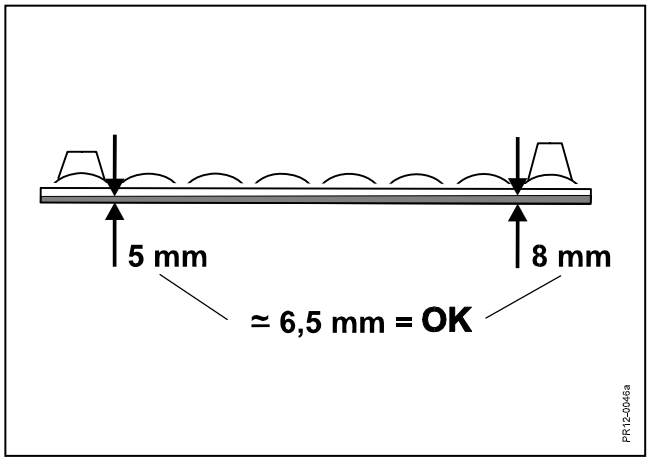



Fig. 4-4

# OIL IN THE CUTTER BAR

**Oil content:** 

| | |
|---|---|
| **GMS/GCS 2400 TS** | **1.70 l** |
| **GMS/GCS 2800 TS** | **2.00 l** |
| **GMS/GCS 3200 TS** | **2.25 l** |

**2** Filling plugs are placed on top of the cutter bar:

**GMS/GCS2400TS**
Between the 1st and 2nd disc in the right **and** left side.

**GMS/GCS2800TS**
Between the 1st and 2nd disc in **the right side**, and between the 2nd and 3rd disc in **the left side**.

**GMS/CGS3200TS**
Between the 1st and 2nd disc in the right **and** the left side.

**Oil type: Only quality: API GL4 SAE 80W**

(In certain countries you cannot get GL4 SAE 80W. In these cases API GL4 or GL5 SAE 80W-90 can be used as an acceptable alternative. Never use pure SAE 90W oil in the cutter bar).

**Fig. 4-2** The oil level must be checked every day during the harvesting season.
**Fig. 4-3** In order to facilitate the daily oil check we can recommend to have a permanent "oil measuring place". This means that the check for **"horizontal cutter bar"**, as shown on Fig. 4-2 and 4-3, only has to be made once.

**Horizontal cutter bar:**

Longitudinal direction: The machine is lifted to max. ground clearance. Hereby the construction of the machine ensures that the cutter bar will tilt backwards to almost horizontal position. Fine adjustment can be made with the tractor's lower links, or by ground adaptation.

Cross direction: Fine adjustment can be made with e.g. a lifting jack, as shown.

**Fig. 4-4** **Oil level:**  6 - 7 mm.

**This oil level must be an average of the measuring from both filling holes** (marked by **A** on Fig. 4-2).
Wait 3 minutes (cold oil: wait 15 minutes) and then check the level.

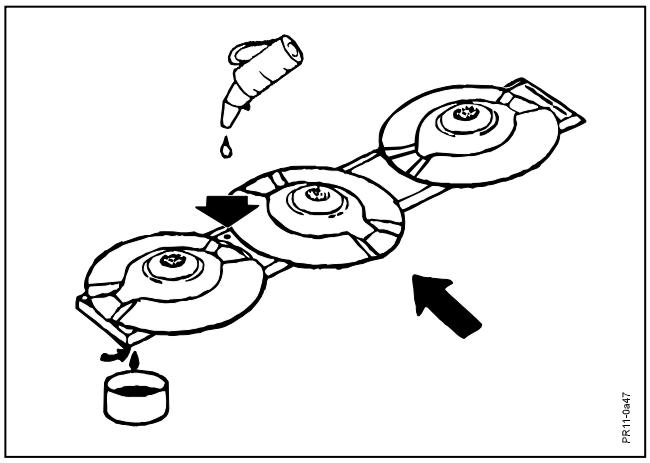



Fig. 4-5

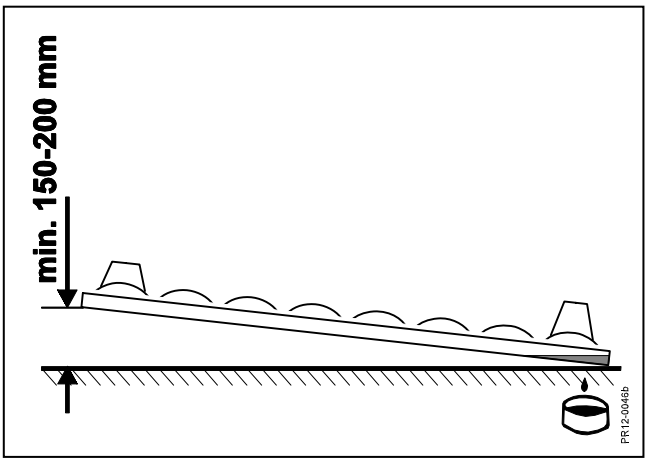



Fig. 4-6

**Fig. 4-5Oil change:**  First oil change after 10 working hours and then after every 200 hours of working or at least once a year.

The oil is drained off at the plug in the bottom in the left-hand side.

**Please note:** The **left** skid is dismounted in order to reach the drain plug.

**Fig. 4-6 For oil changes the cutter bar is raised at least 150-200 mm in the right side to ensure optimum emptying.**

The drain plug is fitted with a magnet and should be cleaned at every oil change.

**REMEMBER:** **Never** fill with more oil than prescribed.
**Too much oil as well as too little oil in the cutter bar causes unintended heating, which in time will damage the bearings.**

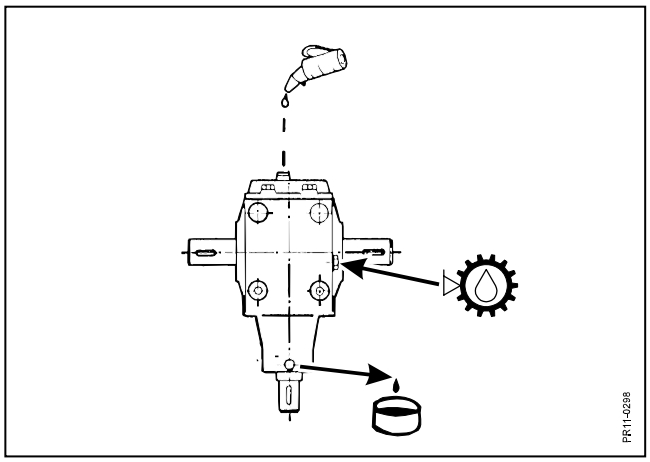



Fig. 4-7

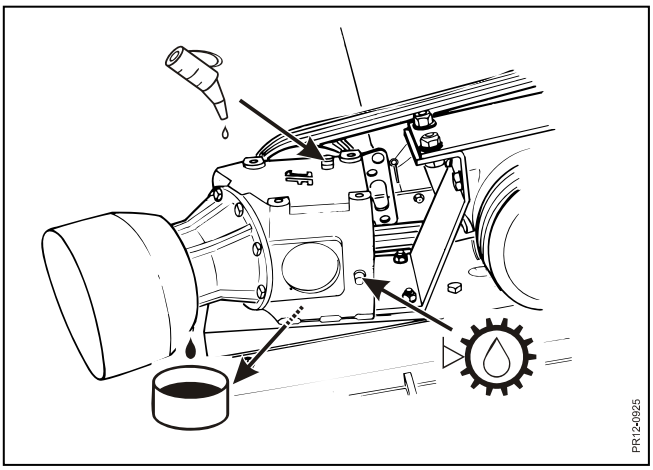



Fig. 4-8

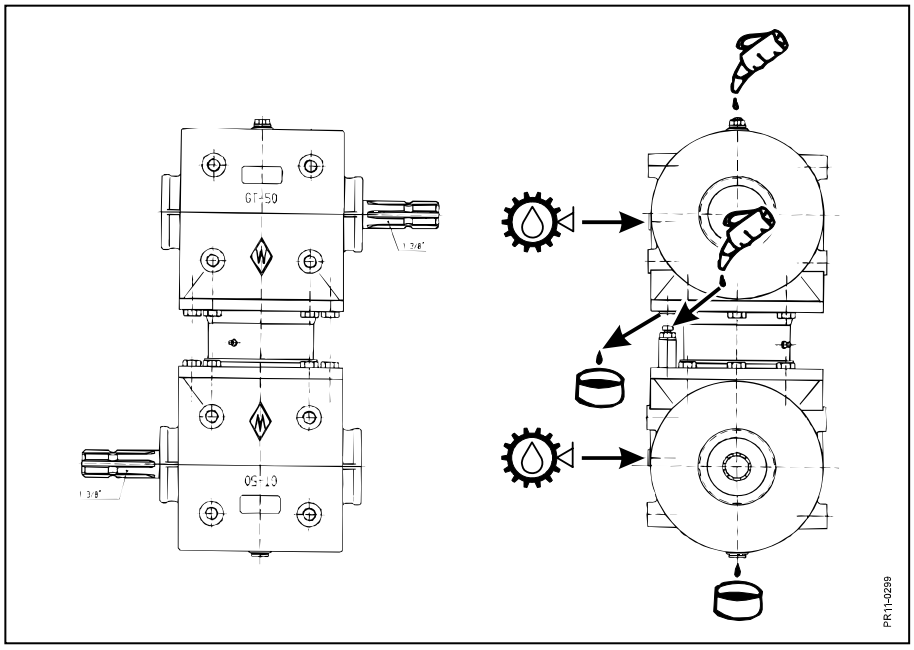



Fig. 4-9

# OIL IN THE BEVEL GEARBOX ABOVE THE CUTTER BAR

Fig. 4-7

**Oil content:**

| Machine : | 2400, 2800 | 3200 |
|---|---|---|
| Quantity: | 1.1 l | 1.5 l |

**Oil type:** API GL4 or GL5 SAE 80W-90

**Oil level:** **The oil level must be checked daily in the harvesting season.**

**Oil change:** First oil change after 50 working hours and then after every 500 working hours or at least once a year.

# 120 DEGREE BEVEL GEARBOX

Fig. 4-8

**Oil content:** 1.7 l

**Oil quality:** API GL-4 or GL-5 SAE 80W - 90

**Oil level:** **The oil level must be checked daily in the harvesting season.**

**Oil change:** First oil change after 50 working hours and then after every 500 working hours or at least once a year.

# SWIVEL GEARBOX AT TRACTOR

Fig. 4-9

**Oil content:**

| Machine: | 2400 | | 2800, 3200 | |
|---|---|---|---|---|
| | The upper part | The lower part | The upper part | The lower part |
| Quantity: | 0.6 l | 0.9 l | 1.8 l | 2.5 l |

**Oil type:** API GL4 or GL5 SAE 80W-90

**Oil level:** **The oil level must be checked daily in the harvesting season.**

**Oil change:** First oil change after 50 working hours and then after every 500 working hours or at least once a year.

# 5. MAINTENANCE

## IN GENERAL

**WARNING:** **For repair or maintenance of the machine it is especially important to ensure correct personal safety. Therefore, always park the tractor (if mounted) and the machine according to the GENERAL SAFETY RULES items 1-20 in the beginning of this instruction manual.**

**IMPORTANT:** **Screws and bolts on your new machine must be retightened after some hours of operation. This also applies if repair has been made**.

Torque moment $\mathbf{M_A}$ (if nothing else has been stated).

| **A**<br>Ø | Class: **8.8**<br>$\mathbf{M_A}$ [Nm] | Class: **10.9**<br>$\mathbf{M_A}$ [Nm] | Class:**12.9**<br>$\mathbf{M_A}$ [Nm] |
|---|---|---|---|
| **M 8** | 25 | 33 | 40 |
| **M 10** | 48 | 65 | 80 |
| **M 12** | 80 | 120 | 135 |
| **M 12x1,25** | 90 | 125 | 146 |
| **M 14** | 135 | 180 | 215 |
| **M 14x1,5** | 145 | 190 | 230 |
| **M 16** | 200 | 280 | 325 |
| **M 16x1,5** | 215 | 295 | 350 |
| **M 18** | 270 | 380 | 440 |
| **M 20** | 400 | 550 | 650 |
| **M 24** | 640 | 900 | 1100 |
| **M 24x1,5** | 690 | 960 | 1175 |
| **M 30** | 1300 | 1800 | 2300 |

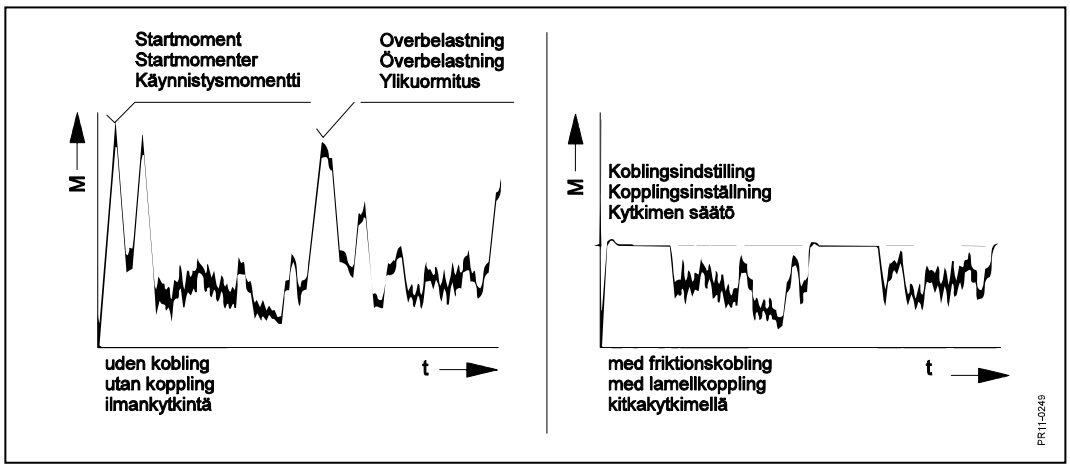



Fig. 5-1

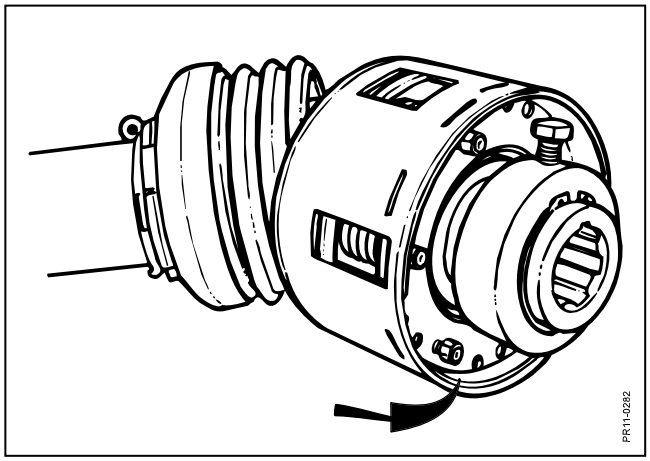
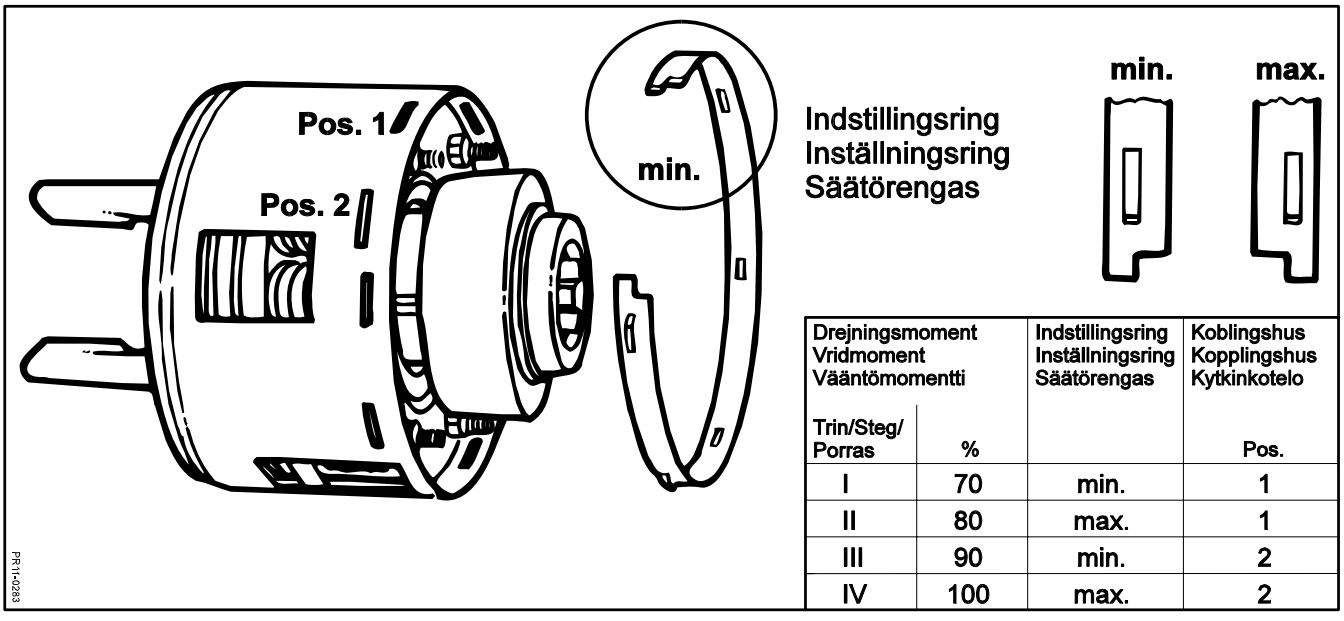



Fig. 5-2




| Drejningsmoment<br>Vridmoment<br>Vääntömomentti | | Indstillingsring<br>Inställningsring<br>Säätörengas | Koblingshus<br>Kopplingshus<br>Kytkinkotelo |
|---|---|---|---|
| Trin/Steg/<br>Porras | % | | Pos. |
| I | 70 | min. | 1 |
| II | 80 | max. | 1 |
| III | 90 | min. | 2 |
| IV | 100 | max. | 2 |

Fig. 5-3

# FRICTION CLUTCH

**Fig. 5-1** **In order to ensure a long life for your tractor and machine** the machine is delivered with **friction clutch** on the front PTO drive shaft. On the figure is shown how the friction clutch protects the transmission against high torque peaks and at the same time is capable of transmitting the nominal torque while it slips.

In order to ensure that the clutch works as intended it must be “aired” at regular intervals **as dirt and moisture may cause the clutch to get “stuck”.**

**Fig. 5-2** Before the start of a new machine and after a long period of standstill, e.g. winter storage, **the clutch is "aired" in the following way:**

The six nuts on the flange are tightened. Hereby the springs are compressed so that they do not press on the clutch plates and the clutch can rotate freely. **Have the clutch rotate for half a minute** to remove dirt and possible rust on the plates. The nuts are **loosened** again until they are at level with the threads of the bolts, and the springs can press on the clutch plates.

**Fig. 5-3** The torque in the friction clutch has 4 different torque adjustments, which should be adapted as required. This is done by turning the adjustment ring and by choosing 2 different positions in the clutch housing.

1. The adjustment ring has a **minimum** and a **maximum** position.

2. The clutch housing has two sets of slots in the height into which the adjustment ring can be mounted, **pos. 1 and pos. 2**.

GUIDING TORQUE ADJUSTMENTS

| PTO | Moment | Adjustment |
|---|---|---|
| 540 | 1500 Nm | Step lV |
| 1000 | 1200 Nm | Step ll |

**The adjustment can only be made when the six nuts are tightened.** After the adjustment has been made the nuts are loosened again to the end of the bolt.

**WARNING:** **If the clutch is overloaded it will slip and get heated, and hence be worn quickly. Overheating will damage the friction plates. If the clutch is blocked or put out of function in other ways the factory guarantee will be discontinued.**

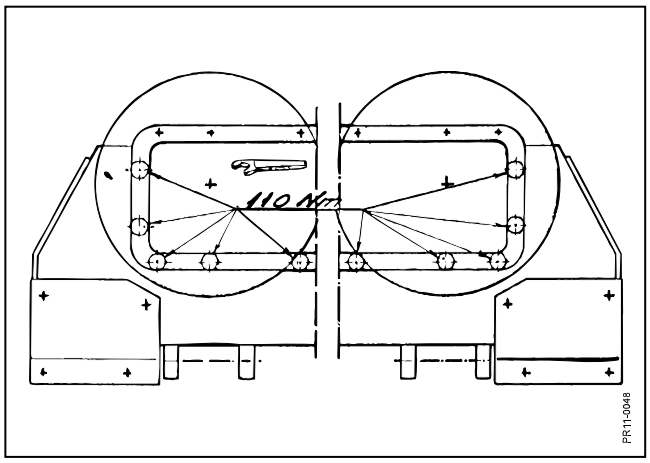



Fig. 5-4

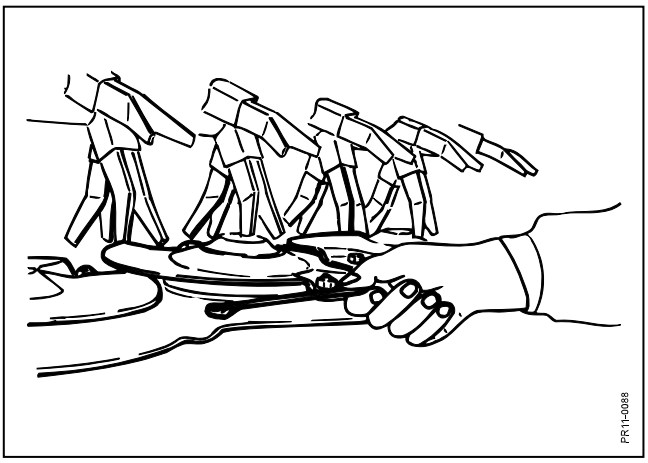



Fig. 5-5

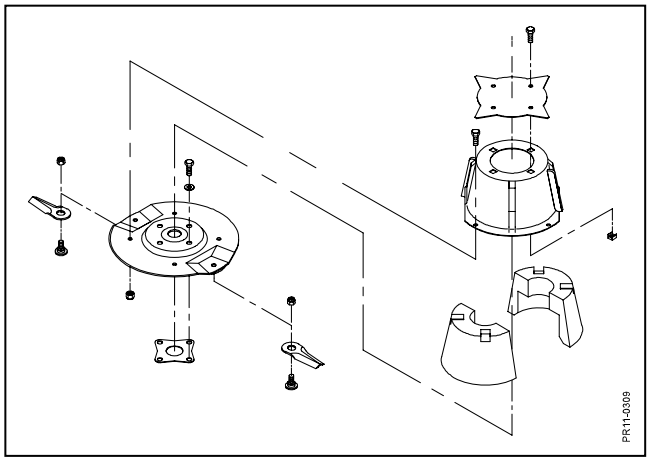



Fig. 5-6

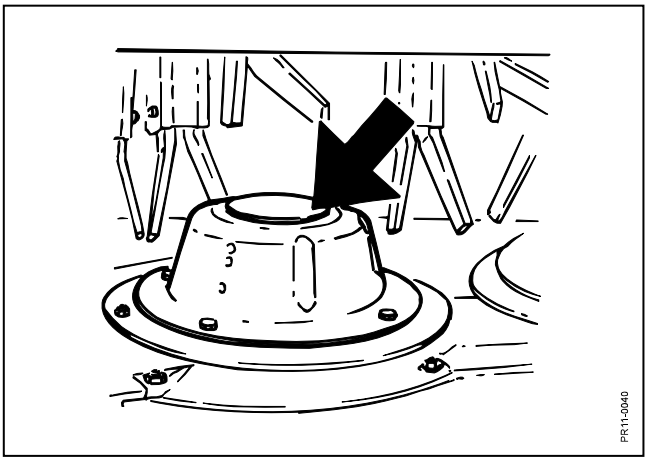



Fig. 5-7

# CONTROL OF UNBALANCE

**WARNING:** **When driving in the field you must always pay attention if the machine starts vibrating more than usually or if it has jarring sounds. The discs rotate with approx. 3000 RPM, and one broken knife may cause serious injury to persons or material damage resulting from unbalance.**

**If working with a modern closed cabin the symptoms may be difficult to discover, and once in a while you have to get out and check if all blades and rotor fingers are intact. In the long run unbalance will cause fatigue fractures and serious damage.**

**Fig. 5-4** To avoid damaging vibrations the bar must be tightened very well. 110 Nm (11 Kpm). Bolts at bar ends are checked regularly.

**Fig. 5-5** Bolts at stone protections and shear bar must be checked at regular intervals.

**Fig. 5-6** The two flow intensifiers in the sides are filled with blocks of foam to avoid unbalance. It is important that the foam blocks remain undamaged so that the flow intensifiers are not filled with dust and dirt.

**Fig. 5-7** Low flow caps should be straightened or replaced by new ones if they are deformed. They should be checked for dust and earth 2 or 3 times per season.

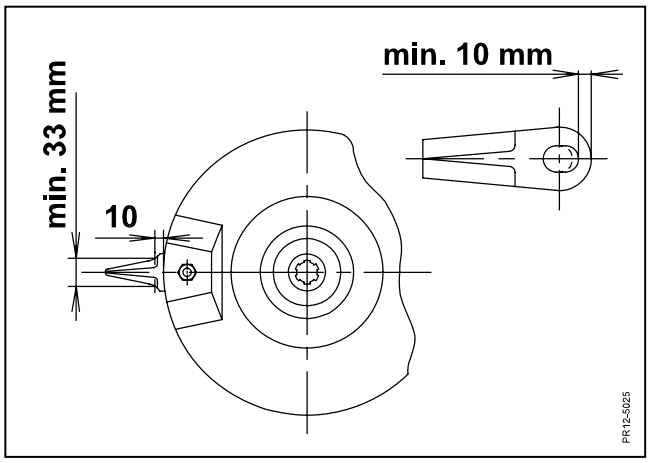



Fig. 5-8

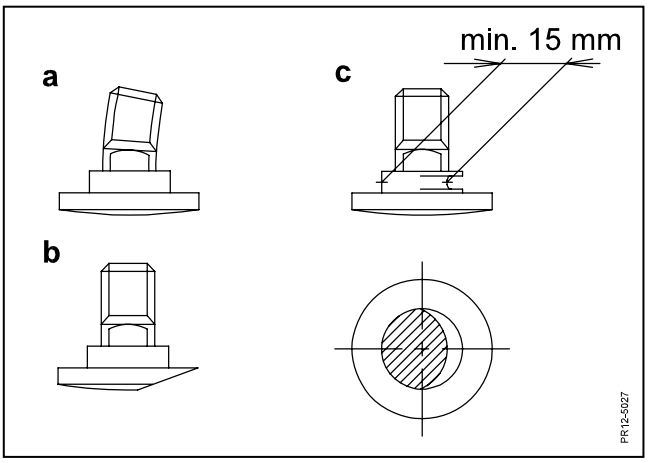



Fig. 5-9

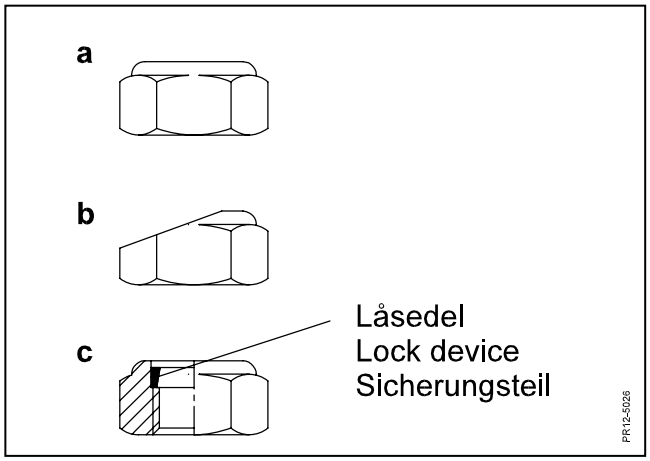



Fig. 5-10

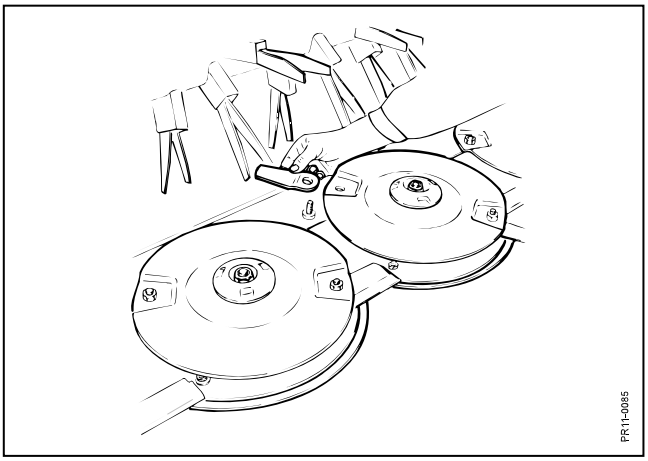



Fig. 5-11

# CUTTER BAR – DISCS AND BLADES

Discs, blade bolts and blades are made from hardened, high-alloyed steel. This heat treatment results in a specially hard and ductile material, which can handle an extreme stress. If a blade or a disc is damaged no attempt must be made to weld the parts together as the generation of heat weakens the parts.

Damaged blades, discs, blade bolts or nuts **must be replaced by original JF spare parts to obtain a safe operation.**

**WARNING:** **When replacing blades, both blades on the disc in question must be replaced as not to create an unbalance.**

**CAUTION:** **Always lower the cutting unit to the ground before replacing blades, blade bolts, discs or the like.**

**Fig. 5-8** **Blades must be replaced if:**

- the width of the blade is less than 33 mm measured 10 mm from the edge
- the metal thickness around the blade hole is less than 10 mm

Bent blades must be replaced immediately.

Blade bolts and nuts must also be checked periodically, in particular the tension of the nuts. Always check these parts after a collision with foreign matter, replacement of blades and the first time the machine is operating.

**Fig. 5-9** **Blade bolts must be replaced if:**

- they are deformed
- they have been worn one-sided
- their diameter is less than 15 mm.

**Fig. 5-10** **The special nut must be replaced if:**

- it has been used more than 5 (five) times
- the height of the hexagon is less than half of the original
- the locking device is worn and loose.

**Fig. 5-11** To obtain a satisfactory harvesting, **it is important that blades and shear bar are intact and sharp.** Blades are replaced by dismounting the blade bolt and pulling it down and out of the disc. This is easy when the blade is in front position, so that the bolt can fall through the hole in the stone protection. The old blade is removed and the new one is mounted with the blade bolt.
The blades can be used on both sides by moving the blades from one disc to another disc with opposite direction of rotation.

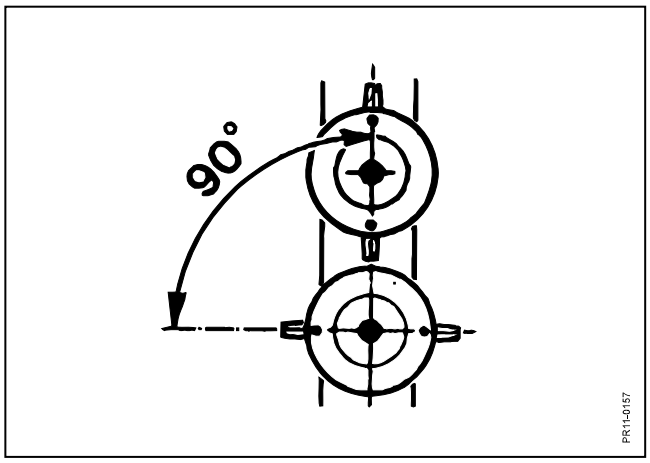



Fig. 5-12

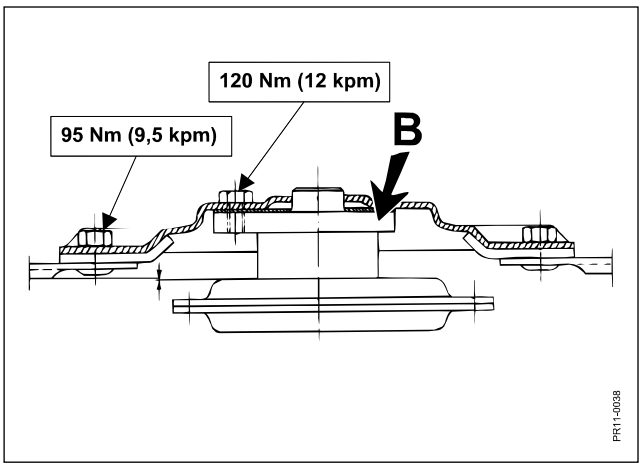



Fig. 5-13

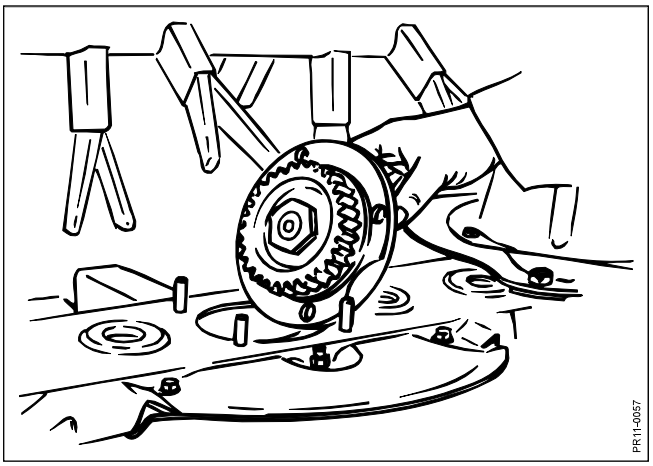



Fig. 5-14

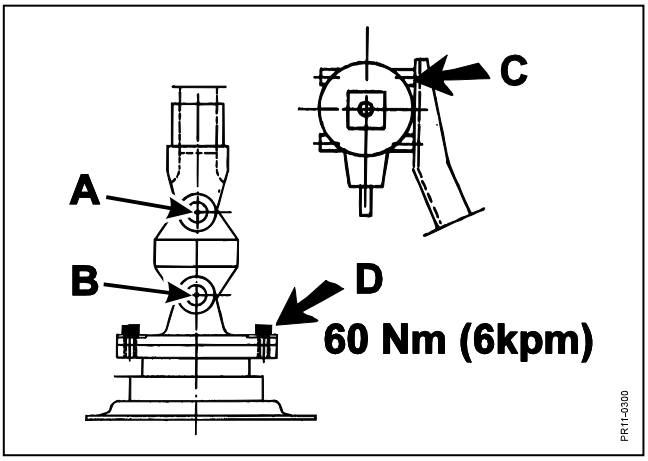



Fig. 5-15

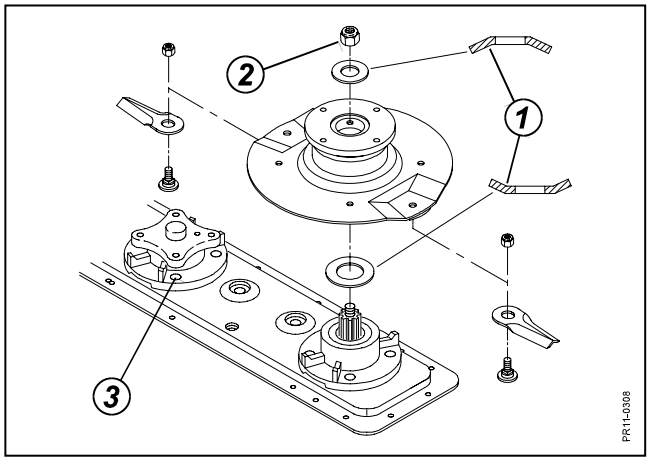



Fig. 5-16

**Fig. 5-12** If the discs have been dismounted they must be re-mounted **staggered 90$^{o}$ in relation to each other**.

**Fig. 5-13** Make sure that the torque of the bolts is as shown.

On discs fixed with 4 bolts the bolts must be tightened to 120 Nm (12 kpm).

On discs fixed with a central hub bolt the bolt must be tightened to 190 Nm (19 kpm).

The blade bolts must be tightened to 95 Nm (9.5 kpm).

The height of the disc can be adjusted by mounting fillers under the disc at **B**. The need might occur when replacing discs, if the knives are not in the same height.

**WARNING: After replacement of blades, blade bolts, discs and the like it should be checked that no tools have been left on the machine.**

**Fig. 5-14** **WHEN REPAIRING:**
The GMS/GCS machines have a bar where the complete disc bearing housing can be dismounted.

**Fig. 5-15** The PTO drive shaft for the cutter bar has been greased for life.

The PTO should run with minimum angular deviation.
The measure difference at **A** and **B** should max. be 6 mm (+/- 3).
An alignment is made at the overhead gear by moving the gear in the oblong holes or by placing fillers at **C**. The screws **D** are locked with LocTite.

**Fig. 5-16**
1. The spring washers are placed, as shown, with the curved side upwards and downwards respectively.
2. The nut is tightened to 190 Nm.
3. The bolts maintaining the disc bearing housing for the bar is tightened to 85 Nm.

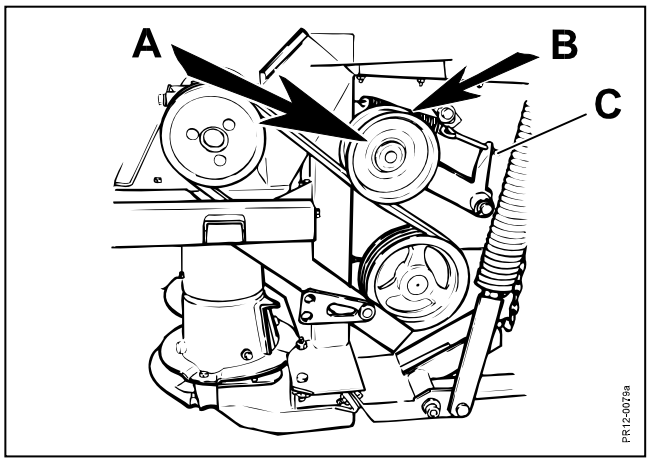



Fig. 5-17

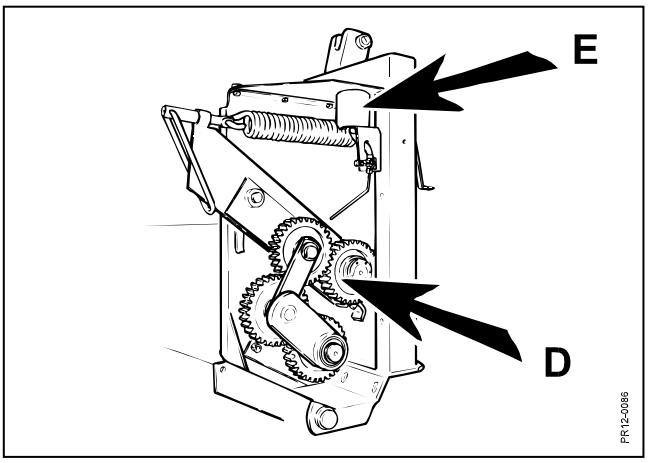



Fig. 5-18

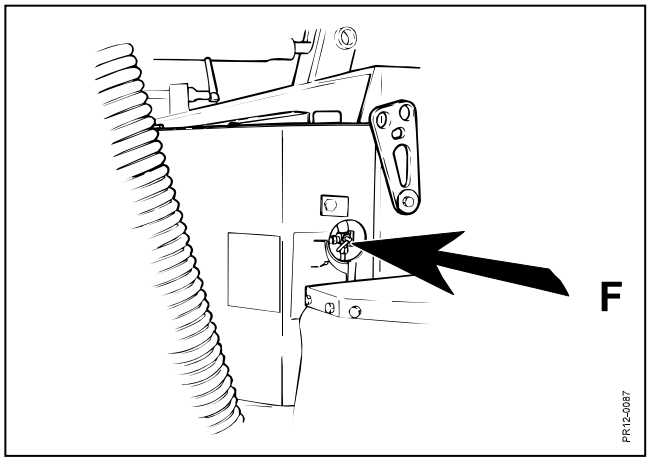



Fig. 5-19

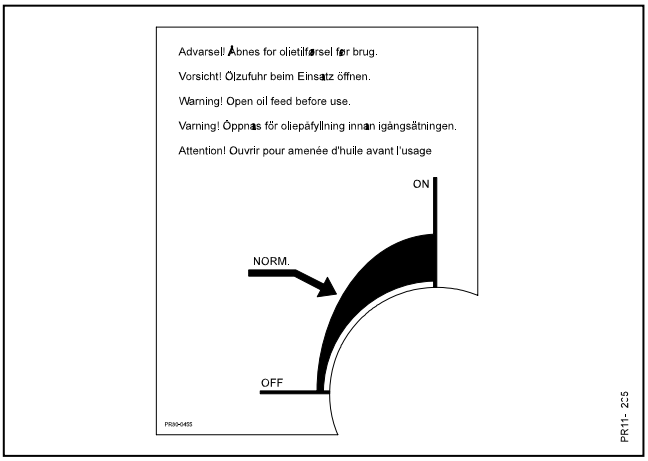



Fig. 5-20

# THE CONDITIONER

Defect fingers are replaced to avoid waste of crop. Also the conditioner rotor will be out of balance among other things resulting in a reduction of the life of the bearings.

### TIGHTENING OF V-BELTS

**Fig. 5-17** The V-belts are tightened with the tension pulley **A**.
The tension pulley is tightened automatically by a spring **B**. The spring should be adjusted so that there is always at least 1-2 mm "air" between the loops. The adjustment is made by means of a nut at **C**.

### DRIP-FEED LUBRICATION (ONLY GCS)

**Fig. 5-18** The gearwheel drive of the rollers (at **D**) is lubricated by drip-feed lubrication. The oil reservoir **E** is filled with chain saw oil. Fill up after approx. every 20th working hour (0.5 litre). Make sure that no dirt enters the reservoir, choking up the oil feed.

**Fig. 5-19** When the machine is started, turn on the oil by turning the tap at **F**, so that it is approx. half-open. **Remember to close again when the machine is stopped**.

**Fig. 5-20** The drip interval must be 2-3 drip/min. This corresponds to a consumption of approx. 0.2 litres of oil during one working day (10 hours). Adjust the drip interval by turning the tap to approx. half-open. Please note that the oil temperature etc. may require a re-adjustment.

It should be checked occasionally that the oil tube is placed correctly at the middle of the roller chain.

# TYRES

In the below scheme is stated which tyre pressure is valid for your disc mower:

| | GMS/GCS 2400 TS | GMS/GCS 2800 TS | GMS/GCS 3200 TS |
|---|---|---|---|
| Size of tyre | 10.0/75-15.3 | 10.0/75-15.3 | 10.0/75-15.3 |
| Recommended tyre pressure bar/PSI | 3.1 / 45 | 3.1 / 45 | 3.1 / 45 |
| Minimum tyre pressure bar/PSI *) | 1.2 / 17.4 | 1.4 / 20.3 | 1.5 / 21.8 |

The minimum tyre pressure can be used in emergencies when driving in areas where extra large carrying capacity from the machine is required (meadows, sandy areas and the like).

***) IF A LOWER TYRE PRESSURE IS USED THAN RECOMMENDED THE LIFE OF THE TYRES WILL BE VERY MUCH REDUCED!**

**At regular intervals check that the tyre pressure and the wheel bolts have been tightened properly.**

# 6. INTERRUPTIONS

| PROBLEM | POSSIBLE CAUSE | REMEDY | SEE PAGE |
|---|---|---|---|
| Stubble uneven or bad cutting. | Wrong relief. | Relief springs must be re-checked. | 35 |
| | Number of RPM on the tractor PTO too low. | Check number of RPM (PTO 540 RPM / PTO 1000 RPM). | 23 |
| | Blades are dull or missing. | Turn the blades or replace them. | 65 |
| | Discs, stone protectors and flow caps are deformed. | Replace deform parts. | 63,65 |
| *) Stripes in stubble. | The inclination of the cutter bar not ideal for the crop in question. | Reduce the inclination of the cutter bar. | 35 |
| | Guide shoe under cutter bar adjusted to high stubble. | Adjust the guide shoe to low stubble (there must be no stones in the field). | 35 |
| | Accumulation of material on the cutter bar. | Increase the driving speed. | |
| | | Mount flow caps on the discs. | 39 |
| | Earth and grass in the space in front of the bar where the blades enter. | Mount special shear bar/replace worn shear bar. Mount only where the blades touch the bar. | 63 |
| Uneven flow through the machine. | Conditioner fingers worn or missing. | Replace worn conditioner fingers. | |
| | | Turn fingers with the straight edge in the direction of rotation. | 41 (Fig. 3-22 'C') |
| | Distance between conditioner plate and rotor too big. | Adjust the conditioner plate reducing the distance at front to 10 - 15 mm. | 41 |
| | | Increase the driving speed. | |
| Machine shaking/ uneven operation. | Check if blades are damaged or missing. | Mount damaged/missing blades. | 65 |
| | Defect PTO drive shaft. | Check that the PTO drive shafts are in order. | |
| | Defect bearings. | Check if bearings are loose or destroyed. | |
| | Defect flow caps and flow intensifiers. | Replace flow caps and flow intensifiers. | 63 |
| | Earth and grass in flow caps, possibly missing foam blocks in flow intensifier. | Clean flow caps and mount missing foam blocks. | 63 |

| PROBLEM | POSSIBLE CAUSE | REMEDY | SEE PAGE |
|---|---|---|---|
| Machine swivels too fast. | The oil flow is too high. | Check that the oil flow of the tractor for the shift cylinder has been adjusted to a minimum. | |
| Power consumption seems too big. | | Dismount flow caps from the discs. | 39 |
| Gear heats. | Wrong oil level. | Check oil level in gear (max. temperature, approx. 80° C.). | 57 |
| Bar heats. | Wrong oil level. | Check oil level in bar (max. temperature, 90-100° C.). | 53 |

*) Especially short, strong spring crops harvested under unfavourable conditions.

# 7. STORAGE (WINTER STORAGE)

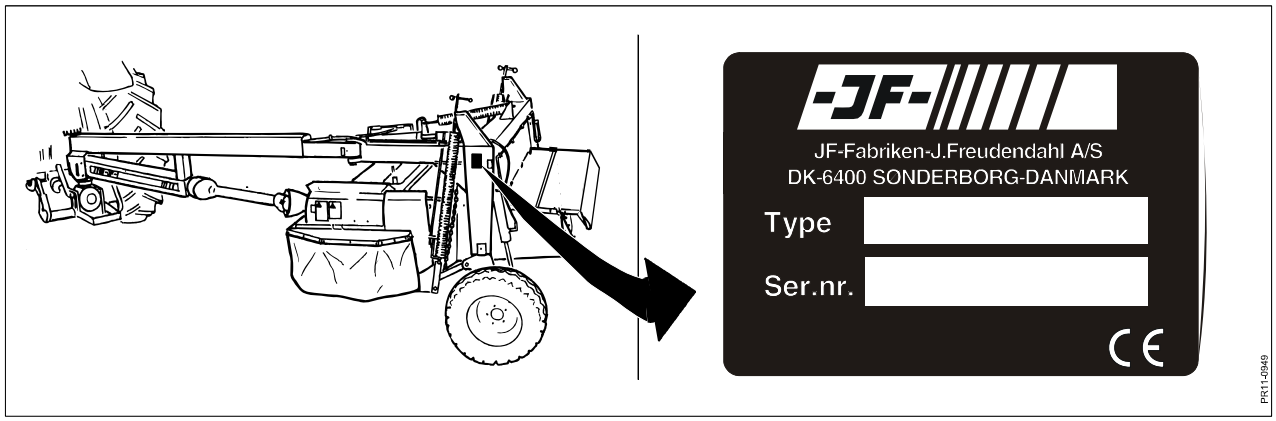
When the season is over the machine should be made ready for winter storage right away. First clean the machine thoroughly. Dust and dirt absorb moisture and moisture increases rusting. **Be alert when cleaning with a high pressure cleaner. Never** clean directly on the bearings and lubricate all greasing spots carefully after having cleaned as to squeeze possible water out of the bearings.

Below items are guiding instructions of how to perform other winter storage items.

- The machine is checked for wear and defects – write down the parts you will need before the next season and order the spare parts.
- Dismount the PTO drive shafts, lubricate the profile tubes and keep them in a dry place.
- Spray the machine with rust-preventing oil. This is especially important as regards all parts polished with use.
- Change the oil in the hydraulic system, the cutter bar and the gearboxes.
- Store the machine in a ventilated engine house. Lay up the machine to unload the tyres.

# 8. SPARE PARTS ORDER

When ordering spare parts, please state model, serial number and year of production. This information is printed on the machine plate. Soonest possible after delivery we request you to write these information on the first page of your spare parts book supplied with the machine so that you have the information at hand when ordering spare parts.



# 9. SCRAPPING THE MACHINE

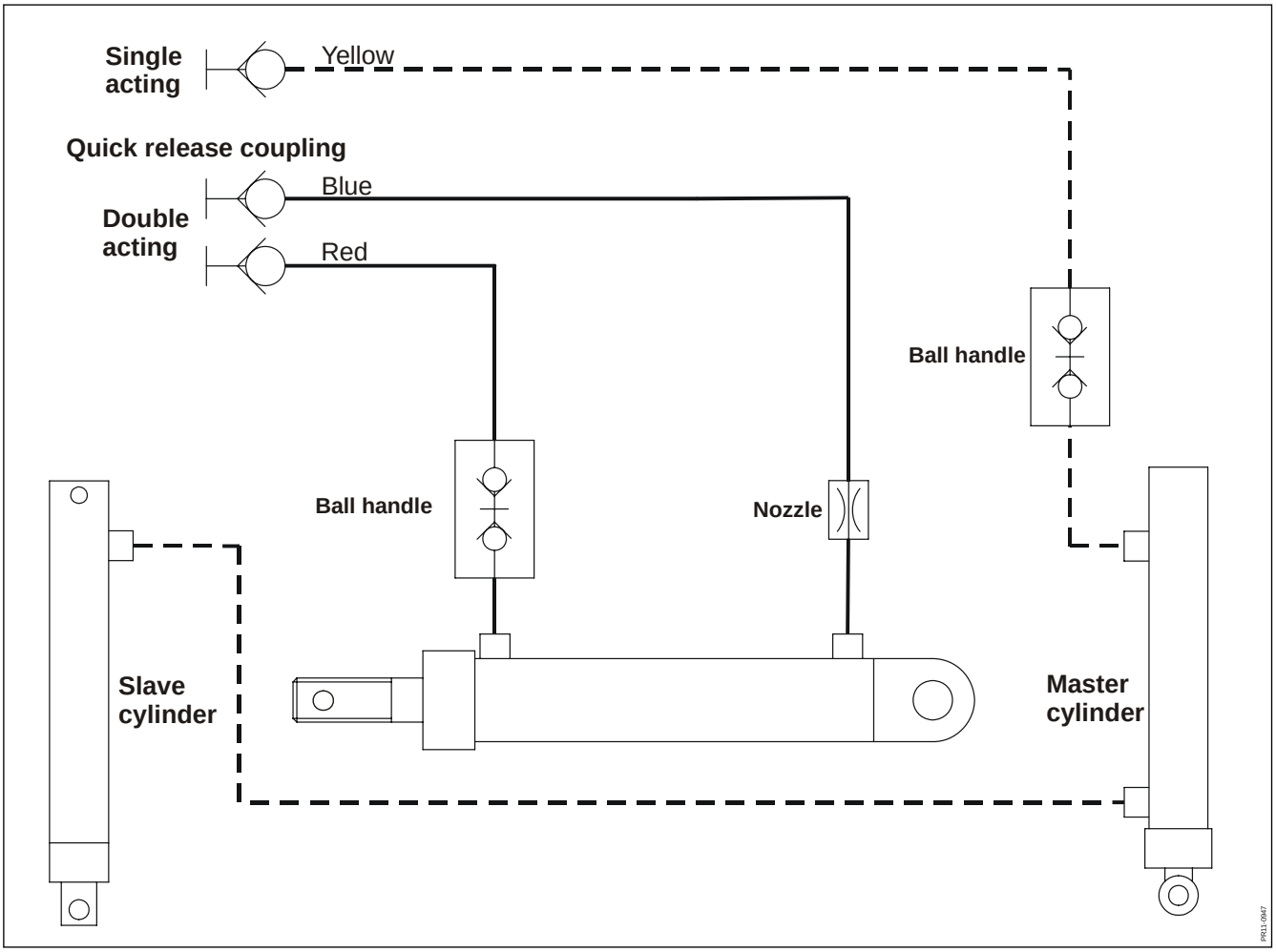
When the machine is worn-down it must be scrapped in a proper way. Observe the following:

- The machine must **not** be placed somewhere outside - it must be emptied of oil (gear and hydraulic system). These oils must be handed over to a destruction company.

- Disassemble the machine and separate the individual recycling parts, for instance tyres, hydraulic hoses, hydraulic valves etc.

- Hand over the usable parts to an authorised recycling centre. The large scrapping parts are handed over to an authorised breaker’s yard.

# 10. HYDRAULIC DIAGRAM



# WARRENTY

**JF-Fabriken - J. Freudendahl A/S**, 6400 Sønderborg, Denmark, hereafter called **"JF"**, grants warranty to any buyer of new JF machines from authorized JF-dealers.

**The warranty covers remedy of material and production faults.**
**This warranty is valid within a year after date of sale to end-user.**

- The warranty is invalidated in the following cases:

1. **The machine has been used for other purposes than those described in the instruction manual.**
2. **Improper use.**
3. **Damage caused by external sources, e.g. lightning or falling objects.**
4. **Insufficient maintenance.**
5. **Transport damage**
6. **The construction of the machine has been modified without JF's written permission.**
7. **Unskilled repair of the machine**
8. **Unoriginal spare parts have been used.**

JF cannot be held responsible for loss of income or legal claim as a result of faults either of the owner or of a third party. JF is also not responsible for wages beyond current agreements in connection with replacement of warranty parts.

JF is not responsible for the following costs:

1. **Normal maintenance such as expenses for oil, grease and minor adjustments.**
2. **Transport of machine to and from workshop.**
3. **The dealer's traveling expenses or freight charges to and from the user.**

Warranty is not granted on wearing parts unless it can clearly be proved that JF has committed a fault.

The following is regarded as wearing parts:
**Protective canvases, blades, blade suspensions, shearbars, guide shoes, stone protections, crimper parts, tyres, tubes, PTO-shafts, clutches, V-belts, chains, rake- and pick-up tines and beater bars for farmyard manure spreaders.**

In addition, the user must note the following:

1. **The warranty is only valid if the dealer has undertaken predelivery check and has given instruction to the end user in the use of the machine.**
2. **The warranty cannot be transferred to others without JF's written permission.**
3. **The warranty can be nullified if the repair is not undertaken immediately.**

## Specialist in grassland machinery and complete diet mixers

When it comes to green feed techniques, JF-STOLL has gained a reputation as one of the world's leading suppliers and specialists. As a specialist manufacturer for over 50 years, we have gained a vast amount of experience from right around the world and, more importantly, unique regional requirements.

We also receive important inspiration in our development work through a close and continuous dialogue with customers, dealers and agricultural researchers.

No matter which type of JF-STOLL-machine you chose, you can be sure to obtain the best result to obtain a top result - in the shape of high performance and operational reliability, minimum maintenance, flexible working possibilities and optimal operating economy.

Dealer

JF-STOLL

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