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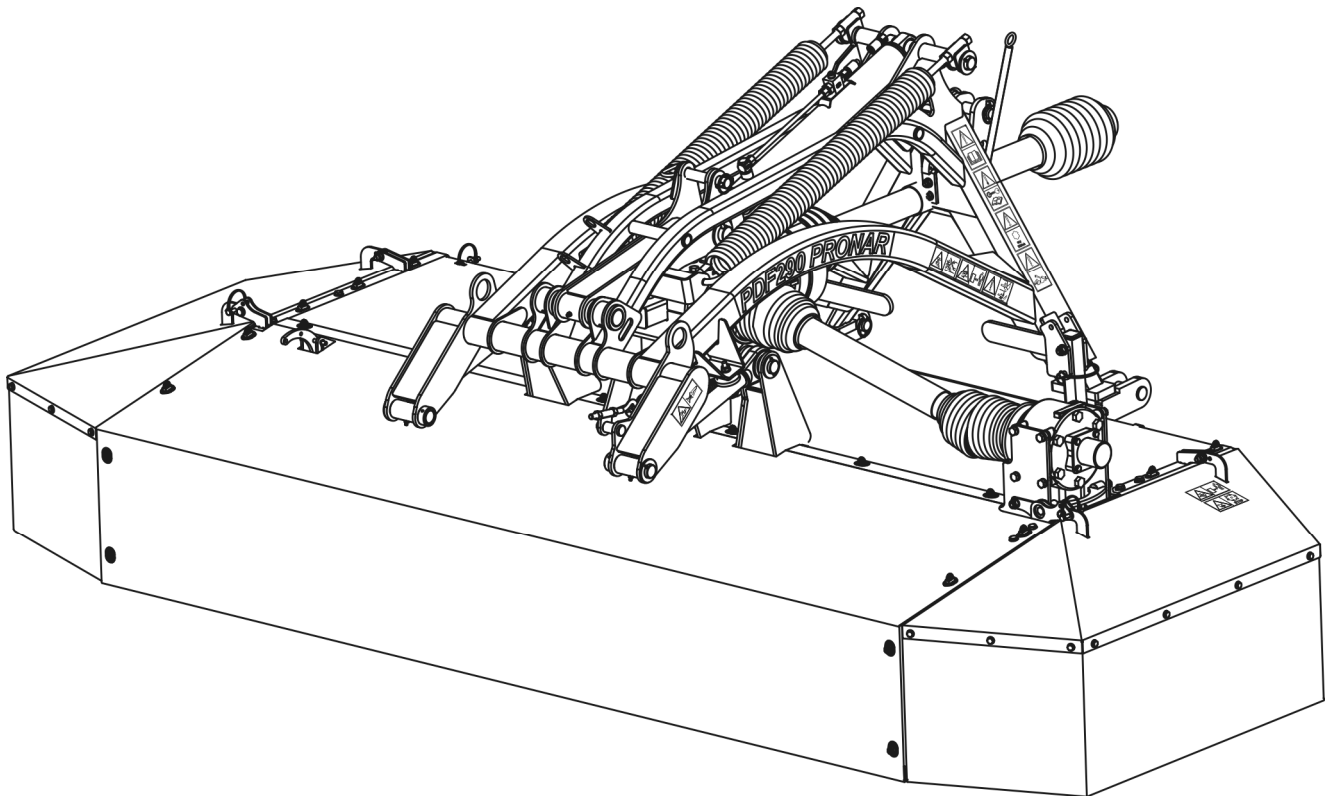
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OPERATOR'S MANUAL

DISC MOWER

PRONAR PDF290

TRANSLATION OF THE ORIGINAL INSTRUCTIONS



ISSUE 2A-01-2010

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DISC MOWER

PRONAR PDF290

MACHINE IDENTIFICATION

SYMBOL /TYPE: PDF290

SERIAL NUMBER:

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INTRODUCTION

Information contained herein is current at date of publication. As a result of improvements, some numerical values and illustrations contained in this publication may not correspond to the factual specification of the machine supplied to the user. The manufacturer reserves the right to introduce design changes in machines produced that facilitate operation and improve the quality of their work, without making minor amendments to this Operator's Manual. Please send your comments and proposals on the design and operation of the machine to the manufacturer. This information enables objective evaluation of the machines produced and provides indications for their further improvement. Information on significant design changes is passed on to users on information inserts attached to this Operator's Manual (annexes).

This Operator's Manual is an integral part of the machine's documentation. Before using the machine, the user must carefully read this Operator's Manual and observe all recommendations. This guarantees safe operation and ensures malfunction free work of the machine. The machine is designed to meet obligatory standards, documents and legal regulations currently in force.

The manual describes the basic safety rules and operation of PDF290 mower. If the information contained in the Operator's Manual needs clarification then the user should refer for assistance to the sale point where the machine was purchased or to the manufacturer.

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Information, descriptions of danger and precautions and also recommendations and orders associated with user safety instructions are marked:



and also preceded by the word "**DANGER**". Failure to observe the instructions may endanger the machine operator's or other person's health or life.

Particularly important information and instructions, the observance of which is essential, are distinguished in the text by the sign:



and also preceded either word "**ATTENTION**". Failure to observe the instructions may lead to damage to the machine as a result of improper operation, adjustment or use.

In order to focus the user's attention on the need to perform maintenance, the relevant section of the Operator's Manual is marked with the pictogram:



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SECTION

1

BASIC INFORMATION

IDENTIFICATION

PROPER USE

EQUIPMENT

WARRANTY TERMS

TRANSPORT

ENVIRONMENTAL HAZARDS

WITHDRAWAL FROM USE

1.1 IDENTIFICATION

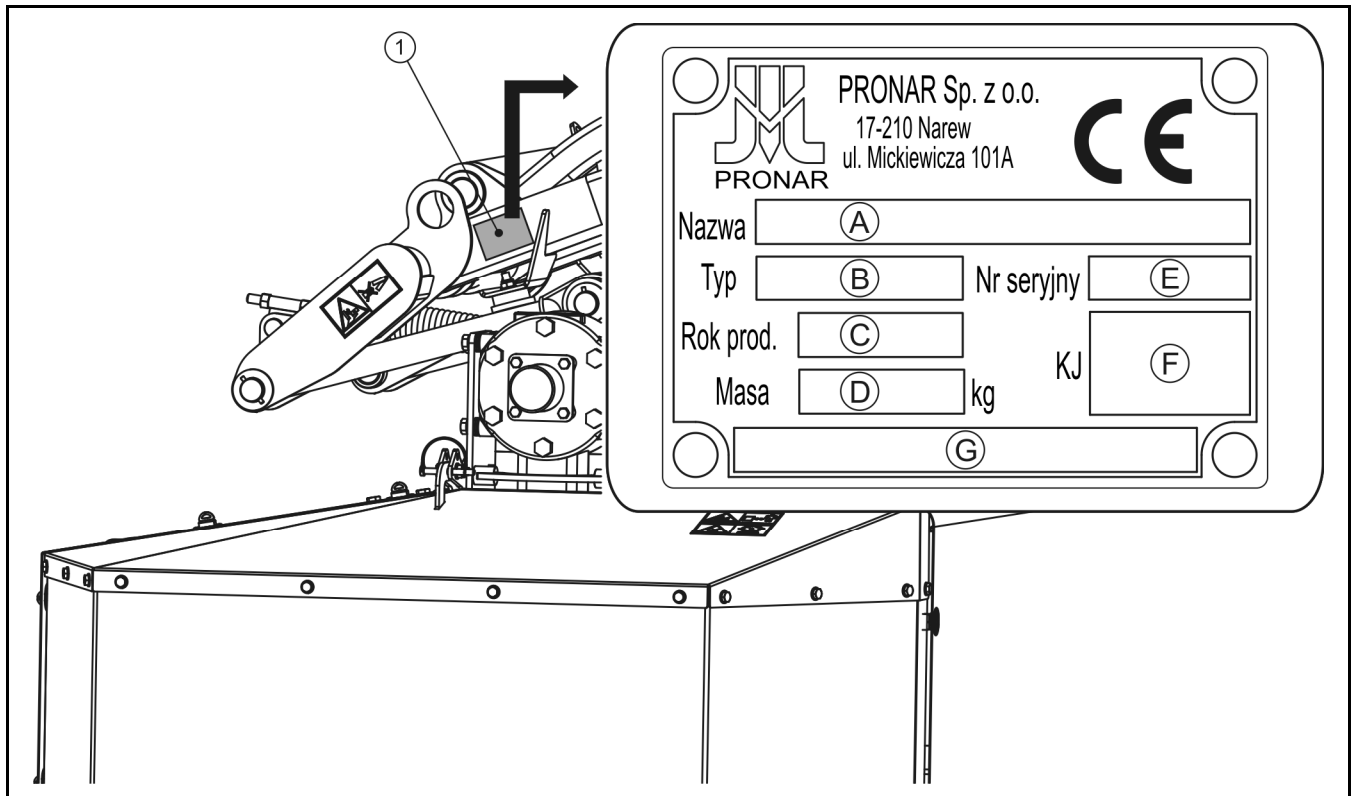


FIG. 1.1A Location of the data plate

(1) data plate

The PDF290 front disc mower has a data plate (1) located on the left side of the mounting frame. When buying the disc mower check that the serial numbers on the machine agree with the number written in the *WARRANTY BOOK*, in the sales documents and in the *OPERATOR'S MANUAL*.

The meaning of the individual fields found on the data plate are presented in the table below:

A – Machine name

B – Type

C – Production year

D – Total weight [kg]

E – Serial number

F – Sign of quality control

G – Machine name, continued

1.2 PROPER USE

The PDF290 front rotary disc mower is designed to cut grass and low stemmed green fodder on permanent grassland (marshes) and on stone free cultivated fields with a level surface. The mower is the basic machine for production of hay and silage. Do NOT use the machine for any other purpose. Using it as intended also involves all actions connected with the safe and proper operation and maintenance of the machine. Due to the above, the user is obliged to:

- carefully read this publication and the PTO shaft Operator's Manual and adhere to the recommendations contained in these documents,
- understand the operating principle of the machine's operation and of its safe and proper use,
- comply with general safety regulations while working,
- prevent accidents,
- comply with road traffic regulations.

TAB. 1.1 The agricultural tractor's requirements

CONTENTS	MEASURED AS	REQUIREMENTS
Front three-point linkage Category	-	II
Hydraulics Front hydraulic connection or access to rear connection Pressure rating of the system	- MPa	16
PTO drive PTO RPM Number of splines on PTO shaft	RPM -	1 000 21
Other requirements Minimum power demand	kW / Horsepower	44 / 60

Do NOT perform unauthorised repairs and modifications to the mower as this shall be treated by the Manufacturer as misusing the machine.

The machine may only be used by appropriately trained users, who are aware of the dangers, design and operation of the mower. Repairs to the machine shall only be made by qualified personnel (in the guarantee period all repairs must be performed in the guarantee service, indicated by the Manufacturer). Maintenance and repairs that can be performed by the user, are described in section 5 „*MAINTENANCE*”.



IMPORTANT!

The mower must not be used for purposes other than those for which it is intended.

1.3 EQUIPMENT

TAB. 1.2 PDF290 mower optional equipment

EQUIPMENT	STANDARD	OPTION
<i>OPERATOR'S MANUAL</i>	•	
<i>WARRANTY BOOK</i>	•	
PTO shaft with single right direction clutch	•	
PTO shaft with friction clutch for connection with tractor.	•	
Limiting chains		•

Recommended PTO shafts for connecting mowers with tractor:

- Comer T401110ENC13F12 Lz =1100, torque transmitted by clutch - 900 Nm,
- B&P 7104 111 CE R08 OS1,
- Weasler 1610-6407-11103

1.4 WARRANTY TERMS

The manufacturer guarantees the reliable operation of the machine when it is used according to its intended purpose as described in the Operator's Manual. Faults discovered during the warranty period will be repaired by the Warranty Service. Repair deadline is given in warranty booklet.

The guarantee does not cover those parts and sub-assemblies of the machine which are subject to wear in normal usage conditions, regardless of the warranty period:

- working discs,
- slides,
- protective aprons,
- cutting knives,
- pins securing cutting knives.

The warranty service only applies to such cases as: mechanical damage which is not the user's fault, factory defects of parts, etc.

In the event of damage arising from:

- mechanical damage which is the user's fault, caused by road accidents,
- by inappropriate use, adjustment or maintenance, use of the mower for purposes other than those for which it is intended,
- use of damaged mower,
- repairs carried out by unauthorised persons, improperly carried out repairs,
- making unauthorised alterations to mower's design,

the user may lose the right to warranty service.

The user is obliged to report immediately on noticing any wear in the paint coating or traces of corrosion, and to have the faults rectified whether they are covered by the guarantee or not. Detailed guarantee regulations are contained in the *WARRANTY BOOK* attached to each machine.



ATTENTION!

Demand that the seller carefully and precisely fills out the *WARRANTY BOOK* and guarantee repair coupons. A missing date of purchase or sale point stamp, may make the user ineligible for any warranty repair or refund.

1.5 TRANSPORT

The PDF290 front mower is ready for sale completely assembled and does not require packing. Packing is only required for the machine operator's manual and elastic covers.

The mower may be moved to another place by transport vehicle on load platform, or independently transported mounted on agricultural tractor using the three point linkage linkage. During independent transport by road the mower should always be set in transport position properly secured - see section 4.4 "*TRANSPORTING THE MACHINE*". Comply with the regulations of the traffic regulations concerning lights and indicators.

When loading and unloading the mower on other vehicles for transport, comply with the general principles of workplace health and safety for reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines. Only use lifting equipment with a lifting capacity greater than the weight of the mower given on the data plate. This also applies to cables, belts and chains used during reloading.

The mower should be attached to lifting equipment in places shown on figure (1.2A), i.e. to transport lug (1) and hole (2) in the linkage frame. When lifting the mower take particular care due to the possibility of tipping over the machine and the risk of injuries from protruding parts.

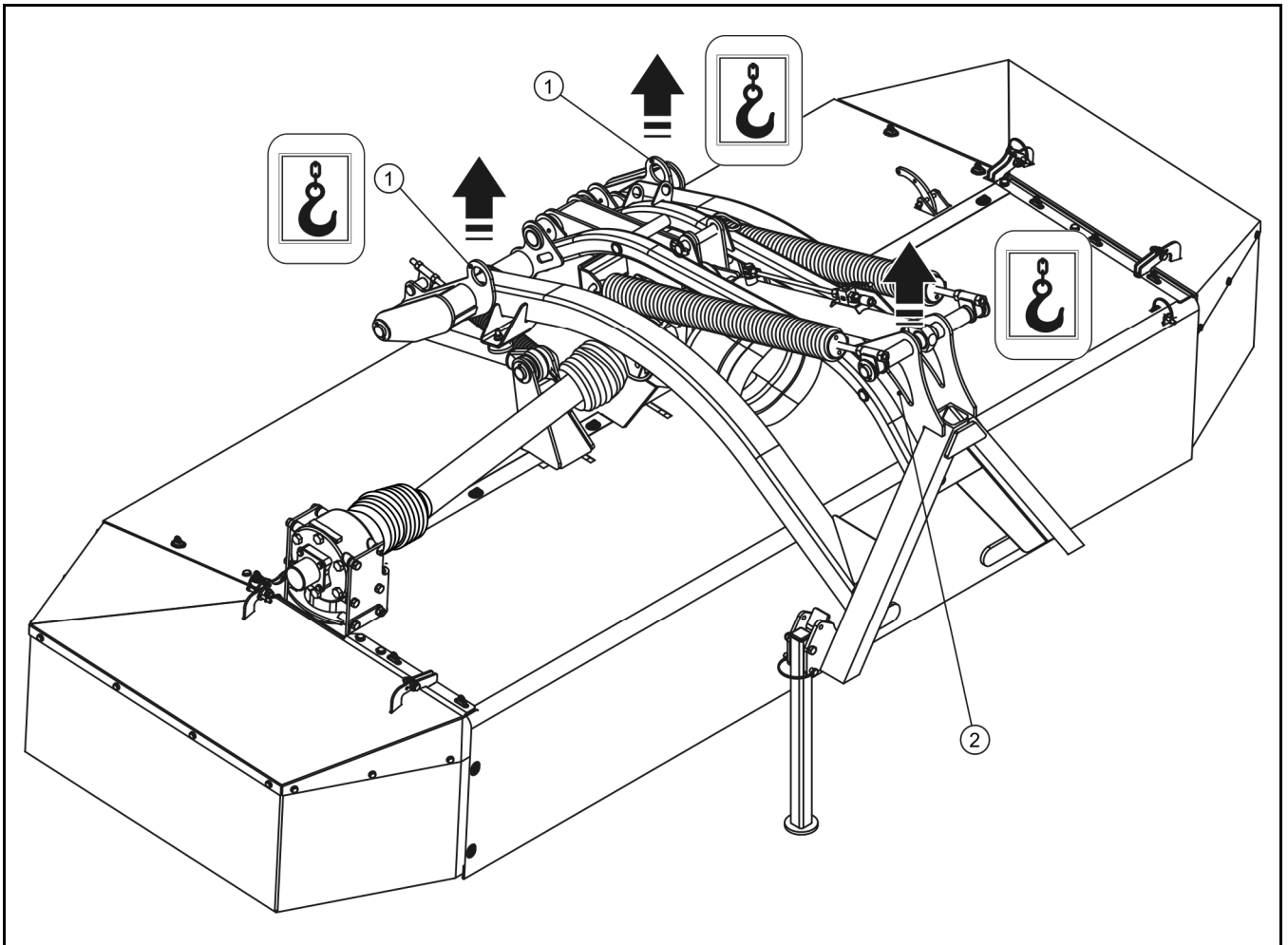


FIG. 1.2A Mower suspension points

(1) transport lug, (2) transport straps fixing eye

ATTENTION!



When transporting independently, the user must carefully read this operator's manual and observe its recommendations. When being transported on a motor vehicle the mower must be mounted on the vehicle's platform in accordance with the transport safety requirements. The driver of the vehicle should take particular care while driving.

During loading mower should be placed in transport position and secured.

The machine should be attached firmly to the platform of the vehicle using straps or chains fitted with a tightening mechanism. The fastening equipment used must have a valid safety certificate. During reloading work, particular care should be taken not to damage parts of the mower's fittings or the paint coat.



DANGER

Nobody may be in the manoeuvring zone during transferring mower to other form of transport.

1.6 ENVIRONMENTAL HAZARDS

A hydraulic oil leak from the reducer constitutes a direct threat to the natural environment owing to its limited biodegradability. While carrying out maintenance and repair work, which involves the risk of an oil leak, this work should take place on an oil resistant floor or surface. In the event of oil leaking into the environment, first of all contain the source of the leak, and then collect the leaked oil using available means. Remaining oil should be collected using sorbents, or by mixing the oil with sand, sawdust or other absorbent materials. The oil pollution, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container, and then passed on to the appropriate oil waste recycling centre. The container should be kept away from heat sources, flammable materials and food.

Oil which has been used up or is unsuitable for further use owing to a loss of its properties should be stored in its original packaging in the conditions described above.

1.7 WITHDRAWAL FROM USE

Should the user decide to withdraw the machine from use, the entire mower should be taken to a scrap yard. When spare parts are changed, worn out or damaged parts should be taken to a collection point for recyclable raw materials. Hydraulic oil should be taken to the appropriate facility dealing with the re-use of this type of waste.

SECTION

2

SAFETY ADVICE

BASIC SAFETY RULES

DRIVING ON PUBLIC ROADS

DESCRIPTION OF MINIMAL RISK

INFORMATION AND WARNING DECALS

2.1 BASIC SAFETY RULES

- Before using the mower the user should carefully read this Operator's Manual and the PTO shaft Operator's Manual and adhere to the recommendations contained in these documents.
- The mower may only be used and operated by persons qualified to drive agricultural tractors and trained in the use of the machine.
- If the information contained in the Operator's Manual is difficult to understand, contact a seller who runs an authorised technical service on behalf of the manufacturer, or contact the manufacturer directly.
- Careless and improper use and operation of the mower, and non-compliance with the recommendations included in this operator's manual is dangerous to your health.
- Be aware of existence of a minimal risk, and for this reason the fundamental basis for using this machine should be the application of safety rules and sensible behaviour.
- The machine must never be used by persons who are not authorised to drive agricultural tractors, including children and people under the influence of alcohol or other drugs.
- Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.
- The mower must not be used for purposes other than those for which it is intended. Anyone who uses the machine other than the way intended takes full responsibility for himself for any consequences of this use.
- Any modification to the machine frees the manufacturer from any responsibility for damage or detriment to health which may arise as a result.
- Before using the machine always check its technical condition. In particular check the technical condition of the mounting hitch system, cutting system, correct mounting of cutting knives and protective guards.
- The machine may only be used when all the safety guards and other protective elements are technically sound and correctly positioned. In the event of loss or destruction of the safety guards, they must be replaced with new ones.

- The machine must not be used when not in working order.
- Before hitching the machine to the tractor, check the technical condition of the hitching system of the mower and the tractor.
- Be especially careful when attaching the machine to the tractor..
- When attaching, there must be nobody between the mower and the tractor.
- To attach the machine to the tractor only the front Three-Point Linkage System may be used. After mounting the machine, check the safeguards.
- To mount machine on tractor use only genuine pins and safeguard linchpins.
- When connecting the hydraulic conduits, make sure that the hydraulic system is not under pressure.
- The mower may only be connected to the tractor by appropriately selected PTO shaft recommended by the Manufacturer.
- The PTO shaft has markings on the casing, indicating which end of the shaft shall be connected to the tractor.
- The chains preventing the shaft cover from turning while the shaft is working, shall be secured to a fixed element of mower's structure.
- Do NOT use the securing chains to support the shaft while machine is parked or when transporting the mower.
- Before using the machine the user should thoroughly acquaint himself with the PTO shaft Operator's Manual and adhere to the recommendations contained in it.
- The driveshaft must be equipped with a cover. Do NOT use the shaft with damaged or missing guards.
- Never use a damaged PTO shaft, it may cause an accident. A damaged shaft must be repaired or replaced.
- After connecting shaft ensure that it is correctly and safely connected to the tractor and to the mower.
- Before starting PTO shaft make certain that the PTO rotation direction is correct.

- Disconnect the drive shaft each time when it is not necessary to drive the machine, or when the tractor and mower are at an unsuitable angle to each other.
- Do NOT go over and under the shaft or stand on it equally during work as also when the machine is parked.
- Do NOT wear loose clothing, straps or whatever may become wrapped round the rotating drive shaft. Contact with rotating PTO shaft may cause severe injuries.
- The mower may not be used or transported in conditions of limited visibility.
- Cutting assembly lock must be always engaged during transport.
- When transporting mower the hydraulic cylinder valve must be closed.
- Before lowering or raising mower on three point linkage make certain that nobody is near the machine and that nobody is operating it.
- Before starting the mower make sure that there are no bystanders (especially children) or animals in the danger zone. The machine operator is obliged to ensure proper visibility of the machine and the working area.
- Before starting PTO shaft the cutting unit must be in working position.
- Mowing should begin after reaching nominal PTO RPM (1000 rpm). Do NOT overload shaft and mower and also engage the clutch suddenly.
- During cutting do NOT use PTO revolution speed greater than 1000 rpm.
- When mowing on the edges of streets, public roads, on stony ground there is a risk that thrown out stones and foreign bodies may constitute a danger to third persons.
- Do NOT leave the tractor cab, when the machine drive is engaged.
- Do NOT approach cutting unit guards until the rotating cutting parts come to a complete standstill.
- Do NOT operate mower while reversing. While reversing lift machine.
- Before disconnecting the shaft, turn off the tractor engine and remove the key from the ignition.
- Reduce pressure prior to disconnecting the hydraulic system.

- Mower disconnected from tractor must be supported with the aid of supports and properly secured against tipping over.
- Do NOT ride on the mower or transport any materials on it.
- When operating the machine wear protective gloves and use the appropriate tools.
- Repair, maintenance and cleaning work should be carried out only after previously:
 - disconnecting drive transmission shaft,
 - switching off tractor engine,
 - applying handbrake,
 - removing the ignition key from ignition switch.
- Regularly check the condition of the bolt and nut connections.
- Regularly check the technical condition of the connections and the hydraulic conduits. There must not be any leaks of hydraulic oil.
- During the warranty period, any repairs may only be carried out by a Warranty Service authorised by the manufacturer.
- In the event of any fault or damage whatsoever, do not use the mower until the fault has been corrected. The machine must not be used when not in working order.
- Repair work should be carried out by persons trained and entitled to do so. This work should be carried out using appropriate tools.
- Should it be necessary to change individual parts, use only those parts indicated by the manufacturer. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine.
- In the event of work requiring the mower to be raised, use properly certified hydraulic or mechanical lifts for this purpose. After lifting the machine, stable and durable supports must also be used. Work must not be carried out under a machine which has only been raised with a lift jack.
- The machine must not be supported using fragile elements (bricks or concrete blocks).
- The paint coating should be cleaned off before beginning welding work. Burning paint fumes are poisonous for people and animals. Welding work should be carried out in a well lit and well ventilated space.

- During welding work pay attention to flammable or fusible elements. If there is a risk that they will catch fire or be damaged, they should be removed or covered with non-flammable material before commencing welding work. The mower must be disconnected from the tractor before commencing electric welding.
- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately cleaned and disinfected. In the event of more serious injuries, seek a doctor's advice.
- After finishing servicing or repair work remove all tools from the machine.
- Damaged, missing or worn cutting knives must be replaced in pairs in order to maintain the balance of the cutting disc.
- In order to reduce the danger of fire the machine must be kept in a clean condition.
- In order to limit occupational risks associated with exposure to noise during mower operation use individual protection (ear protectors).

2.2 DRIVING ON PUBLIC ROADS

- When driving on public roads, respect the road traffic regulations.
- Do not exceed the maximum speed when travelling. Adjust your speed to the road conditions.
- Before beginning travel, the mower must be placed in transport position and raised using the front three-point linkage system. When parked, the mower should be lowered.
- The hydraulic cylinder valve lever should be in closed position.
- Do NOT leave tractor driver's seat when the tractor is moving.

2.3 DESCRIPTION OF MINIMAL RISK

Pronar Sp. z o. o. in Narew has made every effort to eliminate the risk of accidents. There is, however, a certain minimal risk which could lead to an accident, and this is connected mainly with the actions described below:

- using the mower for purposes other than those for which it is intended,

- being between the tractor and the mower while the engine is running and when the machine is being attached,
- operating the machine with removed or faulty safety guards,
- being on the machine while the engine is running,
- not keeping a safe distance from the danger zone or being within the zones while the machine is operating,
- operation of the machine by persons under the influence of alcohol,
- cleaning, maintenance and technical checks when tractor's engine is running,
- making modifications to the machine without the consent of the Manufacturer,
- oil leaks and sudden movement of elements resulting from conduit cracking,
- using unreliable PTO shaft.

The minimal risk may be kept to a minimum by following the recommendations below:


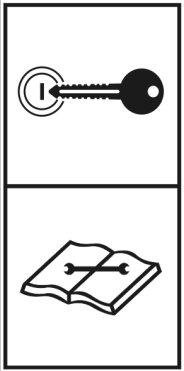


- prudent and unhurried operation of the machine,
- sensible application of the remarks and recommendations contained in the Operator's Manual,
- keeping a safe distance from forbidden or dangerous places,
- a ban on being on the machine when it is operating,
- carrying out repair and maintenance work in line with operating safety rules,
- carrying out repair and maintenance work by persons trained to do so,
- using strictly suited protective clothing,
- ensuring unauthorised persons have no access to the machine, especially children.



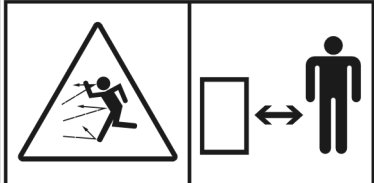

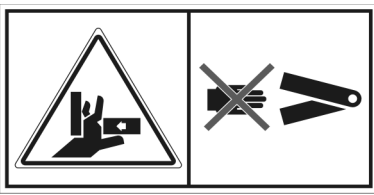
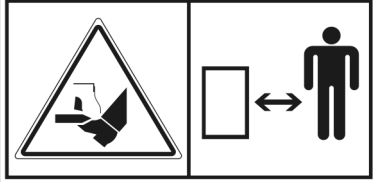

2.4 INFORMATION AND WARNING DECALS




The mower is labelled with the information and warning decals mentioned in table (2.1). The symbols are positioned as presented in figure (2.1A). Throughout the time it is in use, the user of the machine is obliged to take care that notices and warning and information symbols located on the mower are clear and legible. In the event of their destruction, they must be replaced with new ones. Safety decals are available from your PRONAR dealer or directly

from PRONAR customer service. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs.

TAB. 2.1 Information and warning decals

ITEM	SAFETY SYMBOL	DESCRIPTION
1		Machine type
2		Before beginning servicing or repairs, switch off engine and remove key from ignition
3		Before starting work, carefully read the Operator's Manual.
4		Maximum allowable PTO shaft rotation speed is 1000 rpm.

ITEM	SAFETY SYMBOL	DESCRIPTION
5		<p>Danger associated with the rotating PTO shaft.</p>
6		<p>Warning- rotating disc blades - do NOT approach an operating mower.</p>
7		<p>Thrown out objects, endanger the whole body. Keep a safe distance from machine when mower is in operation.</p>
8		<p>Danger caused by setting mower in working or transport positions.</p>
9		<p>Danger of crushing or severing of limbs. Be careful while folding and unfolding lateral guards.</p>
10		<p>Keep a safe distance from mower knife zone, if tractor engine is working and drive transmission shaft is connected.</p>
11		<p>Do NOT touch elements of the machine until the assembly has come to a standstill.</p>

ITEM	SAFETY SYMBOL	DESCRIPTION
12		Do NOT stand near lifting linkages during lifting or lowering.
13		Transport catch point marking.
14		Lubrication points

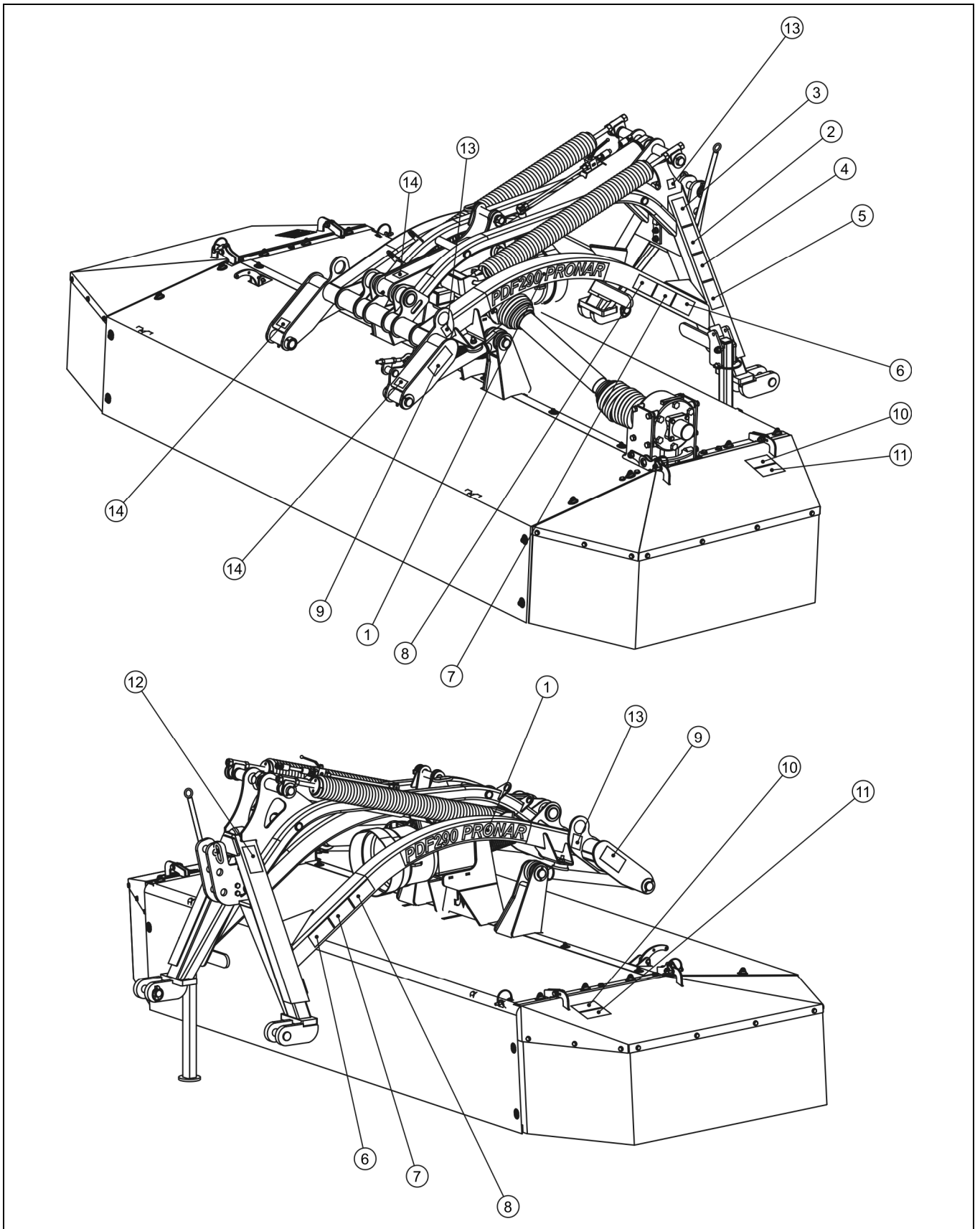


FIG. 2.1A Symbol locations

Labelling according to table 2.1 „Information and warning decals”

SECTION

3

DESIGN AND OPERATION

TECHNICAL SPECIFICATION

GENERAL DESIGN

LINKAGE

DRIVE ASSEMBLY AND CUTTING UNIT

HYDRAULIC SYSTEM

3.1 TECHNICAL SPECIFICATION

TAB. 3.1 PDF290 front mower basic technical specification

CONTENTS	UNIT	DATA
Dimensions		
Total width	mm	3 340
Transport width	mm	2 900
Technical specification		
Cutting width	m	2.90
Work output	ha/h	3★
Minimum tractor power demand	kW / Horsepower	44 / 60
Maximum PTO speed	RPM	1,000
Torque transmitted by the tractor-mower PTO shaft	Nm	900
Three-point linkage category	-	II according to ISO 730
Tare weight	kg	610
Number of discs	item	7
Number of cutting knives	item	14
Rotation speed of discs	RPM	3 180
Swath width with swath guides	m	1.7-1.9
Swath width with swath guides removed	m	2.35
Recommended working speed	km/h	10
Noise emission level:		
L_{pA}	dB	99 ± 1
L_{Amax}	dB	109 ± 1
L_{Cpeak}	dB	113 ± 1

★ work output for speed 10 km/h

L_{pA} - noise level exposure relating to 8 hour working day. Time averaged acoustic pressure emission level correlated with frequency characteristic A

L_{Amax} - maximum value of measurement correlated with frequency characteristic A of acoustic power level

L_{Cpeak} - peak level of acoustic pressure correlated with frequency characteristic C

3.2 GENERAL DESIGN

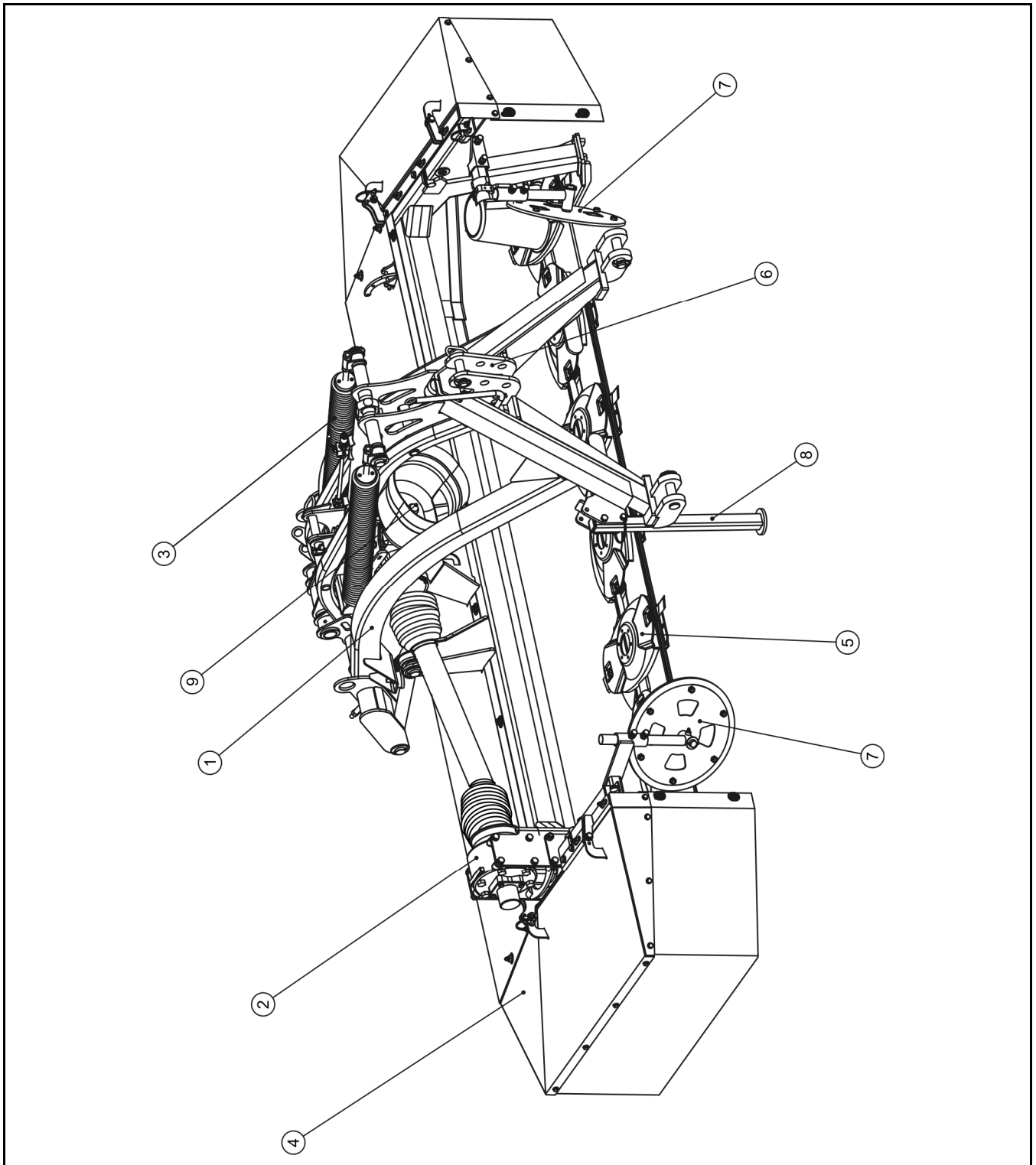


FIG. 3.1A General design

(1) linkage frame, (2) cutterbar drive transmission, (3) stay springs, (4) main frame with guards, (5) cutterbar, (6) hitching system, (7) swath guide, (8) support leg, (9) mower central transmission

The PDF290 front disc mower is designed to operate with a tractor equipped with a front three-point linkage and front power takeoff shaft (PTO). It consists of linkage frame (1), attached to the main frame (4) using eyes and pins. The lifting side shields, front and rear shields are secured to the main frame. Drive transmission from tractor to cutterbar (5) is through the transmission (2) and (9) and PTO shafts - see section 3.4 „*DRIVE ASSEMBLY AND CUTTING UNIT*”. Stay springs (3) ensure the cutterbar exerts uniform pressure on the ground – see section 4.5 "*SETTING AND MOWING*". Adjustable swath guides (7) secured to main frame enable swath width to be set at widths from 1.7 m to 1.9 m. When swath guides are removed the swath width is 2.35 m.

3.3 LINKAGE

Mower's linkage includes linkage frame (1), to which tension rods supporting main frame and the cutting unit are attached using pins. The spring (3) relieves load from the left side of the mower to provide uniform pressure of the cutting unit on the ground. To ensure correct pressure of cutterbar on the surface, the machine is equipped with two strong horizontally mounted stay springs (4). These are installed in parallel to pins of the linkage frame. Spring adjustment system allows setting of optimal cutterbar pressure depending on type of surface and type of forage mown. Hydraulic cylinder (5) allows setting the mower into transport position and prevents downward movement of the cutting unit. Pin (6) locks the mower in transport positions when hydraulics are operated by mistake or a hydraulic conduit ruptures.

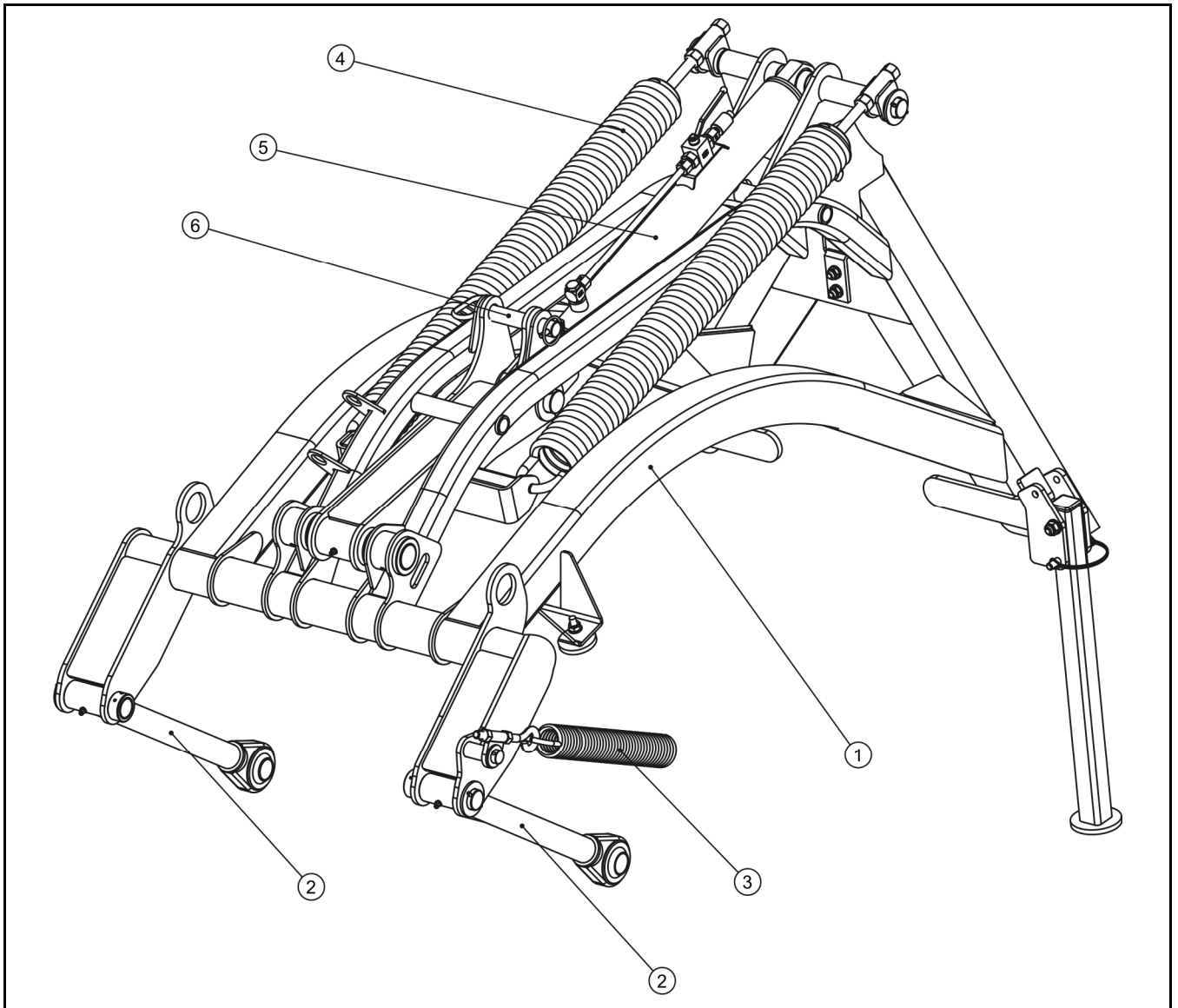


FIG. 3.2A Linkage design

(1) linkage frame, (2) tension rod, (3) tensioning spring, (4) stay spring, (5) drawbar eye, (6) transport lock

Hitching system - figure (3.3A) allows hitching of mower to tractor's three-point linkage. The mower is equipped with a triangular hitching system (1), which is hitched to lower hitching point of tractor's front three-point linkage using pins (4) and to upper hitching point using pin (6) and then secured with linchpins (5). Hitching is completed once catch (2) is engaged in linkage frame. Use catch lever (3) to disconnect the machine.

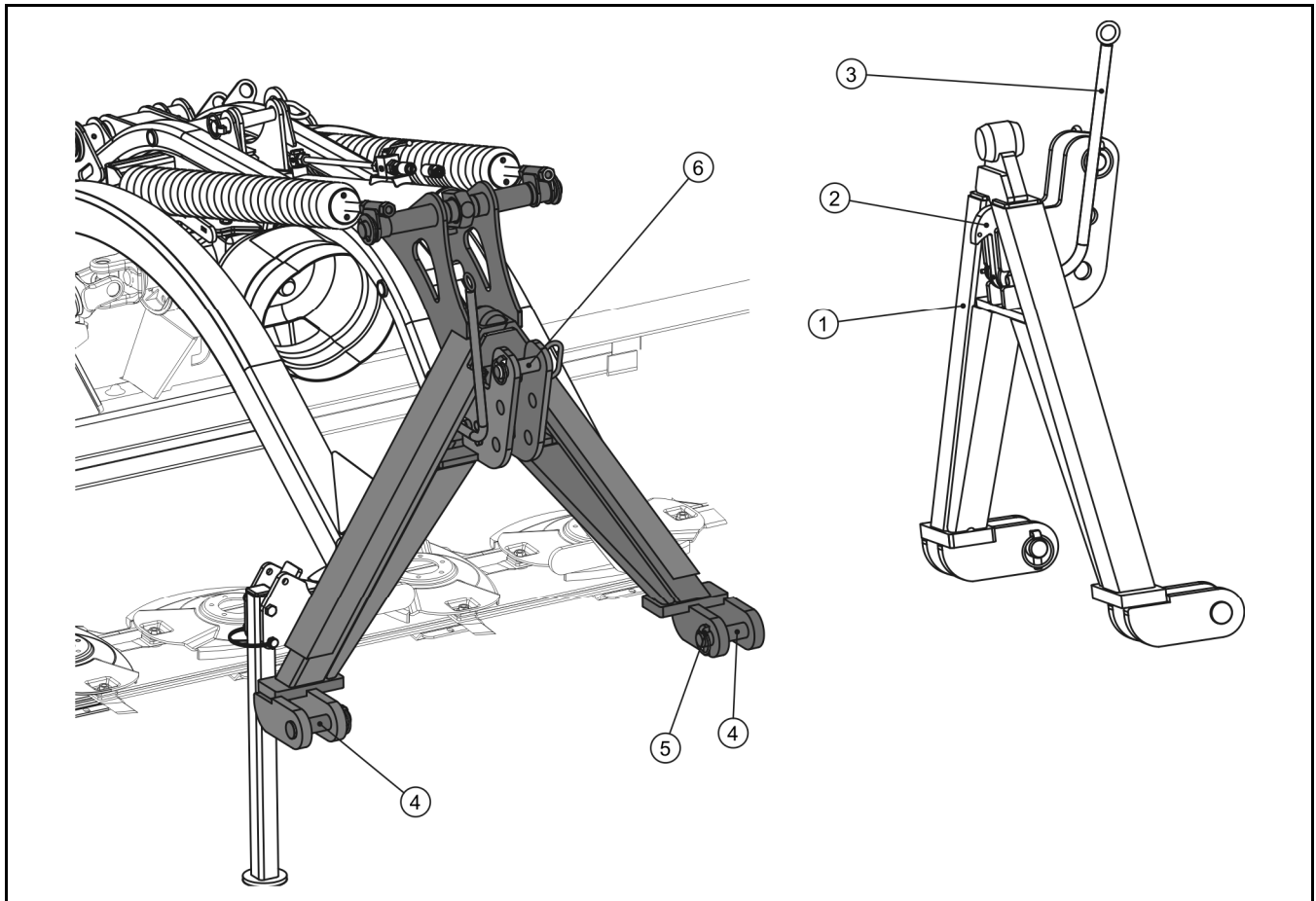


FIG. 3.3A Hitching system

(1) triangular hitching system, (2) catch, (3) catch lever, (4) lower arms mounting pin, (5) linchpin, (6) upper tension rod mounting pin

3.4 DRIVE ASSEMBLY AND CUTTING UNIT

The PDF290 mower is designed to work with PTO speed 1000 rpm and it is suitable for connection to tractors with PTO shaft revs (A) turning clockwise when seen from front of tractor. To connect the machine to a tractor with PTO turning in the other direction, disassemble and turn the mower's central transmission (1) by 180° - see section 4.3 "ATTACHING TO TRACTOR".

Torque of tractor PTO is transferred by PTO shaft with friction clutch (4) to mower central transmission (1). From the central transmission, the drive is transmitted by shaft (3) to the cutter bar transmission (2). Then through connection to double articulated joint (6) the drive reaches the first disc on the cutterbar (5). Disc rotation direction and machine forward motion are marked with arrows. Cutting discs are fitted with left and right knives. If disks rotate

clockwise then right knives are mounted, if anticlockwise then left knives are mounted - see section 5.1 „CHECKING AND REPLACING CUTTING KNIVES AND PINS”

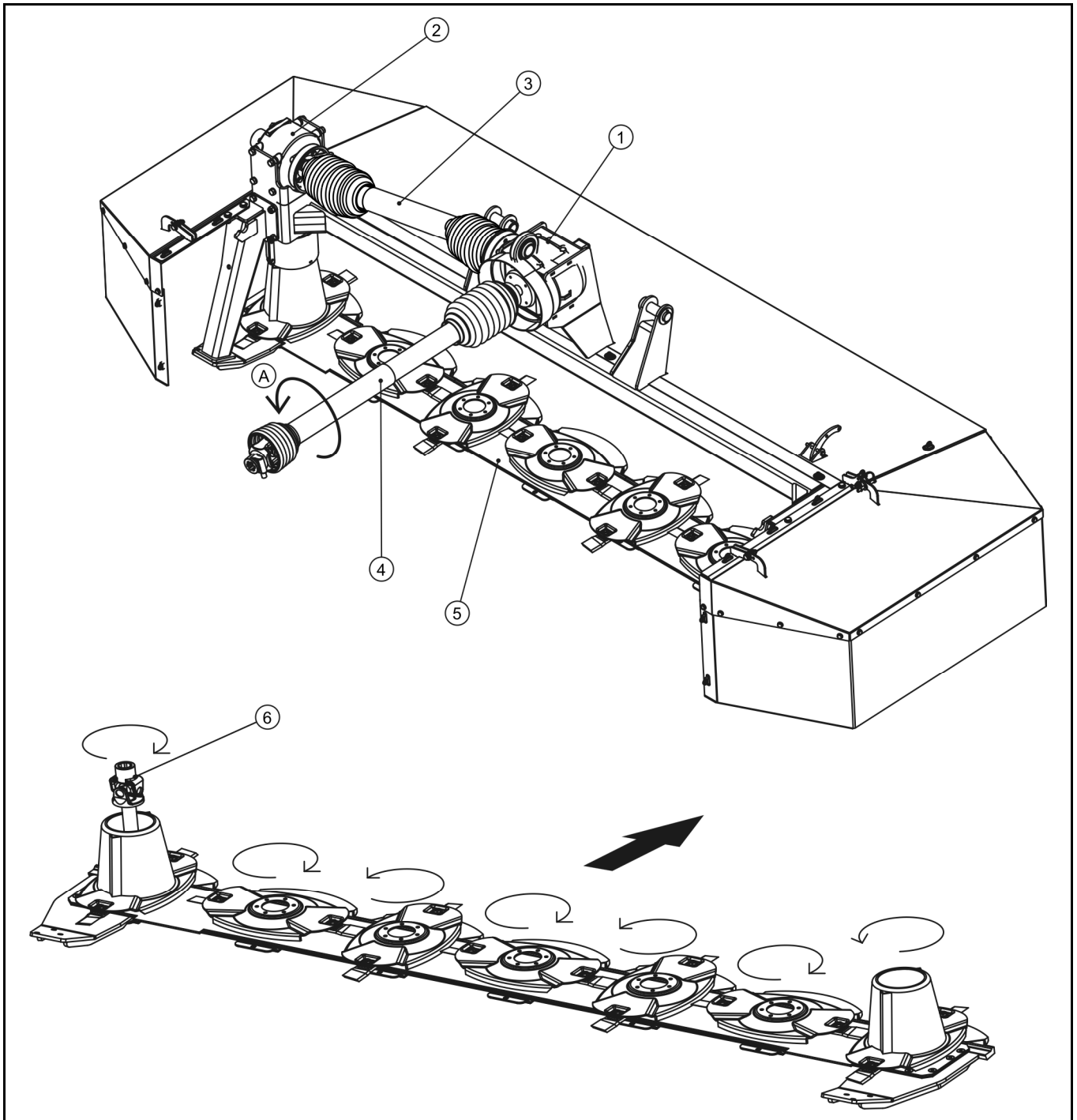


FIG. 3.4A Drive transmission

(1) mower central transmission, (2) cutterbar drive transmission, (3) PTO shaft, (4) PTO shaft for connection with tractor, (5) cutterbar, (6) double articulated joint



ATTENTION!

The machine is designed to work only with tractors with power of at least 44/ 60 kW / Horse power.

Do NOT use mower at PTO speeds other than 1000 rpm.

Only use PTO shafts recommended by the manufacturer for the drive system.

3.5 HYDRAULIC SYSTEM

Hydraulic system in PDF290 front mower allows raising and lowering of cutting unit. The machine is equipped with a single acting hydraulic cylinder (1). The cylinder is supplied from tractor's external hydraulic system connected to a quick coupler (3) by means of a hydraulic conduit. The hydraulic cylinder is equipped with a ball valve (2) which allows locking of the hydraulic cylinder in transport position.

The mower's hydraulic system should be connected directly to tractor external hydraulic system quick coupler socket located on tractor's front linkage.

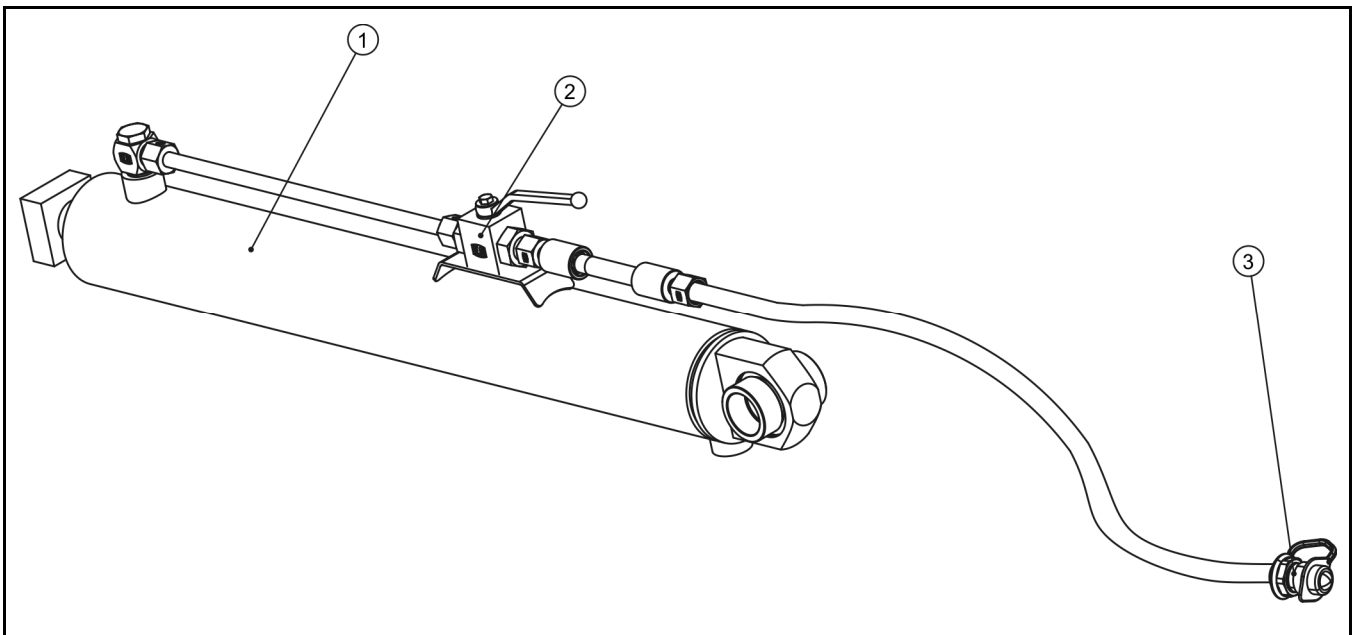


FIG. 3.5A Hydraulic system design

(1) hydraulic cylinder, (2) ball valve, (3) quick coupler

SECTION

4

CORRECT USE

PREPARING FOR WORK

CHECKING TECHNICAL CONDITION OF MOWER

ATTACHING TO TRACTOR

TRANSPORTING THE MACHINE

SETTING AND MOWING

DISCONNECTING FROM TRACTOR

4.1 PREPARING FOR WORK

The manufacturer guarantees that the mower is fully operational and has been checked according to quality control procedures and is ready for normal use. This does not release the user from an obligation to check the machine's condition after delivery and before first use. The machine is delivered to the user completely assembled.

Before connecting to tractor, machine operator must check the technical condition of the mower and prepare it for test startup. In order to do this:

- the user must carefully read this Operator's Manual and observe all recommendations, understand the design and the principle of machine operation
- check the condition of protective paint coat,
- Inspect mower's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components),
- Check all the mower's lubrication points, lubricate the machine as needed according to recommendations provided in section 5,
- check if mounting of cutting knives, discs and protective guards is correct,
- check technical condition of hitching system pins and locking linchpins,
- Check level of lubricating oil in angle transmissions and cutterbar.

If all the above actions are completed and if the technical condition of the mower is not a cause of concern then connect it to the tractor 4.3 "*ATTACHING TO TRACTOR*". Start the tractor's engine, check all systems and test the mower before beginning work. In order to inspect:

- connect the mower to tractor,
- connect PTO shaft to tractor and mower,
- start tractor PTO slowly

ATTENTION!



Before using the mower always check its technical condition. In particular check the technical condition of the cutting unit, drive system, and integrity of protective guards.

Discs and cutting knives work at high rotation speed and even the smallest damage may cause an increase in vibration, which after a certain time shall result in fractures and cracks.

Leave for several minutes working at low RPM, during which check:

- there is no knocking or noise in the drive system arising from scraping or grinding of metal elements,
- if the discs on the cutterbar rotates smoothly without any faltering,
- synchronous rotation of cutting unit.

The mower's operation without load should be smooth. Shaking of cutting unit and whole machine is not acceptable, nor is changed noise and vibrations coming from loose nut and bolt connections. After stopping mower check fastening of cutting knives. Check that the gear oil does not leak from the reduction gear.

DANGER



Before using the mower, the user must carefully read this operator's manual.

Careless and improper use and operation of the mower, and non-compliance with the recommendations included in this operator's manual is dangerous to your health.

The mower must never be used by persons who are not authorised to drive agricultural tractors, including children and people under the influence of alcohol or other drugs.

Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.

Before starting the mower, make sure that there are no bystanders in the danger zone.

If any faults are detected they must be identified and rectified. If a fault cannot be rectified or the repair could void the guarantee, please contact retailer for additional clarifications.

4.2 CHECKING TECHNICAL CONDITION OF MOWER

When preparing the mower for normal use, check individual elements according to guidelines presented in table (4.1).

TAB. 4.1 Technical inspection schedule

DESCRIPTION	SERVICE OPERATION	FREQUENCY
Operation of hydraulic system.	Check the tightness of conduits and proper operation of hydraulic cylinder.	Daily
Check that the cutting knives, mounting pins and discs are in good technical condition.	Visually inspect and if necessary replace damaged parts.	
Check oil level in intersecting axis gears	For details please refer to section "DRIVE SYSTEM OPERATION"	
Check oil level in cutterbar	For details please refer to section "CUTTERBAR OPERATION"	
Check tightness of securing nuts and bolts.	Torque values should be according to table (5.4)	Every three months
Lubrication	Lubricate elements according to guidelines presented in section "Lubrication".	According to table (5.3)



ATTENTION!

Do NOT use unreliable mower.

Prior to connecting hydraulic system conduit the user must carefully read the tractor operator's manual and observe all recommendations of the manufacturer.

4.3 ATTACHING TO TRACTOR

The PDF290 front disc mower is designed to operate with a tractor equipped with a category two front three-point linkage and front power takeoff shaft (PTO) with a rotation speed of 1000 RPM. It is also required that tractor is equipped with a spare hydraulic connector to connect the mower's single acting hydraulic cylinder. The minimum tractor power demand of the hitched machine is 44/60 kW/KM.

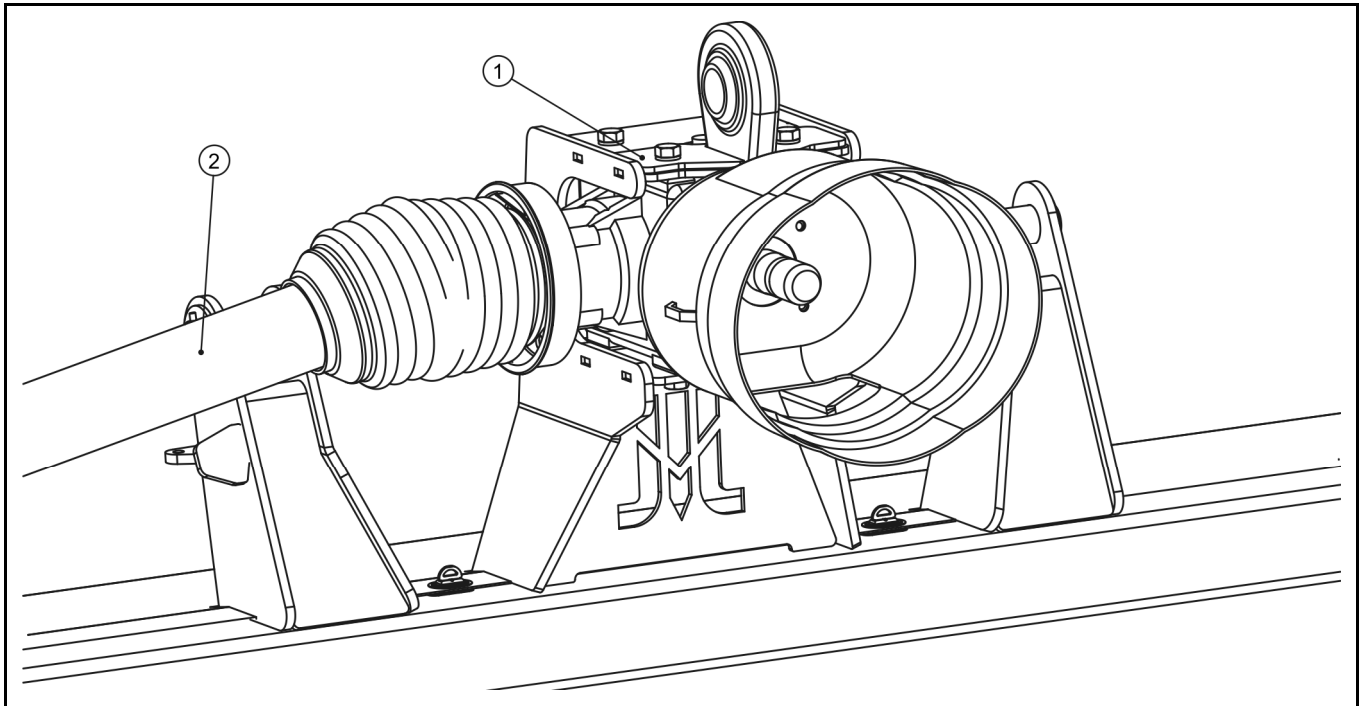


FIG. 4.1A Position of intersecting axis gear

(1) mower central transmission, (2) PTO shaft

Before hitching the mower to tractor, check that PTO speed of both tractor and the mower are the same. Standard machine is suitable for connection to tractors with PTO shaft turning clockwise when seen from front of tractor. To connect the machine to a tractor with PTO turning in the other direction, disassemble and turn the mower's central transmission (1) by 180°.

Once PTO rotation direction is determined and possibly after reversing the direction, in order to attach the mower to tractor, perform the following:

- Attach triangular hitching system (1) to tensions rods (2) of tractor's front three-point linkage,

- Attach top link (3) between the triangular hitching system and tractor's three-point linkage so that triangular hitching system is positioned vertically or slightly inclined forward,
- Secure pins of lower links using linchpins,

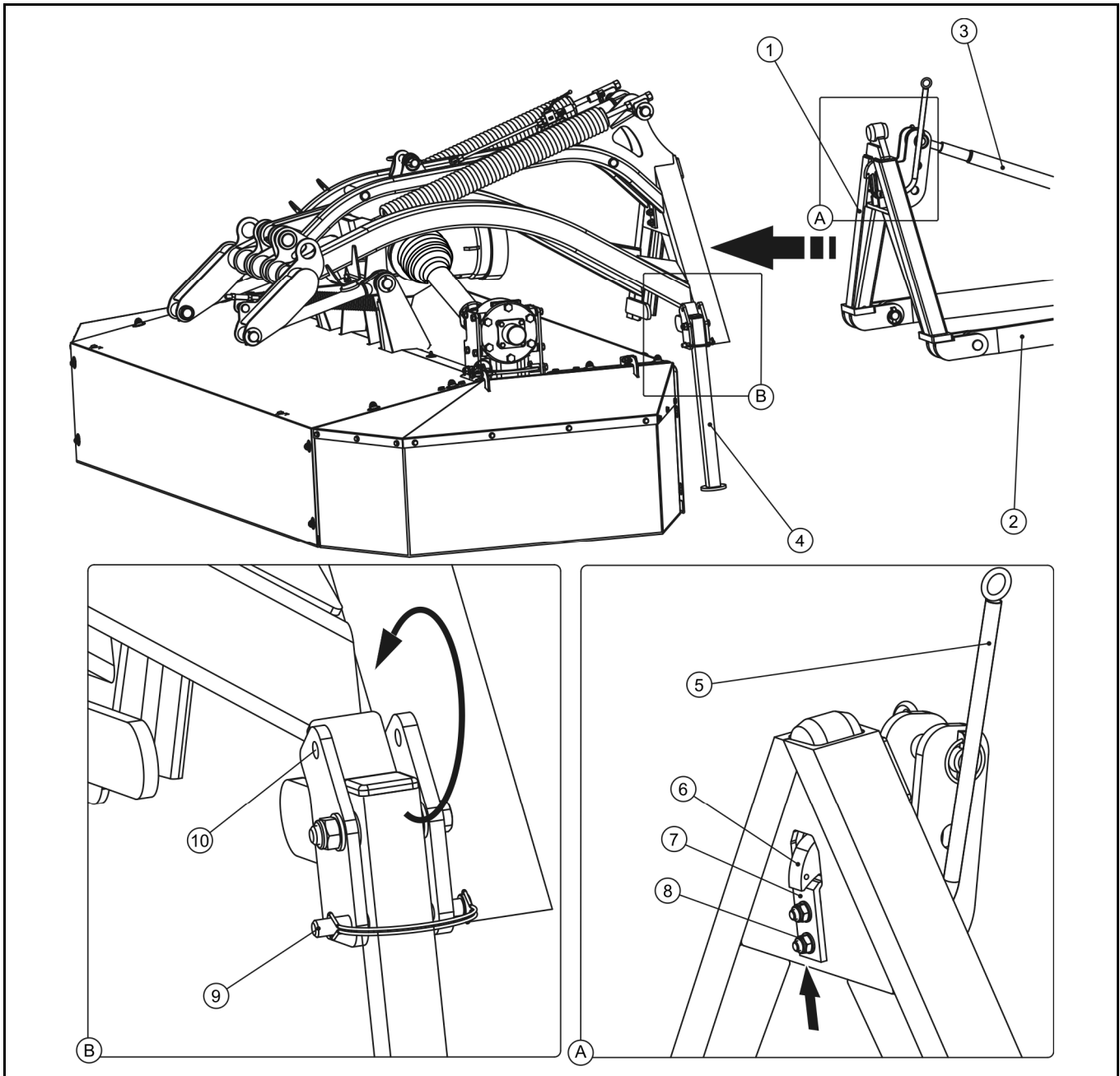


FIG. 4.2 A Attaching to tractor

(1) triangular hitching system, (2) lower link of tractor's three-point linkage, (3) top link, (4) support leg, (5) catch lever, (6) catch, (7) catch limiter, (8) catch bolt, (9) support pin, (10) pin hole

- Drive tractor to mower so that the catch of the triangular hitching system (6) engages. If the connection has too much slack, set catch limiter (7). In order to do so, raise the machine so that it is suspended on the triangular hitching system (1). Loosen nuts (8) and move catch limiter (7) toward the catch (6) so that it can be released using the lever (5). Tighten nuts (8) bearing in mind that they have to be re-tightened after approximately 8 hours of work.



DANGER

To mount machine on tractor use only genuine pins and safeguard linchpins. If play between the catch (6) and limiter (7) is excessive the mower can get disconnected from tractor during work or transport.

- Connect mower lifting cylinder hydraulic conduit to a quick coupler in the tractor,
- Lift support leg (4) and insert pin (9) into hole (10) and secure with linchpin,
- Set mower in working position. Adjustments can be made using top link (3). Link length should be selected so that mower's frame remains in horizontal position during work,
- Install PTO shaft between the machine and tractor. Connect to the mower friction clutch end of the shaft,
- Install limiting chains (option). Attach upper ends to top link pin. Attach opposite ends to lower links of tractor's three-point linkage.



DANGER

When attaching, there must be nobody between the mower and the tractor. when attaching the mower, tractor's driver must exercise caution and make sure that nobody is present in the hazard zone.

4.4 TRANSPORTING THE MACHINE

When driving on public or private roads, respect the road traffic regulations, exercise caution and prudence. To prepare mower for transport (travel on roads) perform the following actions on the tractor:

- connect mower cylinder hydraulic conduit to a quick coupler of tractor's hydraulic system,
- using the mower's hydraulic cylinder (1) lift the main frame including cutting unit by operating the tractor's external hydraulic system control lever.
- secure mower against falling by closing cut-off valve (2) located on the hydraulic cylinder. Set valve in closed position (Z).

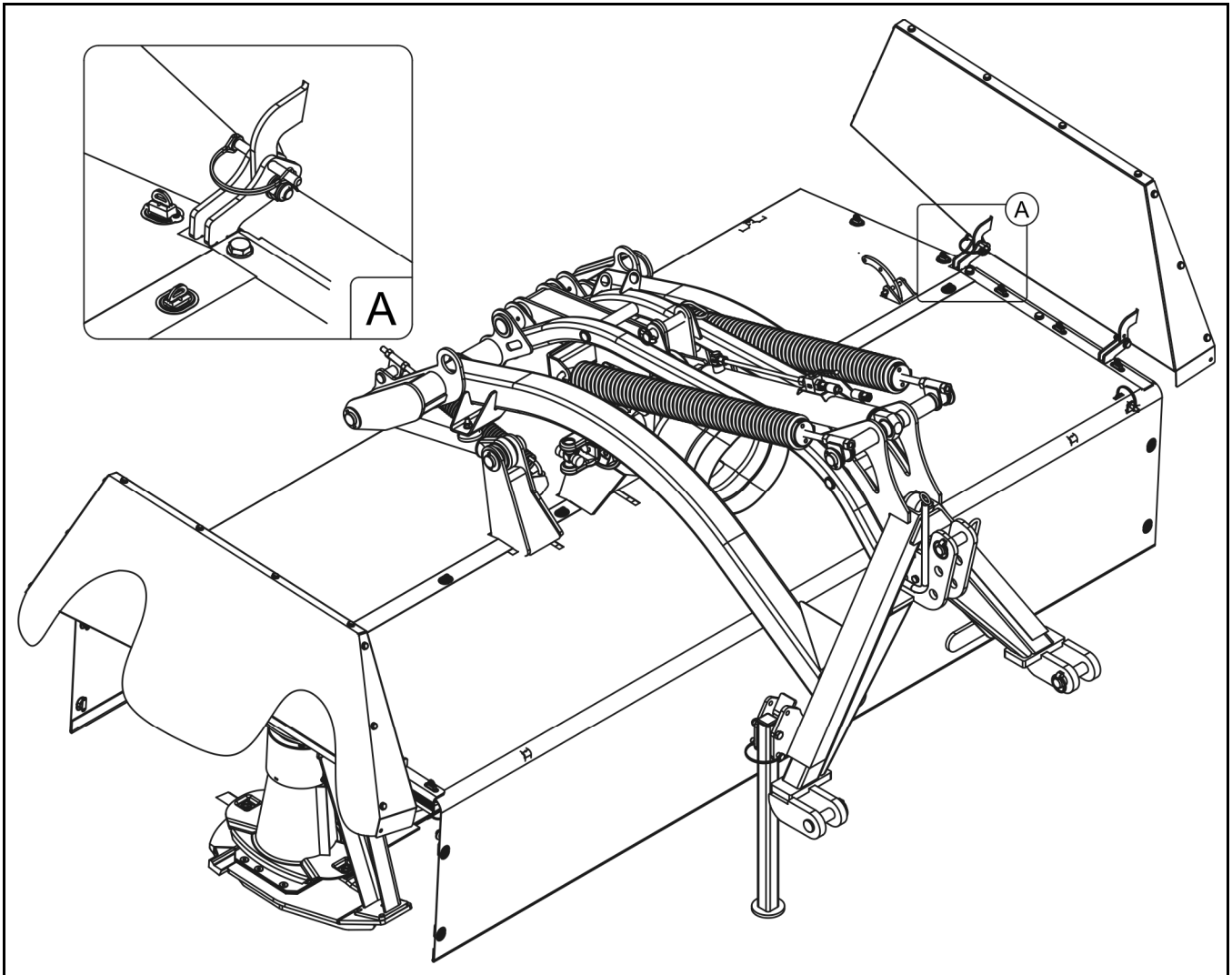


FIG. 4.3A Raising guards for transport

- raise mower lateral guards and secure with linchpins.
- lift mower on tractor lower linkage arms using three point linkage.
- secure with limiting chains (3) (option),
- lock in transport position using securing pin (4) suitably secure using a linchpin.

- Raise the mower on tractor links to a height allowing safe transport making sure that driver's visibility is not limited.

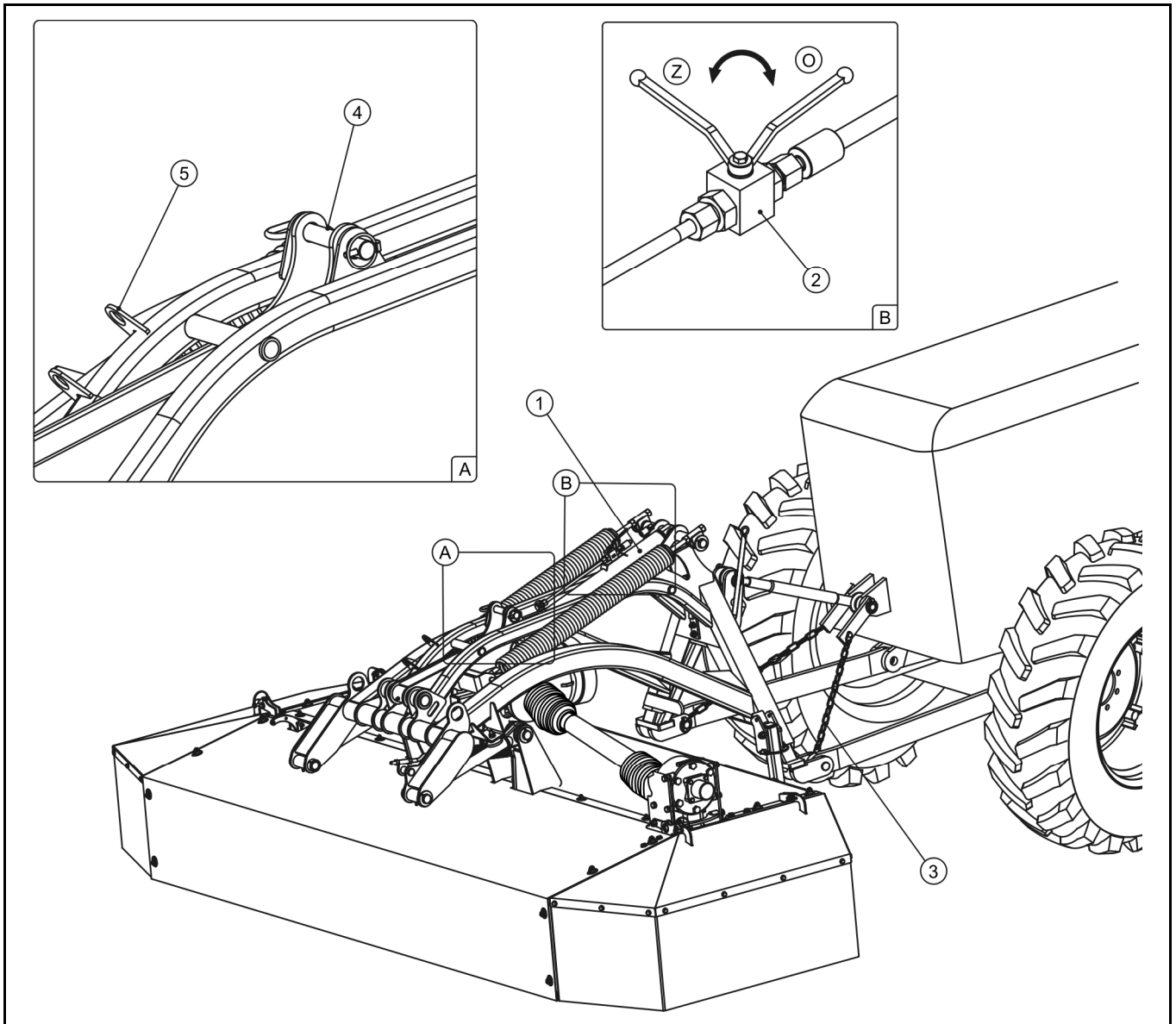


FIG. 4.4A Preparing mower for transport

(1) hydraulic cylinder, (2) cut-off valve, (3) limiting chains, (4) securing pin, (5) pin fixing eye

Listed below are the key guidelines for driving the tractor and mower combination.

- Transport on public roads and outside fields must always take place with raised machine.
- Before moving off make sure that there are no bystanders, especially children, near the mower or the tractor. Take care that the driver has sufficient visibility.

- Make sure that the mower is properly attached to the tractor, and that the PTO shaft is correctly secured.
- Permissible design speed and maximum speed allowable by road traffic law must not be exceeded. Travel speed should be adapted to the current road conditions.



ATTENTION!

Do NOT travel with machine which has an unreliable brake, lighting or signalling system.

- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- Monitor mower's behaviour when travelling on an uneven terrain, and adjust driving speed to road conditions, slow down early enough when turning.



ATTENTION!

Prior to moving off with the mower hitched, check the following:

- pins connecting the mower and tractor are properly secured,
- catch is correctly locked.

Do NOT transport mower mounted on tractor with open hydraulic valve.

When travelling with machine mounted in front of tractor, remember that driving over depressions can cause movement of the machine in an opposite direction to that of tractor.

4.5 SETTING AND MOWING

To work with the PDF290 mower first set it appropriately. The machine cutting unit is capable of moving up and down in relation to the mounting frame. Such a solution enables the cutting unit to respond to unevenness of the mown field, when the linkage frame (1) moves according to the movements of the tractor. For the mower to work optimally set it to the base position recommended by the manufacturer. In order to set it:

- lower machine onto support wheels.
- set lower three-point linkage connection arms of tractor at a height of approximately 570 - 580 mm (adjust the length of limiting chains - option),

- set the mowing height by shortening or lengthening the top link (5).
- Check distance (Z) between the rubber fender (4) and bumper (3) mounted on the link, which must be within the range 210 - 220 mm. This distance is necessary to ensure correct surface tracking by the mower during work.

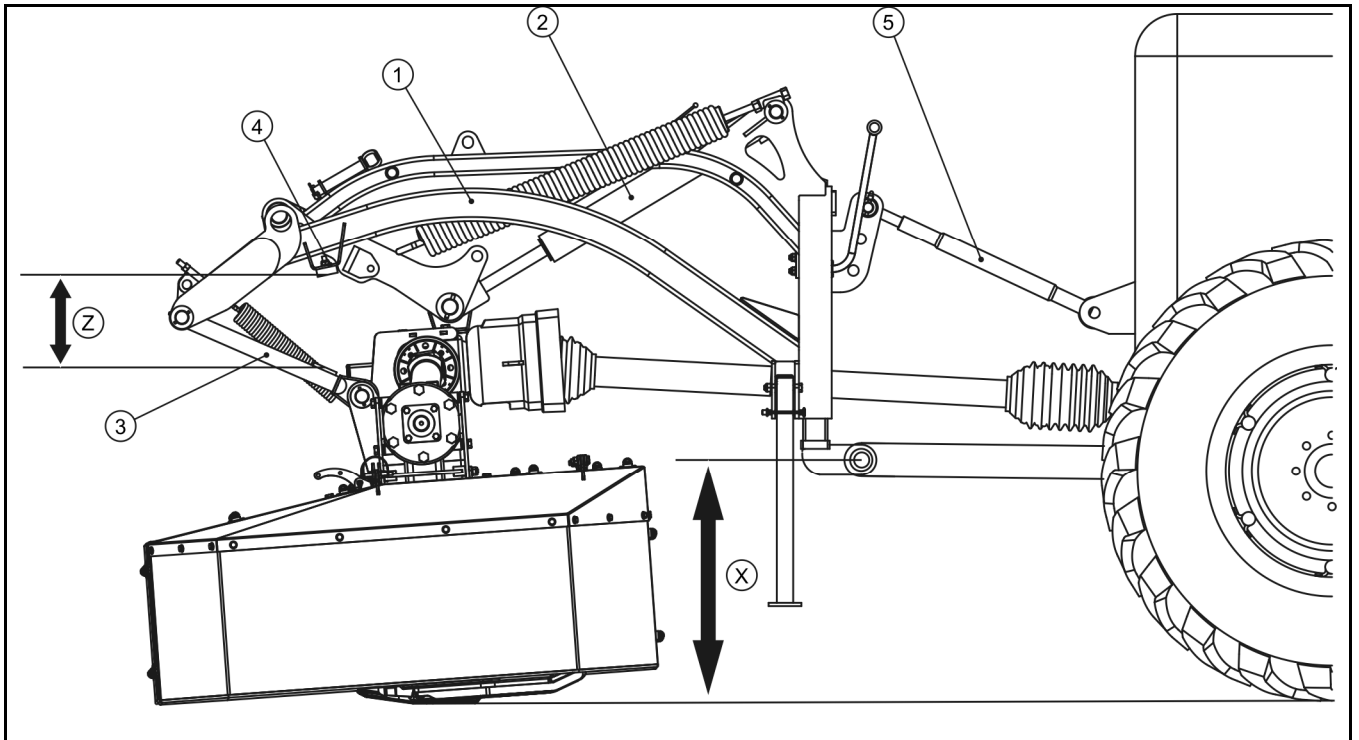


FIG. 4.5A Mower base position

(1) linkage frame, (2) hydraulic cylinders, (3) link, (4) rubber fender, (5) top link, (Z), (X) recommended distance to base position setting

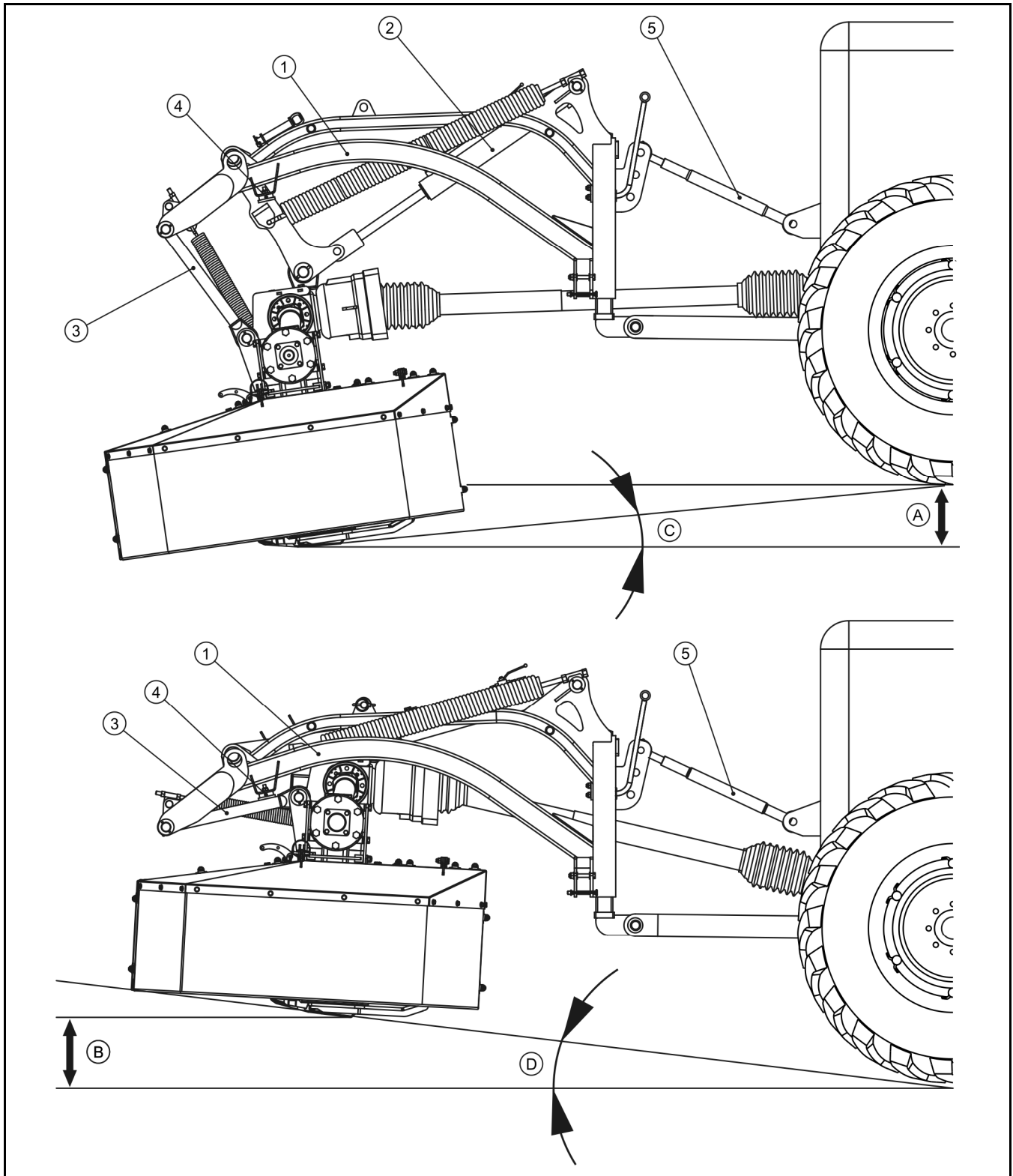


FIG. 4.6A Front mower working positions

(1) linkage frame, (2) hydraulic cylinder, (3) link, (4) rubber fender, (5) top link, (A), (B) cutting unit displacement, (C), (D) cutterbar tipping angle

If the terrain in front of the mower is inclined downward then the cutting unit moves downward in relation to the frame (1). This motion causes the cutterbar to turn forward maintaining the same height of stubble. When tracking terrain, the cutterbar can be set at a maximal angle of 6° (C) to the ground.

If the terrain in front of the machine is inclined upward, the cutting unit moves upward until its rubber fender (4) rests on link bumper (3). During this motion cutterbar turns back maintaining the same stubble height and reducing the risk of knives coming into contact with the ground. Cutterbar tipping angle in relation to the ground can reach a maximum of 7° (D).

In certain conditions it may be necessary to increase or reduce the cutting height. Changes of setting are made by shortening or lengthening the top link (5). Lengthening top link reduces the cutting height and shortening increases the cutting height. When adjusting cutting height it may be necessary to set the top link to a different position in the triangular hitching system.

The cutting unit can be moved within range of 510 mm vertically. By 240 mm (A) downward and 270 mm (B) upward from the base position. Hydraulic cylinder (2) limits downward motion, while hydraulic cylinder (4) sets upper limit.

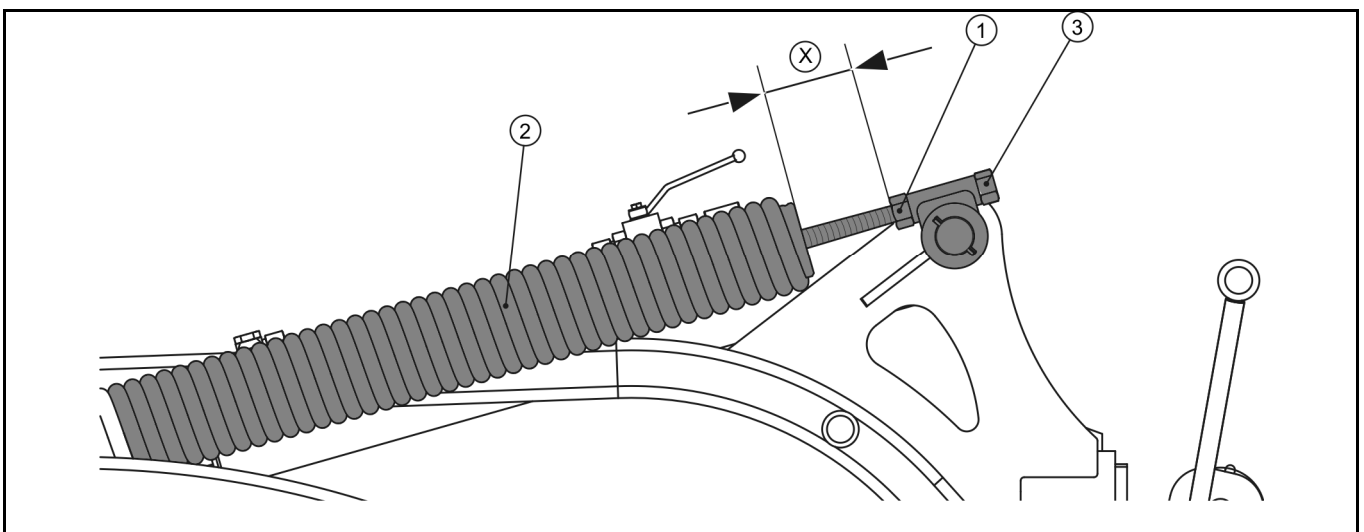


FIG. 4.7A Adjustment of cutterbar pressure

(1) counter nut, (2) stay spring, (3) adjustment bolt

In order to protect the stubble during cutting and reduce partial wear on slide skates of the cutting unit and also to ensure good ground surface tracking it is necessary to adjust the pressure of the cutterbar on the surface appropriately. The stay springs (2) are for this purpose. The pressure must be suitable to the ground conditions, the means of movement, type of surface and type of forage mown.

The loading is adjusted by changing the tension of both springs (2).

- Loosen counter nut (1),
- turn adjustment bolt (3) so that spring tension is adjusted
 - turning the bolt clockwise increases spring tension and reduces cutterbar pressure on the ground (distance X is reduced).
 - turning the bolt anticlockwise reduces spring tension and increases cutterbar pressure on the ground (distance X is increased).
- After achieving required tension, tighten counter nut (1).



ATTENTION!

Machine loading is set in a factory so that pressure on the soil is suited to work in normal conditions.

Before proceeding to mowing, set the swath width so that the cut grass is not crushed by the tractor wheels. The swath guides (1) enable the swath to be formed with widths from 1.7 m to 1.9 m, however with swath guides removed the swath width is 2.35m.

The swath width is set by adjusting the gatherers (1). To do this loosen locking bolts (2) and slide swath guides on guide bar in direction (A) - reducing the swath width or in direction (B) - increasing the swath width. After adjustment tighten bolts (2) and counter their setting with counter nuts (4). To adjust rotation and height of swath guide loosen bolt (3). After adjustment tighten bolts (3) and secure with counter nut (4).

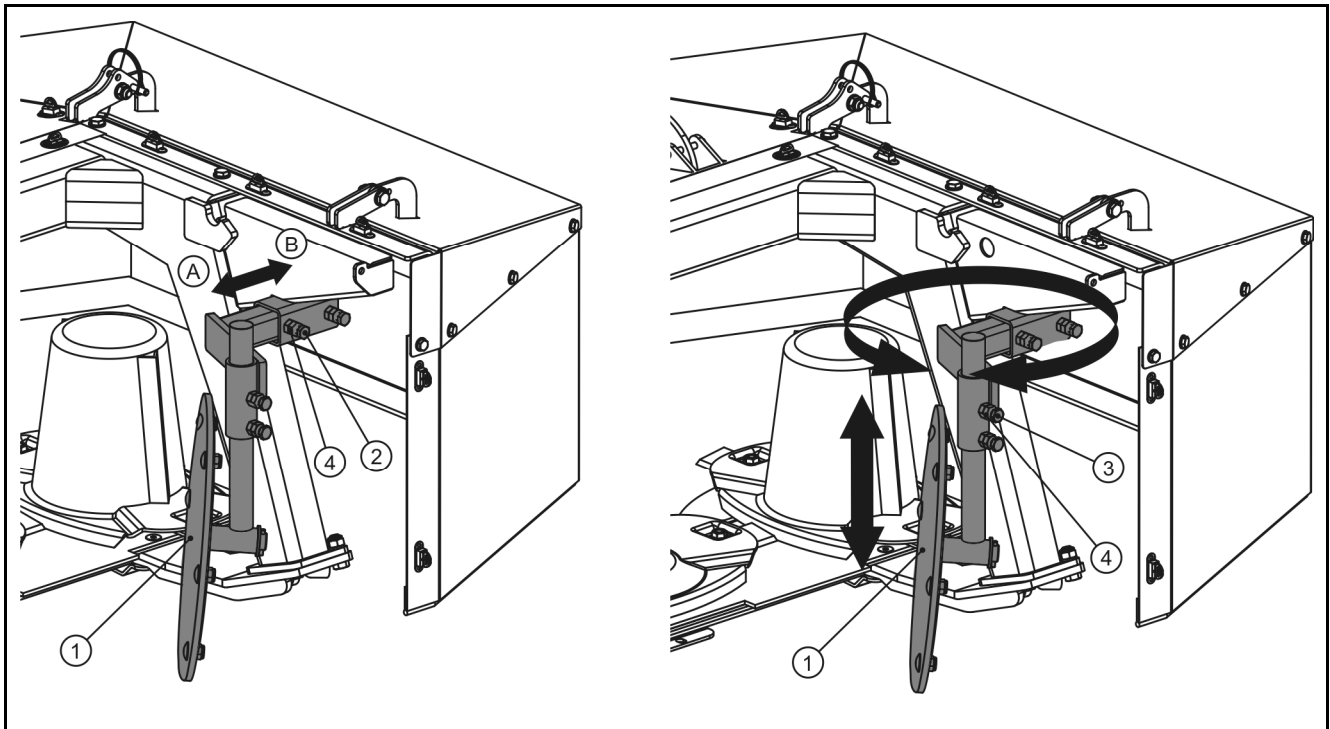


FIG. 4.8A Settings swath width

(1) swath guide, (2), (3) locking bolts, (4) counter nut

After reaching the field edge, first set the mower from transport position into working position. In order to do this:

- Using three-point linkage lower cutting unit to the ground,
- set cut-off valve (2) into open position (O), remove securing pin (4) and insert it into mounting frame eye (5) - figure (4.4A),
- Set the mower hydraulic cylinder control lever in floating position,
- Using tractor three-point linkage raise the mower to set it in cutting position – figure (4.5A).

After setting mower in working position, observe the following procedure:

- at low engine RPM connect PTO drive,
- gradually increase RPM until reaching 1000 rpm for PTO,
- engage appropriate tractor gear and drive into standing crop.

cutting speed should be adjusted to the existing conditions that is the density of the crop, and the type of ground surface, on which one is cutting. The driver must always have the tractor

under control and avoid unevenness and foreign bodies in front of the tractor and machine. On hilly terrain the working speed should be reduced and the driver must pay attention to movements of the machine in relation to the ground surface.

ATTENTION!



If the machine is in the working position and cuts, the single acting cylinder for lifting the cutting unit must always be set in floating position so that the cutting unit may move freely tracking the ground contours optimally.

On uneven ground there is a risk of the machine colliding with mounds of soil or foreign bodies and the driver must minimise the risk of damaging the machine.

During crossing over swaths with the mower and during turning the PDF290 mower cutting unit must first be raised with the aid of the lifting cylinder and RPM must be reduced. Travel speed must be reduced.

ATTENTION!



The machine design does not allow reversing with the machine in working position.

Reversing the PDF290 mower is impossible, unless the cutting unit is raised from the ground with mower hydraulic cylinder and the front lifter.

During cutting always maintain constant revs speed of 1000 rpm for optimum cutting performance. If RPM speed falls the drive loading increases significantly and it may occur at the friction clutch would be activated to protect the system. In such a situation always disconnect the drive and check the cause of the overloading.

Give special attention to sudden movements and impacts in the cutting unit. After a strong impact was an obstacle always check the machine in case of possible damage. Damaged elements must be replaced.

DANGER



Along banks, ditches and furrows always be especially careful and reduce speed because of the possibility encountering foreign bodies and because of soil differences on the edges of banks and furrows. Not reducing speed may cause the soil to slip and the tractor and machine to overturn.

4.6 DISCONNECTING FROM TRACTOR

In order to disconnect the mower from the tractor perform the following:

- Release mower support foot and insert locking pin to secure it,
- lower mower using three point linkage to rest position,
- switch off tractor engine and remove key from ignition,
- disconnect hydraulic conduit,
- dismount PTO shaft and set it aside,
- dismount triangular hitching system



DANGER

Before disconnecting tractor from mower check that the machine is protected against falling over.

During disconnection there must be nobody between the mower and the tractor.

Before lowering or raising mower on three point linkage make certain that nobody is near the machine and that nobody is operating it.

SECTION

5

MAINTENANCE

CHECKING AND REPLACING CUTTING KNIVES AND PINS

DRIVE SYSTEM MAINTENANCE

CUTTERBAR MAINTENANCE

HYDRAULIC SYSTEM OPERATION

LUBRICATION

STORAGE

TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

FAULTS AND MEANS OF REMEDYING THEM

5.1 CHECKING AND REPLACING CUTTING KNIVES AND PINS

Checking of cutting knives and securing pins must be conducted regularly. Make a visual assessment of knives and pins and check tightening torque of nuts according to table (5.4). It is especially important after driving over or collision with foreign bodies, mounting new cutting knives and after first start-up of machine.

DANGER



The entire cutting unit must be checked after impact with foreign bodies.

During work check source of unnatural vibrations and noises, which may come from the machine.

Before replacement switch off tractor engine and remove the key from the ignition and engage tractor parking brake. Ensure that unauthorised persons do not have access to the tractor.

While replacing cutting knives and securing pins the cutting unit should be lowered to the ground.

Change cutting knives if:

- knives on the same disc have different lengths and weights,
- are distorted,
- are very worn.

ATTENTION!



In the event of the loss of a knife vibration may occur, which may cause damage to the cutterbar.

Always replace both knives on the same disc. Distorted or damaged knives must be replaced without delay.

Before securing knives it is necessary to check the direction of disc rotation. Reverse setting shall cause impaired cutting.

Parts should always be replaced with original parts.

Securing pins should be replaced, if they are:

- Distorted – figure (5.1A) - position A,
- very worn and their diameter is less than 13 mm - figure (5.1A) - position B.

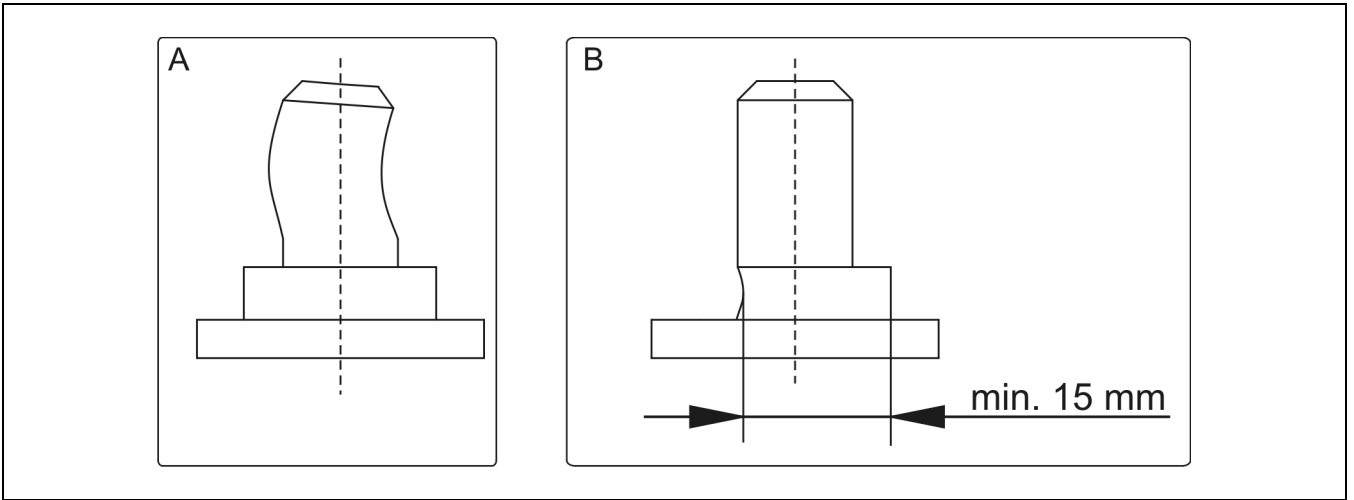


FIG. 5.1A Wear on securing pins

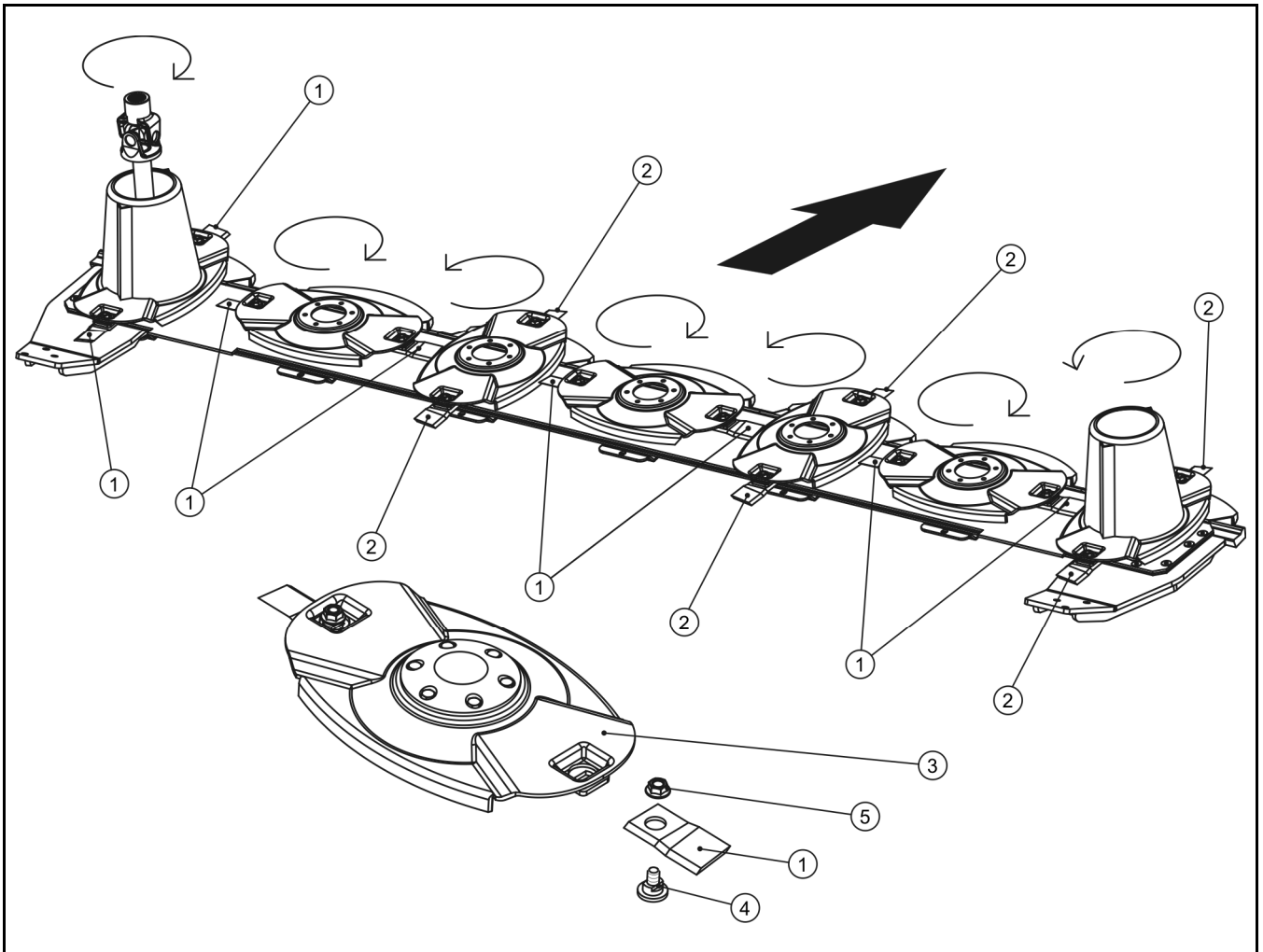
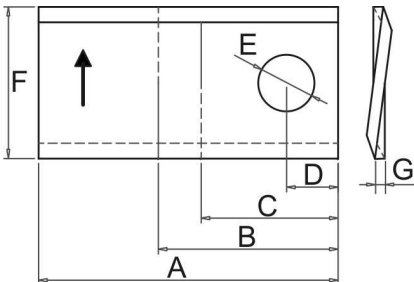
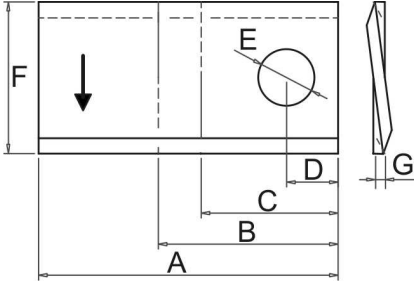


FIG. 5.2A Replacement of cutting knives

(1) right cutting knife, (2) left cutting knife, (3) rotating disc, (4) pin securing cutting knife, (5) self-locking nut

When replacing cutting knives the securing pin (4) is dismantled and taken out from beneath the disc (3). Old knives should be removed and new knives secured together with pin in such a way that the knife flicks grass upwards after cutting it. Knife with cutting edge placed lower is inserted from below in disk opening (3). Then secure pin with self-locking nut (5). It is essential to replace knives in pairs so that the disc stays in balance. Knives are two-sided; so that when they are not distorted they may be turned 180°, remembering the principle that the knife after cutting the grass flicks it upwards. A correctly mounted knife should turn lightly around the securing pin. The characteristics and dimensions of cutting knives used on PDF290 mower are shown in table (5.1).

TAB. 5.1 Cutting knife characteristics

MARKING KNIFE	FIGURE	DIMENSIONS [mm]						
		A	B	C	D	E	F	G
BRZW 100/49/4 P (RIGHT)		100	57	42	20	21	49	4
BRZW 100/49/4 L (LEFT)		100	57	42	20	21	49	4



ATTENTION!

Knives of other manufacturers may be used, but knives must be accompanied by the CE declaration of conformity and conform to ISO 5718 standard.

5.2 DRIVE SYSTEM MAINTENANCE

Drive system maintenance involves general checking of intersecting axis gears, change or supplementing transmission oil deficiencies. In the event of damage to transmission contact authorised service point in order perform repairs.

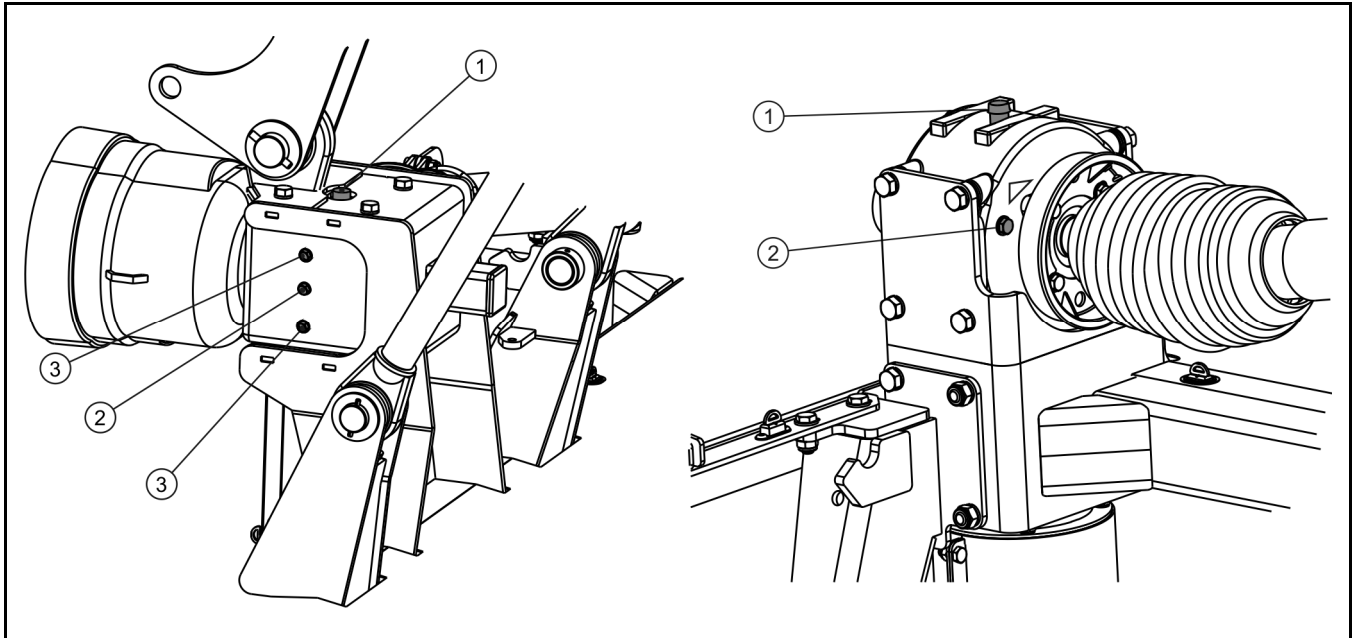


FIG. 5.3A Inspection points of gears

(1) inlet plug, (2) inspection plug, (3) air vent plug

Change oil level through inspection plug openings (2), located on the sides of intersecting axis gears. Check oil and level daily.

First oil change must be made after the first 50 hours worked. The next oil change should be made after 500 hours of mower work or once a year. Most suitable time for changing gear oil is when preparing for first fieldwork. On the PDF 290 mower two intersecting axis gears are mounted and their locations are shown on figure (5.4A).

The quantity of oil necessary to fill the reduction gear box amounts to 1.1 litres.



First oil change in gear transmissions must be made after 50 hours of mower work, and the next change should be after 500 hours, or once a year.

Transmission oil required: SAE 90EP.

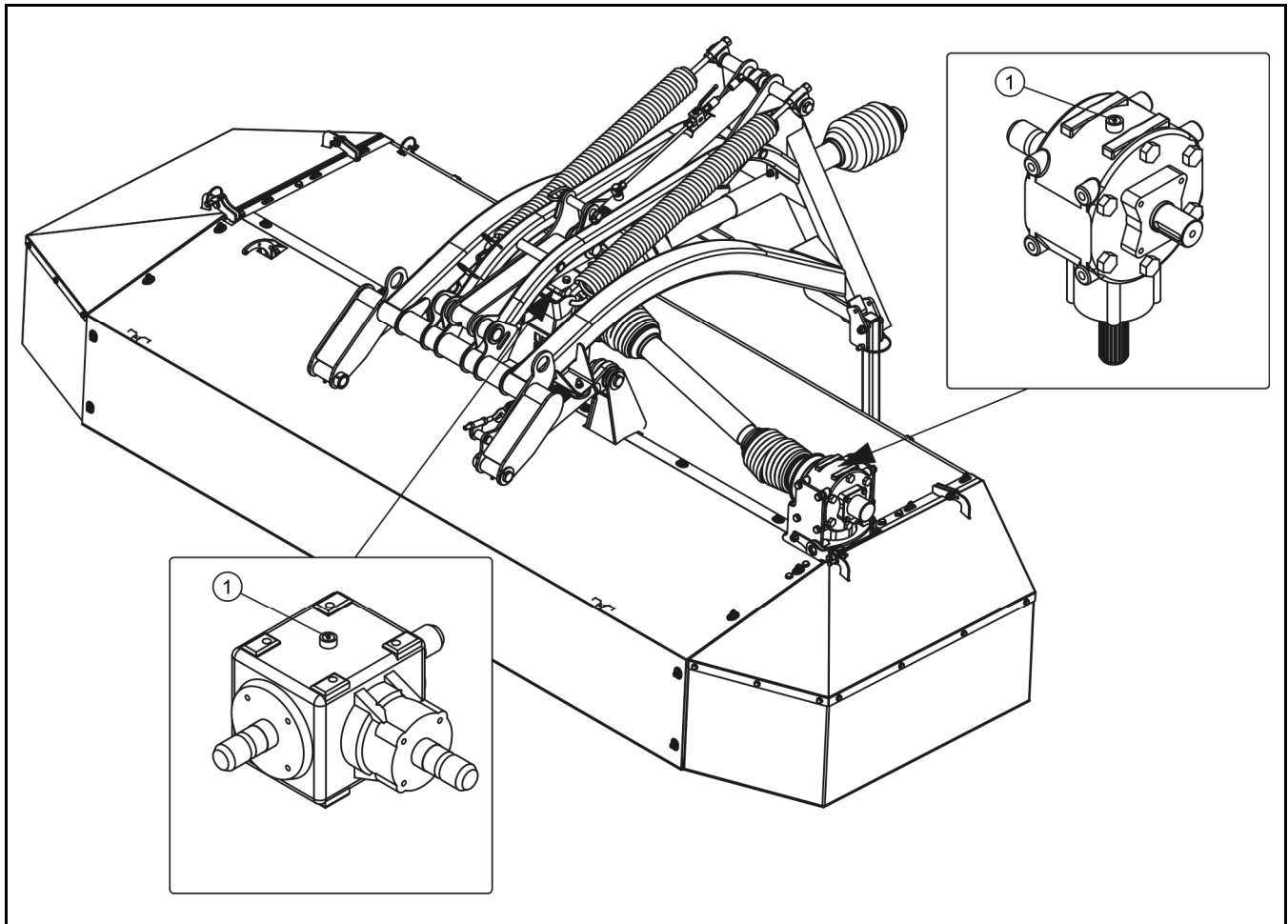


FIG. 5.4A Location and inspection points of intersecting axis gears

(1) inlet plug

In order to change oil in gear transmission:

- set mower on a hard surface and level the machine
- unscrew inlet plug (1),
- unscrew drain plug on lower part of gear transmission,
- drain oil into tight oil resistant container,
- if oil manufacturer recommends flushing transmission with washing detergent, that operation should be performed according to the guidelines of the oil manufacturer,
- tighten drain plug,
- add oil until oil flows out of inspection plug opening, found on side wall of gear transmission.

If a leak is noticed, carefully inspect seals and check oil level. Transmission operation with insufficient oil may cause permanent damage of the mechanism.

Repair of transmission during guarantee period may only be performed at authorised mechanical workshops.

5.3 CUTTERBAR MAINTENANCE

Cutterbar maintenance involves general inspection of cutterbar condition and also oil changing, or replenishing transmission oil deficiency. In the event of damage to cutterbar contact authorised service point in order perform repairs.



Check oil level daily during the season at inlet plug opening (1)

For daily oil inspection of cutterbar, lower and set cutterbar level. Check oil at inlet plug opening (1), which is on the top of the cutterbar between discs 3 and 4 looking from the side of the cutterbar drive transmission. Oil level should be 5-7 mm above the bottom of the cutterbar. When inspecting the level of hot oil wait for 3 minutes and check the level again. When checking cold oil wait for 15 minutes and check again. First oil change should be made after 50 hours work and then, after each 500 hours work or at least once in the season.

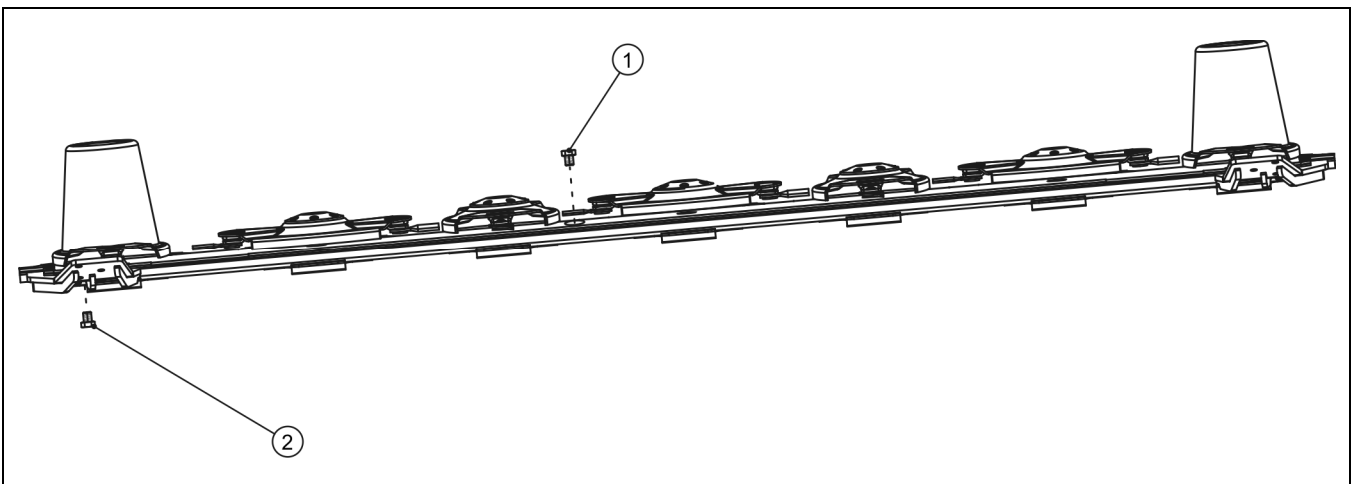


FIG. 5.5A Inspection and oil change points on cutterbar

(1) inlet plug, (2) drain plug

Oil change should be conducted at working temperature, if the machine has worked for several minutes, then possible contamination, in the cutterbar is mixed with the oil and then is drained out with it. In order to change oil:

- lift the mower using tractor's front three-point linkage,
- lift one side of the cutterbar and support it so that the other side where the drain plug (2) is located, is below,
- Leave the cutterbar lowered for approximately 15 minutes, so that oil flows to its lower part – figure (5.5A),
- unscrew drain plug (1) enabling old oil to drain out and be collected in appropriate container,
- clean plug of any contamination and tighten,
- lower cutterbar to horizontal position,
- pour in required oil quantity and tighten inlet plug.



First oil change should be made after 50 hours work and then, after each 500 hours work or at least once in the season.

The correct quantity of oil is 2.7 litres. Only use transmission oil SAE 90EP.



ATTENTION!

Never pour in less or more oil than is recommended. Incorrect oil quantity leads to overheating of cutterbar and then to bearings damage.

Only use oil recommended by the manufacturer.

5.4 HYDRAULIC SYSTEM OPERATION

Always adhere to the principle that the oil in the mower hydraulic system and in the tractor hydraulic system are the same type. Application of different types of oil is not permitted. In new mowers the system is filled with hydraulic oil HL32 to a quantity of 1 litre.

The mower's hydraulic system should be completely tight sealed. Checking tightness of hydraulic system involves connecting machine with tractor and starting hydraulic cylinder ram and holding it in position of maximum extension for a period of 30 seconds. In the event of confirmation of an oil leak on hydraulic conduit connections, tighten connections, and if this

does not remedy faults then change conduit or connection elements. If oil leak occurs beyond connection, the leaking conduit system should be changed. Change of sub assemblies is equally required in each instance of mechanical damage. In the event of confirmation of damage of a hydraulic ram cylinder it must be replaced or repaired. In such an event the whole set of seals must be changed.

TAB. 5.2 HL32 hydraulic oil characteristics

ITEM	NAME	VALUE
1	ISO 3448VG viscosity classification	32
2	Kinematic viscosity at 40 ⁰ C	28.8 – 35.2 mm ² /s
3	ISO 6743/99 viscosity classification	HL
4	DIN 51502 quality classification	HL

The oil applied because of its composition is not classified as a dangerous substance, however long-term action on the skin or eyes may cause irritation. In the event of contact of oil with skin wash the place of contact with water and soap. Do not apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory tract. A hazard only occurs when oil is strongly atomised (oil vapour), or in the case of fire during which toxic compounds may be released. Oil fires should be quenched with the use of carbon dioxide, foam or extinguisher steam.

In the event of necessity of changing hydraulic oil for another oil, check the recommendations of the oil manufacturer very carefully. If it is recommended to flush the system with the appropriate preparation, then comply with these recommendations. Attention should be given, so that chemical substances used for this purpose do not damage the materials of the hydraulic system.

ATTENTION!



Mower with a leaking hydraulic system must NOT be used.

The condition of hydraulic systems should be inspected regularly while using mower.

The hydraulic system is under high pressure when operating.

Regularly check the technical condition of the connections and the hydraulic conduits.

Use the hydraulic oil recommended by the manufacturer. Never mix two types of oil.

5.5 LUBRICATION

Mower lubrication shall be performed where indicated on figure (5.6A) and also detailed in table (5.3). This procedure should be performed using a hand or foot operated grease gun filled with generally available permanent grease. Before commencing lubrication in so far as is possible remove old grease and other contamination. Remove excess oil or grease

TAB. 5.3 Lubrication points

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
1	Tension rod locking pin	2	PERMANENT	20 hours
2	Suspension locking pin	1	PERMANENT	20 hours
3	Hydraulic cylinder eye	1	PERMANENT	50 hours
4	Stay spring adjustment bolts (threaded)	2	PERMANENT	50 hours
5	Tensioning spring adjustment bolt (threaded)	1	PERMANENT	50 hours
6	Cutterbar double articulated connection joint	2	PERMANENT	60 hours
7	Swath guide axis shaft	2	PERMANENT	20 hours
8	Multi-splined driveshaft	1	PERMANENT	20 hours

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
9	Intersecting axis gear	2	OIL	500 hours
10	Cutterbar	1	OIL	500 hours
11	Link ball-and-socket joint eyes	3	OIL	20 hours
12	PTO shaft for connection with tractor. ★			
13	PTO shaft★			

IMPORTANT! Marking description in Item column in table (5.3) conforms with numbering shown in figure (5.6A).

★ PTO shaft lubrication should be performed according to the instructions of manufacturer. For detailed information on maintenance please refer to maintenance instructions attached to the shaft.



When using the mower the user is obliged to observe lubrication instructions according to attached schedule. Excess lubrication substance causes depositing additional contaminants in places requiring lubrication, therefore it is essential to keep individual machine elements clean.

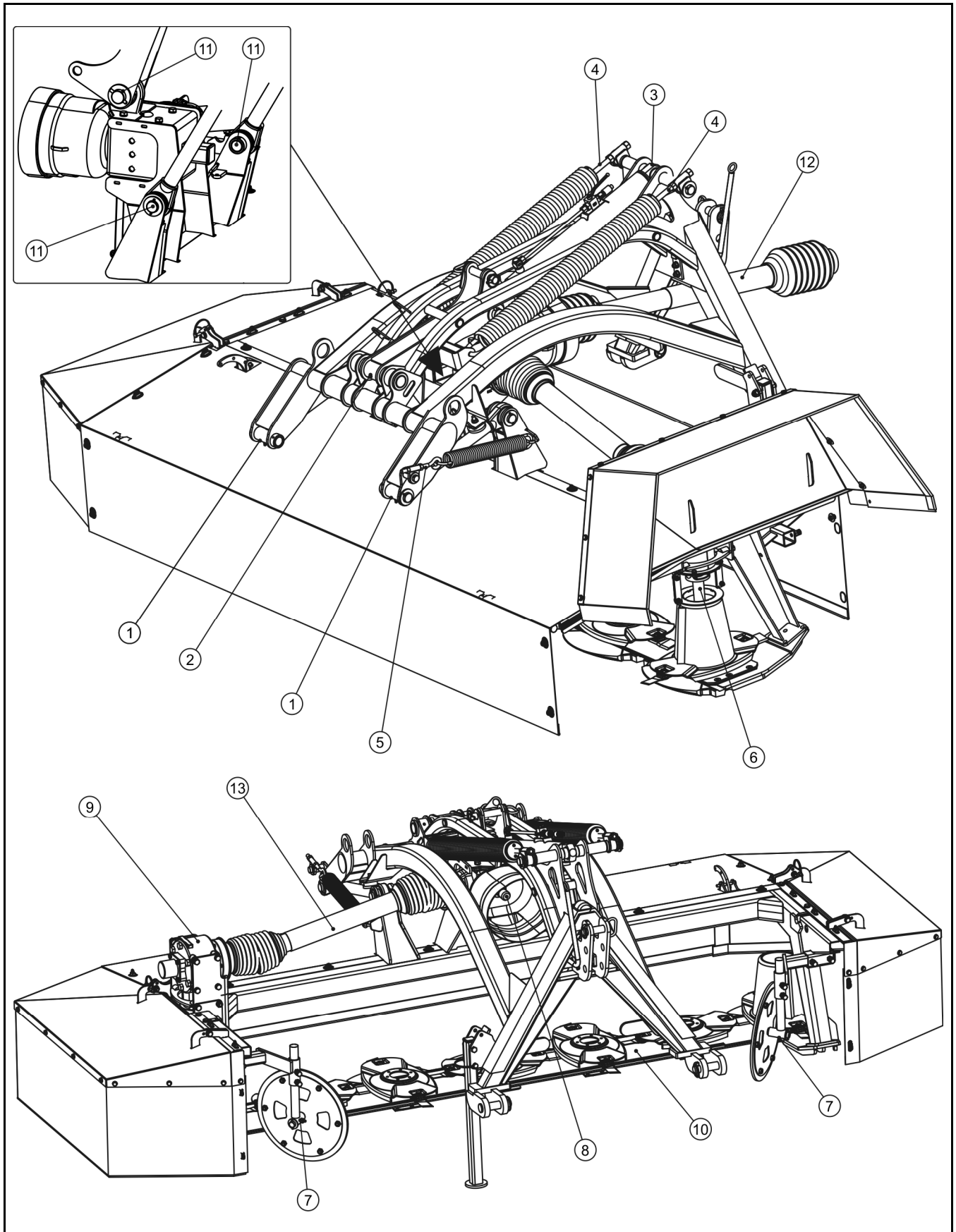


FIG. 5.6A Mower lubrication points

5.6 STORAGE

After finishing work with disc mower carefully clean and wash with water jet. While washing do not direct a strong water or steam jet at information and warning decals or bearings. Nozzle of pressure or steam washer should be kept at a distance of not less than 30 cm from cleaned surface.

After cleaning mower inspect the whole machine, inspect technical condition of individual elements. Used or damaged elements should be repaired or replaced.

In the event of damage to the paint coat, clean rust and dust from damaged area, degrease and then paint with undercoat and after it is dry paint with surface coat paint retaining colour uniformity and even thickness of protective coating. Until the time of touch-up painting, the damaged place may be covered with a thin layer of grease or anticorrosion preparation. Mower should be kept in closed or roofed building at temperature above 0°C.

If the mower shall not be used for a long period of time, protect it against adverse weather conditions, especially those which may cause rusting of steel.

Lubricate mower according to the instructions provided. In the event of prolonged work stoppage, it is essential to lubricate all elements regardless of the period of the last lubrication process. Additionally before the winter period hitching system pins should be smeared with grease.

5.7 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

Unless other tightening parameters are given, during maintenance repair work apply appropriate torque to tightening nut and bolt connections. Recommended tightening torque of most frequently applied nut and bolt connections are given in table (5.4). Given values apply to non-lubricated steel bolts.

Detailed inspection of tightness of nut and bolt connections should be made after the first 10 hours of work, and then each time at the end of working year of mower.

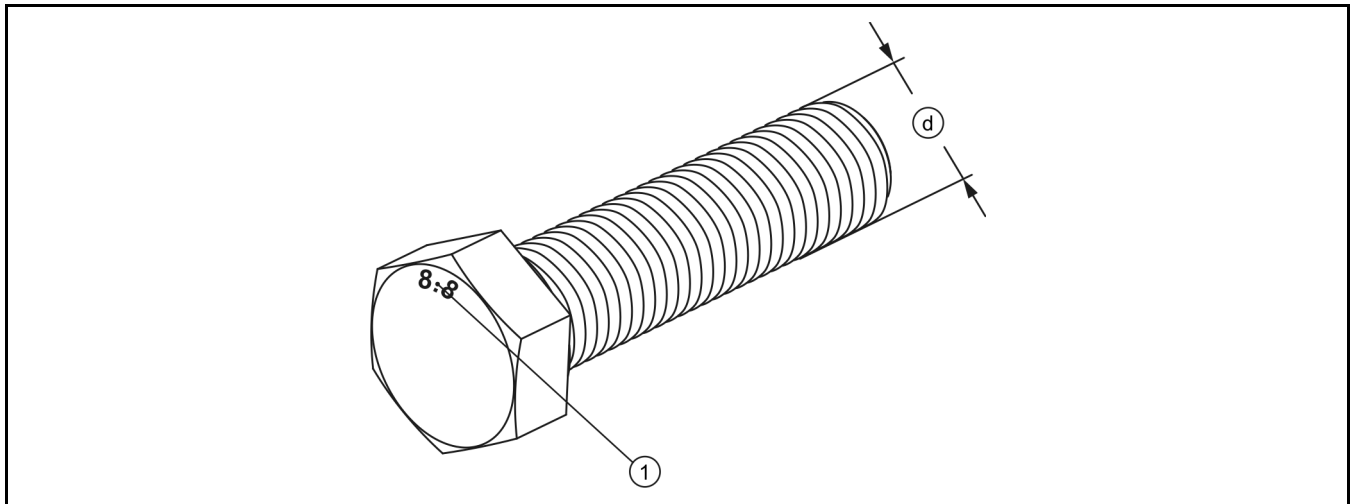


FIG. 5.7A Bolt with metric thread

(1) bolt strength class, (d) thread diameter

TAB. 5.4 Tightening torque for nut and bolt connections

THREAD (d) [mm]	5.8	8.8	10.9
	M_D [Nm]		
M6	8	10	15
M8	18	25	36
M10	37	49	72
M12	64	85	125
M14	100	135	200
M16	160	210	310
M20	300	425	610
M24	530	730	1050
M27	820	1150	1650
M30	1050	1450	2100

(M_D) – tightening torque, (d) thread diameter

5.8 FAULTS AND MEANS OF REMEDYING THEM

TAB. 5.5 Faults and means of remedying them

TYPE OF FAULT	CAUSE	REMEDY
Mower cutting unit cannot be lifted or lowered using the hydraulic cylinder	Lifting arm interlocked with a pin	Remove interlocking pin
	Incorrect connection or damaged quick coupler	Check quick coupler and manner of connection
	Unreliable tractor hydraulic system	Check condition of tractor hydraulic system
Stubble is uneven	Cutterbar is excessively load relieved	Set load relief stay appropriately
	Tractor PTO rotation speed too low	Maintain correct, constant PTO speed
	Worn cutting knives	Turn knives onto the second side or replace
	Incorrect cutting angle	Set appropriate cutterbar inclination by adjustment of top link
Excessive vibration during work	Damaged or missing knife	Check knives, if necessary replace
	Damaged PTO shaft	Check shafts, if necessary replace
	Damaged cutterbar bearing	Repair at authorised service point
Excessive heating of intersecting axis gear or cutterbar	Incorrect oil level	Check oil level.
	Damaged bearing	Repair at authorised service point
Mower drives stopping during cutting	Shaft overload clutch activated as a result of cutting discs being blocked	Disconnect power from mower; remove collected grass or foreign body from cutting unit
	Damaged cog in cutterbar	Repair at authorised service point
	Damaged intersecting axis gear	Repair at authorised service point

NOTES

A series of horizontal dotted lines for writing notes.

