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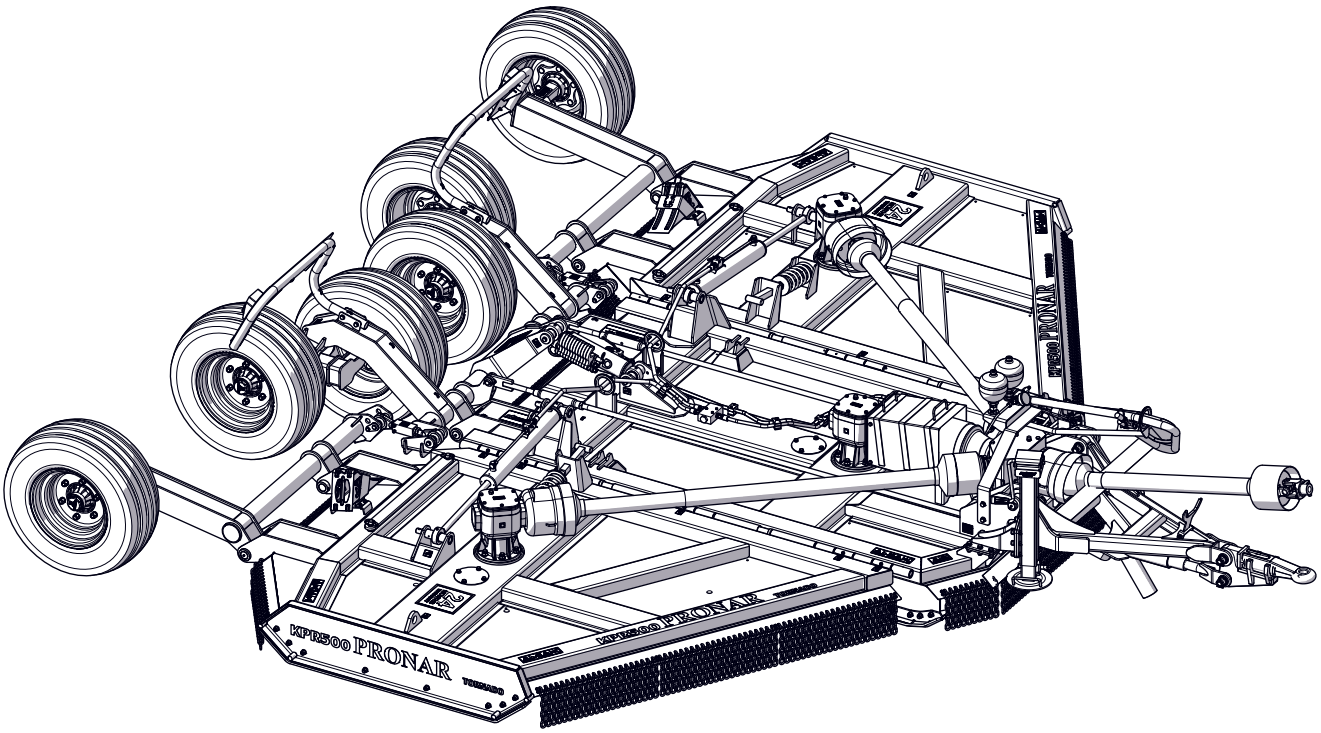
OPERATOR'S MANUAL

MULCHING MOWER

KPR500 TORNADO

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



KEEP FOR FUTURE REFERENCE

EDITION: 1A.10.2019

PUBLICATION NO.: 586.00.UM

EN

INTRODUCTION

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 actual specification of the machine supplied to the user. The manufacturer reserves the right to introduce design changes in machines produced that facilitate and improve the quality of machine operation, without making minor amendments to this Operator's Manual.

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

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.

It is recommended that the serial numbers of the machine and major subassemblies are inscribed in the spaces below after purchase of the machine.

Machine serial number

U.01.1.EN

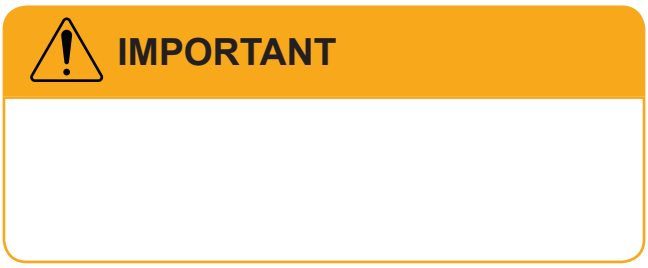
SYMBOLS APPEARING IN THIS OPERATOR'S MANUAL

DANGER

Information, descriptions of danger and precautions as well as recommendations and prohibitions associated with the safety of use are marked in the text with the sign **DANGER**. Failure to observe the instructions may endanger the machine operator's or other person's health or life.

IMPORTANT

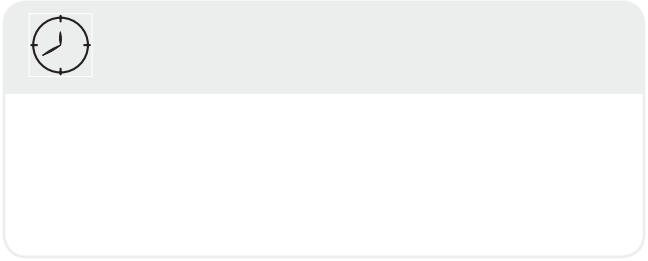
Vital information and instructions that must be observed are highlighted by a border and accompanied by the text: **IMPORTANT** Failure to observe the instructions may lead to damage to the machine as a result of improper operation, adjustment or use.



TIP

Additional tips included in the Operator's Manual describe useful advice for the machine operation and are marked with the sign **TIP**.

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 clock pictogram.



DIRECTIONS USED IN THIS OPERATOR'S MANUAL

Left side – side to the left hand of the operator facing in the direction of machine's forward travel.

Right side – side to the right hand of the operator facing in the direction of machine's forward travel.

Rotation to the right – clockwise rotation of a mechanism (the operator is facing the mechanism).

Rotation to the left – counterclockwise rotation of a mechanism (the operator is facing the mechanism).

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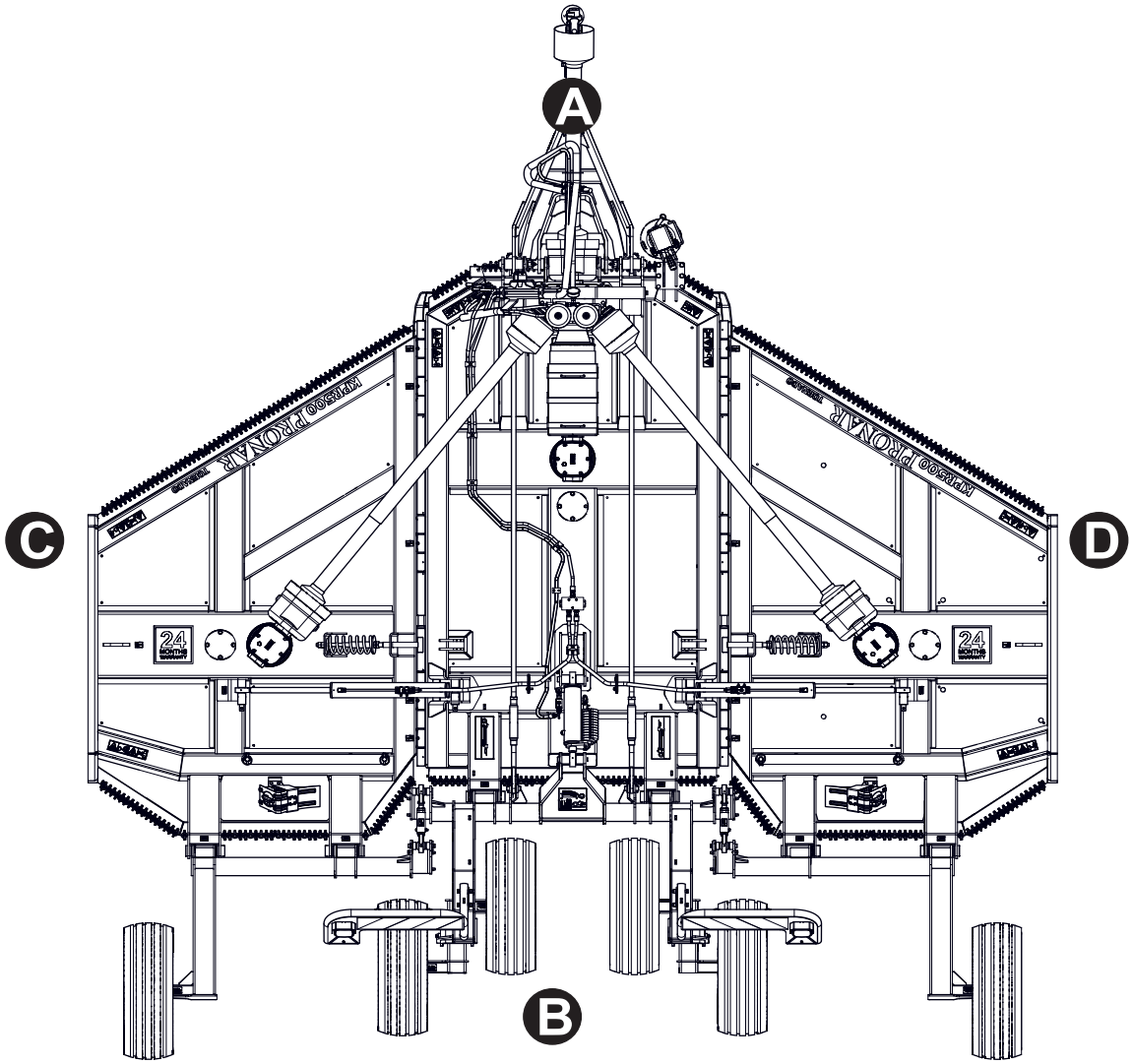

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Figure 1.1 Directions used with reference to the machine
(A) front , (B) rear, (C) left side, (D) right side

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EC DECLARATION OF CONFORMITY OF THE MACHINERY

PRONAR Sp. z o.o. declares with full responsibility, that the machine:

Description and identification of the machinery	
Generic denomination and function:	**Tri-wing mulcher**
Type:	**KPR500**
Model:	–
Serial number:	
Commercial name:	**Tri-wing mulcher PRONAR KPR500 Tornado**

to which this declaration relates, fulfills all the relevant provisions of the Directive **2006/42/EC** of The European Parliament and of The Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (Official Journal of the EU, L 157/24 of 09.06.2006).

The person authorized to compile the technical file is the Head of Research and Development Department at PRONAR Sp. z o.o., 17-210 Narew, ul. Mickiewicza 101A, Poland.

This declaration relates exclusively to the machinery in the state in which it was placed on the market, and excludes components which are added and/or operations carried out subsequently by the final user.

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Z-CA DYREKTORA
d/s [illegible]
[illegible]

Narew, the 2020-05-05

Place and date

Full name of the empowered person position, signature

CONTENTS

CORRECT USE

MAINTENANCE

BASIC INFORMATION

SECTION 1

1.1 IDENTIFICATION

The PRONAR KPR 500 TORNADO mulching mower has been marked with a rating plate located on the mower's frame (1.1). When buying the machine check that the serial numbers on the machine agree with those given in the *WARRANTY BOOK*, in the sales documents and in the *OPERATOR'S MANUAL*.

The meanings of individual fields of the data plate – figure (1.1) are presented in the table below:

A - machine name,

B - machine type/symbol

C – serial number,

D – year of manufacture,

E – gross weight [kg],

F – Quality Control stamp,

G – machine name, name extension

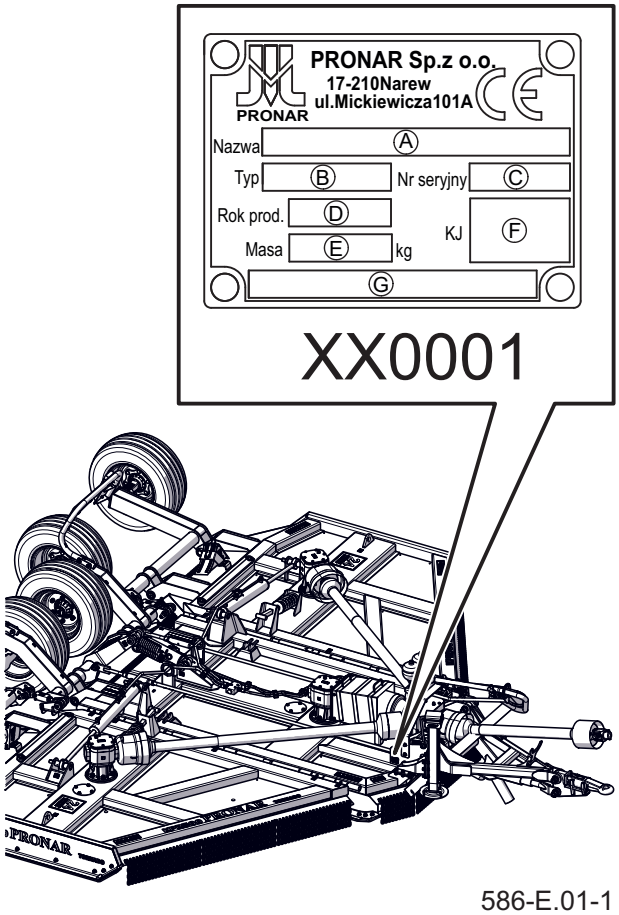

Figure 1.1 Location of the data plate.

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1.2 INTENDED USE

The PRONAR KPR 500 TORNADO mulching mower is designed to operate on large areas. Use the machine to:

- mulch plant residue (stems) left in the fields after cultivating corn, tobacco, sunflower, etc.
- mulch permanent grassland;
- mow difficult grasslands, including bushes and thickets (branches up to 2 cm in diameter).

The mower is designed to mow and break up and evenly scatter the material across the mown area, which leaves natural swath and allows mineralization of plant debris and re-introducing nutrients into the soil.

During the use of the machine comply with all road traffic regulations and transport regulations in force in the given country, and any breach of these regulations is regarded by the Manufacturer as use contrary to the intended purpose of the machine.

The PRONAR KPR500 TORNADO mulching mower can be aggregated with a tractor that meets the requirements of Table 1.1.

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:

IMPORTANT

The machine must not be used for purposes other than those for which it is intended, in particular for: transport people, animals or any items on the machine, reload any items

- carefully read the OPERATOR'S MANUAL and comply with its recommendations,
- understand the machine's operating principle and how to operate it safely and correctly,
- comply with general safety regulations while working,
- prevent accidents,
- comply with road traffic regulations.

The machine may only be used by persons, who:

- are familiar with this publication and with the carrier vehicle's Operator's Manual,
- have been trained in machine operation and safe working conditions,
- have the required authorisation to drive the vehicle and are familiar with the road traffic regulations and transport regulations.

Table 1.1. Requirements for carrier vehicle (agricultural tractor).

Contents	Unit	Requirements
Implement suspension system (three-point linkage)		Field hitch Ø40 The rear of the mower is suspended on wheels, the front rests on the tractor hitch.
Rear power take-off shaft (PTO) Type Max engine RPM	 - rpm	 Type 1 (1 3/8”) according to ISO 500 1000
Minimum carrier vehicle power	kW (hp)	88 (120)
Nominal pressure in the hydraulic system[1]	MPa (bar)	16 (160)
Hydraulic sockets:		12.5 ISO 7241-1 Type A sockets 1 single acting section 1 single acting section with floating position
Electric sockets		7-pin socket, 12V (power supply of rear lamp assembly)

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1.3 EQUIPMENT

- Operator’s Manual
- Warranty Book
- PTO shaft for connection of the mower with tractor
- Wheel chocks;
- Connection lead for the electrical system

Recommended PTO shaft for connection with tractor: B&P 7G7R111CEWR7A53X

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1.4 TERMS & CONDITIONS OF WARRANTY

PRONAR Sp. z o.o. Narew guarantees the reliable operation of the machine when it is used according to its intended purpose as described in the *Operator's Manual*. Defects discovered during the warranty period will be removed by the Warranty Service. The repair period is specified in the *Warranty Book*.

The warranty 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. Consumables include the following parts/ sub-assemblies:

- flail blades,
- Chain guard
- bearings.

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

the user will lose the right to warranty service.

The user is obliged to immediately report all noticed damage, regardless of whether the damage is covered by the warranty or not. For detailed Terms & Conditions of Warranty, please refer to the *Warranty Book* attached to each newly purchased machine.

TIP

Demand that the seller carefully and accurately fills out the **Warranty Book** and warranty repair coupons. A missing date of purchase or sale point stamp may make the user ineligible for any warranty repair or refund.

Modifications of the machine without the written consent of the Manufacturer are prohibited. In particular, do NOT weld, drill holes in, cut or heat the main structural elements of the machine, which have a direct impact on the machine operation safety.

1.5 SHIPPING

The machine is prepared for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation and any extra accessories.

Delivery is either by transport on a vehicle or independently. Transport of the machine connected to carrier vehicle is permissible provided that the driver familiarises himself with the Operator's Manual

IMPORTANT

Before transporting independently, the carrier vehicle driver must carefully read this Operator's Manual and observe its recommendations.
When being transported on a motor vehicle the machine must be secured on the vehicle's platform in accordance with the transport safety requirements. The driver of the vehicle should take particular care while driving. This is due to the vehicle's centre of gravity shifting upwards when the machine is loaded.

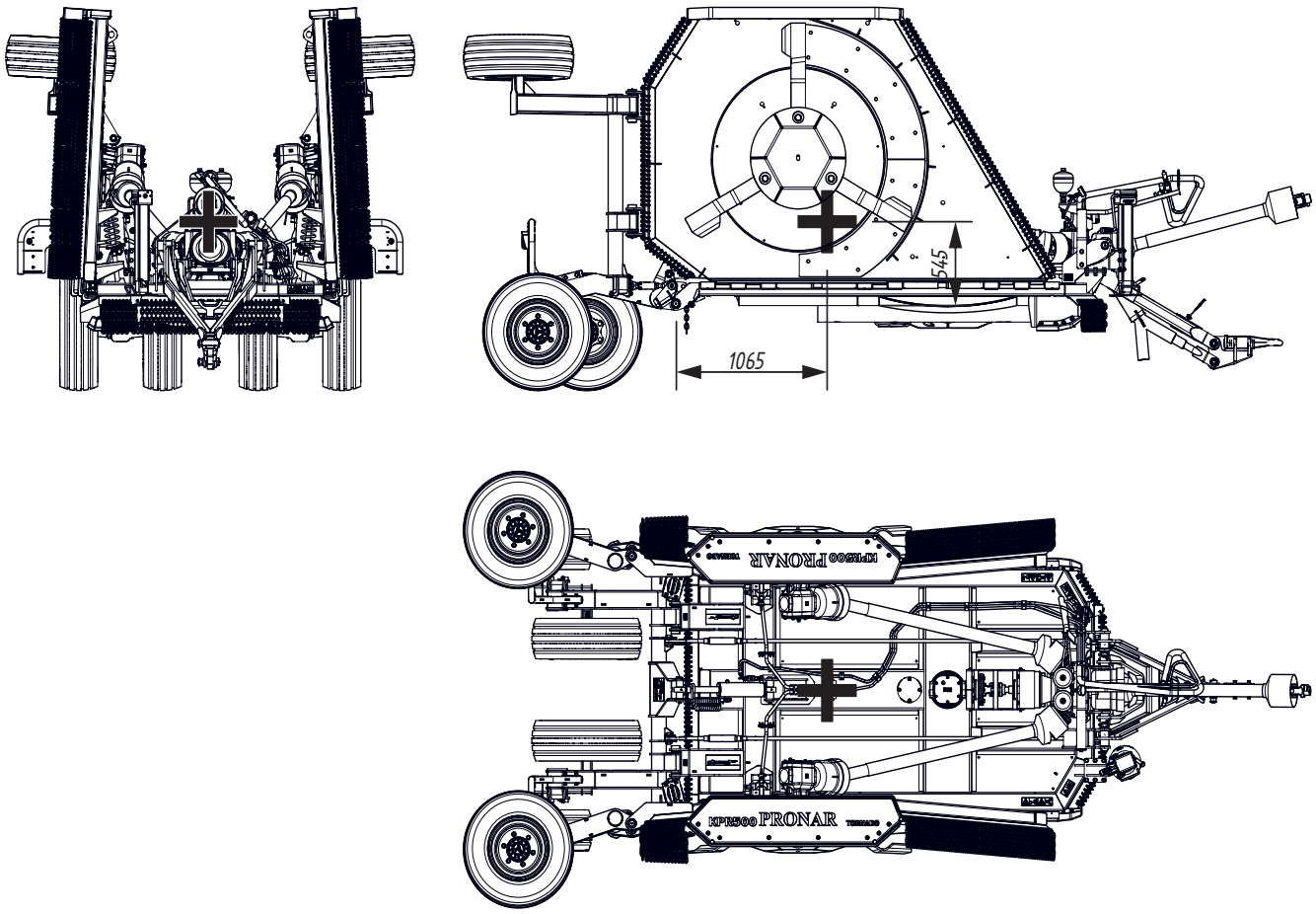

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Figure 1.2 Machine's centre of gravity

IMPORTANT

Do not attach slings and any kind of cargo fasteners to elements other than those intended for this purpose (do NOT attach to hydraulic system and electrical system components).
Persons must NOT be present in the manoeuvring zone during transferring the machine to another means of transport.

and particularly with safety information and principles of connection and transport on public roads.

TIP

The machine must be set in park position during unloading with lifting equipment. Support leg should be lowered and secured with a pin.

When loading and unloading the machine, follow the general health and safety regulations for reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines. The machine should be attached to lifting equipment in places specially designed for this purpose (Figure 1.3).

The KPR500 mower should be firmly secured on the transportation platform with belts or chains equipped with a tensioning mechanism. The fastening equipment used must have a valid safety certificate. Exercise due caution when lifting the machine. During the loading work particular care should be taken not to damage paint coating.

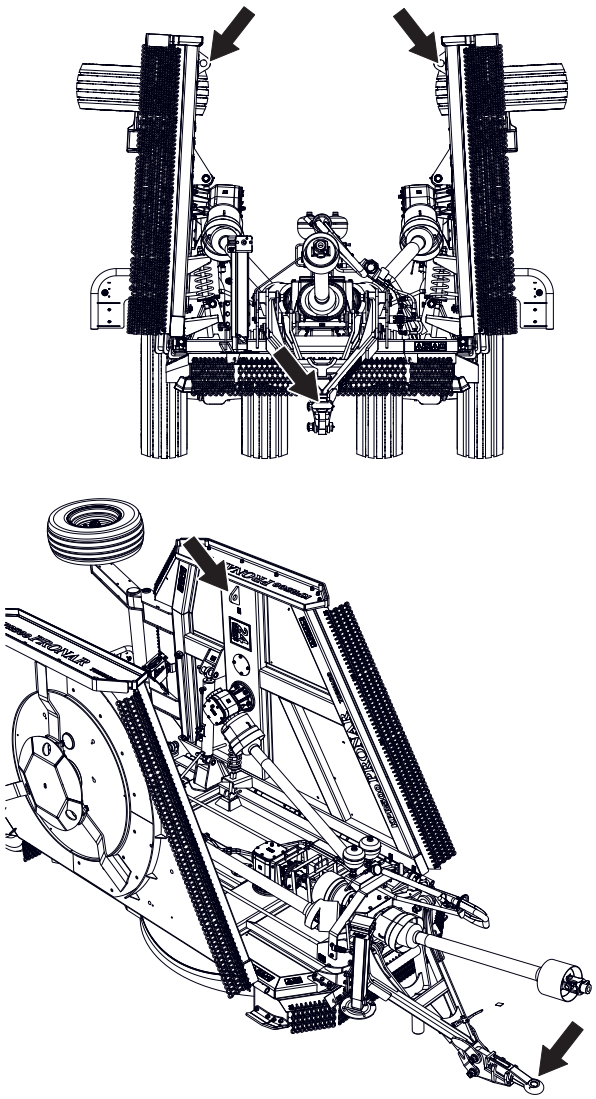

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Figure 1.3 Location of transport lugs

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1.6 ENVORONMENTAL RISK

A hydraulic oil leak 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 contaminations, 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.

DANGER

Used hydraulic oil or gathered remains mixed with absorbent material should be stored in a precisely marked container. Do not use food packaging for this purpose.

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

IMPORTANT

Waste oil should only be taken to the appropriate facility dealing with the re-use of this type of waste. Do NOT dispose of or pour oil into sewerage drains or water reservoirs.

TIP

The hydraulic system of the mower is filled with L-HL32 Lotos hydraulic oil.

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1.7 WITHDRAWAL FROM USE

If you decide to withdraw the machine from use, comply with the regulations in force in the given country regarding withdrawal from use and recycling of machines withdrawn from use.

Before proceeding to dismantle equipment, oil shall be completely removed from hydraulic system and transmission. Locations of drain plugs and method for draining oil are described in Section 5.

When spare parts are changed, worn out or damaged parts should be taken to a collection point for recyclable raw materials. Used oil and also rubber and plastic elements should be taken to the appropriate facilities dealing with the recycling of this type of waste.

DANGER

During dismantling, use the appropriate tools, equipment (overhead crane, crane or hoist etc.) and use personal protection equipment, i.e. protective clothing, footwear, gloves and eye protection etc.

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SECTION 2

SAFETY ADVICE

2.1 SAFE USE

- Before using the machine, carefully read this Operator's Manual, the Operator's Manual of the PTO shaft and *Terms & Conditions of Warranty*. When operating the machine, the operator must follow all instructions and recommendations in these documents.
- The machine may only be used by persons qualified to drive carrier vehicles (tractors) and trained in machine operation. Mulching mower can be operated by a single person only.
- Careless and incorrect use of the machine and failure to follow instructions of thie Operator's Manual poses danger to the operator and bystanders.
- Be aware of the residual risk. Use caution when operating this machine and follow all relevant safety instructions.
- The machine must never be used by persons, who are not authorised to drive carrier vehicles (agricultural tractors), including children and people under the influence of alcohol or other drugs.

IMPORTANT

If the information in this Operator's Manual is difficult to understand, contact the seller who runs the authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.

- The machine must not be used for purposes other than those for which it is intended. Anyone who uses the machine for purposes other than those for which it is intended takes full responsibility for any consequences of this potentially incorrect use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the guarantee.
- The machine may only be used when all the protective features (i.e. safety guards, bolts, cotter pins, warning decals) are technically sound and correctly positioned. In the event of loss or damage to the protective features, they must be replaced with new ones.

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2.2 SAFETY WHEN HITCHING THE MACHINE

- The machine should be hitched to and transported with only such a tractor which meets all the manufacturer's requirements (minimum tractor power demand, required tractor hitch etc.) – see table (1.1) Agricultural tractor requirements.
- Do NOT hitch the machine to carrier vehicle (agricultural tractor) if hydraulic oil in the two machines is of different types.
- After completion of hitching the machine, check the safeguards.
- Use only genuine pins and safeguards to hitch the machine to the carrier vehicle.
- The carrier vehicle (agricultural tractor) to which the machine will be coupled must be technically reliable and must meet all manufacturer's requirements.
- Be especially careful when hitching and unhitching the machine.
- When hitching, there must be nobody between the machine and the carrier vehicle.
- Coupling and uncoupling may only take place with the machine and carrier vehicle (agricultural tractor) switched off.
- Machine unhitched from the carrier vehicle must be placed on level, sufficiently hard surface in such a manner as to ensure that it is possible to connect it again.

F.1.1.586.02.1.EN

2.3 SAFETY RULES WHEN MAINTAINING HYDRAULIC SYSTEM

- The hydraulic system is under high pressure when operating.
- Regularly check the technical condition of the connections and the hydraulic conduits. There must be no oil leaks.
- In the event of the hydraulic system malfunction, discontinue using the machine until the malfunction is corrected.
- When connecting hydraulic lines to carrier vehicle, make sure that the hydraulic system is not under pressure. If necessary, reduce residual pressure in the system.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may find its way under the skin and cause infections. 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. In the event of contact of oil with skin wash the area of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene).
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.
- Rubber hydraulic conduits must be replaced every 4 years regardless of their technical condition.
- Repair and replacement of hydraulic system elements should be entrusted to the appropriately qualified persons.

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2.4 SAFETY DURING TRANSPORT TRAVEL

Before driving on the roads:

1. Make sure that the machine is correctly attached to the carrier vehicle.
2. Fold the mower wings to transport position, secure the wings with a lock.
3. Raise the linkage to an appropriate height using the hydraulic system, secure the cylinder (figure 4.4).
4. Place slow-moving vehicle warning triangle plate in the bracket at the rear of the machine.
5. Check whether lights work correctly.

Also:

- When driving on public roads, observe all road traffic regulations in force in the country, in which the machine is used.
- Do not exceed the maximum speed resulting from road conditions and design restrictions (maximum of 20 km/h). Adjust your speed to the road conditions.

DANGER

During transport, always disconnect the shaft from the tractor.
Accidental starting of the machine with the wings raised may cause loss of health or life of people in the vicinity.

IMPORTANT

Switching on the machine with the wings raised can damage the PTO shafts

- Do NOT ride on the machine or transport any materials on it.
- Before using the machine always check its technical condition, especially in terms of safety. In particular, check the technical condition of the hitch system and elements connecting the hydraulic system.
- Reckless driving and excessive speed may cause accidents.

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2.5 MAINTENANCE AND CLEANING

- During the warranty period, any repairs may only be carried out by warranty service authorised by the Manufacturer. It is recommended that necessary repairs to machine should be undertaken by specialised workshops.
- In the event of any fault or damage, do not use the machine until the fault has been corrected.
- During work, use the proper, close-fitting protective clothing, gloves and appropriate tools. When working on hydraulic systems it is recommended to use oil resistant gloves and protective goggles.
- Any modification to the machine frees the manufacturer from any responsibility for damage or detriment to health which may arise as a result.
- Before undertaking any work on the machine, switch off the carrying vehicle engine and wait until all rotating parts come to a stop.
- Regularly check the technical condition of the safety devices and correct tightening of bolt connections.
- Regularly perform service inspections of machine as recommended by the Manufacturer.
- Do NOT perform maintenance or repair work under raised and unsupported machine.
- Before beginning repairs on hydraulic systems, reduce oil pressure.
- 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.
- Repair, maintenance and cleaning work should be carried out with the carrier vehicle (agricultural tractor) engine turned off and the ignition key removed. Immobilise the carrier vehicle (agricultural tractor) with parking brake. Ensure that unauthorised persons do not have access to the carrier vehicle (agricultural tractor) cab.
- Should it be necessary to change individual parts, use only original parts. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and invalidate the warranty.
- Regularly check technical condition

and mounting of all guards and protective elements.

- In the event of work requiring the machine 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.
- The machine must not be supported using fragile elements (bricks or concrete blocks).
- After completing work associated with lubrication, remove excess oil or grease.
- In order to reduce the danger of fire the machine must be kept in a clean condition.

The machine should be cleaned as needed.

Before using the pressure washer the user is obliged to acquaint himself with the operating principles and recommendations concerning safe use of this equipment.

- Before washing, remove manually and as accurately as possible any remaining mulched plant residue.
- Use only clean running water. Cleaning detergents with neutral pH may be used, which do not react aggressively with the mobile stockpiler's structural elements.
- The use of a pressure washer increases washing effectiveness but care must be taken during work. During washing, the washer nozzle may not be placed closer than 50 cm from the cleaned surface.
- Water temperature should not exceed 55°C.
- Do not aim the water jet directly at system components and equipment, i.e. control valves, bearings, electric and hydraulic plugs, lights, electrical connectors, information and warning decals, nameplate, cable connectors, lubrication points, control panels, safety switches etc. High pressure water jet may penetrate te machine, resulting in mechanical damage or corrosion.
- Do not apply organic solvents, preparations of unknown origin or other substances, which may cause damage to lacquered, rubber or plastic surfaces. In the event of doubt it is recommended to make a test on an unseen surface area.
- Surfaces smeared with oil or grease

DANGER

Carefully read the instructions for application of detergents and maintenance preparations.
While washing with detergents, wear appropriate protective clothing and goggles protecting against splashing.

should be cleaned by application of white spirit or other degreasing agents and then washed with clean water with added detergent. Follow the cleaning agent manufacturer instructions.

- Washing detergent should be kept in original containers, optionally in replacement containers, but very clearly marked. Preparations may not be stored in food and drink containers or in unmarked containers.
- Observe the environmental protection rules, wash the machine in places designed for this purpose.
- Washing and drying the machine must take place at temperature above 0°C.
- Each time after washing lubricate the machine.

F.1.1.586.05.1.EN

2.6 SAFETY DURING MACHINE OPERATION

- Before starting the mower make sure that there are no bystanders (especially children) or animals in the danger zone.

DANGER

The machine can throw objects at considerable distances during operation. The affected danger zone is about 100 m.
Stop the machine when bystanders are in the affected danger zone.

- The machine operator is obliged to ensure proper visibility of the machine and the working area.
- Do not enter the machine rotation and folding zone.
- Before starting the machine, always ensure that all the safety guards are in good condition and in place. Damaged or incomplete sub-assemblies must be exchanged for original new ones.
- During mowing use the correct working position.
- Before raising and lowering the machine's wings, make sure there are no bystanders nearby.
- Before starting the tractor with the connected machine make sure the PTO drive is not engaged, otherwise it can lead to uncontrolled operation of the machine.
- During machine operation do not occupy a different position than that of the operator in the tractor's cab. Do NOT leave the cab, when the machine is in operation.
- Do NOT stand within the material spreading zone or between the machine and the carrier vehicle.
- Do NOT approach the machine until the rotating parts come to a complete stop.

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2.7 SAFE OPERATION OF THE PTO SHAFT

- The machine may only be connected to the carrier vehicle (tractor) by means of an appropriately selected PTO shaft recommended by the Manufacturer.
- Before using the machine, carefully read the PTO shaft Operator's Manual and follow all instructions.
- Adjust the length of PTO shaft to compatible carrier vehicle (tractor) according to the Operator's Manual of PTO shaft.
- The PTO shaft has markings on the casing, indicating which end of the shaft shall be connected to the carrier vehicle (tractor).
- Never use a damaged PTO shaft, it may cause an accident. A damaged shaft must be repaired or replaced.
- Disconnect the shaft drive each time when it is not necessary to drive the machine, or when the carrier vehicle (tractor) and the machine are positioned at an unsuitable angle with regard to each other.
- The chains preventing the shaft cover from turning while the shaft is working, shall be secured to a fixed element of machine structure.
- Do NOT use the securing chains to support the shaft while machine is parked or when transporting the machine.
- The drive shaft must be equipped with a cover. Do NOT use the shaft with damaged or missing guards.
- After connecting the shaft, ensure that it is correctly and safely connected to the carrier vehicle (tractor) and to the machine.
- Before connecting PTO shaft, make certain that the PTO rotation direction is correct.
- Do NOT wear loose clothing, straps or whatever that may become wrapped round the rotating drive shaft. Contact with rotating PTO shaft may cause severe injuries.

DANGER

Before disconnecting the shaft, you must:
- disengage PTO drive
- switch off the engine of the implement carrier (tractor)
- remove key from ignition.

- Do NOT go over and under the shaft or stand on it equally during work as also when the machine is parked.

F.1.1.586.07.1.EN

2.8 RESIDUAL RISK

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

- using the machine for purposes other than those for which it is intended,
- being between the carrier vehicle (agricultural tractor) and the machine while the engine is running and when the machine is being attached,
- being on the machine while the engine is running,
- operating the machine with removed or faulty safety guards,
- not maintaining a safe distance from the danger zone or being within the zones while the machine is operating,
- machine operation by unauthorized persons or persons under the influence of alcohol or psychoactive substances
- cleaning, maintenance and technical checks when carrier vehicle (agricultural tractor) is connected and engine is running.

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

- operate the machine in prudent and unhurried manner,
- sensibly apply the remarks and recommendations contained in the Operator's Manual,
- carry out repair and maintenance work in line with operating safety rules,
- repair and maintenance work should be carried out by persons trained to do so,
- use close fitting protective clothing,
- ensure unauthorised persons have no access to the machine, especially children,
- maintain a safe distance from prohibited or dangerous places
- do not climb on the machine when it is operating or transported

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2.9 INFORMATION AND WARNING DECALS

The machine is labelled with the information and warning decals mentioned in table 2.1. Throughout the machine use, make sure that any warning messages and information decals located on the machine are clear and legible. If any are destroyed or damaged, they must be replaced with new. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. During machine cleaning do not use solvents, which may damage the coating of information decals and do not subject them to strong water jets.

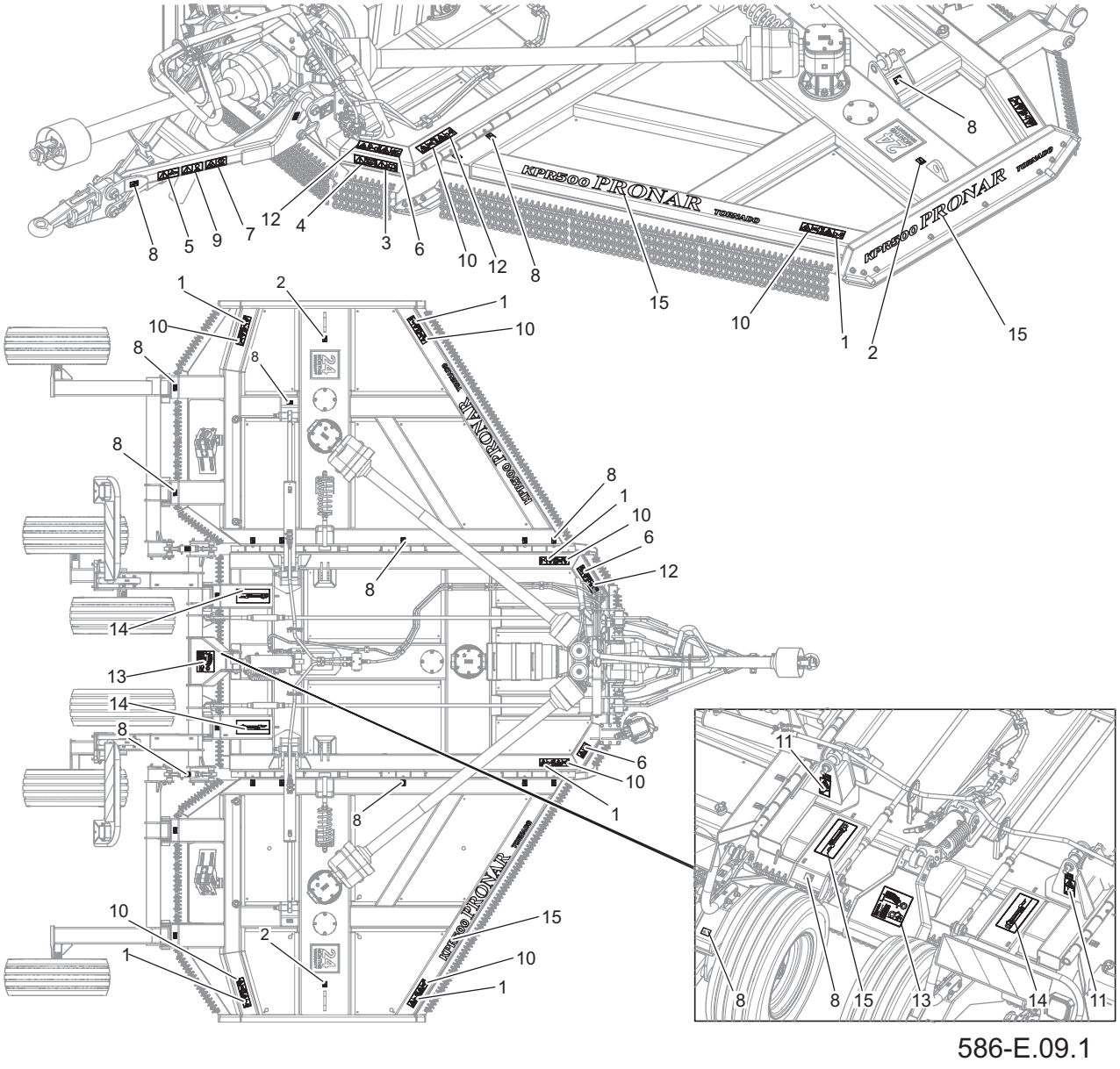
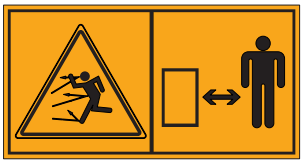
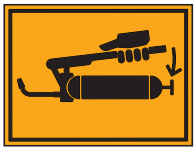
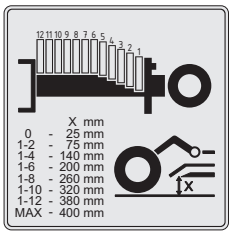
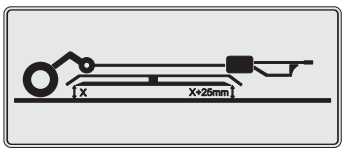


Figure 2.1 Locations of information and warning decals.

Table 2.1. Information and warning decals

Item	Decal	Meaning
1		Thrown out objects endanger the whole body. Keep a safe distance. **178N-00000006**
2		Transport belts or chains fastening points **178N-00000009**
3		Before use Carefully read the Operator's Manual. **185N-00000001**
4		Before beginning servicing or repairs, turn off tractor engine and remove key from ignition. **185N-00000002**
5		Pulling the whole body - Drive train **185N-00000003**
6		Crushing the entire body - force applied from above Crushing - the mower wing **185N-00000007**

Item	Decal	Meaning
7		Injuries to fingers or hands. Do NOT touch the machine components until all machine assemblies have come to a standstill. **185N-00000010**
8		Grease the machine according to the lubrication schedule in the OPERATOR'S MANUAL. **185N-00000011**
9		Do not exceed the maximum PTO speed **188N-00000002**
10		Do not open or remove the safety guard while the engine is running. Cutting fingers or toes - Rotary mower blade. **586N-05000002**
11		Crushing the entire body - force applied from above Before entering danger zone block hydraulic cylinder with an interlocking device **586N-05000003**
12		Pressurised liquid jet. Keep a safe distance. **586N-05000004**
13		Cutting height **586N-05000005**

Item	Decal	Meaning
14		Mower position **586N-05000006**
15	KPR500 PRONAR TORNADO	Machine type **586N-05000007**

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SECTION 3

DESIGN AND OPERATION

3.1 TECHNICAL SPECIFICATION

Table 3.1. Standard equipment specification

Contents	Unit	KPR500
Dimensions		
Width in working setting	mm	5200
Width in transport setting	mm	Below 3000 (depending on the mower setting)
Height in transport setting	mm	2500
Total length in transport setting	mm	5700
Technical specification		
Cutting width	mm	5000
Overlapping of mown areas	mm	125
Tare weight	kg	2800
Drawbar eye load	kg	1050
Minimum power demand	kW / hp	88/120
Hitch	-	Field hitch Ø40 mm
Number of cutting units	pc.	3
Number of blades on the cutting unit	pc.	3
Cutting unit RPM	rpm	1000
Cutting height	mm	25-400
Surface tracking	de-grees	25° down, 30° up
Transport position		Towed on hitch, folded wings secured with lock , suspension system raised maximally up.
Linkage	-	The rear of the mower is sus-pended on wheels, the front rests on the tractor hitch.
PTO maximum speed	-	1000
Operating speed	km/h	(5 – 20)*
Permissible design transport speed **	km/h	40
Nominal pressure in the system hydraulic system	MPa (bar)	16 (160)

Contents	Unit	KPR500
Hydraulic quick coupler plug		CNV082/1615 M
Emitted sound pressure	dB	- (at nominal PTO revs of 1000 rpm)
Other information	-	single person operation

**) - operating speed should be adapted to the type and amount of ground material and the terrain*

***) - the permissible transport speed is determined by local traffic regulations*

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3.2 DESIGN AND OPERATION

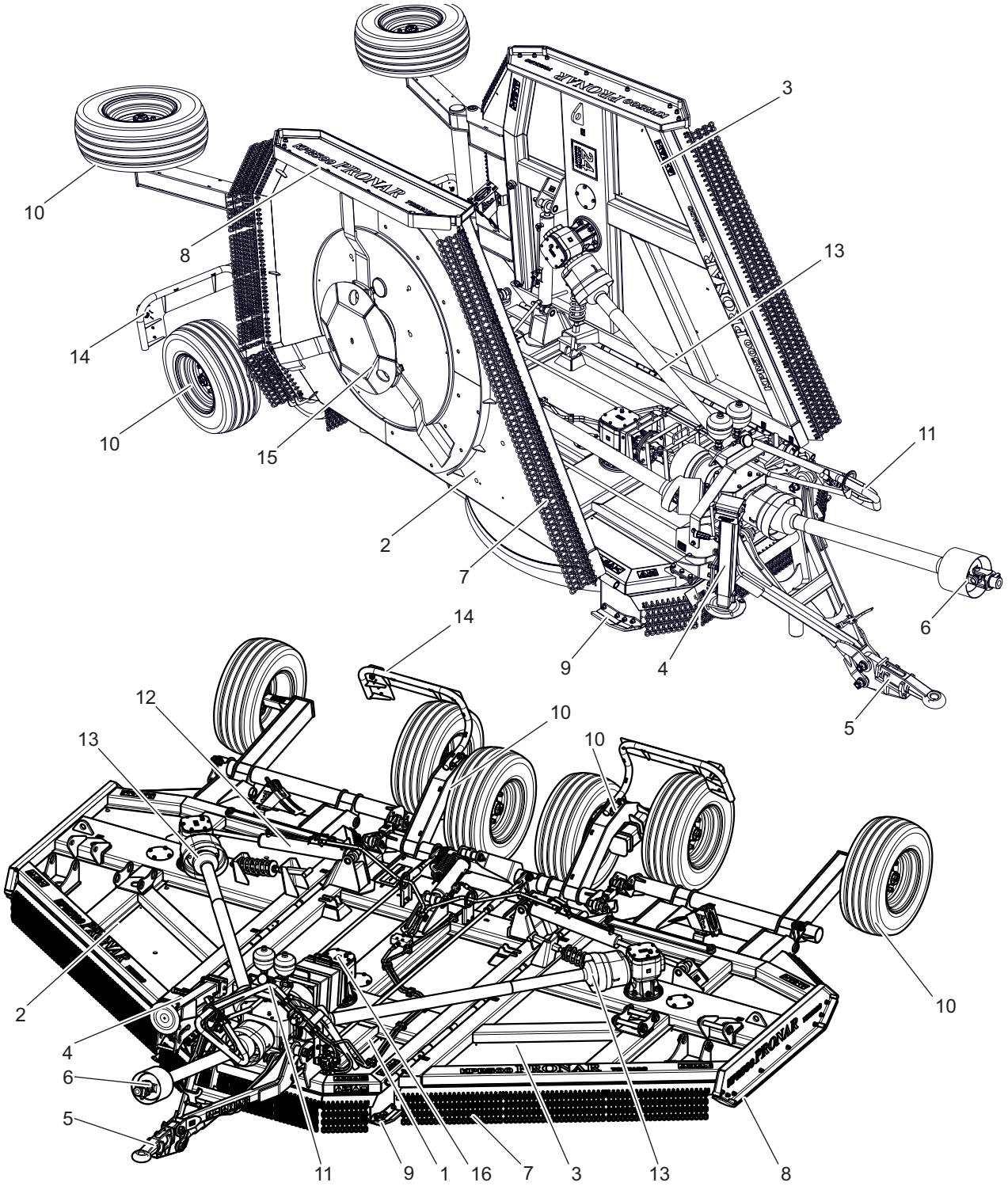

Figure 3.1 KPR500 general design

(1) centre plate *(2) right wing* *(3) left wing*
(4) parking stand *(5) lower drawbar* *(6) PTO shaft*
(7) chain guard *(8) wing skid* *(9) centre plate skid*
(10) linkage *(11) hydraulic system* *(12) wing cylinder*
(13) drive transmission *(14 rear lighting* *(15) cutting unit*

The KPR500 mulching mower (Figure 3.1) is a towed machine that can only be aggregated with a carrier (agricultural tractor) equipped with a lower or upper transport hitch. Aggregation is done by means of the lower (5) or upper drawbar (Figure 3.6).

The main elements of the mower are: the central plate (1) with suspension (10) and cutting head (15) and folding wings (2), (3) with cutting heads (15). The mower's wings are folded into transport position using hydraulic cylinders (12).

The cutting heads (15) are driven by a transmission system (13) consisting of bevel gears, PTO shafts and a divider gearbox.

There is a drive system (10) at the rear of the mower. The drive system consists of a frame, control rods and half axle shafts with wheels. The height of the mower's suspension on the drive system can be adjusted hydraulically by means of a cylinder and a system of tie rods connected to the drawbar.

The suspension can be equipped with a standard hydraulic system (11) or an absorber system.

In the event of maximum lowering of the machine, the mower will rest on skids located in front of the central plate (9) and on the wing edges (8)

Chain covers (7) were used to protect against objects ejected from under the cutting blades.

The machine is equipped with rear lighting (14) (parking lights, stop lights, direction indicators).

The standard equipment includes an articulated PTO shaft (6).

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3.3 LINKAGE

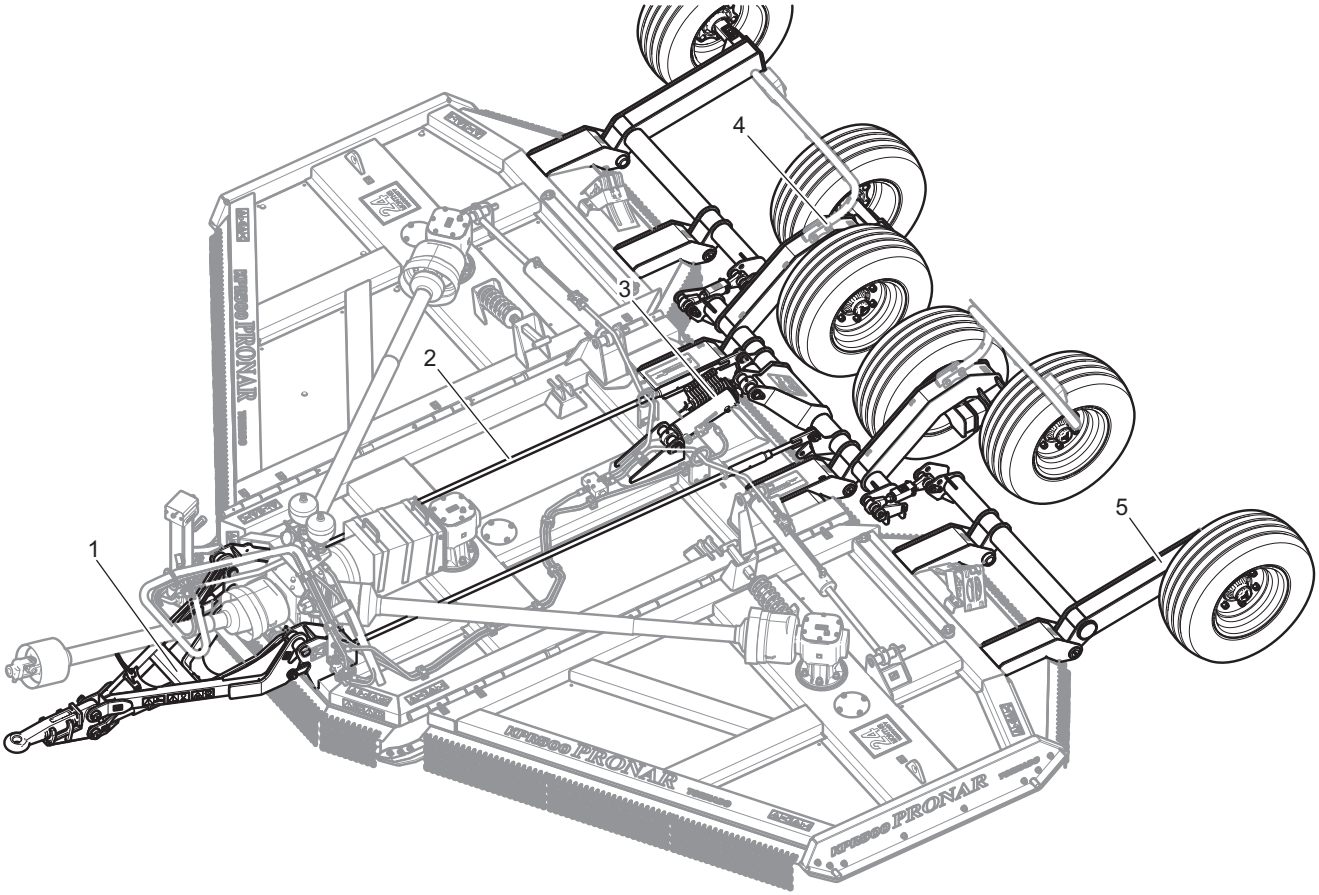

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Figure 3.2 Linkage design

(1) lower drawbar *(2) suspension rod* *(3) suspension cylinder*

(4) centre plate linkage frame *(5) rear wheel suspension side frame*

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3.4 HYDRAULIC SYSTEM

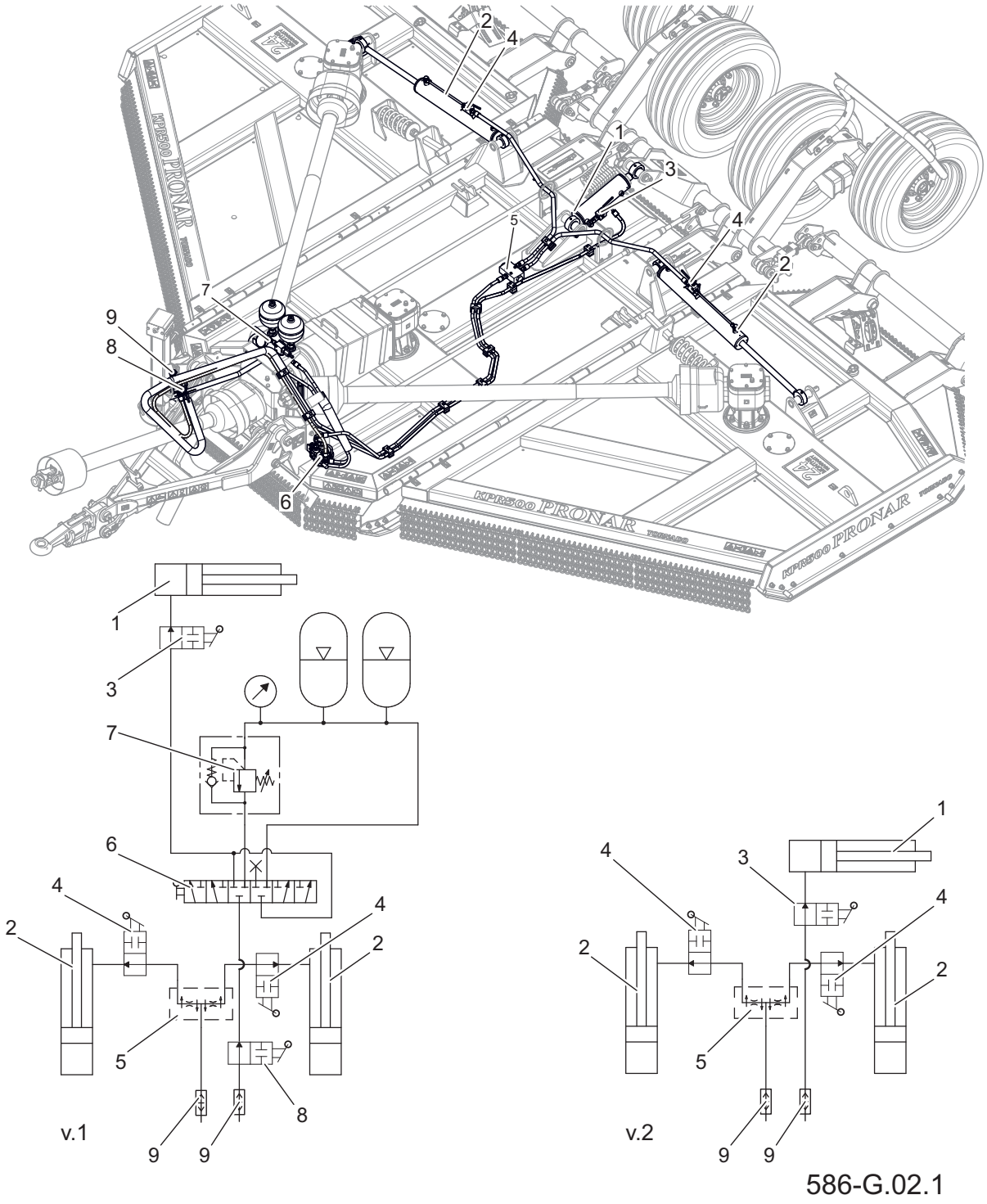

Figure 3.3 Design of hydraulic system of KPR500 mower

v .1 - absorber version, v.2 - standard version

(1) suspension cylinder (2) wing cylinder (3) suspension cylinder valve (4) wing cylinder valve (5) flow divider (6) six-way manifold (7) hydraulic accumulator assembly (8) cut-off valve (9) hydraulic coupler plugs

3.5 ELECTRICAL SYSTEM

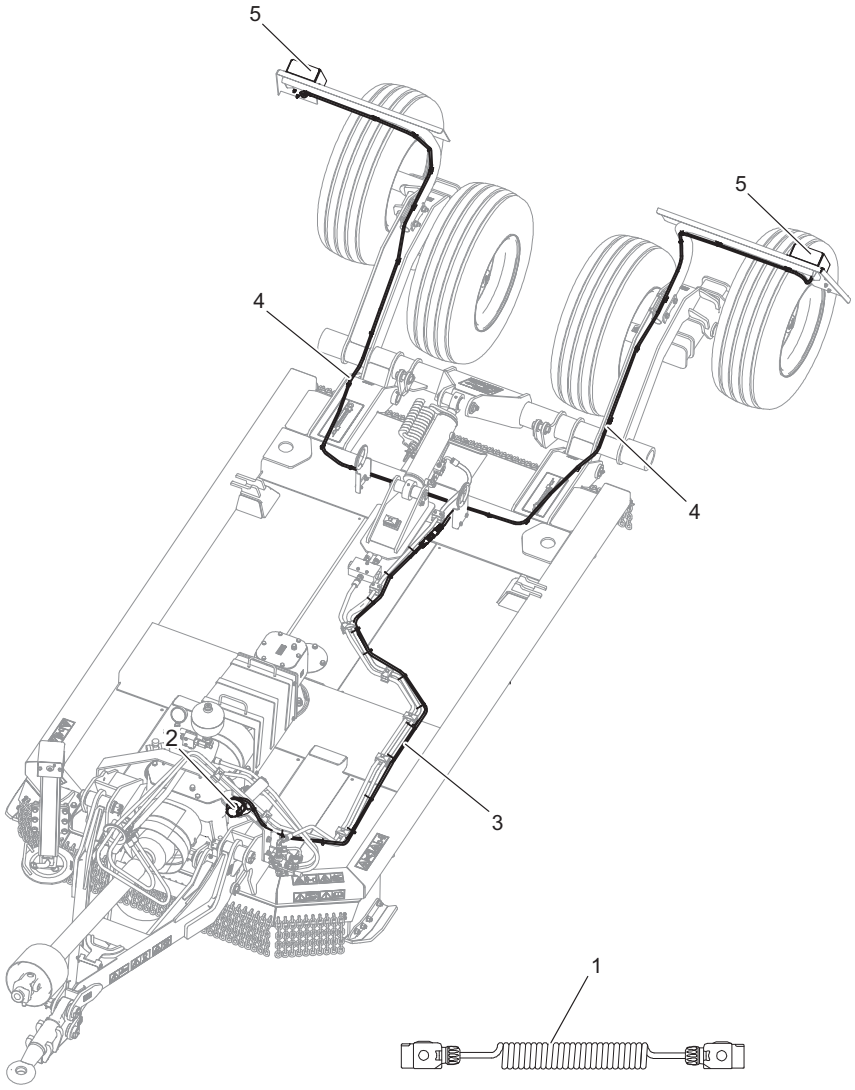

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Figure 3.4 Rear lights electrical system design

(1) coiled cable 7- pin 12V electric plug, *(2) 7 pin electrical plug*

(3) central wiring harness *(4) front wiring harness* *(5) rear lamps*

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3.6 DRIVE TRANSMISSION.

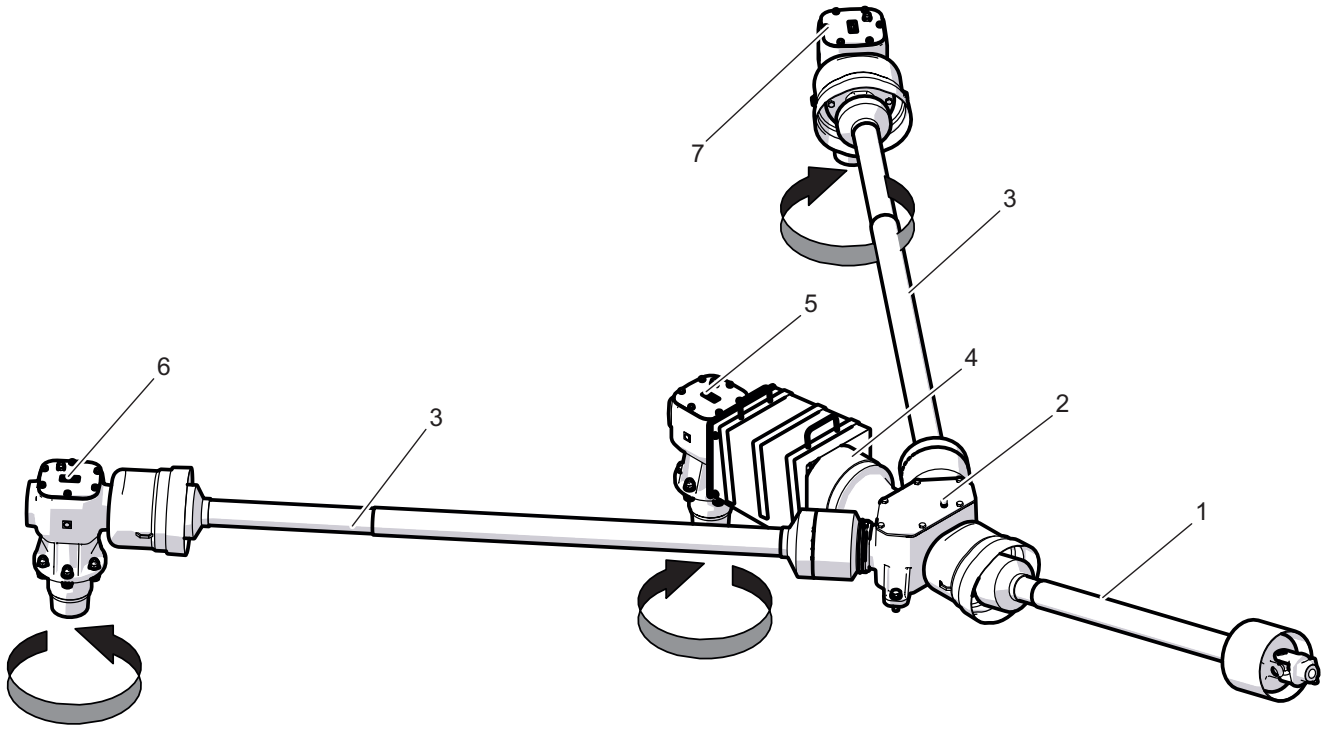

Figure 3.5 Design of drive transmission system
(1) PTO shaft with free wheel and wide angle articulated joint
(2) divider gearbox (3) PTO shaft of the gear drive with overload clutch (4) PTO shaft of the gear drive with overload clutch (5) bevel gear (6) bevel gear
(7) bevel gear

The drive is transmitted from the tractor power take-off shaft (PTO) through the articulated shaft (1) to the main divider gearbox (2). From the gearbox (2), the drive is divided into bevel gears (5,6,7) of the cutting units via articulated telescopic shafts (3, 4) with an overload release clutch. Bevel gears rotate the cutting units with blades. The cutting units should rotate as indicated on the figure.

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3.7 ADDITIONAL AND OPTIONAL EQUIPMENT

UPPER DRAWBAR

The KPR500 mower can optionally be equipped with a drawbar adapted to connect a tractor with an upper transport hitch.

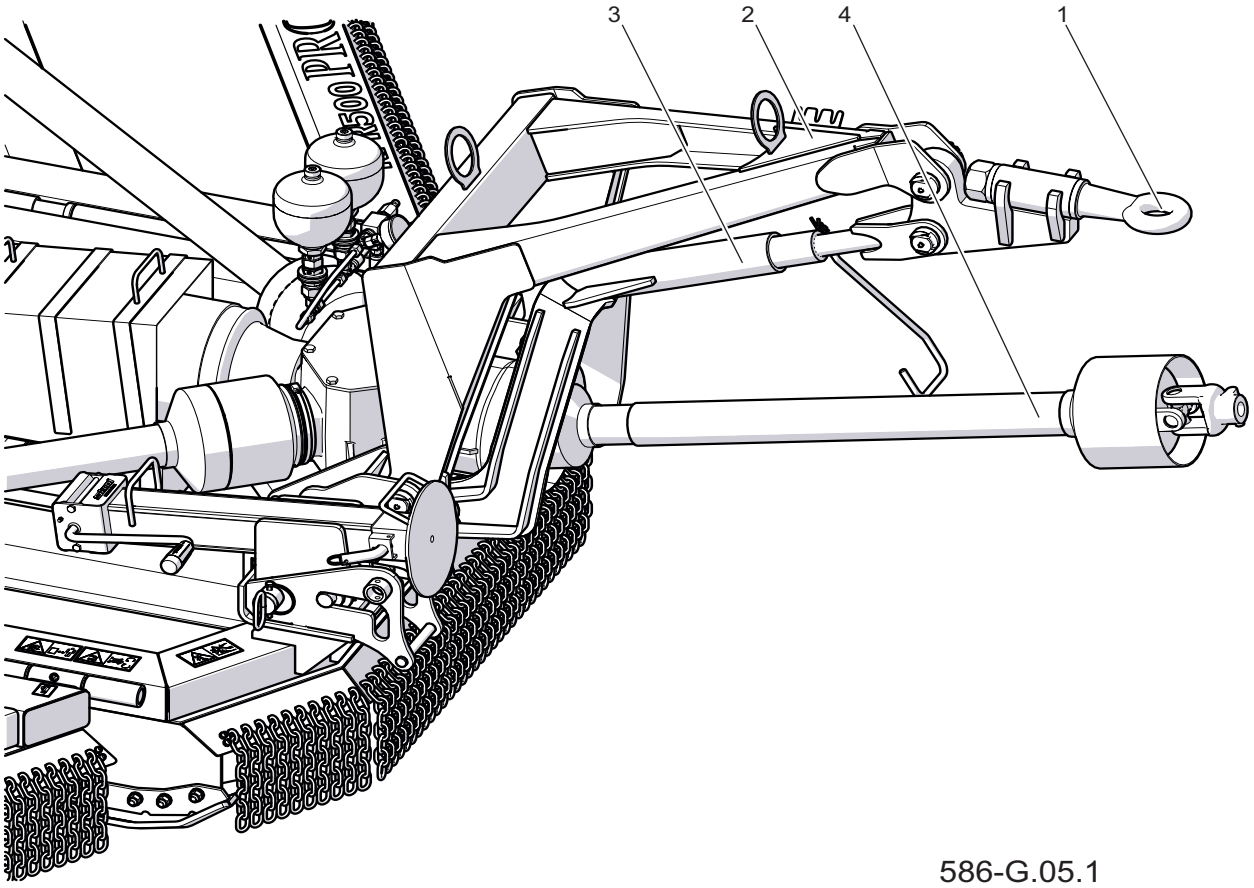

Figure 3.6 Upper hitch
(1) Ø50 swivel hitch *(2) upper drawbar* *(3) drawbar hitching eye*
(4) PTO shaft

GAUGE WHEELS

In order to better adapt the mower to the terrain, it is possible to mount front gauge wheels. To do this:

- set the mower on an even surface in the unfolded position (Figure 3.6), place wheel chocks under the wheels,
- extend or retract the support to such a height that the central plate and wings are parallel to the ground,
- place the wheel assembly (1) in the wing lugs (2) and secure with pins,
- connect the wheel assembly (1) to the side frame of the suspension (5) using the tie rod (4).
- repeat the steps for the other the wheel,

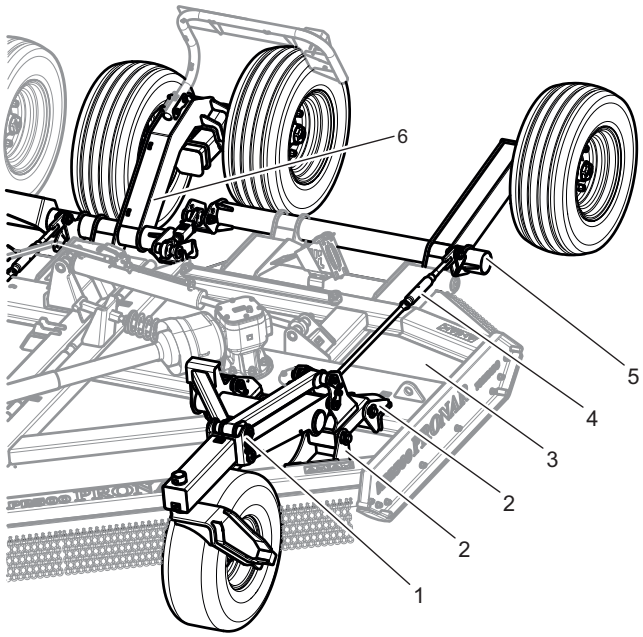

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Figure 3.7 Front gauge wheels
(1) gauge wheel (2) securing lugs (3) mower wing (4) suspension rod
(5) rear wheel suspension side frame
(6) centre suspension frame

- equalize the rod tension (4) so that the left and right wings have equal clearance.

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CORRECT USE

SECTION 4

4.1 GET READY FOR OPERATION

DANGER

Before using the machine, the user must carefully read this Operator's Manual
Careless and incorrect use and operation of the machine, and failure to follow instructions in this operator's manual is dangerous to your life and health.

IMPORTANT

Before using the machine always check its technical condition. In particular, check the technical condition of the suspension system, drive system, protective covers and lighting (direction indicators, stop lamps, parking lights), condition of the blades and their mounting.

IMPORTANT

Before beginning work lubricate all lubrication points.

The manufacturer guarantees that the machine is fully operational and has been checked according to quality control procedures and is ready for 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. Prior to connecting to the carrier vehicle (tractor), machine operator must verify the machine technical condition. In order to do this:

DANGER

The machine must never be used by persons, who are not authorised to drive agricultural tractors (carrier vehicles), 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.

DANGER

Before starting the machine, ensure that there are no bystanders in the danger zone.

- the user must carefully read this Operator's Manual and observe all recommendations, understand the design and the principle of machine operation,
- make sure that the machine's linkage is compatible with that of the carrier vehicle (tractor)
- make sure that power take-off shaft is compatible, e.g. tip type, RPM, rotation direction,
- make sure that the telescopic articulated shaft (PTO) can be connected to the tractor (the shaft should be compatible with the tractor in terms of length, type, strength, etc. - see the manufacturer's operating manual),
- check the compatibility and technical condition of the hydraulic and electric

system, including compatibility of the hydraulic connectors,

- inspect machine's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components),
- check the technical condition and mounting of the blades
- check the technical condition of the suspension system components, guards and safety pins and if mounting is correct.

If all the above checks have been performed and there is no doubt as to the machine's good technical condition, it can be connected to carrier vehicle, started and all its individual systems checked. In order to do this:

DANGER

When starting machine for the first time as well as after servicing the hydraulic system, extreme caution should be exercised because the aerated hydraulic system causes accelerated movement of the powered components.

- hitch the machine to carrier vehicle (see 4.3 HITCHING TO CARRIER VEHICLE),
- after connecting hydraulic system lines and electrical system wiring, check the correct operation of systems and inspect the hydraulic system fr tightness.

In the event of a disruption in the operation of the machine immediately discontinue its use, find and remove the fault. If a fault cannot be rectified or the repair could void the warranty, please contact the Manufacturer for additional clarifications.

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4.2 TECHNICAL INSPECTION

To get the machine ready for use, check components according to guidelines presented in Table 4.1.

Table 4.1. Technical inspection schedule

Description	Maintenance activities	Frequency
Technical condition of protective shields	Check the technical condition of safety guards, if complete and correctly mounted.	Before each use
technical condition of PTO shaft, its shields and securing chains,	Inspect visually and check completeness	Before each use
The correct mounting of cutting blades	Ensure that blades are correctly tightened. Blades are not excessively worn	Before each use
Check technical condition of tyres and tyre pressure,	Check the condition of tyre tread, lateral surfaces, wheel rim and if necessary inflate the tyres up to recommend pressure .	Before each use
oil level in drive system gears,	Check as outlined in chapter DRIVE TRANSMISSION SYSTEM MAINTENANCE	Before each use
Correct operation of lights and indicators of the rotary rake.	Check completeness and technical condition of electrical system, lights and warning signs and indicators.	Before each use
Check if the wheels are properly tightened	According to the chapter “Install and remove wheel, inspect wheel nut tightness.”	50 working hours
Change oil in gears	In accordance with the guidelines in the chapter “Drive transmission system maintenance.”	500 working hours or once a year, depending on which comes earlier
Check if all main nut and bolt connections are properly tightened	Tightening torque should be according to table (5.7)	Every six months

Description	Maintenance activities	Frequency
Checking axle shaft bearings for slackness	In accordance with the chapter “Check wheel half axle bearings for looseness.”	Every six months
Lubrication	Lubricate elements according to guidelines presented in section "Lubrication".	According to table (5.5)

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4.3 HITCH THE MOWER TO IMPLEMENT CARRIER (TRACTOR).

The mower can be connected to an agricultural tractor if all electrical and hydraulic connections and the hitch on the agricultural tractor meet the machine manufacturer's requirements.

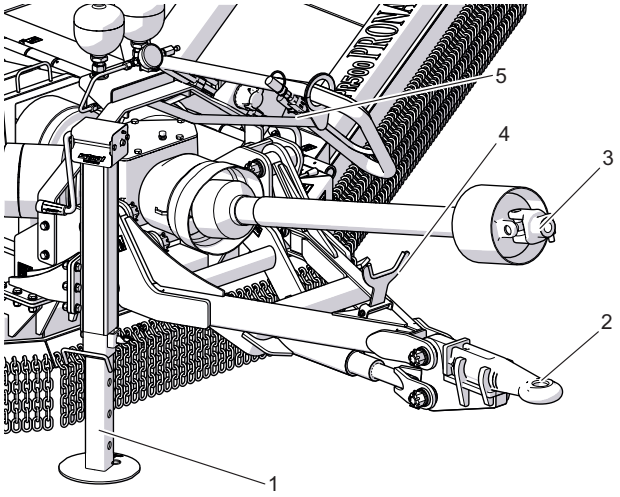

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Figure 4.1 Hitching mower to carrier vehicle
(1) parking stand (2) lower hitch
(3) articulated telescopic shaft
(4) articulated telescopic shaft bracket (5) conduit bracket

The machine's wheels must be chocked. Ensure sufficient visibility during hitching. In order to hitch the mower to the tractor, perform the actions below in the sequence presented.

DANGER

Use only genuine pins and safeguards to hitch the machine to the carrier vehicle.

DANGER

When hitching, there must be nobody between the mower and the tractor. When hitching the machine, tractor driver must exercise caution and make sure that nobody is present in the hazard zone.

Hitch the machine (figure 4.1):

- Position agricultural tractor directly in front of drawbar eye (2).
- Using the support (1), set the drawbar eye (2) at such a height that it is possible to hitch the machines.
- Reverse tractor, hitch the mower, check coupling lock protecting machine against accidental unhitching.
- If the agricultural tractor is equipped with an automatic coupler, ensure that the hitching operation is completed and that drawbar eye is secured.
- Turn off tractor engine. Ensure that

DANGER

Reduce pressure in the system prior to connecting the machine to the hydraulic system.

TIP

The proper alignment of the PTO shaft of the implement carrier (tractor) with the shaft of the machine's drive system significantly extends the life of the drive shaft.

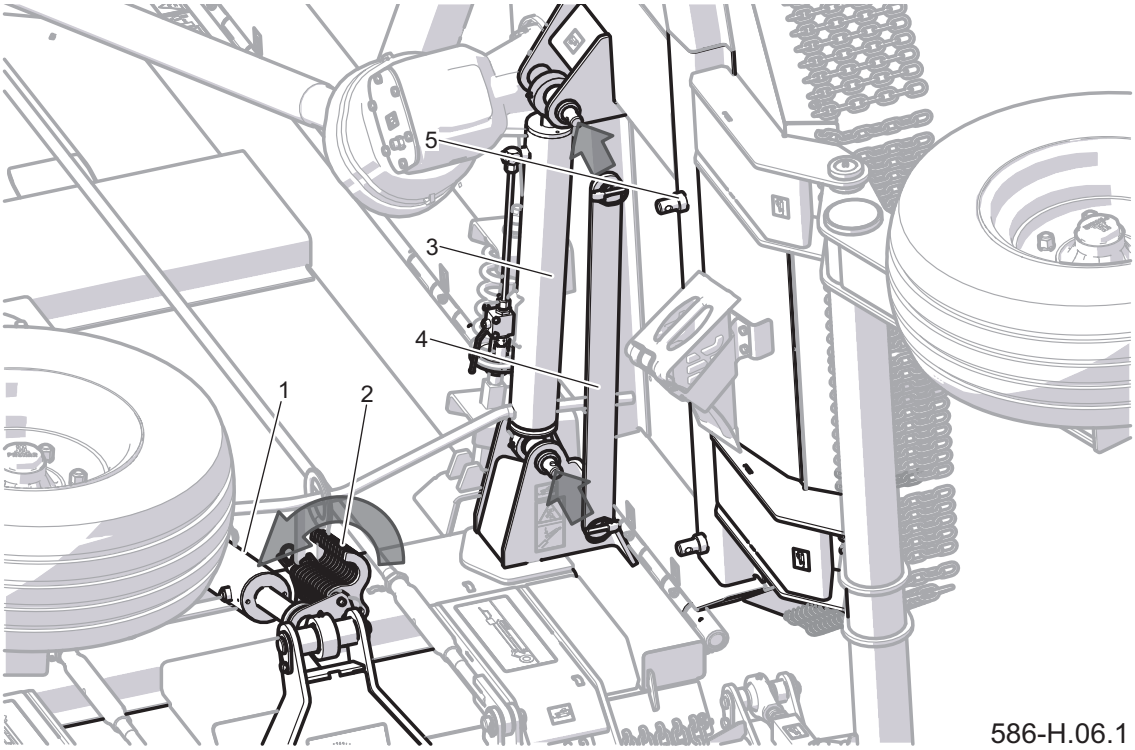

Figure 4.2 Transport lock

(1) suspension cylinder *(2) adjustment plates* *(3) wing cylinder*
(4) cylinder lock *(5) lock sling on the mower wing)*

IMPORTANT

Ensure compatibility of oils in tractor and mower hydraulic systems.

IMPORTANT

Hydraulic and electric lines should be routed in such a way that they do not get caught in the moving parts of the machine and the carrier and are not exposed to kinking or cutting during turning. .

DANGER

Before connecting the PTO shaft it is absolutely necessary to carefully read the Operator's Manual attached by the Manufacturer of the shaft and observe the instructions contained in it.
Before connecting to the carrier vehicle, check technical condition of shaft guards as well as completeness and condition of protecting chains.

unauthorised persons do not have access to the tractor cab.

- Connect the hydraulic lines for the suspension and unfolding wings
- The hydraulic system lines are marked with an appropriate information decal.
- Connect main lead supplying electrical lighting system.
- Connect the articulated telescopic shaft (3) to the PTO of the carrier (tractor) and secure it with safety chains.

DANGER

Exercise due caution during folding support - danger of severing limbs.

- After completing aggregation, release the support cotter pin (6) and raise the support foot (1) to the maximum and secure it again with the cotter pin (Figure 4.1).
- start the tractor, raise the mower wings, lift the mower up, switch off the tractor again,
- (figure 4.2) lock the suspension cylinder (1) with adjustment plates (2), secure the wing cylinders (3) of the mower with the locking strips (4).

The machine is ready for transport.

IMPORTANT

Raising and lowering the mower's wings with the PTO engaged may damage the machine.

IMPORTANT

Before you connect the electrical wires and hydraulic system lines, carefully read the operator's manual of the carrier vehicle and observe all manufacturer's recommendations

DANGER

Only transport the mower with the telescopic shaft disconnected.

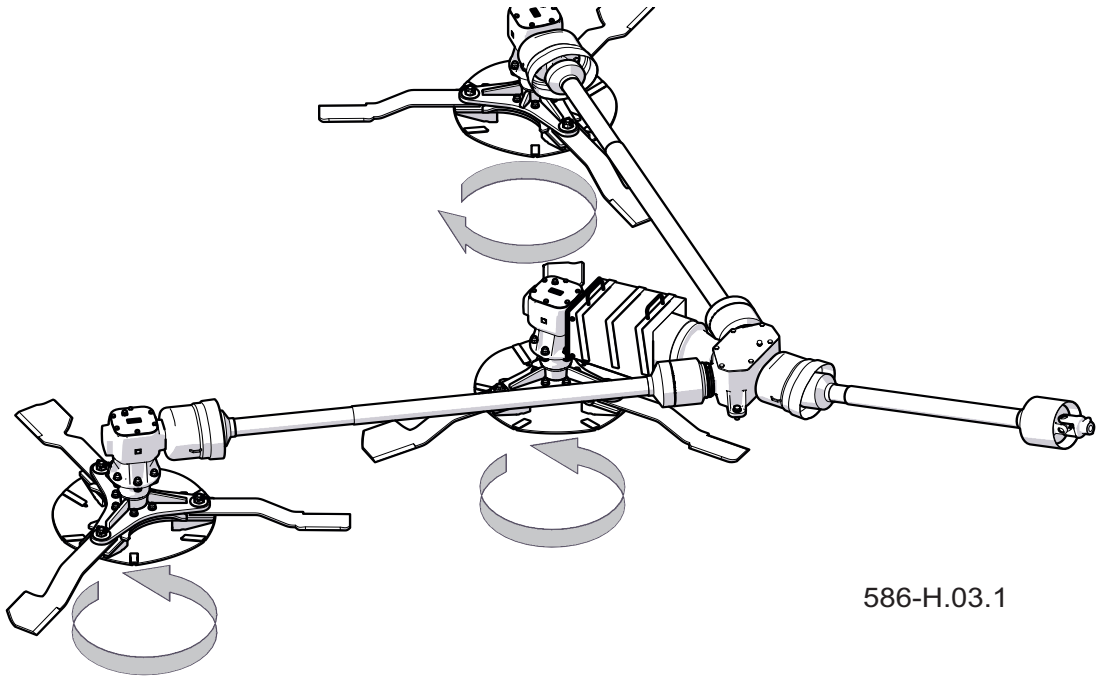

Figure 4.3 Correct direction of rotation of the cutting unit

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4.4 OPERATE THE MOWER

GET READY FOR OPERATION

DANGER

Bystanders must not approach the machine during maintenance.

DANGER

Before raising the mower wings, disengage the PTO drive. Engaging the drive during lifting or when the wings are raised will damage the telescopic shafts and gears.

After transporting the machine to the workplace, change its configuration from transport to operating configuration. To do this, set the tractor and the mower on a flat and stable surface. Next:

- Turn off tractor engine. Ensure that unauthorised persons do not have access to the tractor cab.
- Remove the safety locks from the wing cylinders and suspension cylinder,
- Open the suspension hydraulics valves (3) (figure 4.4),
- Start the tractor, set the desired cutting height with the hydraulic cylinder,
- Lock the suspension cylinder (1) with the adjustment plates (2), set the suspension hydraulic system valve levers (3) to the closed position

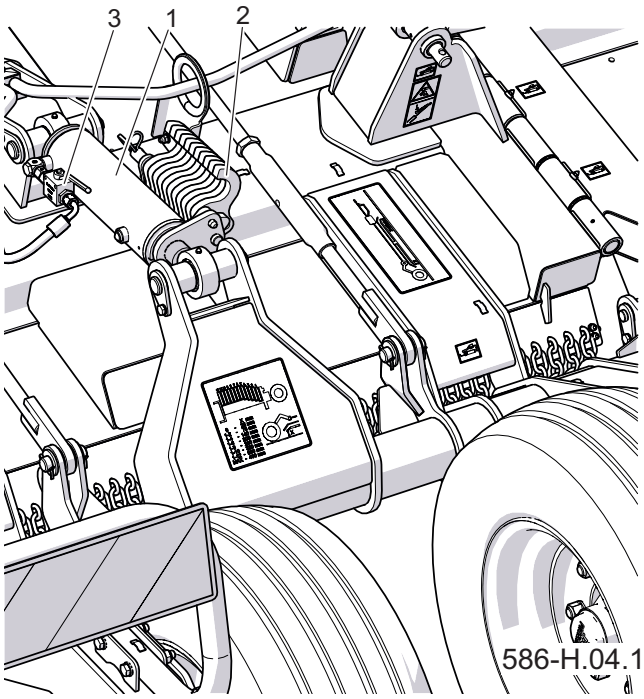

Figure 4.4 Transport lock
(1) suspension cylinder (2) adjustment plates (3) outlet valve

After connecting the articulated telescopic shaft to the mower gear shaft and to the carrier (tractor) PTO, check the rotation direction of the cutting units (Figure 4.3). The cutting units should rotate according to the attached diagram.

Before beginning work, especially on wastelands, remove dirt, rocks, wires,

DANGER

During operation people and animals mut not be present within a 100 m radius of the machine. Operation from the tractor only.

DANGER

During machine operation do not occupy a different position than that of the operator in the tractor's cab. Do NOT leave the cab, when the machine is in operation.
Do NOT stay between the carrier and the machine.
The operator must NOT approach the machine until the cutting units come to a full stop.

DANGER

Before starting the carrier engine make sure that the PTO drive is disengaged. Otherwise, the mower may start uncontrollably and endanger the life and health of bystanders.
The mower may only be started when all its protection guards are installed properly.
Before engaging PTO drive, make sure that there are no bystanders, especially children, near the machine.

cables, metal objects and other foreign materials from the work area. Wire, cable, rope, chains and metal objects can be thrown, entangled in the cutting unit and rotated at high speed:

- Mark objects that cannot be cleared or removed.
- Avoid these objects when mowing.

OPERATE THE MOWER

Mowing operation only takes place when driving forward. Do not mow when reversing. During operation, the mower's wings have the ability to follow ground contour. The machine will mow uneven terrain 25° down and 30° up (Figure 4.4).

Inspect tall grass and scrub on wasteland:

- INSPECT and REMOVE any obscured, large debris.
- cut at an intermediate height
- Inspect and remove remaining debris
- cut at the target height.

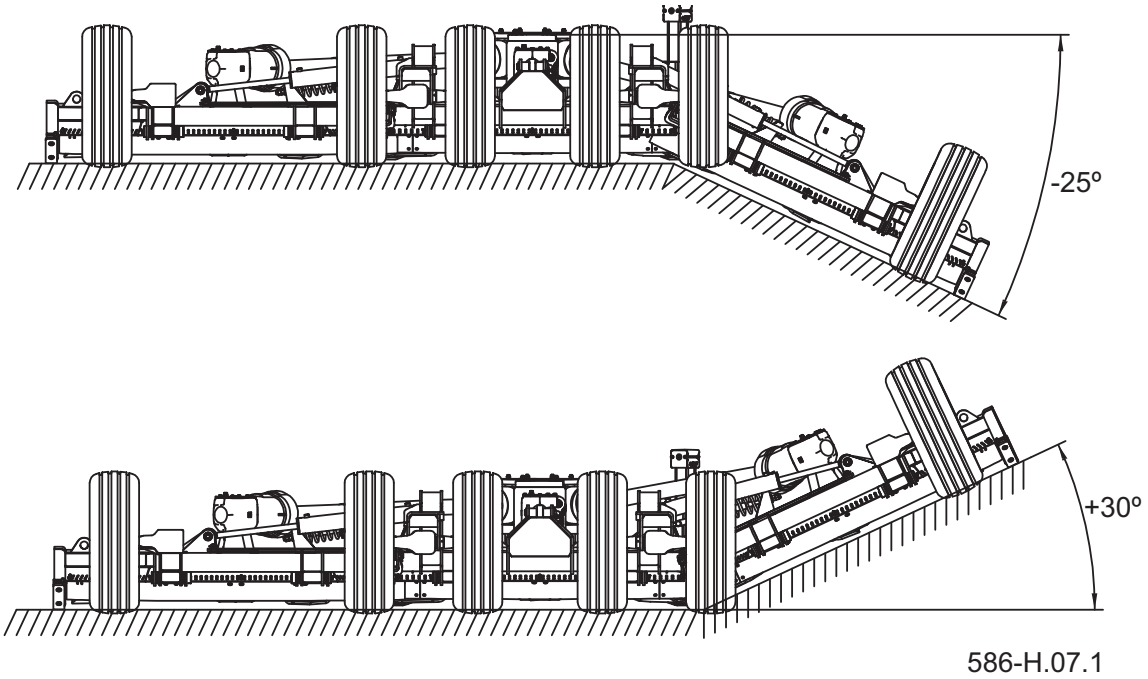

Figure 4.5 Mower operation on a slope - ground contour following

IMPORTANT

Do not mow non-plant material.

DANGER

Only transport the mower with the telescopic shaft disconnected.

Stop mowing immediately if the blades hit heavy objects, solid structures, metal rails or concrete. Check the mower technical condition

To avoid serious injury or death:

- **Keep** bystanders at a minimum distance of 100 meters from the workplace
- All **guards**, including chain guards, steel guards, straps, side skirts and skids are in place and in good condition when mowing.
- The mower sections or wing are positioned so that they are parallel to the ground without exposing the blades.
- **The mowing area** has been checked and foreign objects and they have been removed.
- There are no bystanders nearby

AFTER FINISHING WORK IN THE AREA

You must :

- Disengage PTO drive
- Raise the mower suspension to the maximum position, secure the suspension with blocking plates
- Raise the mower wings to transport position,
- Switch off engine, remove key from ignition and engage parking brake.
- Disconnect the machine articulated telescopic shaft from the tractor's PTO,
- Secure the wing cylinders with mechanical locks (figure 4.2)
- Set the suspension hydraulic valves in a closed position,
- Clean the machine of plant residue.

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4.5 DRIVING ON PUBLIC ROADS

When driving on public roads, respect the road traffic regulations, exercise caution and prudence. Listed below are the key guidelines.

- Before moving off make sure that there are no bystanders, especially children, near the machine and the carrier vehicle (tractor). Ensure that the driver has sufficient visibility.
- Make sure that the machine is correctly attached to the carrier vehicle (tractor), and linkage is properly secured.
- Do not exceed the maximum speed allowed by road traffic regulations. Ground speed should be adjusted to existing road conditions, pavement condition and other conditions.
- While operating the machine, turn on the orange beacon light in the tractor.
- While driving on public roads, the machine should be marked with slow-moving vehicle warning sign placed on the rear of the machine.
- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the machine and the carrier vehicle to suddenly tilt. Driving near ditches or canals is dangerous as there is a risk of the wheels sliding down the slope or the slope collapsing.
- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- When driving on uneven terrain, reduce speed due to dynamic loads and the risk of damage to the machine or tractor.

Take account of the following:

- When driving with the machine's wings raised, these may limit the operator’s view.
- When driving, secure the wings against unfolding using the cylinder lock and use the cylinder adjustment plates prevent the machine suspension system from automatic dropping.

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4.6 UNHITCHING THE MACHINE FROM THE CARRIER VEHICLE

DANGER

Before unhitching the machine from the carrier vehicle, turn off the carrier vehicle's engine, engage parking brake and secure cab against access of unauthorised persons.
Be especially careful when unhitching the machine from the carrier vehicle.

DANGER

When disconnecting the machine, no unauthorized persons should be nearby due to the possibility of being crushed by the wings.

Before the mower is unhitched from the carrier vehicle, it must be placed on a level, sufficiently hard surface to ensure that it is possible to hitch it again.

DANGER

Keep enough space around the implement and wings to avoid contact with buildings or overhead power lines.

In order to disconnect the machine from the carrier vehicle, proceed as follows:

- Put the machine in a parking place.
- Unlock the suspension cylinder from transport position (Figure 4.2), and lower the suspension as much as possible,

DANGER

Reduce pressure prior to disconnecting the hydraulic system.

- Switch off engine, remove key from ignition and engage parking brake.
- Secure the wheels with wheel chocks,
- (figure 4.1) Extend the support leg (1), raise the machine so that it can be safely disconnected from the tractor. Secure the support with the pin.
- Reduce residual pressure in the hydraulic system by moving the appropriate control lever of the hydraulic circuit in the carrier.
- Disconnect the hydraulic system plugs from the carrier, secure with plugs and place in the bracket (5) on the machine frame
- Disconnect the mower's electrical system plugs from the carrier (tractor).
- Disconnect the machine articulated telescopic shaft (3) from the tractor's PTO,
- After disconnecting the articulated telescopic shaft, place it on the support (4)

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MAINTENANCE

SECTION 5

5.1 HALF AXLE MAINTENANCE

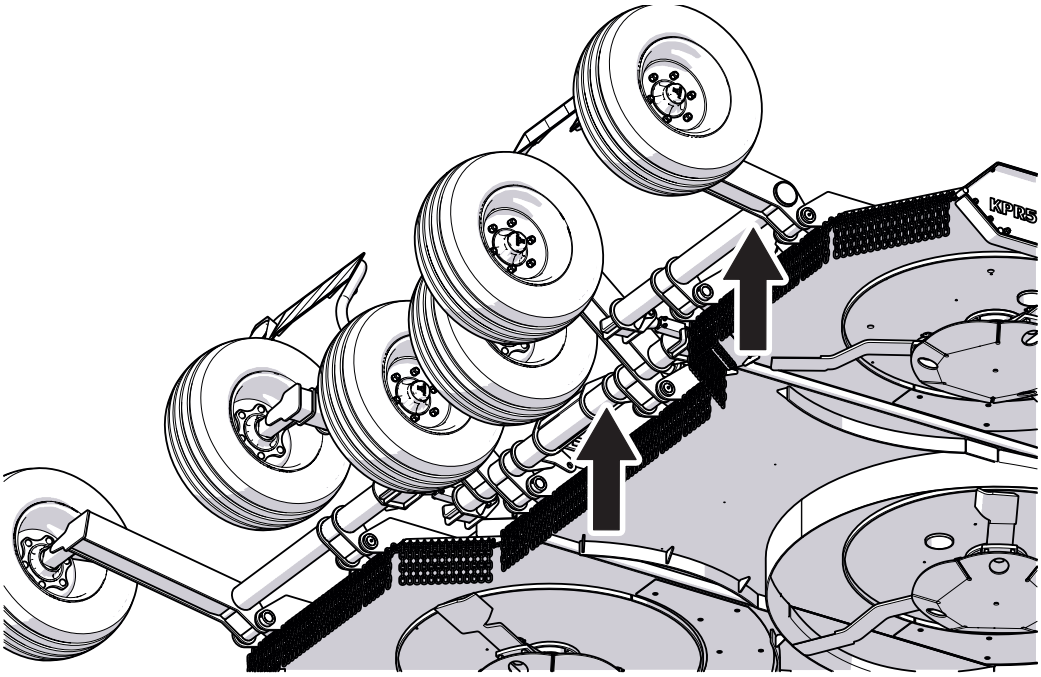

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Figure 5.1 Lifting jack support point

Work connected with the repair, change or regeneration of half axle components should be entrusted to specialist establishments, having the appropriate technology and qualifications for this type of work.

The responsibilities of the user are limited to:

- inspection and adjustment of loose play of half axle bearings,
- Install and remove wheel, inspect wheel nut tightness.
- check air pressure, evaluating technical condition of wheels and tyres.

Procedures connected with:

- changing grease in half axle bearings,
- changing bearings, hub seals,

may be performed by specialist workshops.

CHECK WHEEL HALF AXLE BEARINGS FOR LOOSENESS

Preparation procedures

- Hitch machine to tractor, immobilise tractor with parking brake
- Park tractor and machine on hard level ground.
- Tractor must be placed to drive forward.
- Place the wheel chocks under the machine's wheel opposite to the lifted wheel. Ensure that machine will not move during inspection.
- Raise the wheel (opposite to the side where chocks are placed). Lifting

jack should be positioned in the place indicated by the arrow in figure (5.1). Lifting jack must be suitable for machine weight.

Check wheel half axle bearings for looseness:
– after the first month of use,
– every 6 months of use.

Check wheel half axle bearings looseness

- Turning the wheel slowly in both directions check that movement is smooth and that the wheel rotates without excessive resistance.
- Turn the wheel so that it rotates very quickly, check that the bearing does not make any unusual sounds.
- Moving the wheel try to detect slackness. You may use a lever placed under the wheel supporting the other end of the lever on the floor.
- Repeat the procedure for the other wheel, remembering that the lifting jack must be on the side opposite to the chocks.

TIP

If hub cover is damaged or missing, contamination and dampness enter the hub, which causes significantly faster wear of bearings and hub seals.
Bearing life is dependent on machine working conditions, loading, ground speed and lubrication conditions.

IMPORTANT

Before commencing work, the user must read the instructions for lifting jack and adhere to the manufacturer's instructions.

DANGER

The lifting jack must be stably supported by the ground and so must the half axle.
Ensure that the machine is immobilised during inspection of half axle bearing slackness.

If slackness is felt, adjust bearings. Unusual noise made by the bearing may be a symptom of excessive wear, dirt or damage.

In such an event the bearing, together with sealing ring, should be replaced with new parts, or cleaned and greased again During inspection of bearings ensure that possibly detected looseness comes from the bearing and not from the suspension system

Check condition of hub cover, if necessary replace it with a new cover. Only inspect bearings for looseness, when the machine is hitched to a tractor.

ADJUST SLACKNESS OF HALF-AXLE SHAFT BEARINGS

Prepare tractor and machine for adjustment procedures according to description provided in the section PREPARATION PROCEDURE.

Adjusting looseness of half axle bearing

TIP

The bearing clearance is easier to check and adjust if the wheel is removed.

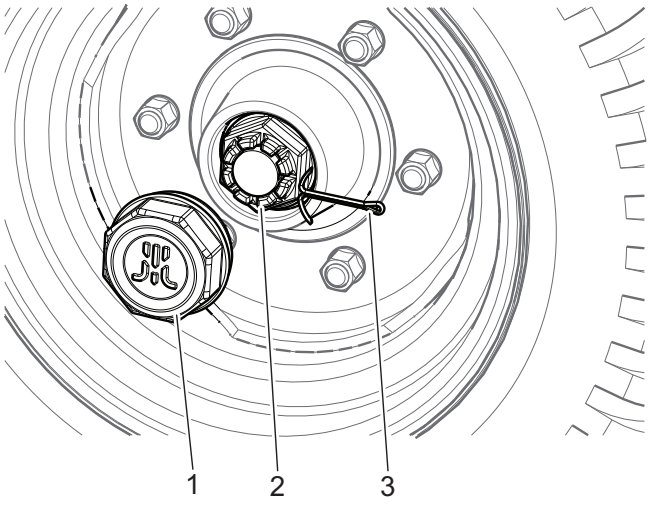

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Figure 5.2 adjustment of road wheel axle bearings

(1) hub cover *(2) castellated nut*

(3) - securing cotter pin

- Take off hub cover (1) – figure (5.2).
- take out split cotter pin (2) securing castellated nut (3)
- Tighten castellated nut in order to eliminate slackness. Wheel should rotate with insignificant resistance.
- Undo nut (not less than 1/3 rotation) to align the nearest thread groove with the opening in wheel half axle pin. Wheel should rotate without excessive resistance.
- The nut must not be excessively tightened. Do not apply excessive pressure because working conditions of the bearings may deteriorate.
- Secure castellated nut with cotter pin and mount the hub cap.
- Delicately tap the hub cap with rubber or wooden mallet.

The wheel should turn smoothly without jamming and detectable resistance. Only adjust bearings, when the machine is hitched to a tractor.

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5.2 WHEEL MAINTENANCE

REMOVE WHEEL

- Place chocks under the wheel that will not be dismounted.
- Ensure that machine is immobilised when wheel is being removed.
- Loosen wheel nuts according to the sequence shown in figure (5.3).
- Place lifting jack and lift rotary rake.
- Dismount wheel.

IMPORTANT

Wheel nuts must not be tightened with impact wrench because of danger of exceeding permissible tightening torque, the consequence of which may be breaking the connection thread or breaking off the hub pin.

INSTALL WHEEL

- Clean half axle pins and nuts of dirt contamination.
- Do not grease thread of nuts and pins.
- Check condition of pins and nuts, if necessary replace them.
- Place wheel on hub, tighten nuts so that wheel rim tightly fits the hub.

Lower the machine, tighten nuts according to recommended torque and given sequence.

TIGHTENING NUTS

Nuts should be tightened gradually diagonally, (in several stages, until obtaining the required tightening torque) using a torque spanner.

Check tightening of half axle wheel nuts:

- after the first use of the trailer,
- after first day of work,
- at regular intervals (50 h).

The inspection should be repeated individually if a wheel has been removed from the wheel axle.

The greatest precision is achieved using a torque spanner. Before commencing work, ensure that correct tightening torque value is set.

TIP

Wheel nuts should be tightened using the torque of 270 Nm – M18x1.5 nuts.

CHECK AIR PRESSURE IN TYRES, TECHNICAL CONDITION OF TYRES AND STEEL RIMS

Tyre pressure should be checked each time after changing spare wheel and not less than every month. In the event of intensive use, air pressure in tyres should be checked more frequently. Check tyres before you drive off when tyres are not warm, or after the machine has been parked for an extended period.

While checking pressure pay attention to

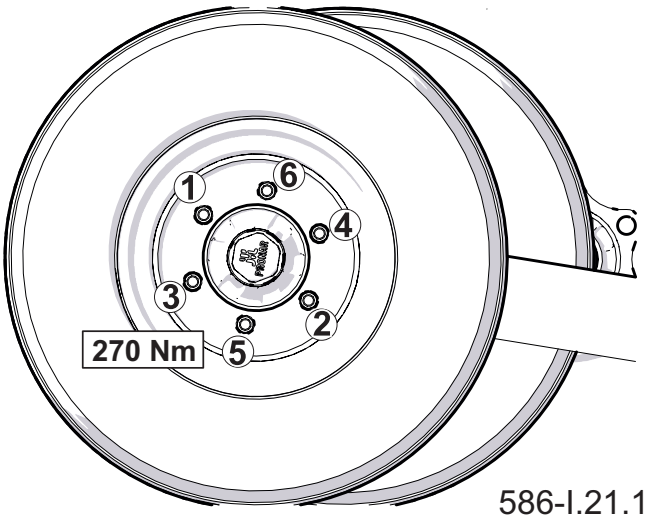

Figure 5.3 Sequence of nut tightening

technical condition of wheels and tyres.

Look carefully at tyre sides and check the condition of tread.

In case of mechanical damage consult the nearest tyre service and check whether the tyre defect requires tyre replacement.

Wheels should be inspected with regard to distortion, breaking of material, breaking of welds, corrosion, especially in the area of welds and contact with tyre.

Proper technical condition and appropriate maintenance of wheels significantly extends the life of these components and ensures appropriate level of safety to machine users.

Check air pressure in tyres and visual inspection of steel wheels:

- at regular intervals (100 h).
- if needed.

TIP

Tyre pressure values are specified in information decal, placed on wheel.

DANGER

Damaged tyres or wheels may be the cause of a serious accident.

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5.3 HYDRAULIC SYSTEM MAINTENANCE

IMPORTANT

Before starting work, visually inspect the hydraulic system components.

DANGER

The machine with a leaking hydraulic system must NOT be used.

Hydraulic system maintenance duties:

- check air tightness of cylinders
- check technical condition of hydraulic lines and quick couplers;

In a new machine, the hydraulic system is filled with HL32 hydraulic oil. Because of its composition, the oil 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.

Spilt oil should be immediately collected and placed in a marked tight container.

Used oil should be taken to the appropriate facility dealing with recycling or regeneration of oils.

The condition of hydraulic system should be inspected regularly while using the machine.

IMPORTANT

Hydraulic lines should be replaced every four years.

The hydraulic system must be tight.

Inspect the seals when the hydraulic cylinder is completely extended. If oil is found on hydraulic cylinder body, check origin of leak.

DANGER

Oil fires should be quenched with carbon dioxide (CO_2), foam or extinguisher steam.
Do NOT use water for fire extinguishing!

Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of

"droplets" stop using the machine until faults are remedied.

If an oil leak is found on hydraulic connections, tighten the connections. If this does not remedy the problem, replace the lines and connection components. Always exchange each mechanically damaged component.

Table 5.1. Hydraulic oil characteristics

Item	Name	Value
1	ISO 3448VG viscosity classification	32
2	Kinematic viscosity at 40°C	28.8 – 35.2 mm²/s
3	ISO 6743/99 quality classification	HL
4	DIN 51502 quality classification	HL
5	Flash point, ^{0}C	Above 210°C
6	Maximum operating temperature, ^{0}C	80

Table 5.2. Hydraulic components tightening torque

Nut thread	Line diameter DN (inch)	Tightening torque [Nm]
M10x1 | M12x1,5 | M14x1,5	6 (1/4”)	30÷50
M16x1.5 | M18x1.5	8 (5/16”)	30÷50
M18x1,5 | M20x1,5 | M22x1,5	10 (3/8”)	50÷70
M22x1,5 | M24x1,5 | M26x1,5	13 (1/2”)	50÷70
M26x1,5 | M27x1,5 | M27x2	16 (5/8”)	70÷100
M30x1,5 | M30x2 | M33x1,5	20 (3/4”)	70÷100
M38x1.5 | M36x2	25 (1”)	100÷150
M45x1.5	32 (1.1/4”)	150÷200

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5.4 DRIVE TRANSMISSION SYSTEM MAINTENANCE

DANGER

If the machine is hitched to the carrier, disengage the PTO, remove the key from the ignition and immobilize the vehicle with the parking brake before you inspect or adjust the transmission system.

The first change of oil in bevel gear should be made after the first 50 hours of work. The next oil changes should be made every 500 hours or once a year (whichever occurs first).

Drive transmission system maintenance (Figure 5.2) involves:

- periodically inspect and change oil in bevel gears and divider gears,
- lubricate telescopic shafts according to the schedule (Table 5.4).

DANGER

Do not touch the telescopic shafts after stopping the machine!

The shafts are equipped with friction clutches, which can become hot during slipping.

The correct oil level in the gearboxes (Figures 5.3 and 5.4) should be on the dipstick (3) in the section between tip and the notch. It is best to change oil immediately after completing work when the gear is still hot and impurities are suspended in oil. Add oil through the filler opening in the gear top cover.

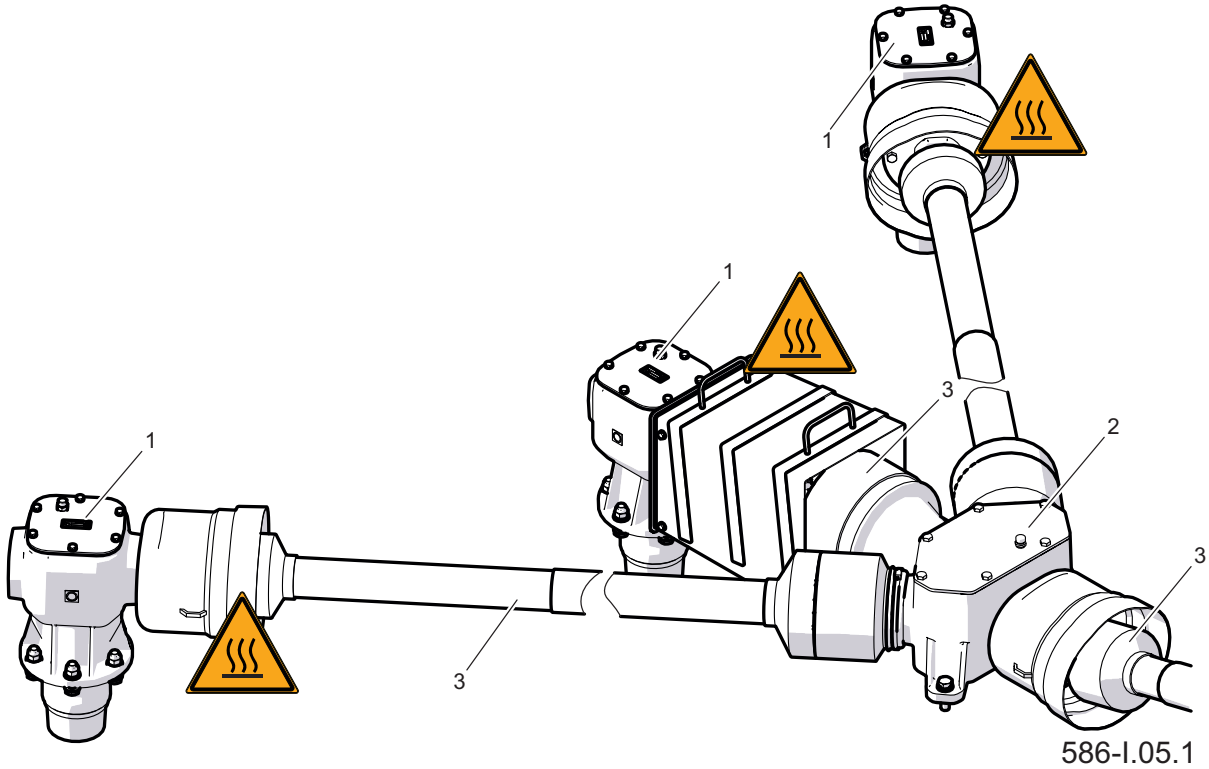

Figure 5.4 Inspect and replace oil in the gearbox

(1) bevel gear (2) divider gearbox (3) telescopic shafts

IMPORTANT

Repairs of bevel gear during warranty period may only be performed at authorised mechanical workshops.

TIP

Fill gears with SAE.90EP (80W90 GL-5) oil - 2.7 litres each.

If a leak is noticed, carefully inspect seals and check oil level. Operation of the transmission with insufficient oil level or without oil may cause permanent damage to the transmission mechanisms.

Only add or change oil when the machine is disconnected from the tractor, and resting on supports.

level the machine The wheels should be secured with chocks against possible rolling.

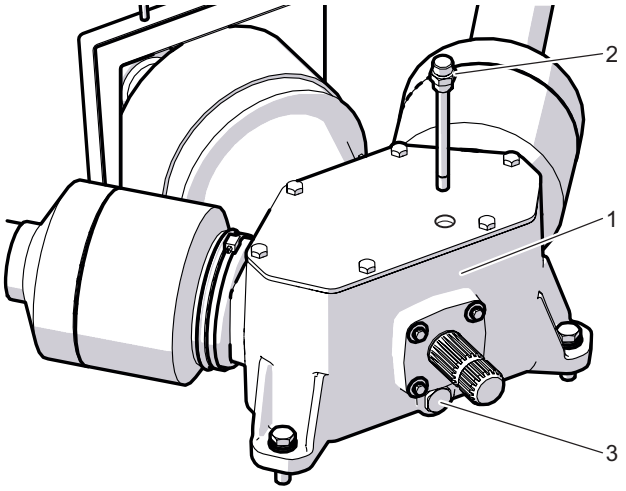

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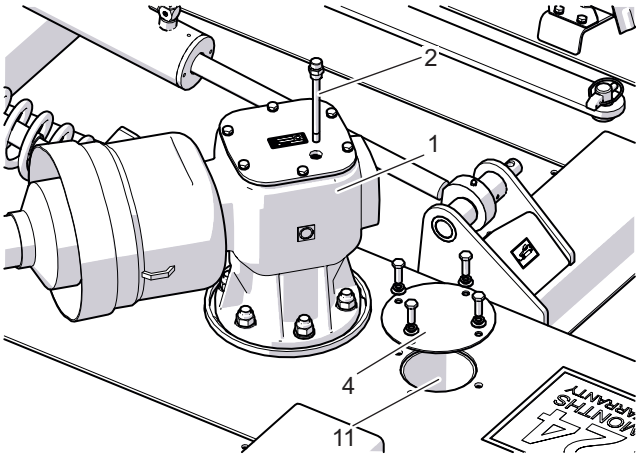
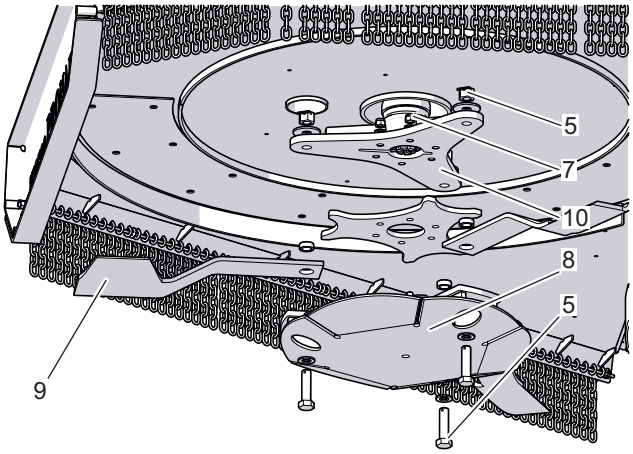
Figure 5.5 Check and change of oil in divider gear

(1) gear body (2) plug with dipstick; (3) oil drain





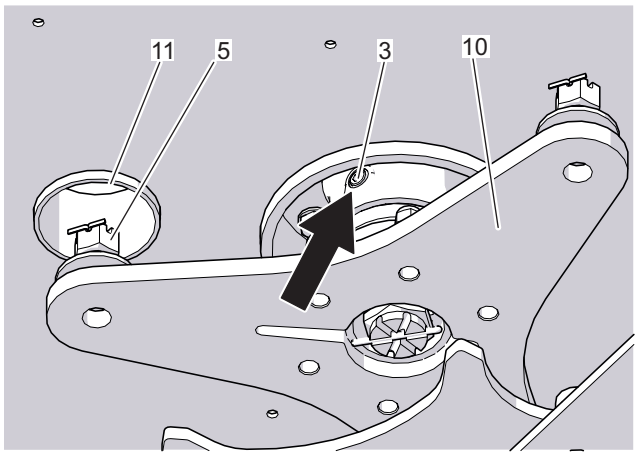


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Figure 5.6 Check oil level and change oil in bevel gears

(1) gear body (2) plug with dipstick; (3) oil drain

(4) inspection opening cover

(5) blade mounting nut (7) cutting unit mounting nut (8) cutting unit guard

(9) cutting blades bracket (10) cutting unit (11) inspection opening

To change oil in divider gearbox (Figure 5.3):

- remove the articulated telescopic shaft on the tractor end.
- remove the PTO shaft guard provided on the gear housing,
- unscrew the upper plug 2
- unscrew the plug (3) in the bottom part of the body under the PTO.
- Drain oil to an appropriate receptacle.
- tighten the plug, add new oil through the opening in the cylinder top cover.

To change oil in bevel gearbox (Figure 5.4):

- unscrew the inspection hole cover (4),
- through the inspection hole (11) loosen the fastening (5) of the cutting blades (9)
- unscrew the top filler plug (2),
- remove the cutting blades (9),
- unscrew the fastener (7) of the unit guard (8),
- use an Allen key to unscrew the oil drain plug (3)
- Drain oil to an appropriate receptacle.
- tighten drain plug (3).
- assemble the cutting unit,
- add oil to the gear.

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5.5 CUTTING UNIT MAINTENANCE

REPLACEMENT OF CUTTING BLADES

TIP

Check the cutting blade edge at least every two days of machine use.

Depending on the use, the cutting blades should be sharpened or replaced after some time.

The blade service life is significantly reduced when working on uneven, stony ground.

DANGER

Since the cutting blades are very sharp, exercise due caution when mounting and dismounting them.

To replace the blades (Figure 5.7):

- unscrew the inspection hole cover (1),
- Remove the cotter pins from the castellated nuts (3),
- Unscrew the bolt nuts (5) securing the blades (6).
- remove the blades from the sockets, remove the sleeves (7) from the blade opening,

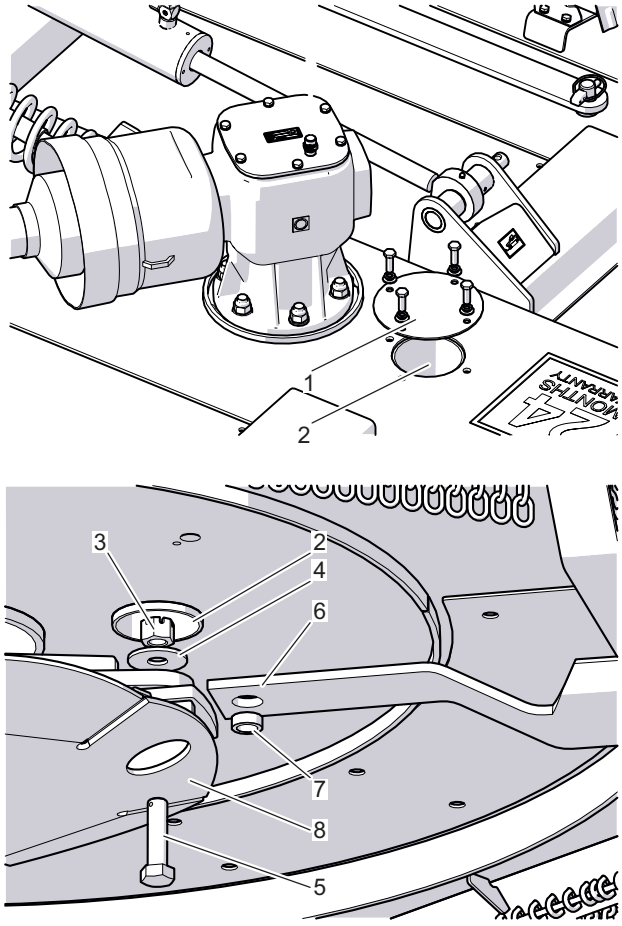

Figure 5.7 Check oil level and change oil in bevel gears

(1) inspection opening cover (2) inspection opening (3)- nut; (4) - washer (5)- bolt (6) blade (7) sleeve (8) cutting unit guard

TIP

There is no need to remove the cutting unit guard for blade maintenance.

IMPORTANT

When installing the blades, note the cutting unit rotation direction.

- Installation should be done in reverse order using new nuts. Bolt and nut connection should be tightened using proper tightening torque.

Table 5.3. List of wearing parts

Item	Name	Part No.	Quantity
1	Left blade	303-890-000250	3 pcs
2	Right blade	303-890-000249	6 pcs

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5.6 ELECTRICAL SYSTEM MAINTENANCE

Electrical system maintenance involves checking the correct operation of the lighting system (Figure 3.6).

DANGER

Do not independently repair electrical system, except items described in chapter ELECTRICAL SYSTEM MAINTENANCE. All electrical system repairs must be performed only by suitably qualified personnel.

Light-emitting diodes (LED) are used as the source of light in lamp assemblies. Thanks to this, the lamps are maintenance-free because there is no need to change bulbs.

IMPORTANT

Before beginning repairs of electrical system, disconnect the machine from power source.

IMPORTANT

Do NOT travel with out of order lighting system. Burned-out or damaged lamps must be replaced with new ones.

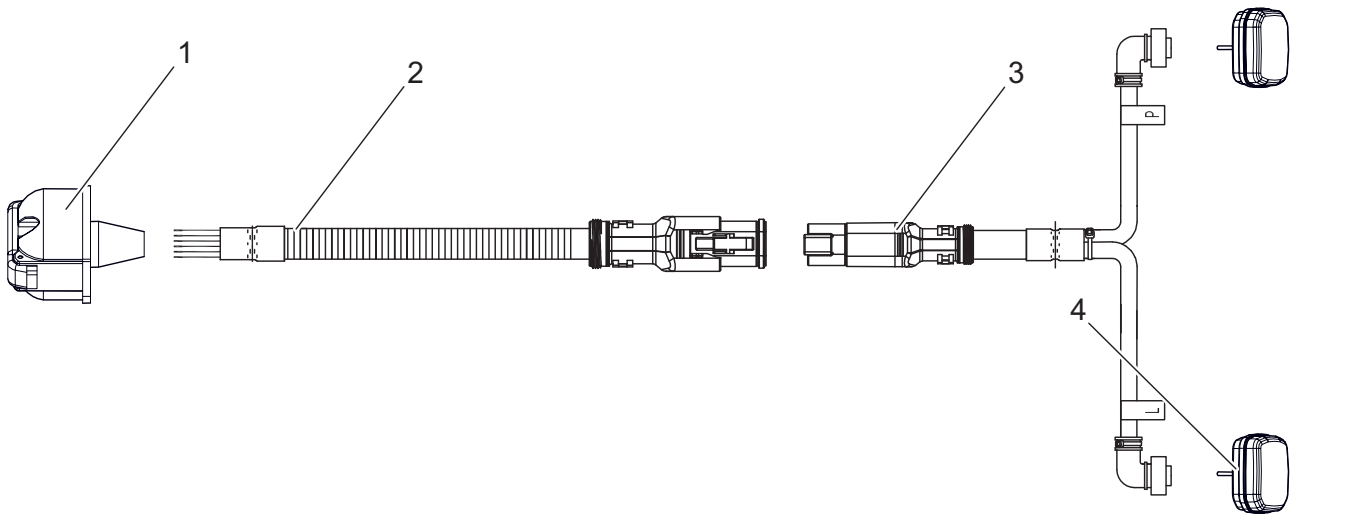

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Figure 5.8 Electrical system diagram

(1) - 7-pin 7P / 12V socket ; (2) centre harness (3) rear harness

(4) rear lamps

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5.7 LUBRICATION

Lubricate the machine using a grease gun, filled with ŁT-43-PN/C-96134 grease. Clean the lubrication points before lubricating. Remove and wipe off excess oil or grease The drive shafts are to be lubricated as instructed in the shaft Operator's Manual provided the shaft manufacturer. Clean the area of old grease before lubrication.

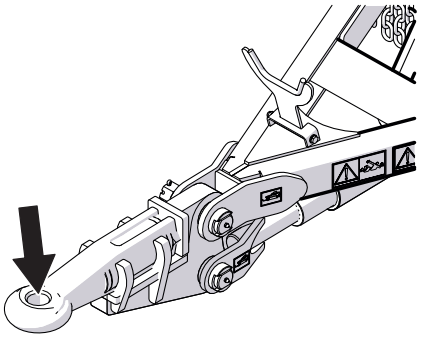
TIP

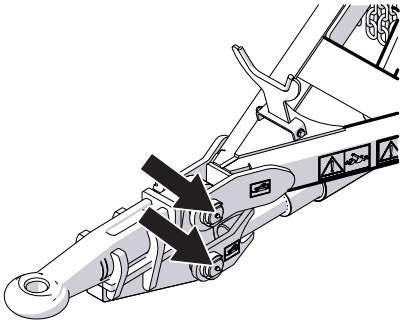
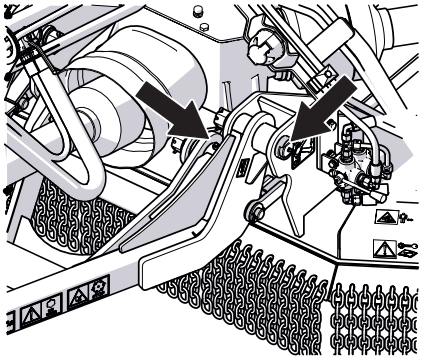
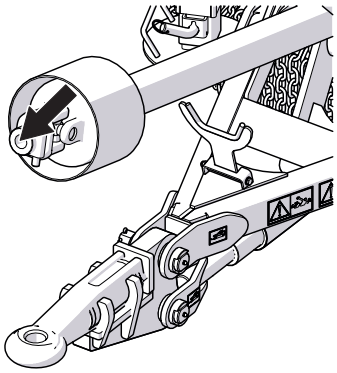
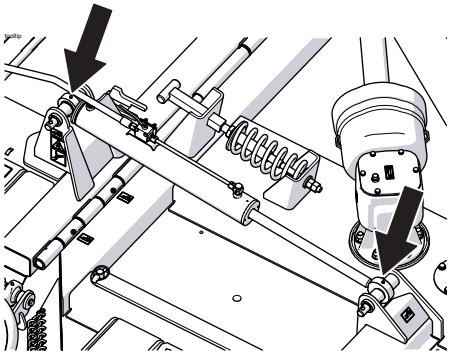
When using the machine the user is obliged to observe lubrication instructions according to attached schedule. Excess lubricant causes depositing of additional contaminants in places requiring lubrication, therefore it is essential to keep individual machine components clean.

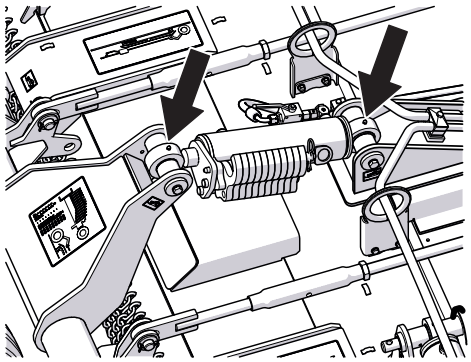
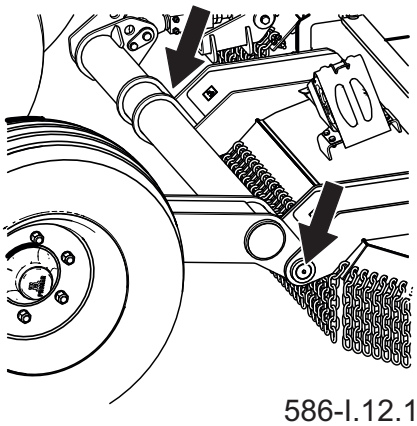
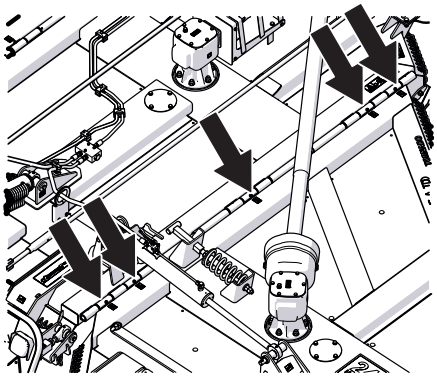
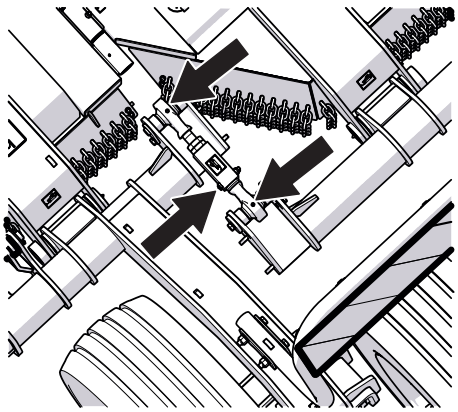
DANGER

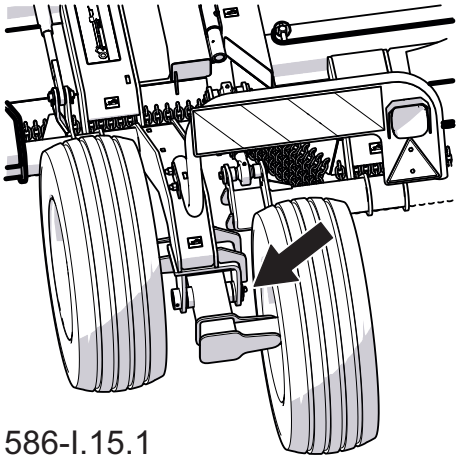
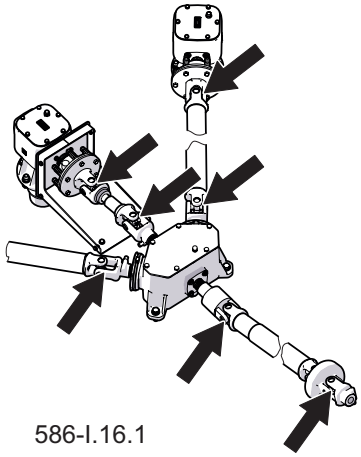
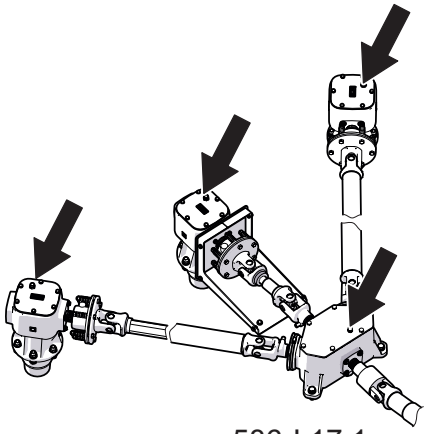
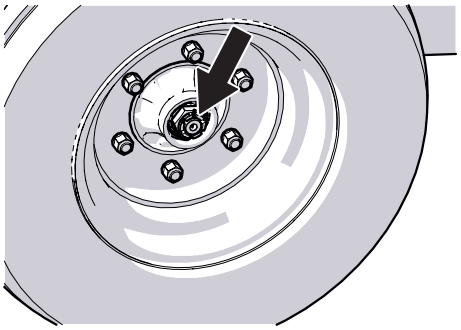
Lubricate the machine when it is lowered on its supports and resting on the ground.
Before lubricating, turn off engine, remove key from ignition and engage carrier vehicle brake.

Table 5.4. Lubrication points and lubrication frequency

Name	Number of lubrication points	Type of grease	Frequency	
Drawbar eye	1	B	10D	 586-I.06.1

Hitch pins (front)	2	A	15D	 586-I.07.1
Hitch pins (rear)	4	A	15D	 586-I.08.1
PTO shaft (socket)	1	B	15D	 586-I.09.1
Wing cylinder bolts	4	A	15D	 586-I.10.1

Suspension cylinder pins	2	A	15D	 586-I.11.1
Suspension locking pin	6	B	5D	 586-I.12.1
Wing hinge	10	A	15D	 586-I.13.1
Suspension rods	6	B	5D	 586-I.14.1

Rocker arm pin	2	B	5D	 586-I.15.1
Shaft elbows*	8	B	2D	 586-I.16.1
Bevel gear divider gearbox	4	E	12M	 586-I.17.1
Hub bearings (2 bearings in each hub)	12	A	12M	 586-I.18.1

**- For detailed information on operation and maintenance please refer to operator's manual enclosed with the shaft.*

Table 5.5. Lubricants

Item	Symbol	Description
1	A	machine general-purpose grease (lithium, alkaline),
2	B	Grease for heavily loaded elements with addition of MoS_2 or graphite
3	C	anticorrosion preparation in aerosol
4	D	ordinary machine oil, silicon grease in aerosol
5	E	SAE 90EP (80W90 GL-5) transmission oil .

TIP

Lubrication frequency (see table *Machine lubrication schedule*):
D - working day (8 hours of machine use)
M - month

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5.8 TIGHTEN BOLT CONNECTIONS

Before each use of the machine and during maintenance and repair work, confirm that all bolt connections are properly tightened. If any clearances in bolt connections are found, tighten bolt connections using appropriate tightening torque (TABLE 5.6), unless other tightening parameters are given. Recommended torque values apply to non-greased steel bolts.

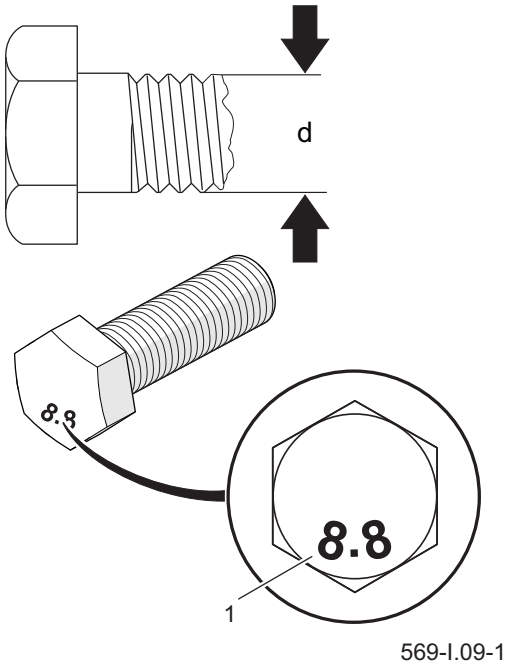

Figure 5.9 Bolt with metric thread
(1) resistance class (d) thread diameter

Table 5.6. Tightening torque for nut and bolt connections

THREAD MARKING [mm]	8.8	10.9
	TIGHTENING TORQUE [Nm]	
M6	10	15
M8	25	36
M10	49	72
M12	85	125
M14	135	200
M16	210	310
M20	425	610
M24	730	1,050
M27	1,150	1,650
M30	1,450	2,100
M32	1,450	2,100

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5.9 STORAGE

After finishing work, mower should be thoroughly cleaned and washed with water jet. Nozzle of pressure or steam washer should be kept at a distance of not less than 50 cm from cleaned surface.

After cleaning, inspect the whole machine,

IMPORTANT

While washing do not direct a strong water or steam jet at information and warning decals, bearings, hydraulic lines or electrical wires.

inspect technical condition of individual elements. Repair or replace any used or damaged components.

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.

If the machine will not be used for a long time, protect it against adverse weather conditions. The mower should be lubricated according to the instructions provided regardless of the date of the last lubrication. Protect against corrosion all mating components, such as pins or articulated joints. Cover them with a thin layer of grease.

The machine should be stored in a roofed building inaccessible for children and animals. The machine unhitched from the carrier vehicle should be placed on level, sufficiently hard surface in a way as to ensure that it is possible to hitch it again.

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5.10 TROUBLESHOOTING

Table 5.7. Troubleshooting

Problem	Possible cause	Solution
Excessive vibration	Check transmission bolts.	Tighten if loose.
	Check the loose nuts on the cutting unit and blades	Tighten if loose.
	Check that the output shaft is not bent. IMPORTANT. If the shaft is bent, oil will leak from the bottom seal.	Replace the shaft if it is bent.
	Check that the blades turn freely.	Loosen the blade fixing bolt.
	Check for even wear on each blade tip. Were the blades replaced at the same time?	Weigh the blades. The difference in weight of individual blades should be within 20 g. Always replace all blades in the unit
	Broken blade.	Replace all blades in the cutting unit.
	Blade holder bent (cutting unit).	Replace the blade holder.
	The cutting unit hub is not properly seated on the shaft	Remove the hub, check the splined shaft, clean and replace.
	New blade or bolts were installed	Replace the set of blades or bolts
Gearbox over-heating	Low oil level.	Add oil to correct level.
	Wrong oil type.	Replace with SAE.90EP (80W90 GL-5)
	Excessive build-up of material (plant stems) around the bevel gear	Remove built-up material.
	Bearing or gears incorrectly positioned	Contact the seller.
Leaking gear	Oil seal damaged	Replace the seal.
	Rough shaft in the area of oil sealing.	Replace or repair the shaft.
	Incorrect oil seal installation.	Replace the seal.
	Oil level too high	Drain the oil to obtain the correct level.
	Loose bolts.	Tighten bolts
Excessive clutch slips	Clutch linings heavily worn or warped plates.	Repair the clutch according to the shaft manual.
	Excessive shaft load.	Reduce ground speed and material intake.
	Oil on linings.	Replace the linings.
	Glazed friction linings.	Wipe with sandpaper.

Uneven mowing	Excessive ground speed.	Reduce ground speed
	Blades worn, blunt or bent	Replace the blades.
	Incorrect height adjustment.	Adjust the mower height.
	Low tire pressure on one side.	Adjust the tire pressure.
	Turning too quick.	Reduce speed while turning
The material is not mowed	Excessive ground speed.	Reduce ground speed
	RPM too low	Use full PTO speed.
	Incorrect blade positioning in relation to the cutting direction.	Install the blades so that the rotation direction is correct.
Poor mulching	Excessive ground speed.	Raise the front of the mower relative to the rear to hold and mulch the material longer. (See @Operation section - Adjust the mower height - Adjust level) Reduce ground speed.
	Cut too high.	Lower cutting height. (See “Operating section - Set up the mower - Set the deck height”)

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