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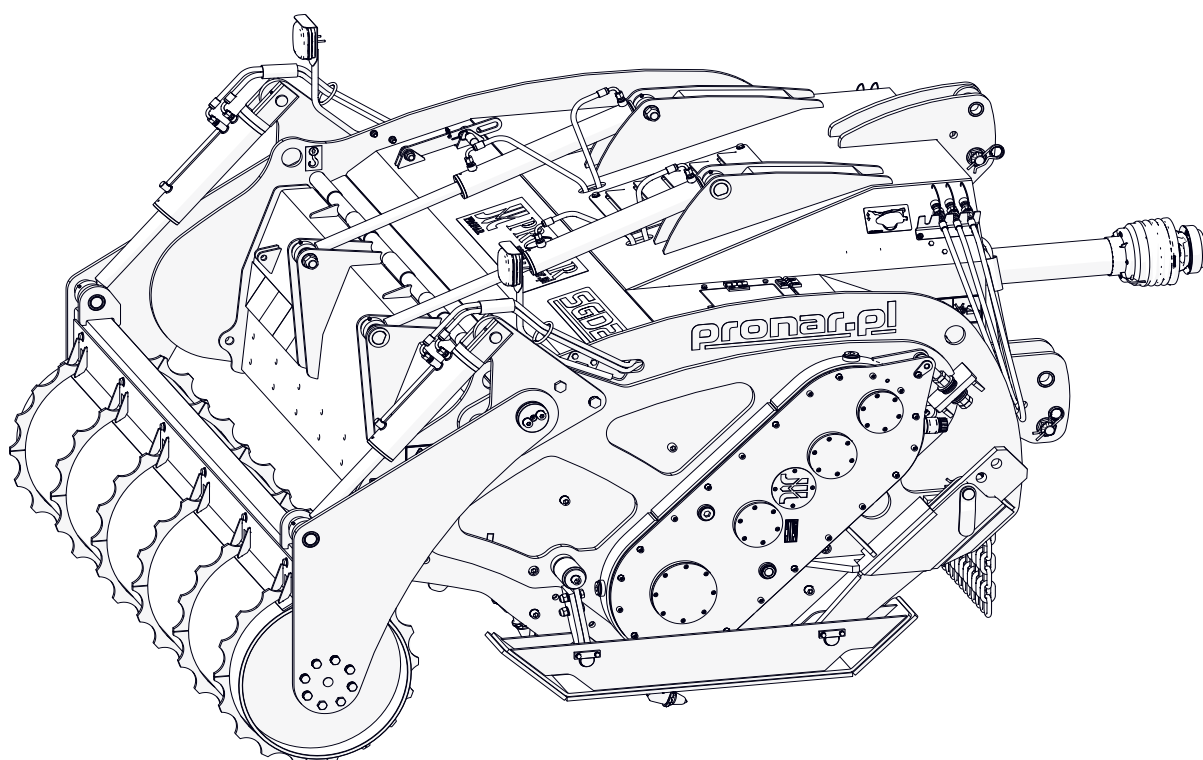
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OPERATOR MANUAL

SOIL STABILIZER

PRONAR SGD21

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



REVISION 1A

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This Operator Manual contains important safety and operating instructions for the machine. The Operator Manual should be kept near the machine so that it is accessible to authorized operators.

Keep this manual for future reference. If the Operator Manual is lost or damaged, contact the seller or the manufacturer for a copy.

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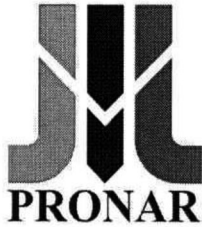
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EC Declaration of Conformity

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

Machine description and identification data	
General description and purpose:	Soil stabilizer
Type:	SGD21
Model:	-
Serial number:	
Commercial name:	Soil stabilizer PRONAR SGD21

referred to in this declaration meets the requirements of Directives:

- **2006/42/EC- MD** - Machine Directive,
- **2014/30/EU- EMC** - Electromagnetic Compatibility Directive,
- **2014/35/EU LVD** - Low Voltage Directive,
- **2016/1628 amended by 2020/1040** - Regulation of the European Parliament and of the Council (EU) of 14 September, 2016. on requirements for internal combustion engines.

The machine has been designed for and meets the requirements of the following standards:

**PN-EN ISO 12100; PN-EN ISO 4413; PN-EN ISO 14120; PN-EN ISO 4254-1;
PN-EN 13524; PN-EN 60204**

This declaration applies exclusively to the machine in the condition, in which it was sold and does not include components or parts added or subsequent modifications made by the final user.

The operator's manual is an integral part of the machine.

The Implementation Department Manager of PRONAR Sp. z o.o., 17-210 Narew, ul. Mickiewicza 101A is authorised to provide the technical documentation.

Z-CA DYREKTORA
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członek zarządu

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Narew, on 2023-01-20

Date and place issued

*Full name of the authorised person, position,
signature*

CHAPTER 1

INTRODUCTION

PRONAR SGD21

1.1 DEAR USER

The manual instruction is intended for the end user. For this reason, some required maintenance is listed in the inspection tables but the procedure is not described in this publication. To perform them, call the manufacturer's authorized service center.

Before starting the machine, you will be familiarized with its construction, principle of operation, available equipment and operation, and above all safety rules. The operator and qualified personnel should be trained during final reception.

Remember!!! You can run the machine only when you have read the content of this "User Manual", you have been trained and you can handle it safely. In case of any doubts, contact the seller to clarify the problem.

The most important thing during operation is your safety, therefore, regardless of everything, all recommendations contained in the "User's Manual" should be observed and guided by reasonable procedure. Remember that the correct service, in accordance with the manufacturer's instructions, reduces the risk of an accident to a minimum, and working with the machine is more efficient and less emergency.

When buying machines, check the compatibility of serial numbers placed on the machine with the number entered in the "Warranty card" and in the sales documents. For information on identifying the machine, see "Basic information" chapter. We recommend that you have the most important serial numbers entered the field below.

Machine serial number:

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

WST.3.B-001.01.EN

1.2 RULES FOR USING THE USER'S MANUAL

The information contained in the publication is current as at the date of publication. As a result of improvement, some sizes and illustrations contained in this publication may not correspond to the actual state of the machine delivered to the user.

The drawings contained in this publication are aimed at clarifying the principle of machine operation and may differ from the facts. This can not be a reason for any claims for this. The manufacturer reserves the right to introduce constructional changes in the manufactured machines to facilitate operation and improve the quality of their work, without making any current changes to this publication.

The operating instruction is the basic equipment of the machine. If the information contained in this study prove not fully understandable to ask for aid to the point of sale in which the machine has been purchased or directly to the manufacturer.

The machine was constructed in accordance with applicable standards, documents and current legal regulations.

Separate studies can be attached to this manual that can be found in the chapter "*Attachments and additional materials*".

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1.3 TARGET AUDIENCE

This Operator's Manual is intended for persons operating the machine hereinafter referred to as end users, and qualified persons, such as electricians, mechanics, plumbers. Detailed information on the competences and responsibilities of end users and qualified persons can be found below in this chapter.

1.3.1 End user (user, authorized user, operator)

Who is the end user?

The end user, otherwise known as the user or operator, is the person authorized to operate the machine. The user may be authorized to operate the machine if the following conditions are met.

- The user has read and understands this "*Operator's Manual*."
- Carefully read the carrier vehicle's Operator Manual and comply with its recommendations.
- Comply with the road traffic regulations and transport regulations in force in the given country, in which the machine is used,
- Has been trained to follow established maintenance and adjustment plans.
- Have driving licenses (vehicle combinations) required in the country of use.

Duties and responsibilities

The knowledge acquired by the user allows the machine to be operated safely. In accidental situations, the user should follow reasonable procedures and first of all ensure her/his own safety and safety persons nearby the operating machine and other road users. The user's knowledge and skills entitle to operate the machine, carry out maintenance and perform repairs or adjustments to the extent specified by the manufacturer. Activities that can be performed by the operator are marked with the pictogram:

1.3.2 Qualified person(s)

Who is a qualified person?

A qualified person is a person authorized to perform certain maintenance, repair or adjustment work to the extent specified by the machine manufacturer and has acquired suitable technical training in a specific profession which is confirmed by an appropriate document, completed training conducted by authorized



manufacturer or seller and is able to perceive and counteract hazards. The acquired professional experience and professional skills entitle a qualified person to carry out some repairs on the machine and perform basic maintenance operations to the extent envisioned by the manufacturer. In addition to the necessary knowledge, a qualified person has the skills to use specialized equipment necessary to perform the responsibilities. Qualified persons include the following:

- qualified mechanic,
- qualified electrician
- qualified plumber.

Activities that a qualified mechanic can perform are marked with a pictogram:



Activities that a qualified electrician can perform are marked with a pictogram:



Activities that a qualified plumber can perform are marked with a pictogram:



1.3.3 Service technicians

Who are the service technicians?

The service technicians, otherwise known as the manufacturer's service technicians, is a person or group of qualified persons with much more experience and knowledge to perform specific repairs and maintenance than qualified persons. Service technicians have the right tools to carry out the work. The manufacturer's service technicians have the required qualifications and represent the machine or other equipment manufacturer.

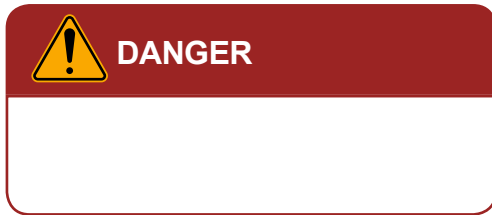
1.3.4 Unauthorized user

Who is an unauthorized user?

An unauthorized user, also known as a bystander, is a person who has not been trained by the manufacturer or authorized seller, has not been familiarized with the basic safety rules, has little or no knowledge of the machine, has not read the entire operator's manual and therefore is not authorized to operate the machine. A bystander must not be allowed to work with the machine.

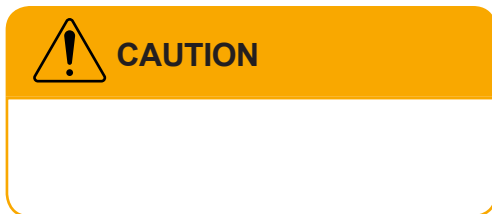
1.4 SYMBOLS AND TAGS USED IN THE MANUAL

1.4.1 Danger



Information, descriptions of hazards and precautions as well as instructions and orders related to the safety of use in the content of the manual are marked with a frame with the word **DANGER**. Failure to comply with these recommendations may endanger the health or life of persons operating the machine or bystanders.

1.4.2 Caution






Particularly important information and recommendations, the observance of which is absolutely necessary, are highlighted in the text with a frame and word **CAUTION**. Failure to comply with these recommendations creates the risk of damage to the machine due to improper handling, adjustment or use.

1.4.3 Advice







Additional instructions contained in the manual describe useful information on operating the machine and are marked with a frame with the word **ADVICE**.

1.4.4 Personal protective equipment pictograms

	Work shoes
	reflective vest
	industrial helmet
	working clothes
	respiratory protection
	safety goggles
	protective gloves
	hearing protectors

1.4.5 Qualification pictograms

	operator
	qualified mechanic
	qualified plumber
	qualified electrician

1.4.6 Typography of the User Manual

Bulleted list

The bulleted list presents actions to perform whose order is not relevant.

Example of using a bulleted list

Comment on the text

Comment is most often a supplement and additional

-
- Check the condition of connections and hydraulic and pneumatic hoses. Hydraulic oil leaks and air defects from a leaky installation are unacceptable.
- In the event of a hydraulic or pneumatic installation failure, the trailer should be turned off from operation until the failure is removed.
-

explanation to order a specific activity. Additional information can also be included in the comment.

An example of a comment

The required air pressure is described on the sticker placed on the machine frame, over the wheel.

Defined list

List shows the to-do, which execution order is important.

Example of using a defined list

1.
2. Unscrew the handles (2) securing the crank (1).
3. Insert the crank into a square shaft of the gear and turning the clock clockwise on the direction of the clock.
4.

References to pages

Reference to chapter (place in the manual) related thematically

An example of a reference application

WST.3.B-004.02.EN

 **page 9.4**

1.5 GLOSSARY OF TERMS

agricultural tractor

A motor vehicle designed for use in combination with implements for agricultural, forestry and horticultural work; the agricultural tractor can be also adapted for towing a trailer and for earthwork.

tractor unit

A motor vehicle designed exclusively for towing a trailer; this term refers to semi-trailer truck and ballast tractor.

carrier vehicle

A motor vehicle made in a special way so that it not only pulls tools but also carries them on itself, and can work with implements attached or suspended from the rear or front of the vehicle.

final acceptance

A number of activities related to getting the finished product ready for delivery and actual delivery of the product. The final acceptance includes delivery of documentation, basic training, acceptance for transport and first start of the machine.

bystander

see - unauthorized user

qualified person

A qualified person is a person authorized to perform certain maintenance, repair or adjustment work to the extent specified by the machine manufacturer and has acquired suitable technical training in a specific profession which is confirmed by an appropriate document, completed training conducted by authorized manufacturer or seller and is able to perceive and counteract hazards.

lorry

A motor vehicle designed for transporting goods; this term also refers to goods and passenger carrier vehicles that are designed for carrying goods and

people (from 4 to 9 persons including a driver).

danger zone

A danger zone is an area around the machine where people's health or life is endangered.

THREE-POINT LINKAGE

Three-point linkage - a lever system used in agricultural tractors to hitch machines and implements suspended on a hydraulic linkage.

end user

Otherwise referred to as the user, authorized user or operator — a person authorized to operate the machine.

unauthorized user

Also referred to as a bystander — a person who has not been trained and has not been allowed to operate the machine.

PTO

PTO - Power Take-Off Shaft - a shaft transmitting drive from the vehicle to the machine being moved.

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1.6 DIRECTIONS USED IN THIS OPERATOR MANUAL

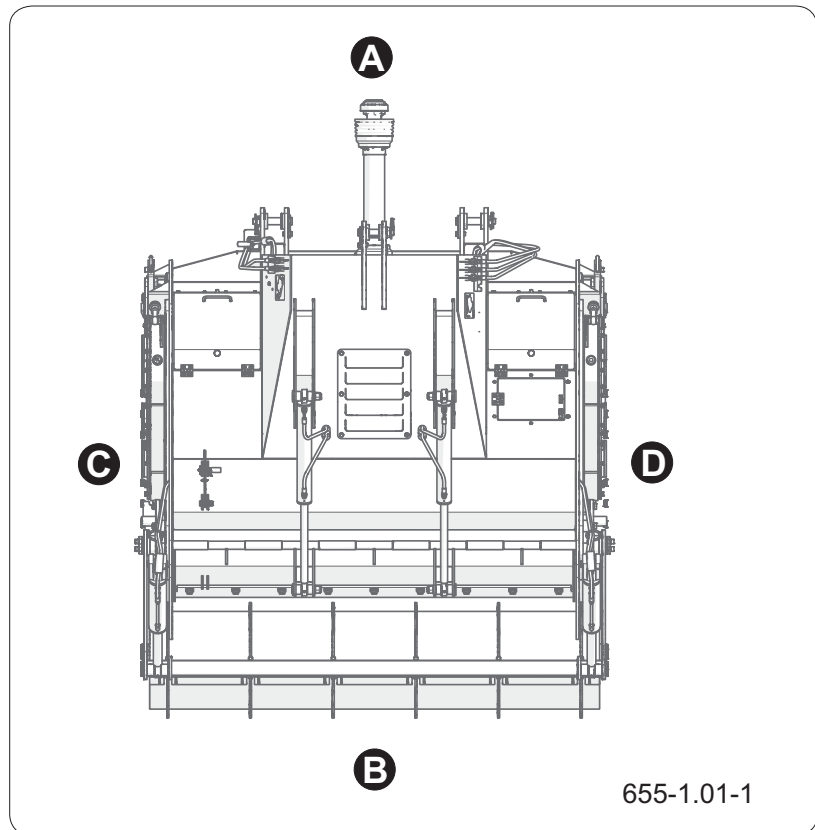


Figure 1.1 Determining directions on the machine (top view)

(A) front

(B) rear

(C) left side

(D) right side

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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1.7 FINAL ACCEPTANCE

1.7.1 Preliminary information

Final acceptance takes place after the machine is delivered to the customer. Final acceptance includes the following:

- provide the required documents, including the “*Operator Manual*”, “*Warranty Book*” and other documents,
- information from the seller about the machine use, risks resulting from using the machine contrary to its intended purpose and about hitching the machine to a tractor and operation.
- inspect the machine upon delivery,
- first start-up of the machine and discussion of the use and operation of the machine.

1.7.2 Inspect the machine upon delivery

The scope of inspection

- Check completeness of the machine according to order:
- Check technical condition of safety guards.
- Check condition of paint coating; check the machine for traces of corrosion.
- Check the machine for damage resulting from wrong transport of the machine to its destination (crushing, piercing, bending or breaking of parts etc.).

1.7.3 First start-up of the machine

Start-up must be preceded by training conducted by the Seller or authorized employees of the Seller.

The scope of operations during the first start-up

- Make sure that the hydraulic and electrical connections on the tractor are compatible with those of the machine.
- Check technical condition of elastic hydraulic lines. Make sure the systems are tight.
- Inspect hydraulic actuators for leaks and tightness.
- Check all lubrication points and regrease if necessary.

If the condition of the machine is satisfactory, proceed to a test run:

- Connect the machine to the tractor's linkage system.
- Connect a properly fitted PTO shaft.
- Connect the hydraulic and electrical lines (optional).
- Raise the machine above the ground surface (approx. 10 cm).
- Check the correct operation of the hydraulic and electrical systems (option).
- Start the PTO and check the operation of the driven system.

If during test run worrying symptoms occur such as:

- noise and abnormal sounds originating from the abrasion of moving elements of the machine design,
- hydraulic or gear oil leaks,
- incorrect hydraulic system operation

or other faults, diagnose the problem. If a fault cannot be rectified or the repair could void the guarantee, please contact the dealer for additional clarifications or to make a repair.



ATTENTION

Training by the seller does not release the user from the obligation to read this Operator Manual and the Operator Manual of PTO shaft attached to the machine and observe all recommendations.

TIP

Adjustment of the PTO shaft applies only to a specific type of tractor. If the machine is connected to a different type of tractor, the adjustment procedure for this type of tractor should be possibly carried out.



ATTENTION

Pipe profiles of the PTO shaft must overlap at least at 1/2 of the length in normal working conditions and at least at 1/3 of the length in all working conditions. When adjusting the PTO shaft, follow the instructions in the operating instructions of the PTO shaft manufacturer.

1.8 PERSONAL PROTECTIVE EQUIPMENT

1.8.1 General



CAUTION

Personal protective equipment should be used in accordance with the recommendations of the security manufacturer.

Follow local regulations regarding personal protective equipment.

The personal protective equipment listed below is a minimum protection for the operator against the effects of unfavourable external factors and is only a recommendation for use.

We recommend carrying out a risk assessment at the machine's workplace and adjusting the personal protective equipment of operator depending on the actual working conditions.

1.8.2 Work clothing



Work clothing should fit the operator's body correctly. The material from which the clothing is made should be characterized by high tear strength. Clothing must not have any protruding elements that may be accidentally caught by the mechanisms of the machine.

1.8.3 Hearing protectors



It is recommended to use of ear muffs for use with a protective industrial helmet for hearing protection. The selection of the damping value should be selected individually depending on the noise level at the location of the machine, which is the result of various sources (e.g. tractor, loader, belt conveyors, etc.).

Remember to properly store and maintain your hearing protectors. Poorly stored and maintained hearing protectors lose their protective properties over time. Periodically replace the soundproofing cushions according to the manufacturer's recommendations.

1.8.4 Work shoes



Work shoes should have the following properties:

- non-slip sole,
- sole material made of a material resistant to oils, gasoline and other organic solvents.
- toe cap resistant to impact with an energy of 200 J,
- insert securing the foot against piercing of the sole.

The above properties correspond to the S3 shoe category according to PN-EN ISO 20345.

1.8.5 Warning vest



The warning (reflective) vest is designed to increase the operator's visibility to other users. Instead of a reflective vest, you may wear work clothes that meet the requirements of EN471. It is recommended that the warning vest (or work clothing) be class 2.

1.8.6 Protective gloves



Protective gloves should be selected depending on the currently performed work.

Strong protective gloves

Strong protective gloves for hand protection are used for protection during heavy work such as cleaning the machine, removing clogs and the like, where there is a risk of damaging the hands. Protective gloves should protect the hands from cuts, scratches, abrasions, punctures and similar injuries to the skin and

against light burns in contact with hot surfaces.

Light protective gloves

For light work (general operation, minor maintenance etc.), we recommend using light protective gloves for work in a dry or slightly oily environment. The working surface of the gloves (internal part should be covered with an impermeable material, e.g. nitrile).

Nitrile gloves

Nitrile gloves designed for working with urea, fuel or lubricants. They are designed for light work where there is a risk of skin contact with lubricants, fuel, urea, gear oil and hydraulic oil.

1.8.7 Safety glasses with side shields

Safety glasses to protect the eyes against contact with hazardous substances, splashing liquids or dust and airborne of the machine dust. Safety glasses with



side shields increase the level of protection.

1.8.8 Industrial protective helmet

The industrial safety helmet is designed to protect the head against injuries related to the fall of thrown objects, parts or materials. The design of the helmet



should be in accordance with the EN397 standard. During normal machine operation, wearing lightweight industrial helmets will not protect the user from injury and is therefore not recommended.

The protective helmet must fit correctly to the anatomical shape of the skull. There are adjustment straps for this purpose. The helmet has a limited shelf life.,



CAUTION

Remember that personal protective equipment should be regularly maintained and used in accordance with the recommendations of the product manufacturer. Following these guidelines will ensure safe use and the best protection.

After this date, the material from which it was made loses its properties and does not fulfil the assumed task. The helmet must be replaced.

1.8.9 Anti-dust respirator



Dust can become airborne when operating the machine. It is recommended to use disposable respirators with an exhalation valve to protect the respiratory tract.

The size of the mask should match the operator's face. The mask should fit snugly against the skin. The nasal part should be adjusted using the adjustment plate. Remember that facial hair can make it difficult to seal the face mask.

Minimum half mask recommendations:

- type FFP1, in accordance with EN-149: 2001 + A1: 2009, protection against non-toxic liquid or solid aerosols,
- P1 class.

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BASIC INFORMATION

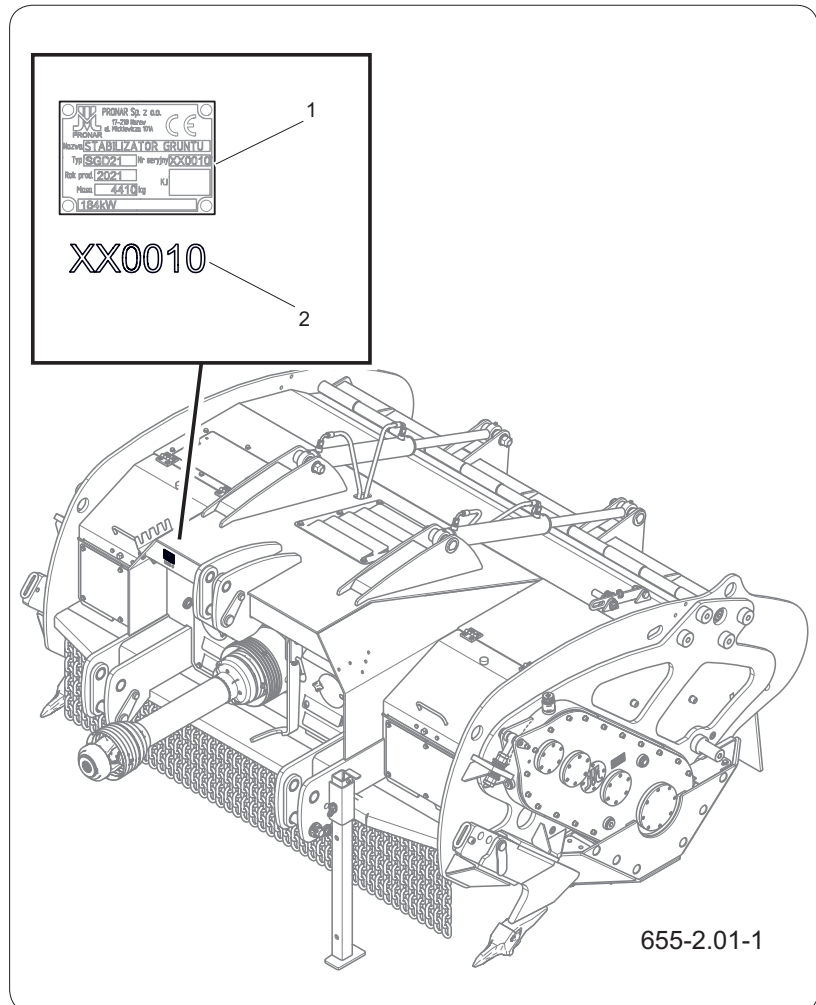
Pronar SGD21

2.1 IDENTIFICATION

2.1.1 Machine identification

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.



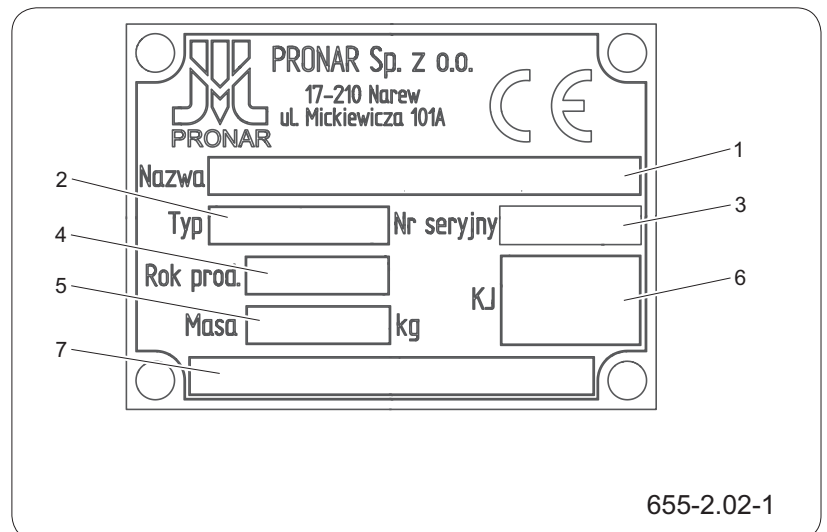
Rysunek 2.1 Machine identification

(1) nameplate

(2) serial number

The machine is marked with a nameplate (1) and a serial number (2) located under the plate on the machine frame.

When buying the machine 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 Manual*.

**Rysunek 2.2** Name plate

- (1) Machine name
- (2) Type/symbol
- (3) Serial number
- (4) Year of manufacture
- (5) Gross weight [kg]
- (6) Quality Control Stamp KJ
- (7) Additional information

INF.2.9-001.01.EN

2.2 INTENDED USE OF THE MACHINE

2.2.1 Intended use



DANGER

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



ATTENTION

The machine is intended for use only in temperate climate zones

PRONAR SGD21 soil stabilizer is intended for preparing the soil before its compaction by mixing previously scattered ingredients that increase the stability and cohesion parameters.

The machine can be used for land reclamation, eg. meadows and wastelands. 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 use of the machine.

The soil stabilizer can be aggregated with an agricultural tractor that meets the requirements listed in the table "*Agricultural tractor requirements*"

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 the *Operator 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 the contents of this publication and with the contents of the agricultural tractor (carrier vehicle) *Operator 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.

2.2.2 Anticipated misuse

The SGD21 soil stabilizer must not be used for purposes other than those for which it is intended, in particular:

- for transporting people and animals,
- transporting any loads,
- processing stones, rubble, stumps, hardened surfaces (asphalt, cobblestones, paving, concrete, and others),
- processing unprepared ground (risk of encountering an invisible obstacle),
- working with open safety guards, covers or without covers,
- working around other people,
- working with an incomplete or damaged working roller.
- working with an unrecommended carrier vehicle and with unrecommended parameters.
- working in climatic zones other than the temperate climate zone.

Do NOT allow anyone without qualifications and required skills or anyone who has not been trained in the safe use, health and safety, to operate the machine.

When operating the machine, do NOT:

- stay in the danger zone,
- climb on the machine when it operates,
- make any arbitrary design modifications,
- allow unauthorized and unqualified person to repair and service the machine

INF.2.9-002.01.EN

2.3 REQUIREMENTS FOR AGRICULTURAL TRACTOR

Tabela 2.1. Requirements for agricultural tractor

Contents	Unit	Requirements
Rear power take-off shaft (PTO)		
Type of shaft	-	type 3 according to ISO 500: 1 3/4" z=20 (standard) 1 3/4" z=6 (optional)
Rotation speed	RPM	1000
Rotation direction	-	clockwise (looking at the shaft front)
Hydraulic system		
The required hydraulic outlets: - version with levelling plate - version with levelling roller	-	sockets 12.5 ISO 7241-1 Type A 1 pair of quick couplers + free drain 2 pairs of quick couplers + free drain
Hydraulic system pressure rating	bar / MPa	210 / 21
Hydraulic oil	-	L-HL-32 ⁽¹⁾
Electrical system		
Electrical system voltage	V	12
Lighting socket	-	7-pole compliant with ISO 1724
Tractor linkage		
Type	-	Rear three-point linkage system cat. 3 according to ISO 730
Other requirements		
Minimum tractor power on PTO	kW / HP	184 / 250 - basic version 265 / 360 - reinforced version
Beacon light	-	orange light

⁽¹⁾ – use of other oil is permitted on condition that it may be mixed with the oil in the machine.

2.3.1 Minimum tractor front axle load



ATTENTION

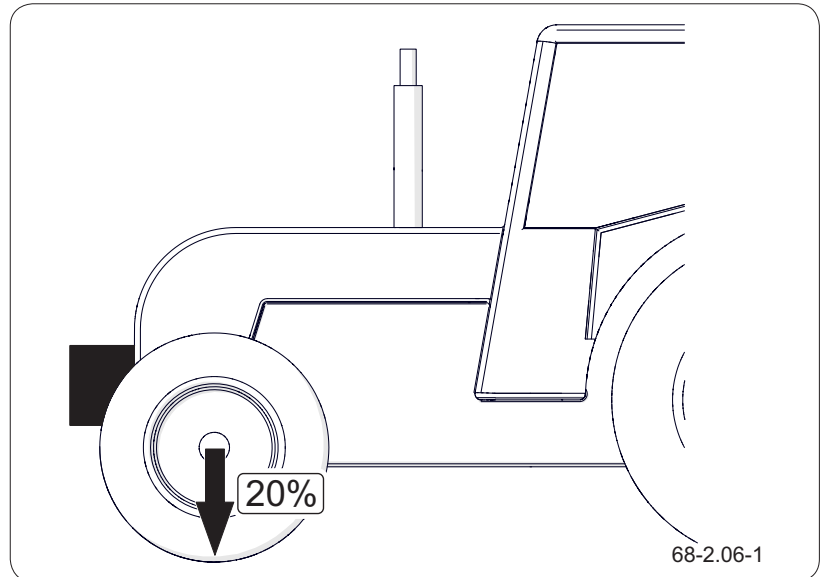
The load on the front axle of the carrier vehicle (tractor) must be at least 20% of its own weight and the load of the coupled machine. If this condition is not met, the front axle must be additionally loaded.



DANGER

Inadequate load on the front axle of the tractor may result in damage, insufficient stability and insufficient steering and braking ability of the tractor.

The tractor's front axle must be always loaded with at least 20% of the tractor's weight and the load of the aggregated machine. See section " *Correct use* "



Rysunek 2.3 Minimum tractor front axle load

INF.2.9-003.01.EN

2.4 MACHINE EQUIPMENT

Tabela 2.2. Equipment

Contents	Standard	Additional	Optional
Operator Manual	•		
Warranty Book	•		
Special tools (wrench and punch)	•		
Levelling plate	•		
Levelling roller (instead of a levelling plate, it presses the processed material, makes it easier to adjust the working depth of the working roller)			•
Drive transmission with gearbox with a power of 184 kW	•		
Drive transmission with gearbox with a power of 265 kW			•
Short slides and side teeth	•		
Long slides, adjustable (instead of short slides and side teeth)			•
Electrical system, rear road lighting (version without levelling roller)		•	
Electrical system, rear road lighting (version with levelling roller)		•	
PTO shaft CS0N071CER10R10AX 1 3/4" z=20 on the tractor and machine side	•		
PTO shaft CS0N071CER09R10AX 1 3/4" z=6 on the tractor side; z=20 from the machine side; Lc min=1002mm			•
Bullets Cat. 3 of lower connectors $\varnothing 37.4 \times \varnothing 64 \times 45$ (2 pcs.)		•	
Ball Cat. 3 of central connector $\varnothing 32 \times \varnothing 60 \times 5$ (1 pc.)		•	
Carbide tooth d=15mm (66 pcs.)	•		
Carbide tooth d=18.9mm (66 pcs.)			•
Carbide tooth d=19mm locked with a ring (66 pcs)			•
Hardfacing tooth with sintered carbide d=15mm (66 pcs.)			•

(1) Some standard equipment components, which are listed in the table, may not be present in the delivered machine. This allows the possibility of ordering new machines with a different set of optional equipment, replacing standard equipment.

2.5 TRANSPORT

The machine is prepared for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation and possibly some elements of equipment. The machine is delivered to the user either transported on a vehicle or independently, after being attached to a carrier vehicle.

2.5.1 Shipping by road



DANGER

When shipped by road on a motor vehicle the machine must be mounted on the vehicle's platform in accordance with the safety requirements and regulations.

Vehicle driver should be especially careful when driving. This is due to the vehicle's centre of gravity shifting upwards when the machine is loaded.

Use only certified and technically reliable securing measures. Carefully read the information contained in the Operator Manuals for the given securing measures.

Incorrect use of securing measures may cause an accident.

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 firmly to the platform of the vehicle using straps or chains fitted with a tightening mechanism. Securing elements

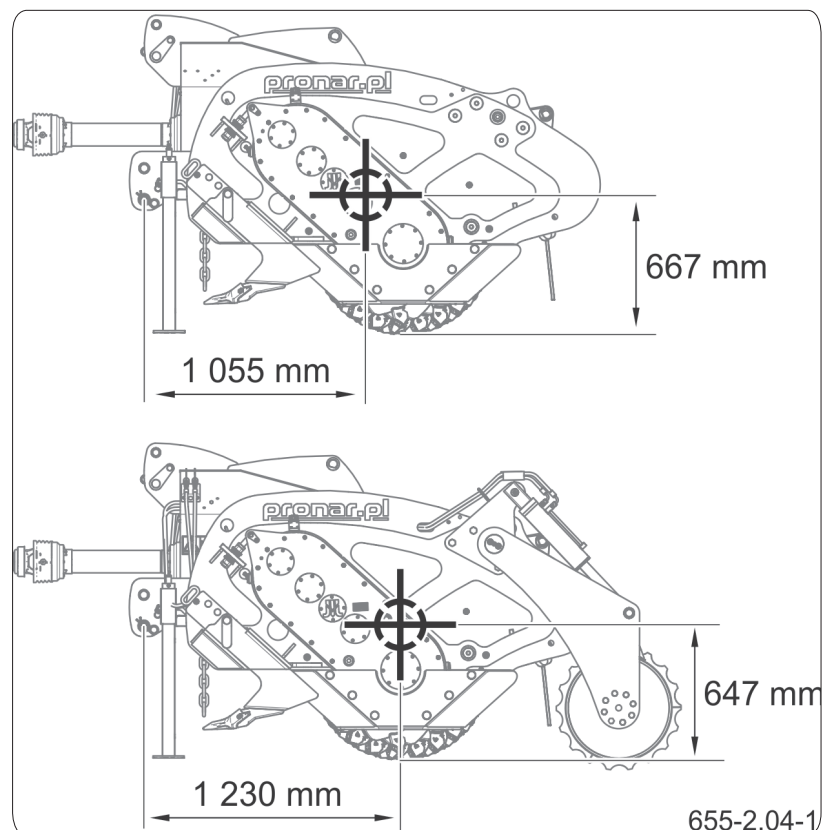


Figure 2.4 Machine's centre of gravity
Depending on the version, centre of gravity varies in the ± 75 mm range.



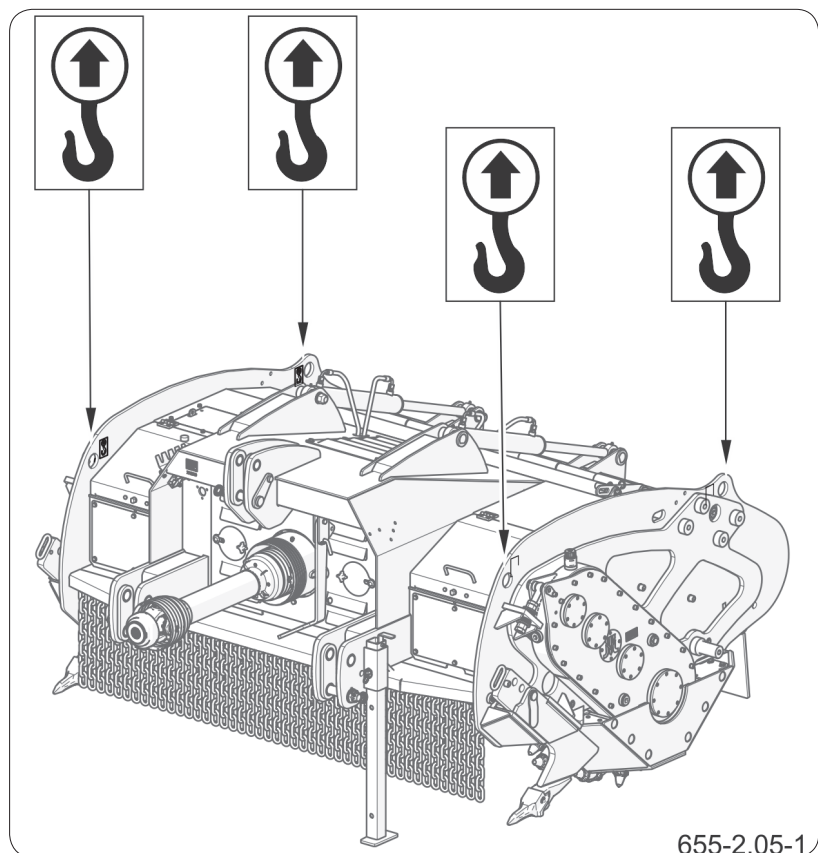
ATTENTION

Do NOT secure lifting slings or any types of securing elements to hydraulic and electrical system components and fragile elements of the machine (e.g. shields, lines)

should be attached to the transport lugs designed for this purpose (Fig. *Attachment points*) marked with stickers.

Use only certified and technically reliable securing measures. Worn straps, cracked securing catches, bent or corroded hooks as well as elements damaged in a different way may be unsuitable for use. Carefully read the information in the Operator Manual for the given securing measure. The number of securing elements (cables, straps, chains, stays etc.) and the force necessary for their tensioning depend on a number of factors, including weight of the machine, carrying vehicle design, ground speed and other conditions. For this reason it is impossible to define the securing plan precisely.

The securing elements must be selected according to the guidelines of the Manufacturer of these elements. In case of doubt apply a greater number of securing



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Rysunek 2.5 Attachment points

straps in order to secure the load. If necessary, cover the sharp edges of the machine in order to protect the securing elements from tearing or breaking during transport.

During reloading work, take special care not to damage any accessories or paint finish.

During transport, the machine should be supported on the parking stand, working roller and levelling roller (if present). It is recommended to use special pallets.

2.5.2 Transport by the user



ATTENTION

When transporting independently, the user must carefully read this Operator Manual and observe all its instructions.

Transport after connecting to a carrier vehicle can be performed if the machine does not cover the rear lights of the tractor. Otherwise, the machine should be equipped with a lighting system (additional equipment).

In the event of transport by the user, read the User Manual and follow its recommendations. During driving adjust ground speed to the prevailing road conditions, but do not exceed the maximum design speed of 25km/h.

Turn off the PTO drive during driving.

INF.2.9-005.01.EN

2.6 TERMS & CONDITIONS OF WARRANTY

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.

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 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:

- working roller teeth,
- teeth sockets
- side teeth,
- slides
- levelling plate,
- bearings,
- chain guard,
- working chamber lining,
- paint coating in places of contact with the excavated material and the three-point linkage.

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,
- incorrect use, adjustment or maintenance, use of the machine for purposes other than those for which it is intended,
- collision of the machine with an invisible obstacle,
- 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.
Do NOT attempt to modify the machine without the written consent of the Manufacturer. 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.

INF.2.9-006.01.EN

2.7 ENVIRONMENTAL RISK



DANGER

Do not store oil waste in containers for food.

Store used oil in hydrocarbon-resistant containers.



ATTENTION

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.

A hydraulic oil leak constitutes a direct threat to the natural environment owing to its limited biodegradability. Maintenance and repair work which involves the risk of an oil leak should be performed in the rooms with oil resistant 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.

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. Detailed information on hydraulic oils can be found in the Material Safety Data Sheets.

INF.3.B-007.02.EN

2.8 WITHDRAWAL



DANGER

Before commencing dismantling, reduce residual pressure in hydraulic systems.



DANGER

During dismantling, use appropriate tools and equipment (overhead cranes, elevators, lifts, etc.) and use personal protective equipment, i.e. protective clothing, footwear, gloves, glasses, etc.

Avoid oil contact with skin. Do not allow oil to leak.

In the event of decision by the user to withdraw the machine from use, comply with the regulations on withdrawal from use and recycling of machines withdrawn from use in force in a given country.

Before proceeding with disassembly, reduce the residual pressure in the hydraulic system, completely remove the oil from the system and the gearbox. In the event of replacement of parts, take the worn or damaged elements to a collection point for recyclable materials. Take used oil as well as rubber or plastic elements to plants dealing with the utilization of this type of waste.

INF.2.9-008.01.EN

Tabela 2.3. Codes of waste generated by dismantling of the machine

Item	Code	Meaning
1	07 02 13	Plastic waste
2	13 01 10	Other hydraulic oils
3	13 02 04*	Mineral engine, gear and lubricating oils containing halogenated organic compounds
4	13 02 06*	Synthetic engine, gear and lubricating oils
5	13 02 08*	Other engine, gear and lubricating oils
6	13 05 02*	Sludges from oil dewatering in separators
7	13 05 08*	A mixture of sand trap waste and oil dewatering in separators
8	15 01 10*	Packaging containing residues of or contaminated by hazardous substances
9	15 02 02*	Sorbents, filter materials and protective clothing contaminated with hazardous substances
10	16 01 03	Worn tires
11	16 01 17	Ferrous metals
12	16 01 22	Other not listed items

SAFETY OF USE

PRONAR SGD21

3.1 BASIC SAFETY RULES



CAUTION

If the information contained in the User's Manual is difficult to understand, contact a seller who runs an authorized technical service on behalf of the manufacturer, or contact the manufacturer directly.

- Before using the machine, please read carefully the content of this publication and the „Warranty Card“. During operation, follow all recommendations.
- The user manual should be available to the operator for all the time. Protect the manual from damage.
- If the information contained in the User's Manual is difficult to understand, contact a seller who runs an authorized technical service on behalf of the manufacturer, or contact the manufacturer directly.
- If you ignore the recommendations contained in these document, you create a threat to the health and life of bystanders and/or the machine operator.
- Use and operate the machine carefully! By a careless work, you create a threat to the health and life of bystanders and/or the machine operator.
- You are obliged to familiarize yourself with the construction, operation principles and safe operation of the machine.
- Familiarize yourself with all machine controls before starting work.
- Do not use the machine without knowing its function.
- There is a residual risk of threats, therefore the basic principle of using the machine should be the application of the principles of safe use and sensible behaviour. Remember that your safety is the most important thing.
- It is forbidden to use the machine by persons who are not authorized to drive carriers, including children, people under the influence of

**CAUTION**

The machine may only be used and operated by persons qualified to drive agricultural tractors (carriers).

alcohol, drugs or other intoxicating substances, etc.

- The machine may not be used for purposes other than those for which it was intended. Everyone who uses the machine in a manner contrary to its intended use, thus takes full responsibility for all consequences arising from its use.
- Use of the machine for purposes other than envisaged by the Manufacturer is inconsistent with the intended use and may void the warranty.
- The machine may only be used when all safety elements (e.g. covers, pins, cotter pins, warning labels) are technically sound and placed in the right place. If the safety elements are damaged or lost, replace them with new ones.

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3.2 SAFETY WHEN HITCHING THE MACHINE



DANGER

Be especially careful when hitching the machine.

- Do not connect the machine to a tractor if it does not meet the requirements set by the Manufacturer (minimum tractor power requirement, inappropriate connections, etc.) - see section "*Agricultural tractor requirements*".
- Before hitching the machine, make certain that oil in the external hydraulic system of tractor may be mixed with the hydraulic oil in the machine's hydraulic system.
- Before hitching the machine check that both machines are in good technical condition.
- Carefully read the tractor Operator Manual.
- Use only genuine pins and safeguards to hitch the machine to the carrier vehicle.
- After completion of hitching the machine, check the safeguards.
- Be especially careful when hitching the machine.
- When hitching, there must be nobody between the machine and the tractor.
- You can only couple and uncouple the machine when the carrier vehicle is stationary.
- Do not disconnect the machine from the carrier vehicle if the levelling roller (option) is raised.
- 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.

BHP.2.9-002.01.EN

3.3 SAFETY DURING TRANSPORT TRAVEL



ATTENTION

If the machine covers the tractor's rear lighting while driving on public roads, it should be equipped with a lighting system (additional equipment)

Before driving on the roads:

1. Make sure that the machine is correctly attached to the carrier vehicle.
2. While driving on public roads the trailer and the tractor must be fitted with a certified or authorised reflective warning triangle.
3. 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 25 km/h). Adjust your speed to the road conditions.
- 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 mounting elements for the coupling system, as well as the connecting elements of the hydraulic and electrical systems.
- When driving the machine on uneven terrain, exercise particular caution and reduce the travel speed as the carrier and the machine may become damaged or overturned.
- Reckless driving and excessive speed may cause accidents.
- Do NOT leave machine raised and unsecured while the carrier vehicle is parked. Lower the machine when parked.

BHP.2.9-004.01.EN

3.4 SAFETY RULES WHEN OPERATING THE HYDRAULIC SYSTEM



DANGER

The hydraulic system of the machine is under high pressure during operation.

- Regularly check the technical condition of connections and hydraulic lines.
- Machine operation with a leaking system is forbidden.
- In the event of failure of the hydraulic system, the machine must be decommissioned until the failure is remedied.
- When connecting the hydraulic conduits to the carrier, make sure that the tractor and machine hydraulic systems are not under pressure. If necessary, reduce the residual pressure of the installation (see chapter "*Hydraulic installation operation*").
- Use hydraulic oil recommended by the manufacturer.
- After changing the hydraulic oil, the used oil must be disposed of. Used oil or oil which has lost its properties should be stored in original containers or replacement packaging resistant to hydrocarbons. Replacement containers must be accurately described and properly stored.
- It is forbidden to store oil in packaging intended for food storage.
- Rubber hydraulic hoses should be replaced every 4 years regardless of their technical condition.

Procedure in the event of an accident

- In the event of injuries being caused by pressurized hydraulic oil, contact a doctor immediately. Hydraulic oil can penetrate the skin and cause infection.
- If the oil gets into the eyes, rinse with plenty of water and if irritation occurs, contact a doctor.
- In the event of contact of oil with skin wash the area of contact with water and soap. Do not use

organic solvents (petrol, kerosene).

BHP.2.9-003.01.EN

3.5 MAINTENANCE AND CLEANING

- During the warranty period, any repairs may only be carried out by a manufacturer-authorized warranty service. It is recommended that any repairs are carried out by specialised workshops.
- When you find any malfunctions or damage to the machine, stop using it until it is repaired.
- Use appropriate, fitted protective clothing, gloves and the right tools when working. Wear oil-resistant gloves and safety goggles when working on the hydraulic system.
- Any modifications to the machine will relieve PRONAR Narew of any responsibility for damage or injury caused.
- Before any work is undertaken on the machine, switch off the engine of the carrier (tractor) and wait for all rotating parts to stop.
- Regularly check the technical condition of the safety devices and the correct tightness of the screw connections.
- Carry out regular maintenance on the machine in accordance with the scope specified by the manufacturer.
- Reduce the residual oil pressure completely before carrying out repair work on the hydraulic system.
- Carry out repair, maintenance and cleaning work with the carrier engine switched off and the ignition key removed from the ignition. Secure the carrier with the parking brake. Secure the tractor cab against unauthorised access.
- If individual components need to be replaced, only use parts recommended by the manufacturer. If you do not comply with these requirements you may endanger the health or life of bystanders or operators, contribute to damage

to the machine. This constitutes grounds for revocation of the guarantee.

- Check the condition of protective elements, their technical condition and correct fastening.
- 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. You may not carry out any work underneath the machine, raised only by means of a lift (without supports).
- Do not support the machine with brittle elements (bricks, hollow blocks, concrete blocks).
- After completing work associated with lubrication, remove excess grease or oil. Keep the machine clean.
- You may not carry out repairs to plumbing components yourself. If these components are damaged, have them repaired by an authorised repairer.
- To reduce the risk of fire, keep the machine clean.
- Clean the machine as required.
- Before using the pressure washer, familiarise yourself with the principle of operation and the recommendations for safe operation of this equipment.
- Use only clean running water for cleaning. It is possible to use pH-neutral cleaning detergents that do not have an aggressive effect on the structural components of the machine.
- The use of pressure washers increases the effectiveness of cleaning, but be careful when working. When cleaning, do not approach the nozzle of the cleaning unit at a distance of less than 50 cm from the surface to be cleaned.
- The water temperature should not exceed 55 °C.



DANGER

Refer to the instructions for using cleaning detergents and preservatives.

When washing with detergents, wear suitable protective clothing and eye protection.



CAUTION

Strong water jet pressure can cause mechanical damage or corrosion to the machine.

- Do not point the water jet directly at system components and equipment, i.e. control valves, bearings, electrical and hydraulic plugs, lights, electrical connections, information and warning labels, rating plate, cable connections, lubrication points, etc. High water jet pressure can cause water penetration and consequent mechanical damage or corrosion.
- Do not use organic solvents, preparations of unknown origin or other substances which may cause damage to painted, rubber or plastic surfaces. It is recommended to make a test on an invisible surface in case of doubt.
- Surfaces oily or greasy by grease should be cleaned with petrol or degreasing agents, and then washed with clean water and detergent. Follow the cleaning agent manufacturer's instructions.
- Store detergents for washing in their original containers, or alternatively in substitute containers, but very carefully labelled. Detergents must not be stored in food or drink storage containers or unlabelled containers.
- Observe the rules of environmental protection, wash the machine in designated areas.
- Washing and drying of the axle must take place at an ambient temperature above 0°C.
- Every time you wash the machine, carry out lubrication.
- Perform maintenance and repair activities applying the general principles of health and safety at work.

Accident management

- In case of injury, wash and disinfect the wound immediately.
- In case of serious injuries consult a physician.

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3.6 SAFETY DURING MACHINE OPERATION



DANGER

The machine can throw objects at considerable distances during operation. Stop the machine when bystanders are in the affected work zone.

- Before starting the machine 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.
- Each time the machine is used, 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.
- Select appropriate settings and parameters when operating the machine.
- Before raising and lowering the leveling roller (option), make sure that 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 cab. Do NOT leave the cab, when the machine is in operation.
- DO NOT enter the work area of the machine elements.
- There must be no bystanders within the machine discharge zone.
- No one is allowed between the carrier vehicle and the machine during operation.
- Do not approach the machine until the rotating parts come to a complete standstill.

BHP.2.9-006.01.EN

3.7 SAFE OPERATION OF THE PTO SHAFT



CAUTION

Before starting work, read the operator's manual of the shaft provided by the shaft manufacturer.

- Before starting work, read the operator's manual of the PTO provided by the shaft's manufacturer and follow the recommendations contained therein.
- If necessary, adjust the length of the shaft to the cooperating tractor in accordance with the shaft's instruction manual.
- The machine may only be connected to the tractor with the use of a properly selected articulated telescopic shaft recommended by the Manufacturer.
- The drive shaft must be equipped with guards. It is forbidden to use the shaft with damaged or missing safety elements.
- Some parts of the PTO shaft (especially the clutch) can become very hot. Do not touch hot parts.
- After installing the shaft, make sure that it is correctly and securely connected to the tractor and the machine.
- Do not wear loose clothing, loose belts or anything that could get caught in a rotating shaft. Contact with the rotating articulated telescopic shaft may cause serious injuries.
- Before disconnecting the shaft, turn off the tractor engine and remove the key from the ignition switch. Secure the tractor with the parking brake.
- When working in conditions of limited visibility, use the tractor's working lights to illuminate the articulated telescopic shaft and its surroundings.
- During transport, the shaft should be stored in a horizontal position so as to avoid damaging the guards and other securing elements.
- During the use of the shaft and the machine,

**DANGER**

Before disconnecting of the shaft, you should:

- turn off the PTO drive,
- turn off the engine of the carrying vehicle (tractor)
- remove the ignition key.

do not use a different speed of PTO than the permissible one. Do not overload the shaft and the machine, do not engage the clutch suddenly. Before starting the articulated telescopic shaft, make sure that the PTO rotation direction is correct.

- Do not go over or under the shaft and do not stand on it, both during operation and when the machine is stopped.
- The articulated telescopic shaft has markings on the casing, indicating which end of the shaft should be connected to the tractor.
- Never use a damaged PTO shaft, it may cause an accident. Repair the damaged shaft or replace it with a new one.
- Do not use PTO shaft extensions / adapters.
- Disconnect the drive of the shaft each time when there is no need to drive the machine, or when the tractor and the machine are in an unfavourable angular position to each other.
- Prevent the shaft cover securing chain from turning while the shaft is working, and attach it to a fixed structural element of the machine.
- Do not use protective chains to support the shaft during a stop or transport of the machine, use a bracket on the machine's frame.

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3.8 DESCRIPTION OF RESIDUAL RISK

Pronar Sp. z o. o. in Narew has made every effort to eliminate the risk of an accident. However, there is some residual risk that can lead to an accident and is primarily associated with the following activities:

- using the machine contrary to its intended use,
- staying between the carrier (tractor) and the machine while the engine is running and when connecting the machine
- being on the machine during engine work,
- work with the machine with removed or inoperative guards,
- not keeping a safe distance from dangerous zones or standing in these zones while the machine is operating,
- machine operation by unauthorized persons under the influence of alcohol or drugs,
- cleaning, maintenance and technical inspection with the carrying vehicle (tractor) connected and running,
- introducing design changes without the consent of the Manufacturer,
- presence of persons, animals or obstacles in areas invisible from the operator's position,

Residual risk can be reduced to a minimum by following these recommendations:

- prudent and unhurried operation of the machine,
- sensible application of the remarks and recommendations contained in the operating instructions,
- performing maintenance and repair work in accordance with the principles of operating safety,
- maintenance work carried out by trained personnel,
- using appropriate fitted protective clothing,
- securing the machine against access by




- unauthorized persons, especially children,
- keeping a safe distance from prohibited and dangerous places,
 - a ban on being on the machine while it is working or during transport.

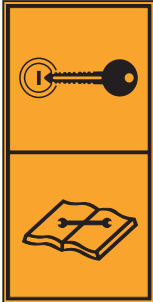






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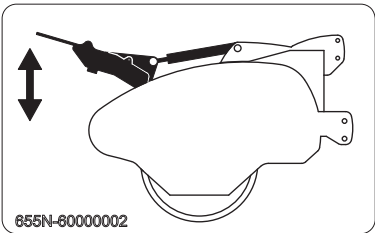
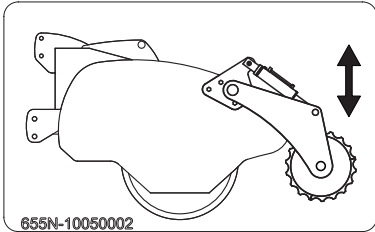


3.9 INFORMATION AND WARNING DECALS

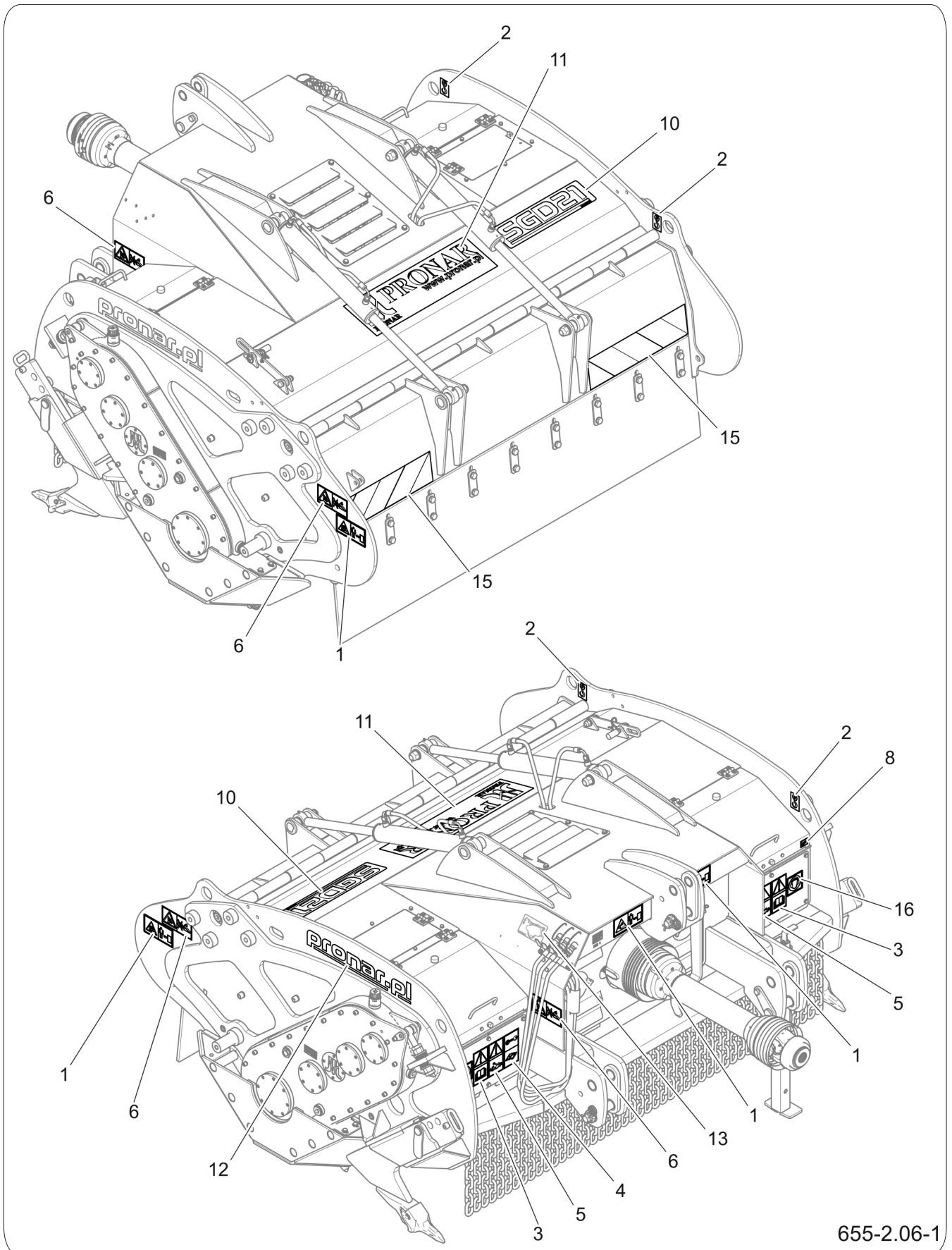
The machine is labelled with the information and warning decals mentioned in table 3.1. Throughout the machine use, you must ensure that any warning messages and information decals located on the machine are clear and legible. If any are destroyed or damaged, they must be replaced with new. New assemblies, 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.

Table 3.1. Information and warning decals

Item	Decal	Meaning
1		Thrown out objects endanger the whole body. Keep a safe distance. 12N-15000008
2		Transport belts or chains fastening points 35N-27000009
3		Before starting work, carefully read the Operator Manual. 70N-00000004

Item	Decal	Meaning
4		<p>Before maintenance or repairs, turn off the tractor unit's engine and remove keys from ignition.</p> <p>70N-00000005</p>
5		<p>Pulling the whole body - Drive train</p> <p>78N-00000005</p>
6		<p>Do not reach into crushing space if elements may move. Danger of crushing hands or fingers.</p> <p>35N-27000008</p>
7		<p>Pressurised liquid jet. Keep a safe distance.</p> <p>12N-15000009</p>
8		<p>Grease the machine according to the lubrication schedule in the Operator Manual.</p> <p>185N-00000011</p>
9		<p>Direction and PTO RPM</p> <p>153N-00000009</p>
10		<p>Machine model</p> <p>655N-96000001</p>

Item	Decal	Meaning
11		Manufacturer's marking 187N-00000033
12		Manufacturer's marking 566N-97000003 05
13		Marking of hydraulic lines controlling the working roller cover 655N-60000002
14		Marking of hydraulic lines controlling the levelling roller (option) 655N-10050002
15		Rear clearance marking 344N-97000001L 344N-97000001P
16		Hearing protection recommended 130N-36000011



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Figure 3.1 Locations of information and warning decals

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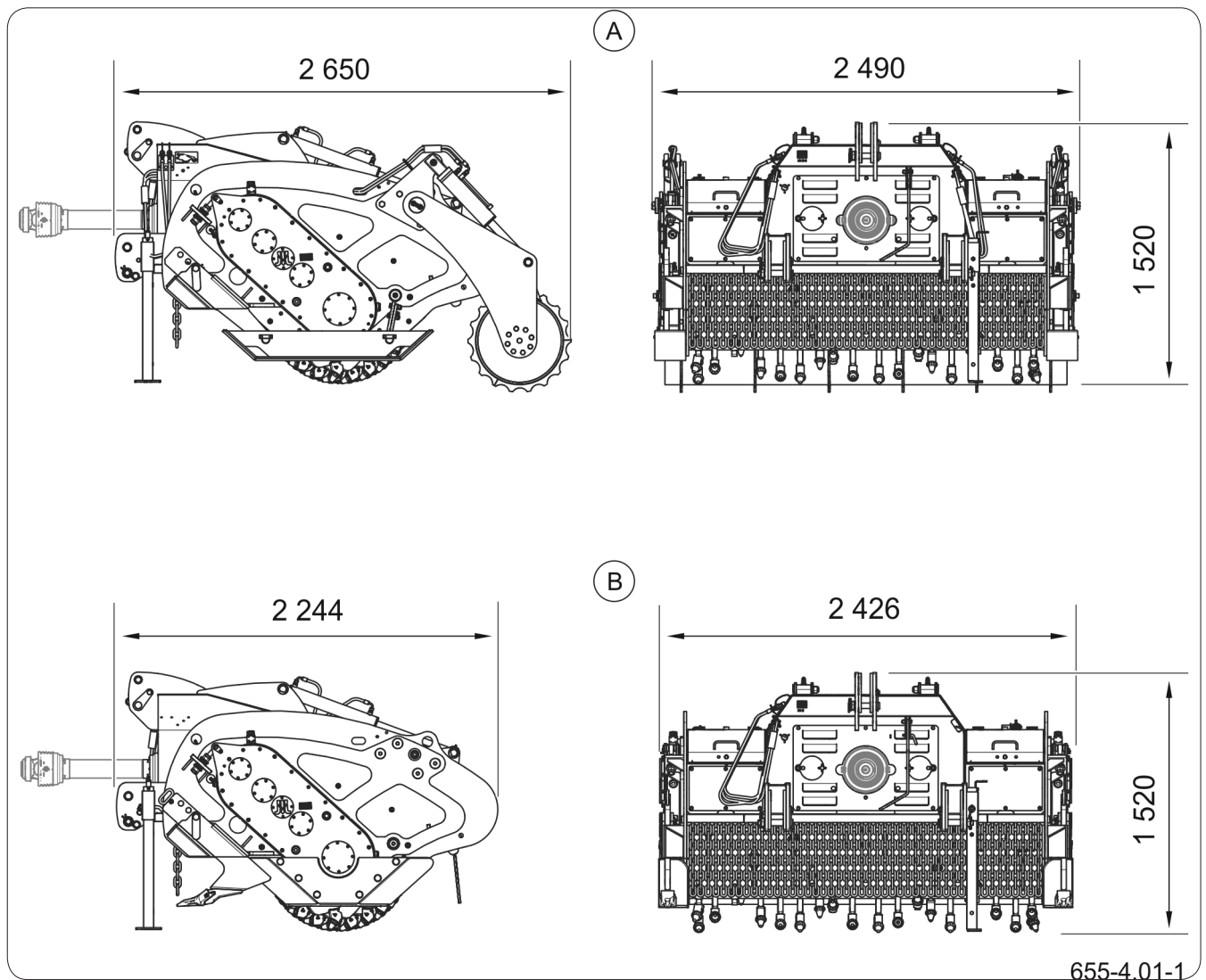
CHAPTER 4.

CONSTRUCTION AND PRINCIPLE OF OPERATION

PRONAR SGD21

4.4 TECHNICAL SPECIFICATION

Contents	Unit	SGD21
Technical specification		
Working width	mm	2 100
Maximum working depth	mm	400
Speed of the working roller	rpm	286
Method of attachment to carrier vehicle	-	Rear three-point linkage system cat. 3 according to ISO 730
Power demand: - basic version - reinforced version	kW / HP kW / HP	184 / 250 265 / 360
Power take-off shaft	-	type 3 according to ISO 500; n=1000 RPM
Working speed	km/h	0.1 - 2 (depending on working conditions)
Transport speed	km/h	25 (maximum)
Dimensions		
Width: - with levelling plate - with levelling roller	mm mm	2 426 2 490
Length: - with levelling plate - with levelling roller	mm mm	2 244 2 650
Height	mm	1 520
Weights		
Machine weight with levelling plate: - basic version - reinforced version	kg kg	4 410 4 450
Machine weight with levelling roller: - basic version - reinforced version	kg kg	5 010 5 050
Other information		
Hydraulic system pressure rating hydraulic system	MPa (bar)	21 (210)
Maintenance	-	single person operation
Noise emission level	dB	-



Rysunek 4.1 Basic dimensions

(A) version with levelling roller (B) version with levelling plate

Dimensions on the drawing are given in millimetres [mm].

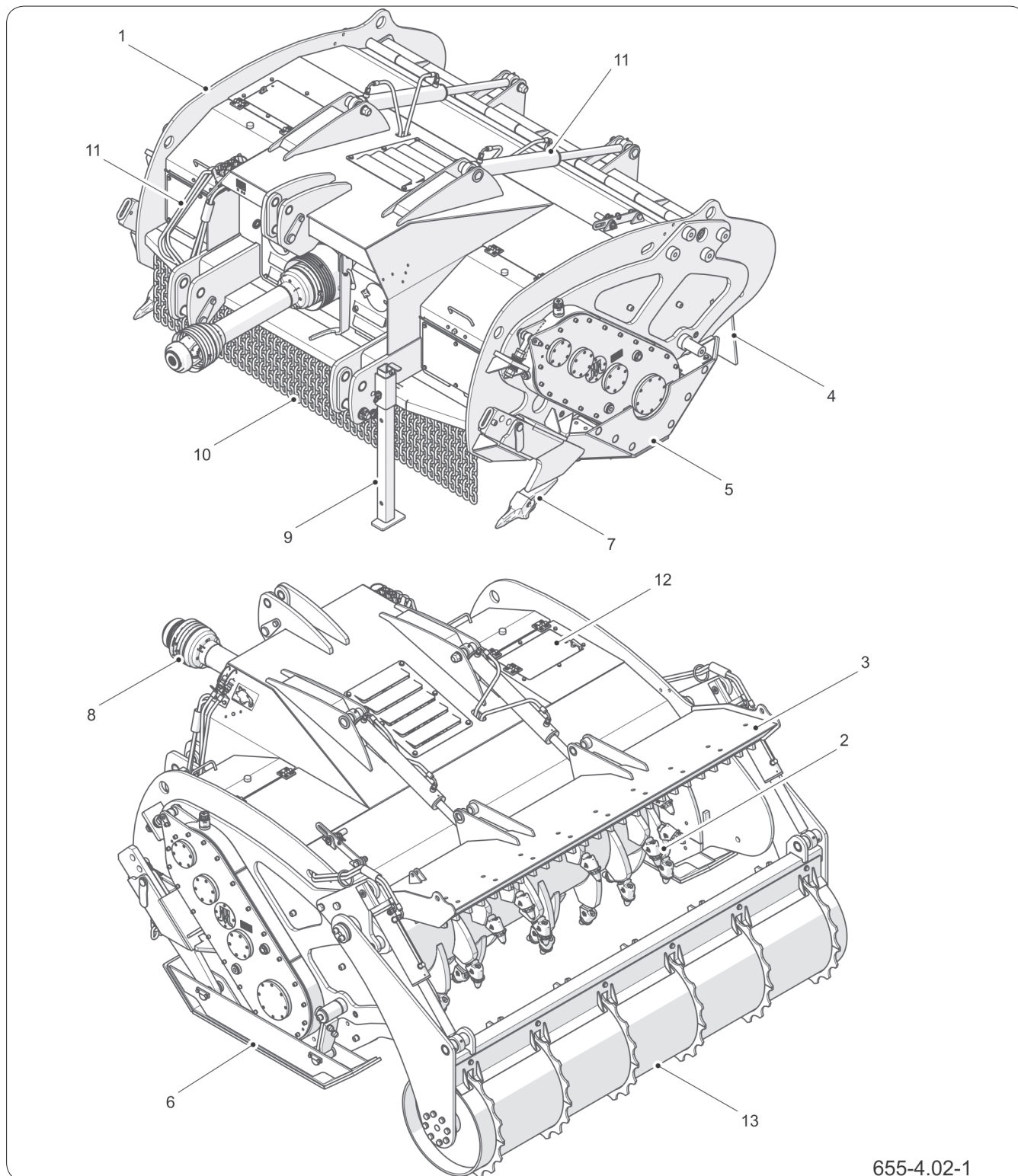


ATTENTION

Some technical parameters may vary depending on additional equipment of the machine.

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4.5 GENERAL DESIGN



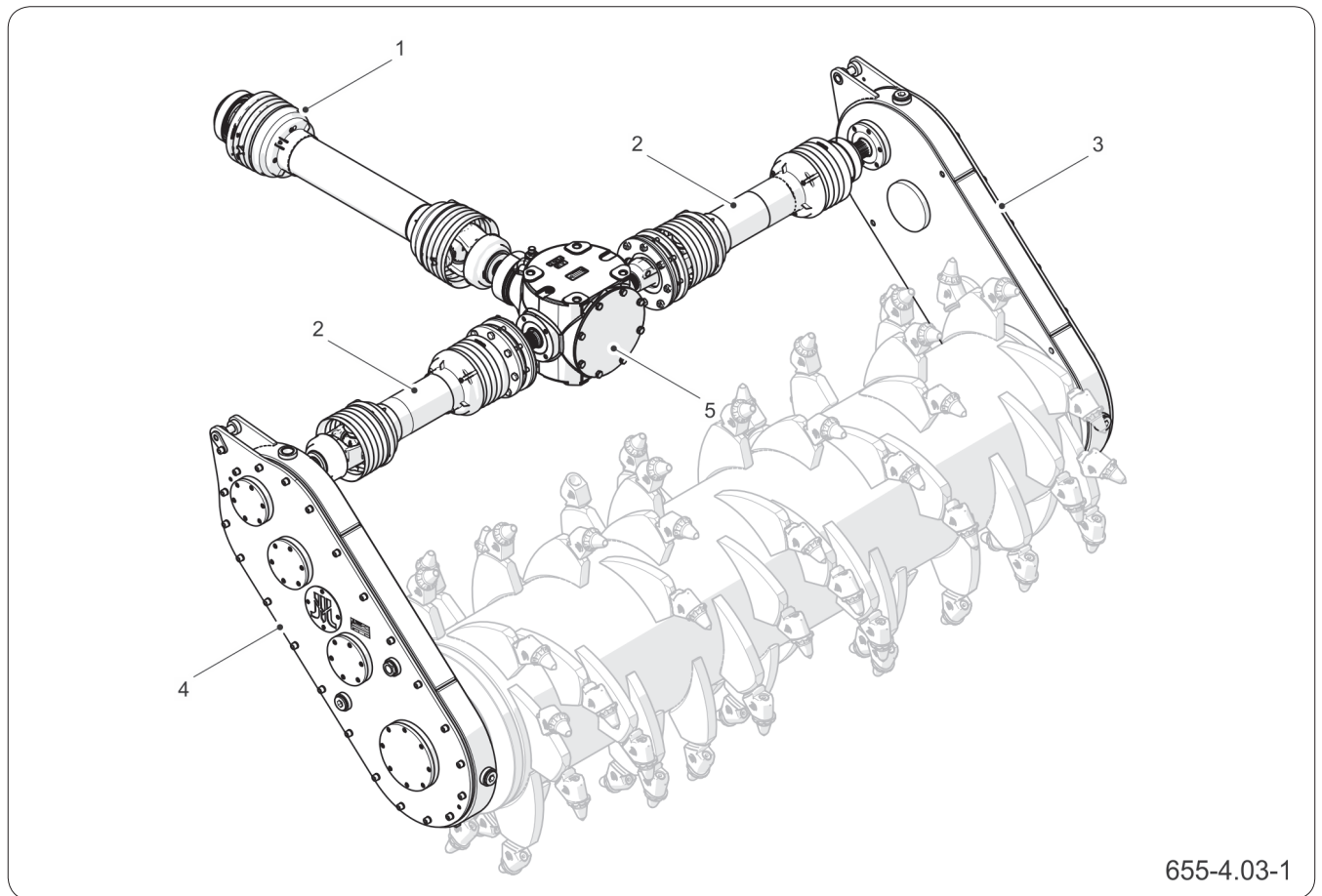
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Rysunek 4.2 Machine design

- | | | |
|-------------------------------|------------------------|-------------------------|
| (1) frame | (2) working roller | (3) screen |
| (4) levelling plate | (5) slide | (6) long slide (option) |
| (7) lateral prong | (8) drive transmission | (9) parking stand |
| (10) chain guard | (11) hydraulic system | (12) locker |
| (13) leveling roller (option) | | |

BIZ.2.9-002.01.EN

4.6 DRIVE TRANSMISSION.



Rysunek 4.3 Design of drive transmission system

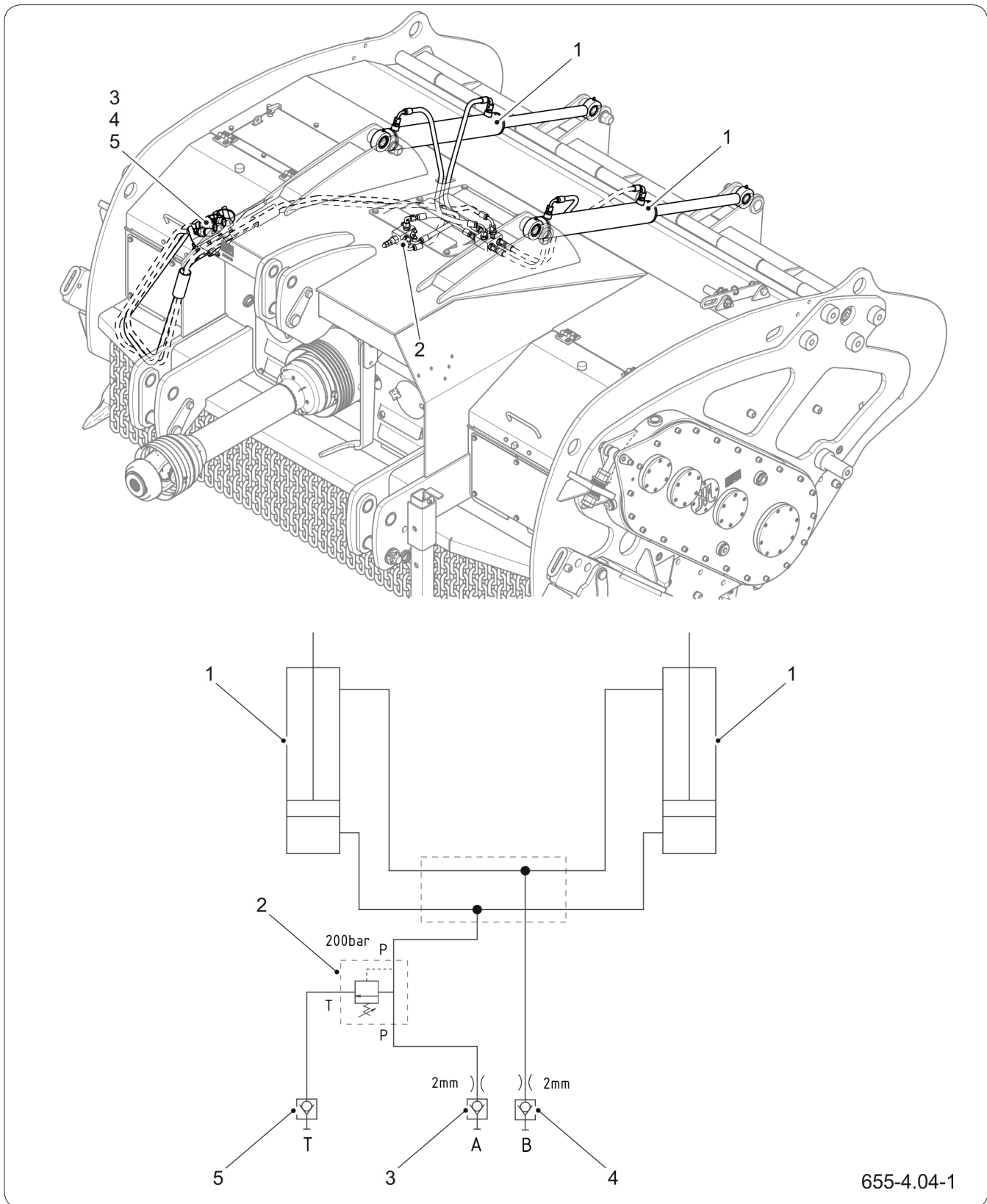
(1) PTO shaft
gearing shaft
clutch

(2) PTO shaft with overload clutch
(4) left side gearing shaft

(3) right side
(5) central bevel gear with one-way
clutch

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4.7 HYDRAULIC SYSTEM



Rysunek 4.4 Hydraulic system design

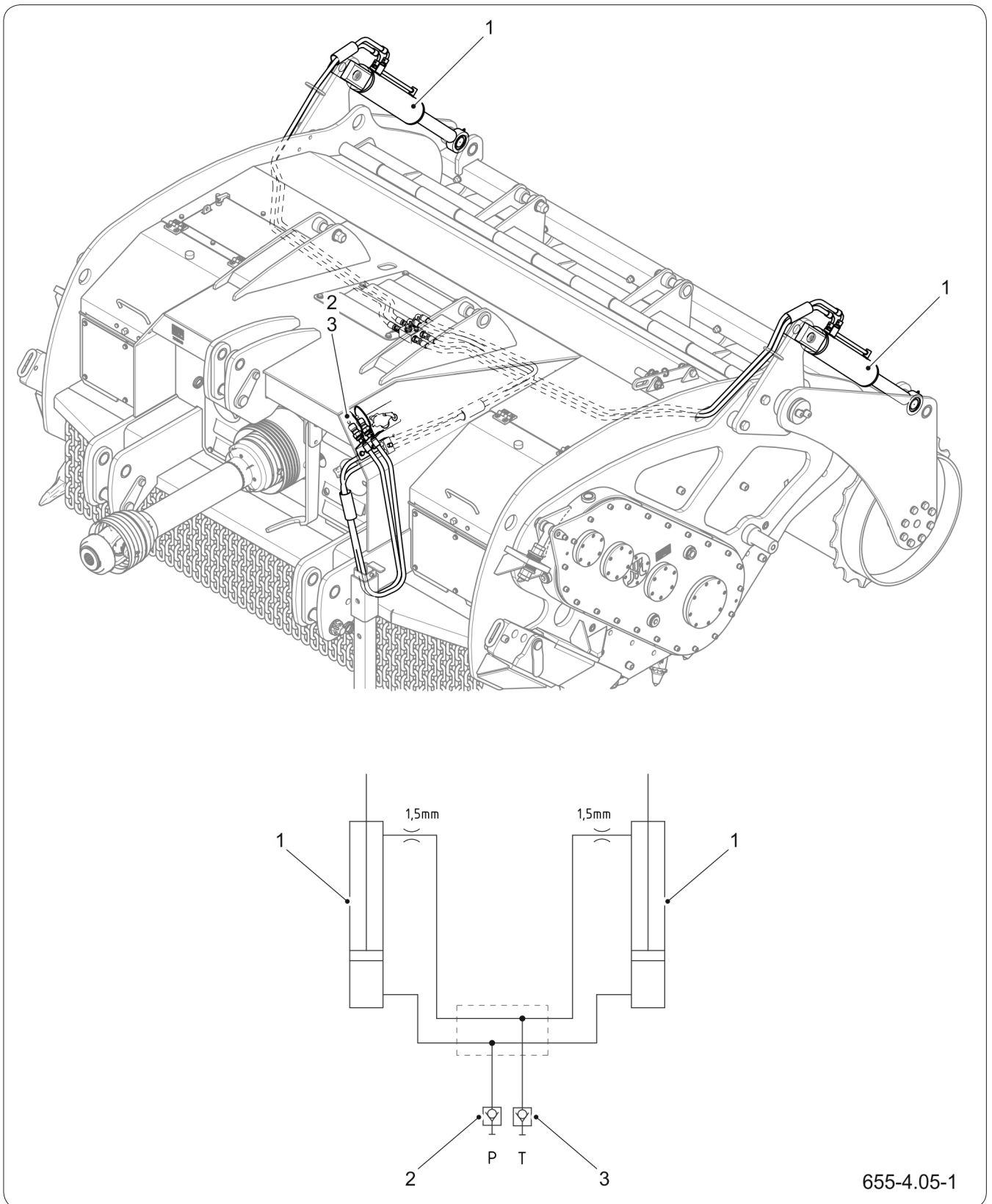
(1) actuator

(2) overflow valve

(3) "power supply" quick coupler

(4) "return" quick coupler

(5) "free drain" quick coupler



Rysunek 4.5 Construction of the hydraulic system for the leveling roller (option)

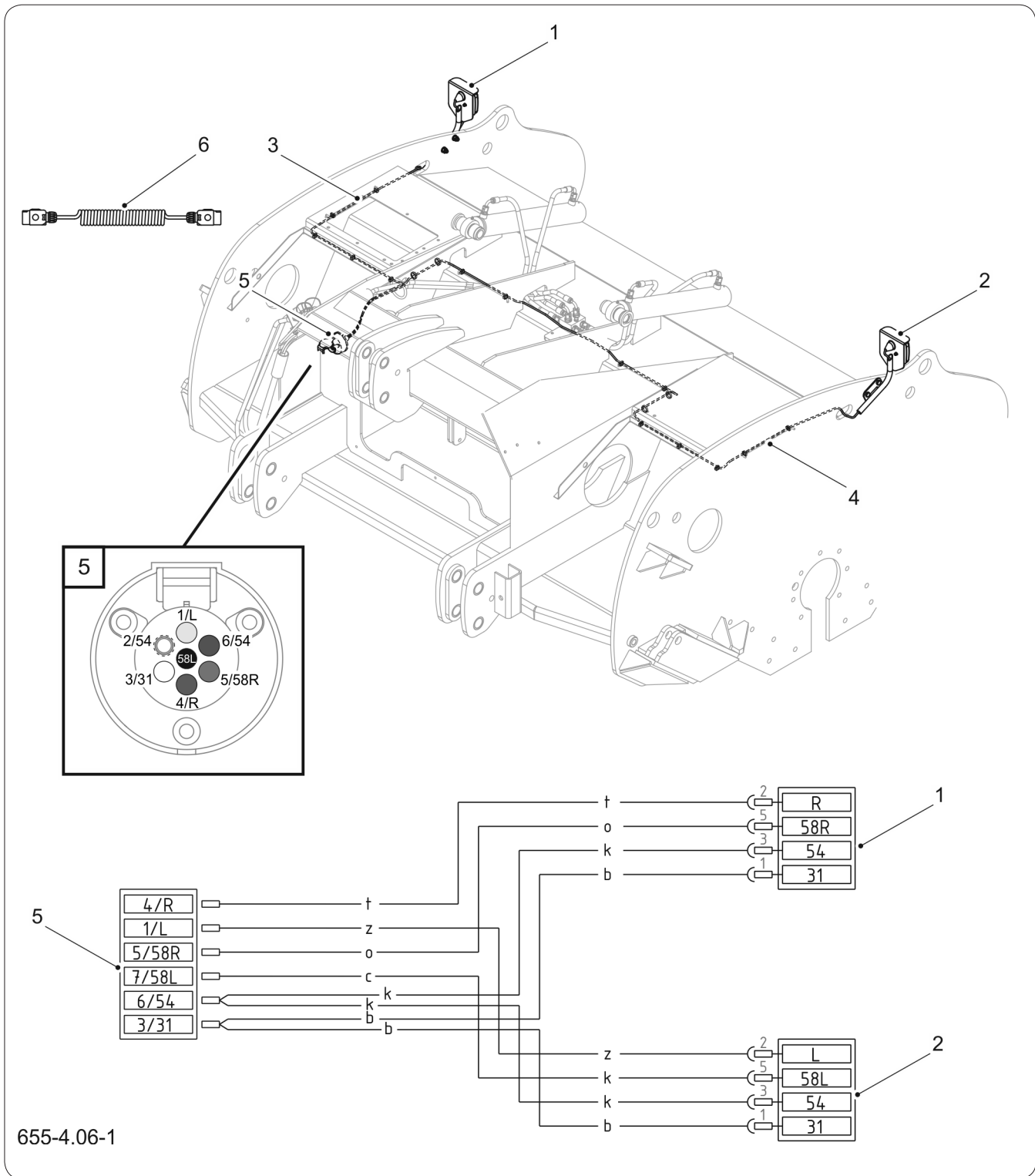
(1) actuator

(2) "power supply" quick coupler

(3) "return" quick coupler

655-4.05-1

4.8 ELECTRICAL SYSTEM



Rysunek 4.6 Electrical system design

(1) right lamp assembly
harness

(2) left lamp assembly
harness

(3) right harness

(4) left

(5) 7-pin socket
(6) connection wire 7pin (12V)

Tabela 4.1. Marking of connection socket's connections

Marking	Function
3/31	Weight
2/54	unused
1/L	Left indicator
6/54	STOP light
7/58L	Rear left parking light
5/58R	Rear right parking light
4/R	Right indicator

Tabela 4.2. Lead colour marking

Marking	Colour
b	White
c	Black
f	Violet
k	Red
l	Lazurite
n	Blue
o	Brown
p	Orange
r	Pink
s	Grey
t	Green
z	Yellow

BIZ.2.9-005.01.EN

CHAPTER 5.
RULES OF USE

PRONAR SGD21

5.1 GET READY FOR OPERATION



DANGER

Before using the machine, the user must carefully read this Operator Manual

Careless and incorrect use and operation of the machine, and failure to follow instructions in this Operator Manual is dangerous to your life and health.



DANGER

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

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



ATTENTION

Before using the machine always check its technical condition. In particular, check the technical condition of the linkage system, drive system, completeness of protective covers and lighting.



ATTENTION

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:

- the user must carefully read this Operator 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.
- 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 of the brush (wear, damage, foreign bodies)
- check technical condition of protective shields and pins and check if they are correctly installed,

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:

- hitch the machine to carrier vehicle (see Section "HITCHING TO CARRIER VEHICLE"),

**DANGER**

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

**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.

- after connecting hydraulic system lines and electrical system wiring, check the correct operation of systems and inspect the hydraulic system for 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.

OBS.2.6-001.01.EN

5.2 ARTICULATED TELESCOPIC BOOM LIFT ADJUSTMENT



DANGER

Stop the tractor engine, remove the ignition key and brake the tractor with the parking brake before adjusting the shaft. Secure the tractor against unauthorized access.



CAUTION

When adjusting articulated telescopic boom lift first follow and use the instructions contained in the articulated telescopic boom lift manual.



CAUTION

Check and adjust the length of the articulated telescopic boom lift every time you change the tractor, as recommended by the articulated telescopic boom lift manufacturer. Failure to do so may result in damage to the tractor shaft, machine or PTO.



CAUTION

If the articulated telescopic boom lift is equipped with an overrunning clutch, make sure that the overrunning clutch is installed on the machine side when installing the articulated telescopic boom lift.

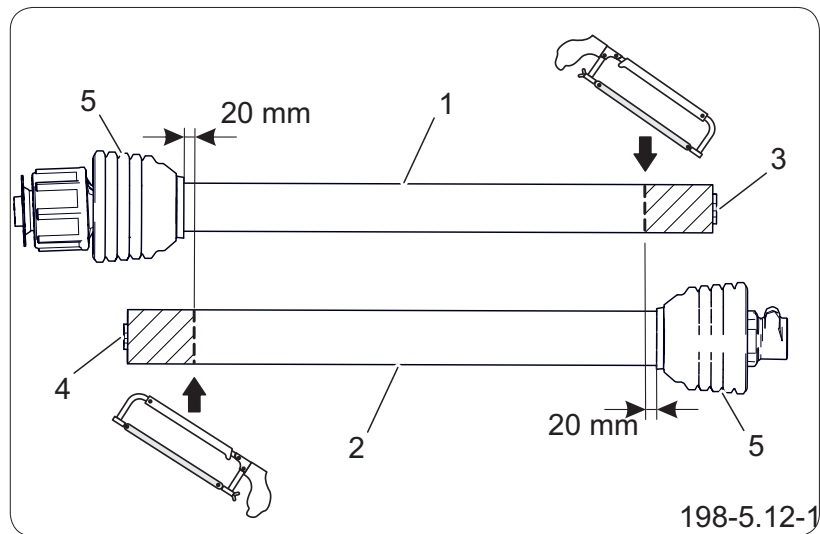


Figure 5.1 The principle of adjusting the articulated telescopic boom lift with the shortest working setting.

- | | |
|--------------------------------|------------------------------|
| (1) inner shield tube | (2) outer shield tube |
| (3) outer shaft profile tube | (4) inner shaft profile tube |
| (5) cross joint tapered guards | |

Adjust the length of the articulated telescopic boom lift before the first start-up.

For this purpose:

1. Attach the machine to the tractor suspension system
2. Position the machine so that the distance between the tractor's Power take-Off (PTO) terminals and the machine is the smallest.
3. Slide the articulated telescopic boom lift shield into two parts (1) and (2).
4. Install one part of the shaft on the tractor PTO end.
5. Install the second part of the shaft onto the PTO end of the machine.

The shaft assembly procedure is specified in detail in the shaft manufacturer's operating instructions.

6. Position the two parts of the shaft guard (1) and (2) parallel to each other.

ADVICE

Use a hand-held metal saw to shorten shaft guards and profile pipes.

7. Mark the location where the guard tubes should be shortened with a minimum clearance. 20 mm from the tapered roller guards (5) of the shaft cross joints.
8. Shorten the guard tubes (1) and (2) at the selection point.
9. Shorten the profile tubes (3) and (4) by the same length as the guard tubes (1) and (2).
10. Sharp edges of profile pipes (3) and (4) gently walk with a file and remove any metal swarf.
11. Coat the outer surface of the inner profile tube (4) with grease.
12. Slide the profile tubes (3) (4) and guard tubes (1) (2) off the shaft.
13. Make sure that the profile tubes (3) and (4) overlap with the greatest distance between the tractor and machine PTO ends is sufficient.

Refer to the shaft manufacturer's manual for details on shaft alignment and inspection.

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5.3 CARRIER LOADING

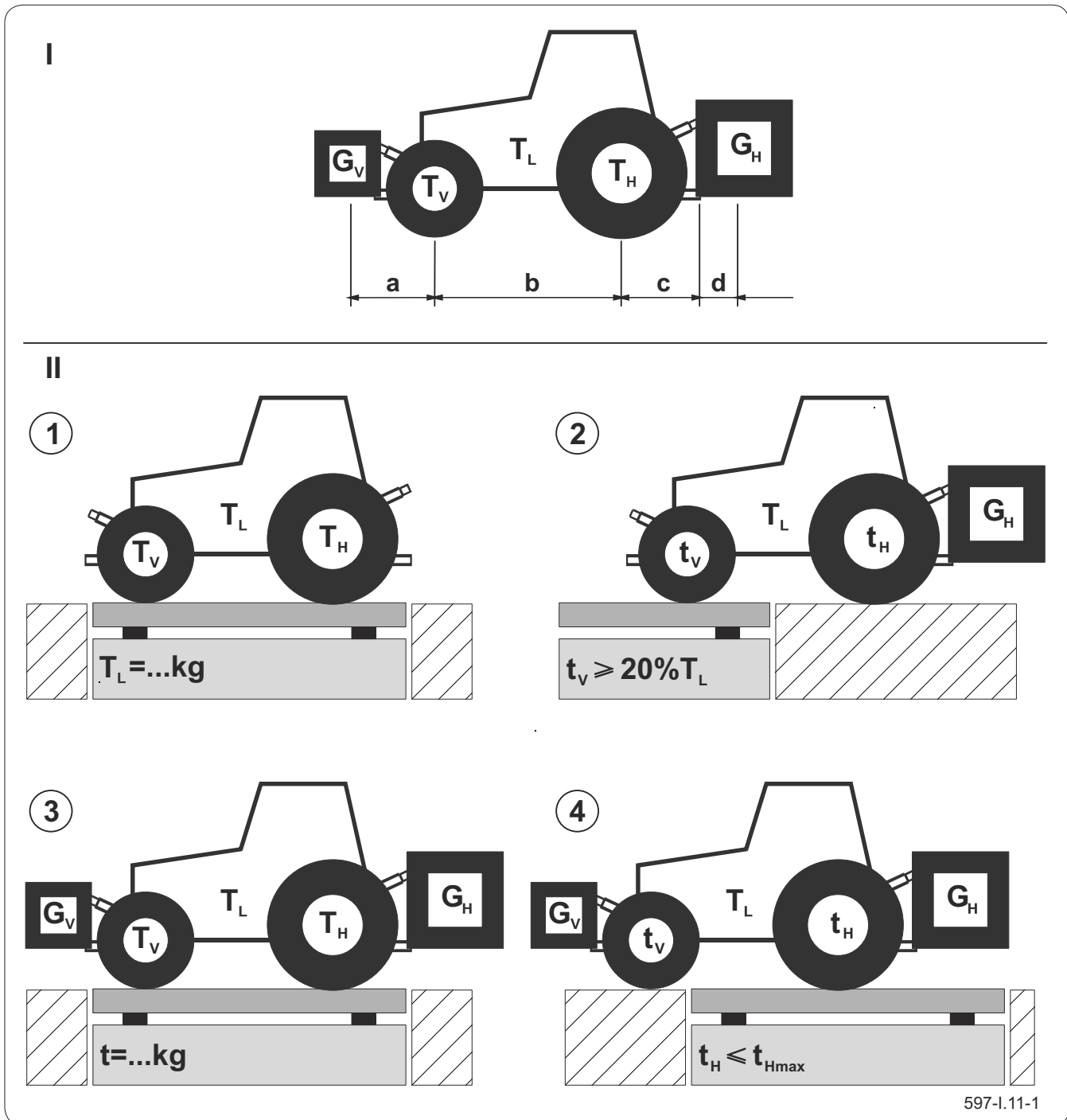


Figure 5.2 Loading of the tractor



CAUTION

The load on the front axle of the tractor must be at least 20% of its own weight and the load of the aggregated machine.

Before attaching the machine to the tractor, check the suitability of your tractor for this purpose. Suspension of tools in the three-point linkage at the front or rear must not exceed the permissible total weight, permissible axle load and load capacity of tractor tires. The

**CAUTION**

Incorrect use of the tractor may cause breakage, insufficient stability and the ability to steer and brake the tractor.

front axle of the tractor must always be loaded with at least 20% of the tractor's own weight and the load of the aggregated machine.

To ensure that these conditions are met, perform the following calculations:

CALCULATION OF MINIMUM FRONT BALLAST G_{Vmin}

$$G_{Vmin} = \frac{G_H \cdot (c+d) - T_V \cdot b + 0,2 \cdot T_L \cdot b}{a + b}$$

Table 5.1. Carrier loading

Symbol / dimensions	Unit	Description
T_L	kg	Carb weight of the tractor
T_V	kg	The load on the front axle of the tractor without the machine
T_H	kg	The load on the rear axle of the tractor without the implement
t	kg	Axle load of the tractor with the machine
t_V	kg	The load on the front axle of the tractor with the machine
t_H	kg	The load on the rear axle of the tractor with the machine
G_H	kg	Total weight of the rear-attached machine or rear weight
G_V	kg	The total weight of the front-attached machine or front weight
a / and	m	Distance between the centre of gravity of the front-mounted machine/front load and the centre of the front axle
b	m	Tractor wheelbase
c	m	Distance from the centre of the rear axle to the centre of the tractor lower links
d	m	Distance from the centre of the tractor's lower links to the centre of gravity of the rear-attached machine or rear weight

CALCULATION OF MINIMUM REAR BALLAST G_{Hmin}

$$G_{Hmin} = \frac{G_V \cdot a - T_H \cdot b + 0,45 \cdot T_L \cdot b}{b + c + d}$$

The calculation of the required minimum front and rear ballast assumes that all parameters are known. If the parameters are not known and cannot be determined, measurements should be made using a scale.

MEASUREMENT OF PERMISSIBLE AXLE LOADS USING A SCALE

Measure the curb weight of the tractor (T_L).

Hitch the machine to the tractor and measure the front axle load (t_V). If the load is less than 20% of the weight of the tractor alone (T_L), add weights to bring the load above the minimum value ($t_V \geq 20\% T_L$).

Measure the total weight (t) of the tractor with the machine and weights. Check the tractor manual to see if the measured value is less than the Average Gross Weight.

Measure the load on the rear axle (t_H) and check in the tractor manual whether the measured value is lower than the permissible maximum value of the load on the rear axle of the tractor (t_{Hmax}).

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5.4 CONNECTING THE MACHINE TO THE CARRIER VEHICLE



DANGER

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

Ensure sufficient visibility during hitching.

After completed hitching of the machine, check the safeguards.



DANGER

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



ATTENTION

When connecting the machine to the carrier vehicle, select the position of the lower link holes so that when operating the machine, the PTO shaft is as close to the horizontal as possible. Exceeding the permissible operating angles of the roller causes its damage.



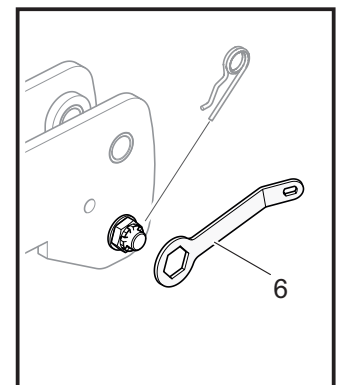
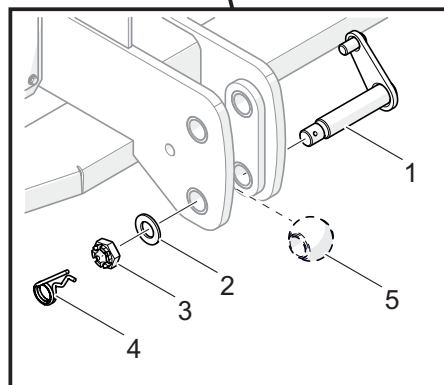
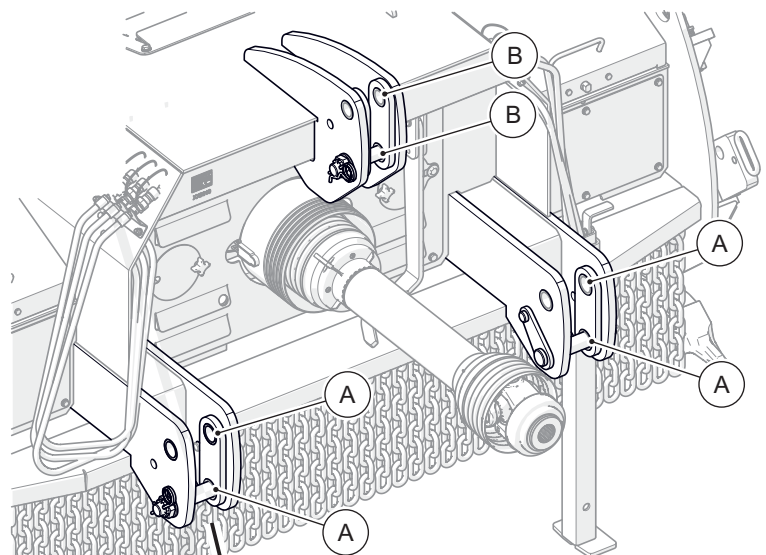
ATTENTION

After connecting the machine, lock the tractor's three-point linkage lower links to prevent side movements of the machine.

The machine may be hitched to an agricultural tractor if all connections (electrical, hydraulic) and the linkage system in the tractor comply with the requirements of the machine manufacturer given in the table "*Requirements of agricultural tractor*"

Connecting the machine to the tractor linkage system:

- Place the tractor with its back facing straight in front of the machine's linkage system.
- When reversing the tractor, bring the tractor's three-point linkage lower links closer to the



655-5.01-1

Figure 5.3 Connecting the machine to the carrier vehicle
 (A) lower link attachment points (B) central link attachment points
 (1) pin (2) washer (3) nut (4) cotter pin (5) ball (accessory) (6) key



DANGER

Before connecting the PTO shaft it is necessary to carefully read the Operator 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.



ATTENTION

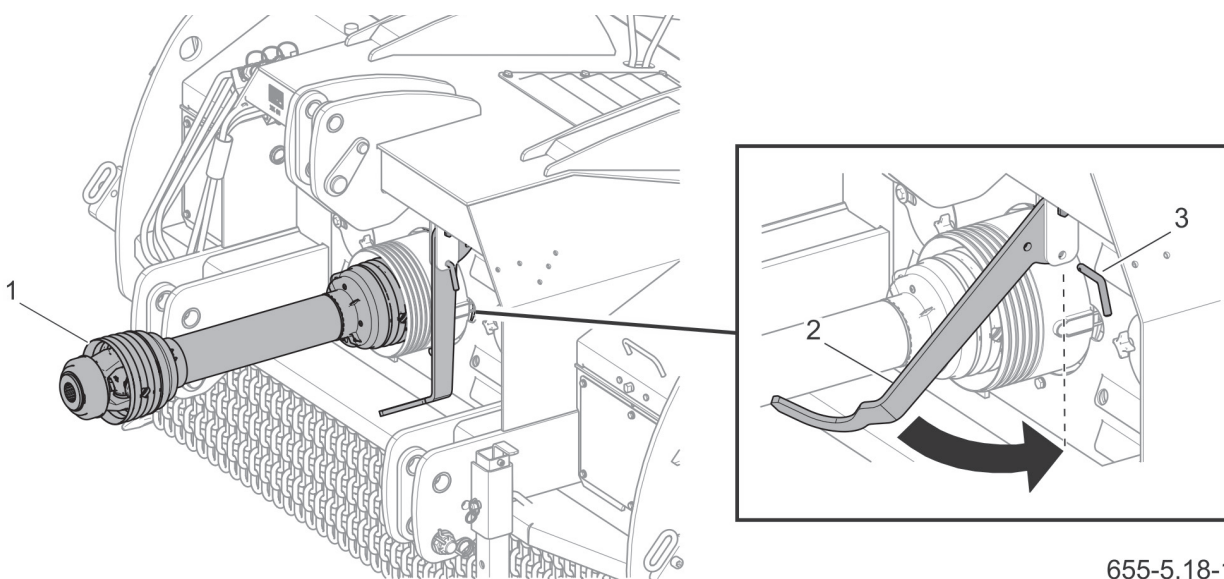
During operation, the machine should be positioned horizontally. Any other setting shortens the life of the roller, gearbox and PTO. Adjust the length of the central link.

attachment points on the machine.

- Set the lower links of the tractor at appropriate height.
- If necessary, use balls of the links (additional equipment).
- Connect the lower links of the tractor's linkage system with the lower mounting points (A) on the machine and secure.
- Turn off the tractor engine and immobilize it with the parking brake. Ensure that unauthorised persons do not have access to the cab.
- Connect the central connector to the upper attachment point (B) on the machine and secure it.

Connecting PTO shaft

- Connect the previously fitted PTO shaft to the tractor's PTO shaft.
- Secure the shaft cover against rotation with retaining chains.
- Unlock the shaft hanger (2) and lower it to the working position. Use the pin to lock the hanger in the lower position.



655-5.18-1

Figure 5.4 Connecting of PTO shaft

(1) PTO shaft

(2) shaft bracket

(3) pin

**DANGER**

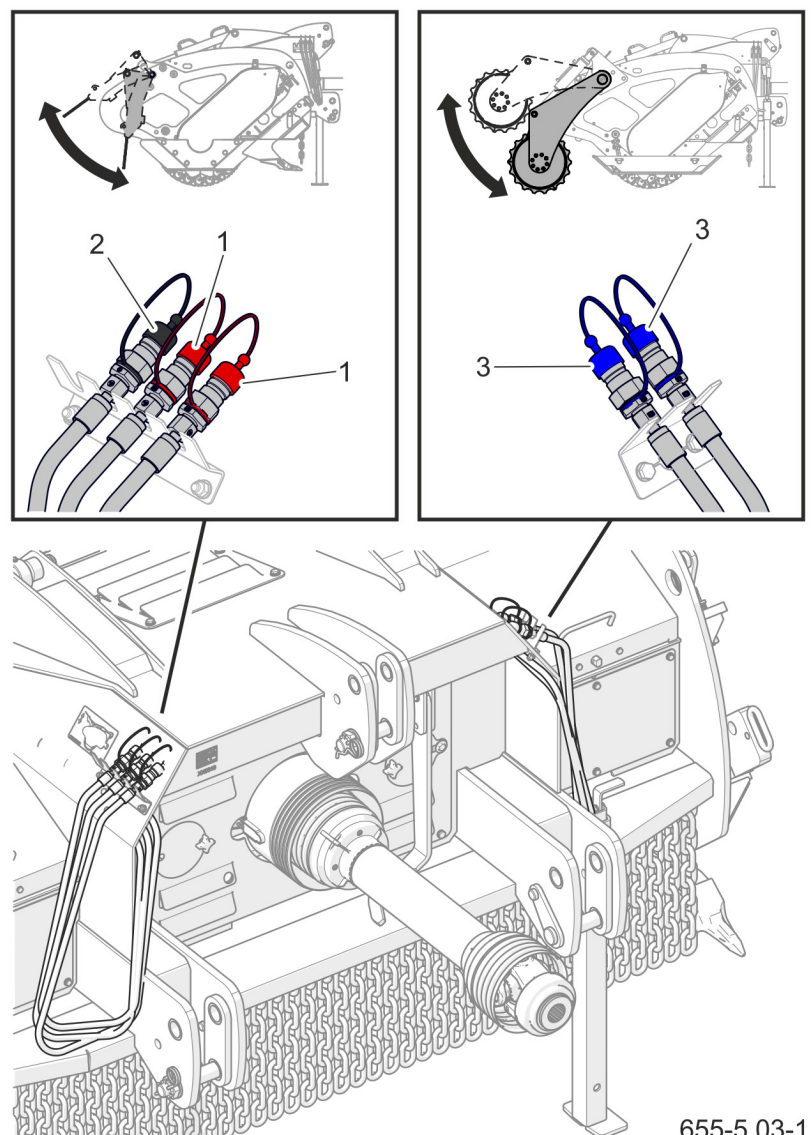
Reduce pressure in the system prior to connecting the machine to the hydraulic system.

**ATTENTION**

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

Connecting the hydraulic system

- Connect the hydraulic connectors (1) supply/return marked in red to one hydraulic section in the tractor.
- Connect the connector (2) marked in black to the "free drain" connector in the tractor
- If the machine is equipped with a levelling roller, connect lines (3) to the second hydraulic section in the tractor.

**ATTENTION**

Pay attention to the possibility of mixing oils in the hydraulic system of the tractor and machine.

**ATTENTION**

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 damage. .

Figure 5.5 Connect the hydraulic system
 (1) cover control supply/return quick couplers
 (2) "free drain" return quick coupler (black)
 (3) quick couplers supply/return for levelling roller control (option)

655-5.03-1



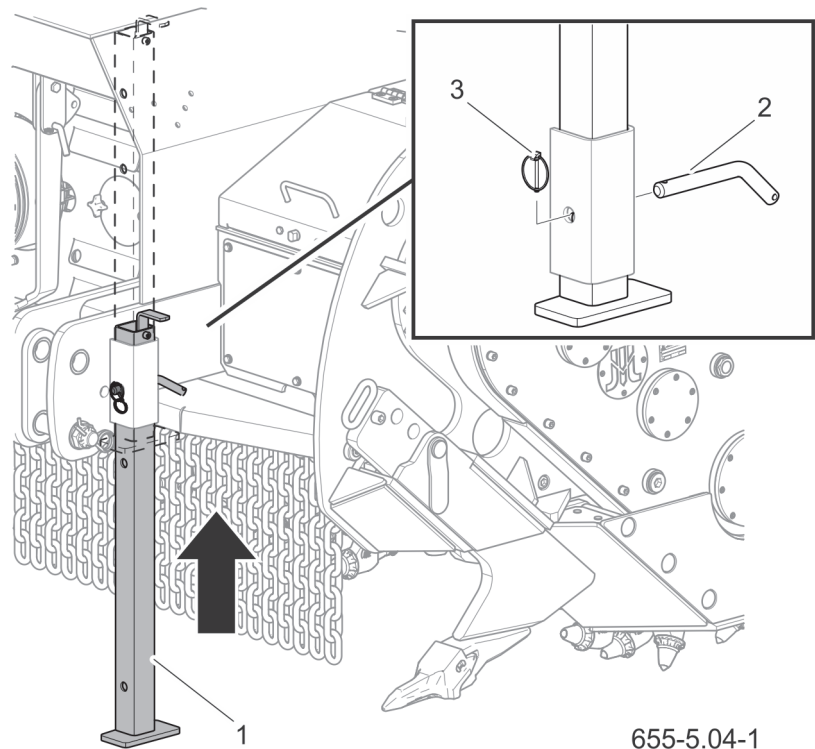
DANGER

Raising and lowering the parking stand may only be done when the machine is raised.



ATTENTION

Perform daily inspection of the machine after hitching it to the tractor but prior to moving off.



655-5.04-1

Figure 5.6 Raising parking stand

(1) support foot

(2) pin

(3) cotter pin

Connecting the electrical system (optional)

- Connect the cable supplying the machine's lighting system to the 7-pin socket on the machine and the tractor.

Raising parking stand

- Raise the machine suspended on the three-point linkage to the minimum height allowing you to remove the pin (2).
- Remove the support pin, raise the support foot (1) as far as it will go and secure it again with the pin and cotter pin.

OBS.2.9-003.01.EN

5.5 TRANSPORTING THE MACHINE



DANGER

When driving the machine in the transport position on uneven terrain, exercise particular caution and reduce the travel speed as the carrier and the machine may become damaged or overturned.



ATTENTION

If the machine covers the tractor's rear lighting while driving on public roads, it should be equipped with a lighting system (additional equipment)

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

- Driving on public roads may only take place if the machine is equipped with rear lighting (additional equipment).
- Before moving off, make sure that there are no bystanders, especially children, near the machine or the tractor. Ensure that the driver has sufficient visibility.
- Make sure that the machine is correctly attached to the tractor, and linkage is properly secured.
- The weight of the machine affects the tractor's steerability.
- Do not exceed the design speed of 25 km/h and maximum speed allowed by road traffic regulations. Ground speed should be adjusted to prevailing road conditions and other conditions.
- When driving, comply with all road traffic regulations, indicate an intention to turn using indicator lamps, keep all road lights and indicator lights (optional equipment) clean at all times and ensure they are in good condition.
- Any damaged or lost lamps or indicator lights must be immediately repaired or replaced.
- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the machine or the tractor 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, avoid sharp turns especially on slopes.
- Please note that the braking distance is substantially increased at higher speeds and loads.
- Monitor machine behaviour when travelling on an uneven terrain. Adjust speed to the terrain and road 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.

OBS.2.9-005.01.EN

5.6 MACHINE OPERATION



DANGER

Make sure that no bystanders or animals are within a radius of 50 m from the workplace when operating the machine.



DANGER

Start the machine's drive only after lowering the machine above the ground at the workplace.

Before raising the machine, turn off the PTO drive.



ATTENTION

Do not operate the machine on hard surfaces (asphalt, cobblestones, pavement, concrete, etc.).

Do not operate the machine while driving in reverse because there is a risk of damaging the machine's components.



ATTENTION

Incorrect work speed has a negative impact on the work effect and the life of the machine.



DANGER

Before starting the carrier engine make sure that the PTO drive is disengaged. Otherwise, the machine may be started in an uncontrolled manner. The machine 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.

Preparation of the work area

Before starting work, especially in wasteland, remove objects such as rocks, concrete, tree trunks, wires, cables and metal objects from the work area. Wire, cable, rope, chains and metal objects can be thrown, entangled in the working roller and rotated at high speed:

Mark objects that cannot be cleared or removed. Avoid these objects while working.

Machine operation

The working depth of the working roller can be smoothly adjusted using the tractor's three-point hitch system (TUZ) and by adjusting the height of the levelling roller (option).

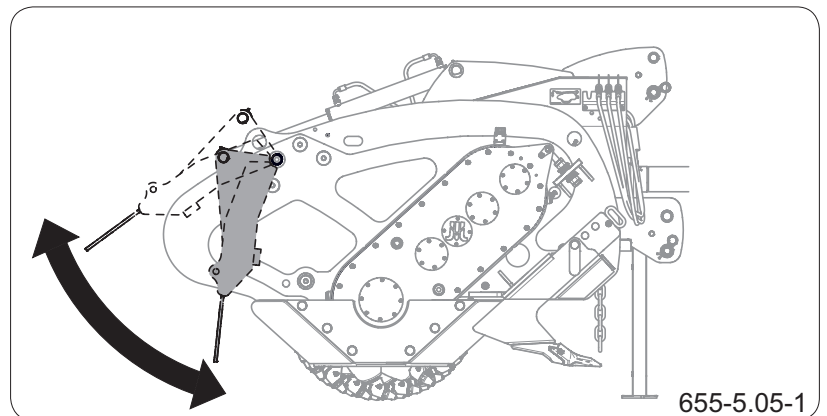


Figure 5.1 Adjustable cover with levelling plate

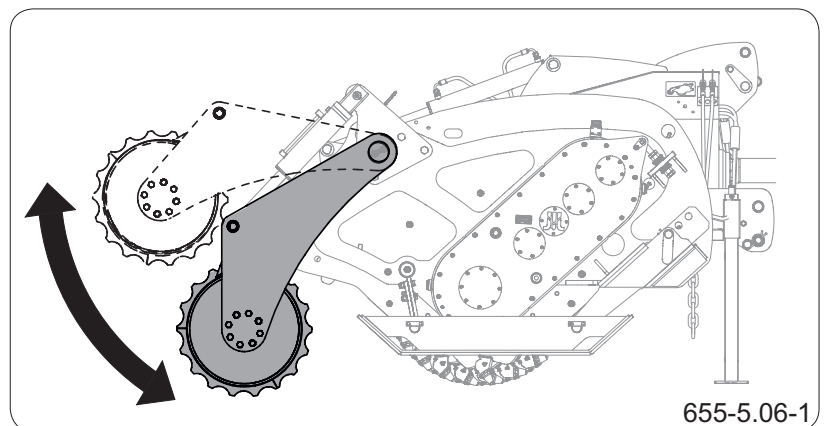


Figure 5.2 Adjustable levelling roller (option)



DANGER

Adjust the working speed to the type of ground and working conditions.

Do not work with the roller cover open.

Do not operate the machine in conditions of limited visibility.



DANGER

During machine operation do not occupy a different position than that of the operator in the tractor cab. Do NOT leave the cab, when the machine is in operation.

Do NOT stay between the carrier and the machine.

Do not approach the machine until the rotating parts come to a complete standstill.



DANGER

When operating the machine, there is a risk of objects being thrown towards the tractor



ATTENTION

Monitor the temperature of the central gear while operating the machine. If the operating conditions cause the permissible gear temperature - 90 °C to be exceeded, work breaks should be taken to cool the system.



ATTENTION

After the first 5, 10 and 15 hours of operation, check the tightness of the screws securing the right and left bracket of the levelling roller (option).

The side teeth are used to loosen the soil in front of the short slides to increase the working depth of the machine. It is allowed to work without side teeth.

Thanks to adjustable long slides (optional), the working depth can be permanently limited to 150 mm. The hydraulically adjustable rear cover allows you to increase and decrease the degree of soil mixing. The lower the rear cover is lowered, the longer the soil is mixed and the driving speed should be reduced accordingly.

If the tractor load is too heavy when operating the machine, reduce the driving speed or working depth. Stop the machine immediately if the working roller hits heavy objects, metal elements, rock, concrete and check its technical condition.

While operating the machine, check the technical condition and completeness of the working roller teeth. Working without teeth or with worn tooth flanges results in wear of the mounting sockets and the need for time-consuming and expensive regeneration. The method of replacing the teeth is described in chapter 6 "*Operation of the working roller*".

Periodically check the technical condition of:

- overlays on the side walls inside the working roller housing,
- chains protecting against throwing objects towards the tractor.

After finishing work

After finishing working with the machine, turn off the PTO drive of the carrier. To disconnect the machine from the carrier, follow the section "*Disconnecting the machine from the carrier*".

OBS.2.9-004.01.EN

5.7 CLEANING



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.



DANGER

When the machine is connected to the carrier vehicle, you can only be near the machine when:

- the carrier vehicle engine is turned off,
- the machine is lowered to the ground



ATTENTION

After each use, clean the machine of any remaining material.

After finishing washing wait until the machine is dry and then grease all greasing points according to recommendations. Remove excess oil or grease with a dry cloth.

During work, use appropriate, close-fitting protective clothing, gloves and appropriate tools.

Every day, after finishing work, thoroughly clean the machine of any remaining dirt. Before using the pressure washer the user is obligated to acquaint himself with the operating principles and recommendations concerning safe use of this equipment.

Machine cleaning guidelines

Stop the carrier vehicle with the machine on a flat, level surface.

- Lower the machine to the ground, lift the roller cover.
- Turn off the vehicle's engine and remove the key from the ignition;
- Secure the carrier vehicle with the parking brake and the cabin against access by other people.
- Clean and wash the machine with a strong stream of water and leave to dry in a dry and airy place.

The use of pressure washers increases the effectiveness of washing, but be careful when working. During washing, washer nozzle may not be closer than 50 cm from the surface being cleaned.

Water temperature should not exceed 55°C.

Using excessive pressure for washing may damage lacquer coating.

Do not direct the water jet directly at the system and equipment elements of the machine, i.e. valves, actuators, electrical and hydraulic plugs, lights, electrical connector, information and warning stickers, nameplate, cable connections, lubrication points, etc. high jet pressure water may mechanically damage these components.

- For cleaning and maintenance of plastic coated surfaces, use clean water or special preparations designed for this purpose.

TIP

Once a month, while the machine is in use, wash the central gear cavity and clean the compartment of the articulated and telescopic shafts connecting the gears.

The key provided with the machine is used to open covers secured with a lock. To facilitate cleaning of the drive system components, it is recommended to dismantle the remaining covers.

After cleaning the machine, reinstall the covers.

- Do not apply organic solvents, preparations of unknown origin or other substances, which may cause damage to lacquered, rubber or plastic surfaces. If in doubt, test on an inconspicuous surface.
- Surfaces smeared with oil or grease 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.
- Observe the rules of environmental protection and wash the machine in a place designed for this purpose.

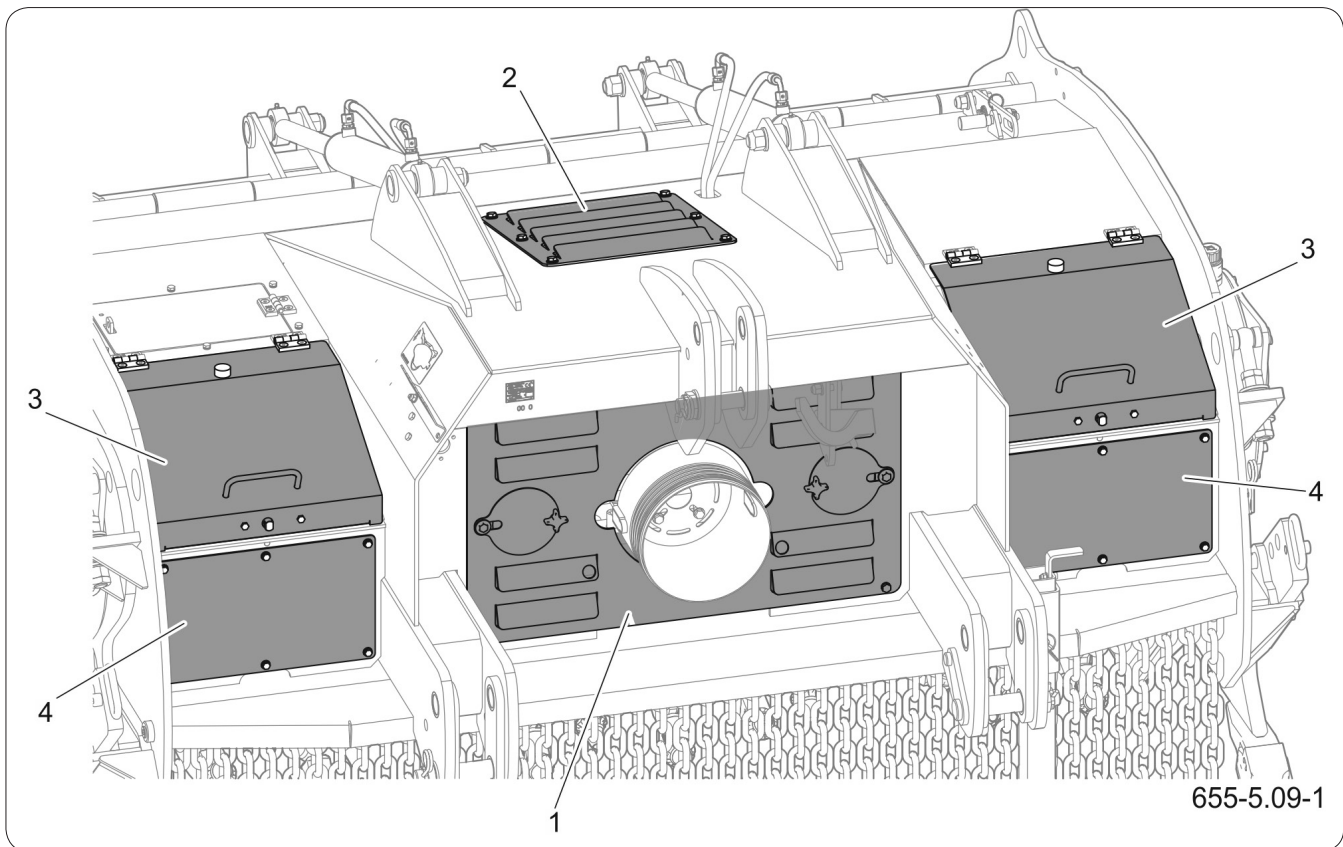


Figure 5.7 Covers dismantled to clean the machine
 (1) central gear cover (2) upper cover of the central gear (3) cover with lock
 (4) lower covers of the shafts connecting the gears

- Washing and drying the machine must take place at temperature above 0 °C.

In winter, freezing water may cause damage to paint coating or machine elements.

OBS.2.9-006.01.EN

5.8 UNHITCHING THE MACHINE FROM 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

Before disconnecting from the carrier vehicle, lower the machine and the levelling roller (option) to the ground.

Before disconnecting the machine from the carrier vehicle, place the machine on a horizontal, sufficiently hard surface so that it can be reconnected.

To disconnect the machine from the carrier vehicle, perform the following steps:

- Park the tractor with the machine in a parking space.
- Raise the machine suspended on the three-point linkage as much as possible.
- Turn off the engine, remove key from ignition and engage parking brake.
- Unlock, lower the parking stand and lock in the lower position.
- Lower the machine to the ground.
- 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

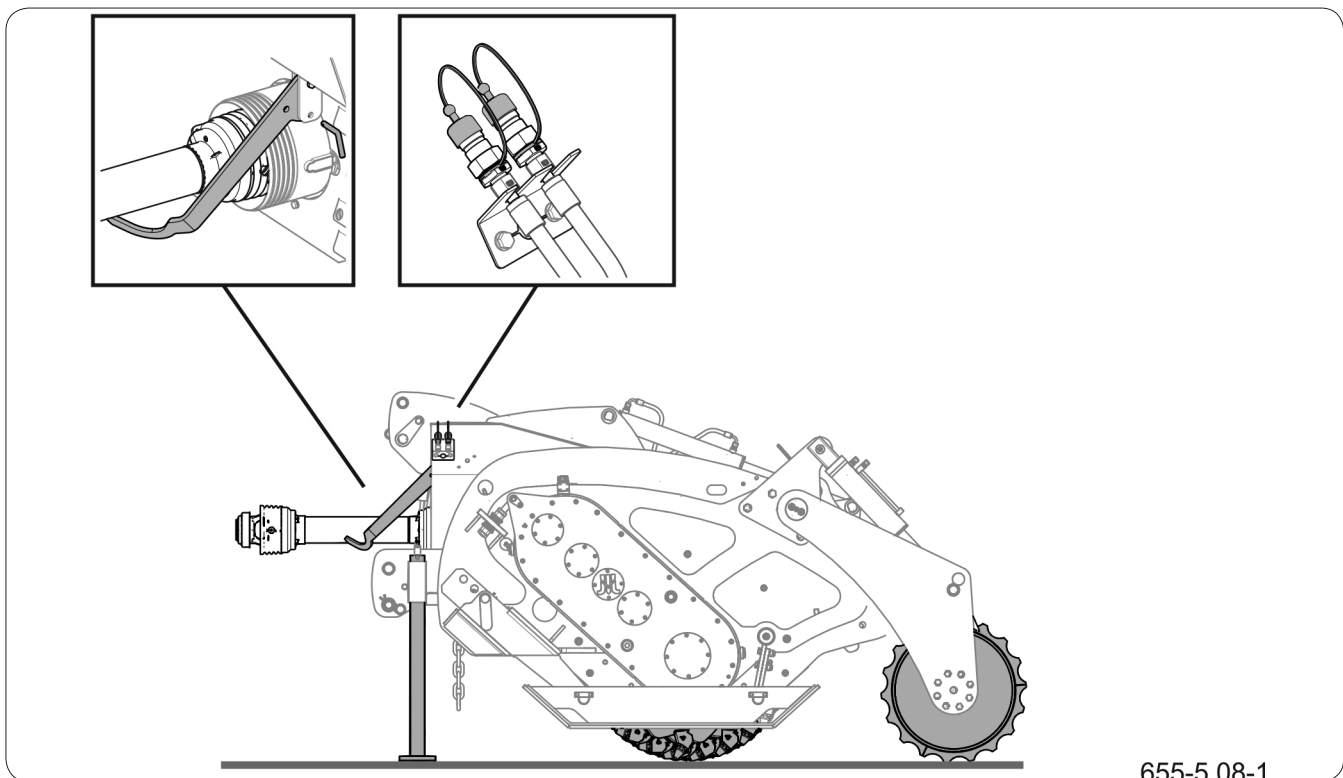


Figure 5.8 Stock item

**DANGER**

Reduce pressure prior to disconnecting the hydraulic system.

**ATTENTION**

The teeth of the working roller are sharp and may damage the storage surface while standing.

the carrier, secure with plugs and place in the bracket on the machine frame.

- Disconnect the electrical system cable from the carrier vehicle (option).
- Disconnect the PTO shaft from the carrier vehicle and place it on the support.
- Unlock and disconnect the upper link (central link).
- Unlock the tractor's three-point linkage lower links and disconnect it from the machine.
- Start the tractor and drive away from the machine.

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5.9 ADJUSTMENT AND SETTINGS



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 adjust the machine.

TIP

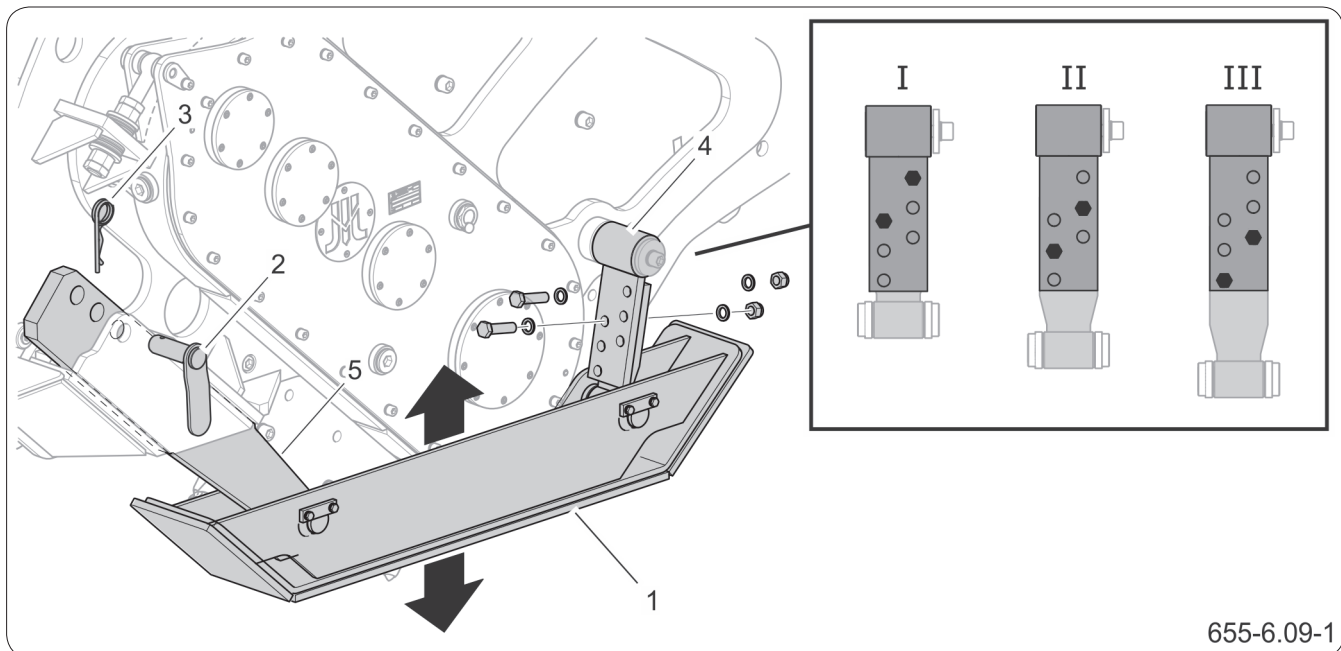
The height of the long slides can be changed in 3 steps, every 40 mm.

The right and left slides should be set to the same height.

Slides adjustment

Long slides (option) are height adjustable (Fig.: *Long slide adjustment*). To change the slide height:

- Remove the cotter pin (3) and slide the pin (2) out of the guide.
- Disconnect the mounting (4) fastened with screws.
- Set the appropriate slide height (1) and lock the bracket (5) using the pin (2) with a cotter pin.
- Assemble the mounting (4) in position (I,II,III) corresponding to the pin position.
- Adjust the slide on the other side of the machine in the same way.
- Tighten screw connections to the appropriate torque.



655-6.09-1

Figure 5.9 Height adjustment of long slides (option)

(1) long slide

(2) pin

(3) cotter pin

(4) fixing point

(5) bracket

(I,II,III) regulation level

TIP

The height of the side teeth can be changed in 3 steps, every 40 mm.

The right and left teeth should be set to the same height.



Section 6 - Tightening torques for screw connections connections

Adjusting the height of the side teeth

The side teeth can be adjusted in height (Fig.: "Side teeth adjustment"). To change the height of the side teeth:

- Remove the cotter pin (3) and slide the pin (2) out of the guide.
- Extend the tooth in the guide to the appropriate height and lock it with the pin (2) and cotter pin.
- Adjust the tooth on the other side of the machine in the same way.

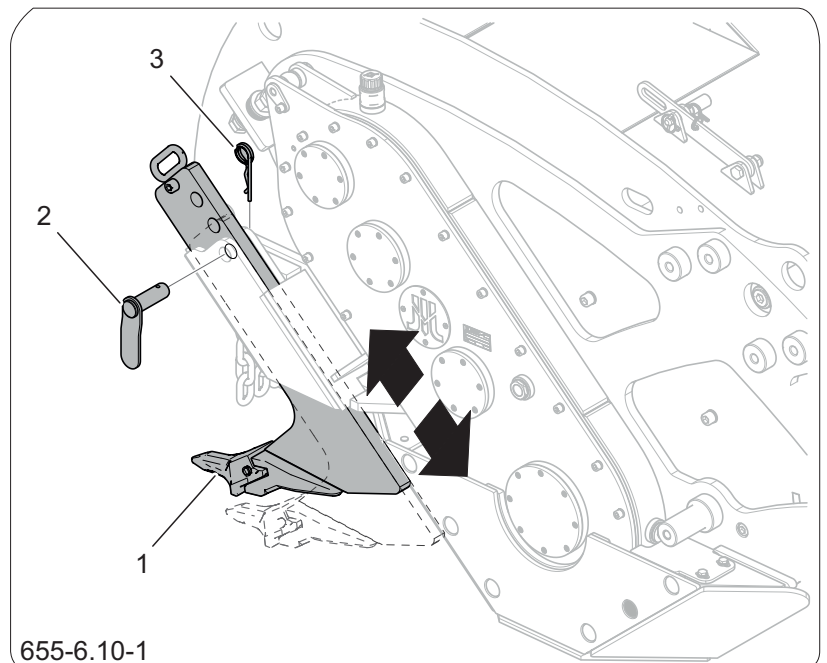


Figure 5.10 Adjustment of side teeth

(1) ząb

(2) retaining bolt

(3) cotter pin

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5.10 STORAGE

After finishing work, carefully clean, wash and lubricate the machine.

Machine should be kept in closed or roofed building. Before longer outdoor storage, it is essential to protect the machine against adverse weather conditions, especially those causing corrosion.

In the event of damage to the lacquer coating clean those places from rust and dirt, degrease and then paint with paint maintaining uniform colour and even thickness of protective coating. Until the time of touch-up painting, the damaged place should be covered with a thin layer of grease, anticorrosion preparation or priming paint.

If the machine has been parked for more than 1 month, lubricate all points regardless of the period of the last treatment and subject the machine to a comprehensive check.

For the duration of the standstill, leave the PTO shaft mounted on the gearbox and resting on the shaft bracket. Disconnect the electrical system connection cable (option) from the machine and store it indoors. Small elements of the machine's equipment, e.g. a key

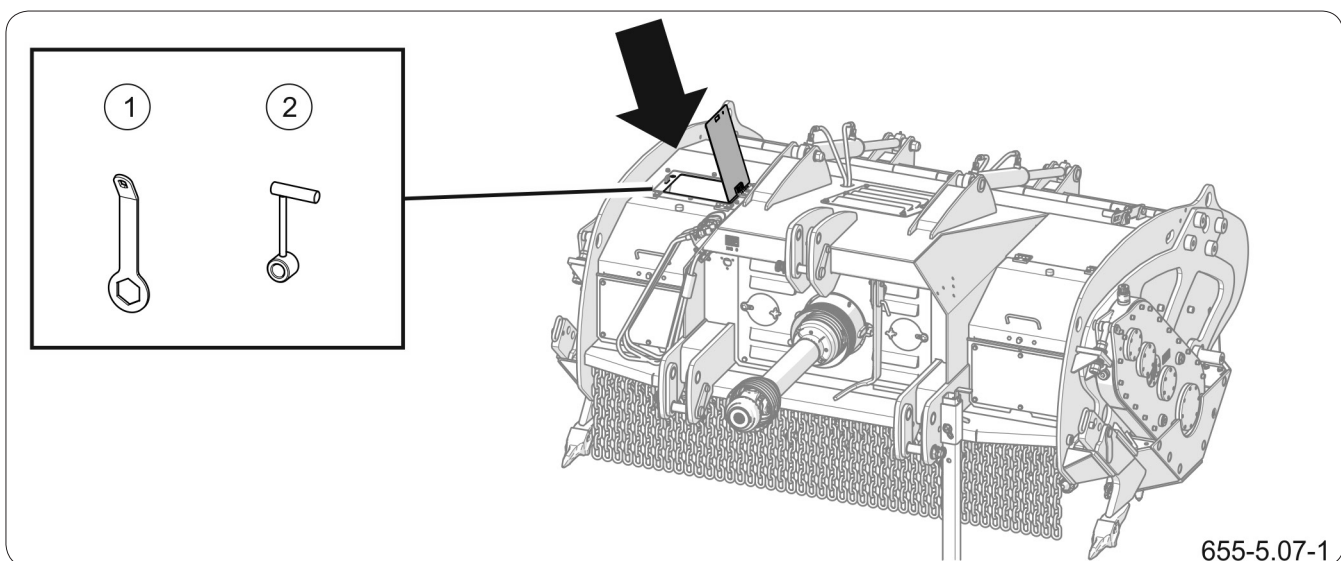


Figure 5.11 Storage compartment for equipment items
 (1) wrench (2) tooth replacement punch

and a punch for replacing teeth, etc., can be stored in a special compartment on the machine frame.

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CHAPTER 6.

PERIODIC INSPECTION AND MAINTENANCE

PRONAR SGD21

6.1 BASIC INFORMATION



CAUTION

It is forbidden to use a defective machine.

Repairs during the guarantee period may only be carried out by authorised service centres.

When using the sweeper, it is necessary to constantly check the technical condition and perform maintenance procedures that will allow the machine to be kept in good technical condition. Compulsorily carry out all maintenance and adjustment activities specified by the Manufacturer according to the established schedule.

Repairs during the warranty period may only be carried out by Authorised Sales and Service Outlets (APSiO). The warranty inspection of the machine is only carried out by an authorised service centre.

In the event of unauthorised repairs, changes to the factory settings or operations not included as possible by the machine operator (not described in this manual), the user will forfeit the warranty.

For detailed information on the maintenance schedule, refer to the chapter entitled " *Maintenance and Inspection Schedule* ".

After the warranty expires, it is recommended that servicing is carried out by specialised repair shops.

Use appropriate protective clothing and equipment when working.

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6.2 MAINTENANCE AND INSPECTION SCHEDULE

Table 6.1. Inspection categories

Category	Description	Carried out by	Frequency
A	Inspection daily	Operator	Inspection conducted daily before the first start or every 10 hours of continuous operation in shift mode.
B	Maintenance inspection	Operator	Inspection performed periodically every month of machine operation. Daily inspection should be carried out each time before this inspection.
C	Maintenance inspection	Operator	The inspection is performed once after the first 50 hours of operation.
D	Maintenance inspection	Operator	The inspection is performed periodically every 12 months or 500 hours of machine operation (whichever comes first). Daily inspection and monthly inspection should be carried out each time before this inspection.
E	Warranty inspection	Authorised Points of Sale and Service (APSS) ⁽¹⁾	Inspection carried out against payment after the first 12 months of machine use, after user notification.
F	Maintenance inspection	Service ⁽²⁾	Inspection carried out every 4 years of the machine use

⁽¹⁾ - Authorized Point of Sale and Service

⁽²⁾ - post-warranty service

Table 6.2. Inspection schedule

Description of activities	A	B	C	D	E	F
Correct mounting and wear of the working roller teeth.	•					
Technical condition of side teeth and slides.	•					
Technical condition of the side covers in the mixing chamber	•					
Technical condition of PTO shaft, its shields and securing chains ⁽¹⁾	•					
Kontrola wtyków i gniazd przyłączy.	•					
Kontrola osłon Check protective shields	•					
Oil level in the central gear.		•				
Oil level in side gears	•					
Efficiency of the electrical lighting system (option).	•					
Kontrola instalacji hydraulicznej.		•				
Change oil in gears			•	•		
Replace hydraulic lines						•
Smarowanie	See table: <i>Lubrication schedule</i>					
Kontrola połączeń śrubowych	See point: <i>Tightening torque for nut and bolt connections</i>					

⁽¹⁾ in accordance with the PTO shaft's Operator Manual

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6.3 INSPECTION OF CONNECTION PLUGS AND SOCKETS



DANGER

The hydraulic system of the machine and tractor is under high pressure during operation.

Do NOT use an inoperative machine.

Damaged connection body or hydraulic or electric line socket body should be replaced. In the event of damage to cover or seal, change these elements for new reliable elements.

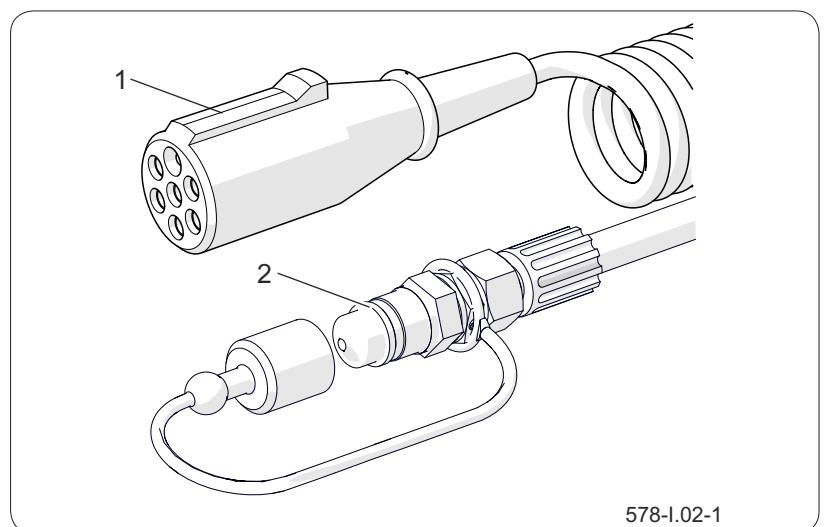
If the machine is disconnected from the tractor, secure the hydraulic plugs with covers and place them in the brackets intended for this purpose.

Hydraulic connections for connecting the trailer to tractor must be technically reliable and kept clean.

Each time before hitching the machine, inspect technical condition and cleanness of connections and sockets in tractor unit.

If necessary, clean or repair the tractor unit sockets. Tractor and machine hydraulic systems are sensitive to the presence of permanent contamination, which may cause damage to precision system components (jamming of hydraulic valves, scratching of cylinder surfaces etc.)

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Figure 6.1 Machine's connections
(1) 7-pin electrical plug (option) (2) hydraulic plug

6.4 CHECKING OF THE HYDRAULIC SYSTEM



DANGER

The hydraulic system of the machine is under high pressure during operation.



CAUTION

It is forbidden to use the machine with inefficient braking system.

Checking the tightness of the hydraulic system

1. Connect the machine to the tractor.
2. Connect all hydraulic system conduits in accordance with the *"User's Manual"*.
3. Clean the hose connections, hydraulic cylinders and couplings.
4. Activate all hydraulic systems in turn, extending and retracting the piston rods of the cylinders.
5. Repeat all operations 3-4 times.
6. Leave the hydraulic cylinders fully extended.
7. Check the all hydraulic circuits for leaks.
8. After completing the inspection, put all cylinders to the rest position.

When the cylinder is fully extended, check the the seal locations. In the event of oiling on the hydraulic cylinder body, the nature of the leakage must be check. Small leaks with symptoms of "sweating" are permissible. When you notice "droplets" type leaks do not use the machine until the fault is removed.

If visible moisture appears on the cable connectors tighten the the connector with a specified torque and carry out the test again. If the problem persists replace the leaking element.

Control of the technical condition of hydraulic connectors

Follow the steps described in the *„Checking plugs and connection sockets“*.

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6.5 REPLACEMENT OF HYDRAULIC HOSES



Rubber hydraulic hoses should be replaced every 4 years regardless of their technical condition. This operation should be entrusted to specialized workshops.

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6.6 MAINTENANCE OF ELECTRICAL SYSTEM AND WARNING ELEMENTS



ATTENTION

Do NOT travel with out of order lighting system. Damaged lamp lenses must be replaced immediately before travelling. Lost or damaged warning signs must be replaced.

Before driving on a public road, make sure all lamps and reflectors are clean.

TIP

Light-emitting diodes (LED) are used as the source of light. Damaged lights can be replaced only as complete units. It is impossible to repair or regenerate them.

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

User obligations only include technical inspection of the electrical system, reflectors (if any), and warning signs (if any).

Procedure

1. Check if the connection wire is reliable. Check connection sockets in carrier vehicle and machine.
2. Connect the machine to the carrier vehicle with the appropriate connection cable.
3. Check completeness and technical condition of machine lights.
4. Check wiring harnesses for damage (abrasion of insulation, broken leads, etc.). Check the completeness of lamps and reflective elements (if present).
5. Check the correct mounting of the triangular slow-moving vehicle warning sign and its holder (if present).
6. Check the technical condition and correct installation of warning signs (if any)

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6.7 TIGHTENING TORQUES FOR SCREW CONNECTIONS



During maintenance and repair work, apply appropriate tightening torques to screw connections, unless other tightening parameters are given. Recommended tightening torques for the most commonly used bolted connections are shown in the Table “*Tightening torques for screw connections*”. The given values apply to non-lubricated steel bolts.

Hydraulic lines and other hydraulic components with rubber seals should be tightened with torque according to the Table “*Tightening torques of hydraulic elements*”.

Check the tightness using a torque wrench. During daily inspection of the machine pay attention to loose connections and tighten the connector if necessary. Replace the lost elements with new ones.

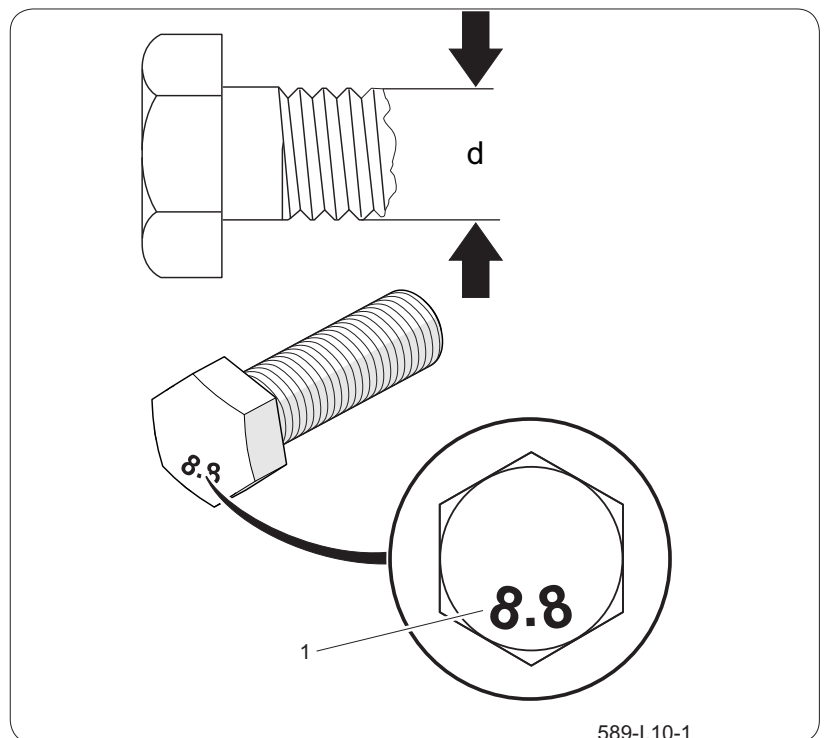


Figure 6.2 Screw with metric thread
(1) strength class, (d) thread diameter

Table 6.3. Tightening torques for screw connections

Metric		
	8.8 ^(*)	10.9 ^(*)
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

(*) - strength class according to DIN ISO 898

Table 6.4. Tightening torques of hydraulic elements

Thread of nuts	Wire diameter DN (inch)	Tightening torques [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 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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6.8 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 maintain the transmission system.



ATTENTION

Repairs of the transmission during warranty period may only be performed at authorised mechanical workshops.



DANGER

The transmission may become very hot during operation.

Do not touch the transmission immediately after the machine has stopped.

Drive transmission system maintenance involves:

- periodic inspection and replacement of oil in cylindrical gears (2) and central gear (1),
- lubrication of telescopic shafts in accordance with the shaft manufacturer's recommendations.

Before measuring the oil level in the gears, the machine should be positioned horizontally.

It is best to change oil immediately after completing work when the gear is still hot and impurities are suspended in oil. Perform all oil change activities when the machine is level and resting on the ground.

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

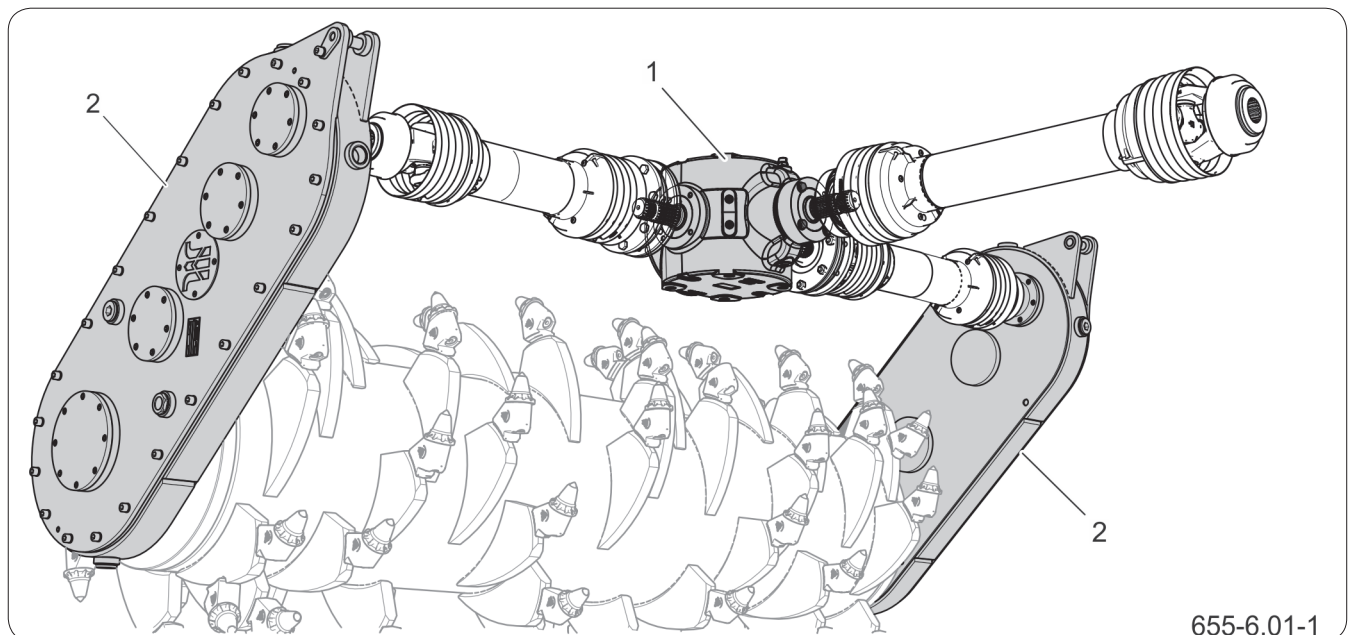


Figure 6.3 Arrangement of the drive transmission gear
(1) central gear (2) right/left gearing shaft

TIP

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

TIP

Fill the central gear with ISO VG 150 EP oil in the amount of:
 - 4 litres for S2155100063 184kW gearbox;
 - 6 litres for S2200100047 265kW gearbox (option)

Central transmission

To check the oil level in the central gear, remove the cover (4) (Figure: *Inspection and replacement of oil in the central gear*). Unscrew the inspection plug (1). The correct oil level in the central gear should reach the lower edge of the inspection hole secured with the inspection plug (1). To refill the oil, use the filler hole secured with a plug with a vent (2).

To change the oil in the central gear:

- prepare a suitable container for used oil and place it under the gearbox,
- unscrew filler plug (2).
- unscrew the drain plug (3) and drain the oil into a container,
- tighten drain plug (3),
- unscrew the inspection plug (1),
- pour new oil through the filler hole (2) until oil appears in the inspection hole.

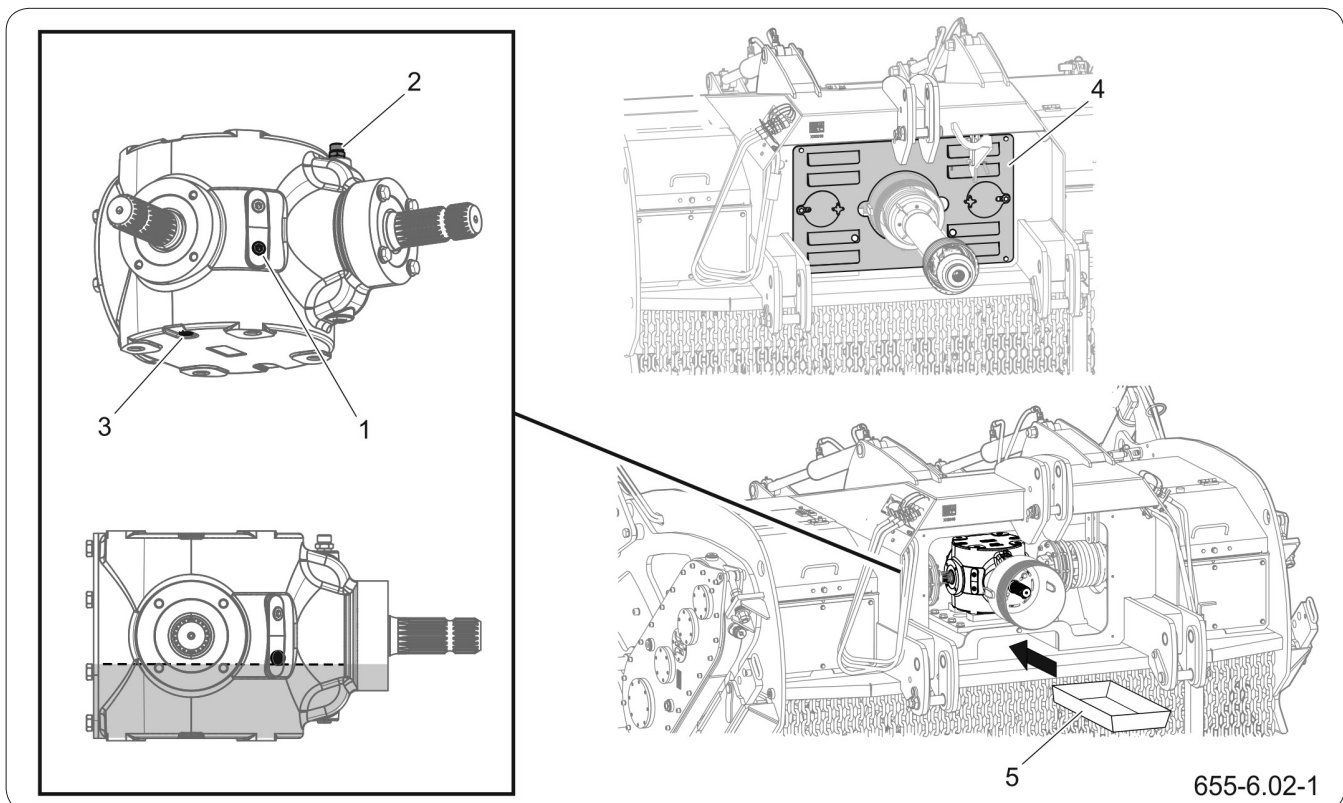


Figure 6.4 Check and change of oil in central gear

(1) inspection plug (2) filler plug with breather (3) drain plug (4) cover
 (5) used oil container

**DANGER**

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. You must not perform any work under the machine if it is only raised with a jack.

**ATTENTION**

If the operating conditions cause the permissible gear temperature - 90 °C to be exceeded, work breaks should be taken to cool the system.

- Tighten filler plug (2) and inspection plug (1).
- install the gear cover (4).

Side gearing shafts

The correct oil level in gearing shafts should reach 1/2-2/3 of the surface of the sight glass located on the gear housing (Figure: *Inspection and change of oil in side gearing shafts*).

To change the oil in side gearing shafts:

- remove the slides (4) covering the lower part of the gearbox,
- prepare a container for used oil,
- unscrew filler plug (2),
- Unscrew the drain plug (3) and drain oil into the container.
- screw on the drain plug (3),
- pour oil through the filler hole until oil appears in the sight glass (1),

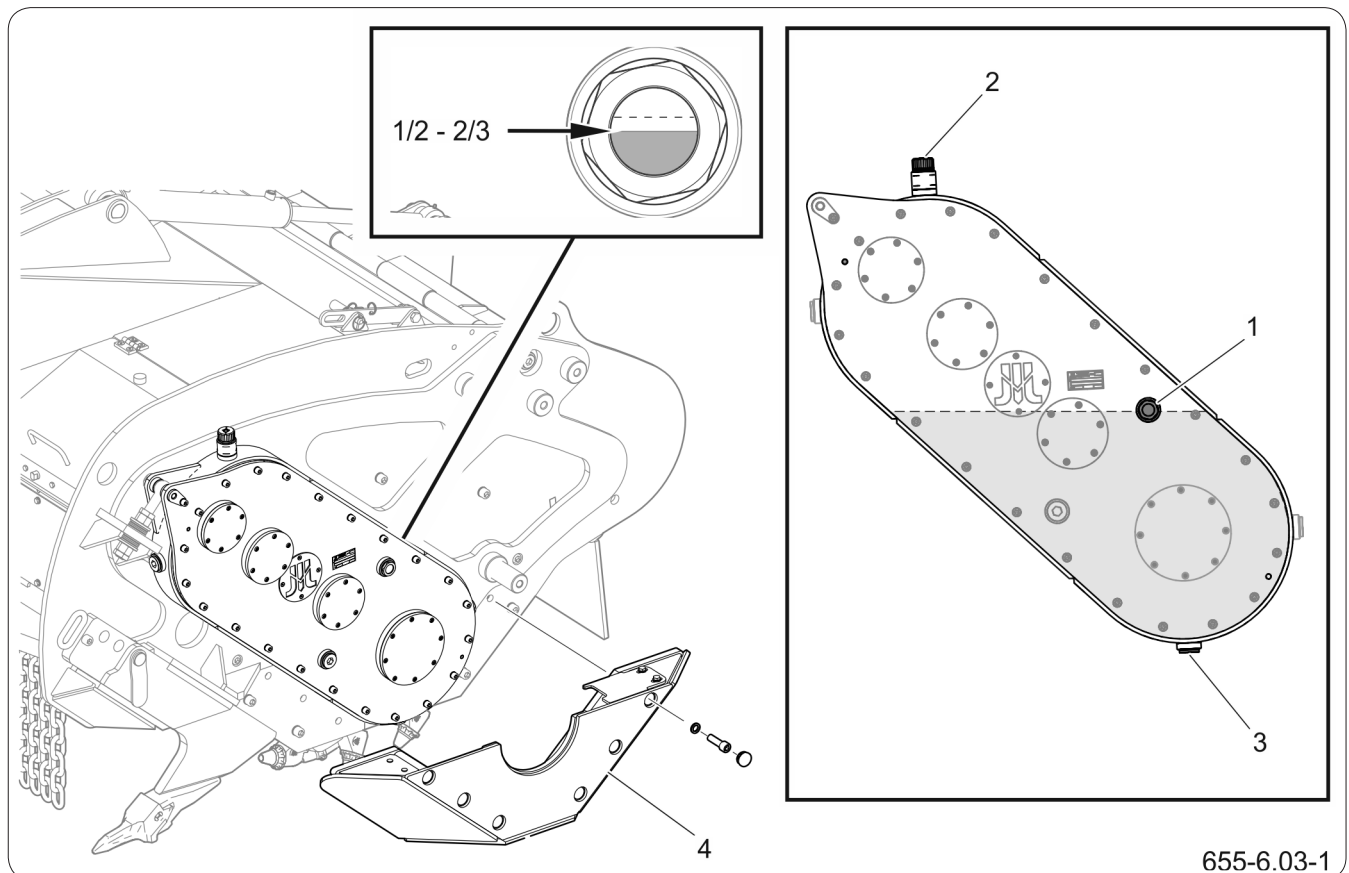


Figure 6.5 Inspection and replacement of oil in side gearing shafts

(1) oil level sight glass

(2) filler plug

(3) drain plug

(4) slide



DANGER

Do not open covers and shields while the machine is operating.



DANGER

Do not touch the telescopic shafts after stopping the machine!

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

TIP

A key that is standard equipment of the machine is used to open the covers with a lock.

TIP

Oil in both gearing shafts must be changed after the first 50 hours of work. The next oil changes should be made every 500 hours or once a year (whichever occurs first).

TIP

Fill the gearing shafts with ISO VG 150 EP oil in the amount of 11 litres each.

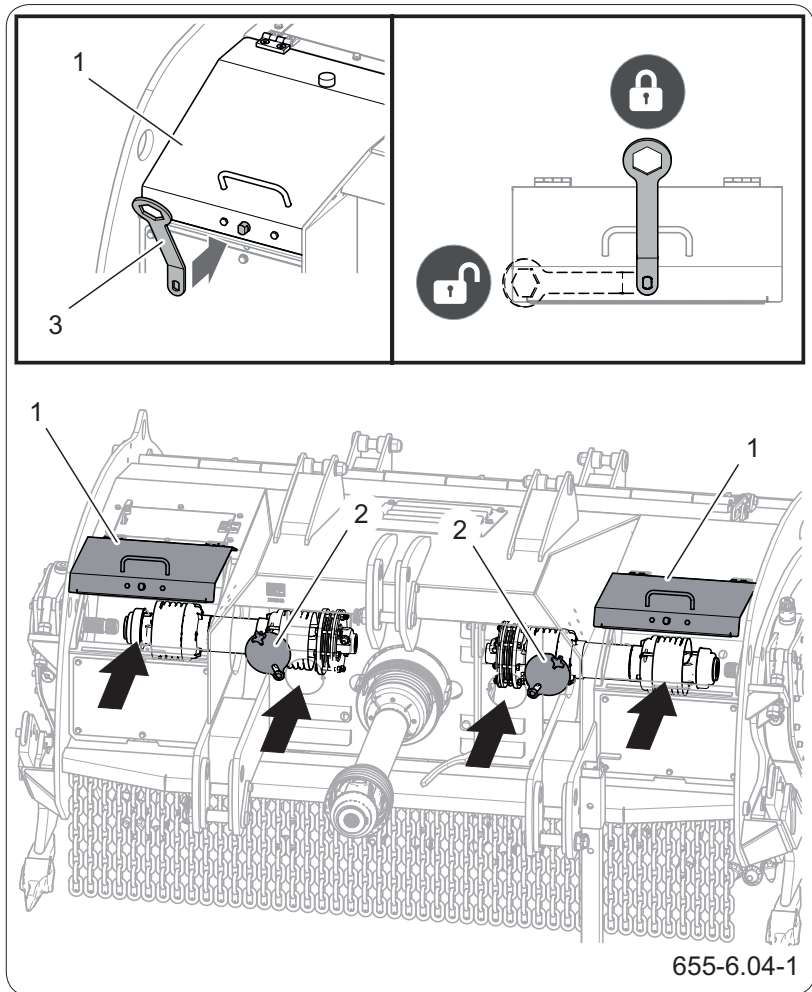


Figure 6.6 Inspection covers for operating PTO shafts
 (1) cover with lock (2) plug
 (3) wrench

- screw on filler cap (2).

PTO shafts

Perform technical service on PTO shafts in accordance with the shaft manufacturer's recommendations. To facilitate access to the shafts connecting the central and side gears, there are covers (1) and inspection plugs (2) in the machine frame (Fig.: *Inspection covers for operating PTO shafts*). The key (3) stored in the glove compartment is used to open the cover locks.

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6.9 OPERATING THE WORKING ROLLER

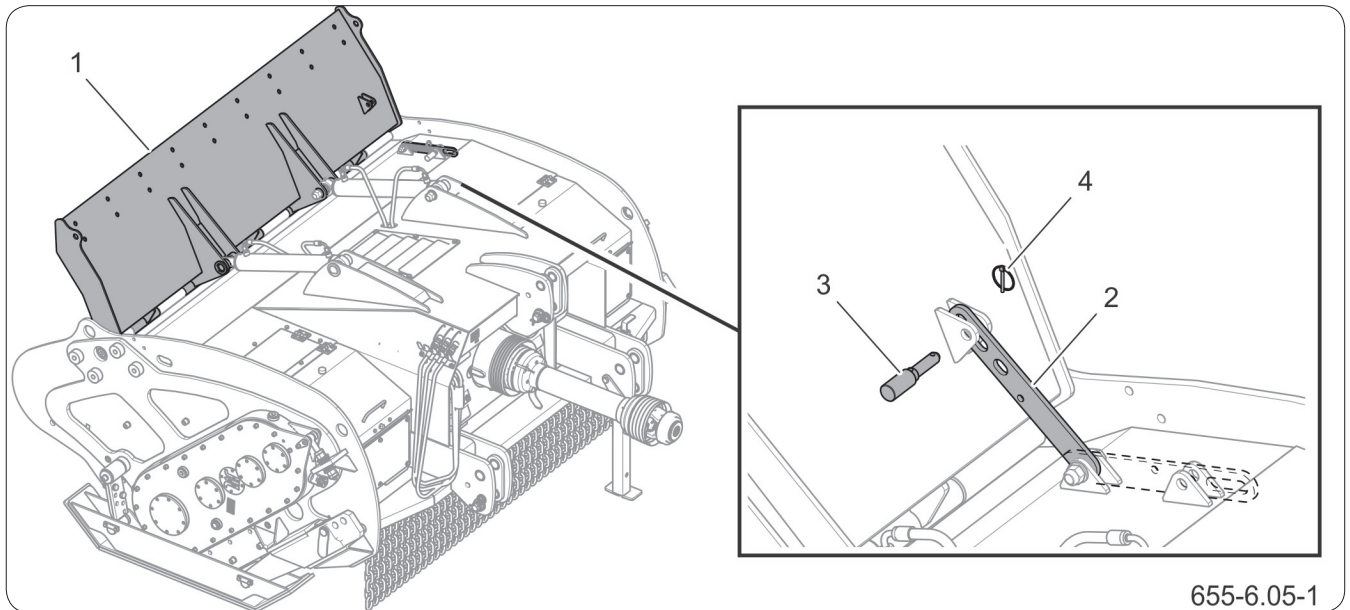


Figure 6.7 Locking of the working roller cover
 (1) working roller cover (2) interlock (3) pin (4) cotter pin



DANGER

During inspection and replacement of teeth, the working roller cover must be locked in the upper position and the machine disconnected from the carrier vehicle.

TIP

The condition of the working roller teeth should be checked every day before starting work.

Replacement of roller teeth

Depending on demand, the working roller can be equipped with various types of working teeth. The roller teeth may need to be replaced after some time of use. Every day while operating the machine, the technical condition and completeness of the working teeth should be checked.

To replace worn or damaged roller teeth:

- Using the hydraulic system, raise the working roller cover as much as possible.
- Secure the open cover with a lock (Figure: "Working roller cover lock"),
- Using a punch (supplied with the machine) and a hammer, knock out the damaged tooth (Figure "Dismantling the working roller teeth")
- Clean the tooth socket.
- Install the new tooth using the other side of the punch (Figure: *Installation of the working roller*



ATTENTION

When replacing teeth, do not hit the carbide directly with a hammer. For replacement, use the punch provided with the machine.

TIP

It is recommended to store the tooth replacement punch in a box on the machine frame.



ATTENTION

During operation, check the technical condition and completeness of the roller teeth. Working your teeth with a worn collar wears out the seat.

teeth)

- Unlock and lower the working roller cover.

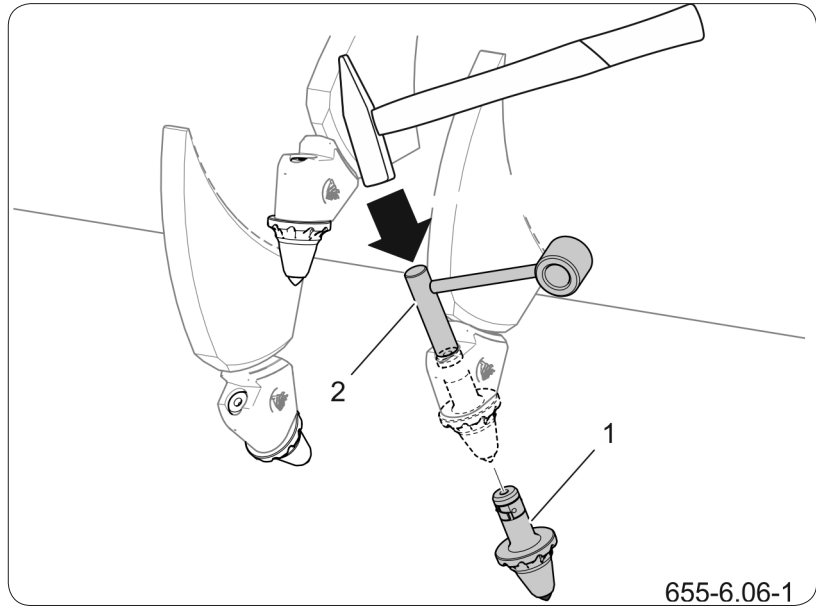


Figure 6.8 Dismantling the teeth of the working roller
(1) tooth (2) punch

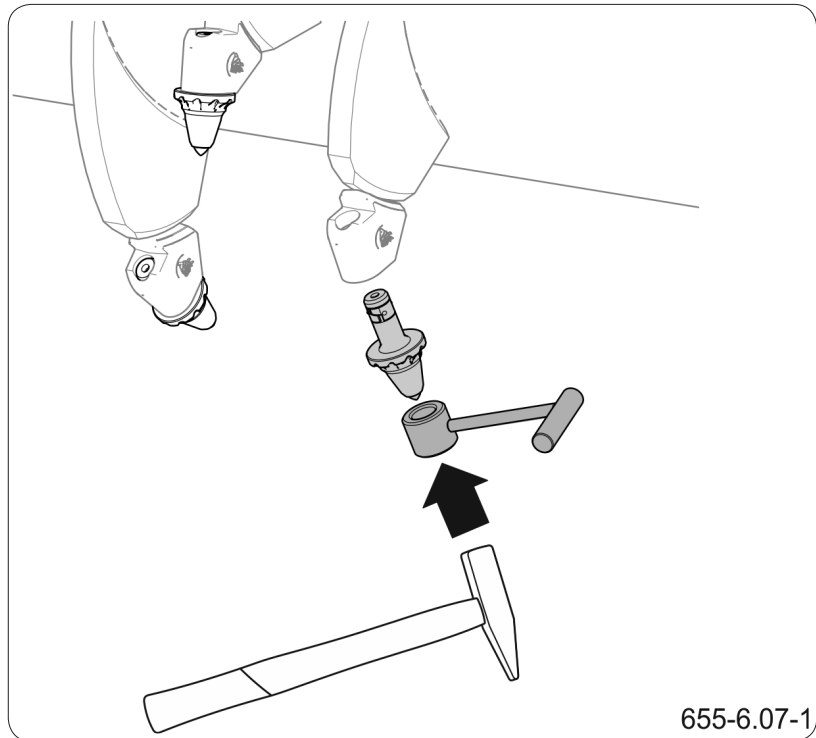


Figure 6.9 Installation of the working roller teeth

Table 6.1. List of teeth of the working roller

Item	Name	Part No.	Quantity
1	Tooth Ø25-15	KRM0007-2	66 pcs
2	Tooth Ø25-18.9	KRM0054	66 pcs
3	Tooth Ø25-19-L	KRM0085	66 pcs
4	Tooth Ø25-15	KRM0007-2-P	66 pcs
	Locking ring	KSI218	66 pcs

TIP

The side teeth of the machine are equipped with replaceable working elements:

- COMBI C2 T7 12117 tooth.
- C-LOCK 12306 lock.

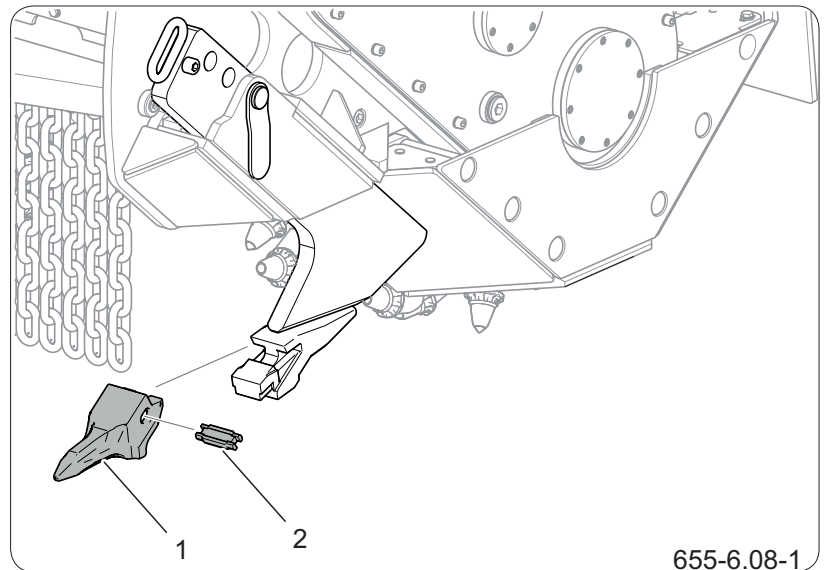


Figure 6.10 Replacement of side teeth
(1) tooth (2) lock

Replacement of side teeth

The side teeth are equipped with replaceable working elements. To replace the tooth (1), first remove the protection (2) in the side part of the tooth (Figure: "Replacing side teeth").

After installing the new tooth, the protection must be reinstalled.

Regeneration of the working roller

The working roller can be regenerated if:

- deposits of the tooth frames will be worn off
 - resurfacing,
- wear of the tooth setting is greater than 3 mm of wall thickness - replacement of elements,
- wear of the tooth body exceeds 20mm in thickness - replacement of elements

**ATTENTION**

Regeneration and replacement of the working roller can only be carried out by the machine manufacturer.

**ATTENTION**

Regeneration works, depending on their scope and location on the roller, may lead to loss of permissible balance. It is recommended to perform balancing when vibrations are greater.

- the working roller tube shows wear of 5mm wall thickness (minimum wall thickness 15mm) - replace the roller with a new one.

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6.10 LUBRICATION



TIP

The maintenance intervals given in the user manual refer to normal operating conditions. In difficult operating conditions, it is recommended to increase the frequency of maintenance.

TIP

The lubrication frequency is described in the table: *Machine lubrication schedule*):

D - working day (8 hours of machine use)

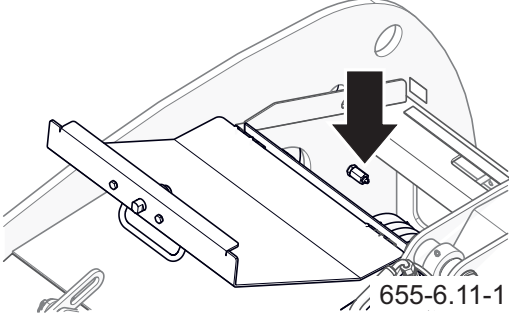
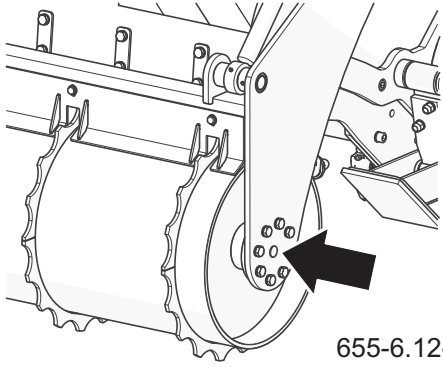
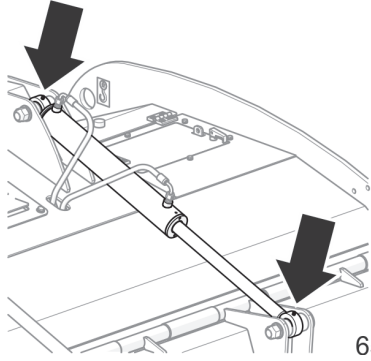
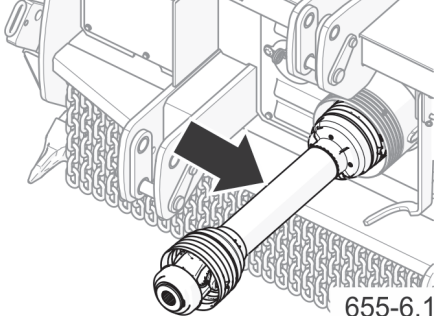
M - month

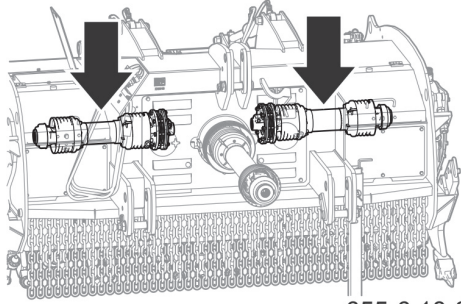
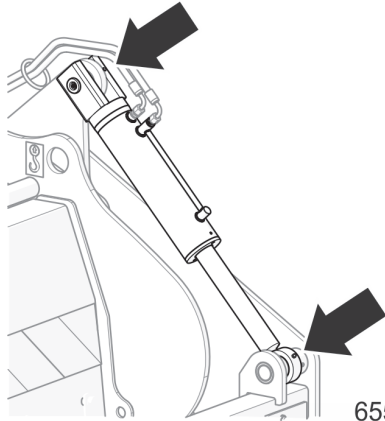
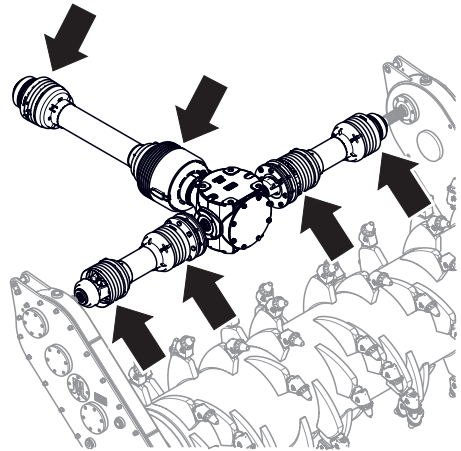
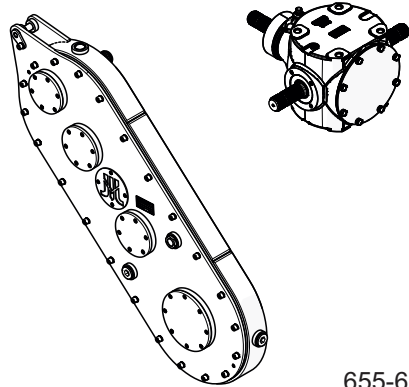
- Machine lubrication should be performed with the aid of a manually or foot operated grease gun, filled recommended grease. Before starting lubrication, remove old grease and other contamination. After completed lubrication, wipe off excess grease.
- Parts to be lubricated with machine oil should be wiped with dry clean cloth. Apply oil to their surfaces using a brush or oil can. Wipe off excess oil.
- Empty grease or oil containers should be disposed of according to the recommendations of the lubricant Manufacturer.
- If the machine will not be used for more than a month, lubrication should be carried out regardless of the period of the last treatment

Table 6.5. 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	Gear oil ISO VG 150 EP

Table 6.6. Machine lubrication schedule

Name	Number of lubrication points	Type of grease	Frequency	
Working roller bearings	2	B	2D	 <p>655-6.11-1</p>
Levelling roller bearings (option)	2	B	2D	 <p>655-6.12-1</p>
Pins of the working roller cover actuators	4	A	7D	 <p>655-6.14-1</p>
PTO shaft pipes *	1	B	2D	 <p>655-6.15-1</p>

<p>Pipes of side PTO shafts *</p>	<p>2</p>	<p>B</p>	<p>6M</p>	 <p>655-6.18-2</p>
<p>Levelling roller actuator pins (option)</p>	<p>4</p>	<p>A</p>	<p>7D</p>	 <p>655-6.13-1</p>
<p>Joints and shaft covers *</p>	<p>6</p>	<p>B</p>	<p>2D</p>	 <p>655-6.16-1</p>
<p>Central transmission Gearing shaft</p>	<p>1 2</p>	<p>E</p>	<p>12M or 500 hours</p>	 <p>655-6.17-1</p>

*- For detailed information on operation and maintenance please refer to Operator Manual enclosed with the shaft.

6.11 CONSUMABLES



6.11.1 Hydraulic oil

TIP

The hydraulic system of the machine uses L-HL 32 Lotos oil.

Always adhere to the principle that the oil in the machine hydraulic system and in the tractor hydraulic system are of the same type. In the event of application of different types of oil make certain that both hydraulic substances may be mixed together. Application of different oil types may cause damage to machine or tractor. In a new machine, the hydraulic system is filled with L-HL32 Lotos hydraulic oil.

If it is necessary to change 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. Make sure that the chemicals used for this purpose do not damage the materials of the hydraulic system. During normal machine use change of hydraulic oil is not necessary, but if required, this operation should be entrusted to a specialist service point.

Because of its composition the oil applied 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 area of

Table 6.7. L-HL 32 hydraulic oil characteristics

Item	Name	Unit	
1	ISO 3448VG viscosity classification	-	32
2	Kinematic viscosity at 40°C	mm ² /s	28,8 – 35,2
3	ISO 6743/99 quality classification	-	HL
4	DIN 51502 quality classification	-	HL
5	Flash-point	C	230

**DANGER**

Do not use water to quench oil fires.

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 carbon dioxide, foam or extinguisher steam.

6.11.2 Lubricants

TIP

Lubrication frequency (see table *Machine lubrication schedule*):

For heavily loaded parts it is recommended to apply lithium greases with addition of molybdenum disulphide (MOS₂) or graphite. In the case of less loaded sub-assemblies the application of general purpose machine greases is recommended, which contain anticorrosion additives and have significant resistance to being washed away by water. Aerosol preparations (silicon greases and anticorrosive-lubricating substances) should have similar characteristics.

Before using the grease, read its information leaflet. Particularly relevant are safety rules and handling procedures for a given lubricant as well as waste disposal procedure (used containers, contaminated rags etc.). Information leaflet (material safety data sheet) should be kept together with grease.

6.11.3 Gear oil

Table 6.8. Characteristics of gear oil FUCHS RENOLIN CLP 150

Item	Name	Unit	
1	Classification according to ISO 3448VG	-	150
2	Viscosity index	-	96
3	Viscosity at 100°C	mm ² /s	14.5
4	Viscosity at 40°C	mm ² /s	150
5	Density at 15°C	kg/m ³	894
6	Fluidity loss temperature	°C	-24
7	Flash-point	°C	250

TIP

FUCHS RENOLIN CLP 150 - ISO VG 150 EP gear oil was used in the central gear and both gearing shafts

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6.12 TROUBLESHOOTING

Table 6.9. Troubleshooting

Problem	Possible cause	Solution
Excessive vibration	Damage or loss of teeth on the working roller.	Check condition and completeness, replace missing teeth if necessary.
	Loss of factory balance of the working roller due to damage to the roller, its teeth, and repeated repairs of worn out elements.	Balance the roller including the pins; performed by the machine manufacturer
	Uneven wear of the working roller teeth.	Replace excessively worn teeth.
	A stuck foreign body.	Remove.
The working roller rotates at an inappropriate speed.	Incorrect selection of the carrier's vehicle PTO rotational speed.	Select the appropriate PTO speed.
The operating roller does not rotate or stops during operation	Material entangled in the working roller, e.g. cables, ropes, wire	Remove the blockage.
	Failure of PTO shaft couplings.	Repair.
	Gear failure	Repair.
The hydraulic control of the machine does not work	Hydraulic connectors not properly connected to the carrier vehicle	Check the compatibility of connector types and correct connection.
	Damaged hydraulic lines	Replace damaged lines.
	Hydraulic oil level in the carrier vehicle is too low.	Check the oil level.

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