



**PRONAR Sp. z o.o.**

17-210 NAREW, UL. MICKIEWICZA 101A, PODLASKIE PROVINCE

phone:	+48 085 681 63 29	+48 085 681 64 29
	+48 085 681 63 81	+48 085 681 63 82
fax:	+48 085 681 63 83	+48 085 682 71 10

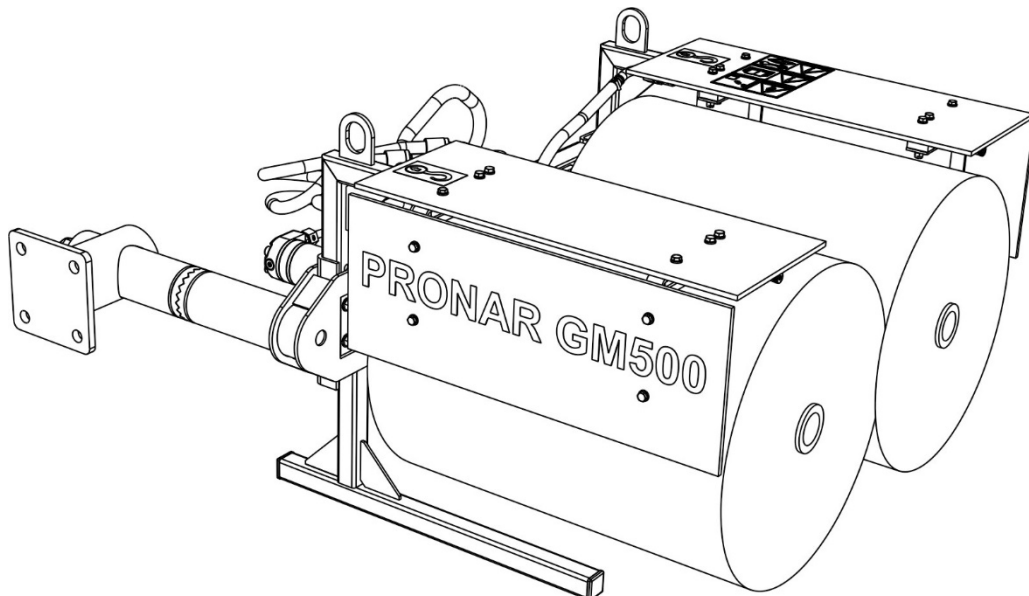
[www.pronar.pl](http://www.pronar.pl)

# OPERATOR`S MANUAL

## WASHING HEAD

## PRONAR GM500

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



EDITION 1B-04-2014

PUBLICATION NO. 269N-00000000-UM





# WASHING HEAD

# PRONAR GM500

## MACHINE IDENTIFICATION

SYMBOL /TYPE:

SERIAL NUMBER:

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# INTRODUCTION

Information contained herein is current at date of publication. As a result of improvements, some numerical values and illustrations contained in this publication may not correspond to the factual specification of the machine supplied to the user. The manufacturer reserves the right to introduce design changes in machines produced that facilitate operation and improve the quality of their work, without making minor amendments to this Operator's Manual.

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

The manual describes the basic safety rules and operation of PRONAR GM500 washing head. If the information stated in the Operator's Manual needs clarification then the user should refer for assistance to the sale point where the machine was purchased or to the Manufacturer.

## MANUFACTURER'S ADDRESS:

*PRONAR Sp. z o.o.  
ul. Mickiewicza 101A  
17-210 Narew*

## CONTACT TELEPHONES

<i>+48 085 681 63 29</i>	<i>+48 085 681 64 29</i>
<i>+48 085 681 63 81</i>	<i>+48 085 681 63 82</i>

## SYMBOLS APPEARING IN THIS OPERATOR'S MANUAL

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



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

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



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

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



Additional tips and advice for machine operation are marked with the sign:



and also preceded by the word "**TIP**".

## DIRECTIONS USED IN THIS OPERATOR'S MANUAL

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

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





**PRONAR Sp. z o.o.**

ul. Mickiewicza 101 A  
17-210 Narew, Polska

tel./fax (+48 85) 681 63 29, 681 63 81, 681 63 82,  
681 63 84, 681 64 29

fax (+48 85) 681 63 83

http://www.pronar.pl

e-mail: pronar@pronar.pl

## EC DECLARATION OF CONFORMITY OF THE MACHINERY

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

Description and identification of the machinery	
Generic denomination and function:	<b>Traffic sign cleaning head</b>
Type:	<b>GM500</b>
Model:	—
Serial number:	
Commercial name:	<b>Traffic sign cleaning head PRONAR GM500</b>

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

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

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

Narew, the 2011-03-24

*Place and date*

Z-CIA DYREKTORA  
d/s technicznych  
członkowie zarządu

*Roman Omelaniuk*

*Full name of the empowered person  
position, signature*





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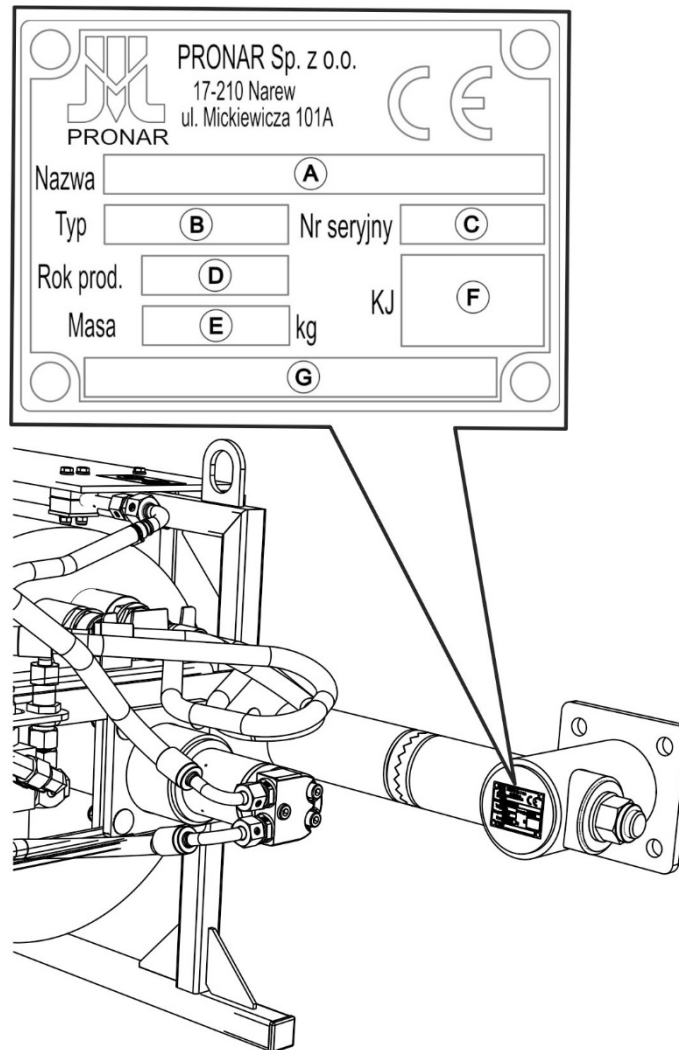
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**BASIC INFORMATION**

## 1.1 IDENTIFICATION



**FIGURE 1.1** Location of the data plate.

PRONAR GM500 washing head is marked with the data plate located on the head connection. 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'S MANUAL*.



- carefully read the *OPERATOR'S MANUAL* and comply with its recommendations,
- understand the machine's operating principle and how to operate it safely and correctly,
- adhere to the established maintenance and adjustment plans,
- comply with general safety regulations while working,
- prevent accidents,
- comply with the road traffic regulations and transport regulations in force in the given country, in which the machine is used,
- Carefully read the Operator's Manual of the agricultural tractor or implement carrier and the Operator's Manual of the multifunction arm and comply with their recommendations.

The washing head may only be used by persons, who:

- are familiar with the contents of this publication and with the contents of the Operator's Manual of the agricultural tractor or implement carrier and the Operator's Manual of the multifunction arm,
- have been trained in the washing head operation and work safety,
- have the required authorisation to drive carrying vehicles and are familiar with the road traffic regulations and transport regulations.

## 1.3 EQUIPMENT

**TABLE 1.1** Equipment of PRONAR GM500 washing head

EQUIPMENT	STANDARD	OPTION
Operator's Manual	•	
Warranty book	•	

## 1.4 WARRANTY TERMS

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

The warranty does not cover those parts and sub-assemblies of the machine which are subject to wear in normal usage conditions, regardless of the warranty period. Consumables include, among others, the brushes.

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

the user will lose the right to warranty service.



### TIP

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

The user is obliged to report immediately on noticing any wear in the paint coating or traces of corrosion, and to have the faults rectified whether they are covered by the warranty or not. For detailed Terms & Conditions of Warranty, please refer to the WARRANTY BOOK attached to each newly purchased machine.

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

## 1.5 TRANSPORT

The washing head is ready for sale completely assembled and does not require packing. Packing is only required for the machine's technical documentation and any extra fittings.

### ATTENTION

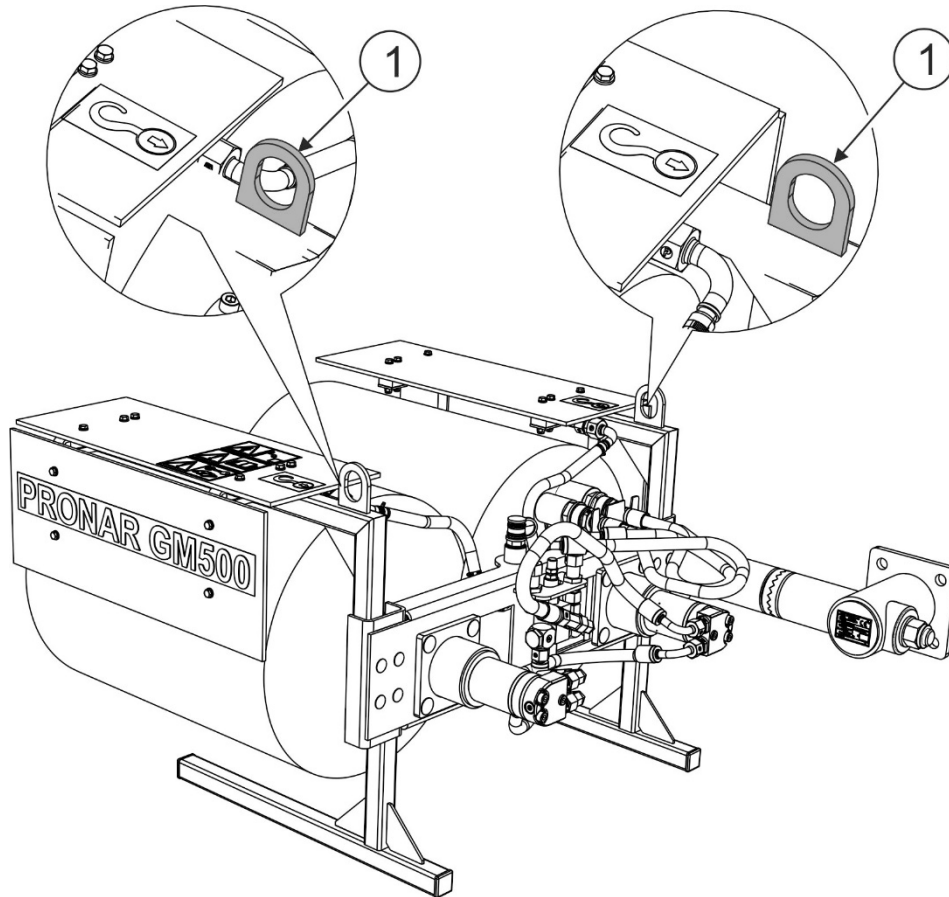


**Before transporting independently, the multifunction arm operator must carefully read this Operator's Manual and observe its recommendations. When being transported on a motor vehicle, the washing head must be mounted on the vehicle's platform in accordance with the transport safety requirements. The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

Delivery is either by transport on a vehicle or independently. Transport of the washing head connected to the multifunction arm is allowed provided that the tractor or implement carrier driver is familiar with the Operator's Manual of the washing head and the Operator's Manual of the multifunction arm, in particular, with the information concerning safety and principles of hitching and transport of the washing head on public roads. Do NOT drive the tractor or implement carrier with the multifunction arm and the washing head connected when visibility is limited.

When loading and unloading the washing head, comply with the general principles of workplace health and safety for reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines.

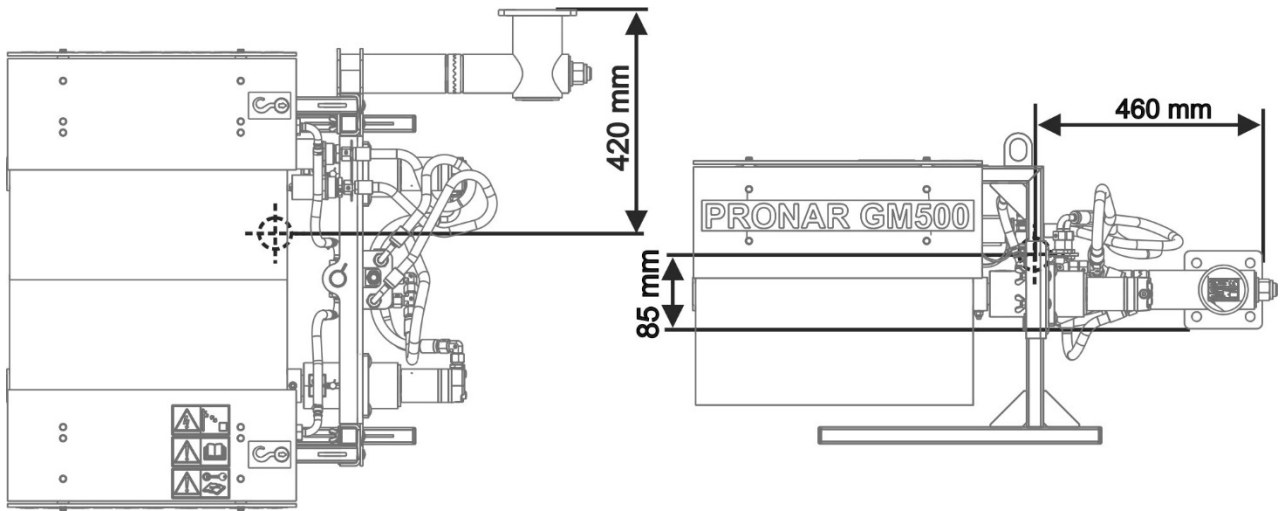




**FIGURE 1.2** Lifting equipment attachment points.

*(1)- attachment points*

The washing head should be attached to lifting equipment in places designed for this purpose (FIGURE 1.2), i.e. by the lugs on the right side and the left side of the washing head housing. The lifting equipment attachment points are marked with pictograms.



**FIGURE 1.3** Location of centre of gravity of the washing head.

The machine should be attached firmly to the platform of the vehicle using straps or chains fitted with a tightening mechanism. The fastening equipment used must have a valid safety certificate. Exercise due caution when lifting the machine. To keep lifted machine in the correct direction it is recommended to apply additional guy cables. During the loading work particular care should be taken not to damage paint coating.



**ATTENTION**

Nobody may be in the manoeuvring zone when moving the washing head to other means of transport.

## 1.6 ENVIRONMENTAL HAZARDS

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

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.

## 1.7 WITHDRAWAL FROM USE

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

Before proceeding to dismantle machine, oil shall be completely removed from hydraulic system.

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



### **ATTENTION**

**During dismantling, personal protection equipment shall be used i.e. protective clothing, boots, gloves and protective goggles etc.**

**Avoid contact of skin with oil. Do not allow used oil to spill.**



***SECTION***

**2**

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**SAFETY ADVICE**

## 2.1 BASIC SAFETY RULES

### 2.1.1 USE OF MACHINE

- Before using the machine, the user must carefully read this Operator's Manual and the *WARRANTY BOOK*. When operating the machine, the operator must comply with all recommendations contained in the Operator's Manual.
- The washing head may only be used and operated by persons qualified to drive agricultural tractors and carrying vehicles and trained in the use of the machine. The washing head can be operated by a single person only.
- If the information contained in the Operator's Manual is difficult to understand, contact the seller who runs the authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and incorrect use and operation of the machine, and non-compliance with the recommendations given in this operator's manual is dangerous to your health.
- Be aware of the residual risk. Use caution when operating the washing head and apply all relevant safety principles.
- This machine must never be used by persons who are not authorised to drive agricultural tractors or implement carrier, including children and people under the influence of alcohol, drugs or other drugs.
- Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.
- The machine must not be used for purposes other than those for which it is intended. Anyone who uses the washing head other than the way intended takes full responsibility for himself for any consequences of this use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the guarantee.
- The washing head may only be used when all the safety guards and other protective elements are technically sound and correctly positioned. In the event of loss or destruction of the safety guards, they must be replaced with new ones.
- Use personal protective equipment (hearing protectors) in order to limit occupational risks associated with exposure to noise during washing head

operation. In order to reduce the level of noise during work, the operator cab windows and door should be closed.

### **2.1.2 HITCHING AND UNHITCHING THE MACHINE**

- After hitching the machine, check the safeguards. Carefully read the tractor (carrying vehicle) Operator's Manual.
- Use only original bolts and protections to hitch the washing head to the multifunction arm.
- The multifunction arm to which the washing head will be hitched must be technically reliable and must fulfil the requirements of the washing head Manufacturer.
- Be especially careful when hitching and unhitching the machine.
- When hitching, there must be nobody between the washing head and the multifunction arm and the tractor.
- Do NOT unhitch the washing head from the multifunction arm if the washing head is raised. Exercise caution when unhitching the machine.
- Connect the machine with multifunction arm only when the tractor/carrying vehicle engine and the machine are off.
- The washing head disconnected from the multifunction arm must be placed in a stable manner on parking stands, on even and level surface.
- All hydraulic quick couplers of the washing head must be connected to the multifunction arm.
- The quick coupler of the washing head's sprinkler system must be connected to the water tank (additional equipment) with a water pump.

### **2.1.3 HYDRAULIC SYSTEM**

- The hydraulic system is under high pressure when operating.
- Regularly check the technical condition of the connections and the hydraulic conduits. There must be no oil leaks.
- In the event of the hydraulic system malfunction, discontinue using the machine until the malfunction is corrected.

- When connecting the hydraulic conduits to the hydraulic motor, make sure that the hydraulic system of the multifunction arm is not under pressure. If necessary, reduce residual pressure in the system.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may penetrate the skin and cause infections. In the event of contact of oil with eyes, rinse eyes with a large quantity of water and in the event of the occurrence of irritation consult a doctor. In the event of contact of oil with skin wash the area of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene).
- Use the hydraulic oil recommended by the Manufacturer. Never mix two types of oil.
- After changing the hydraulic oil, the used oil should be properly disposed of. Used oil or oil which has lost its properties should be stored in original containers or replacement containers resistant to action of hydrocarbons. Replacement containers must be clearly marked and appropriately stored.
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.
- Rubber hydraulic conduits must be replaced every 4 years regardless of their technical condition.
- Repair and replacement of hydraulic system elements should be entrusted to the appropriately qualified persons.

#### **2.1.4 TRANSPORTING THE MACHINE**

- When driving on public roads, comply with the road traffic regulations in force in the country in which the machine is used.
- Do not exceed the permitted speed arising from road conditions and design limitations. Adjust travelling speed to the prevailing road conditions and other limitations specified in the road traffic regulations.
- Before driving off, the washing head must be folded to transport position and mounted on the hitch of the multifunction arm head.
- Do NOT leave machine raised and unsecured while the tractor (implement carrier) is parked. When parked, the machine should be lowered.



- Do not transport the washing head set in the working position.
- The washing head may not be used or transported in conditions of limited visibility.
- 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 linkage, sprinkler system, washing head's guards and brushes and hydraulic system connections.
- Reckless driving and excessive speed may cause accidents.

### **2.1.5 MAINTENANCE**

- During the warranty period, any repairs may only be carried out by warranty service authorised by the Manufacturer. It is recommended that necessary repairs to machine should be undertaken by specialised workshops.
- In the event of any fault or damage, do not use the washing head until the fault has been corrected.
- During work, use the proper, close-fitting protective clothing, gloves and appropriate tools. When working on hydraulic system it is recommended to use oil resistant gloves and protective goggles.
- Any modification to the washing head frees the manufacturer from any responsibility for damage or detriment to health, which may arise as a result.
- Before undertaking any work on the washing head, turn off the tractor/carrying vehicle engine and wait until all rotating parts come to a stop.
- Regularly check the technical condition of the safety devices and correct tightening of bolt connections.
- Regularly perform service inspections of machine as recommended by the Manufacturer.
- Do NOT perform maintenance or repair work under raised and unsupported machine.
- Before beginning repair works on hydraulic systems, reduce oil pressure.
- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately

cleaned and disinfected. In the event of more serious injuries, seek a doctor's advice.

- Repair, maintenance and cleaning work should be carried out with the tractor/carrying vehicle engine turned off and the ignition key removed. Immobilise the tractor/carrying vehicle with parking brake. Ensure that unauthorised persons do not have access to the vehicle cab.
- Should it be necessary to change individual parts, use only original parts. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and invalidate the warranty.
- Regularly check technical condition and mounting of all guards and protective elements.
- In the event of work requiring the washing head to be raised, use properly certified hydraulic or mechanical lift jacks for this purpose. After lifting the machine, stable and durable supports must also be used. Do NOT carry out work under the machine, which has only been raised with the multifunction arm.
- The machine must not be supported using fragile elements (bricks or concrete blocks). The washing head should be positioned on parking stands.
- After completing work associated with lubrication, remove excess oil or grease.
- Damaged or excessively worn brushes must be replaced with new ones recommended by the washing head manufacturer.
- In order to reduce the danger of fire the machine must be kept in a clean condition.

### **2.1.6 WASHING HEAD OPERATION**

- Before lowering or lifting the washing head mounted on the multifunction arm, make sure there are no bystanders near the machine.
- Before starting work and starting the washing head drive, dismount the parking stands.
- Before starting the washing head drive, the washing head brushes must be set in working position.

- Before starting the washing head, 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.
- Start working with the washing head only when the nominal speed of the multifunction arm PTO or nominal hydraulic power is reached. Do NOT overload the washing head.
- When operating the washing head, do NOT use a PTO speed higher than nominal and the oil pressures and flow rates exceeding the recommended ones.
- Do NOT leave the tractor/carrying vehicle cab, when the machine drive is engaged.
- Do NOT stand within the washing head's working zone.
- Do NOT approach the guards of the brushes until the rotating parts come to a complete stop.
- Do NOT operate the washing head while reversing. While reversing, raise the washing head.
- Keep a safe distance from overhead electric power lines during travel with raised washing head.

## 2.2 RESIDUAL RISK

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

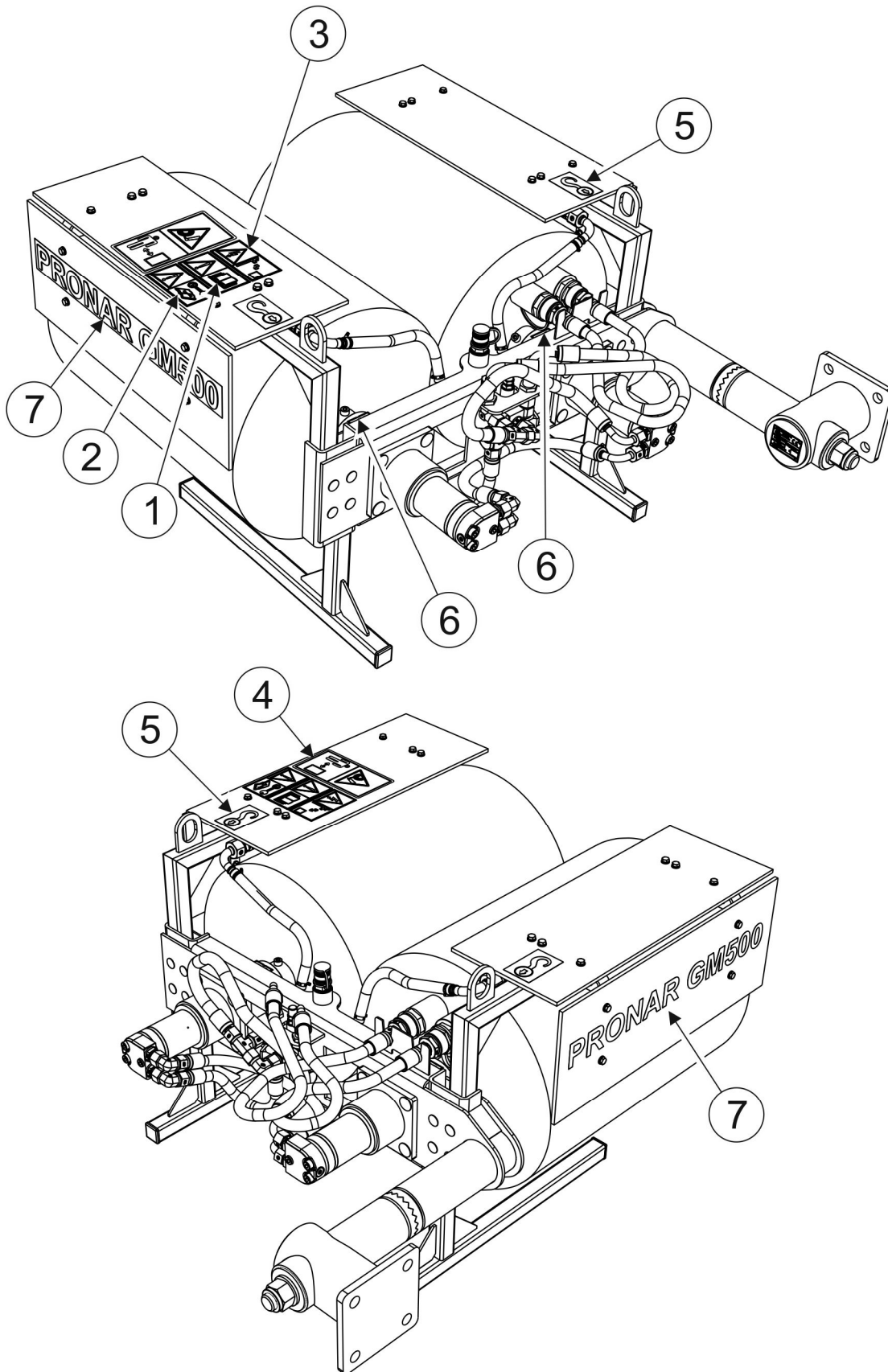
- using the machine for purposes other than those for which it is intended,
- being between the tractor/carrying vehicle and the machine while the engine is running and when the machine is being attached,
- being on the machine while the engine is running,
- operating the washing head with removed or faulty safety guards,
- not maintaining a safe distance from the danger zone or being within the zones while the machine is operating,
- operation of the machine by persons under the influence of alcohol,
- cleaning, maintenance and technical checks when the multifunction arm is connected and working.

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

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

## 2.3 INFORMATION AND WARNING DECALS

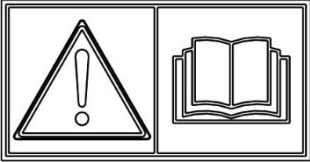
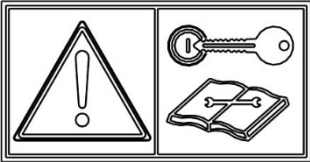
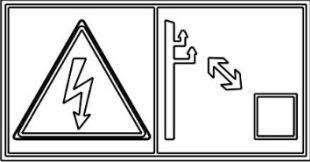
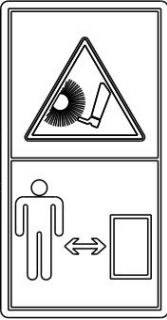
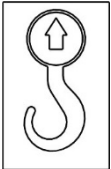


The washing head is labelled with the information and warning decals mentioned in table (2.1). The symbols are positioned as shown in figure (2.1). Throughout the time it is in use, the user of the machine is obliged to take care that notices and warning and information symbols located on the machine are clear and legible. In the event of their destruction, they must be replaced with new ones. Safety decals are available from your PRONAR dealer or directly from PRONAR customer service. New assemblies, changed during repair, must be labelled once again with the appropriate safety signs. When cleaning the washing head, do not use solvents which may damage the coating of information label stickers and do not subject them to strong water jets.



**FIGURE 2.1** Locations of information and warning decals

*Meaning of symbols (TABLE 2.1)*

**TABLE 2.1** Information and warning decals

ITEM	DECAL	MEANING
1		Before starting work, carefully read the Operator's Manual.
2		Before beginning maintenance or repairs, turn off engine and remove key from ignition.
3		Take particular care while working near electric power lines. Danger of electric shock.
4		Do NOT approach and do NOT touch rotating brushes.
5		Transport lugs marking.
6		Lubrication points
7		Machine type

Numbers in the Item column correspond to decals (FIGURE 2.1)





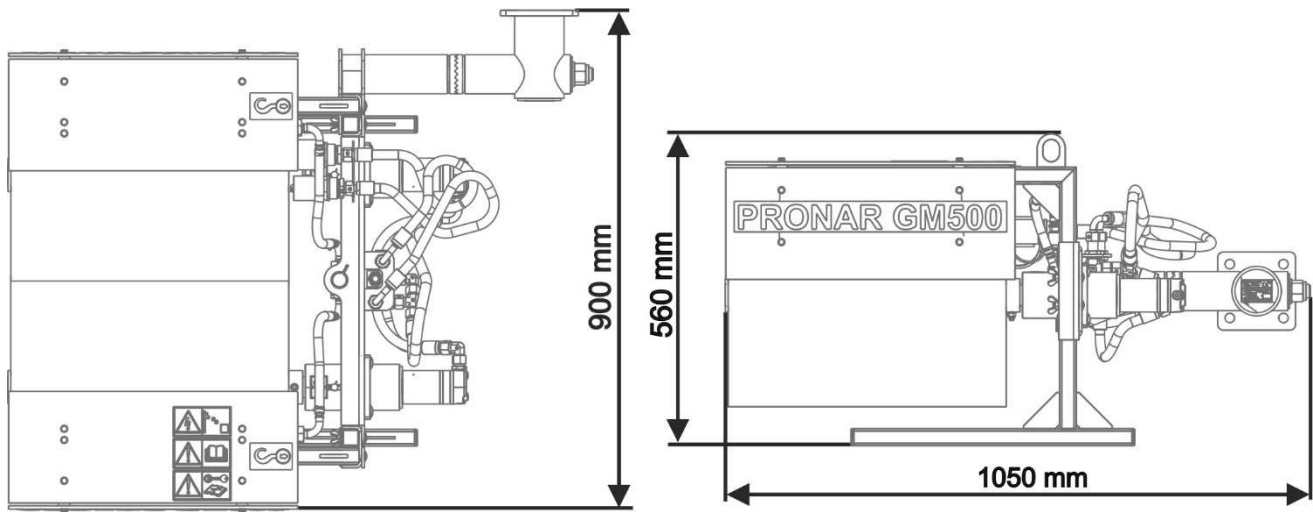
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**3**

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**DESIGN AND  
OPERATION**

### 3.1 TECHNICAL SPECIFICATION

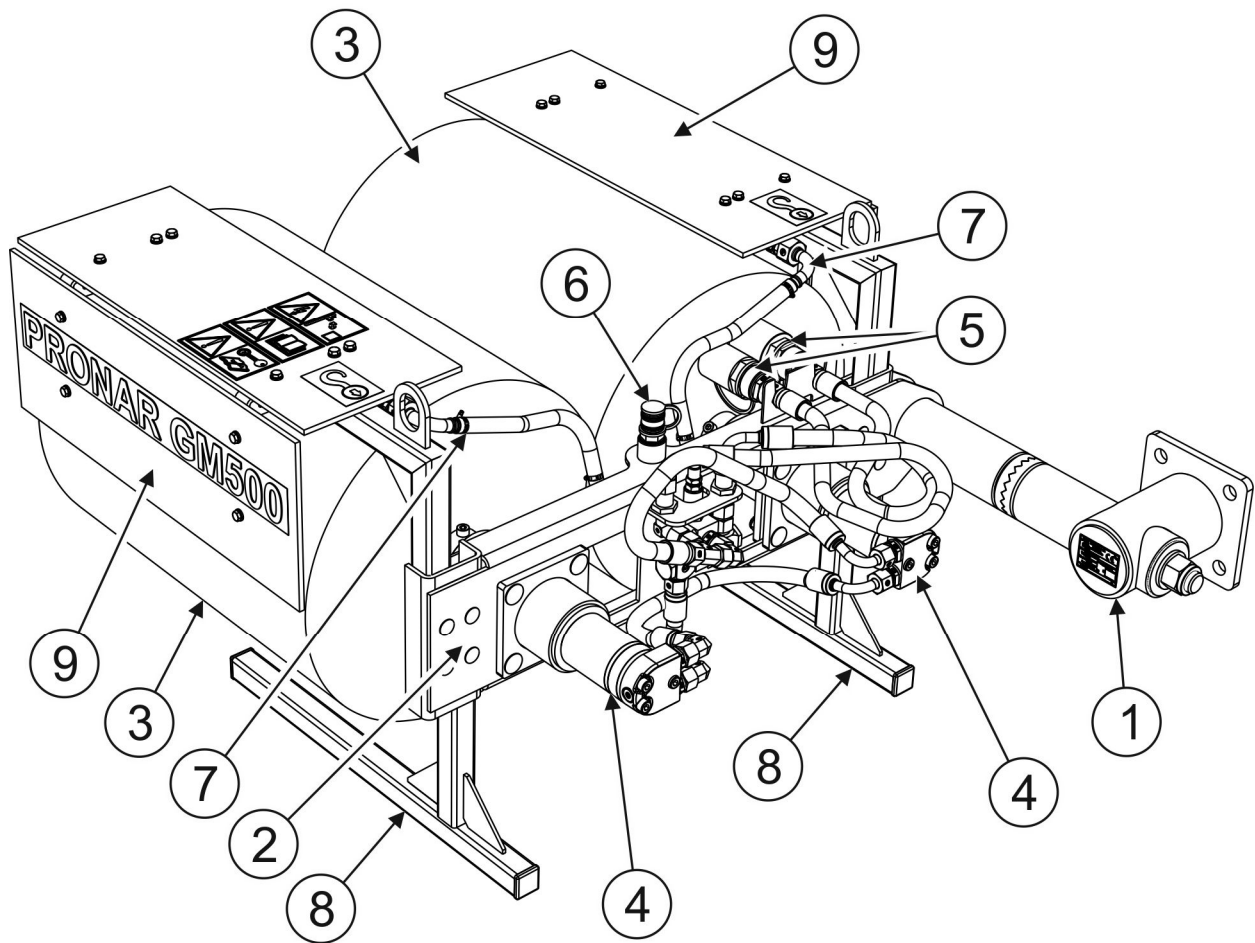


**FIGURE 3.1 Basic dimensions**

**TABLE 3.1 BASIC TECHNICAL DATA**

	Unit	GM500
<b>Dimensions and weight</b>		
Transport length:	mm	1050
Transport width:	mm	900
Transport height:	mm	560
Tare weight	kg	70
<b>Technical specification</b>		
Linkage:		Multifunction arm WWP600 / WWP500 / WWP500U / WWP500UH
Brush diameter	mm	Ø400
Brush length	mm	500
Number of brushes	pc.	2
Nominal oil working pressure	bar	100
Water pressure	bar	2 - 4

## 3.2 GENERAL DESIGN



**FIGURE 3.2 General design.**

(1)- connection; (2)- frame; (3)- brushes; (4)- hydraulic motor; (5)- quick couplers of hydraulic conduits; (6)- quick coupler of water supply conduit; (7)- sprinkler system; (8)- parking stands; (9)- guards.

The washing head consists of frame (2) (FIGURE 3.2) with connection (1) that enables the connection of the washing head with the head of WWP600, WWP500, WWP500U or WWP500UH multifunction arm by means of four bolts. When parked, the washing head is supported on two parking stands (8).

The washing head is driven by two hydraulic motors (4) supplied with oil using hydraulic conduits with quick couplers (5) from the multifunction arm. The hydraulic motors (4) drive the brush shafts (3) directly via coupling and rotate the roller brushes in the opposite directions.

Sprinkler system (7) is supplied with pressurized water from the water tank (not included in the washing head equipment) through quick coupler (6). The sprinkler system consists of two

metal pipes located above the brushes (3). Water is sprayed to the brushes (3) through the openings in the pipes. Guards (9) protect the brushes and the sprinkler system against excessive water splashes during washing and protect bystanders against the risk caused by rotating brushes.

***SECTION***

**4**

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**CORRECT USE**

## 4.1 PREPARING FOR WORK

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.



### ATTENTION

**Before using the washing head always check its technical condition. In particular check the technical condition of the brushes, drive system, and integrity of protective guards.**

Before hitching to the multifunction arm, the machine operator must check the technical condition of the washing head and prepare it for test start-up. In order to do this:

- the user must carefully read this Operator's Manual and observe all recommendations, understand the design and the principle of machine operation,
- check the condition of protective paint coat,
- inspect machine's individual components for mechanical damage resulting from incorrect transport (dents, piercing, bent or broken components),
- check technical condition of the hydraulic system and the sprinkler system;
- check if the brushes, linkage and protective guards are installed correctly.

If all the above checks have been performed and there is no doubt as to the machine's good technical condition, hitch the machine to the multifunction arm. Start the tractor/carrying vehicle's engine, check all systems and perform a test run before beginning work. In order to inspect:

- hitch the washing head to the multifunction arm (see "*HITCHING TO MULTIFUNCTION ARM*")
- set it in working position,
- power up the multifunction arm, and then use the control panel to start the washing head drive.

Engage the washing head's drive for 3 minutes and check the following:

- that there is no knocking or noise in the hydraulic motor arising from scraping or grinding of metal elements,
- that the washing head's brushes do not vibrate excessively.

The washing head's operation at no load should be smooth. Shaking of hydraulic motor and brushes is not acceptable, nor is abnormal noise and vibrations coming from loose nut and bolt connections. After a complete stop of the brushes, check their mounting. Confirm that oil does not leak from the hydraulic motor.

## **DANGER**



**Before using the washing head, the user must carefully read this Operator's Manual.**

**Careless and incorrect use and operation of the washing head, and non-compliance with the recommendations given in this Operator's Manual is dangerous to your health.**

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

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

**Before starting the washing head, make sure that there are no bystanders in the danger zone.**

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

## 4.2 TECHNICAL INSPECTION

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

**TABLE 4.1 TECHNICAL INSPECTION SCHEDULE**

DESCRIPTION	MAINTENANCE ACTIVITIES	FREQUENCY
Condition of safety guards	Check the technical condition of safety guards, if complete and correctly mounted.	Daily before beginning work
Check if hydraulic conduits and linkage are correctly installed	Check if correctly installed	
Technical condition of the hydraulic system.	Check according to section " <i>DRIVE SYSTEM MAINTENANCE</i> "	
Check if all main nut and bolt connections are properly tightened	Tightening torque values should be according to table (5.2)	Every 2 hours
Lubrication points	Lubricate in accordance with the "LUBRICATION" section	Every 10 hours
Technical condition of drive system	Check mounting of hydraulic motors and brushes.	Every 2 hours
Technical condition of brushes	Visually inspect and, if necessary, replace	Every 8 hours



### ATTENTION

Do NOT use out of order washing head.



## 4.3 HITCHING TO MULTIFUNCTION ARM

PRONAR GM500 washing head can be hitched to WWP600, WWP500, WWP500U or WWP500UH multifunction arm.



### ATTENTION

Before hitching the washing head, the user must carefully read the operator's manuals of the washing head, tractor (carrying vehicle) and multifunction arm and observe all instructions contained in the manuals.



### DANGER

When hitching, there must be nobody between the machine and the tractor/carrying vehicle.

Exercise caution when hitching the machine.



### DANGER

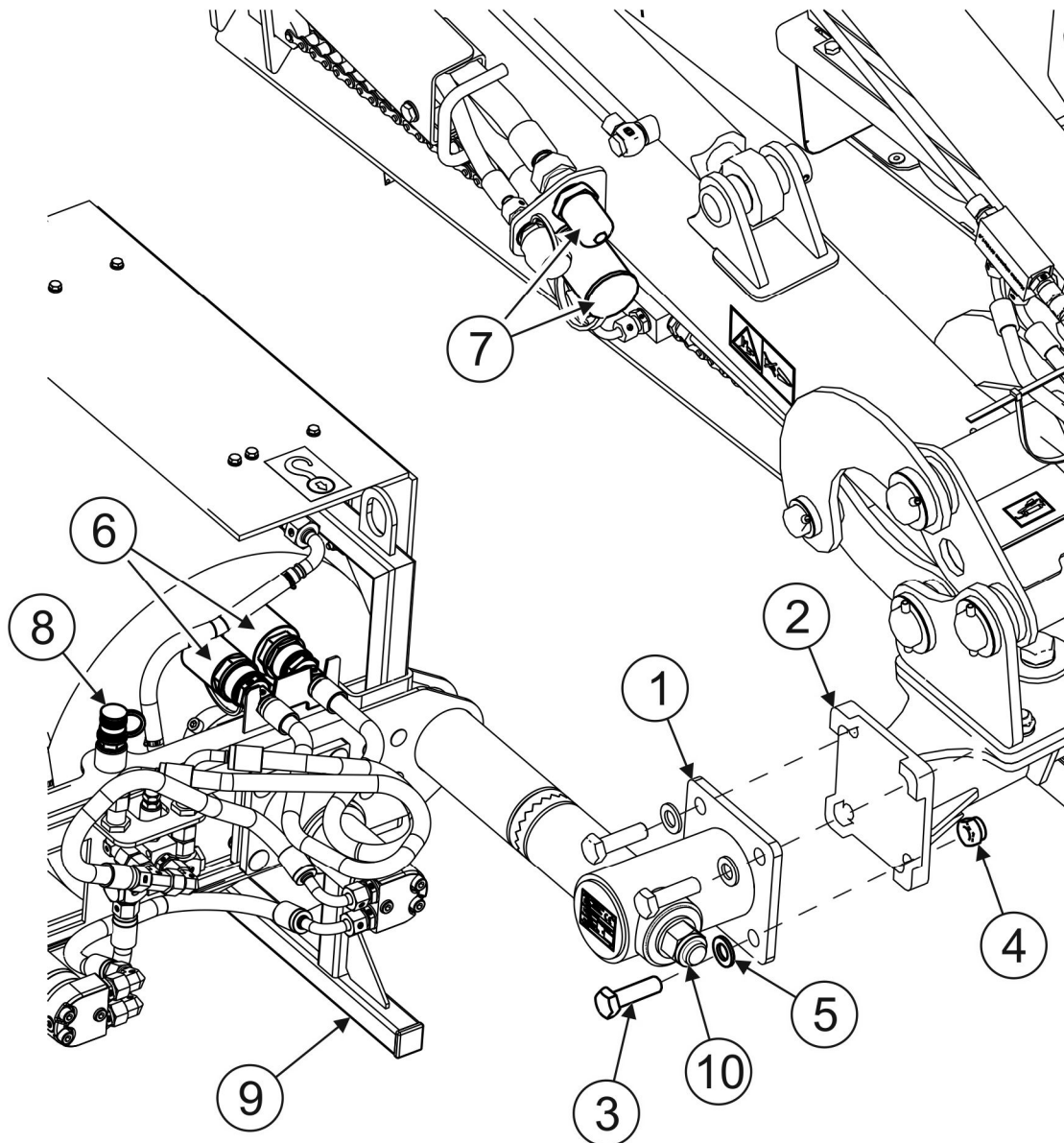
Before hitching the washing head, turn off the tractor/carrying vehicle's engine and remove the key from the ignition. Ensure that unauthorised persons do not have access to the tractor/carrying vehicle cab.

Check technical condition of the washing head's guards and general technical condition of the machine.

In order to hitch the washing head to the multifunction arm head (FIGURE 4.1), proceed as follows:

- Control the multifunction arm and bring its head (2) close to the connection (1) of the washing head.
- Using the control panel, set the multifunction arm head (2) at the same height with the washing head connection.
- Immobilize the tractor/carrying vehicle and prevent it from moving.
- Connect the multifunction arm head (2) to the washing head connection (2) using four fixing bolts (3).
- Connect quick couplers of hydraulic conduits (7) of multifunction arm to quick couplers (6) of hydraulic motors of washing head.

- Connect quick coupler of water tank's water conduit to quick coupler (8) of washing head's sprinkler system.
- Raise washing head using control panel of multifunction arm.



**FIGURE 4.1** Hitching to multifunction arm

(1)- washing head connection; (2)- multifunction arm head; (3)- bolt; (4)- nut; (5)- washer; (6)- quick couplers of washing head's hydraulic system; (7)- quick couplers of multifunction arm; (8)- quick coupler of washing head's sprinkler system; (9)- parking stand; (10)- nut for adjusting the head inclination angle.

**DANGER**

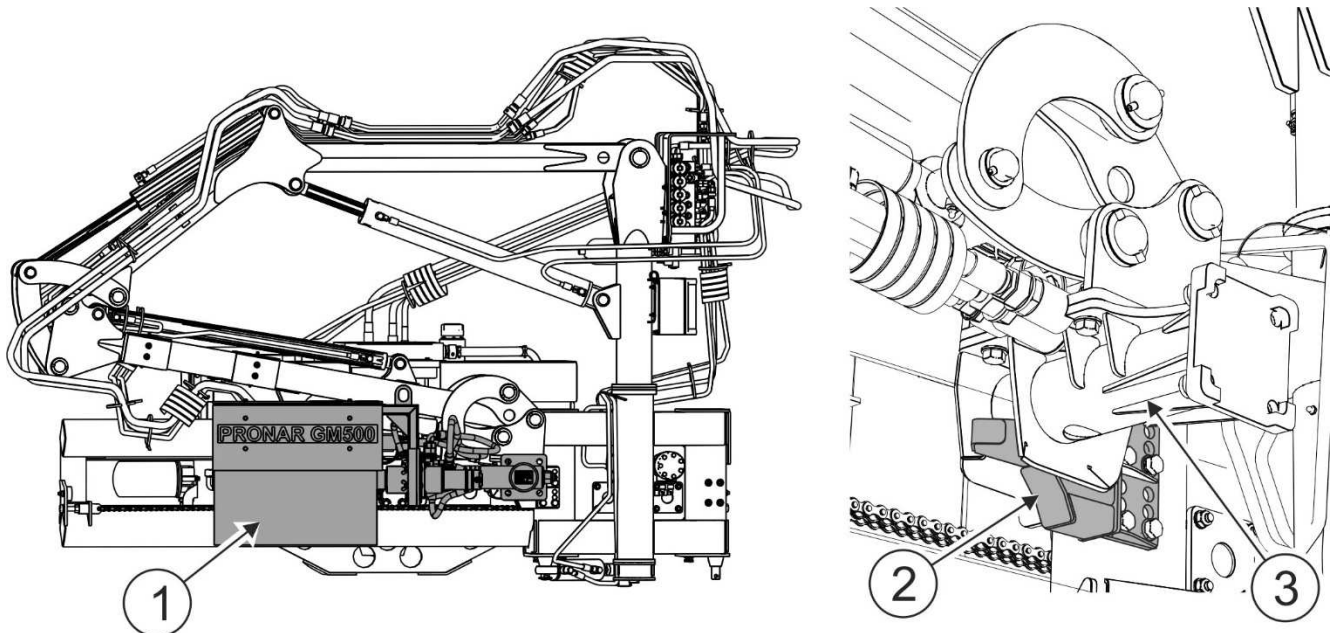
Prior to connecting individual hydraulic system conduits, the user must carefully read the operator's manual of the multifunction arm and observe all recommendations of the Manufacturer.

**DANGER**

When connecting the hydraulic conduits to the washing head, make sure that the hydraulic system of the multifunction arm is not under pressure.

## 4.4 TRANSPORTING THE MACHINE

For transport to place of work and back, raise the washing head (1) and mount it on hitch (2) of multifunction arm head (3) (FIGURE 4.2).



**FIGURE 4.2** Transport position

(1)- washing head in transport position; (2)- hitch of multifunction arm head; (3)- multifunction arm head.



### ATTENTION

During transport, the washing head should be positioned parallel to the ground as shown in FIGURE 4.2. If necessary, adjust the washing head position by turning it with regard to the connection (1) (FIGURE 4.1).

## 4.5 SETTING AND OPERATION OF WASHING HEAD

### 4.5.1 SETTING THE WASHING HEAD IN WORKING POSITION

To set the washing head in working position:

- Dismount the parking stands (9) of the washing head (FIGURE 4.1)
- If necessary, set a proper working angle of the washing head. To do this, loosen adjusting nut (10) (FIGURE 4.1) to enable the rotation of washing head with regard to connection (1). When a proper working angle is set, tighten adjusting nut (10) to prevent the rotation of washing head with regard to connection (1).
- Raise the washing head above the hitch of the multifunction arm head (FIGURE 4.2)
- Controlling appropriate hydraulic circuits, set the arms of the multifunction arm so as to place the washing head in the working area.

### 4.5.2 WASHING HEAD OPERATION

#### **DANGER**



The washing head may only be started when all guards are complete and the washing head is set in working position.

Before engaging the washing head drive make sure that there are no bystanders, especially children, near the washing head.

Bystanders should stay at a safe distance from the washing head during its operation.

After setting the washing head in working position, the washing head drive may be started.

#### **HIGH NOISE LEVEL WARNING**



Depending on the working conditions, the tractor (carrying vehicle) with the machine may generate noise exceeding the level of 85dB at the driver position. In such conditions the operator should use personal protective equipment (ear protectors).

In order to reduce the level of noise during work, the operator cab windows and door should be closed.

When operating the washing head, pay attention to obstacles in the working area (power lines, poles, fences, etc.). Working speed of the washing head depends on degree of contamination of a surface to be cleaned, as well as the type of terrain where tractor (carrying vehicle) is moving. Travelling speed during operation must not exceed 2 km/h.

Working speed of the washing head should be limited if:

- surface to be cleaned is heavily contaminated,
- the terrain is uneven and there are obstacles nearby,
- there is a high risk of collision with an obstacle.

When driving across the road, pavement or other obstacles and when making turns, raise the washing head by means of the multifunction arm and disengage the washing head drive.

Exercise due caution during operation. If the washing head's drive system is stopped during operation, disengage the drive and check the cause of failure.

## 4.6 UNHITCHING FROM MULTIFUNCTION ARM



### **DANGER**

**Reduce pressure prior to disconnecting the hydraulic system.**

In order to unhitch the washing head from the multifunction arm (FIGURE 4.1), proceed as follows:

- install the parking stands (9) of the washing head (FIGURE 4.1)
- lower the washing head by means of the multifunction arm to rest position, on level surface,
- power off the multifunction arm and remove the key from ignition
- reduce residual pressure in the hydraulic system by movement of appropriate lever controlling hydraulic circuit,
- disconnect quick couplers (4) of hydraulic system conduits from the washing head's hydraulic motors and protect with plugs,
- disconnect multifunction arm head (2) from washing head connection (1) by unscrewing four bolts (3) that fix the head to the connection,

The washing head unhitched from the multifunction arm should be supported on the parking stands.

***SECTION***

**5**

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**MAINTENANCE**

## 5.1 INSPECTION AND DISASSEMBLY OF SAFETY GUARDS

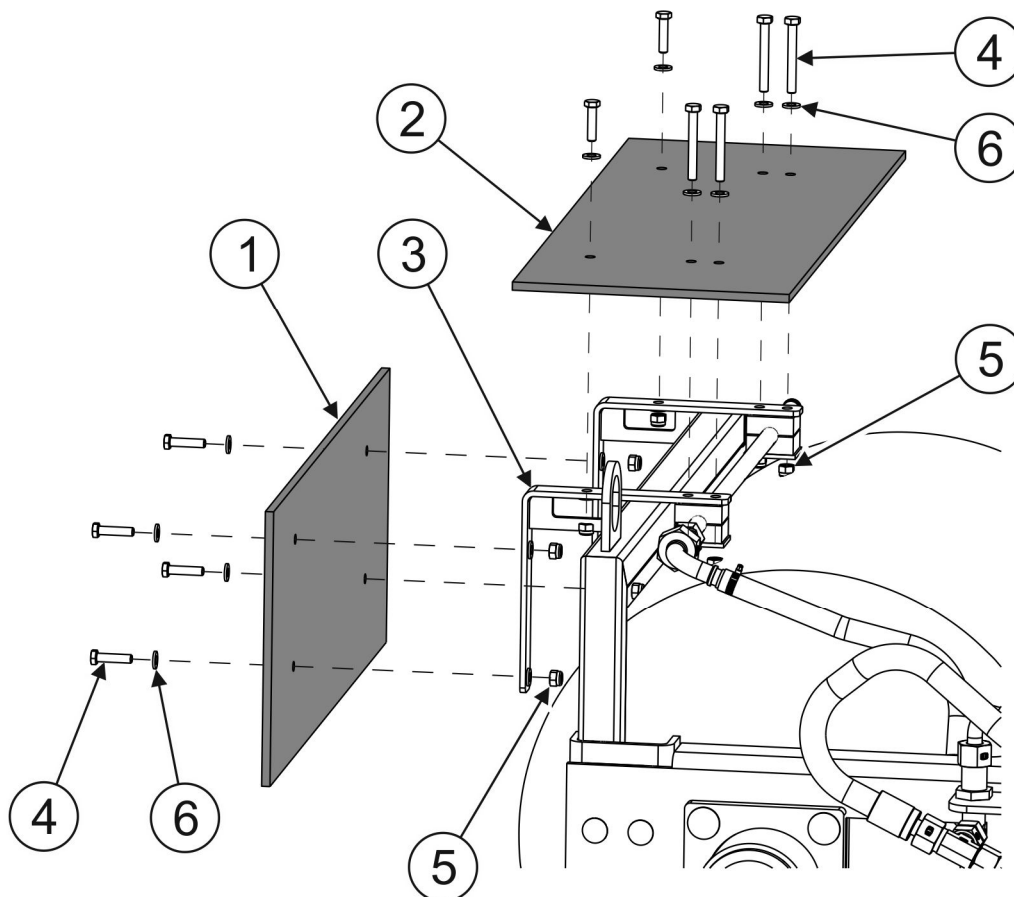
The washing head may only be used when all the safety guards and other protective elements are technically sound and correctly positioned. The guards should ensure protection against ejected contaminations. In the event of loss or destruction of the safety guards, they must be replaced with new ones.



### DANGER

When inspecting and dismantling safety guards be sure to power off the multifunction arm. Washing head must rest on the ground. Ensure unauthorised persons, especially children, have no access to the machine.

Method of disassembly of safety guards of washing head's brushes is shown in FIGURE 5.1.



**FIGURE 5.1 Disassembly of safety guards of washing head's brushes.**

(1)- side brush guard; (2)- upper brush guard; (3)- bracket; (4)- bolt; (5)- nut; (6)- washer.

When disassembling side guard (1) and upper guard (2), undo nuts (5) and remove bolts (4) that fix guards (1) and (2) to brackets (3).




Pay special attention to correct mounting of safety guards. Bolts should be tightened using appropriate tightening torque according to TABLE 5.3. TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS.

**ATTENTION**

The washing head must not be started if safety guards are damaged, incorrectly mounted or unsecured.

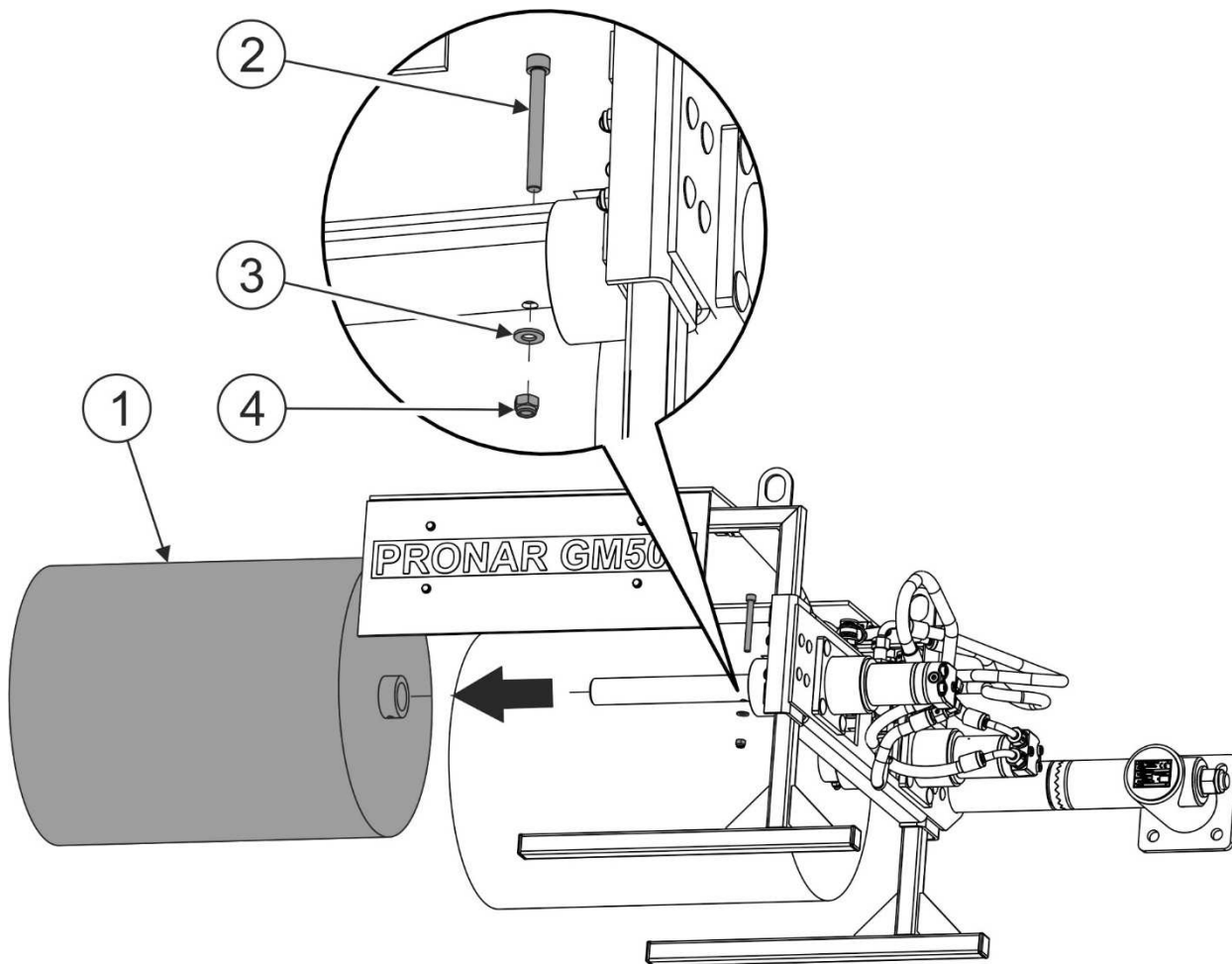
## 5.2 INSPECTION AND REPLACEMENT OF BRUSHES



**DANGER**

Before inspecting or replacing the brushes, turn off the tractor/carrying vehicle's engine and remove the key from the ignition. The washing head must be mounted on the hitch of the multifunction arm's head in transport position and supported on stable and strong supports.

Regularly inspect the brushes. Visually inspect the degree of wear of brushes and mounting of the brushes to the shaft. A damaged or worn brush must be replaced with a new one provided by the washing head manufacturer (part number: 269N-0000001). Clean the washing head before replacing the brush.



**FIGURE 5.2** Brush replacement  
 (1)- brush; (2)- bolt; (3)- washer; (4)- nut.

In order to replace the brush proceed as follows (FIGURE 5.2):

- undo nut (4) and remove bolt (2) that fixes the brush to the shaft;
- remove a worn or damaged brush from the shaft;
- install a new brush on the shaft in such a manner as to ensure that the fixing bolt (2) openings in the brush align with the opening in the shaft;
- connect the brush with the shaft by means of fixing bolt (2), install washer (3) and tighten fixing nut (4).

When replacing the brush (1) (FIGURE 5.2), pay attention to condition of bolt (2) that fixes the brush to the shaft. Damaged brush fixing bolt should be replaced with a new one of the same type.



### **ATTENTION**

Damaged or excessively worn brush may cause excessive vibration of washing head, cause damage to washing head and pose a risk for the operator.



### **DANGER**

Use only the brushes provided by the washing head Manufacturer.



### **ATTENTION**

Each time before starting work, check technical condition of brushes and their mounting.

## 5.3 DRIVE SYSTEM MAINTENANCE



### **DANGER**

Do NOT perform service or repair work under raised and unsupported machine.

Drive system maintenance involves periodic inspection of the condition of hydraulic motor's hydraulic conduit connections and the condition of mounting of hydraulic motors to washing head frame.



Connections of hydraulic conduits supplying hydraulic motor should be checked daily.



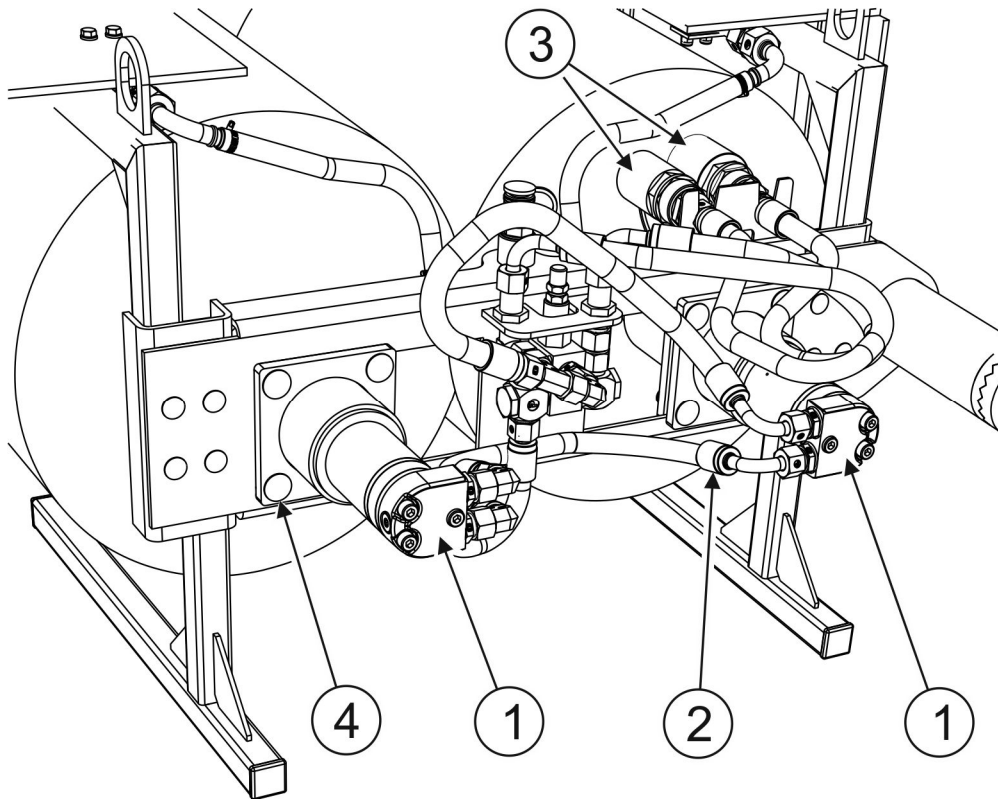
### **DANGER**

Before commencing whatever work on hydraulic system reduce the pressure in the system.



### **DANGER**

During work on hydraulic system, use the appropriate personal protection equipment i.e. protective clothing, footwear, gloves and eye protection. Avoid contact of skin with oil.



**FIGURE 5.3 Inspecting connections of quick couplers of hydraulic motor's hydraulic conduits.**

(1)- hydraulic motor; (2)- hydraulic conduits; (3)- quick couplers of motor's hydraulic conduits; (4)- bolts fixing the motor to the frame.

Make sure that the oil in the washing head's hydraulic system is of adequate grade. Do not add hydraulic oil of other grade. The hydraulic system of a new washing head is filled with HL46 hydraulic oil.



### ATTENTION

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

The hydraulic system should be completely tight. If oil leak is detected on hydraulic motor body (1) (FIGURE 5.6), ascertain origin of leak. In the event of noticing leaks stop using the machine until faults are remedied.

Connections of hydraulic conduits (2) to hydraulic motor (1) and quick couplers (3) of the multifunction arm should be tight.

In the event of confirmation of an oil leak on hydraulic conduit connections, tighten connections, and if this does not remedy faults then change conduit or connection elements.

Always exchange each mechanically damaged component. Also, pay attention to ensure that flexible hydraulic conduits are not fractured.



**Flexible hydraulic conduits should be replaced after 4 years of use.**

**TABLE 5.1 L-HL 32 Lotos hydraulic oil characteristics**

ITEM	NAME	VALUE
1	ISO 3448VG viscosity classification	32
2	Kinematic viscosity at 40°C	28,8 ÷ 35,2 mm <sup>2</sup> /s
3	ISO 6743/99 quality classification	HL
4	DIN 51502 quality classification	HL
5	Flash-point	above 210 °C

Because of its composition, the oil is not classified as a dangerous substance, however long-term action on the skin or eyes may cause irritation. In the event of contact of oil with skin wash the place of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory tract. A hazard only occurs when oil is strongly atomised (oil vapour), or in the case of fire during which toxic compounds may be released. Oil fires should be quenched with carbon dioxide (CO<sub>2</sub>), foam or extinguisher steam. Do NOT use water for fire extinguishing.

Spilt oil should be immediately collected and placed in a marked tight container. Used oil should be taken to the appropriate facility dealing with recycling or regeneration of oils.

## 5.4 STORAGE

After completed work, the washing head should be thoroughly cleaned and washed with a water jet. While cleaning, do not direct a strong water or steam jet at information and warning decals or hydraulic conduits. Nozzle of pressure or steam washer should be kept at a distance of not less than 30 cm from cleaned surface.


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

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

If the washing head shall not be used for a long period of time, protect it against adverse weather conditions.

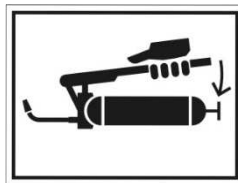
## 5.5 LUBRICATION

Machine lubrication should be performed with the aid of a manually or foot operated grease gun, filled with generally available grease. Before commencing lubrication insofar as is possible remove old grease and other contamination. Remove and wipe off excess oil or grease

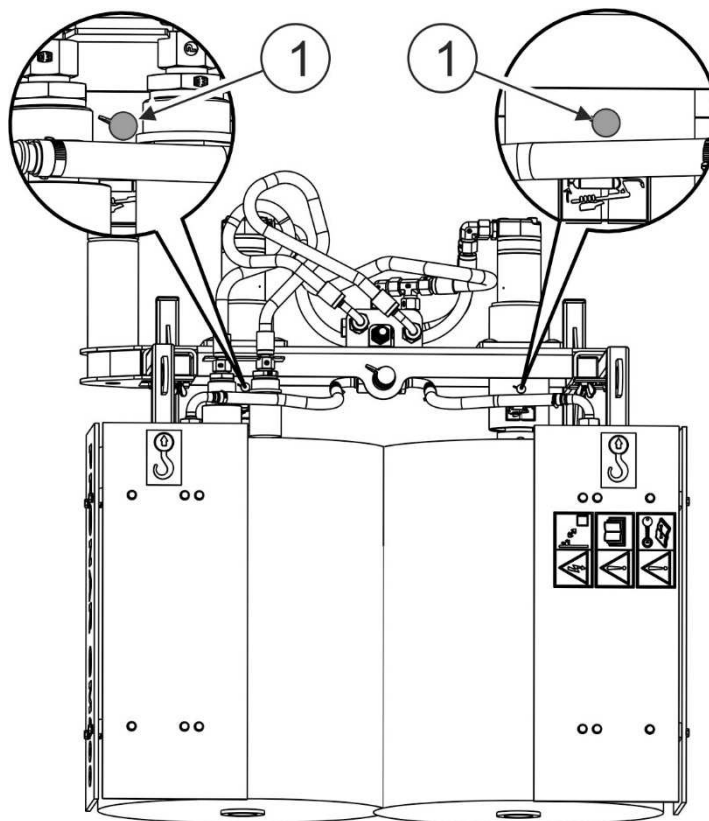


**When using the machine the user is obliged to observe lubrication instructions according to attached schedule. Excess lubricant causes depositing of additional contaminants in places requiring lubrication, therefore it is essential to keep individual machine components clean.**

Grease the grease nipples located on the brush shaft bearing housing, marked with the pictogram:



and shown in FIGURE 5.4.



**FIGURE 5.4 Lubrication points.**

*(1)- grease nipples of brush shaft bearings*



## 5.6 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

Unless other tightening parameters are given, during maintenance and repair work apply appropriate tightening torque to bolt and nut connections. Recommended torque values apply to non-greased steel bolts.



### ATTENTION

Should it be necessary to change individual parts, use only original parts or those indicated by the Manufacturer. Non-adherence to these requirements may put the user and other people's health and life at risk, and also cause damage to the machine.

**TABLE 5.2 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS**

THREAD DIAMETER [mm]	5.8	8.8	10.9
	TIGHTENING TORQUE [Nm]		
M6	8	10	15
M8	18	25	36
M10	37	49	72
M12	64	85	125
M14	100	135	200
M16	160	210	310
M20	300	425	610
M24	530	730	1 050
M27	820	1 150	1 650
M30	1050	1 450	2 100
M32	1050	1 450	2 100

## 5.7 TROUBLESHOOTING

**TABLE 5.3 TROUBLESHOOTING**

<b>TYPE OF FAULT</b>	<b>CAUSE</b>	<b>REMEDY</b>
It is impossible to start the washing head drive	Incorrectly connected or damaged quick couplers of the multifunction arm	Check quick couplers and manner of their connection
	Hydraulic system of multifunction arm is out of order	Check condition of the multifunction arm's hydraulic system
It is impossible to set the washing head by means of the multifunction arm	Hydraulic system of multifunction arm is out of order	Check condition of the multifunction arm's hydraulic system
Excessive vibration during work	Damaged brush or shaft. Incorrectly mounted brush or hydraulic motors	Check brushes, shaft and mounting of motors, replace if necessary
Washing head drive stops during operation	The multifunction arm's hydraulic system or the washing head's hydraulic motor is out of order	Repair at an authorised service point

# NOTES

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