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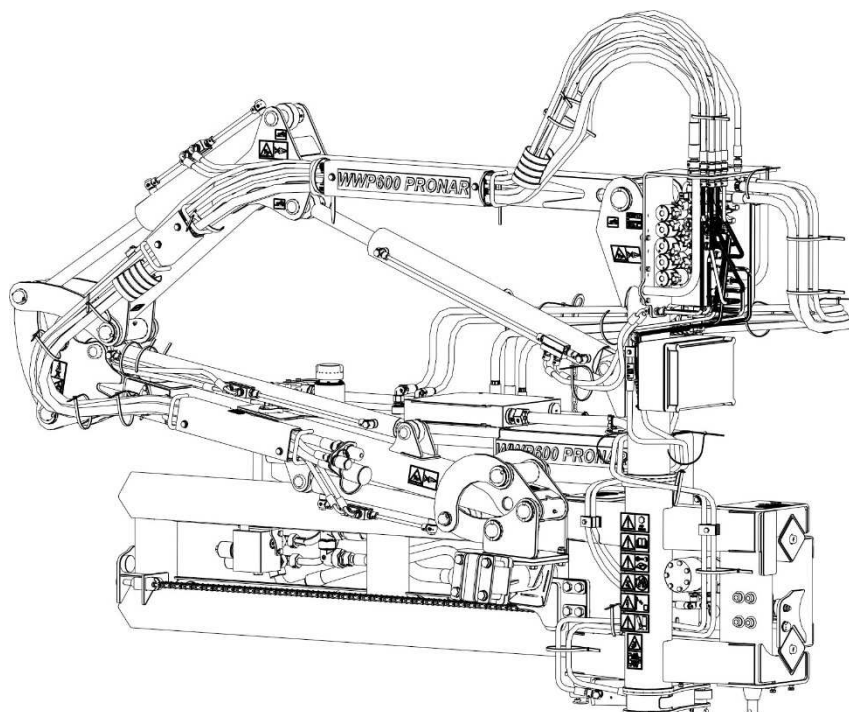
www.pronar.pl

OPERATOR'S MANUAL

MULTIFUNCTION ARM

PRONAR WWP600 / PRONAR WWP500

TRANSLATION OF THE ORIGINAL INSTRUCTIONS



EDITION 1A-11-2012

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EN

MULTIFUNCTION ARM

PRONAR WWP600 / PRONAR WWP500

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 malfunction free work of the machine. The machine is designed to meet obligatory standards, documents and legal regulations currently in force.

The manual describes the basic safety rules and operation of multifunction arm PRONAR WWP600 / WWP500. 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:

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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:



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.



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EC DECLARATION OF CONFORMITY OF THE MACHINERY

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

Description and identification of the machinery		
Generic denomination and function:	Multifunction arm	
Type:	WWP600	WWP500
Model:	—	—
Serial number:		
Commercial name:	Multifunction arm PRONAR WWP600 Multifunction arm PRONAR WWP500	

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 22 MAR. 2013

Place and date

Z-CIA DYREKTORA
d/s technicznych
członek zarządu

Roman Grelaniuk

Full name of the empowered person
position, signature

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SECTION

1

**BASIC
INFORMATION**

1.1 IDENTIFICATION

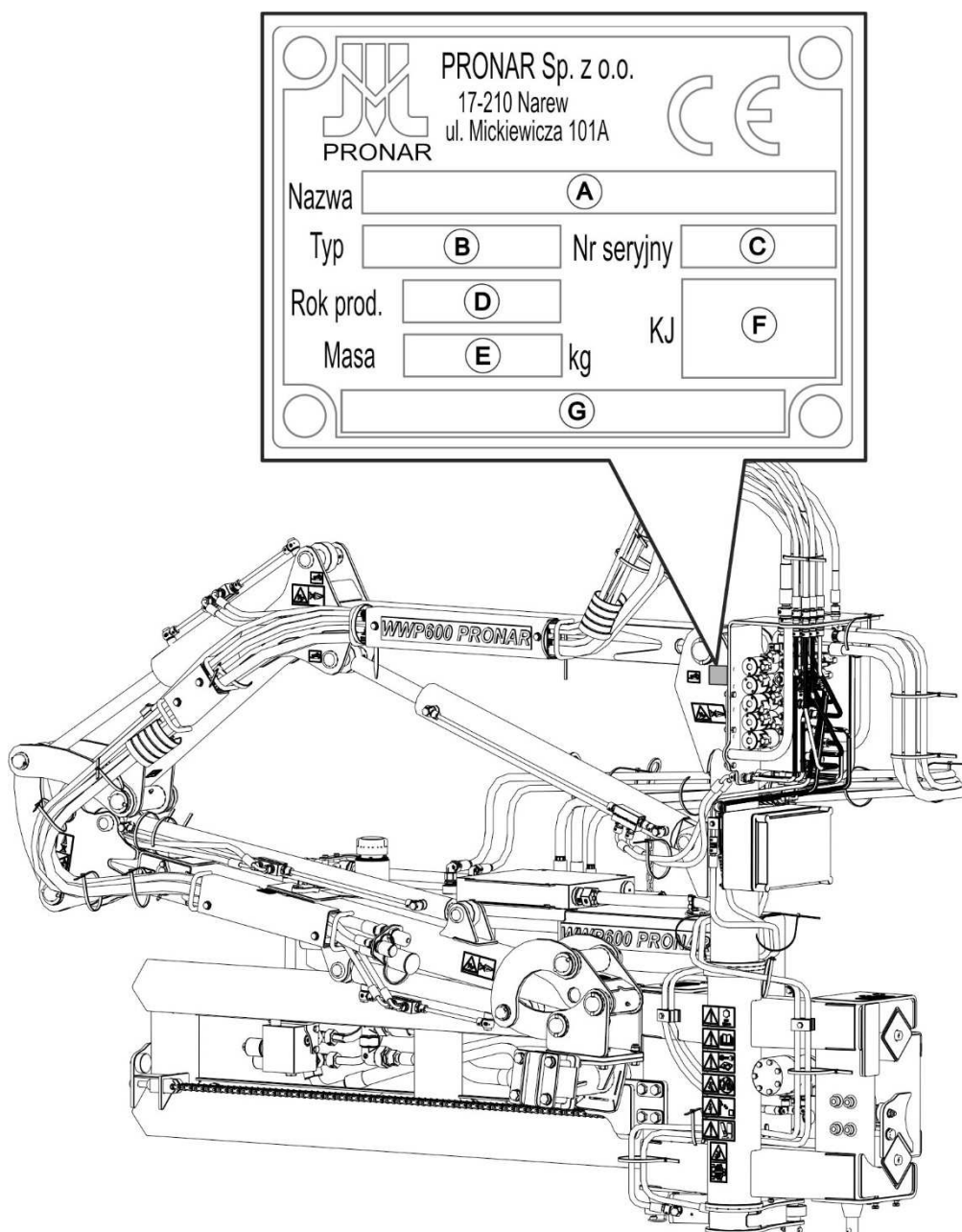


FIG. 1.1 Location of the data plate.

Multifunction arm PRONAR WWP600 is marked with the data plate located on the multifunction arm. 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*.

The meanings of the individual fields found on the data plate (FIGURE 1.1) are presented in the table below:

A - machine name, B - machine type/symbol
C – serial number, D – year of manufacture,
E - gross weight [kg], F – Quality control stamp,
G – machine name, name extension

1.2 PROPER USE

PRONAR WWP600 /WWP500 multifunction arms are constructed according to current safety requirements and engineering standards.

Multifunction arm PRONAR WWP600 / WWP500 is designed for cooperating with various types of compatible working heads (cutting head GK110 / GK140, hedge cutter GP200, ditch digger GO800, traffic sign cleaning head GM500).

The multifunction arm with a working head is designed for the maintenance of municipal infrastructure, urban greenery, orchards and wooded areas and for agricultural works. Exact intended purpose of the multifunction arm-working head set is described in the Operator's Manual of a given working head.

Transporting people, animals or other materials is forbidden and regarded as contrary to the intended purpose. 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 its intended purpose.

ATTENTION



The multifunction arm must not be used for purposes other than those for which it is intended, in particular:

- for transporting people and animals,
- for transport of whatever materials or objects.

Using it as intended involves all actions connected with the safe and proper operation and maintenance of the machine. In connection with this the user is obliged to:

- 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 a given country, in which the machine is used,
- carefully read the Operator's Manual and comply with its recommendations,

TAB. 1.1 Agricultural tractor's requirements

CONTENTS	UNIT	REQUIREMENTS
Implement suspension system (TPL - three-point linkage)		Category II front three-point linkage according to ISO 730
FRONT POWER TAKE-OFF SHAFT (PTO)		
Rotation speed	RPM	1000
Number of splines on PTO shaft	pc.	6
Rotation direction	-	clockwise
Other requirements		
Min. Tractor power	hp	80
Minimum tractor weight	kg	4500

The multifunction arm may only be used by persons, who:

- are familiar with the contents of this publication and with the contents of the agricultural tractor Operator's Manual,
- have been trained in the multifunction arm safe operation,
- have the required authorisation to drive and are familiar with the road traffic regulations and transport regulations.

1.3 EQUIPMENT

TAB. 1.2 Equipment of multifunction arm PRONAR WWP600 / WWP500

EQUIPMENT	STANDARD	OPTION
Operator's Manual	•	
Warranty book	•	

1.4 TERMS & CONDITIONS OF WARRANTY

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

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

The warranty service only applies to factory defects and mechanical damage that is not due to the user's fault.

In the event of damage arising from:

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

Modification of the multifunction arm without the written consent of the Manufacturer is forbidden. 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 multifunction arm 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 tractor driver must carefully read this operator's manual and observe its recommendations. When being transported on a motor vehicle the multifunction arm 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 multifunction arm is permissible connected to a tractor provided the tractor's driver familiarises himself with the machine's Operator's Manual and particularly with information concerning safety and principles of connection and transport of multifunction arm on public roads. Do NOT drive the tractor with the multifunction arm hitched when visibility is limited.

When loading and unloading the multifunction arm, 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.

**ATTENTION**

Do NOT secure lifting slings or any types of securing elements to hydraulic cylinders.

**TIP**

During loading, the multifunction arm should be placed in transport position. (FIGURE 4.3).

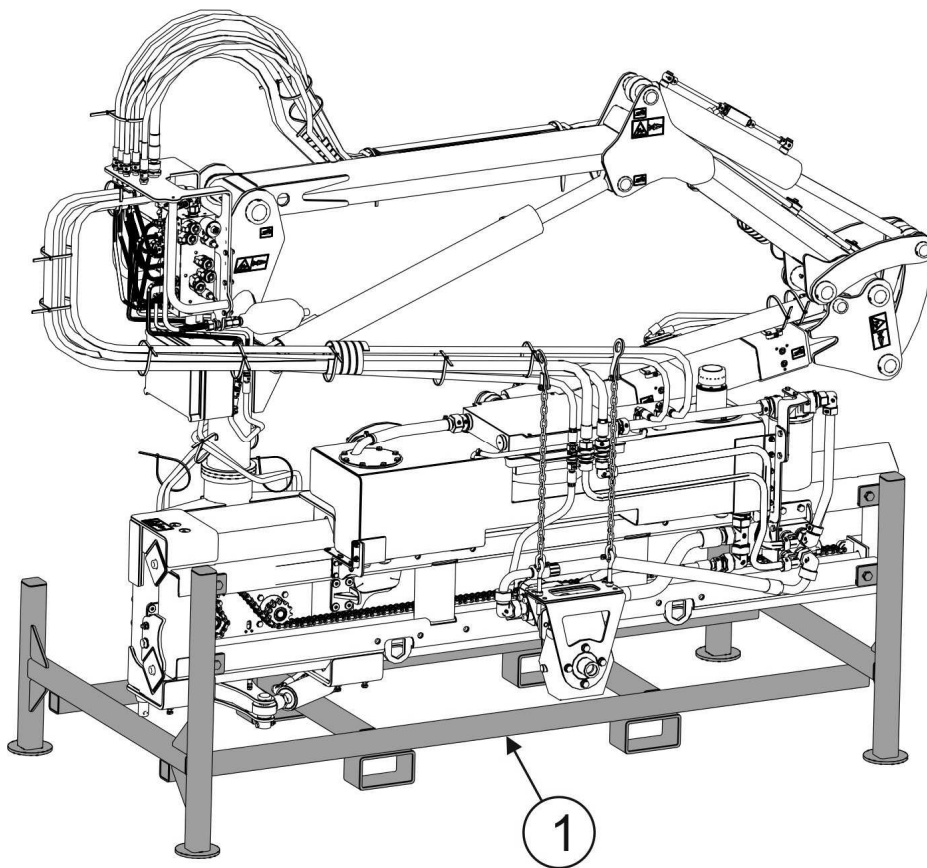


FIG. 1.2 **Stillage.**

(1)- SP01 stillage.

During transport and storage, the multifunction arm should be mounted on special SP01 stillage (FIGURE 1.2). The stillage is used for loading the multifunction arm with the aid of a forklift truck to the platform of the transport vehicle.

The multifunction arm 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 particular caution when lifting the stillage with the machine. During the loading work particular care should be taken not to damage paint coating.



ATTENTION

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

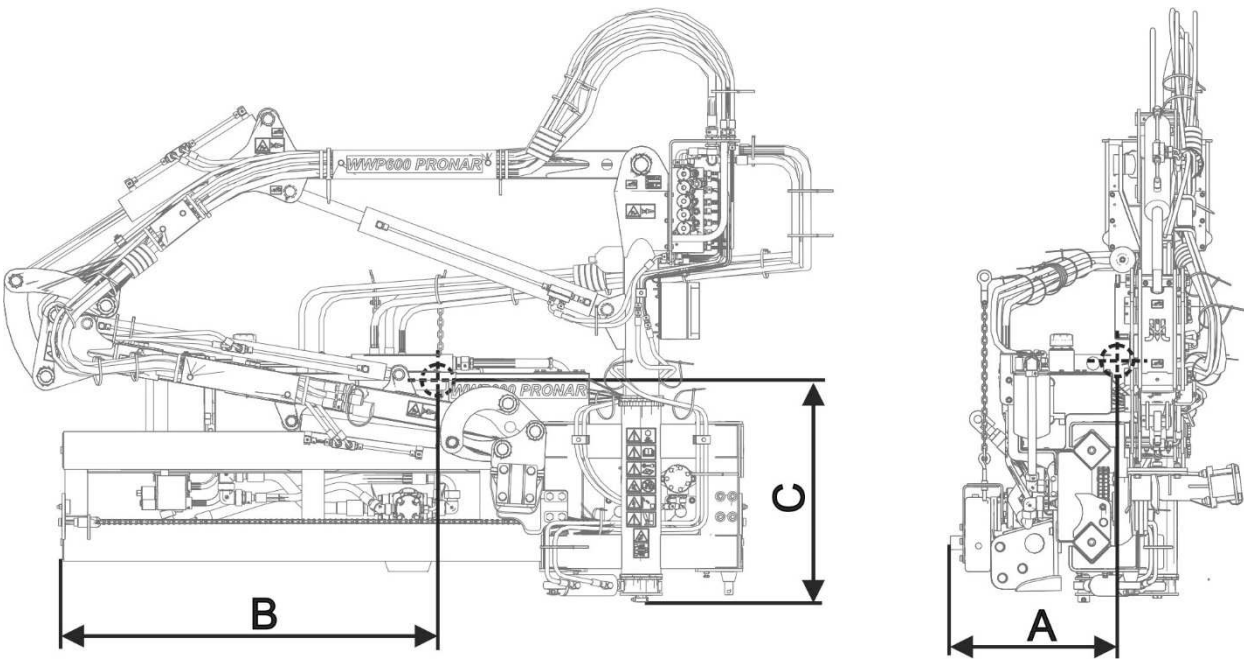


FIG. 1.3 Location of centre of gravity of the multifunction arm in transport position.

TAB. 1.3 Centre of gravity.

Dimension (FIGURE 1.3)	Unit	Multifunction arm model	
		WWP600	WWP500
A	mm	600	590
B	mm	1340	1370
C	mm	820	750

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 pollution, once gathered up, should be kept in a sealed, marked, hydrocarbon resistant container, and then passed on to the appropriate oil waste recycling centre. The container should be kept away from heat sources, flammable materials and food.

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

1.7 WITHDRAWAL FROM USE

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

When spare parts are changed, worn out or damaged parts should be taken to a collection point for recyclable raw materials. Waste oil and also rubber and plastic elements should be taken to establishments undertaking the utilisation of such 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

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 the recommendations.
- The multifunction arm may only be used and operated by persons qualified to drive agricultural tractors and agricultural machines and trained in the use of the machine. The multifunction arm can be operated by a single person only.
- If the information stated in the Operator's Manual is difficult to understand, contact a seller, who runs an authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and improper use and operation of the machine, and non-compliance with the recommendations given in this operator's manual is dangerous to your health.
- Be aware of the existence of a residual risk, and for this reason the fundamental basis for using this multifunction arm should be the application of safety rules and sensible behaviour.
- The machine must never be used by persons, who are not authorised to drive agricultural tractors, including children and people under the influence of alcohol or other drugs.
- Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.
- The machine must not be used for purposes other than those for which it is intended. Anyone who uses the multifunction arm 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 warranty.
- The multifunction arm 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.

- In order to limit occupational risks associated with exposure to noise during multifunction arm operation use individual protection (ear protectors). In order to reduce the level of noise during work the tractor cab window and door should be closed.

2.1.2 HITCHING AND UNHITCHING FROM CARRYING VEHICLE

- Do not link the multifunction arm to the tractor when the linkage systems of multifunction arm and tractor are not compatible.
- To attach the machine to the tractor only the front Linkage System may be used. After hitching the machine, check the safeguards. After coupling the machine, check the safeguards. Carefully read the tractor Operator's Manual.
- To mount machine on tractor use only genuine pins and safeguard cotter pins.
- The agricultural tractor to which the multifunction arm will be linked must be technically reliable and must fulfil the requirements of multifunction arm Manufacturer.
- Be especially careful when hitching the machine to the tractor or truck tractor.
- When hitching, there must be nobody between the multifunction arm and the tractor.
- Unhitching the multifunction arm from the tractor is forbidden when the working head is raised. Exercise caution when unhitching the sweeper.
- Hitching and unhitching may only take place when the cutting head and the tractor are switched off.
- Unhitched multifunction arm must be secured against overturning and supported on stable and level surface.

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 lines. 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 working head, 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 find its way under the skin and cause infections. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. In the event of contact of oil with skin wash the area of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene).
- 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 travel speed to the prevailing road conditions and other limitations arising from road traffic regulations limits.
- Before beginning travel, the multifunction arm must be folded to transport position.
- Do NOT leave working head raised and unsecured while the tractor is parked. When parked, the working head should be lowered.
- Do not transport the multifunction arm set in the working position.
- The multifunction arm 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 the linkage and connection elements of the hydraulic system.
- 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 whatsoever, do not use the multifunction arm until the fault has been corrected.
- During work use the proper, close-fitting protective clothing, gloves and appropriate tools. When working on hydraulic systems it is recommended to use oil resistant gloves and protective goggles.
- Any modification to the multifunction arm frees the manufacturer from any responsibility for damage or detriment to health, which may arise as a result.

- Before undertaking any work on the multifunction arm disconnect tractor 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 service 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's engine turned off and the ignition key removed. Immobilise tractor with parking brake. Ensure that unauthorised persons do not have access to the tractor cab.
- Should it be necessary to change individual parts, use only original parts. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and invalidate the warranty.
- Regularly check technical condition and mounting of all guards and protective elements.
- In the event of work requiring the multifunction arm 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 a machine, which has been raised only with the three point linkage.
- The machine must not be supported using fragile elements (bricks or concrete blocks).
- After completing work associated with lubrication, remove excess oil or grease.
- In order to reduce the danger of fire the machine must be kept in a clean condition.

2.1.6 OPERATING THE MULTIFUNCTION ARM

- Before lowering or raising the multifunction arm linkage, make sure that there are no bystanders near the machine.
- Before starting the multifunction arm drive, lower the working head to working position.
- Before starting the multifunction arm, 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.
- Multifunction arm operation should begin after reaching nominal PTO RPM of 1000 rpm. Do NOT overload the multifunction arm's hydraulic system and also do NOT engage the PTO suddenly.
- Do NOT leave the tractor cab, when the machine drive is engaged.
- Do NOT stand within the multifunction arm's working zone.
- Do NOT operate the working head while reversing. While reversing raise the multifunction arm.
- Keep a safe distance from electric power lines during travel with raised multifunction arm.
- All the control panel operations should be performed only from the operator's seat in the carrying vehicle's cab. Operating the control panel outside the operator's cab is forbidden.
- The multifunction arm MUST NOT be used without counterweight suspended on tractor rear three-point linkage (min. 700 kg).
- Operation and transport of the multifunction arm is allowed only on slopes with the maximum inclination of 7°. However, due to changing location of centre of gravity depending on type of working head, type of tractor and length of telescopic multifunction arm, the allowable slope inclination angle may be smaller. That is why the user must exercise particular caution and determine by himself the maximum slope inclination angle for operating the multifunction arm.
- If the full reach of the multifunction arm is to be used, make sure that stability of the tractor will be maintained.

- While working on slopes, do not raise the working head more than 0,5 m above the ground.
- In the event of a tilt of the tractor with the multifunction arm, immediately lower the working head to the ground and stop the tractor.

2.1.7 MAINTENANCE OF PTO DRIVE

- While reversing and during turns, the PTO drive must be disengaged.
- The machine may only be connected to the tractor PTO by multiplier gear box recommended by the Manufacturer.
- Before starting the machine make sure that there are no bystanders (especially children) in the danger zone. The machine operator is obliged to ensure proper visibility of the machine and the working area.
- Before starting PTO multiplier gear box make certain that the PTO rotation direction is correct.
- Before disconnecting the multiplier gear box shaft, turn off the tractor engine and remove the key from the ignition.

2.2 DESCRIPTION OF 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 sweeper for purposes other than those for which it is intended,
- being between the tractor and the machine while the engine is running and when the machine is being attached,
- being on the machine while the engine is running,
- operating the multifunction arm with removed or faulty safety guards,
- not maintaining safe distance from the danger zone or being within the zones while the machine is operating,
- operation of the machine by persons under the influence of alcohol,
- cleaning, maintenance and technical checks when tractor is connected and engine is running;

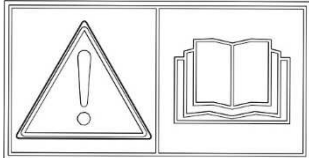
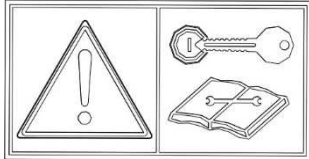
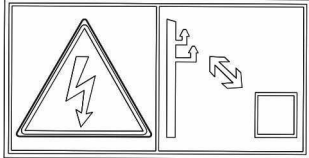
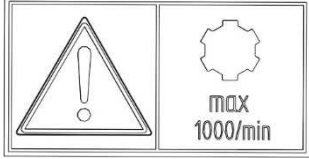
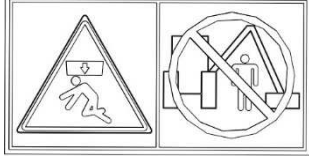
The residual risk may be kept to a minimum by following the recommendations below:

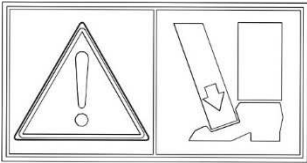
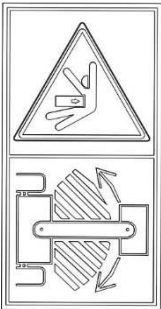
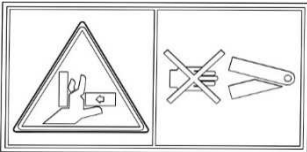
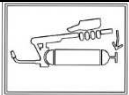
- prudent and unhurried operation of the machine,
- sensible application of the remarks and recommendations stated in the Operator's Manual,
- carrying out repair and maintenance work in line with operating safety rules,
- carrying out repair and maintenance work by persons trained to do so,
- using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

2.3 INFORMATION AND WARNING DECALS

The multifunction arm is labelled with the information and warning decals mentioned in table (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. During multifunction arm cleaning do not use solvents which may damage the coating of information label stickers and do not subject them to strong water jets.

TAB. 2.1 Information and warning decals

ITEM	DECAL	MEANING
1		Before starting work, carefully read the Operator's Manual.
2		Before beginning servicing or repairs, switch off engine and remove key from ignition
3		Take particular care while working near electric power lines. Danger of electric shock.
4		Maximum allowable PTO shaft rotation speed is 1000 rpm.
5		Danger of being struck. Do not stay within the reach of the multifunction arm and working head

ITEM	DECAL	MEANING
6		Danger of crushing foot of toes
7		No bystanders may stay in the areas marked in this way when implement is in use. If any work is required in these areas, make sure the tractor is stationary, and whether the implement is disconnected from the power source.
8		Do not reach into crushing space because elements may move. Danger of crushing hands or fingers.
9		Lubrication points
10	WWP600 PRONAR or WWP500 PRONAR	Machine type

SECTION

3

**DESIGN AND
OPERATION**

3.1 TECHNICAL SPECIFICATION

TAB. 3.1 BASIC TECHNICAL SPECIFICATION

	Unit	WWP600	WWP500
Dimensions			
Total length in transport setting	mm	920	
Width in transport setting:	mm	2720	2400
Height in transport setting:	mm	1740	
Technical specification			
Multifunction arm drive		hydraulic	
Multifunction arm control		electric	
Working range of multifunction arm operation	mm	6750	5550
Tare weight of the multifunction arm-cutting head assembly	kg	980	890
Minimum power demand	hp	80	
Maximum PTO speed	RPM	1000	
Oil tank capacity	l	75	
Minimum tractor weight	kg	4500	
Hydraulic pump power	kW	39	
Method of mounting on tractor		Adapter plate and tractor front three-point linkage.	

3.2 DESIGN AND OPERATION

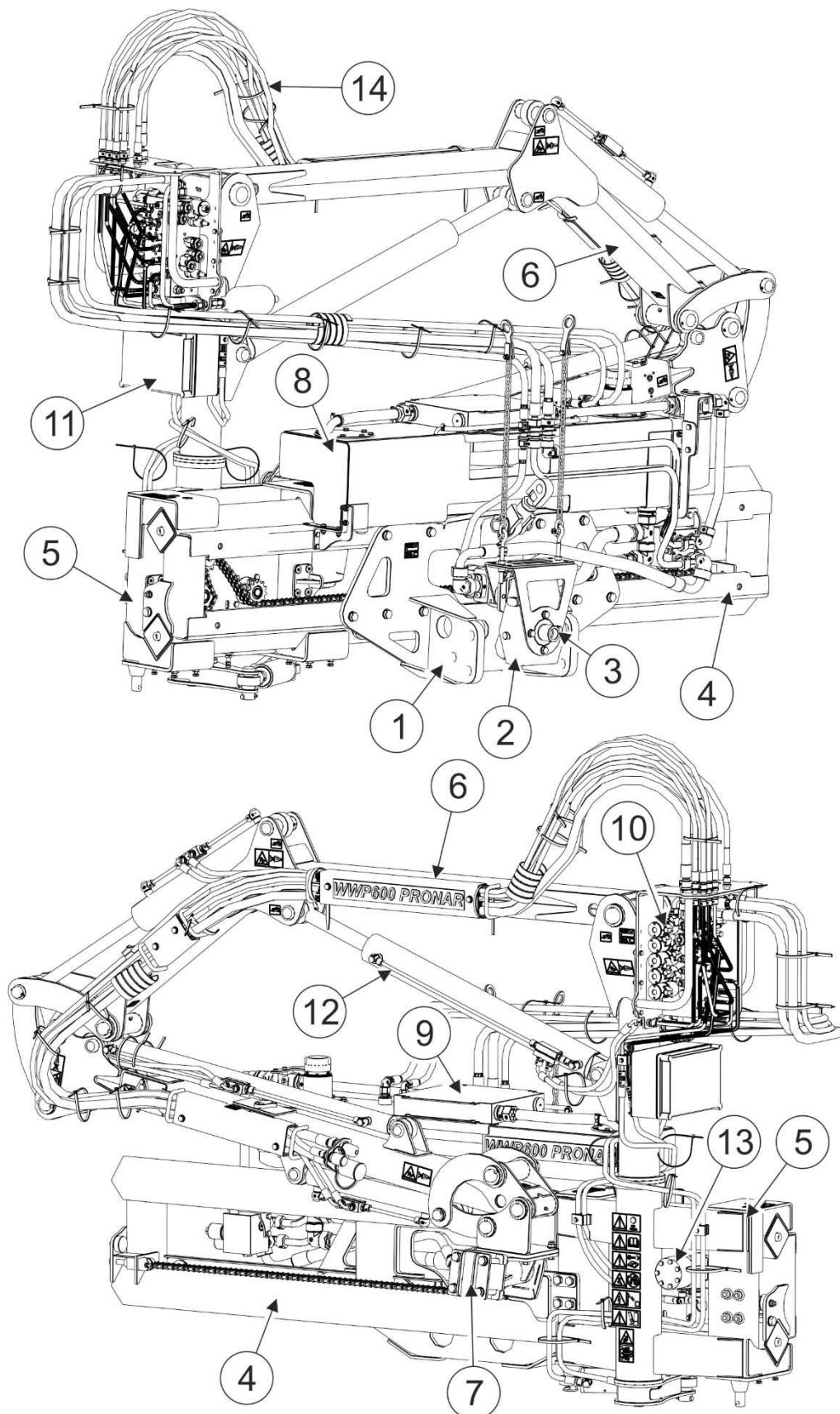


FIG. 3.1 General design

(1)- adapter plate of linkage; (2)- multiplier gear box with hydraulic pumps; (3)-multiplier gear box connection to the tractor; (4)-guide; (5)- support system slide; (6)- support system arm; (7)- working head connection; (8)-hydraulic oil tank; (9)- oil cooler; (10)-selective control valve; (11)- selective control valve control box; (12)- hydraulic cylinder; (13)- hydraulic motor for support system slide drive; (14)- hydraulic conduits

Main elements of the multifunction arm:

- linkage
- working head support system
- hydraulic system
- control system
- counterweight

Multifunction arm linkage allows you to connect the multifunction arm to front three-point linkage frame after removing the lower links of the front three-point linkage.

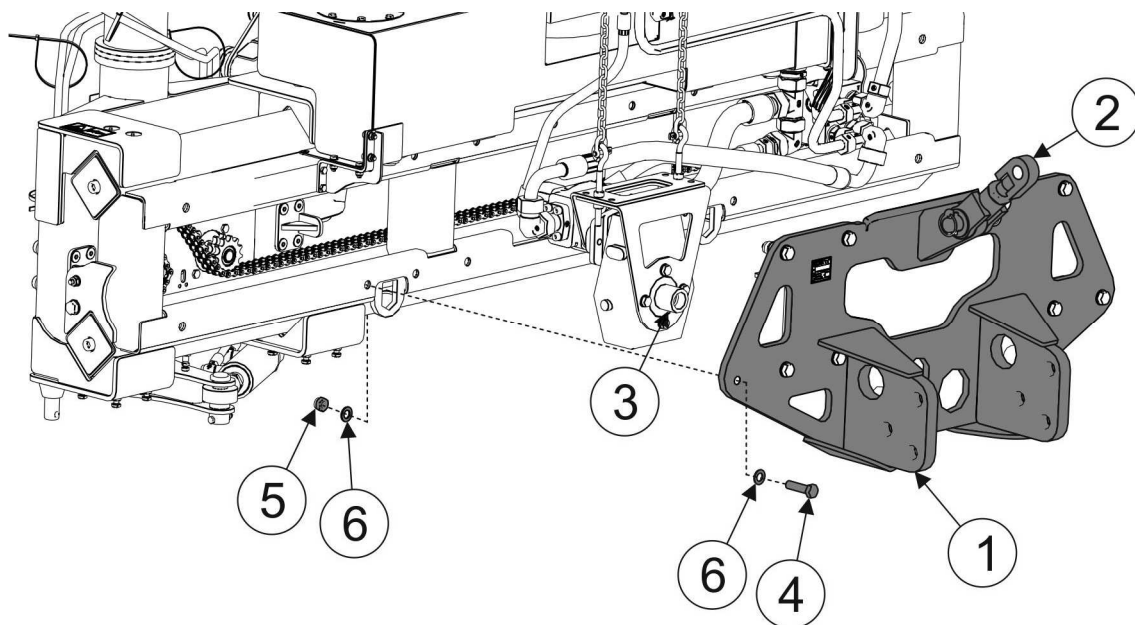


FIG. 3.2 Linkage

(1) - bottom brackets of the three-point linkage adapter plate; (2) - a central link; (3) - multiplier gear box connection to the tractor; (4) - bolt; (5) - nut; (6) - washers.

The main component of the multifunction arm linkage (Figure 3.2) is the adapter plate constructed of two brackets (1) and the central link (2) for connection of the tractor front three point linkage. Multiplier gear box connection (3) is used to connect the tractor front PTO with the multiplier gear box.

The adapter plate is bolted to guide (4) (FIGURE 3.1) of support system slide (5). Slide (5) is connected with hydraulic motor (13) and enables movement of the support system on guide (4) to the left or right with regard to the tractor. This enables operation of the multifunction arm on the right as well as on the left side of the tractor.

Working head support system consists of arms that are moved by hydraulic cylinders. One of the arms has telescopic design, which increases working range of the working head. Hydraulic cylinders are controlled by means of selective control valve (10).

Multifunction arm is driven by the tractor front PTO via a multiplier gear box (2) to the hydraulic pump assembly. Hydraulic pumps draw oil from an independent reservoir (8) through the oil filter and pump it the oil lines (14) supplying the operating head and hydraulic cylinders. Hydraulic cylinders (12) enable free manoeuvring of the arms (6) of the support system of the multifunction arm to which the working head is attached. The hydraulic system is controlled through selective control valve (10) from the tractor driver's cab by means of control panel.

SECTION

4

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!

Check technical condition of the implement before each use. In particular, check the technical condition of the suspension system, hydraulic system and the integrity of safety guards.

Before hitching to the tractor, the machine operator must check the technical condition of the multifunction arm 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 all the lubrication points, lubricate the machine according to recommendations provided in section 5 "*MAINTENANCE*",



ATTENTION!

Before beginning work lubricate all lubrication points.

- check technical condition of the hydraulic system;
- check if working head, linkage and safety guards are correctly installed,
- check technical condition of hitching system pins and locking cotter pins,
- Check the hydraulic oil level in the hydraulic oil tank.

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 tractor. Start the tractor's engine, check all systems and perform a test run before beginning work. In order to inspect:

- hitch the multifunction arm to tractor (see "*HITCHING TO TRACTOR*")
- set in working position,
- start PTO drive.

Engage multifunction arm's drive for 3 minutes and check the following:

- that there is no knocking or noise in the hydraulic pump drive system arising from scraping or grinding of metal elements,
- confirm that there are no oil leaks in the hydraulic system.
- confirm that the support system slide moves smoothly and without resistance along the guide.



ATTENTION!

Check technical condition of the implement before each use. In particular check the technical condition of the hydraulic system, linkage and drive system.

The multifunction arm's operation at no load should be smooth. Shaking of drive transmission is not acceptable, nor is changed noise and vibrations coming from loose nut and bolt connections. Confirm that oil does not leak from the hydraulic system.



DANGER

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

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

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

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

Before starting the multifunction arm, 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 CHECKING TECHNICAL CONDITION

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

TAB. 4.1 TECHNICAL INSPECTION SCHEDULE

DESCRIPTION	SERVICE OPERATION	FREQUENCY
Correct mounting of the multifunction arm on the tractor's linkage	Check if correctly installed.	Daily before beginning work
Technical condition of the multifunction arm's hydraulic system	For details please refer to section <i>"HYDRAULIC SYSTEM OPERATION"</i>	
The oil level in the hydraulic oil tank and multiplier gear box	For details please refer to section <i>"HYDRAULIC SYSTEM OPERATION"</i>	
Tightening of all main nut and bolt connections	Torque values should be according to table (5.4)	
Lubrication	Lubricate elements according to table <i>LUBRICATION</i> .	



ATTENTION!

Do NOT use out of order multifunction arm.

4.3 HITCHING TO TRACTOR

The PRONAR WWP600 / WWP500 multifunction arm may only be mounted on a tractor fulfilling the requirements contained in table „1.1 AGRICULTURAL TRACTOR'S REQUIREMENTS”.



ATTENTION!

Before hitching the multifunction arm to carrying vehicle, read the carrying vehicle operator's manual. Comply with the recommendations relating to linkage and mounting points.



DANGER

When hitching, there must be nobody between the machine and the tractor. Exercise caution when hitching the machine.

In order to attach the multifunction arm to the tractor front three-point linkage you must adhere to the following guidelines:

- mount the counterweight box on the tractor rear three-point linkage and fill it with a load of min. 700 kg (Figure 4.1).



DANGER

The multifunction arm **MUST NOT** be used without counterweight suspended on tractor rear three-point linkage (min. 700 kg).

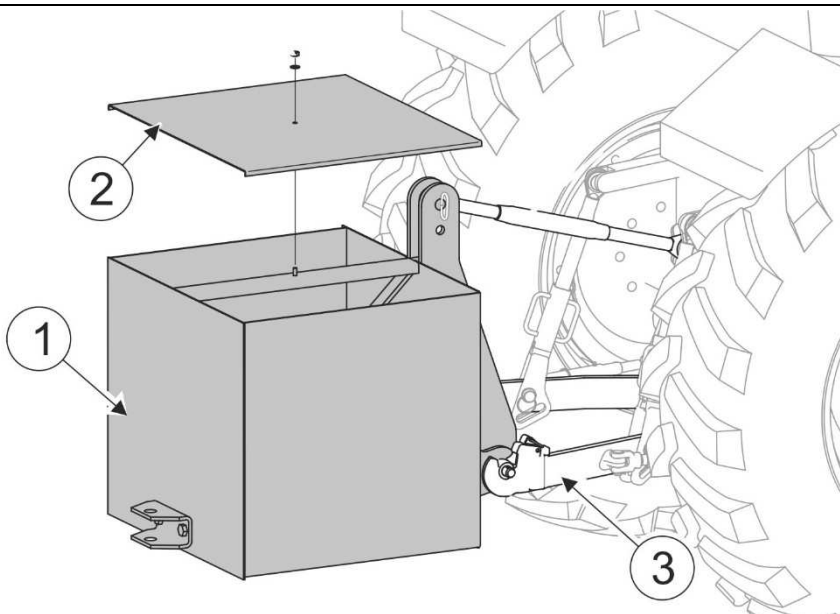


FIG. 4.1 Counterweight attached to the tractor rear three-point linkage.

(1) - counterweight box; (2) - counterweight box cover; (3) - tractor rear three-point linkage

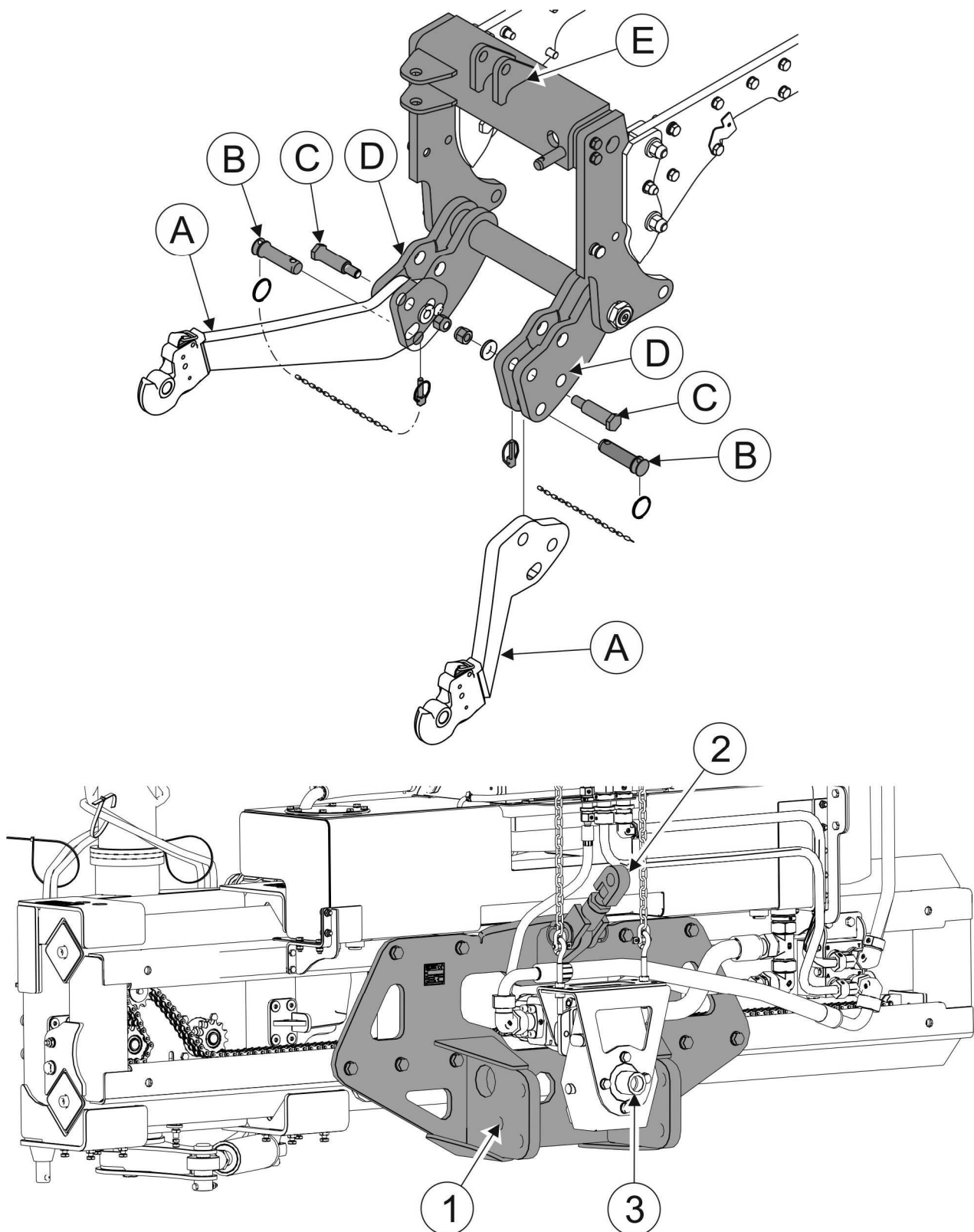


FIG. 4.2 Attach multifunction arm to the tractor.

(A) - lower links of tractor three-point linkage; (B) - fixing pins; (C) - fixing bolts; (D) - three-point linkage lower brackets; (E) - three-point linkage upper brackets; (1) - adapter plate lower brackets; (2) - a central link; (3) - multiplier gear box connection to the tractor;

- remove the lower links (A) of the tractor front three-point linkage (Figure 4.2)

- align the lower brackets (1) of the multifunction arm adapter plate with the lower bracket holes (D);
- align the three-point linkage lower bracket holes with the multifunction arm adapter plate holes.
- switch off tractor's engine and prevent it from moving.
- connect the adapter plate lower brackets (1) with the tractor three-point linkage lower brackets (D) of by means of fixing pins (B) and bolts (C). Secure fixing pins with cotter pins.
- Connect multifunction arm linkage central link (2) to tractor three-point linkage upper link (E) and secure with cotter pin;
- Connect the PTO and secure the multiplier gear box connection (3) to the tractor;
- install the multifunction arm's control panel inside the tractor's cab.

**DANGER**

Turn off the tractor engine and remove the key from the ignition before connecting the tractor front PTO multifunction arm multiplier gear box. Ensure that unauthorised persons do not have access to the tractor.

4.4 TRANSPORTING THE MACHINE

For transport to place of work and back, set the multifunction arm to transport position (FIGURE 4.3). In this position, working head connection (2) is mounted on working head hitch (1) (FIGURE 4.4)

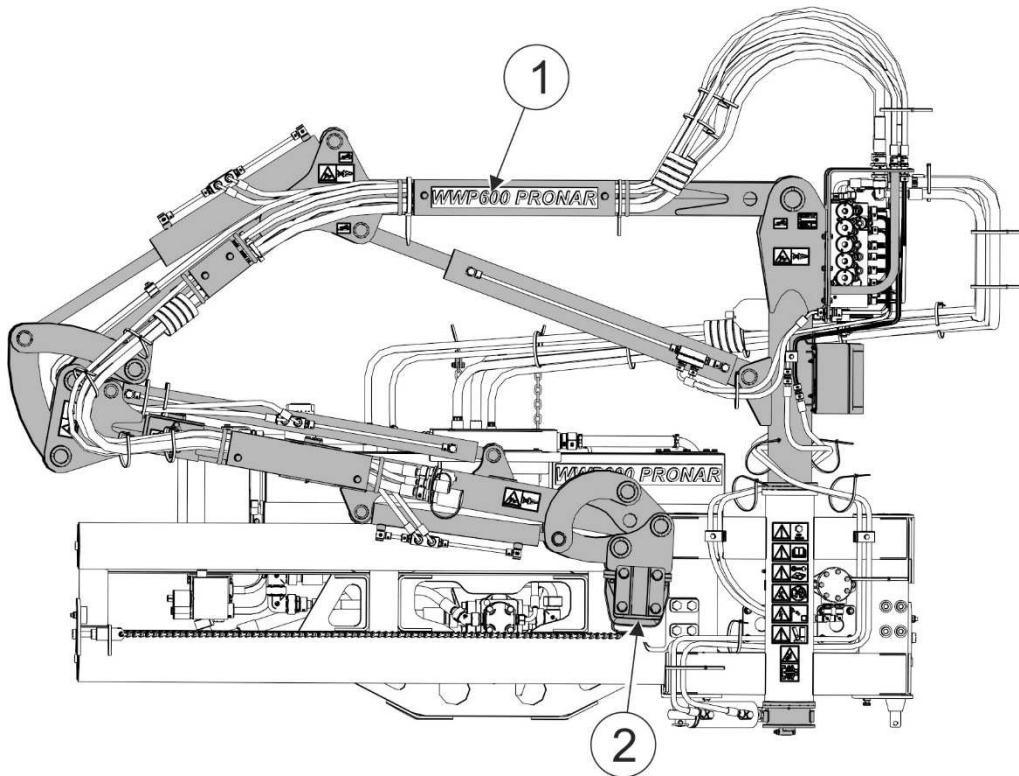


FIG. 4.3 Transport position

(1)- support system arms, (2)- working head connection

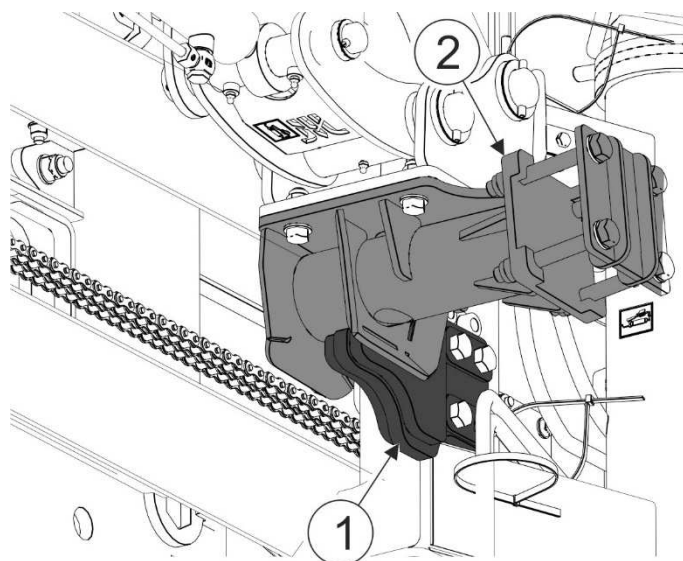


FIG. 4.4 Mounting of the working head connection on the working head hitch.

(1)- working head hitch; (2)- working head connection

4.5 SETTING AND OPERATION

4.5.1 SETTING THE MULTIFUNCTION ARM IN WORKING POSITION

To set the multifunction arm in working position:

- Engage front PTO drive;
- operate appropriate hydraulic cylinders of the multifunction arm in order to place the working head in the working area;
- start the hydraulic motor that drives the working head;
- engage appropriate tractor gear and start working.

4.5.2 OPERATION AND CONTROL BY MEANS OF CONTROL PANEL

DANGER



The multifunction arm may only be started when all guards of the working head are in place and the working head is set in working position.

Before engaging PTO drive make sure that there are no bystanders, especially children, near the multifunction arm.

Bystanders should be at a safe distance from the multifunction arm's working head during work because of the risk of injury caused by thrown objects (stones, branches etc.).

ATTENTION!



Before beginning work, lubricate all lubrication points until grease appears between the shaft and bearing housing.

After setting the multifunction arm in working position, the machine starting procedure may begin. Engage front PTO in the tractor at a suitably low speed and then gradually increase the speed until PTO speed of 1000 rpm is reached. When a proper pressure in the multifunction arm's hydraulic system is reached, one may commence work.

The arms and working head are controlled by means of control panel installed in the cab of the tractor (FIGURE. 4.5).

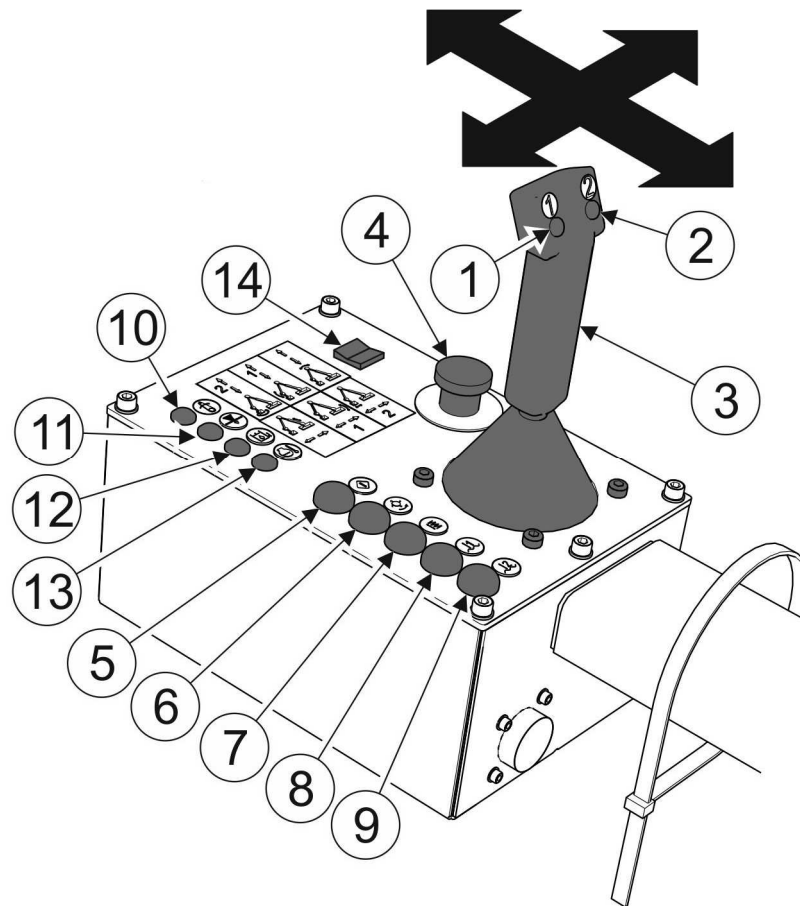


FIG. 4.5 Control panel of multifunction arm.

(1)- function push-button 1 of control lever; (2)- function push-button 2 of control lever; (3)- control lever; (4)- emergency stop; (5)- control activation push-button; (6)-push-button for shock absorber activation; (7)- push-button for activation of multifunction arm's floating function; (8)- push-button for activation of working head's floating function; (9)- push-button for activation of working head drive; (10)-oil temperature indicator light; (11)-oil level in container indicator light; (12)- fuse activation indicator light; (13)-oil filter contamination indicator light; (14)- main power supply switch of control panel.



ATTENTION!

All the control panel operations should be performed only from the operator's seat in the carrying vehicle's cab. Operating the control panel outside the operator's cab is forbidden.

Before manoeuvring the multifunction arm, switch on the main power supply switch of control panel (14) and activate control panel by depressing push-button (5) for about 2 seconds. Activation of control is signalled by the lamp on the activation push-button.

The pictogram showing the lever (3) control diagram is located on the control panel (FIGURE 4.6).

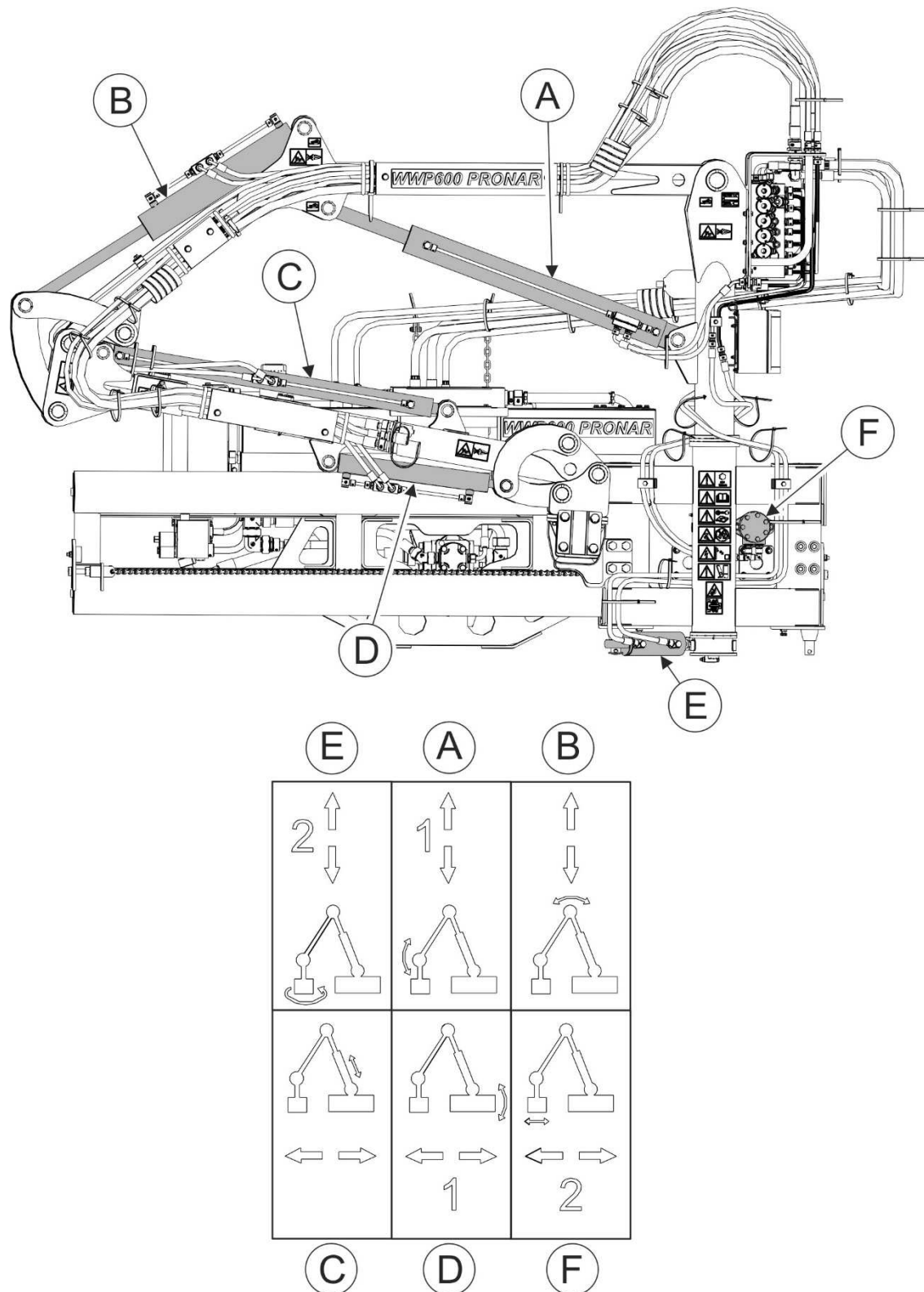











FIG. 4.6 The control lever diagram and method of controlling individual hydraulic cylinders of the multifunction arm.

(A), (B), (C), (D), (E)- hydraulic cylinders; (F)- hydraulic motor.

TAB. 4.2 Pictograms of push-buttons and indicator lights on the control panel

Item	PICTOGRAM	MEANING
1		Pictogram of control activation push-button.
2		Pictogram of push-button for activation of working head drive
3		Pictogram of shock absorber activation push-button.
4		Pictogram of push-button for activation of multifunction arm's floating function
5		Pictogram of push-button for activation of working head's floating function
6		Pictogram of fuse activation indicator light
7		Pictogram of oil filter contamination indicator light.
8		Pictogram of oil level in container indicator light
9		Pictogram of oil temperature indicator light

Individual functions of control lever (FIGURE 4.5 / 4.6):

- control lever (3) tilted to the right or left activates hydraulic cylinder (C) that extends the telescopic arm of the multifunction arm;
- control lever (3) tilted forwards or backwards activates hydraulic cylinder (B);

- control lever (3) tilted to the right or left, with function push-button (1) pressed, activates hydraulic cylinder (D);
- control lever (3) tilted forwards or backwards, with function push-button (1) pressed, activates hydraulic cylinder (A);
- control lever (3) tilted to the right or left, with function push-button (2) pressed, activates hydraulic motor (F) that shifts the arm's slide to the right or left along the guide;
- control lever (3) tilted forwards or backwards, with function push-button (2) pressed, activates hydraulic motor (F) that rotates the arms of the multifunction arm.

ATTENTION!



Operation and transport of the tractor with hitched multifunction arm is allowed only on slopes with the maximum inclination of 7°. However, due to changing location of centre of gravity depending on type of working head, type of tractor and length of telescopic multifunction arm, the allowable slope inclination angle may be smaller. That is why the user must exercise particular caution and determine by himself the maximum slope inclination angle for operating the tractor with the multifunction arm.

If the full reach of the multifunction arm is to be used, make sure that stability of the tractor will be maintained.

While working on slopes, do not raise the working head more than 0,5 m above the ground.

In the event of a tilt of the tractor with the multifunction arm, immediately lower the working head to the ground and stop the tractor.

After setting the working head in working position, engage working head drive by pressing push-button (9) on the control panel (FIGURE 4.5). Ramp time for activation of working head drive is about 2 seconds. When ground surface tracking is required for the working head, engage floating position of the multifunction arm and working head by pressing push-buttons (7) and (8) and shock absorber function using the (6) button.

HIGH NOISE LEVEL WARNING



Depending on the working conditions, the tractor with the machine may generate noise exceeding the level of 85dB at the driver position. In such conditions the driver should apply individual protection (protective ear guards).

In order to reduce the level of noise during work the tractor cab window and door should be closed.

While operating the multifunction arm, pay attention to uneven surface and obstacles on the route of moving multifunction arm. When an obstacle is encountered, fuse activation indicator light (12) lights up. The indicator light goes out when the multifunction arm returns to its previous position.

When driving across the road, pavement or other obstacles and when making turns, raise the working head and disengage the working head drive.

Be especially careful when mowing along ditches, furrows and slopes. If overheating of the multifunction arm hydraulic system occurs during operation of the working head, disengage the PTO drive and find the cause of overload. Overheating of the hydraulic system is indicated by the oil temperature warning light on the control panel. Oil cooler fan is turned on when this occurs. If the oil temperature does not drop within 10 min, working head drive is turned off. When the light goes out, you can turn on working head drive again.

When immediate emergency stopping of the multifunction arm is required, press emergency stop (red mushroom push-button) (4) on the control panel. This push-button switches off the complete control system.

After finishing work, switch off the main power supply switch (14) of the control panel.

SECTION

5

MAINTENANCE

5.1 HYDRAULIC SYSTEM OPERATION



DANGER

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



DANGER

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

Makes sure that the oil in the multifunction arm hydraulic system is of adequate grade. Do not add hydraulic oil of other grade. The hydraulic system in a new multifunction arm 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 sealed. Inspect the seals when hydraulic cylinders are completely extended. In the event of confirmation of oil on hydraulic ram cylinder bodies ascertain origin of leak. Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of "droplets" stop using the machine until faults are remedied.

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. Change of sub-assemblies is equally required in each instance of mechanical damage. Also, pay attention to ensure that flexible hydraulic conduits are not fractured.



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



TIP

Bleeding air from the multifunction arm hydraulic system is not required.

TAB. 5.1 HL46 hydraulic oil characteristics

ITEM	NAME	VALUE
1	ISO 3448VG viscosity classification	46
2	Kinematic viscosity at 40°C	41.4 ÷ 50.6 mm ² /s
3	ISO 6743/99 quality classification	HL
4	DIN 51502 quality classification	HL
5	Flash-point	above 220°C

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 place of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory tract. A hazard only occurs when oil is strongly atomised (oil vapour), or in the case of fire during which toxic compounds may be released. Oil fires should be quenched with the use of carbon dioxide (CO₂), foam or extinguisher steam. Do NOT use water for fire extinguishing.

Spilt oil should be immediately collected and placed in marked tight container. Used oil should be taken to the appropriate facility dealing with the re-use of this type of waste.

5.1.1 THE OIL TANK AND SUCTION FILTER

Hydraulic oil tank capacity is 75 l. Check tank welded joints and hydraulic hoses for leaks every day. Repair any leaks on the welds by welding.

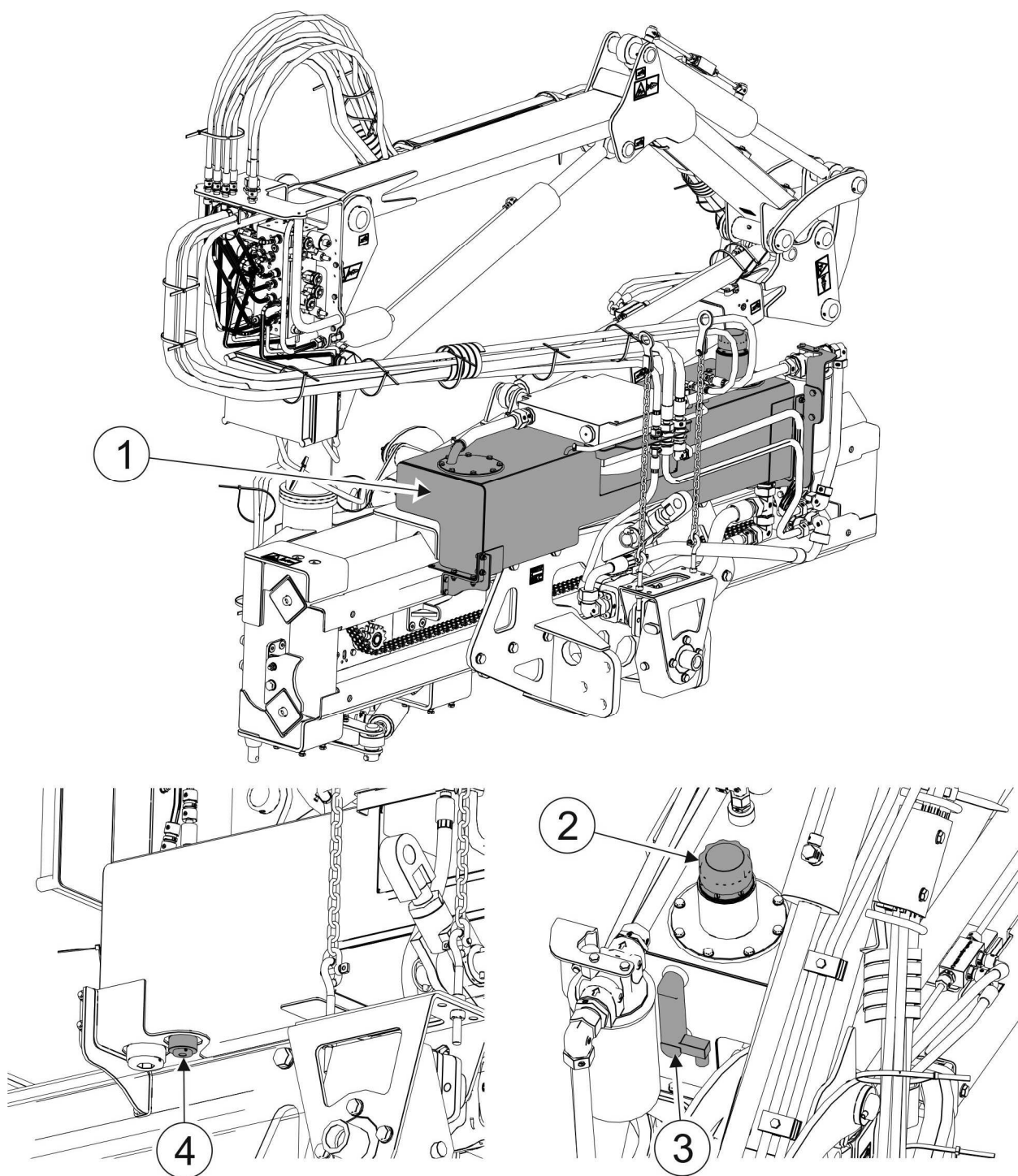


FIG. 5.1 **Oil tank**

(1) - oil tank; (2) - oil filler cap; (3) - oil level indicator; (4) - drain plug.

Drain the oil from the tank before welding. To do this, unscrew the oil filler cap (2) and drain plug (4) and drain the oil into a prepared vessel. Repair damaged paint coat immediately after the welding. If the drained oil was not used up replace and tighten the drain plug (4) pour oil back to the oil tank through a strainer in the top filler inlet (2). Each time you change the oil and during the daily checks of the multifunction arm hydraulic system, check the oil level on the tank sight glass (3). Sight glass float indicator should be near the top. Float

indicator trigger a minimum oil level sensor. If the light (11) (Figure 4.5) comes on the multifunction arm control panel add the oil in the tank to the required level.

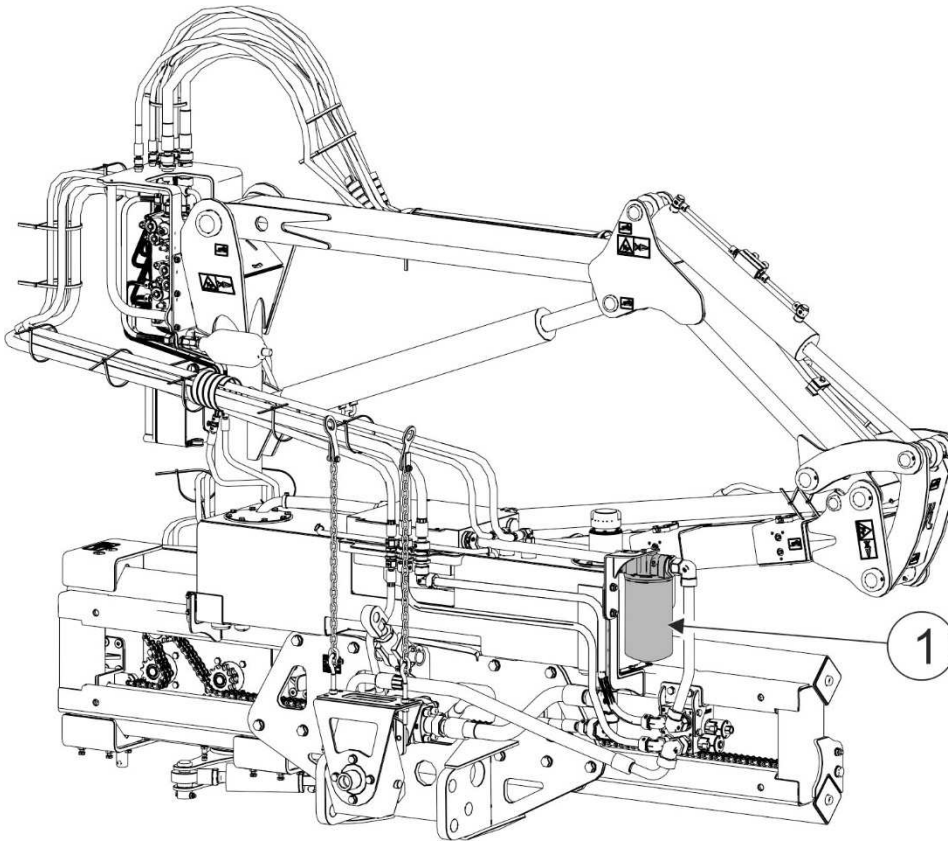


FIG. 5.2 Suction filter.

(1) - oil suction filter.

Suction filter is located between the tank and the oil pump. Filter clogging sensor fitted in the filter housing triggers a light indicator the multifunction arm control panel in the tractor (13) (FIGURE 4.5). Replace suction filter each the filter clogging indicator comes on. Replace the filter for the first time filter change should occur after 100 hours of multifunction arm operation regardless of whether the sensor indicates a clogged filter. In order to change filter:

- unscrew the clogged filter housing;
- cover sealing ring of new filter with oil (few drops);
- screw in new filter until sealing ring and casing make contact and then screw in by hand making one more half turn (do not screw in too tightly).

**ATTENTION!**

When unscrewing used filter do not use hammer, chisel etc. as this may damage filter casing. Use filters recommended by machine manufacturer (originals).

Screw in filter by hand, without use of any tools.

5.1.2 MULTIPLIER GEAR BOX WITH THE HYDRAULIC OIL PUMP ASSEMBLY

Multiplier gear box (1) transfers power from the tractor PTO through a gear train to the hydraulic pumps assembly (2), which supplies the multifunction arm hydraulic system and its operating head.

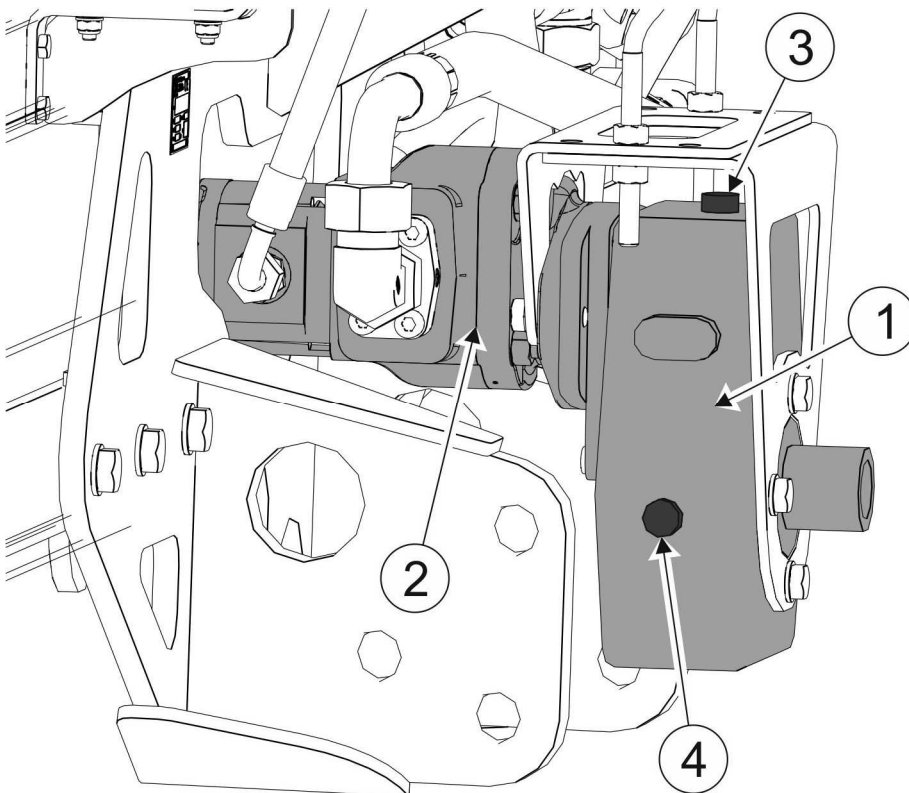


FIG. 5.3 Multiplier gear box with hydraulic pump

(1) - multiplier gear box; (2) - hydraulic pumps assembly; (3) - oil filler cap with vent; (4) - plug.

Check the condition of the multiplier gear box and pumps every day. There must be no oil leaks. These can be stopped by tightening the mounting bolts or replacing the seals. If needed, remove the oil filler cap (3) and add SAE 90 gear oil to control plug level (4). Replace oil after the first 500 hours of multiplier gear box operation.

5.1.3 SELECTIVE CONTROL VALVES

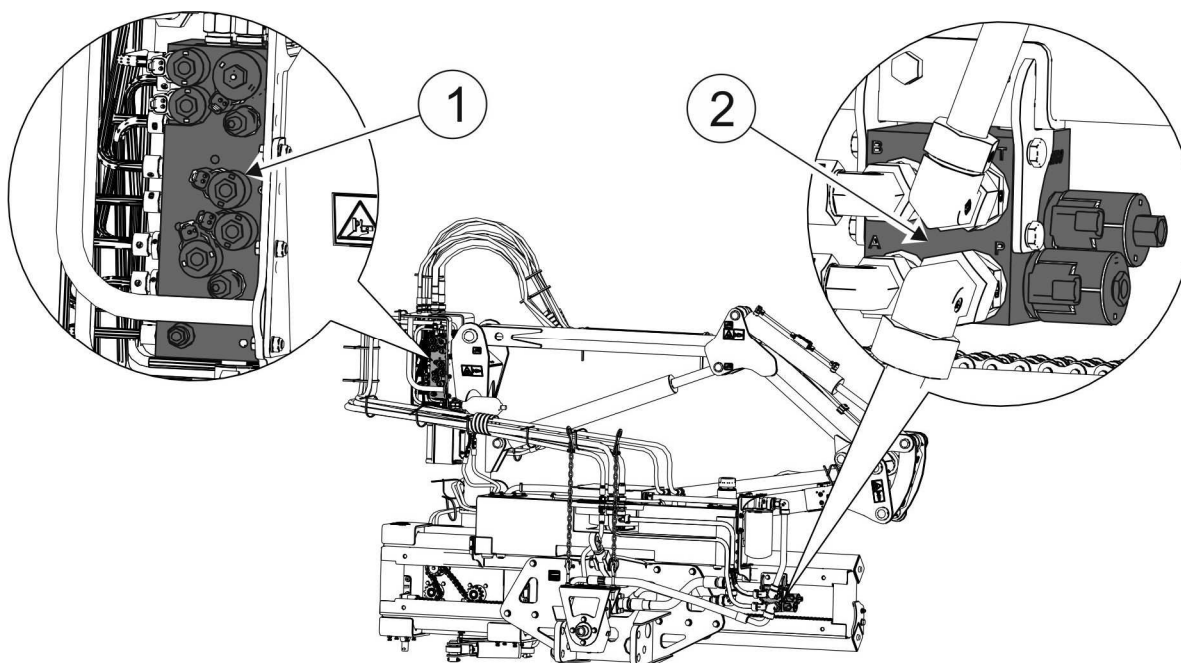


FIG. 5.4 **Selective control valves.**

(1) - Selective control valve of support system arm cylinders; (2) - selective control valve of the operating head hydraulic motor.

Selective control valve (1) controls five hydraulic cylinders of support system. Single section selective control valve (2) drives the operating head hydraulic motor. Selective control valves are controlled by means of control panel from the tractor's cab. Condition of seals of selective control valves should be checked daily.

ATTENTION!



Selective control valve is equipped with overflow valves that are set in the factory by the Manufacturer for proper working pressure of the multifunction arm's hydraulic system.

Do NOT adjust overflow valves because it may lead to damage to the multifunction arm's hydraulic system and working head. Adjustment of overflow valves should be carried out by an authorised service station of the machine manufacturer.

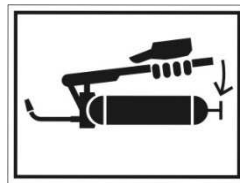
5.2 LUBRICATION

Machine lubrication should be performed with the aid of a manually or foot operated grease gun, filled with generally available permanent 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 lubrication substance causes depositing additional contaminants in places requiring lubrication, therefore it is essential to keep individual machine elements clean.

Grease all grease nipples located on the machine in places marked with the following pictogram:



The lubrication points are the following: all the hinge pins of the support system, hydraulic cylinder eyes, extending arm of support system, chain of slide drive mechanism and slide of support system.

5.3 TIGHTENING BOLT CONNECTIONS

Before each use of the machine and during maintenance and repair work, confirm that all bolt connections are properly tightened. If any clearances in bolt connections are found, tighten bolt connections using appropriate tightening torque, unless other tightening parameters are given. 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 damage the machine.

TAB. 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

5.4 STORAGE

After completion of work the multifunction arm should be carefully cleaned and washed with a water jet. While washing do not direct a strong water or steam jet at information and warning decals, bearings or hydraulic lines. 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. Multifunction arm should be kept in a closed or roofed building.

If the multifunction arm shall not be used for a long period of time, protect it against adverse weather conditions. Lubricate the multifunction arm according to the instructions provided. In the event of prolonged work stoppage, it is essential to lubricate all elements regardless of the period of the last lubrication process. Protect against corrosion all cooperating elements i.e. pins, articulated joints, hydraulic cylinder pistons, guides of support system slide. Cover them with a thin layer of grease.

5.5 TROUBLESHOOTING

TAB. 5.3 TROUBLESHOOTING

TYPE OF FAULT	CAUSE	REMEDY
It is impossible to control support system arms	Control panel is damaged	Repair at authorised service point
	Multifunction arm's hydraulic system is out of order	Check individual elements of the multifunction arm's hydraulic system
Excessive heating of the multiplier gear box	Incorrect oil level	Check oil level.
	Damaged bearing	Repair at authorised service point
It is impossible to start the working head	Control panel is damaged	Repair at authorised service point
	Selective control valve is damaged	Repair at authorised service point
	Hydraulic pump is damaged	Repair at authorised service point
Oil cooler fan does not turn on	No power	Check the supply voltage
	Faulty temperature sensor	Replace the sensor

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.



