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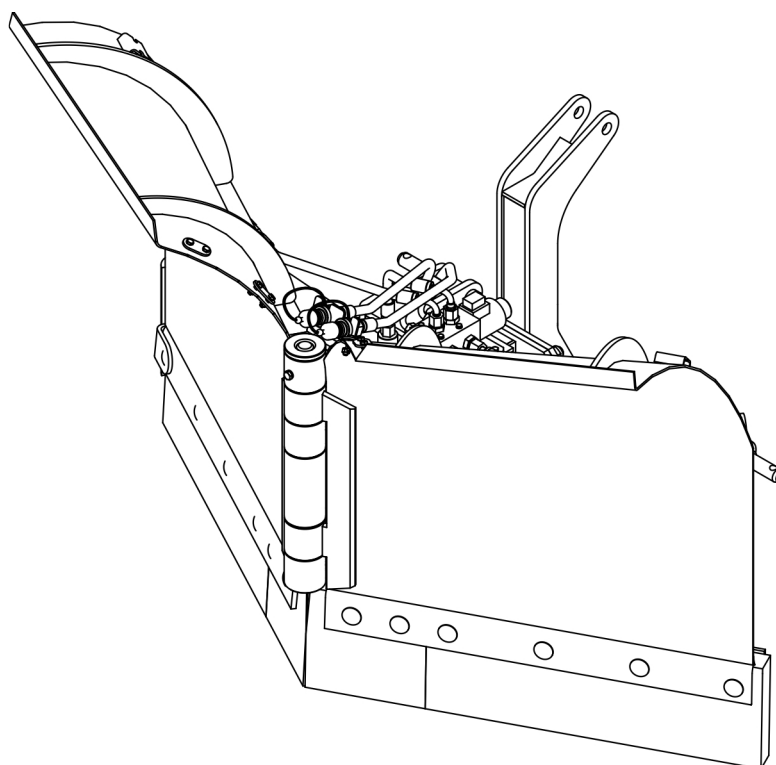
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OPERATOR'S MANUAL

SNOW PLOUGH

PRONAR PUV-1400

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



EDITION 1B-11-2011

PUBLICATION NO 305N-0000000-UM



SNOW PLOUGH

PORNAR PUV-1400

MACHINE IDENTIFICATION

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 the machine. 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:	Snow plough PRONAR
Type:	PUV-1400
Model:	—
Serial number:	
Commercial name:	Snow plough PRONAR PUV-1400

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 -10- 06

Place and date

Z-C.A. DYREKTORA
d/s technicznych
członek Zarządu

Roman Omelianiuk

*Full name of the empowered person
position, signature*

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SECTION

1

**BASIC
INFORMATION**

1.1 IDENTIFICATION

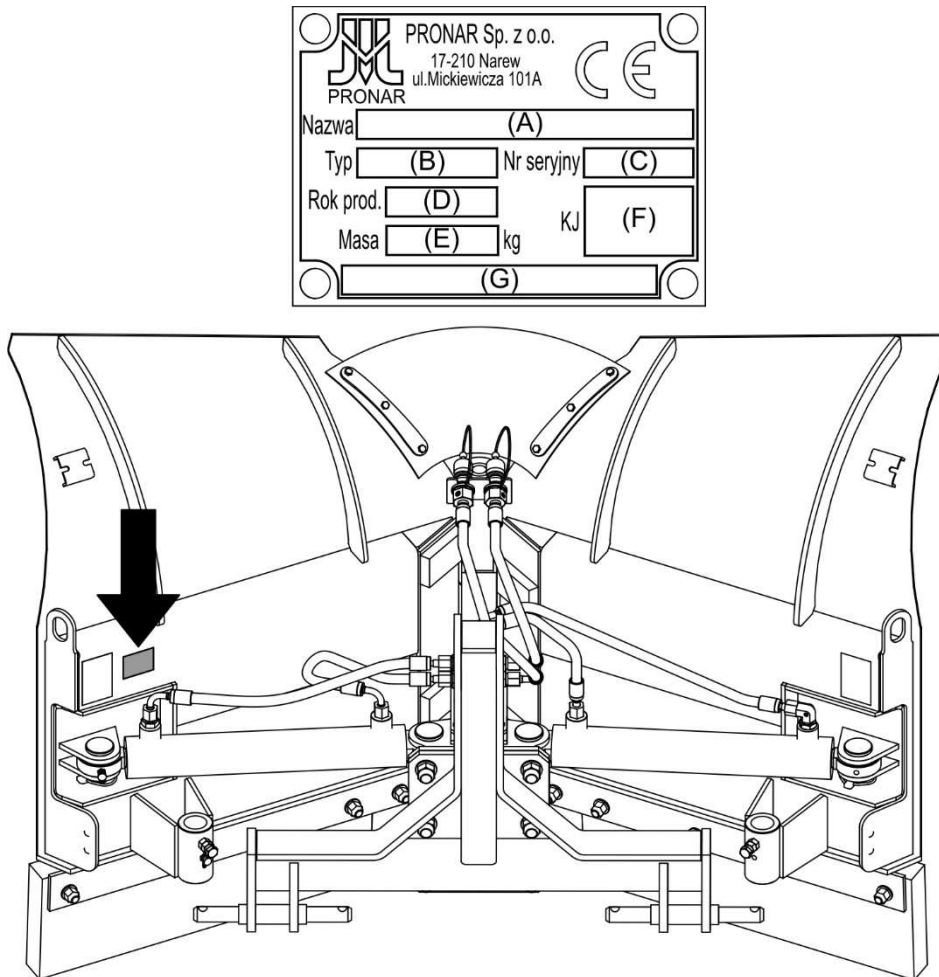


FIGURE 1.1 Location of the data plate

Meaning of each field of the data plate located on the machine (FIGURE 1.1):

- A - machine name,
- B – machine type,
- C – serial number,
- D – year of manufacture,
- E – machine tare weight [kg],
- F – Quality Control stamp,
- G – unfilled box or extension of name (box A).

Serial number is stamped on the data plate. Data plate is located on the left mouldboard. When buying the machine, check that the serial number corresponds with that indicated in the *WARRANTY BOOK*, in the sales documents and in the *OPERATOR'S MANUAL*.

1.2 INTENDED USE

PUV-1400 snowploughs are designed for clearing road surfaces, squares, parking spaces and all other hard road and footpath surfaces such as asphalt, concrete paving blocks, paving, concrete. The use of the snowplough for other purposes should be regarded as improper. Depending on the equipment, the snowploughs can be mounted on agricultural tractors and other slow-moving vehicles that meet the requirements set out in Table 1.1.

Using it as intended also involves all actions connected with the safe and proper operation and maintenance of the machine. Due to the above, the user is obliged to:

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

The machine may only be used by persons, who:

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


	<p style="margin: 0;">ATTENTION</p> <p style="margin: 0;">The snowploughs must not be used for purposes other than those for which it is intended, in particular for:</p> <ul style="list-style-type: none"> • levelling of roads, terrain; • transport of people, animals and other items on the machine.
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TABLE 1.1 AGRICULTURAL TRACTOR (CARRYING VEHICLE) REQUIREMENTS

	UNIT	REQUIREMENTS
Linkage		
Front three point linkage	-	Category I according to ISO 730-1
Hydraulic system		
Hydraulic oil	-	HL32
Nominal pressure of the system	MPa	16
Hydraulic sockets	-	2 sockets of one section on the front of the tractor (vehicle)
Electrical system		
Solenoid supply	-	cigarette lighter socket
Electrical system voltage	V	12
Other requirements		
Power range	hp (kW)	to 40 (to 30)
Beacon light	-	orange light

1.3 EQUIPMENT

Some standard equipment elements, which were listed in table (1.2), may not be present in the delivered snowplough. This allows the possibility of ordering new machines with a different set of optional equipment, replacing standard equipment.

TABLE 1.2 THE SNOWPLOUGH EQUIPMENT

EQUIPMENT	STANDARD	ADDITIONAL	OPTIONS
The Operator's Manual	•		
Warranty Book	•		
The snowplough electrical system	•		
Hydraulic system without shock absorbers, with two plugs	•		
Rubber snowplough blades	•		
Steel snowplough blades			•
Support slides		•	
Wheels		•	
Category I/I three-point linkage (narrow) ISO 730-1	•		
A-RAMA linkage			•
A-RAMA linkage (rigid)			•
Connection (<i>for swing linkages</i>)			•
Clearance lamps		•	
Fenders, set		•	

1.4 TERMS 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. Consumables include the following parts/sub-assemblies:

- rubber or metal collecting strips,
- slides,
- wheels,
- bulbs.

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

1.5 TRANSPORT

The machine is prepared for sale completely assembled and does not require packing. Packing is only required for the machine operator's manual and electrical system components.

Delivery is either by transport on a vehicle or independently. Transport of the machine is permissible connected to a carrying vehicle provided the vehicle's driver familiarises himself with the machine's Operator's Manual and particularly with information concerning safety and principles of connection and transport on public roads.

During road transport the machine should be firmly secured on the load platform by means of certified belts or chains fitted with a tightening mechanism.

When loading and unloading the machine, 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.

DANGER



When transporting independently, the user must carefully read this Operator's Manual and observe all recommendations. When being transported on a motor vehicle the machine 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 transporting the machine. This is due to the vehicle's centre of gravity shifting upwards when loaded with the machine.

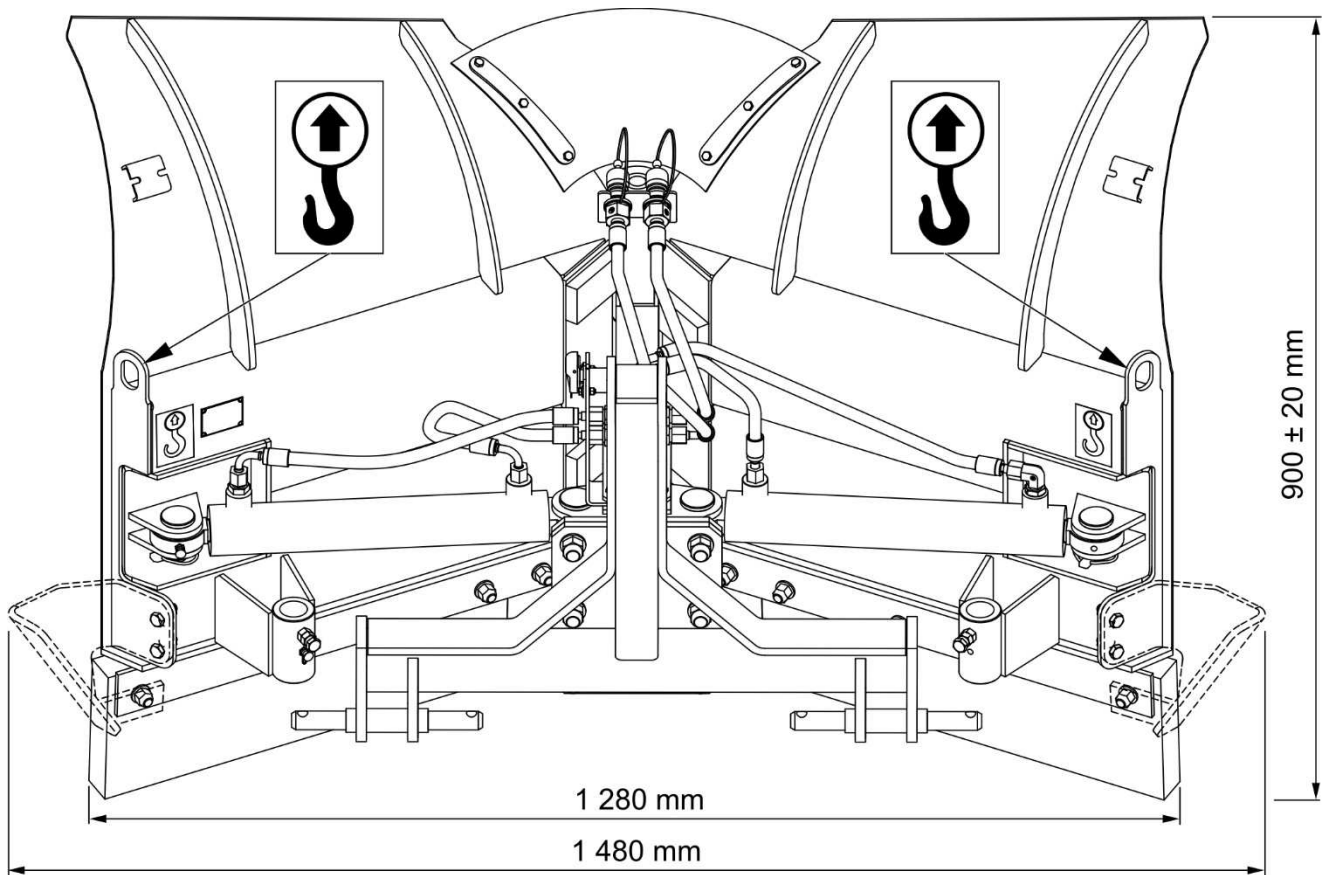


FIGURE 1.2 Transport lugs

The machine should be attached to lifting equipment in places specially designed for this purpose (FIGURE 1.2), i.e. by the external lugs on internal reinforcement of the right and left mouldboard. Suspension points are identified with information decals. When lifting the machine be especially careful due to the possibility of tipping over the machine and the risk of injuries from protruding parts. 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.

	<p>ATTENTION!</p>
<p>Do NOT secure lifting slings or any types of securing elements to hydraulic cylinders.</p>	

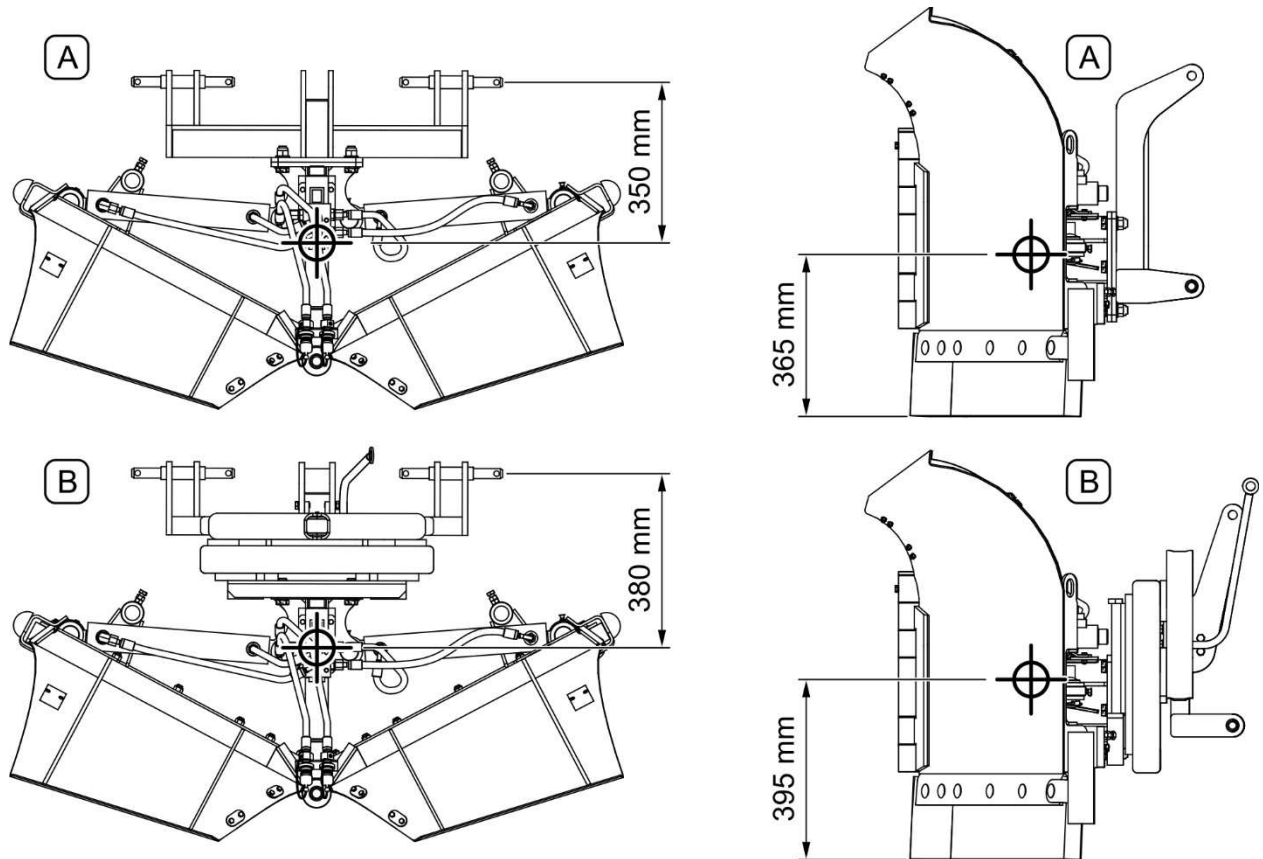


FIGURE 1.3 Centre of gravity

(A) - centre of gravity of the snowploughs with the three-point linkage; (B) - centre of gravity of the snowploughs with A-RAMA linkage



ATTENTION!

Position of centre of gravity depending on the snowplough version (slides or wheels, rubber or metal collecting strips, A-RAMA linkage (rigid)) varies within the range of ± 50 mm.

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 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. 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.

DANGER



Disassembly of the hydraulic system should be performed by suitably qualified personnel. Before disassembly relieve the accumulator pressure on both the liquid and gas sides.

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 machine may only be used and operated by persons qualified to drive agricultural tractors and carrying vehicles and trained in the use of the machine. Machine 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 machine should be the application of safety rules and sensible behaviour.
- The machine must never be used by persons, who are not authorised to drive agricultural tractors, including children and people under the influence of alcohol or other drugs.
- Non-compliance with the safety rules of this Operator's Manual can be dangerous to the health and life of the operator and others.
- The machine must not be used for purposes other than those for which it is intended. Anyone who uses the machine other than the way intended takes full responsibility for himself for any consequences of this use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the warranty.
- The machine may only be used when all the safety guards and other protective elements are technically sound and correctly positioned. In the event of loss or destruction of the safety guards, they must be replaced with new ones.

2.1.2 HITCHING AND UNHITCHING THE MACHINE

- Do NOT hitch the machine to a tractor, if hydraulic oil applied in both machines are of different types, or if the three point linkage system of the machine is not compatible with the category of the linkage system of the tractor or other carrying vehicle.
- After completed hitching of the machine, check the safeguards. Carefully read the tractor (carrying vehicle) Operator's Manual.
- To mount machine on tractor (carrying vehicle) use only genuine pins and safeguard cotter pins.
- The agricultural tractor or other carrying vehicle to which the machine will be coupled must be technically reliable and must fulfil the requirements of machine Manufacturer.
- Be especially careful when hitching the machine.
- When hitching, there must be nobody between the machine and the tractor (carrying vehicle).
- Exercise caution when unhitching the machine.
- Machine disconnected from the tractor (carrying vehicle) must be set in a suitable position so that the blades are folded back, resting on the collecting strips or, optionally, on slides or wheels.

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 tractor (vehicle), make sure that the tractor (vehicle) hydraulic system and the snowplough hydraulic system are not pressurised. 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.
- 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.
- Do NOT leave machine raised and unsecured while the tractor (carrying vehicle) is parked. When parked, the machine should be lowered.
- Do NOT ride on the machine or transport any materials on it.
- Before using the machine always check its technical condition, especially in terms of safety. In particular, check the technical condition of the hitch system and elements connecting hydraulic system.
- During transport, the tractor (carrying vehicle) three-point linkage should be locked in the up position to prevent its accidental lowering.
- 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 machine until the fault has been corrected.
- During work on the machine use the proper, close-fitting protective clothing, gloves and appropriate tools. When working on hydraulic systems it is recommended to use oil resistant gloves and protective goggles.
- Any modification to the machine frees PRONAR from any responsibility for damage or detriment to health which may arise as a result.
- Before undertaking any work on the machine, disconnect tractor (carrying vehicle) engine.
- 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 (carrying vehicle) engine turned off and the ignition key removed. The vehicle shall be immobilized with the parking brake and secured against unauthorized access.
- 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.
- Do NOT weld, drill holes in, cut or heat the main structural elements, which have a direct impact on the machine operation safety.
- In the event of work requiring the machine to be raised, use properly certified hydraulic or mechanical lifts for this purpose. After lifting the machine, stable and durable supports must also be used. Do NOT carry out work under a machine, which has only been raised with the three point linkage or extension arm.
- 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 SNOWPLOUGH OPERATION

- Before lowering or lifting the machine mounted tractor (carrying vehicle), make sure there are no bystanders, especially children, near the machine.
- Before starting the machine make sure that there are no bystanders (especially children) or animals in the danger zone. The machine operator is obliged to ensure proper visibility of the machine and the working area.
- During machine operation do not occupy a different position than that of the operator in the vehicle's cab. Do NOT leave the cab, when the machine is in operation.
- Do NOT stand within the machine's working zone and also between the tractor and the machine.
- Do NOT operate the snowplough while reversing. Lift the machine when reversing.

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 machine 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 machine 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.


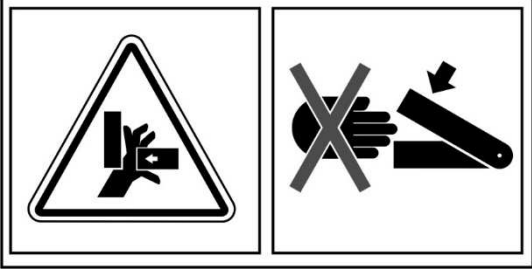
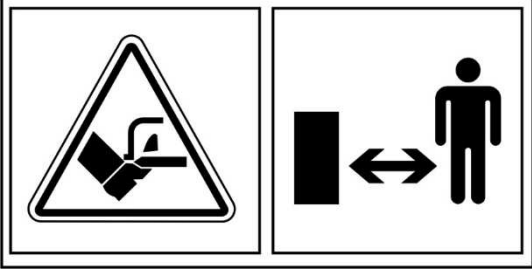
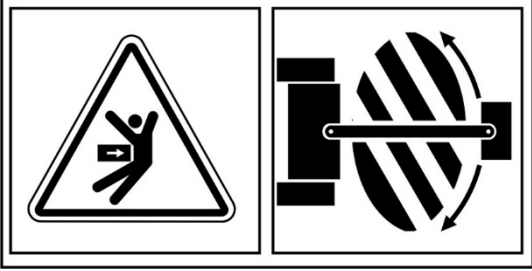
The residual risk may be kept to a minimum by following the recommendations below:



- prudent and unhurried operation of the machine,
- reasonably apply all the remarks and recommendations stated in the Operator's Manual,
- carry out repairs 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 safe distance from prohibited or dangerous places,
- do not climb on the machine when it is operating.

2.3 INFORMATION AND WARNING DECALS

All signs should always be legible and clean, visible to the operator and also to persons possibly being in the vicinity of the machine in operation. If any safety sign is lost or illegible, it should be replaced with a new one. All elements having safety signs replaced during repairs should be affixed with these signs. Safety signs and decals may be purchased from the Manufacturer or the Seller.

TABLE 2.1 INFORMATION AND WARNING DECALS

ITEM	SYMBOL	DESCRIPTION
1		<p>Before starting work, carefully read the Operator's Manual.</p>
2		<p>Do not reach into crushing space because elements may move. Danger of crushing hands or fingers.</p>
3		<p>Keep a safe distance from machine when engine is running. Risk of injury to foot or leg!</p>
4		<p>When implement is in use there must be no bystanders in designated areas. If any work is required in these areas, make sure the tractor is stationary, and whether the implement is disconnected from the power source.</p>

ITEM	SYMBOL	DESCRIPTION
5		Machine model
6		Transport suspension points

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

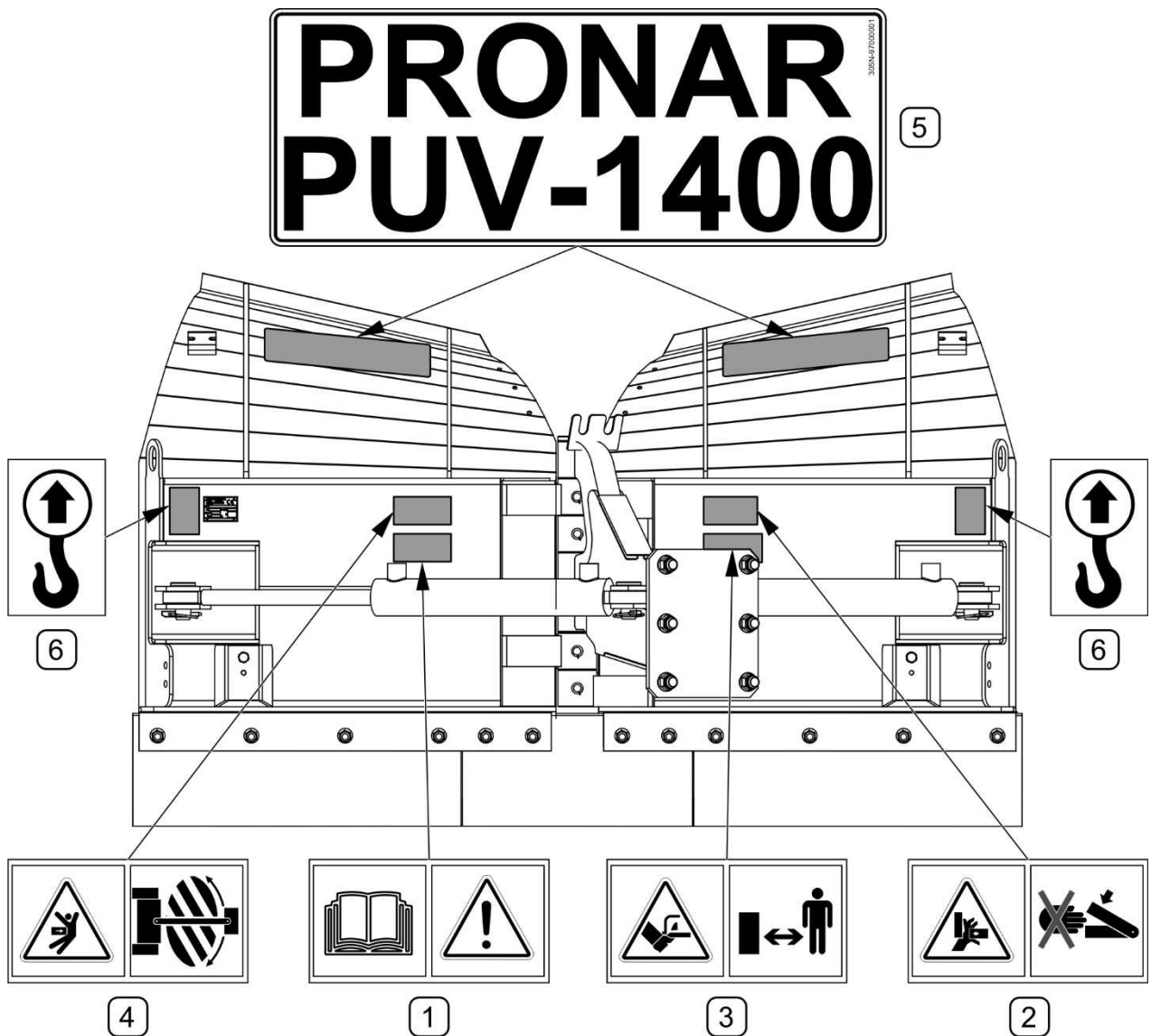


FIGURE 2.1 Locations of information and warning decals.

Meaning of symbols (TABLE 2.1)

SECTION

3

**DESIGN AND
OPERATION**

3.1 TECHNICAL SPECIFICATION

TABLE 3.1 BASIC TECHNICAL SPECIFICATION

Snowplough model		PUV-1400
CONTENTS	Unit	DATA
Mounting method: - three point linkage - other	- - -	cat. I according to ISO 730-1 A-RAMA linkage A-RAMA linkage (rigid)
Width (for "arrow" position)	mm	1,280
Width depending on the operating position A, B, C, D (FIGURE 3.1)	mm	from 1 280 ± 20 to 1,320 ± 20
Working height of snowplough blade	mm	860 (870*)
Number of working positions	pc.	4
Operation	-	hydraulic using solenoid
Number of hydraulic cylinders	pc.	2
Power supply	-	tractor (carrying vehicle) external hydraulic and electrical system 12V
Type of collecting strips	-	rubber or metal
Weight of machine ready for operation: - with three-point linkage cat. I according to ISO 730-1 - with A-RAMA linkage - with A-RAMA linkage (rigid)	kg kg kg	163 (175*) 205 (217*) 180 (192*)
Weight of additional equipment: - slides (2 pcs.) - wheels (2 pcs.)	kg kg	5 13
Power demand	hp (kW)	to 40 (to 30)
Maximum working speed	km/h	10
Other information	-	single person operation

* – with metal collecting strips

Level of noise emitted by machine does not exceed 70 dB(A)

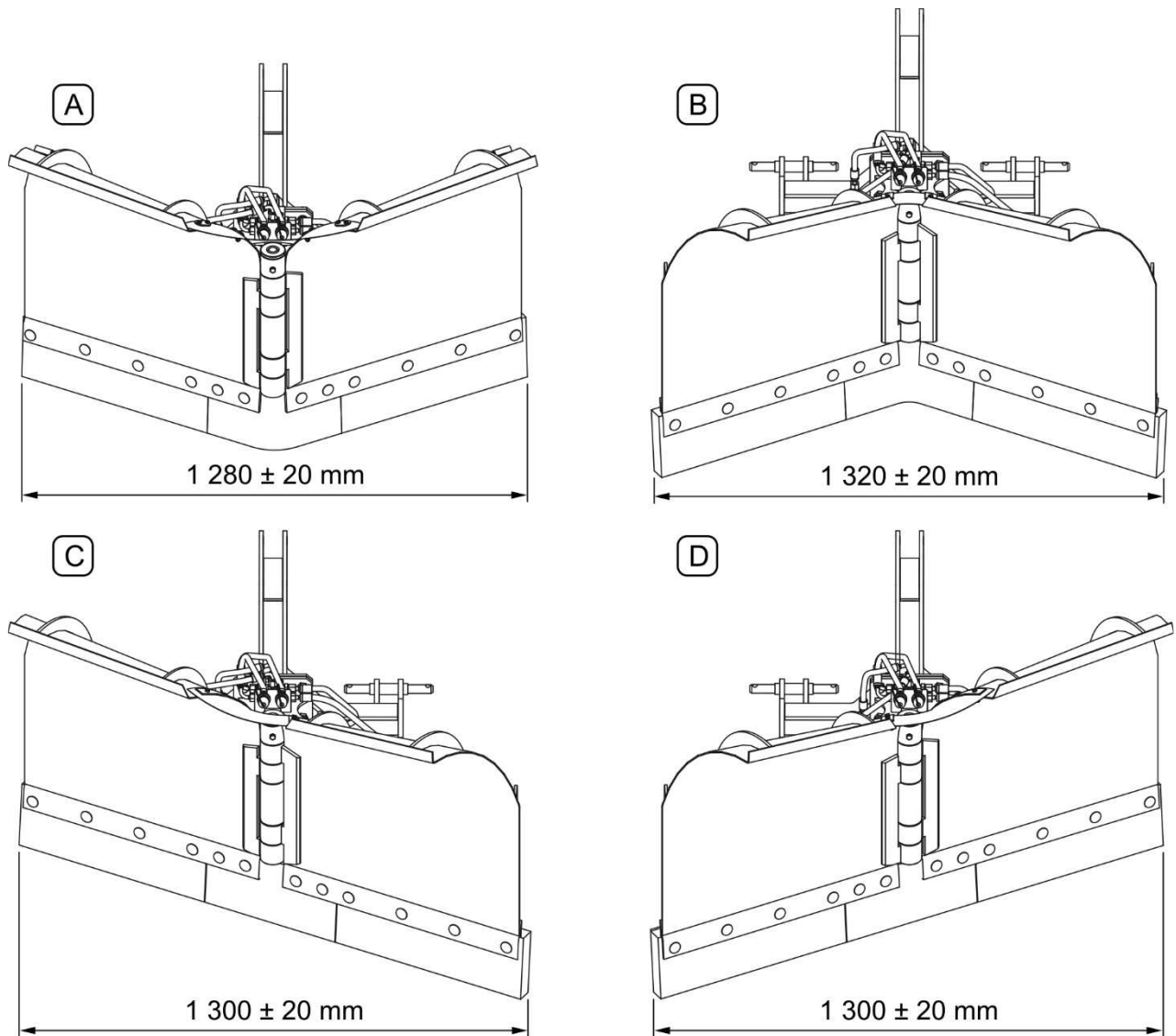


FIGURE 3.1 Width depending on the operating position:

(A), (B), (C), (D) – individual working positions

3.2 GENERAL DESIGN

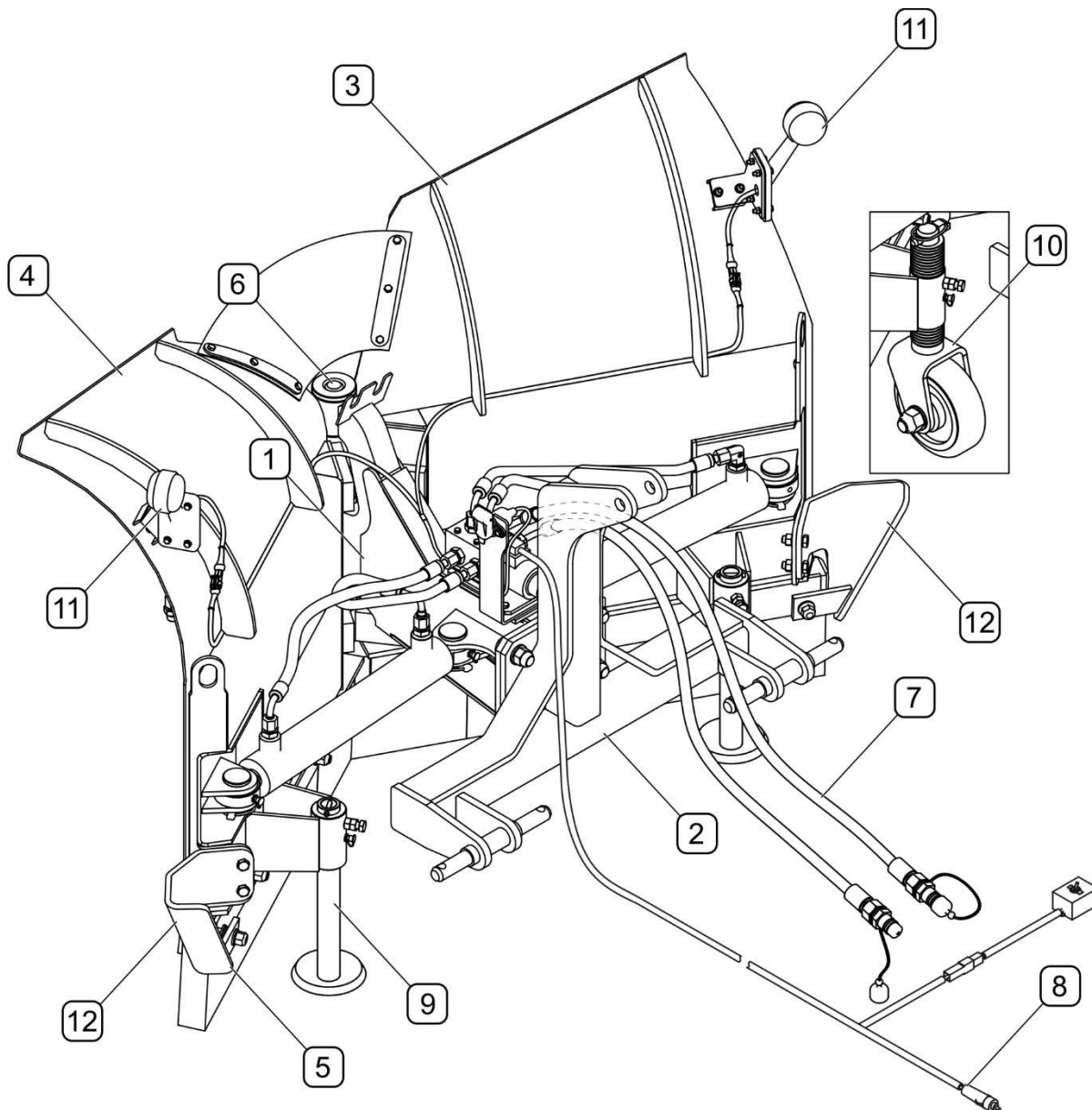


FIGURE 3.2 General design

(1)- frame; (2)- linkage; (3)- right mouldboard; (4)- left mouldboard; (5)- blade; (6)- main pin; (7)- hydraulic system; (8)- electrical system; (9)- slide (option); (10)- wheel (option); (11)- clearance lamps (option); (12)- fenders (option)

PUV-1400 snowplough consists of rubber blade (5) or steel blade (option), frame (1) to which right mouldboard (3) and left mouldboard (4) are connected through main pivot (6). The snowplough is hitched to the tractor using a suitable linkage system (2). Additionally, the snowplough can be equipped with slides (9) or wheels (10), clearance lamps (11) and fenders (12) and optionally, with other linkage systems.

3.3 HYDRAULIC SYSTEM

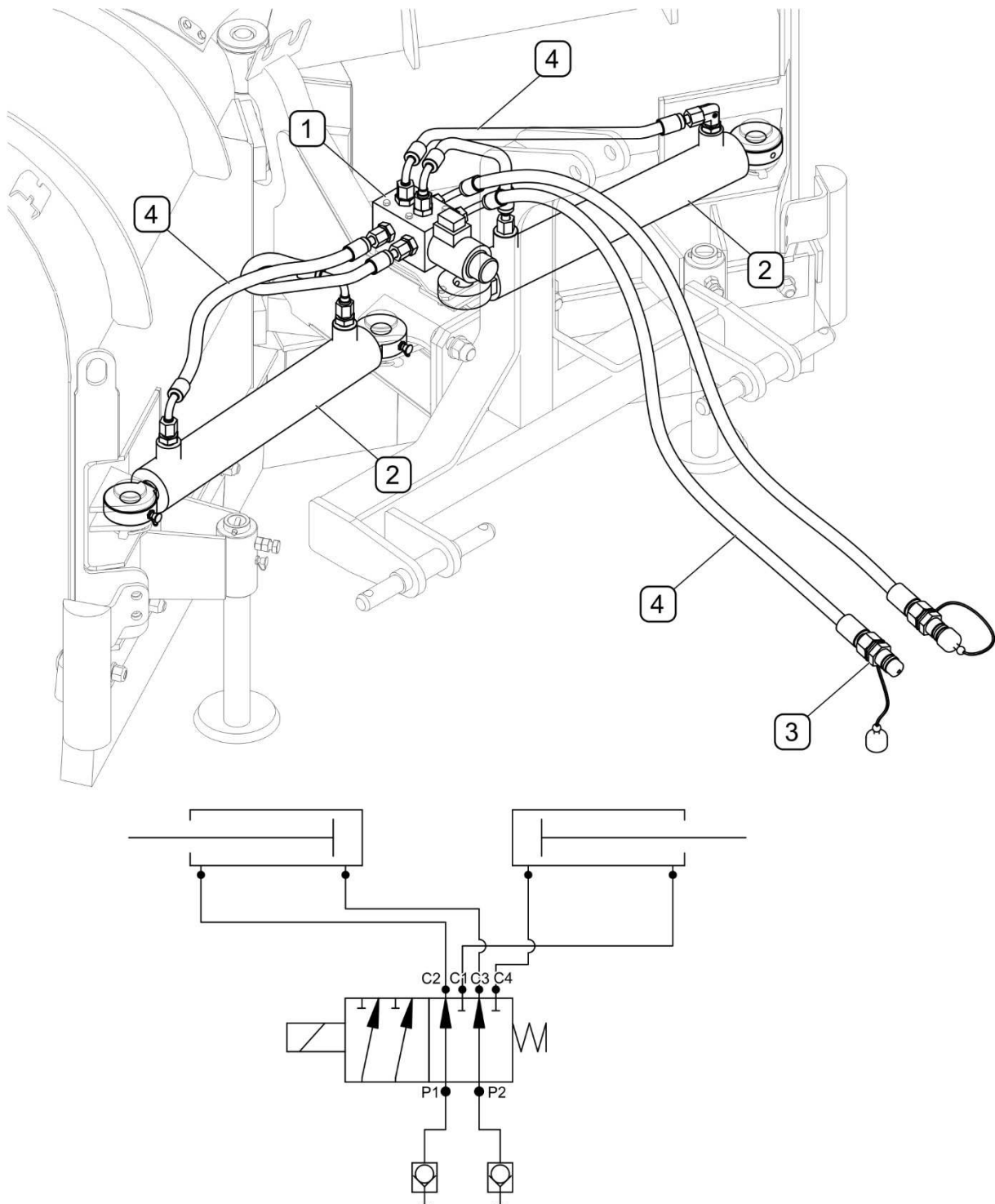


FIGURE 3.3 Hydraulic system design

(1)- solenoid valve; (2)- hydraulic cylinders; (3)- quick coupler; (4)- hydraulic conduits

Working position of the snowplough's mouldboards can be adjusted by means of two hydraulic cylinders (2) controlled by solenoid valve (1) using the switch on conductor. The

snowplough's hydraulic system is supplied with oil from the tractor's (carrying vehicle's) hydraulic system via two conduits (4) terminated with quick couplers (3).

3.4 ELECTRICAL SYSTEM

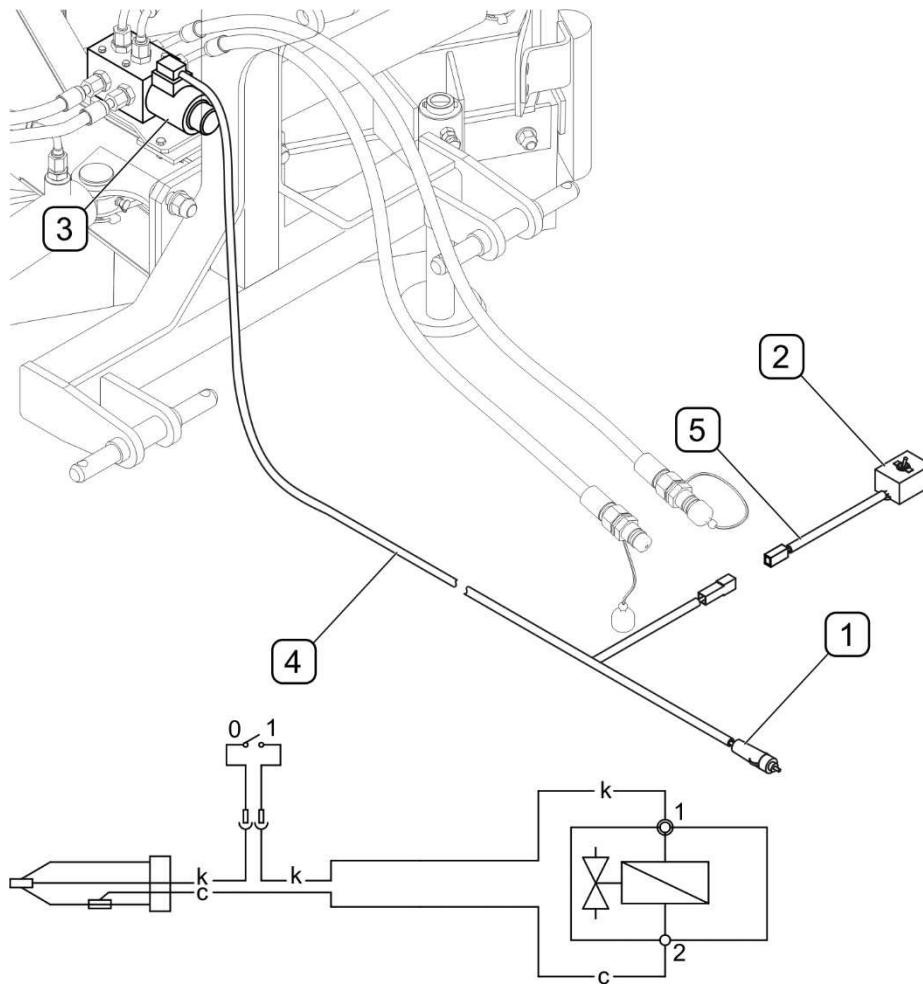


FIGURE 3.4 Electrical system design

(1) - cigarette lighter socket; (2) – switch; (3) - solenoid valve; (4) - solenoid valve wiring harness; (5) - switch wiring harness; c - black colour; k - red colour

Electrical system of the snowplough's clearance lights (FIGURE 3.5) consists of two clearance lamps (1) and wiring harness (3) connected to 3-pin socket (2). The snowplough's electrical system is connected with the tractor's (carrying vehicle's) electrical system by means of power supply wiring harness (4), which is equipped with 7-pin plug (a) and adapter socket (b).

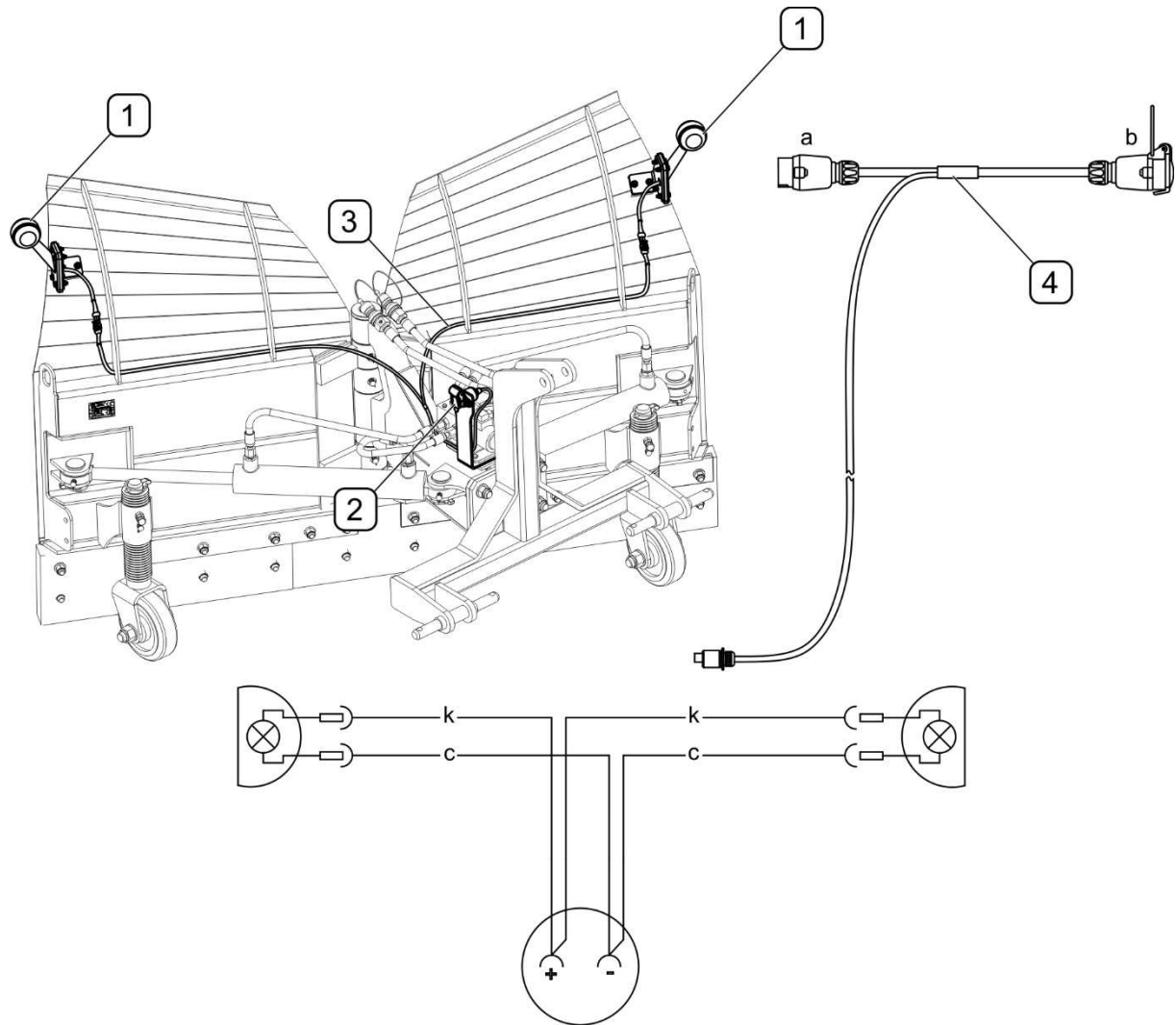


FIGURE 3.5 Design of electrical system of clearance lights

(1)- clearance lamp; (2)- 3-pin socket; (3)- wiring harness of clearance lamps; (4)- power supply wiring harness; a- 7-pin plug; b- adapter socket; c- black colour; k- red colour

SECTION

4

**CORRECT
USE**

4.1 PREPARING FOR WORK

DANGER



Before using the snowplough, the user must carefully read this Operator's Manual.

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.

The machine 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 machine, make sure that there are no bystanders in the danger zone.

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 (except for individually packed wiring).

Prior to connecting to the tractor, machine operator must verify the machine's technical condition. 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 compatibility of the snowplough linkage with suspension system of the carrying vehicle,
- make sure that electrical wiring and hydraulic system outlets are compatible,
- 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 as needed according to recommendations provided in section 5 "MAINTENANCE",
- check technical condition of the hydraulic and electrical system,
- check the technical condition of the collecting strips,

- check technical condition of the linkage components.

**ATTENTION!**

Non-adherence to the recommendations stated in the Operator's Manual or improper use may cause damage to the machine.

The technical condition before starting the machine must be no cause for concern.

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 carrying vehicle, started and all its individual systems checked. In order to do this:

- hitch the machine to a tractor or a carrying vehicle (see "*HITCHING TO CARRYING VEHICLE*"),
- after connection of hydraulic system conduits and electrical system wiring, the correct operation of individual systems should be checked with inspection of systems and hydraulic cylinders with regard to seals and tightness,
- check the snowplough's settings for each working position.

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

**ATTENTION!**

Before using the machine always check its technical condition. In particular, check the technical condition of the hitch and hydraulic system.

4.2 CHECKING TECHNICAL CONDITION

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

TABLE 4.1 TECHNICAL INSPECTION SCHEDULE

DESCRIPTION	MAINTENANCE ACTIVITIES	FREQUENCY OF INSPECTIONS
Technical condition of blades and collecting strips.	Inspect visually and if necessary replace according to section " <i>REPLACEMENT OF COLLECTING STRIPS</i> "	before beginning work
Technical condition of slides (option)	Check technical condition, if complete and correctly mounted.	
Technical condition of linkage	Check technical condition, if complete and correctly mounted.	
Technical condition of the hydraulic system.	Visually inspect the technical condition	
Technical condition of the electrical controls	Visually inspect the technical condition	
Tightening of all main nut and bolt connections	Tightening torque values should be according to table (5.2)	Once a week
Lubrication	Lubricate elements according to table <i>LUBRICATION</i> .	According to table (5.1)



ATTENTION!

The machine must not be used when not in working order.

4.3 HITCHING TO VEHICLE

PUV-1400 snowplough may only be hitched to a tractor (carrying vehicle) fulfilling the requirements contained in table 1.1 „*REQUIREMENTS FOR CARRYING VEHICLE (AGRICULTURAL TRACTOR)*”.



ATTENTION!

Before hitching the snowplough to tractor (carrying vehicle), the user must carefully read the operator's manual for the tractor (carrying vehicle).



DANGER

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

Exercise caution when hitching the machine to carrying vehicle.



ATTENTION!

Weight of tractor (carrying vehicle) must not be transferred to the snowplough as it could lead to the snowplough damage.

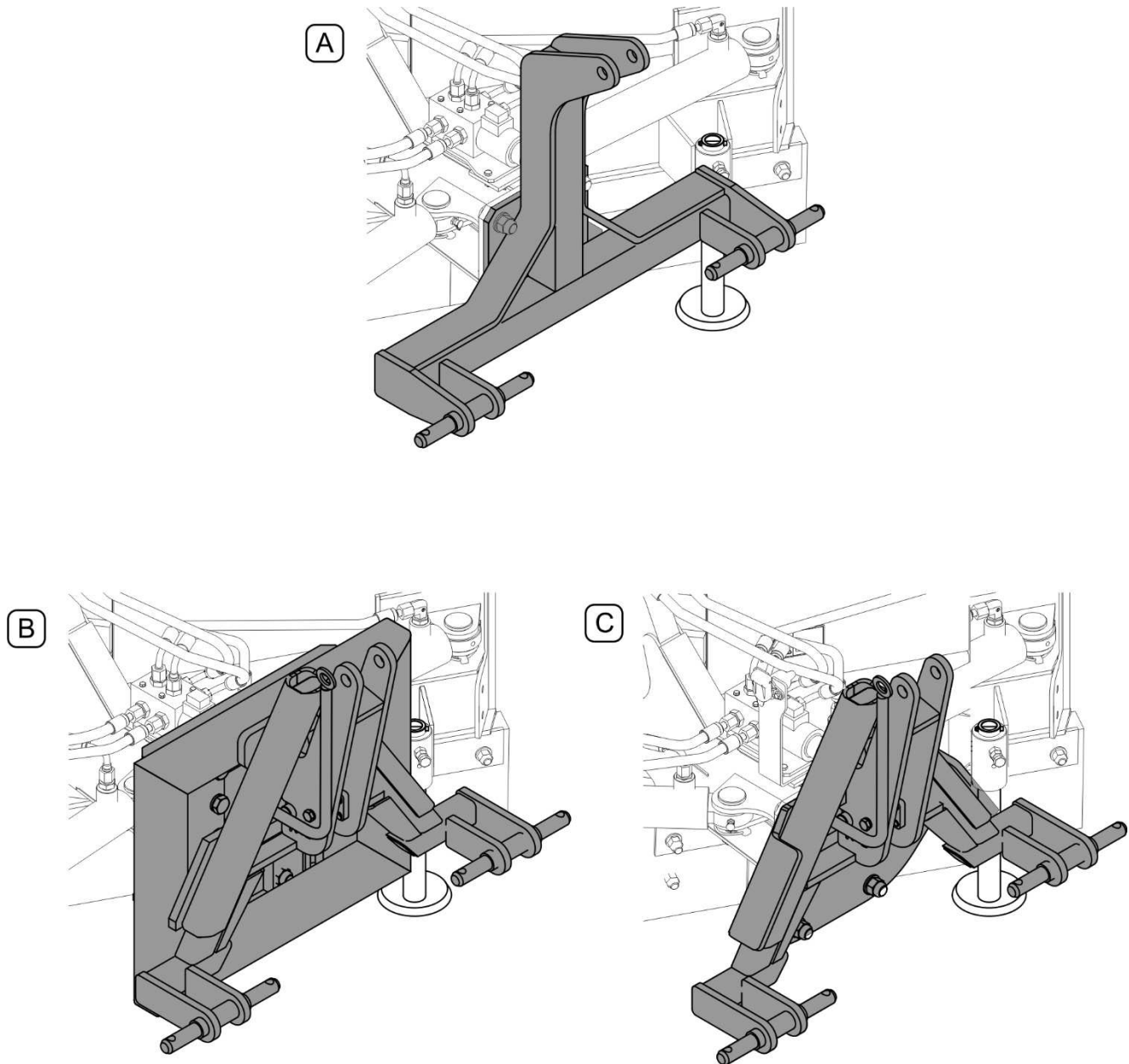


FIGURE 4.1 Types of linkage systems

(A) - three-point linkage of cat. I/I (narrow) according to ISO 730-1; (B) - A-RAMA linkage; (C) - A-RAMA linkage (rigid)

4.3.1 HITCHING TO THE THREE POINT LINKAGE

Before hitching the snowplough to tractor three-point linkage, make sure that the category of the tractor linkage is compatible with that of the snow plough.

In order to hitch the snowplough to the tractor three-point linkage:

- move the lower links of tractor three-point linkage to the lower linking points of the snowplough; set lower links at an appropriate height,
- turn off tractor engine and prevent it from moving,

- connect the lower pins of the plough linkage with three-point linkage and secure with cotter pins,
- in the case of the hook linkage place balls on plough linkage pins, secure with cotter pins and lift the pins until balls lock in hooks,
- connect tractor upper link (central connector) to the snowplough upper attachment point and secure with cotter pin,
- eliminate lateral plough movements by appropriate adjustment of the lower arm stabilisers; it is recommended that both the lower links of the three-point linkage are set at the same height,
- lift the snowplough using the tractor's three point linkage.

**DANGER**

To hitch the machine to tractor (carrying vehicle) use only original pins and safeguards.

4.4 CONNECTING HYDRAULIC SYSTEM AND ELECTRICAL SYSTEM

SYSTEM

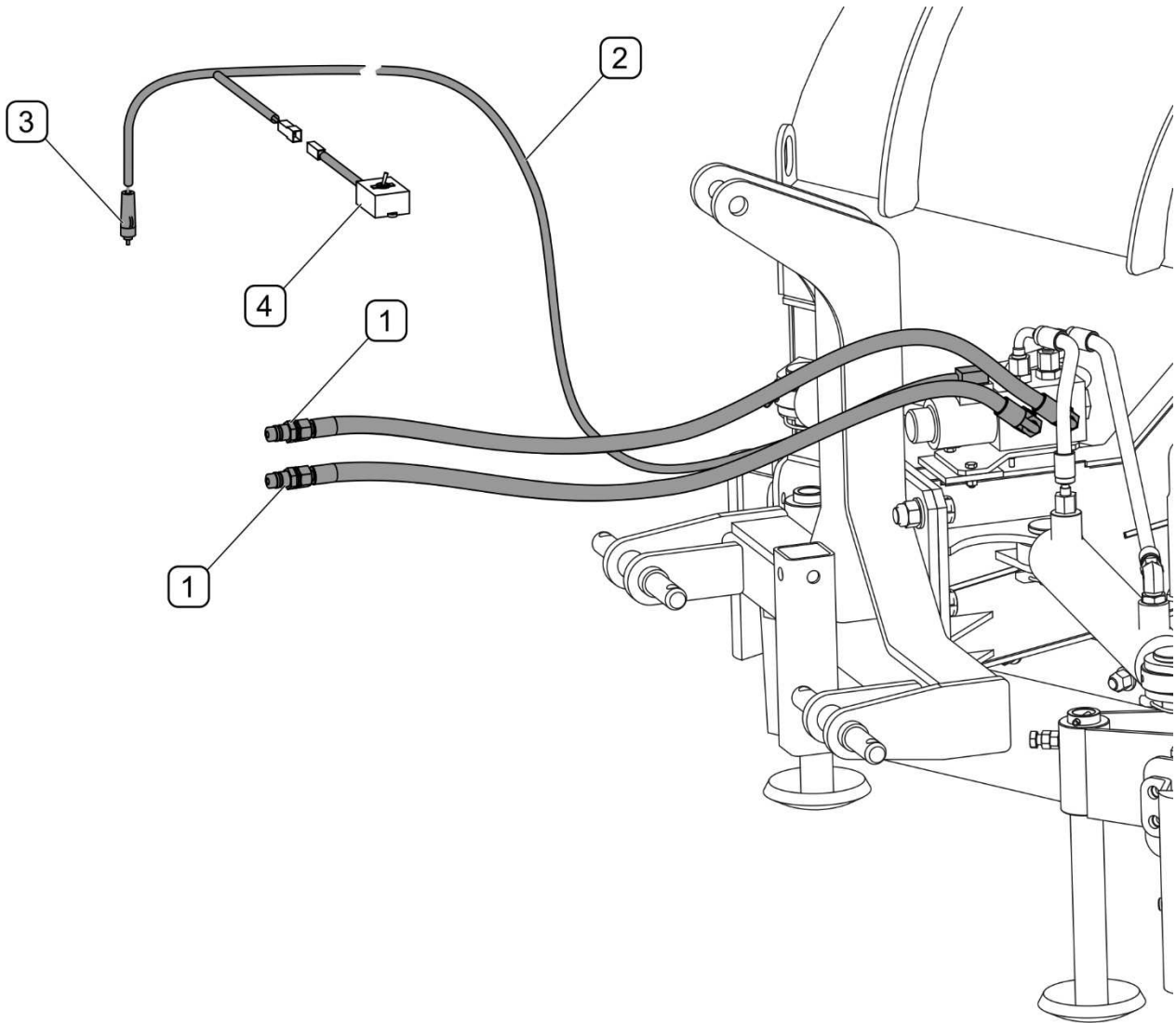


FIGURE 4.2 Connecting hydraulic system and electrical system to tractor

(1) - hydraulic conduits; (2) - solenoid valve power cable; (3) - lighter socket plug; (4) - switch



DANGER

Prior to connecting individual system conduits, the user must carefully read the tractor Operator's Manual and observe all Manufacturer's recommendations.

Connect the snowplough control hydraulic conduit connectors (1) to the tractor external hydraulic outlets (FIGURE 4.2). When connecting hydraulic conduits to the tractor make sure they are arranged without bends and twists, and are protected from damage.

Connect plug (3) of solenoid (2) power lead to 12V cigarette lighter socket; connect switch (4) to lead (2) and place it in an accessible place in the operator's cab. Arrange electrical wires so as to prevent their damage during operation.



DANGER

When connecting the hydraulic conduits to the tractor, make sure that the tractor hydraulic system is not under pressure.



ATTENTION!

During operation, the connecting cables should be routed so that they do not get entangled in moving machine parts.

4.5 SNOWPLOUGH OPERATION

4.5.1 LEVELLING THE SNOWPLOUGH BODY

To ensure the optimum operation, the snowplough body should be level (the main blades pivot axis should be perpendicular to the ground and collecting strips should be vertical). Levelling of the snowplough body in the carrying vehicles with three-point linkage is done by adjusting the central link (FIGURE 4.3). Otherwise, collecting strips will wear unevenly.

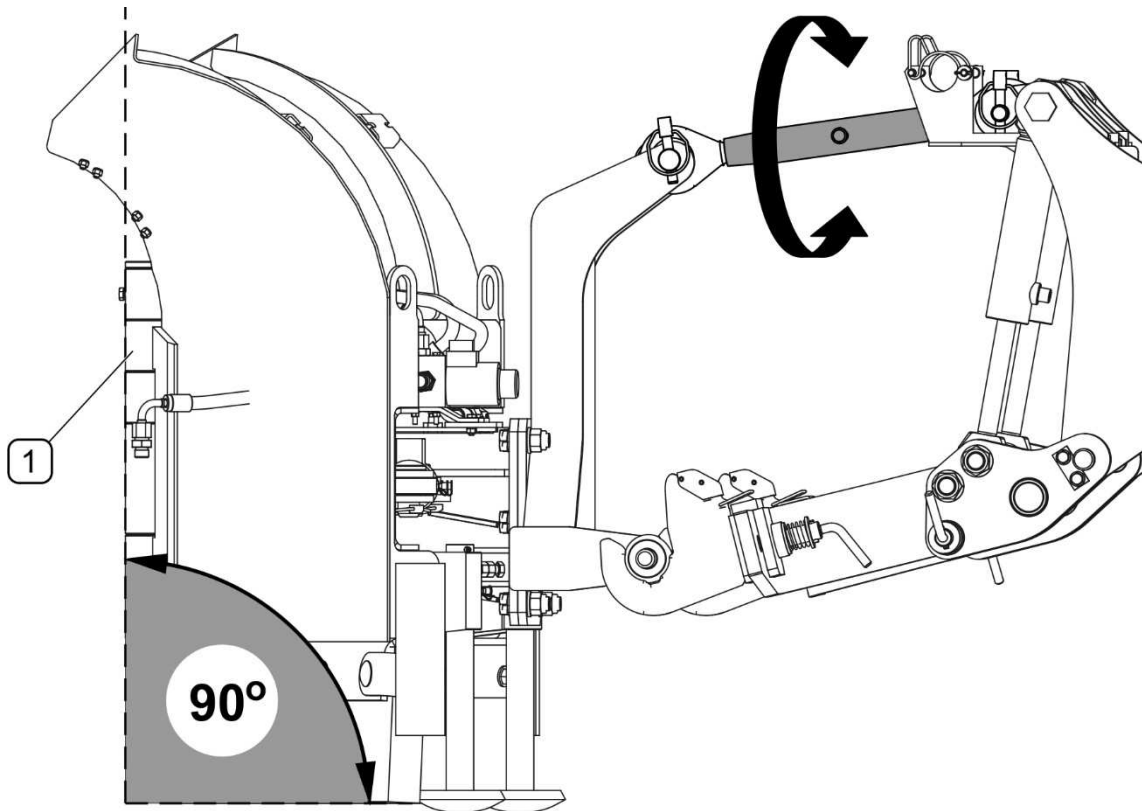


FIGURE 4.3 Levelling the snowplough body

(1) - main pin of blades

4.5.2 ADJUSTING THE SNOWPLOUGH WORKING POSITIONS

PUV-1400 snowplough has four adjustable working positions. In order to change the snowplough working position use a single selective control valve lever in tractor and an electric switch.

When the switch is set to "OFF" or "0" (switched off), a single snowplough blade can be controlled and when the switch is flipped to "ON" or "1" (switched on), the other snowplough blade can be controlled (FIGURE 4.4).



DANGER

The snowplough is controlled from the operator cab.

When snowplough is in use there must be no bystanders near the machine.

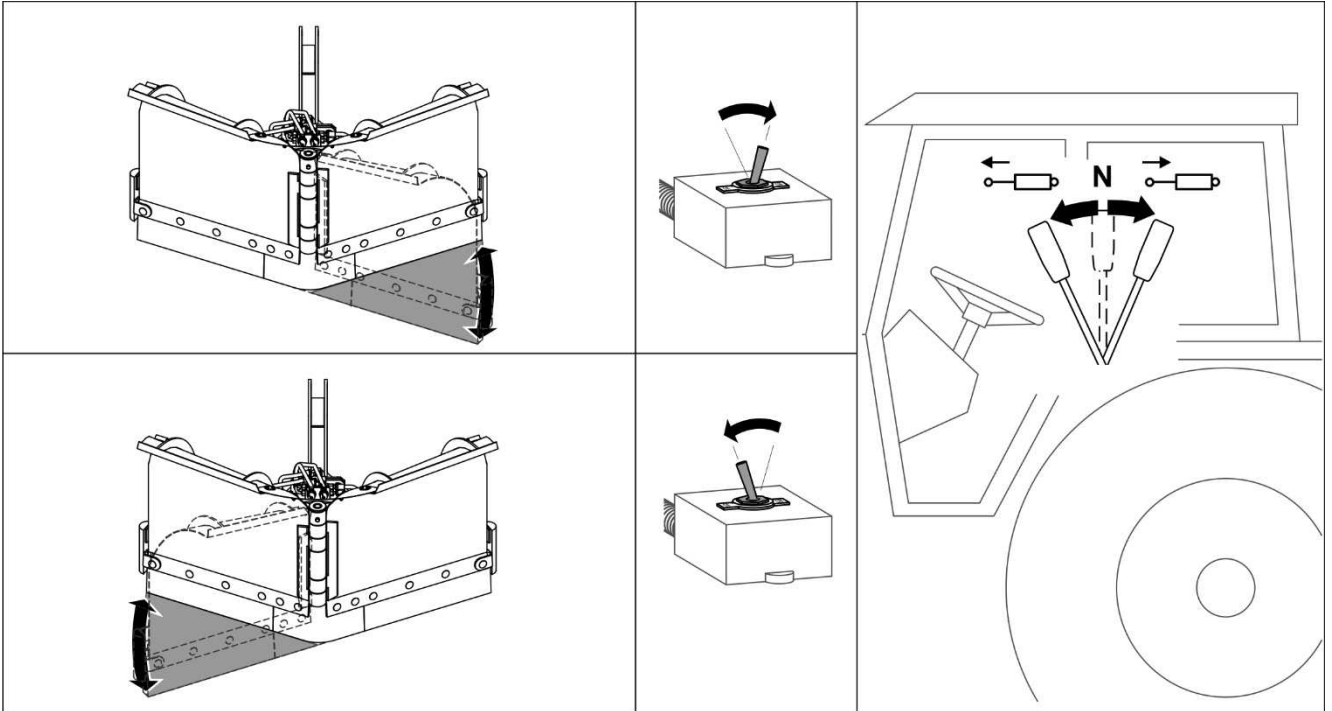


FIGURE 4.4 Setting working position



ATTENTION

It is not recommended to operate the machine in heavy duty conditions with a speed exceeding 6 km/h.

Working speed depends on the quantity and quality of collected material but also on the type of terrain.

4.5.3 SETTING THE WORKING HEIGHT



DANGER

Setting the working height should be performed only when the engine is stopped, and the machine is raised and secured.

In the snowploughs equipped with slides (FIGURE 4.5), the working height adjustment is performed by unlocking nut (2) and bolt (3) and proper extension or withdrawal of slide (1) in guide. When the height is set, secure the slide by tightening bolt (3) and nut (2). Adjustment of the left slide and the right slide is carried out in the same way. Slides of the left and right mouldboard should be put forward at the same height. The recommended distance of the collecting strips from the cleared surface is 5 ÷ 12 mm.

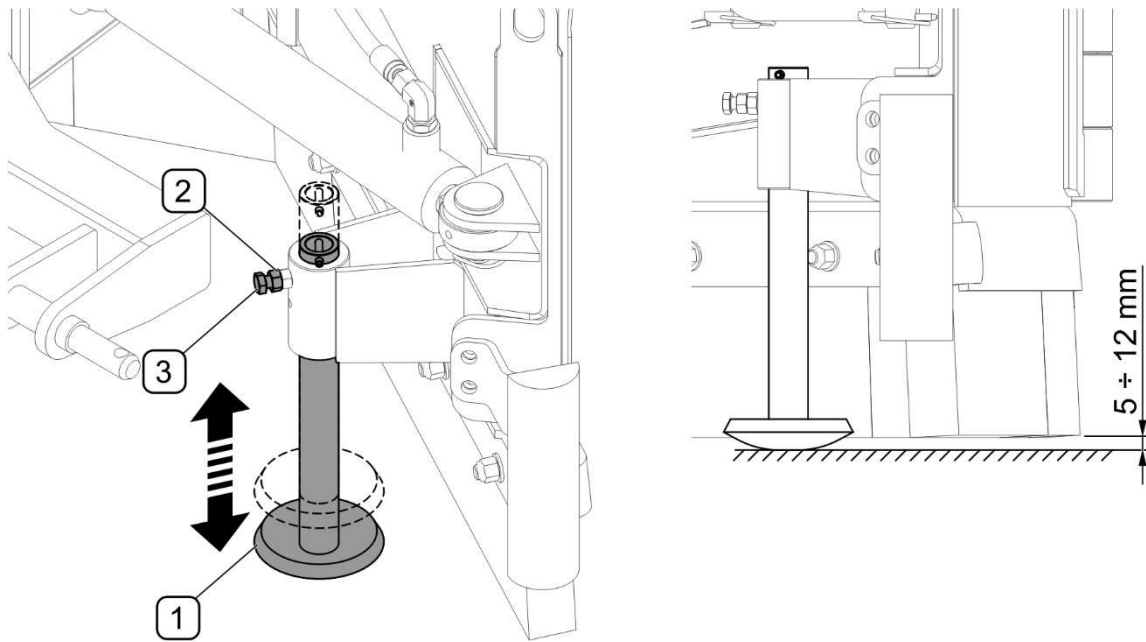


FIGURE 4.5 Working height adjustment in the snowploughs equipped with slides
 (1) - slide; (2) - slide guide; (3) - pin; (4) - securing cotter pin

In the snowploughs equipped with wheels (FIGURE 4.6), the working height adjustment is performed by means of washers (3). To do this, take out pin (2) and remove wheel with washers (1). When a proper height is set, secure the wheel with pin (2). Location of the wheel in the guide can be changed every 6 mm. Adjustment of the left wheel and the right wheel is carried out in the same way. Both wheels should be set at the same height.

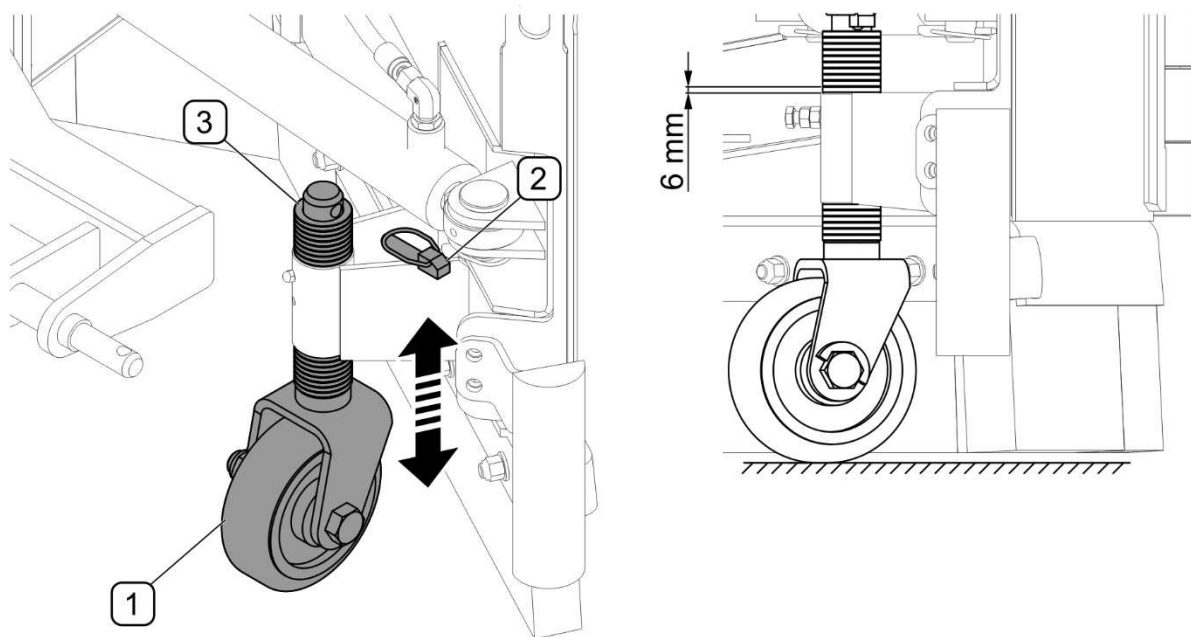


FIGURE 4.6 Working height adjustment in the snowploughs equipped with wheels.
 (1) - wheel; (2) - pin; (3) - washer

4.5.4 SHOCK ABSORPTION OF STEEL COLLECTING STRIPS

Optionally, PUV-1400 snowplough can be equipped with steel blades. Shock absorption of steel collecting strips (1) is performed by means of polyurethane shock absorber (2), which is able to swing backwards when an obstacle is encountered (FIGURE 4.7).

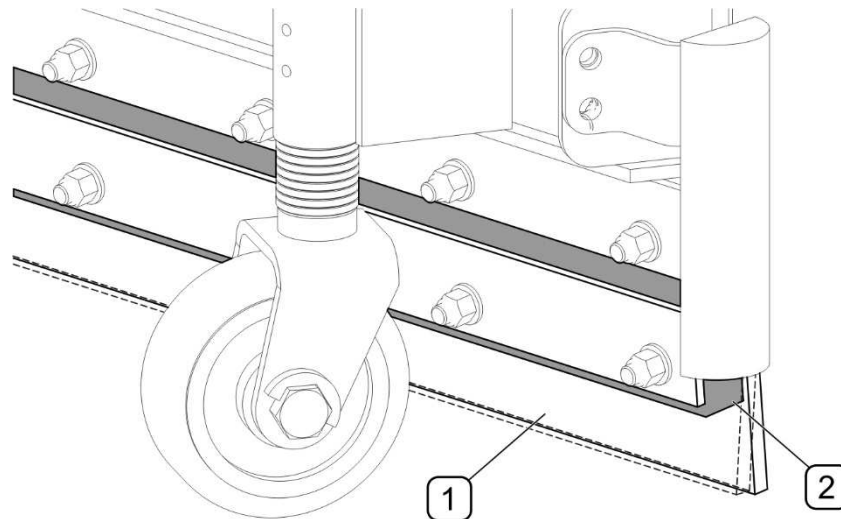


FIGURE 4.7 Shock absorption of steel collecting strips

(1) - steel collecting strip; (2) - polyurethane shock absorber

4.6 DRIVING ON PUBLIC ROADS

When driving on public roads, respect the road traffic regulations, exercise caution and prudence. If snow clearing with the snowplough is done on a pavement, special attention should be paid to the bystanders likely to be near the machine. Listed below are the key guidelines.

- Before moving off make sure that there are no bystanders, especially children, near the machine or the tractor. Take care that the driver has sufficient visibility.
- Make sure that the snowplough is correctly attached to the tractor (carrying vehicle) and linkage is properly secured.
- While driving or operating the machine on public roads turn on clearance lamps.
- The maximum working speed and the maximum speed allowed by road traffic regulations must not be exceeded. Speed of travel should be adjusted to prevailing road conditions and other conditions.
- While working with the snowplough turn the orange beacon light in tractor.

- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the machine or the tractor to suddenly tilt. Driving near ditches or canals is dangerous as there is a risk of the slope collapsing.
- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- When driving on uneven terrain with the implement raised reduce speed due to dynamic loads and the risk of damaging the machine or carrying vehicle.
- When driving with raised snowplough set it so as not to obscure the lights or restrict the visibility of the operator.
- When driving with raised snowplough, secure the tractor (carrying vehicle) linkage against falling or accidental dropping.

4.7 DISCONNECTING THE SNOWPLOUGH

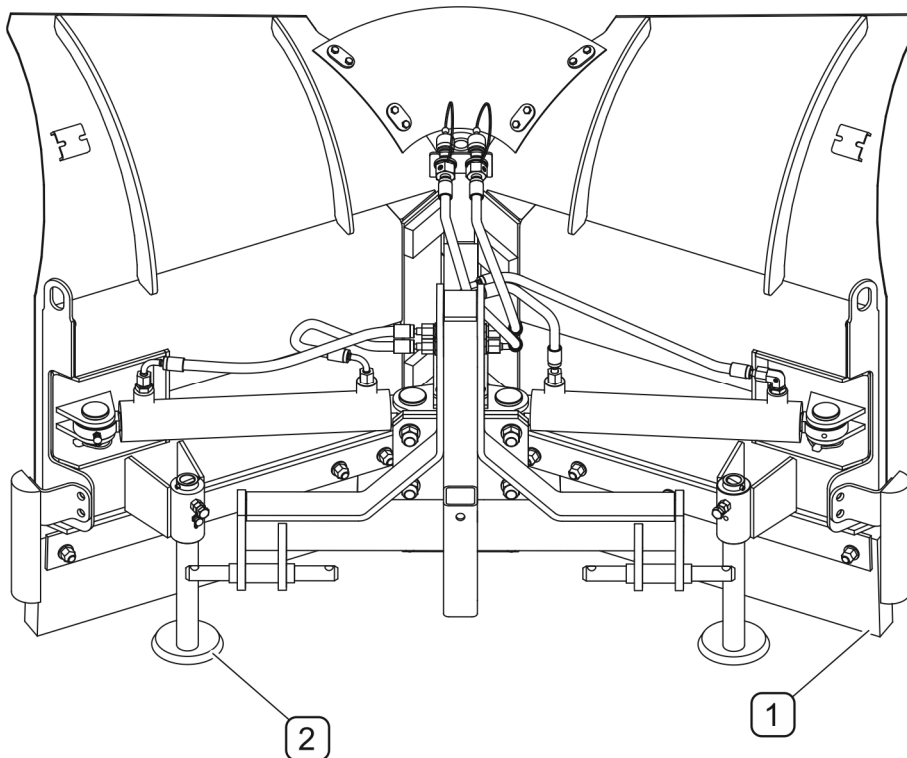


FIGURE 4.8 Snowplough position when disconnected from the carrying vehicle

(1) - rubber collecting strip; (2) - slide (option)

In order to disconnect the snowplough from the tractor, proceed as follows:

- position the snowplough in "arrow" position so that blades are folded to the rear (FIGURE 4.8),
- lower the snowplough until it fully rests on the ground,
- turn off the engine in the tractor, engage the parking brake,
- reduce residual pressure in the hydraulic system by movement of appropriate lever controlling hydraulic circuit,
- disconnect from the tractor the plugs of hydraulic system conduits and electric power lead of the electromagnetic regulator and clearance lamps,
- protect the plugs of quick couplers of hydraulic conduits against soiling and put them in proper places on the frame support (FIGURE 4.9),
- disconnect the snowplough from the tractor (carrying vehicle) linkage,
- after disconnecting from the carrying vehicle, the snowplough should rest on the ground leaning against rubber collecting strips or against slides or wheels (option) if the snowplough is equipped with steel collecting strips.

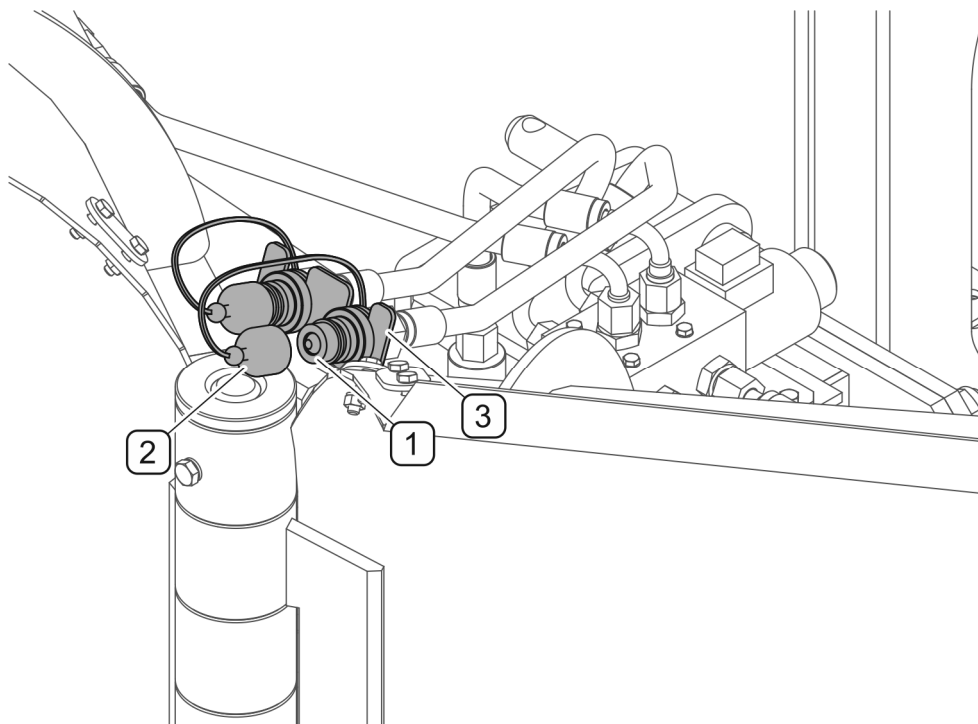


FIGURE 4.9 Protection of hydraulic socket plugs

(1) - hydraulic socket plugs; (2) - plug; (3) - plug mounting support



DANGER

Reduce pressure prior to disconnecting the hydraulic system.

SECTION

5

MAINTENANCE

5.1 CHECKING AND REPLACEMENT OF COLLECTING STRIPS



DANGER

During inspection and replacement of collecting strips, turn off tractor engine and remove the key from the ignition.

Excessively worn or damaged collecting strips must be replaced. Before replacing collecting strip raise the snowplough and support with sufficiently stable and strong supports. If the snowplough is hitched and raised on the front three-point linkage, protect it from falling and immobilise the tractor (turn off the engine and engage the parking brake).



DANGER

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

Rubber collecting strip consists of three segments (A, B) (FIGURE 5.1). To dismantle the segments of the strip, undo nuts (3), take out fixing bolts (1) and washers (4) and remove clamping strips (2). Replace the strip segments, reassemble in reverse order.

To dismantle the metal collecting strips (C), undo nuts (3), take out fixing bolts (1) and washers (4) and remove clamping strips (2) and shock absorber (5). Replace the metal collecting strips, reassemble in reverse order. After replacement of collecting strips, the working height should be checked and possibly adjusted (see 4.5.3 *SETTING THE WORKING HEIGHT*).



ATTENTION!

Each time snowplough hits an obstacle, the technical condition of collecting strips and their mounting should be checked.

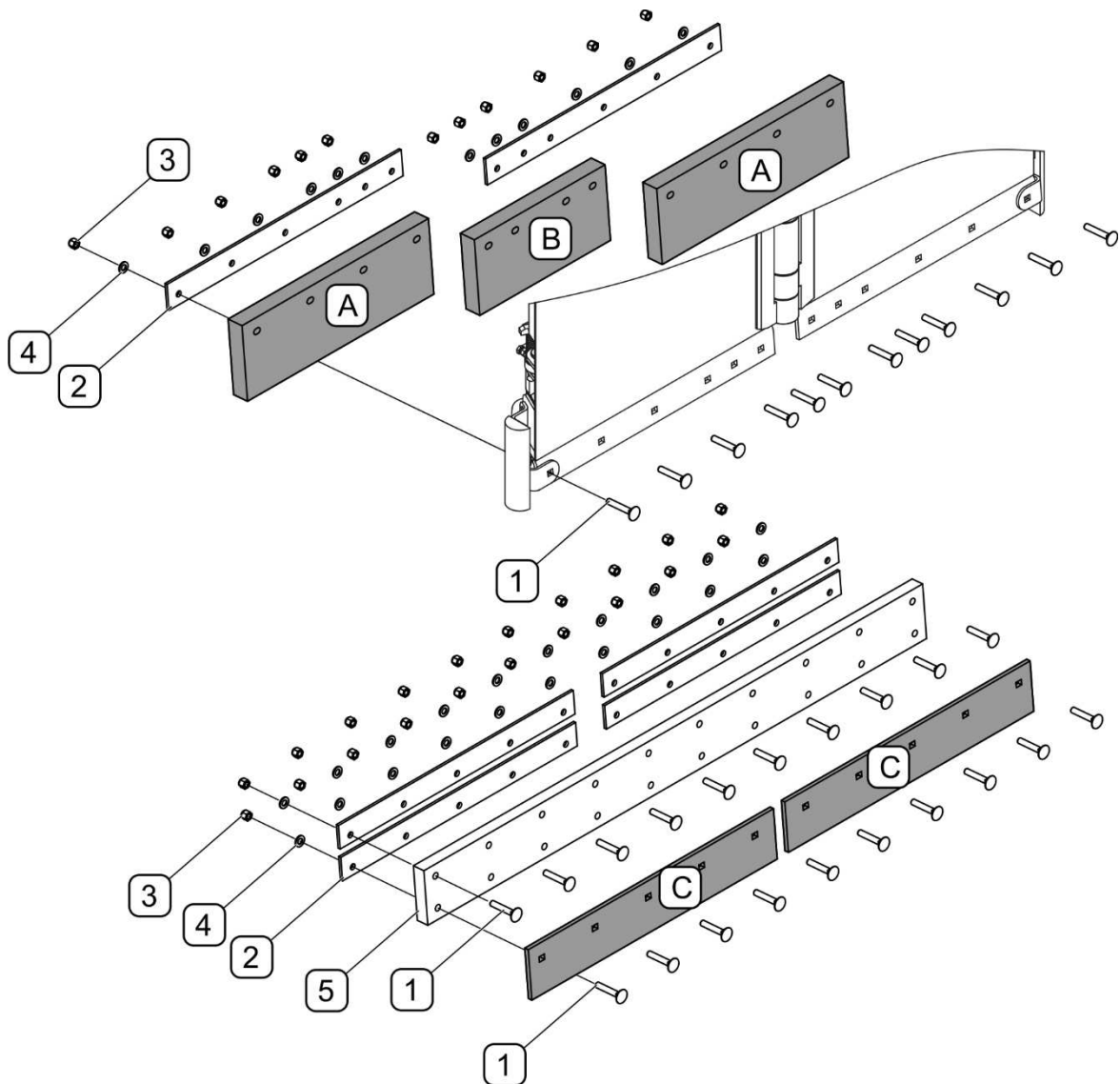


FIGURE 5.1 Replacement of collecting strip

(A)- rubber collecting strip; (B)- central rubber collecting strip; (C)- metal collecting strip;
 (1)- bolts; (2)- clamping strip; (3)- nuts; (4)- washers; (5)- shock absorber

TABLE 5.1 THE TYPES OF COLLECTING STRIPS IN PUV-1400 SNOWPLOUGHS

Marking FIGURE 5.1	Name / Catalogue No.	Number of items
A	Rubber collecting strip / 305N-05000002	2
B	Central rubber collecting strip / 305N-05000003	1
C	Metal collecting strip / 305N-06000001	2

5.2 SLIDE REPLACEMENT

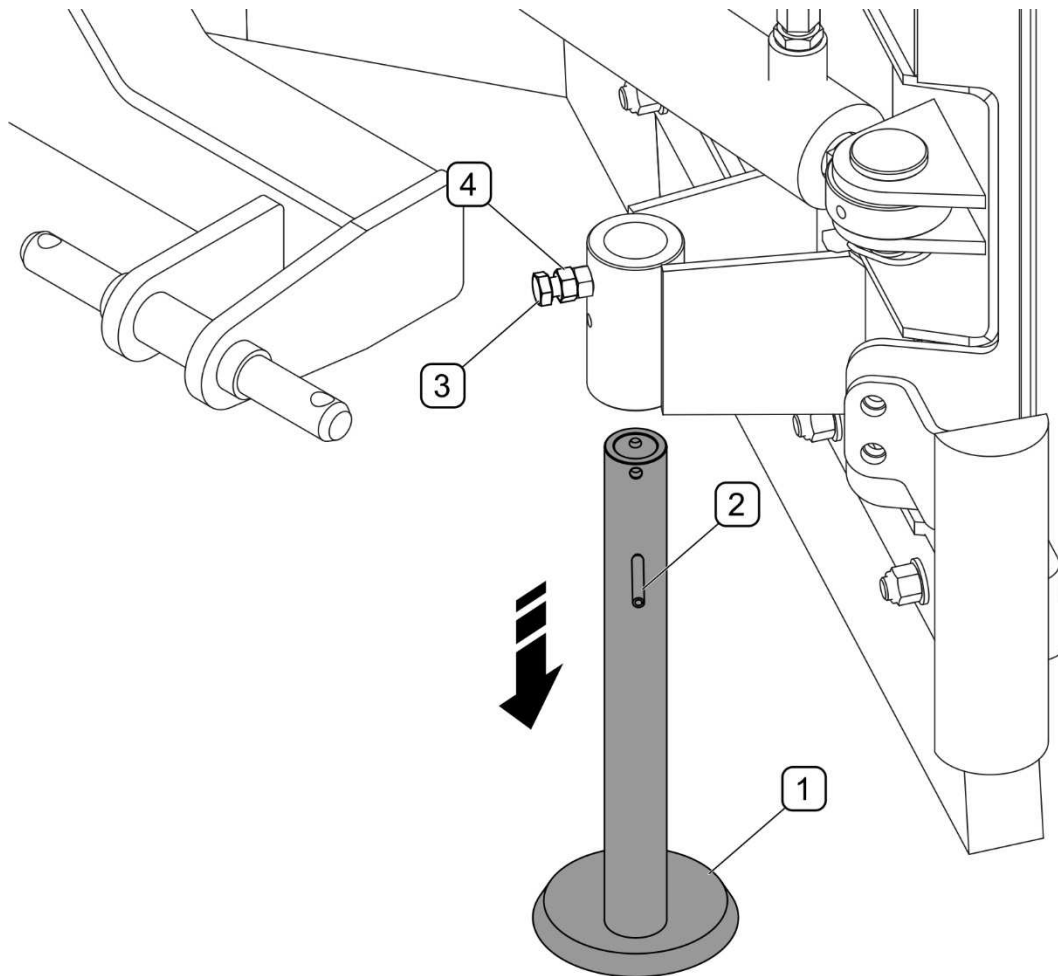


FIGURE 5.2 Slide replacement

(1)-slide; (2)- spring pin; (3)- bolt; (4)- nut

Excessively worn or damaged slides must be replaced (FIGURE 5.2). In order to do this raise the plough and support with sufficiently stable and strong supports. If the snowplough is hitched and raised on the front three-point linkage, protect it from falling and immobilise the tractor (turn off the engine and engage the parking brake.) Loosen nut (4) and bolt (3) and take out spring pin (2) and then remove slide (1) from guide. Check the slide and other elements for damage or excessive wear. The list of slide working components including catalogue numbers is shown in TABLE 5.2.

TABLE 5.2 THE LIST OF SLIDE WORKING COMPONENTS FOR PUV-1400 SNOWPLOUGHS

Marking FIGURE 5.2	Name / Catalogue No.	Number of items
1	Slide / 305N-35010000	1
2	Spring pin 8x50-C PN-EN ISO 8752	1
3	Bolt M10x30-8,8-A2J PN-EN ISO 4017	1
4	Nut M10-8-A2J PN-EN ISO 4032	1

5.3 HYDRAULIC SYSTEM OPERATION

The duties of the operator connected with the hydraulic system include:

- checking tightness of cylinders and hydraulic connections,
- checking technical condition of hydraulic conduits and quick couplers.



DANGER

Do not repair hydraulic system on your own. All hydraulic system repairs must be performed only by suitably qualified personnel.



ATTENTION!

Before you begin, visually inspect the hydraulic system components.

The hydraulic system of new machine is factory filled with HL32 hydraulic oil. 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.



	<p>DANGER</p> <p>Oil fires should be quenched with carbon dioxide (CO₂), foam or extinguisher steam. Do NOT use water for fire extinguishing!</p>
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TABLE 5.3 HL32 HYDRAULIC OIL CHARACTERISTICS

ITEM	NAME	VALUE
1	ISO 3448VG viscosity classification	32
2	Kinematic viscosity at 40°C	28.8 – 35.2 mm ² /s
3	ISO 6743/99 quality classification	HL
4	DIN 51502 quality classification	HL
5	Flash point, °C	Above 210°C
6	Maximum operating temperature, °C	80

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.

The hydraulic system should be completely tight sealed. Inspect the seals when hydraulic cylinders are completely extended. If oil is found on hydraulic cylinder body, check 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.

	<p>The condition of hydraulic system should be inspected regularly while using the machine.</p>
---	---

	<p>DANGER</p> <p>Before commencing whatever work on hydraulic system reduce the residual pressure in the system.</p>
---	---

**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.

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.

**ATTENTION!**

The hydraulic system is vented automatically during machine operation.



Hydraulic conduits should be replaced after 4 years of machine use.

5.4 ELECTRICAL SYSTEM MAINTENANCE

Electrical system maintenance involves periodical checking the operation of the clearance lamps system. After connecting the plough to carrying vehicle, connect power lead of the clearance lamps electrical system. Next, place solenoid valve lead and switch in the tractor operator cab. Insert the solenoid valve supply plug into the cigarette lighter socket. Start the tractor and check if clearance lamps and solenoid valve operate correctly.

In order to replace a clearance lamp bulb, take out lens from flexible housing.

Clearance lamps are equipped with R5W / 12V bulbs.


**DANGER**

Do not independently repair electrical system, except items described in chapter 5.4 ELECTRICAL SYSTEM MAINTENANCE.

All electrical system repairs must be performed only by suitably qualified personnel.

5.5 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 ŁT-43-PN/C-96134 grease is recommended for lubrication.

	<p>DANGER</p> <p>Lubrication may only be performed when the snowplough is lowered, and resting on the ground.</p> <p>Before lubricating, turn off engine, remove key from ignition and engage tractor parking brake.</p>
---	---


	<p>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.</p>
--	--

TABLE 5.4 LUBRICATION POINTS AND LUBRICATION FREQUENCY

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
1	Blade main pivot pin	4	grease	50 hours
2	Slide sleeve	2		
3	Cylinder rod eye	2		
4	Hydraulic cylinder eye	2		

Marking description in Item column (TABLE 5.4) conforms with numbering shown (FIGURE 5.3)

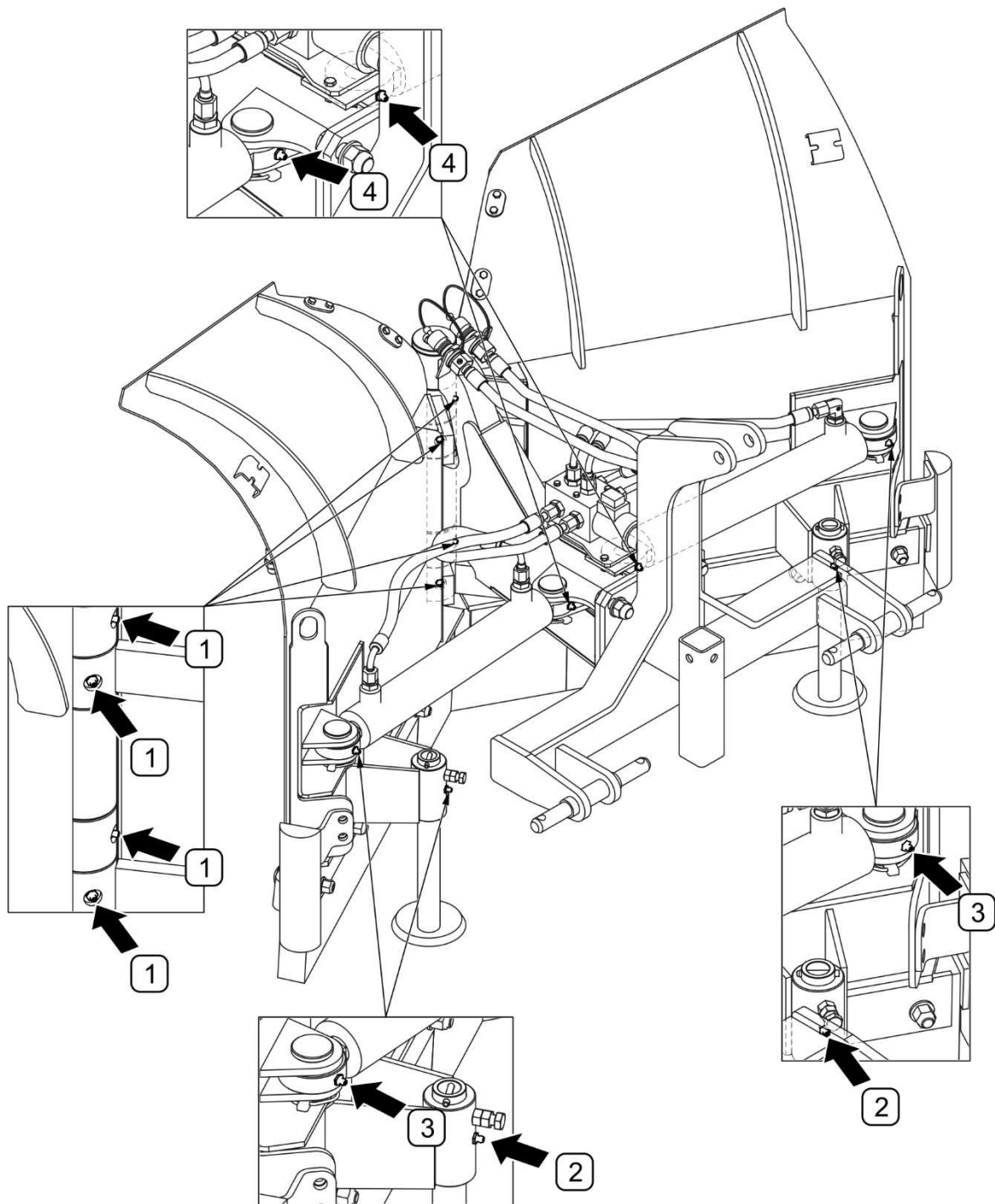


FIGURE 5.3 Lubrication points

Lubrication points are described in table 5.4

5.6 STORAGE

After finishing work, machine should be thoroughly cleaned and washed with water jet. While washing 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. Machine should be kept in closed or roofed building.

If the machine shall not be used for a long period of time, protect it against adverse weather conditions. Lubricate machine according to the instructions provided. In the event of prolonged work stoppage, it is essential to lubricate all elements regardless of the period of the last lubrication process. Additionally, before the winter period, apply grease to hitching system pins.

5.7 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

During maintenance and repairs use appropriate tightening torques for bolt connections (unless a different tightening torque is specified for a particular connection). Recommended tightening torque values apply to non-greased steel bolts (TABLE 5.5).



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.

TABLE 5.5 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

5.8 TROUBLESHOOTING

TABLE 5.6 Troubleshooting

TYPE OF FAULT	CAUSE	REMEDY
Blades do not swing as you control the working position	The hydraulic system is not connected	Connect quick couplers to tractor (carrying vehicle) system.
	Damaged hydraulic quick couplers	Check quick couplers for damage, refer repair to service, if necessary
	Tractor hydraulic system unreliable switched off	Check the tractor (carrying vehicle) hydraulic system
When controlling plough setting of just one blade changes	The electrical system not connected to the tractor (carrying vehicle)	Connect electrical system to tractor.
	Hydraulic system valve control switch set in one position	When switched off, just one snowplough blade can be controlled, when switched on the other blade can be controlled
	Faulty wiring	Repair at an authorised service point
	Damaged solenoid valve	Repair at an authorised service point
	Burnt fuse in lighter socket plug	Check and replace
Plough scoops snow unevenly	Plough improperly mounted on a carrying vehicle	Check and adjust according to operator's manual
	Slides or wheels (option) incorrectly positioned	Check and adjust according to operator's manual
	Excessively worn or damaged collecting strips	Check and replace if necessary

NOTES

A series of horizontal dotted lines for writing notes.