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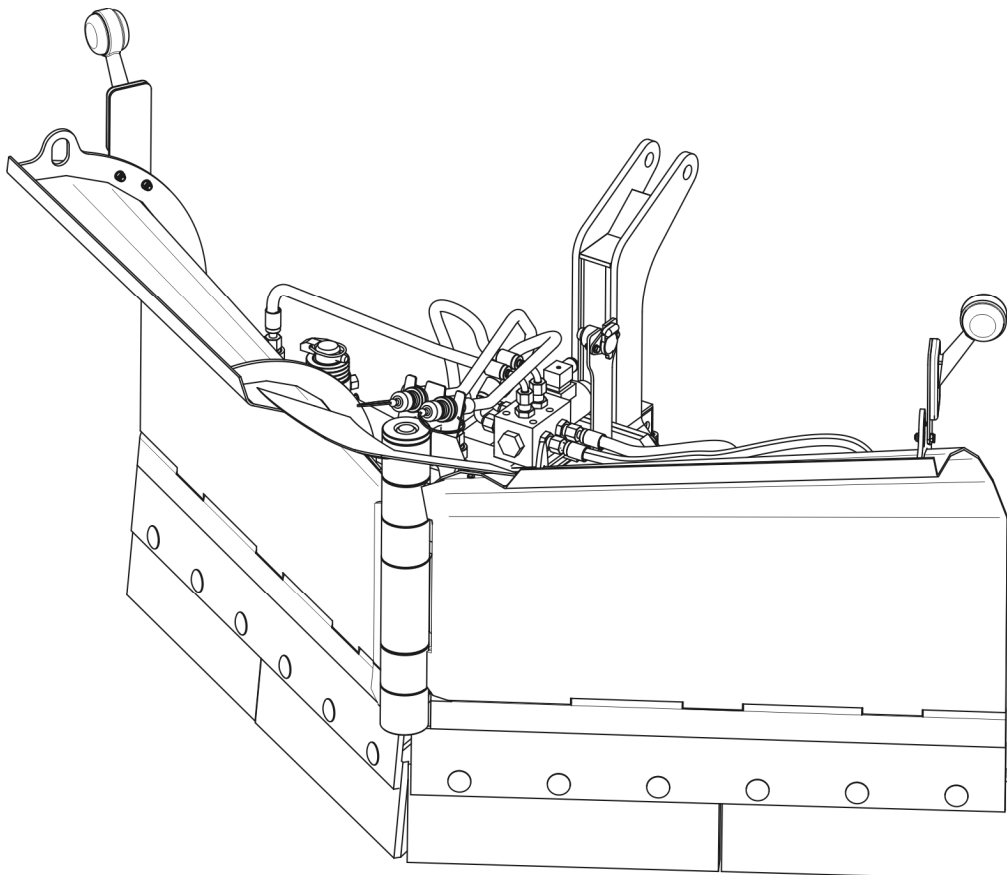
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OPERATOR'S MANUAL

SNOW PLOUGH

PRONAR PUV-1600

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



EDITION 1B-11-2012

PUBLICATION NO 335N-0000000-UM



SNOW PLOUGH

PRONAR PUV-1600

MACHINE IDENTIFICATION

TYPE: *PUV-1600*

SERIAL NUMBER:

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INTRODUCTION

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

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

The manual describes the basic principles of safe use and operation of PUV-1600 snow plough. If the information in this Operator Manual needs clarification, 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 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.

Vital information and instructions that must be observed are by the symbol:



and also preceded by the word "**IMPORTANT**". 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 Manual is marked with the pictogram:



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



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

DIRECTIONS USED IN THIS OPERATOR 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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EG - Konformitätserklärung

PRONAR Sp. z o.o. erklärt mit voller Verantwortung, dass die Maschine:

Beschreibung und Identifizierung der Maschine	
Allgemeine Bezeichnung und Funktion:	Schneepflug
Typ:	PUV-1600
Modell:	—
Seriennummer.:	
Handelsbezeichnung:	Schneepflug PRONAR PUV-1600

auf die sich diese Konformitätserklärung bezieht, allen einschlägigen Bestimmungen der EG-Richtlinie **2006/42/EG** des Europäischen Parlaments und des Rates vom 17. Mai 2006 über Maschinen und zur Änderung der Richtlinie 95/16/EG (Amtsblatt der EU L 157/24 vom 09.06.2006) entspricht.

Zur Zusammenstellung der technischen Unterlagen ist der Leiter der Entwicklungsabteilung der Firma PRONAR Sp. z o.o., 17-210 Narew, Polen, ul. Mickiewicza 101 A bevollmächtigt.

Diese Erklärung bezieht sich nur auf die Maschine in dem Zustand, in dem sie in Verkehr gebracht wurde; vom Endnutzer nachträglich angebrachte Teile und/oder nachträglich vorgenommene Eingriffe bleiben unberücksichtigt

Narew, den. 10 MAJ 2012

Ort und Datum der Erklärung

Z-CA DYREKTORA
d/s technicznych
członak zarządu

Roman Gmelianiuk

Vorname, Name der bevollmächtigten Person,
Stelle, Unterschrift

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SECTION

1

BASIC INFORMATION

1.1 IDENTIFICATION

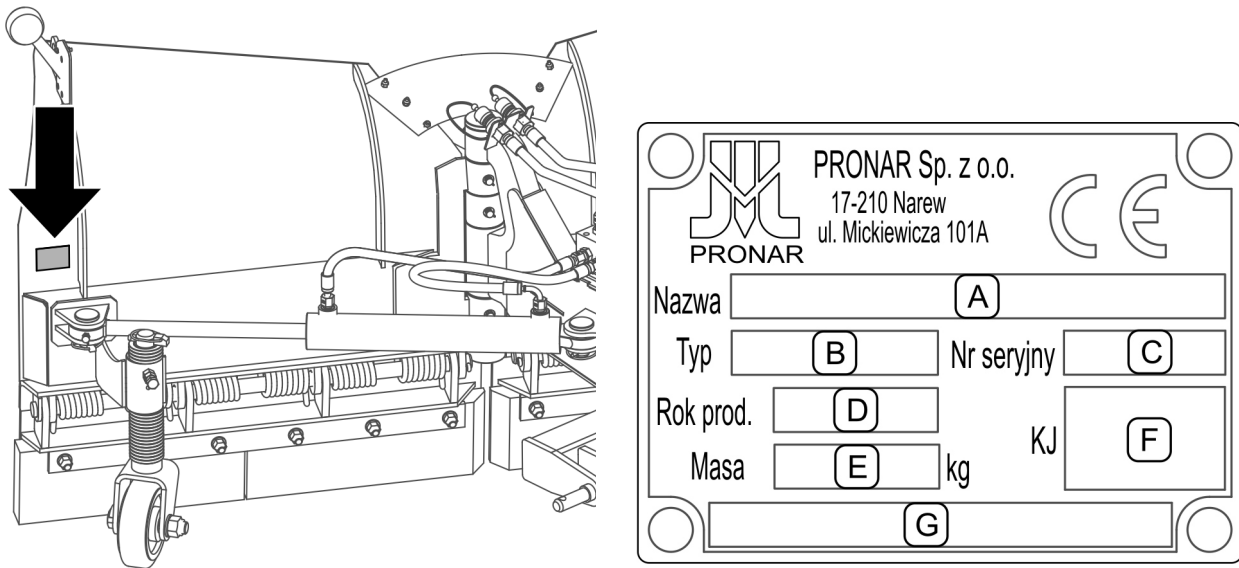


FIGURE 1.1 Location of the nameplate

Meaning of each field depending on the type of nameplate 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)

The factory number is stamped into the nameplate (FIGURE 1.1) and on mounting base beside the nameplate. nameplate is located on the left mouldboard. When purchasing the machine, check that the serial number corresponds with that indicated in the *WARRANTY BOOK*, in the sales documents and in the *OPERATOR MANUAL*.

1.2 INTENDED USE

PUV-1600 snow plough is designed for clearing narrow road, squares, parking spaces and all other hard road and footpath surfaces such as asphalt, concrete paving blocks, paving, concrete. Using the machine for other purposes will be regarded as contrary to intended use. Depending on the equipment ploughs can be mounted on agricultural tractors, front loaders 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 Manual* and comply with its recommendations,
- understand the machine's operating principle and how to operate it safely and correctly,
- comply with general safety regulations while working,
- prevent accidents,
- comply with road traffic regulations.

The machine may only be used by persons, who:

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



IMPORTANT

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

- level roads, terrain;
- transport people, animals or any items on the machine

TABLE 1.1 Agricultural tractor (carrier vehicle) requirements

	UNIT	REQUIREMENTS
Linkage	–	compatible with the snow plough's mounting system, with the floating function (<i>ploughs with a rigid linkage system</i>)
Hydraulic system		
Hydraulic oil	–	HL32
Nominal pressure of the system	MPa	16
Hydraulic sockets	–	2 socket of one section with the possibility of changing the direction of oil circulation, located at the front of the carrier vehicle
Electrical system		
Electrical system voltage	V	12
Electric sockets	–	Cigarette lighter socket
	–	7-pin socket (<i>for clearance lamps</i>)
Other requirements		
Power range	hp (kW)	to 30 (22)
Beacon light	–	orange light

1.3 EQUIPMENT

The snow plough equipment includes:

- Operator Manual
- Warranty Book

Equipment versions:

- slides or supporting wheels,
- clearance lamps,
- hydraulic couplers PLUG-PLUG or SOCKET-PLUG type

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 MANUAL*. Defects discovered during the warranty period will be removed by the Warranty Service. The repair period is specified in the *WARRANTY BOOK*.

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

- collecting blades,
- slides
- wheels.

The warranty service only applies to such cases as: mechanical damage which is not the user's fault, factory defects of parts, etc.

In the event of damage arising from:

- mechanical damage which is the user's fault, damage caused by road accidents,
- inappropriate use, adjustment or maintenance, use of the machine for purposes other than those for which it is intended,
- use of damaged or malfunctioning machine,

- repairs carried out by unauthorised persons, repairs carried out improperly,
- making unauthorised alterations to machine design,

the user will lose the right to warranty service.



TIP

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

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

Do NOT attempt to modify the machine without the written consent of the Manufacturer. In particular, do NOT weld, drill holes in, cut or heat the main structural elements, 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 Manual and electrical system components. Delivery is either by transport on a vehicle or independently, after being attached to a tractor. Transport of the machine is permissible connected to a carrier vehicle provided the vehicle's driver familiarises himself with the machine's Operator Manual and particularly with information concerning safety and principles of connection and transport on public roads.

During road transport the machine should be secured on the carrier platform by certified straps or chains fitted with pulley.

When loading and unloading the machine, follow the general health and safety regulations for reloading work. Persons operating reloading equipment must have the qualifications required to operate these machines.

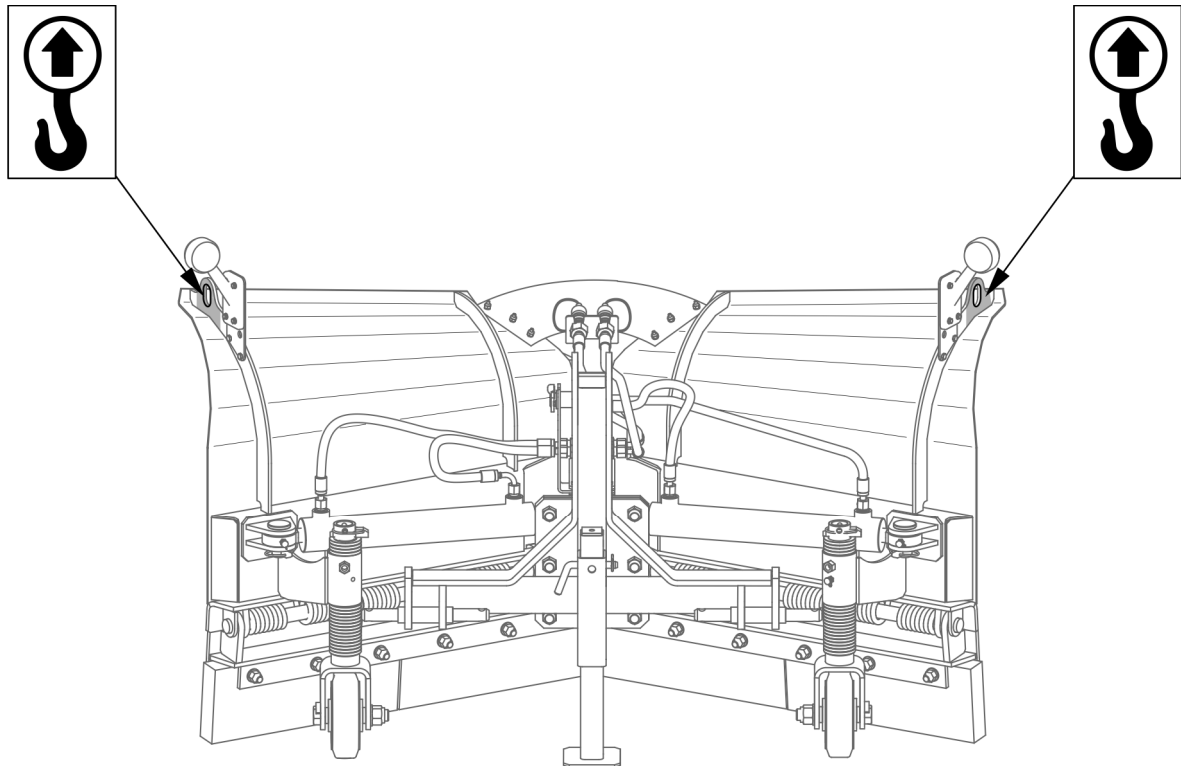


FIGURE 1.2 Transport lugs

The machine should be attached to lifting equipment in places specially designed for this purpose (FIGURE 1.2), i.e. by the lugs on the sides of the mouldboards. Suspension points are marked with information decals. When lifting the machine take special care to avoid 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 reloading work, special care should be taken not to damage the paint coating.

DANGER



When transporting independently, the user must carefully read this Operator Manual and observe all its instructions. 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 use extreme caution while transporting the machine. This is due to the vehicle's centre of gravity shifting upwards when the machine is loaded.

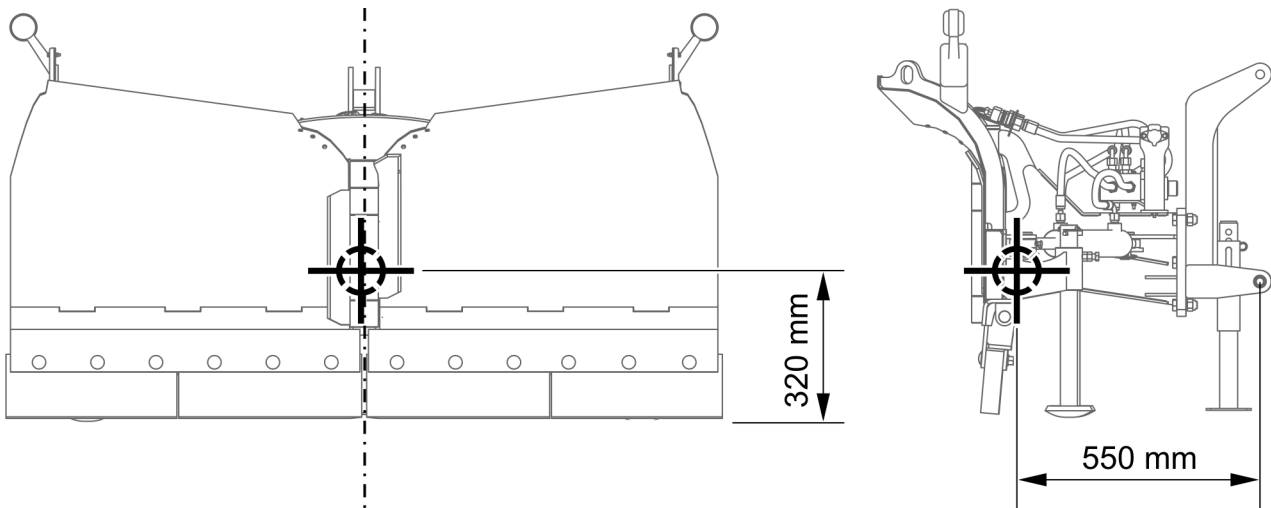




FIGURE 1.3 Centre of gravity

Position of the centre of gravity for the category I-1 narrow type three-point linkage (the mouldboards set straight)

	<p>NOTE</p> <p>Depending on the version, centre of gravity varies in the ± 50 mm range.</p>
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	<p>NOTE</p> <p>Do NOT secure lifting slings or any types of securing elements to hydraulic cylinders and light brackets.</p>
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1.6 ENVIRONMENTAL RISK

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

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

1.7 WITHDRAWAL FROM USE

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

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

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



IMPORTANT

During dismantling, use the appropriate tools, equipment and use personal protection equipment, i.e. protective clothing, footwear, gloves and eye protection 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 MACHINE USE

- Before use, the user must carefully read this Operator Manual and the *WARRANTY BOOK*. When operating the machine, follow all instructions in these documents.
- The machine may only be used and operated by persons qualified to drive agricultural tractors and carrier vehicles and trained in the use of the machine.
- If the information in this Operator Manual is difficult to understand, contact the seller who runs the authorised technical service on behalf of the Manufacturer, or contact the Manufacturer directly.
- Careless and improper use and operation of the machine, and failure to comply with the instructions of this operator manual is dangerous to your health.
- Be aware of the residual risk. Use caution when operating this machine and follow all relevant safety instructions.
- The machine must never be used by persons who are not authorised to drive carrier vehicle, 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 in any other way than the way intended takes full responsibility for any consequences of this use. Use of the machine for purposes other than those for which it is intended by the Manufacturer may invalidate the guarantee.
- The machine may only be used when all the protective elements are technically sound and correctly positioned. In the event of loss or damage to the protective elements, 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 carrier vehicle.
- After completion of hitching the machine, check the safeguards. Carefully read the carrier vehicle Operator Manual.
- To hitch the machine to tractor (carrier vehicle) use only original pins and safeguards.
- The carrier vehicle to which the machine will be coupled must be technically reliable and must meet all manufacturer's requirements.
- Be especially careful when hitching the machine to the tractor.
- When hitching, there must be nobody between the machine and the carrier vehicle.
- Exercise caution when unhitching the machine.
- The machine disconnected from the carrier vehicle must be supported on the snow plough blades and slides or wheels (depending on the machine's equipment) and placed on level, sufficiently hard surface in such a manner as to ensure that it is possible to connect it again.

2.1.3 HYDRAULIC SYSTEM

- When connecting the hydraulic lines to the carrier vehicle, make sure that the hydraulic systems of the carrier vehicle and the machine are not pressurised. If necessary, reduce residual pressure in the system.
- Regularly check the technical condition of the hydraulic lines and connections. There must be no oil leaks.
- The hydraulic system is under high pressure when operating.
- In the event of the hydraulic system malfunction, discontinue using the machine until the malfunction is corrected.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may penetrate the skin and cause infections. In the

event of contact of oil with 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 deteriorated oil should be stored in original containers or replacement containers resistant to 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 lines 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, observe all road traffic regulations in force in the country, in which the machine is used.
- Do not exceed the maximum speed resulting from road conditions and design restrictions. Adjust speed to the prevailing road conditions and other limitations arising from road traffic regulations.
- Do NOT leave machine raised and unsecured while the tractor (carrier vehicle) is parked. When parked, the machine should be lowered.
- Do NOT ride on the machine or transport any materials on it.
- When driving with raised implement, the carrier vehicle's 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, do not use the machine until the fault has been corrected.
- During work, use proper, close fitting protective clothing, gloves and appropriate tools. When working on hydraulic system it is recommended to use oil resistant gloves and protective goggles.
- Any modification of the machine releases the manufacturer (PRONAR) from any responsibility for damage or detriment to health which may arise as a result.
- 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.
- 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.
- The machine must not be supported using fragile elements (bricks or concrete blocks).
- Servicing and repair work should be carried out in line with the general principles of workplace health and safety. In the event of injury, the wound must be immediately cleaned and disinfected. In the event of more serious injuries, seek a doctor's advice.
- Repair, maintenance and cleaning work should be carried out with the carrier vehicle engine turned off and the ignition key removed. The vehicle shall be immobilized with the parking brake and secured against unauthorized access.

2.1.6 SNOW PLOUGH OPERATION

- Before lowering or lifting the machine mounted tractor (carrier 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 tractor cab. Do NOT leave the cab, when the machine is in operation.
- Person must not stand in the machine operation area and also between the carrier vehicle and the machine.
- Do NOT operate the snow plough while reversing. Lift the machine when reversing.
- The snow plough must not be additionally loaded with a weight other than its own weight.

2.2 RESIDUAL RISK

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

- using the machine for purposes other than those for which it is intended,
- being between the tractor and the machine while the engine is running and when the machine is being hitched,
- being on the machine while the engine is running,
- operating the machine with removed or faulty safety guards,
- failure to maintain a safe distance from the danger zone or being within the zones while the machine is operating,
- machine operation by unauthorized persons or persons under the influence of alcohol

- cleaning, maintenance and technical checks when tractor is connected and engine is running.

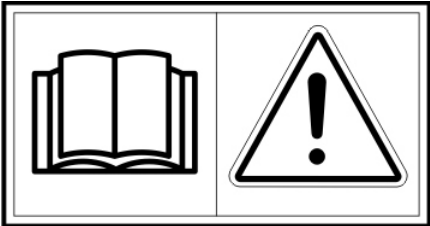
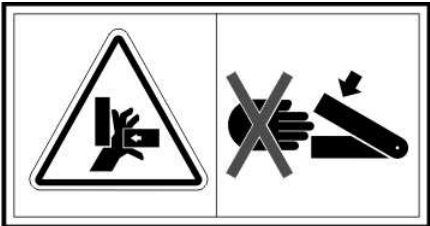
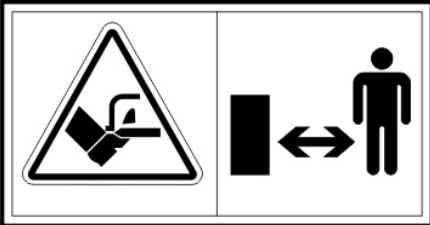
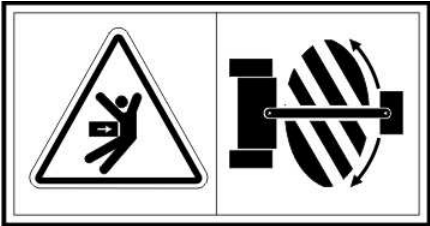


The residual risk may be kept to a minimum by following the recommendations below:

- operate the machine in prudent and unhurried manner,
- reasonably apply all the remarks and recommendations stated in the Operator 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 a safe distance from forbidden 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 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>DO NOT allow persons to stand near 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.</p>
5		<p>Machine model</p>
6		<p>Transport suspension points</p>

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

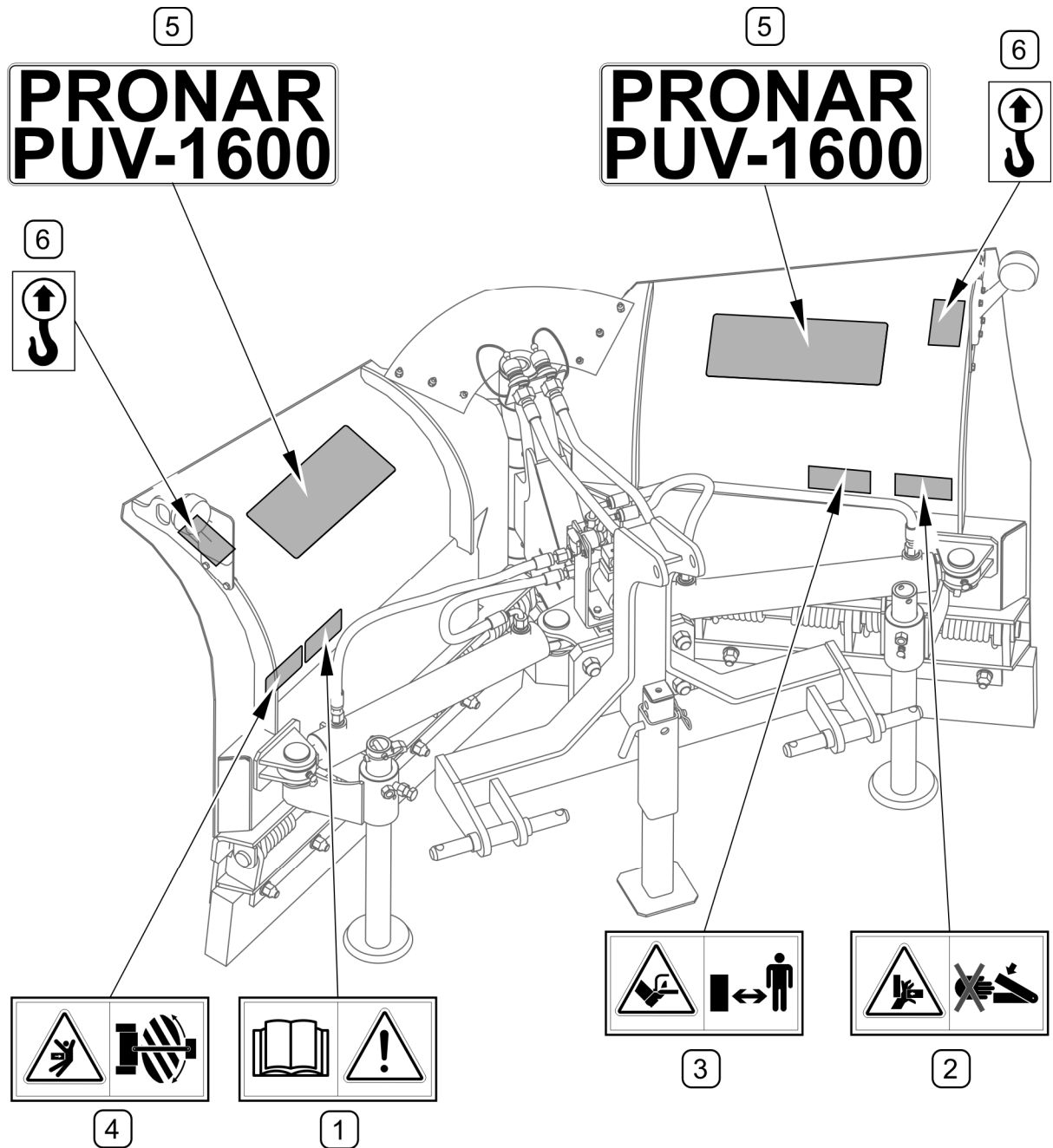


FIGURE 2.1 Locations of information and warning decals

Meaning of symbols (TABLE 2.1)

SECTION

3

**DESIGN AND
OPERATION**

3.1 TECHNICAL SPECIFICATION

TABLE 3.1 BASIC TECHNICAL DATA

	Unit	
Snow plough model	–	PUV-1600
Mounting method depending on the suspension system, e.g.:		
- three point linkage	–	cat. I or II according to ISO 7301 cat. I or I “narrow” according to ISO 730-1 cat. 0 or I according to ISO 730-1
- front loader	–	EURO mounting system
- wheel loaders	–	ATLAS 35 GEHL WILLE 455 WEIDEMANN 2070 CX50
- other	–	A-RAMA linkage built-in plate
Width (FIGURE 3.1)		
- for working position A, B, C, D	mm	1,400 - 1,415
- for an intermediate position, straight ahead	mm	1,600
Height:		
- mouldboard working height	mm	675
- total height (with three-point linkage)	mm	780
Type of collecting blades	–	rubber, cushioned
Supply	–	external hydraulic system and 12V electrical system of the carrier vehicle
Control	–	hydraulic (solenoid valve and carrier manifold)
Number of hydraulic cylinders	pc.	2
Weight (without linkage)	kg	155
Power demand	KM (kW)	to 30 (22)
Maximum working speed	km/h	10
Other information	–	single person operation

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

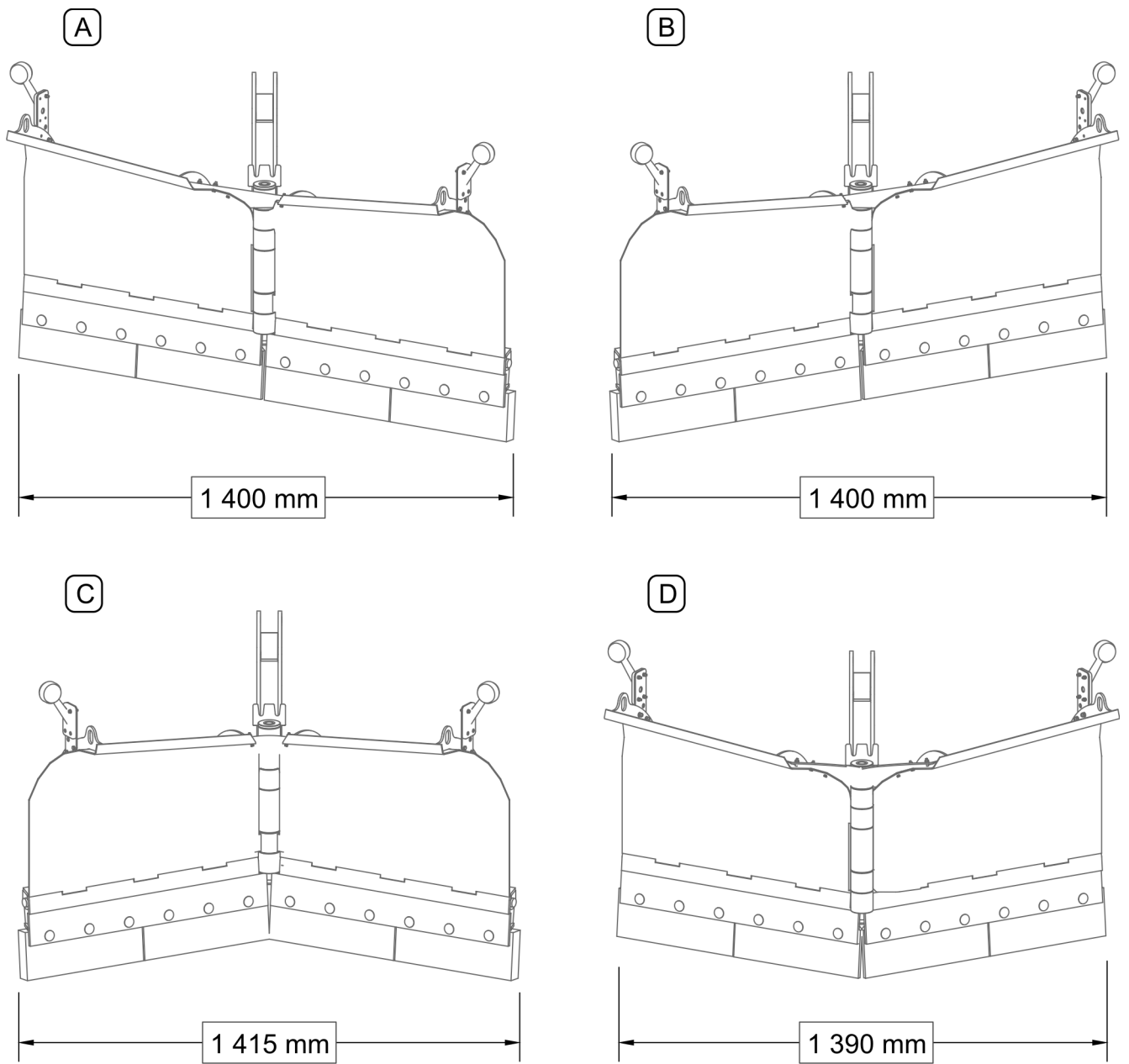


FIGURE 3.1 Width depending on the operating position:

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

3.2 GENERAL DESIGN

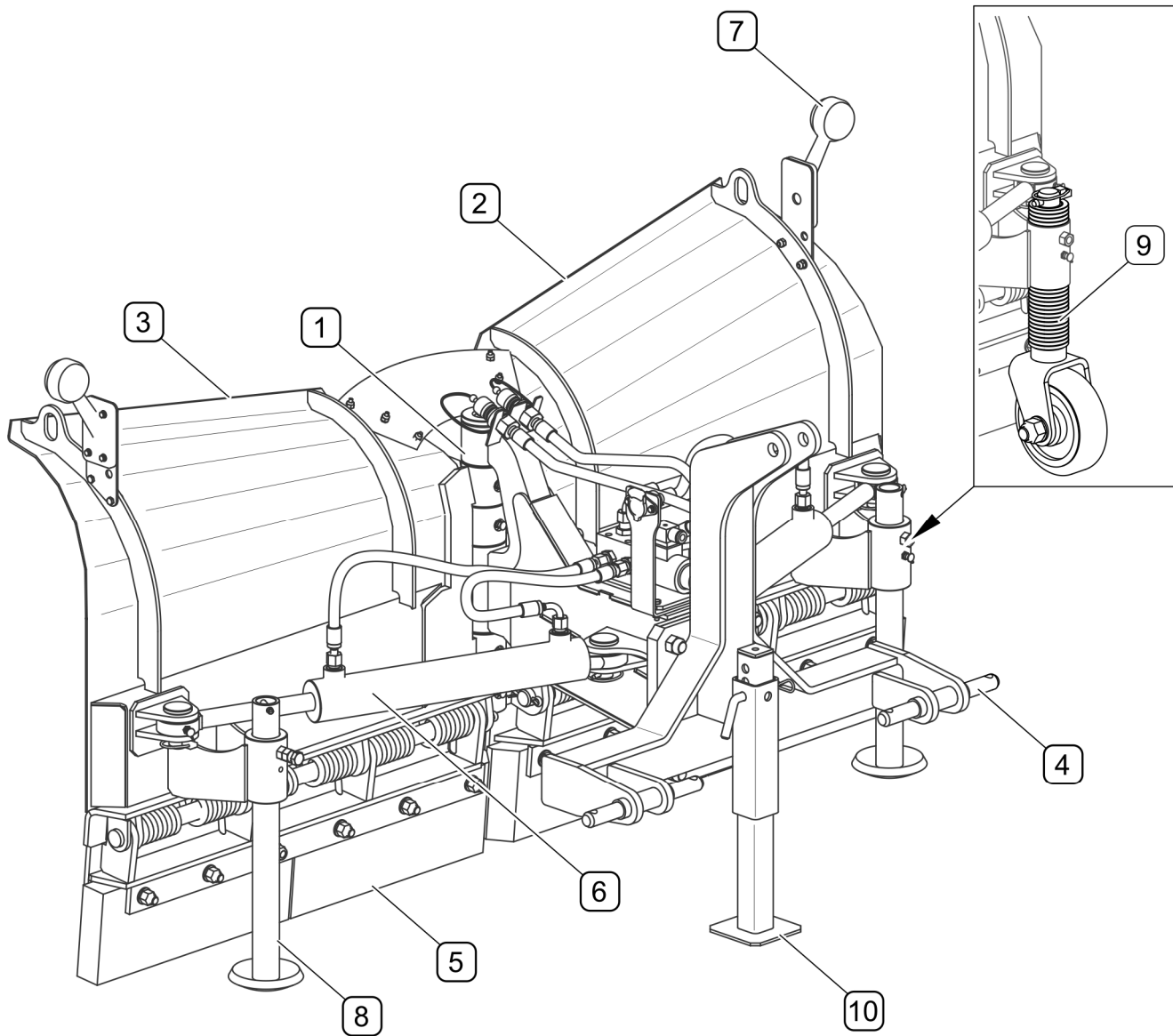


FIGURE 3.2 General design

(1) - arm; (2) - right mouldboard; (3) - left mouldboard; (4) - suspension system; (5) - scraper bar; (6) - hydraulic system; (7) - electrical system ; (8) - slides (option); (9) - wheels (option); (10) - parking stand

The PUV-1600 plough is equipped with two mouldboards (2) and (3) rotary mounted to the arm (1). Shock absorbing scraper bars (5) can swing backwards when they hit an obstacle. Using suitable linkage (4), the plough is connected to tractor or carrier vehicle. The working height is adjusted by means of slides (8) or wheels (9) (optional). The hydraulic system (6) is used to change the working position. The plough can be equipped with various suspension systems.

3.3 HYDRAULIC SYSTEM

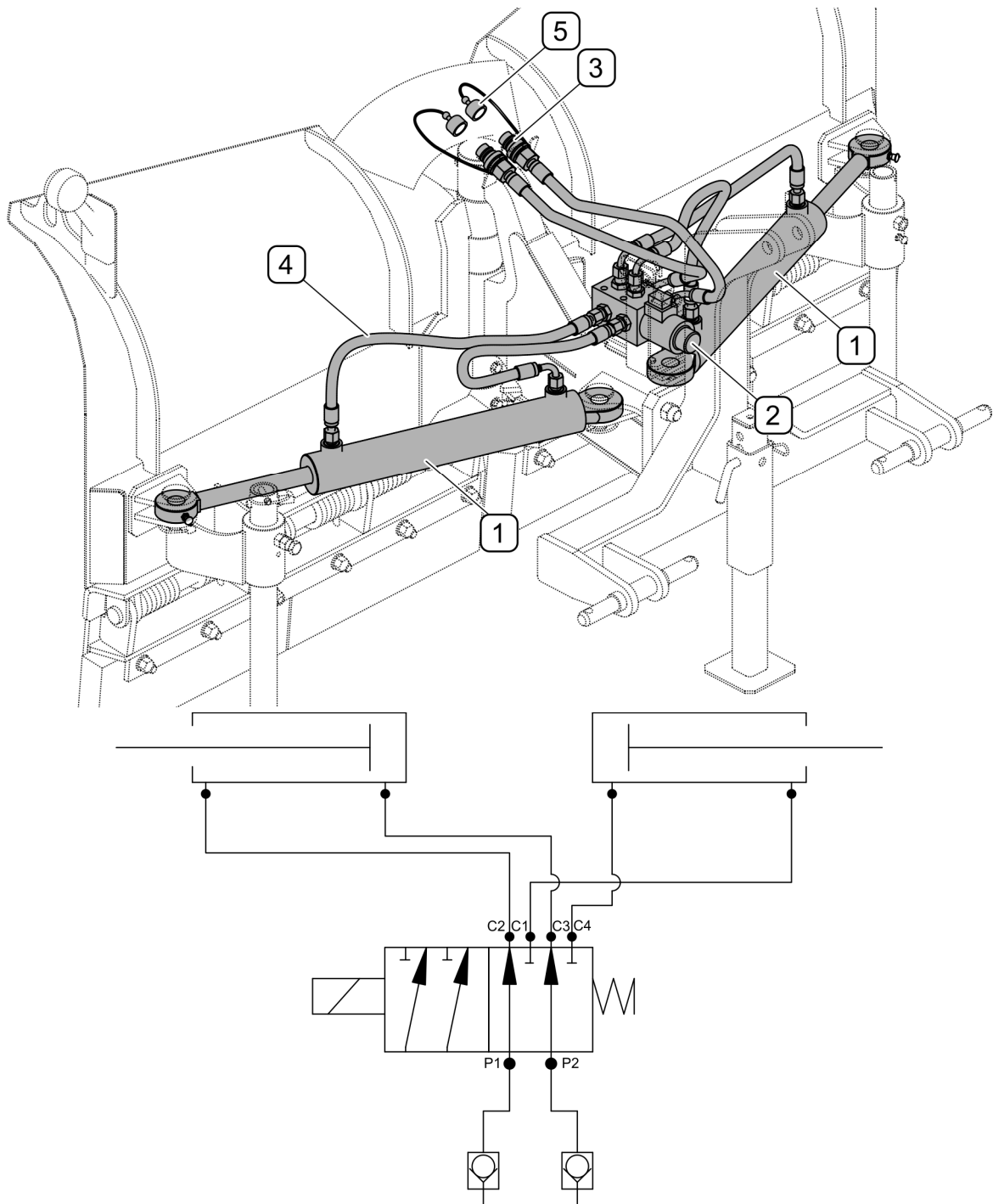


FIGURE 3.3 Hydraulic system design

(1) - hydraulic cylinder; (2) - hydraulic solenoid valve; (3) - quick couplers; (4) - wires; (5) - protective cap

Working position of the plough can be adjusted by means of two hydraulic cylinders (1) controlled by solenoid valve (2). The plough's hydraulic system is powered with oil supplied from the tractor or other carrier vehicle by two lines terminated with quick couplers (3).

3.4 ELECTRICAL SYSTEM

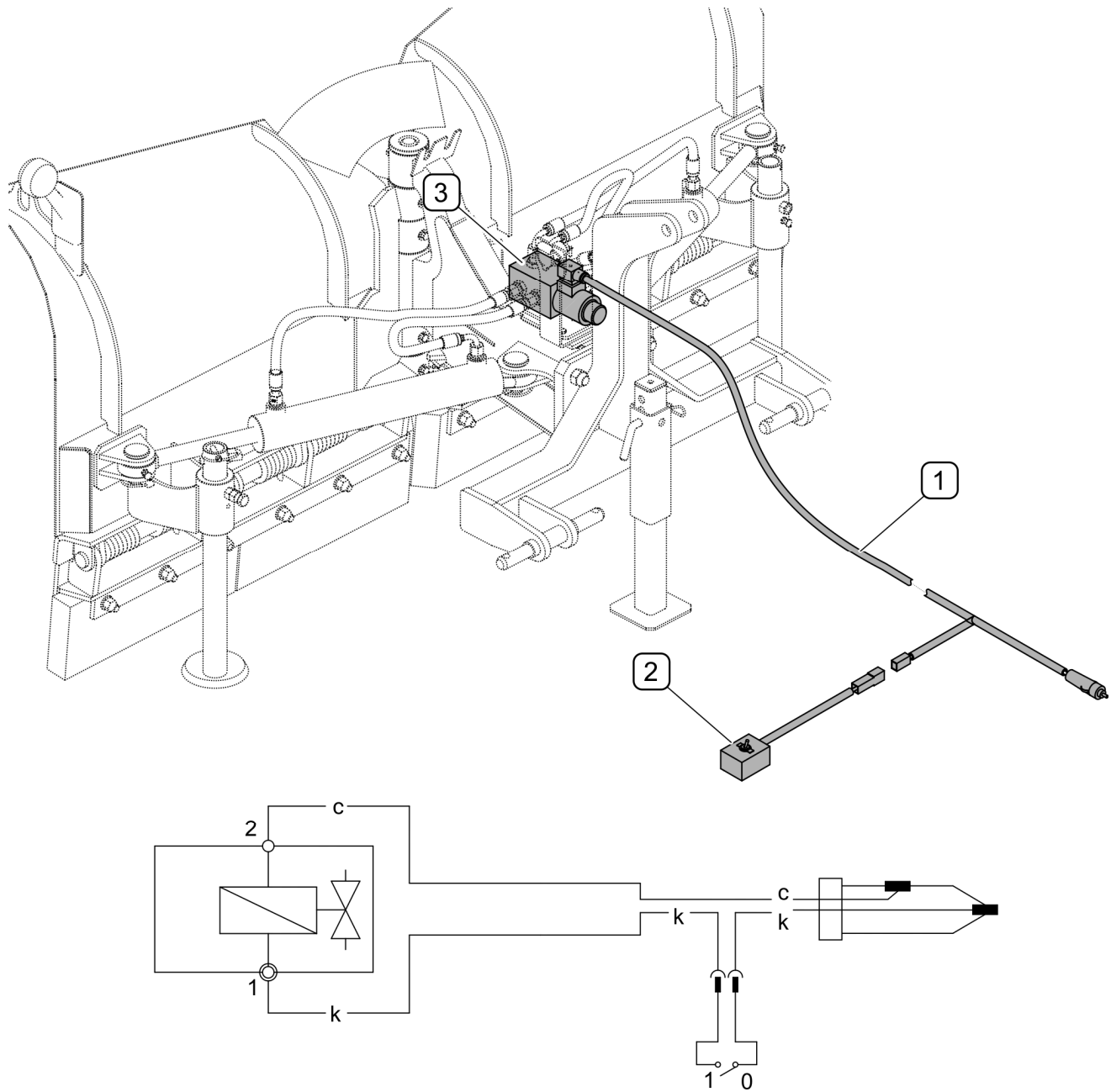


FIGURE 3.4 Design of solenoid valve electrical system
 (1) - power cord; (2) - solenoid valve switch; (3) - hydraulic solenoid valve

The electrical system of the solenoid valve (FIGURE 3.4) consists of a power cord (1) with a cigarette lighter plug. The switch (2) controls the solenoid valve (3).

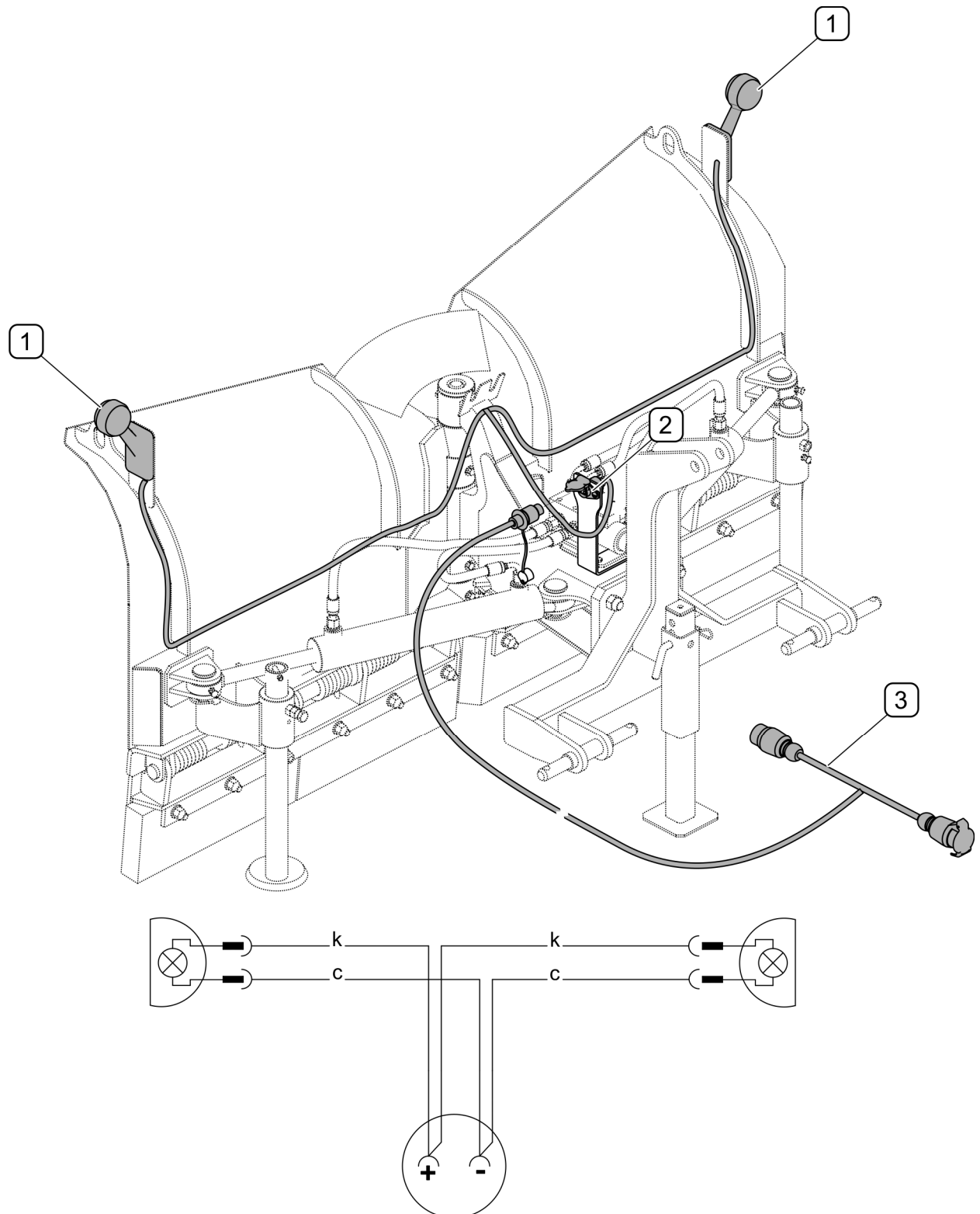


FIGURE 3.5 Design of electrical system of clearance lights (optional)

(1) - clearance lights (option); (2) - 3-pin socket; (3) - power cord with adapter

The clearance lighting system (option) consists of two clearance lights (1) and a power cord (3) with an adapter for connecting to the 7-pole socket of the carrier.

SECTION

4

CORRECT USE

4.1 GET READY FOR OPERATION

DANGER



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

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

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

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

Before starting the machine, ensure 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 technical condition. In order to do this:

- the user must carefully read this Operator Manual and observe all recommendations, understand the design and the principle of machine operation,
- make sure that the machine's linkage is compatible with that of the carrier vehicle.
- check the compatibility of connection sockets,
- 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",
- check technical condition of the hydraulic and electrical system;
- check technical condition of mouldboard, collecting blades,
- check technical condition of the linkage components,

**NOTE**

Failure to follow instructions in this Operator Manual or starting the machine incorrectly 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 carrier vehicle, started and all its individual systems checked. In order to do this:

- connect the machine to carrier vehicle (see „4.3 Hitching to vehicle”),
- After connecting the hydraulic lines and electrical cables, the correct operation of individual systems should be checked by inspecting tightness of the system and cylinders.
- check your plough settings for each working position,

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

**NOTE**


Before using the machine always check its technical condition. In particular, check the technical condition of the linkage as well as the hydraulic system and the electrical system.

4.2 TECHNICAL INSPECTION

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

TABLE 4.1 TECHNICAL INSPECTION SCHEDULE


DESCRIPTION	MAINTENANCE ACTIVITIES	FREQUENCY
Technical condition of mouldboard and collecting blades	Visually inspect and if necessary replace according to section 5.1 Check and replace collecting blades	Before starting work
Technical condition of linkage components	Assess the technical condition, if complete and correctly mounted.	
Technical condition of the hydraulic system and electrical system	Visually inspect the technical condition, check tightness and confirm correctness of operation	
Check if all main nut and bolt connections are properly tightened	Tightening torque should be according to table 5.5	Once a week
Lubrication	Lubricate the components according to section „5.5 LUBRICATION”.	According to table 5.4



NOTE


Do NOT use a malfunctioning or incomplete machine.

4.3 HITCHING TO VEHICLE



NOTE

Before hitching the plough to the carrying vehicle, read the manual of the carrying vehicle with which it is to be operated.



DANGER

Exercise caution when hitching the machine to carrier vehicle.
Do NOT hitch the machine to the carrier vehicle when the vehicle's engine is running.

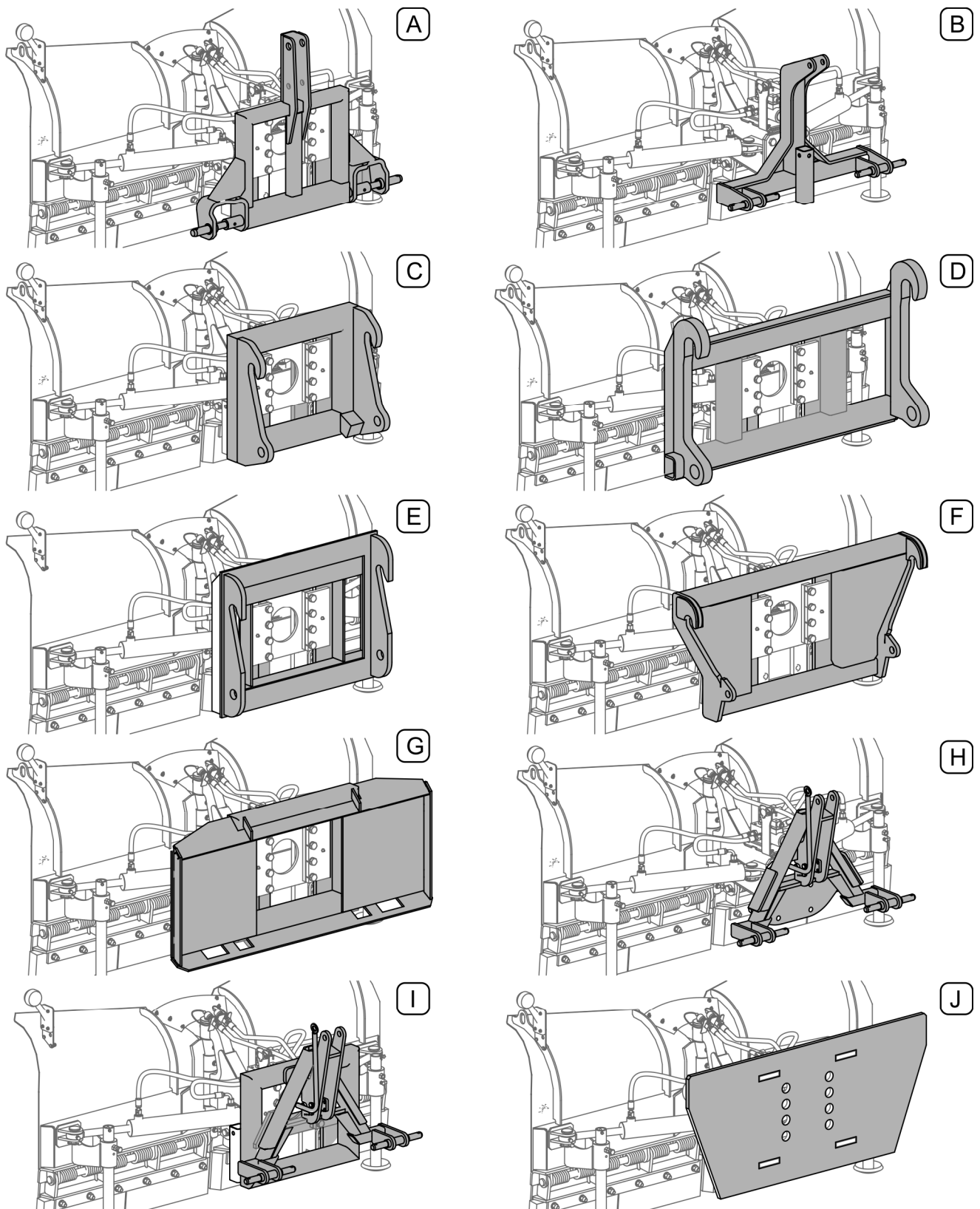


FIGURE 4.1 Types of linkage systems

(A) - *cat. I and II ISO 730-1 three-point linkage*; (B) - *cat. I and I "narrow" ISO 730-1 (rigid) three-point linkage*; (C) - *ATLAS AR 35*; (D) - *WILLE 455*; (E) - *WEIDEMANN 2070 CX50*; (F) - *loaders with EURO mounts*; (G) - *GEHL*; (H) - *A-RAMA (rigid)*; (I) - *A-RAMA*; (J) - *installation plate without fixing elements*.

The PUV-1600 plough is adapted to be attached to the front of a tractor (carrying vehicle) that meets the requirements presented in table 1.1 “*REQUIREMENTS FOR CARRIER VEHICLE (AGRICULTURAL TRACTOR)*.”

The (B) and (H) (FIGURE 4.1) suspension systems are rigidly attached to the plough and require the floating carrier suspension, enabling the ground contour following.

4.3.1 HITCHING TO THE THREE POINT LINKAGE

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

- Drive the tractor to bring the lower links of the three-point linkage closer to the lower points (A) or (B) (*depending on the three-point linkage category*) of the plough linkage.
- Set the lower links of the tractor at appropriate height.
- turn off vehicle's engine and prevent it from moving,
- connect the lower points (A) or (B) (*depending on the three-point linkage category*) of the plough mounting with the lower links of the carrying vehicle.
- Connect the central upper link to the upper point (A) or (B) and secure.
- Connect quick couplers of hydraulic lines to the tractor external hydraulic system.
- Lift the machine using tractor three point linkage.
- Raise parking stand and secure with pin and cotter pin (FIGURE 4.5).

Both lower links of the tractor three point linkage are recommended to be set at the same height and in the position that enables their vertical movement with regard to each other.



DANGER

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



NOTE

The connecting cables should be routed so that they do not get entangled in moving machine parts.

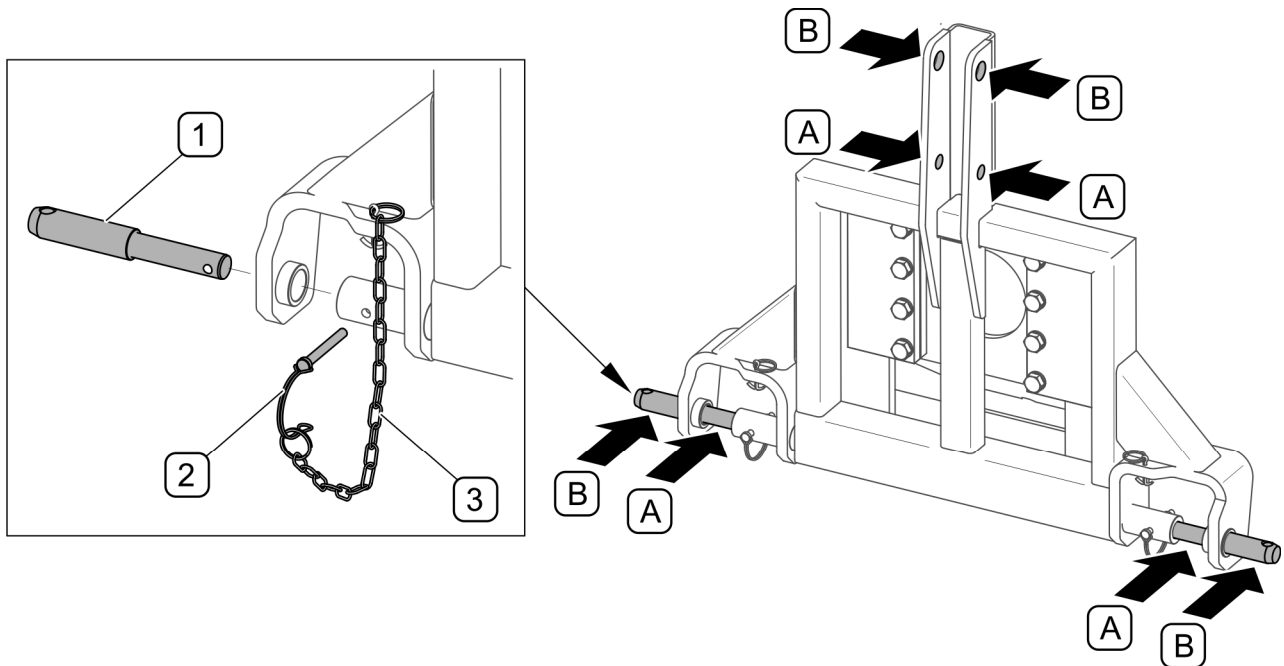


FIGURE 4.2 Connect the category I and II ISO 730-1 three-point linkage of the tractor
 (A) - ISO 730-1 cat. I linkage; (B) - ISO 730-1 cat. II linkage, (1) - lower link pin; (2) - securing cotter pin; (3) - chain

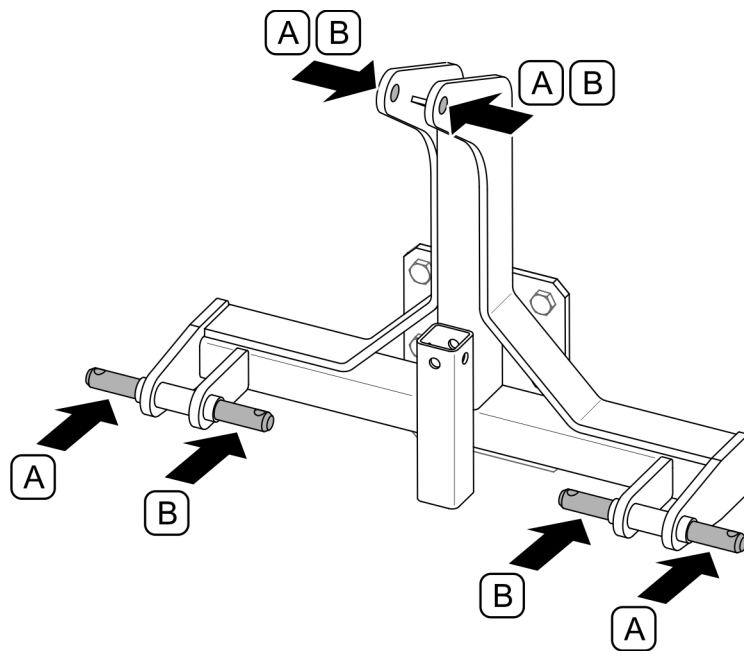


FIGURE 4.3 Connect the category I and I "narrow" three-point linkage
 (A) - ISO 730-1 Cat I linkage; (B) - ISO 730-1 Cat. I "narrow" linkage

4.3.2 HITCHING TO FRONT LOADER OR ANOTHER CARRIER VEHICLE

In order to hitch the snow plough to front loader (FIGURE 4.4):

- unlock quick securing mechanism in loader frame,
- lower arm and turn frame downwards (A) so that mounting points on quick mounting frame are below the mounting points of the plough,
- drive loader close to the plough and insert mounting points in the appropriate places in the quick mounting frame,
- lift the arm (B) so that the upper mounting points are in the plough hooks;
- controlling the loader frame tilt it back (C), causing the locking of the quick mounting mechanism,
- check if mounting is secure,
- engage the quick securing mechanism (depending on loader type),
- raise the parking stand (FIGURE 4.5),

The described method of attaching is indicative only and may vary depending on the loader model. A detailed method of connecting attachments is provided in front loader Operator Manual.

Prior to hitching the snow plough to another carrier vehicle, the user must carefully read the vehicle (carrier vehicle) Operator Manual and observe all Manufacturer's recommendations.

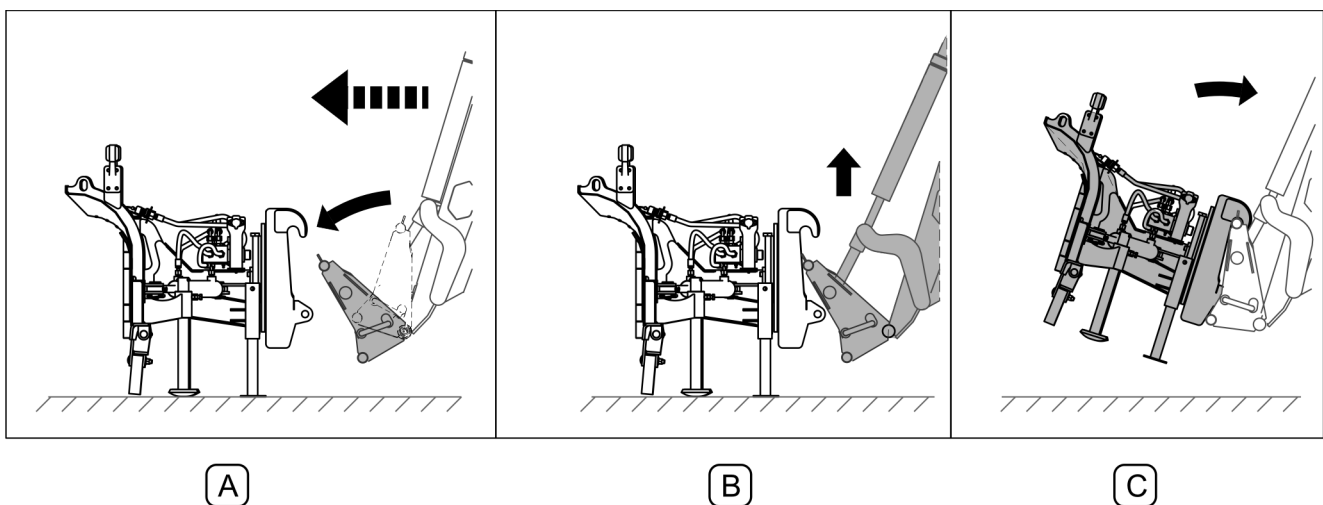


FIGURE 4.4 Hitting to front loader
 (A), (B), (C) - successive stages of hitching

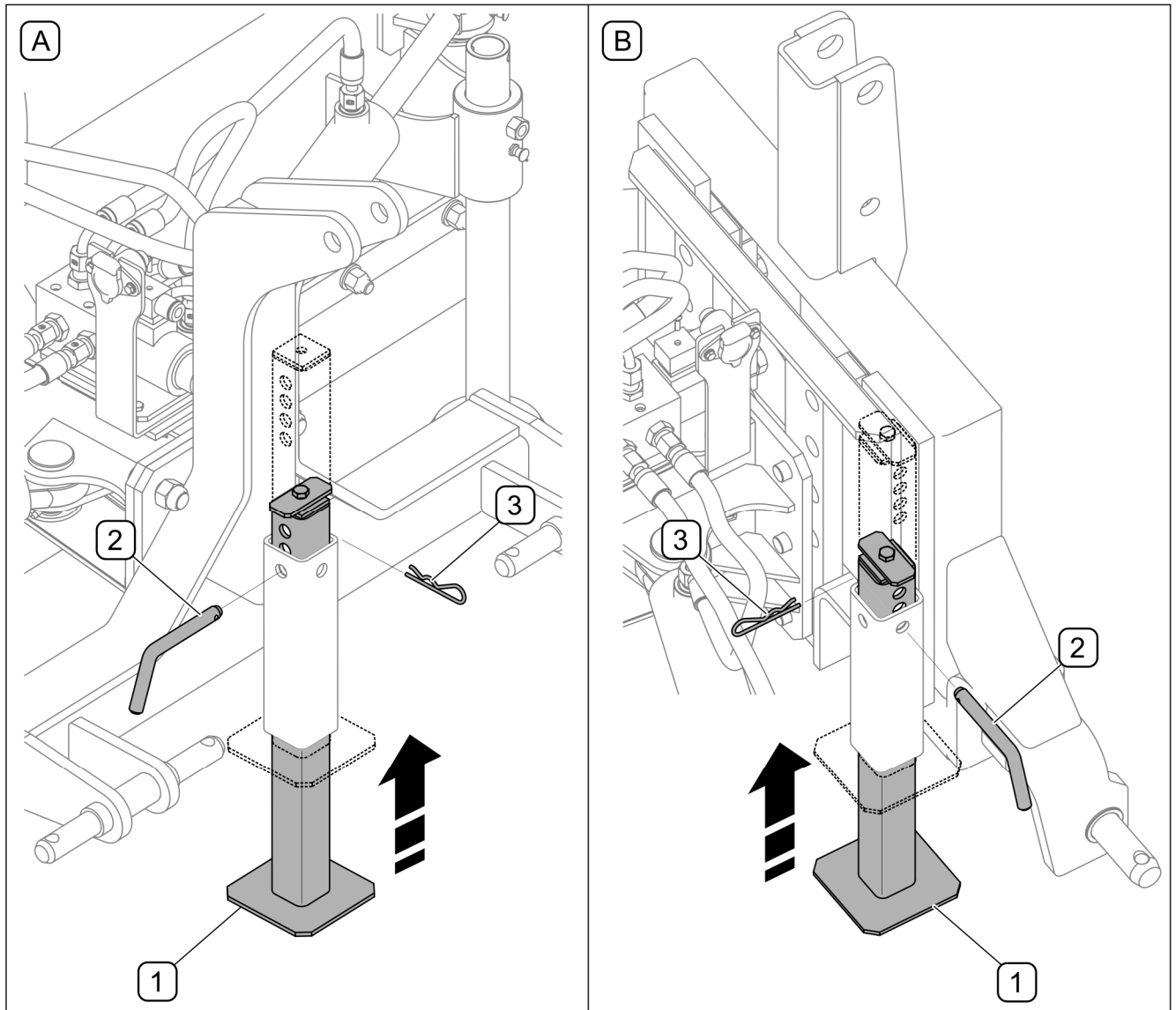


FIGURE 4.5 Raising parking stand

(1) - parking stand; (2) - pin; (3) - securing cotter pin; (A) - ISO-730-1 cat. I - I "narrow" rigid three-point linkage ; (B) - swing linkage

To raise the parking stand (FIGURE 4.5):

- lift the machine mounted on a carrier vehicle,
- remove cotter pin (3) and pin (2),
- raise parking stand (1) and lock it in upper position.

4.4 CONNECT THE HYDRAULIC SYSTEM

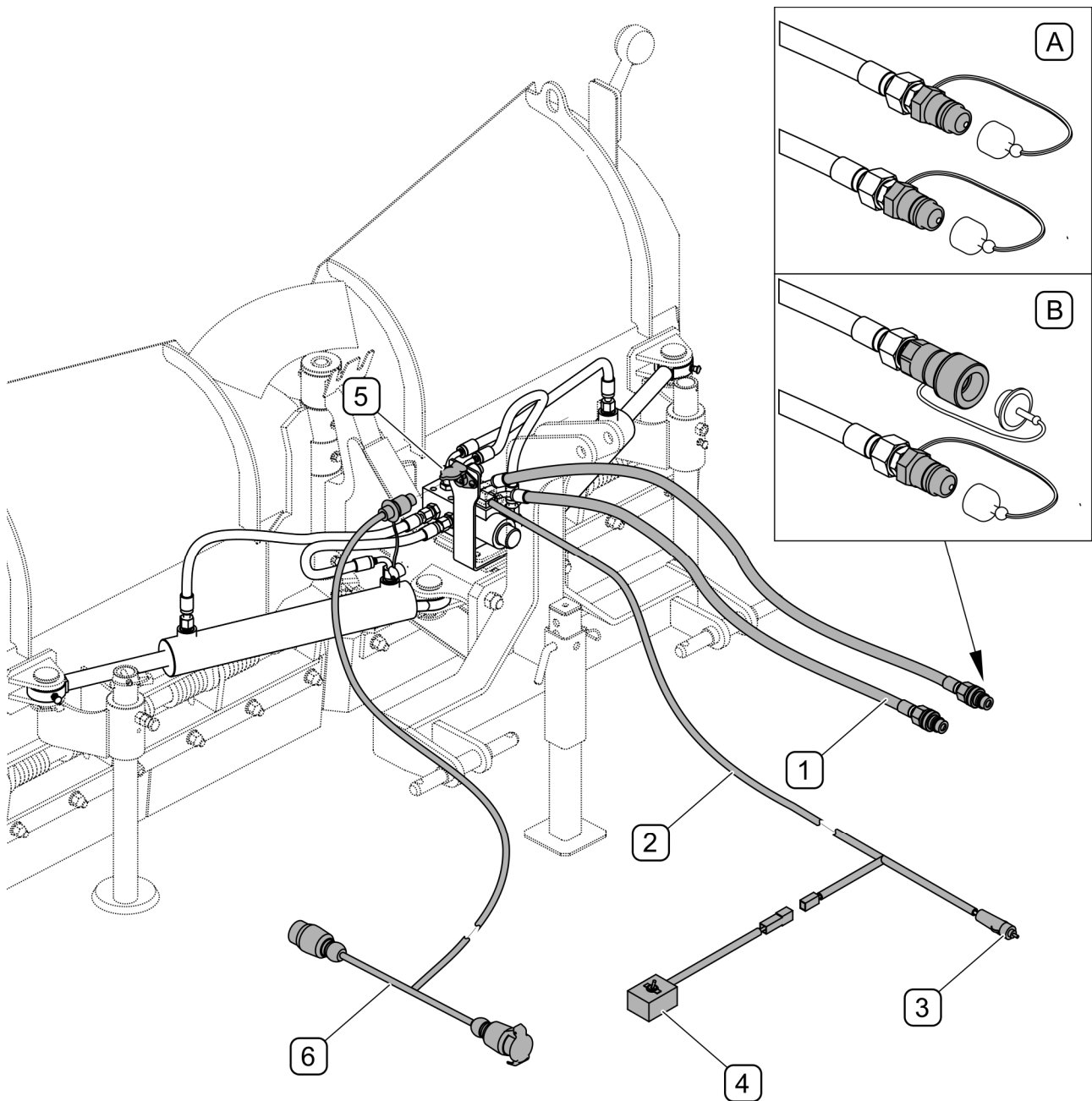


FIGURE 4.6 Connect the hydraulic system

(A) - MALE-MALE hydraulic couplers; (B) - MALE-FEMALE hydraulic couplers; (1) - hydraulic lines; (2) - solenoid valve power cable; (3) - cigarette lighter plug; (4) - switch; (5) - 3-pin socket for clearance lighting (option); (6) - clearance light supply cable (option)

**DANGER**

Prior to connecting the hydraulic system lines, carefully read the Operator Manual of the carrier vehicle and observe all manufacturer's recommendations.

The hydraulic lines (1) of the plough control (FIGURE 4.6) should be connected to the carrying vehicle's external hydraulic sockets. Depending on the version of the hydraulic system, the lines can be terminated with (A) MALE-MALE or (B) MALE- FEMALE type connectors. Arrange the hydraulic lines without bends or twists so that they cannot be damaged while the machine is in use.

The plug (3) of the solenoid valve power cable (2) should be connected to the 12V cigarette lighter socket,

connect the switch (4) to the line (2) and place it in the operator's cabin in an accessible place (FIGURE 4.6).

In the plough equipped with clearance lights (option), additionally connect the power cord (6) to the 3-pin socket in the plough and to the 7-pin socket in the carrying vehicle.

**DANGER**

When connecting hydraulic lines to carrier vehicle, make sure that the hydraulic system is not under pressure.

**NOTE**


During operation, the hydraulic hoses should be routed so that they do not get entangled in the machine and carrier vehicle parts.

4.5 SNOW PLOUGH OPERATION

4.5.1 POSITIONING PLOUGH BODY

To ensure optimum operation, the snow plough body should be level (the main blades pivot axis should be perpendicular to the ground). Levelling plough body in carrier vehicles with three-point linkage (A) is done by controlling the central link (FIGURE 4.7), while in front loaders and other vehicles (B) by positioning an implement mounting frame (*eg, using implement position indicator, if any*).

The swing linkage of the snow plough (C) must be set so that when the snow plough rests on the ground the range of the snow plough body movement relative to the linkage during ground surface tracking is 1/3 down and 2/3 up of the total stroke (FIGURE 4.7). When working with a plough equipped with a swing linkage (A, C, D, E, F, G, I, J) (FIGURE 4.1), set the carrier (*tractor three-point linkage, loader boom*) in a fixed position, do not work in floating position.



NOTE

Tractor weight (carrier vehicle) must not be transferred to the plough, as it could result in damaging it.

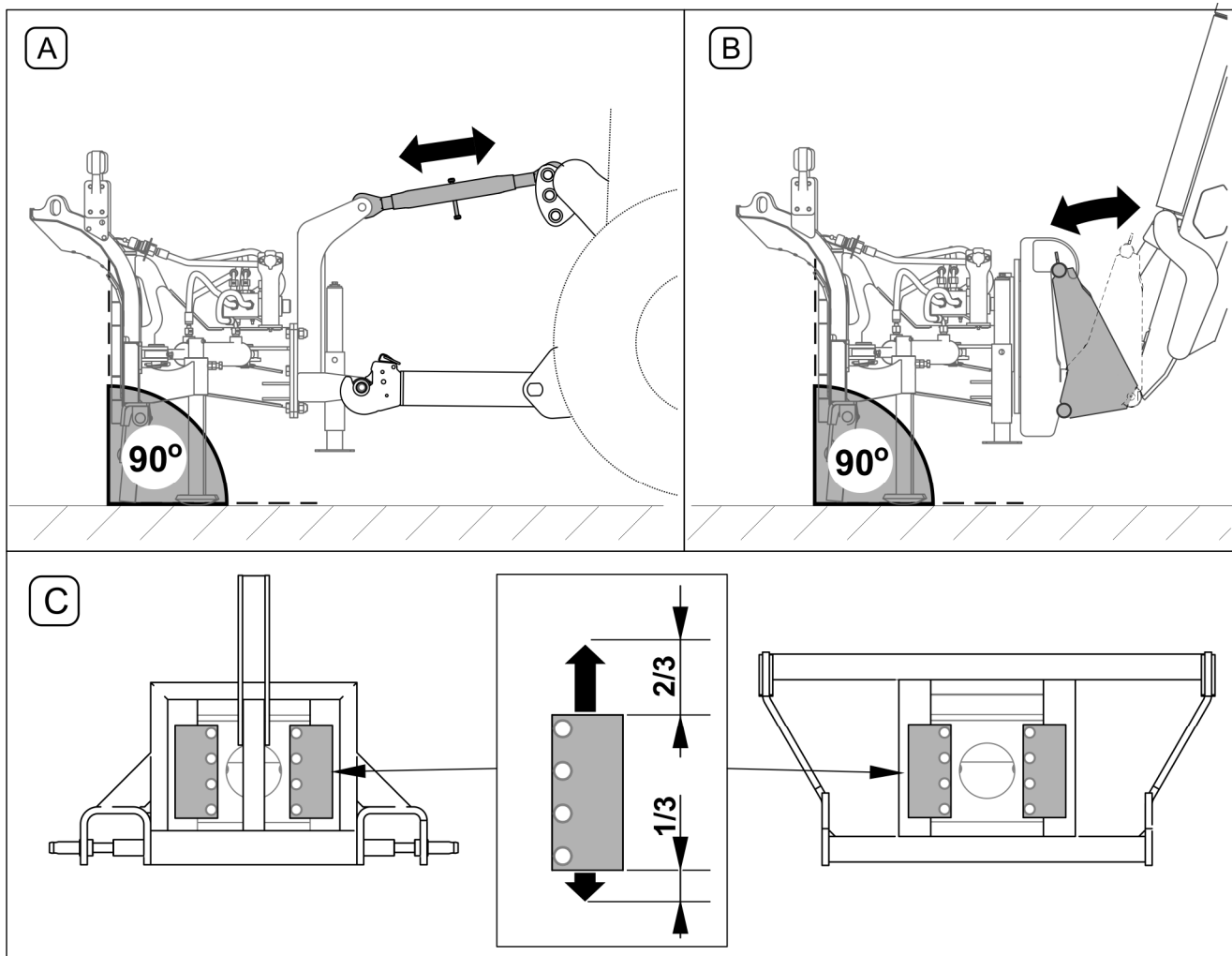


FIGURE 4.7 Positioning plough body

(A) - carriers equipped with a three-point linkage; (B) - front loaders and others; (C) - setting the ground following range for plough swing linkage systems

4.5.2 CHANGE THE WORKING POSITION SETTINGS



DANGER

The snow plough is controlled from the operator cab.

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

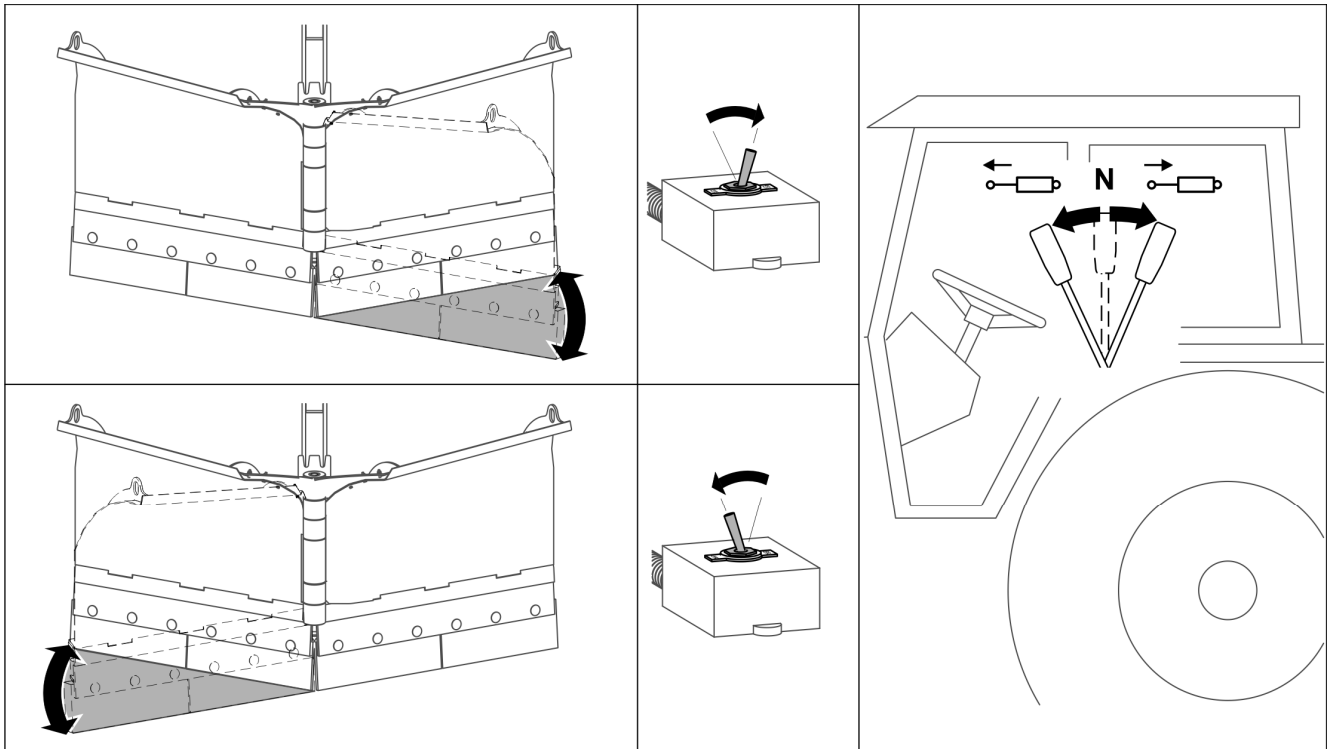


FIGURE 4.8 Change of working position

In order to change the plough working position, use a single lever of the hydraulic selective control valve in the carrying vehicle and the electric switch of the plough's solenoid valve (FIGURE 4.8)

Working speed depends on the quantity and quality of collected material but also on the type of terrain. It is not recommended to operate the snow ploughs mounted on front loaders and loaders when blades are set (to the right or to the left) in severe conditions, i.e.:

- on uneven terrain,
- in unknown terrain with obstacles
- on packed or frozen snow or ice,
- on snow layer thicker than 30 cm.

IMPORTANT



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

It is not recommended to operate the snow plough attached to front loader with a speed of more than 6 km/h.

4.5.3 SET THE WORKING HEIGHT

In the snowploughs equipped with slides (A), the working height adjustment (FIGURE 4.9) is performed by unlocking nut (5) and bolt (3) and proper extension or withdrawal of slide (1) in guide. The right and left slide should be extended to the same height. Adjustment of the left and right slide is carried out in the same way.

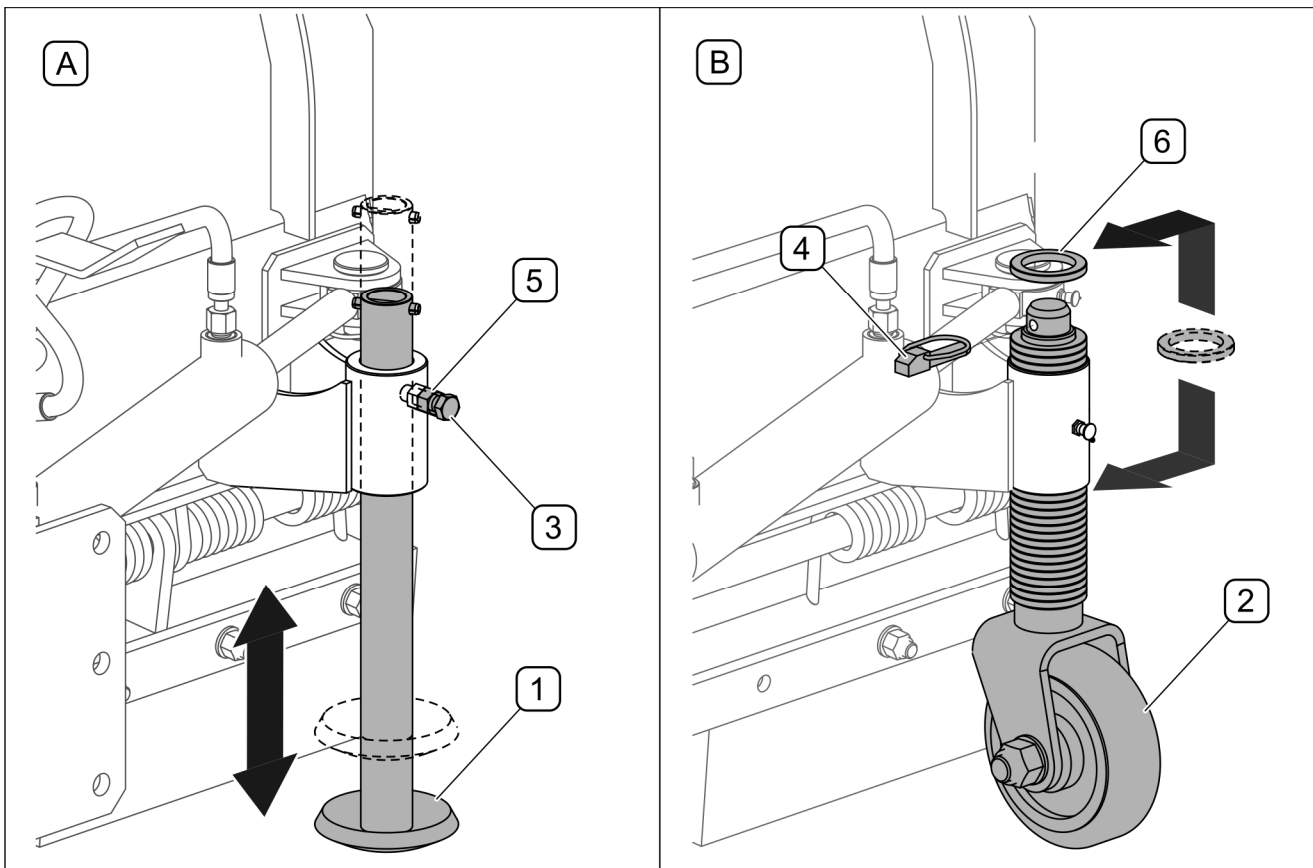


FIGURE 4.9 Working height adjustment

(A) - slide height adjustment; (B) - wheel height adjustment; (1) - slide; (2) - wheel; (3) - clamping bolt; (4) - securing cotter pin; (5) - lock nut; (6) - spacer (thickness 6 mm)

Optionally, the plough can be equipped with wheels (B) (FIGURE 4.9). Wheel (B) height is adjusted with the use of 10 mm-high spacer washers. In order to lift wheel (1), take out cotter

pin (2) and relocate spacer washers above the wheel bracket. Right and left wheel heights should be the same. The recommended distance of the blade from the ground is 6 ÷ 12 mm.

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. Ensure that the driver has sufficient visibility.
- Make sure that the snow plough is correctly attached to the tractor (carrier vehicle), and linkage is properly secured.
- While driving or operating the machine on public roads turn on clearance lamps.
- Do not exceed the design speed and maximum speed allowed by road traffic regulations. Ground speed 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 wheels sliding down the slope or the slope collapsing.
- Speed must be sufficiently reduced before making a turn or driving on an uneven road or a slope.
- When driving on uneven terrain with the implement raised reduce speed due to dynamic loads and the risk of damaging the machine or carrier 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 implement, secure the tractor (carrier vehicle) linkage against falling or accidental dropping.

4.7 DISCONNECTING THE PLOUGH

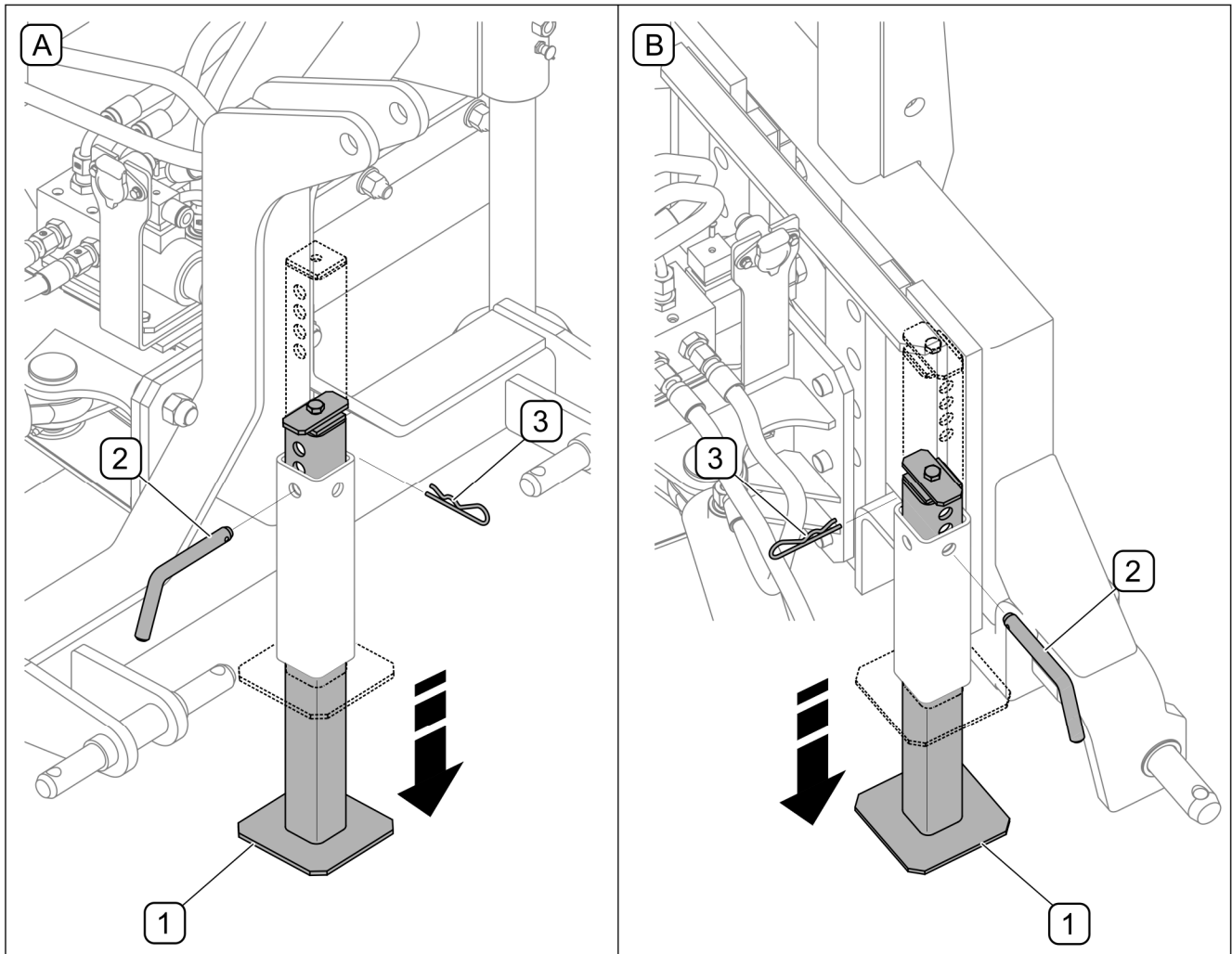


FIGURE 4.10 Lowering of parking stand

(1) - parking stand; (2) - linchpin; (3) - securing cotter pin

The plough detached from the carrying vehicle should rest on its blades, slides or wheels (depending on the optional equipment) and the parking support. Place snow plough on a level, sufficiently hard surface in such a manner as to ensure that it is possible to connect it again.

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

- when the snow plough – blade is raised, take out securing cotter pin (3) and linchpin (2) (FIGURE 4.10),
- lower parking stand (1) and secure it with linchpin (2) and cotter pin (3),
- lower the snow plough until it fully rests on the ground,
- turn off the tractor engine, engage the parking brake,
- reduce residual pressure in the hydraulic system using the appropriate hydraulic circuit control lever,
- disconnect hydraulic line connectors (1), secure them with stoppers (2) and place in bracket (3) on the snow plough frame (FIGURE 4.11),
- disconnect the snow plough from the carrier vehicle's linkage.



DANGER

Reduce pressure prior to disconnecting the hydraulic system.

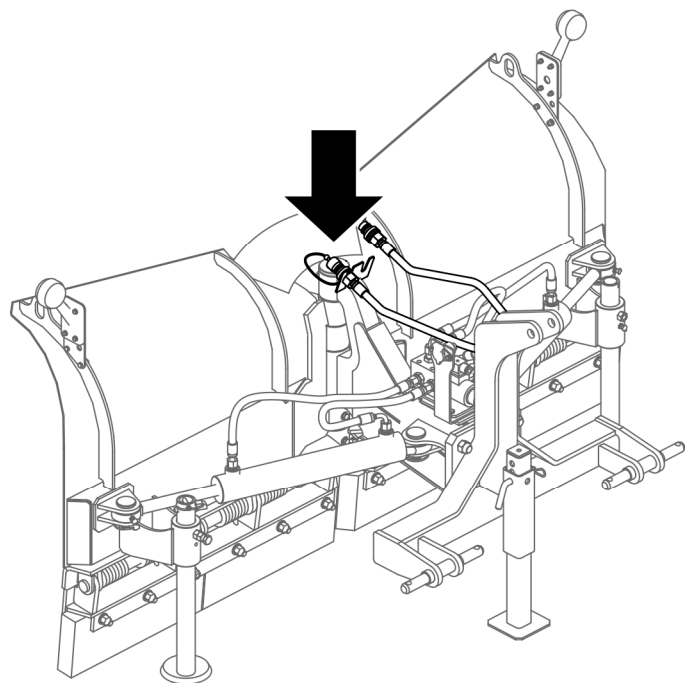
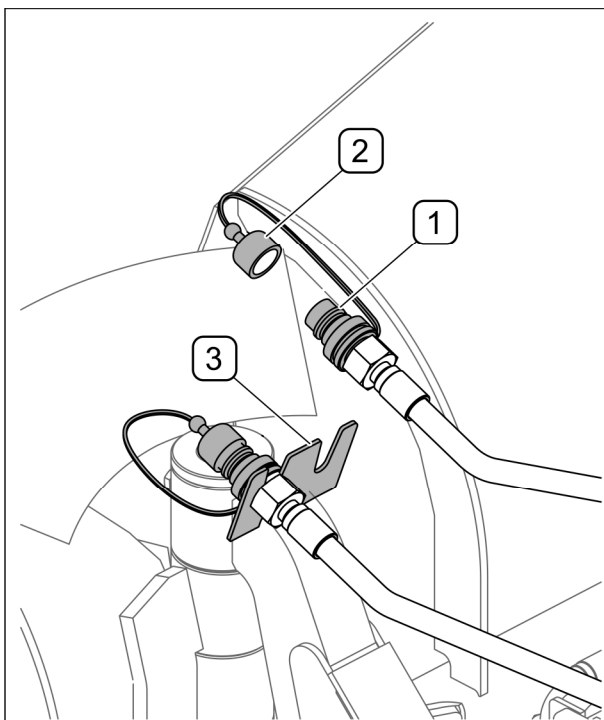


FIGURE 4.11 Protection of hydraulic line connectors

(1) - hydraulic line connector; (2) - plug; (3) - bracket

SECTION

5

MAINTENANCE

5.1 CHECK AND REPLACE COLLECTING STRIPS



DANGER

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

Before replacing collecting strip raise the plough and support with sufficiently stable and strong supports. If the plough is hitched and raised on the front three-point linkage or another linkage, protect it from falling and immobilise the carrier vehicle (turn off the engine and engage the parking brake.)

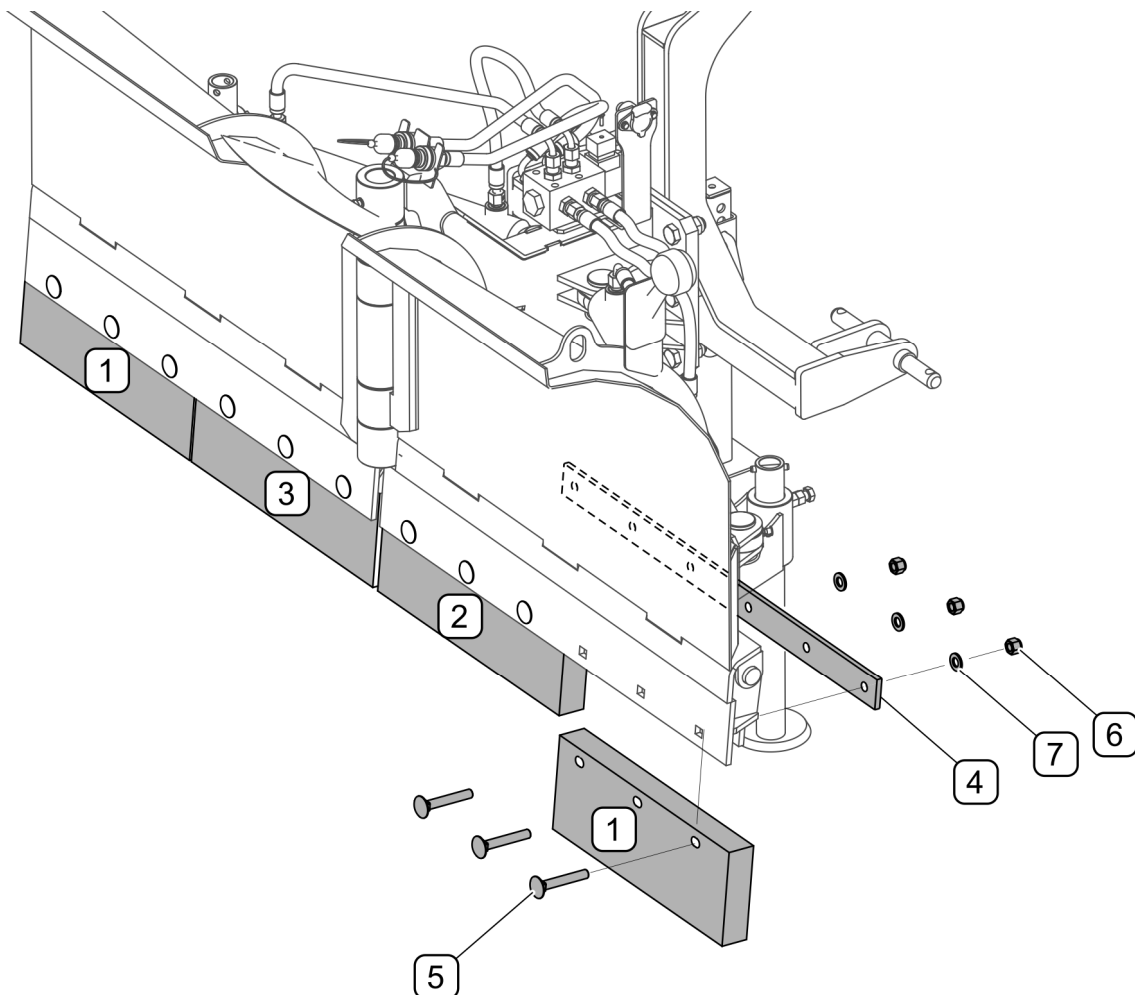


FIGURE 5.1 Replace the scraper blades

(1) - outer rubber blade; (2) - left inner rubber blade; (3) - right inner rubber blade;
 (4) - clamping bar; (5) - Z M12x80-8.8 bolt ; (6) - M12-8 nut; (7) - washer 12-100HV

The list of scraper blade element is presented in TABLE 5.1. To remove the blades, unscrew the nuts (4), remove bolts (5) and remove the clamping bar (6). Install on a new blade and assemble in the reverse order.

TABLE 5.1 LIST OF THE PUV-1600 SCRAPER BLADE COMPONENTS

Marking FIGURE 5.1	Name / Part No.	Quantity [pcs]
1	Outer rubber blade / 335N-05000001	2
2	Left inner rubber blade / 335N-05000002L	1
3	Right inner rubber blade / 335N-05000002P	1
4	Clamping bar / 335N-05000003	2
5	Bolt M12x80-8.8-A2J / PN-M-82406	12
6	Nut M12-8-A2J / PN-EN ISO 7040	12
7	Washer 12-100HV-Fe//Zn / PN-EN ISO 7091	12

The above-mentioned quantities apply to both mouldboards



DANGER

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

After replacement of collecting strips, the working height should be checked and possibly adjusted (see 4.5.3 *Setting THE WORKING HEIGHT*).



NOTE

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

5.2 SLIDE REPLACEMENT

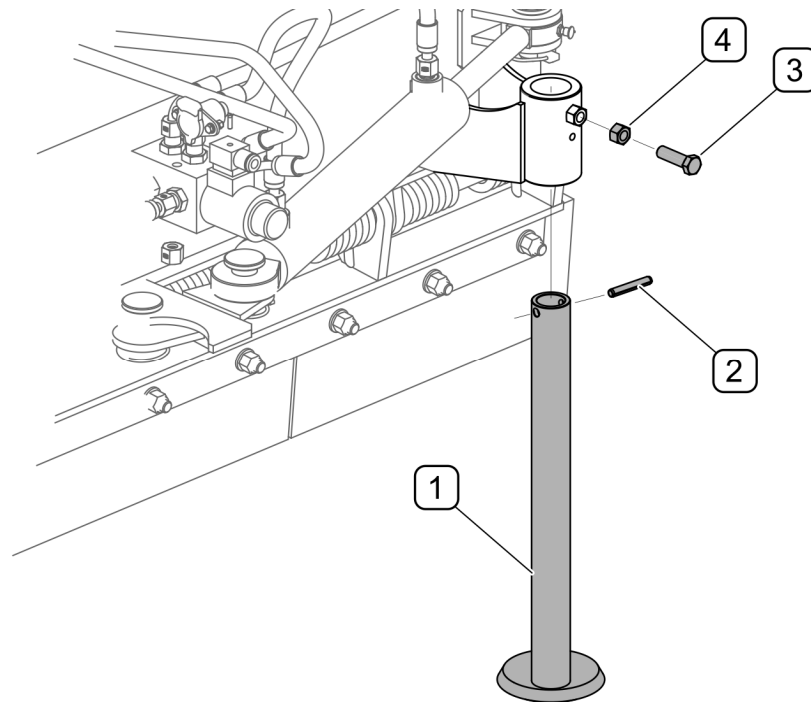


FIGURE 5.2 Slide replacement

(1) - slide; (2) - spring pin; (3) - M10x30-8.8 bolt; (4) - M10-8 lock nut

If the slides (FIGURE 5.2) are excessively worn or damaged, replace them with new. In order to do this raise the plough and support with sufficiently stable and strong supports. If the plough is hitched and raised on the carrier vehicle, protect it from falling and immobilise the carrier vehicle (turn off the engine and engage the parking brake.) Remove the spring pin (2), loosen the counter nut (4) and undo the bolt (3) securing the slide (1). Check the slide and other parts for damage. Install in reverse order. The right and left slide are replaced in the same way. The list of slide components with part numbers is presented in TABLE 5.2



DANGER

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

TABLE 5.2 LIST OF SKID COMPONENTS

Marking FIGURE 5.2	Name / Part No.	Quantity [pcs]
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

The above-mentioned quantities are for a single slide

After replacing the slides, it is recommended to check and, if necessary, adjust the working height

(see 4.5.3 SET THE WORKING HEIGHT)

5.3 HYDRAULIC SYSTEM MAINTENANCE

Hydraulic system maintenance duties:

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



DANGER


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



NOTE

Before starting work, 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 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.




DANGER

Oil fires should be quenched with carbon dioxide (CO₂), foam or extinguisher steam. Do NOT use water for fire extinguishing!


TABLE 5.3 HL32 HYDRAULIC OIL SPECIFICATION

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



DANGER

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




DANGER

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

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

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



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

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

**NOTE**

The hydraulic system is vented automatically during machine operation.



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

5.4 LUBRICATION

Machine lubrication should be performed with the aid of a manually or foot operated grease gun, filled with generally available grease. Before commencing lubrication insofar as is possible remove old grease and other contamination. Remove and wipe off excess oil or grease ŁT-43-PN/C-96134 grease is recommended for lubrication.

**DANGER**

Lubricate only when the plough is lowered and resting on the ground.

Before lubricating, switch off engine, remove key from ignition and engage tractor parking brake.



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

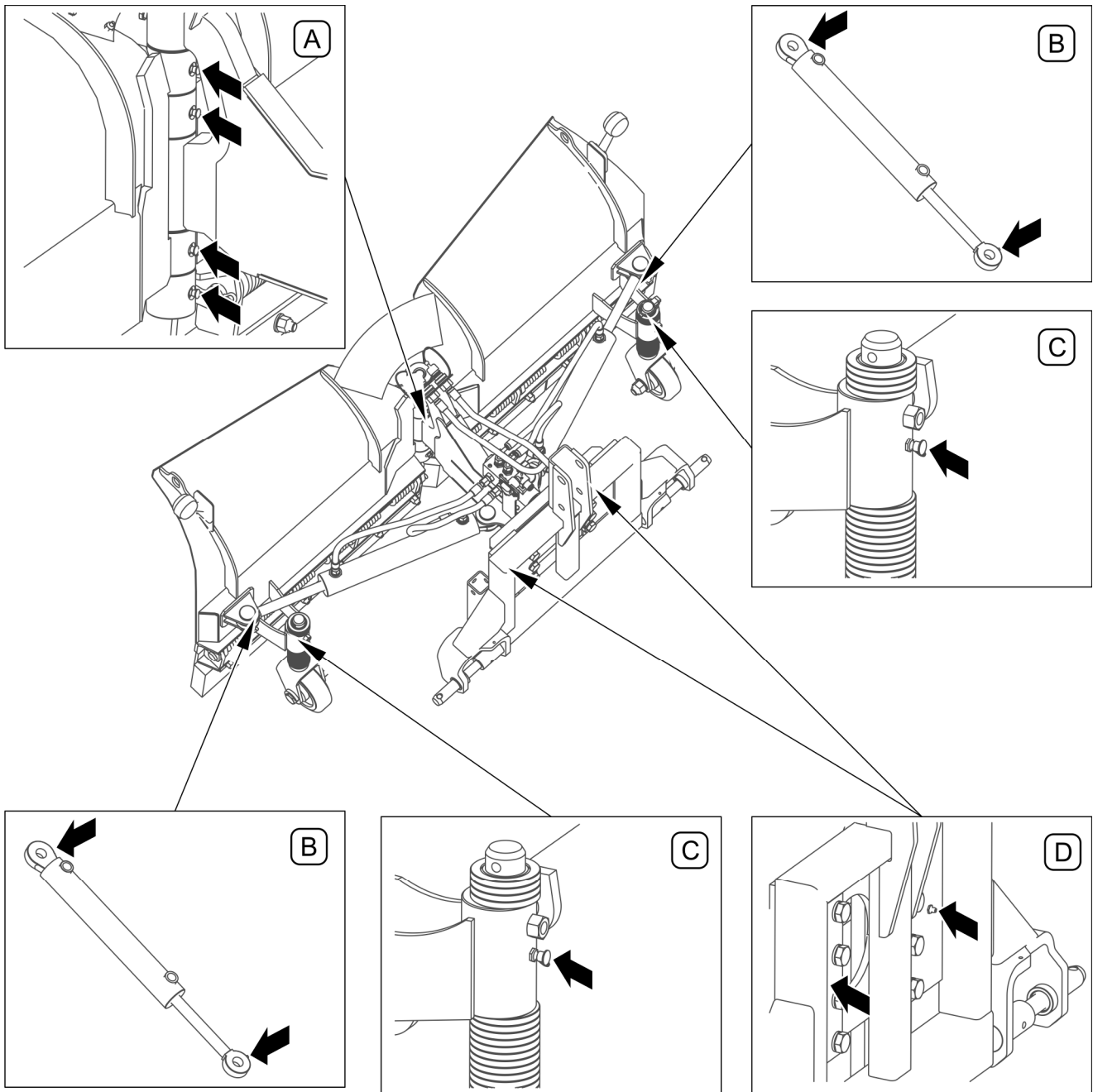


FIGURE 5.3 Lubrication points

Lubrication points are detailed in TABLE 5.4

TABLE 5.4 LUBRICATION POINTS AND LUBRICATION FREQUENCY

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
A	Mouldboard pivot	4	grease	50 hours
B	Eye of the hydraulic cylinder piston rod	4		50 hours
C	Wheel rotation bushing	2		50 hours
D	Linkage head plate (applies to swing systems)	2		20 hours

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

5.5 STORAGE

After finishing work, clean and wash the machine thoroughly with a water jet. While cleaning, do not direct a strong water or steam jet at information and warning decals 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. Repair or replace any used or damaged components.

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

If the machine will not be used for an extended period of time, protect it against adverse weather conditions. Disconnect the electric cables supplying the solenoid valve and clearance lighting (optional) from the machine and protect against moisture. Lubricate machine according to the instructions provided. In the event of a prolonged storage, it is essential to lubricate all components regardless of the date of the last lubrication. Additionally, before the winter, grease the three-point linkage pins and the swing linkage plate (if present).

5.6 TIGHTENING TORQUE FOR NUT AND BOLT CONNECTIONS

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


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

5.7 TROUBLESHOOTING

TABLE 5.6 TROUBLESHOOTING

TYPE OF FAULT	POSSIBLE CAUSE	REMEDY
The plough mouldboards do not swing out when controlling the working position	The hydraulic system is not connected	Connect quick couplers to tractor (carrier 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 (carrier vehicle) hydraulic system
When controlling the plough, the setting of only one mouldboard is changed	The electrical system not connected to the tractor (carrier vehicle)	Connect electrical system to tractor.
	Hydraulic system valve control switch set in one position	When switched off, just one mouldboard can be controlled, when switched on the other mouldboard 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 carrier vehicle	Check and adjust according to Operator Manual
	Slide incorrectly positioned (wheels)	Check and adjust according to Operator Manual
	Excessively worn or damaged collecting strips	Check and replace if necessary

NOTES

A series of horizontal dotted lines for writing notes.