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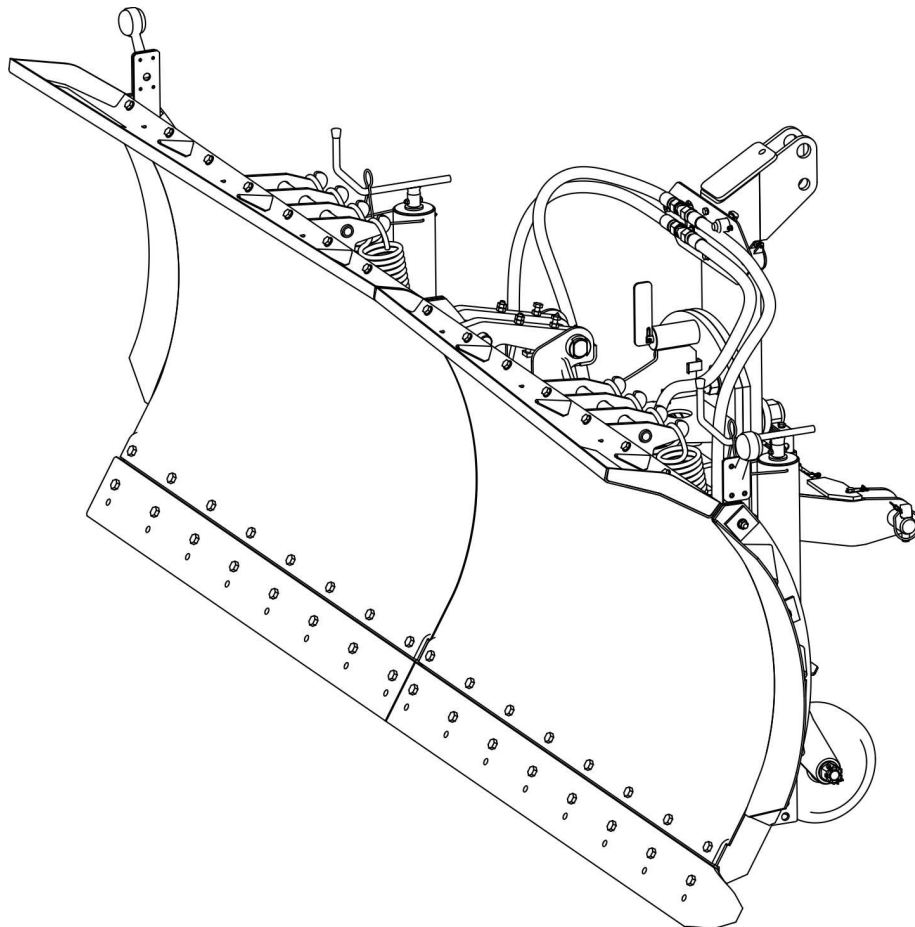
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OPERATOR'S MANUAL

SNOW PLOUGH

PRONAR PU-2600 / PU-3300

TRANSLATION OF THE ORIGINAL INSTRUCTIONS



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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.

This Operator's Manual describes the basic safety rules and operation of PU-2600/PU-3300 SNOW PLOUGH. If the information contained in the Operator's Manual needs clarification then the user should refer for assistance to the sale point where the tractor 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	
Type:	PU-2600	PU-3300
Model:	—	—
Serial number:		
Commercial name:	Snow plough PRONAR PU-2600 Snow plough PRONAR PU-3300	

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 2010 -04- 07

Place and date

Z-CIA 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

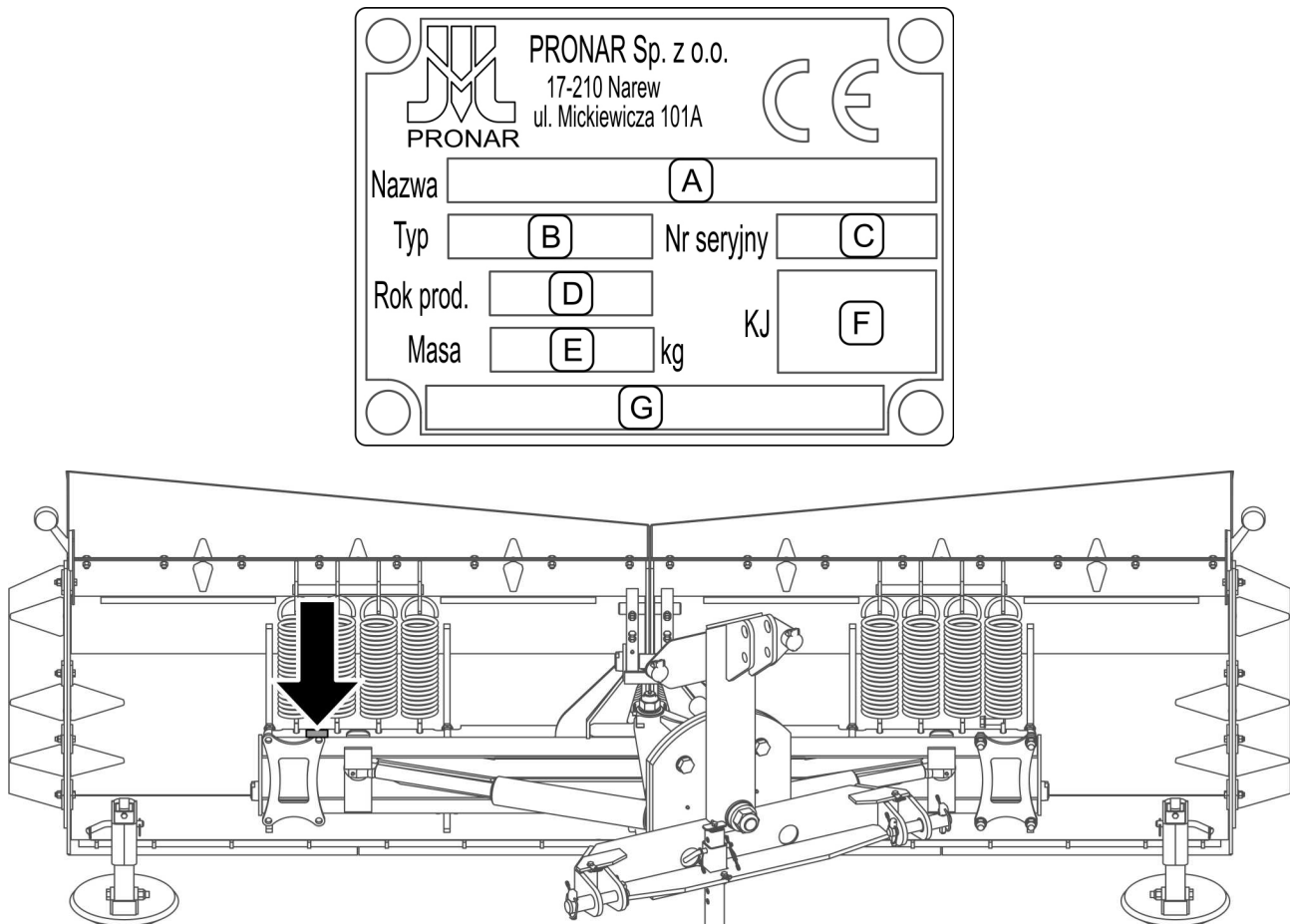


FIGURE 1.1 Location of the data plate

Meaning of data plate items (FIGURE 1.1):

- A - machine name
- B – type (i.e. PU-2600)
- 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 frame on the left side of the machine. 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 PROPER USE

The PRONAR PU-2600 and PU-3300 snow ploughs 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. Use for other purposes is not in accord with design. 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'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 agricultural tractor (carrying vehicle) Operator's Manual,
- have been trained in machine operation and safe working conditions,
- have the required authorisation to drive 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:

- levelling of roads, terrain;
- transport of people, animals and other items on the machine

TABLE 1.1 Agricultural tractor (carrying vehicle) requirements

	UNIT	REQUIREMENTS
Linkage		
Front three point linkage	-	Category II and III (ISO 730-1)
Front loader	-	EURO mounting system (ISO 23206)
	-	ŁC-1650 mounting system (Pronar)
	-	EURO-SMS mounting system
Hydraulic system		
Hydraulic oil	-	HL32
Pressure in the system	MPa	16 ÷ 20
Hydraulic sockets	-	2 sockets of one section on the front of the tractor (vehicle)
Electrical system		
Clearance lamp power	-	3 pin sockets on the front of the vehicle
Electrical system voltage	V	12
Other requirements		
Power range	hp (kW)	80 ÷ 150 (59 ÷ 110)
Beacon light	-	orange light

1.3 OPTIONAL EQUIPMENT

The plough equipment includes:

- Operator's Manual
- Warranty Book

Additional fittings and optional equipment:

- wheels (*used instead of slides*)
- metal collecting strips (*used instead of rubber strips*)
- side rims

1.4 WARRANTY TERMS

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

The guarantee 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
- bulbs,
- 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, 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 guarantee repair coupons. A missing date of purchase or sale point stamp, may make the user ineligible for any warranty repair or refund.

The user is obliged to report immediately on noticing any wear in the paint coating or traces of corrosion, and to have the faults rectified whether they are covered by the guarantee or not. Detailed guarantee regulations are contained in 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, after being attached to a tractor. 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 secured on the carrier platform by certified belts or chains fitted with pulley.

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.

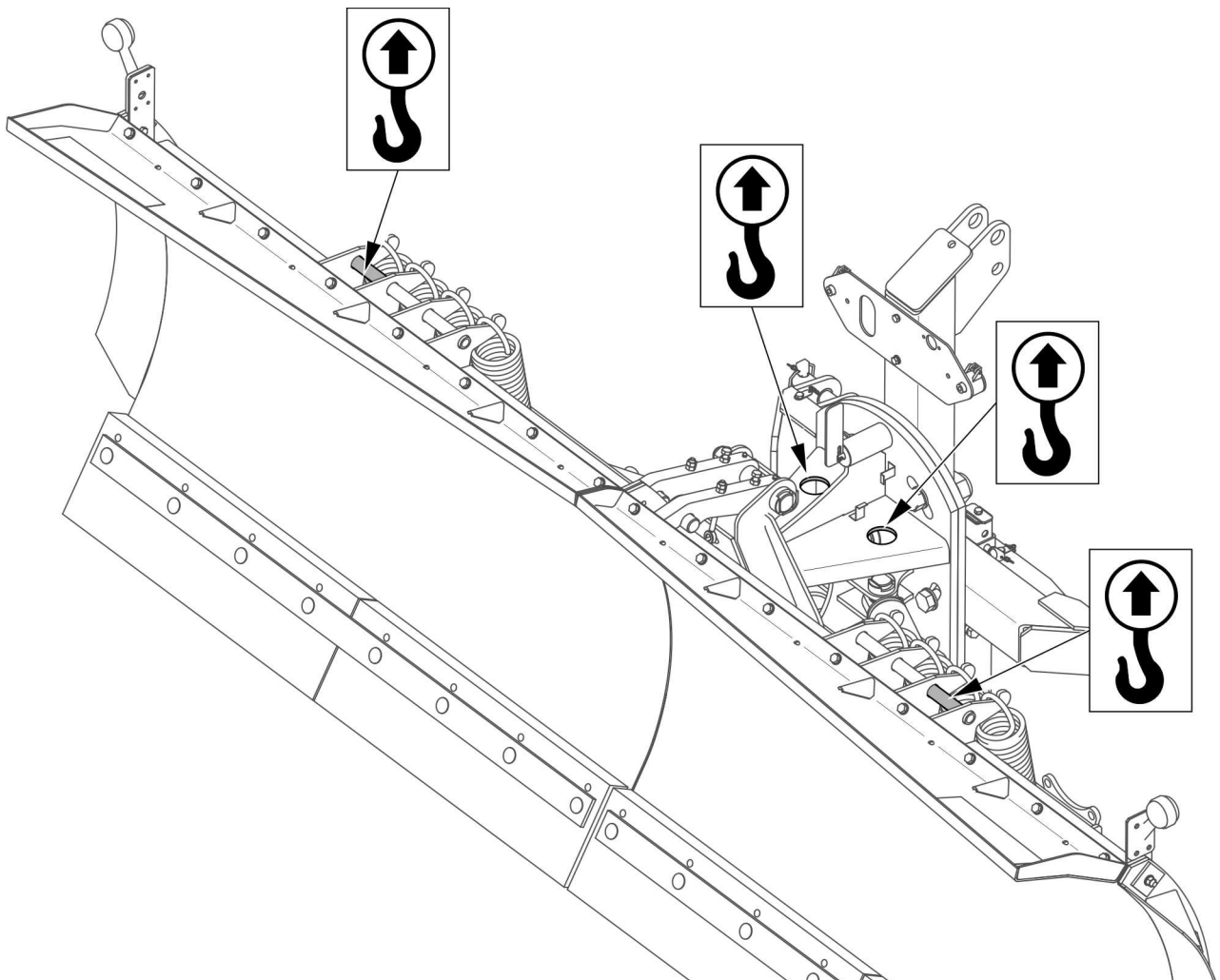



FIGURE 1.2 transport lugs


The machine should be attached to lifting equipment in places specially designed for this purpose (FIGURE 1.2), i.e., the by outer tubes on spring brackets and holes in linkage bracket. Suspension points are identified with information decals. When lifting the machine take particular care 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 ropes. During the loading work particular care should be taken not to damage paint coating.

ATTENTION!



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

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.

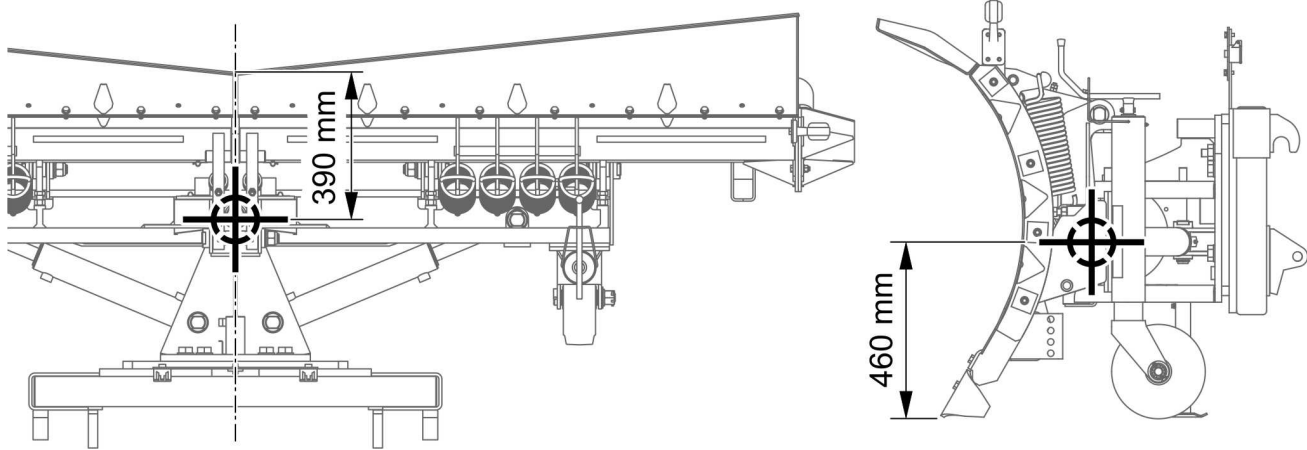



FIGURE 1.3 Centre of gravity

ATTENTION!



Centre of gravity, depending on the version (slides, wheels, various suspension systems, collecting strips) varies in the range ± 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 mower 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.



IMPORTANT!

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

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

SECTION

2

**SAFETY
ADVICE**

2.1 BASIC SAFETY RULES

2.1.1 USE OF MACHINE

- Before using the machine, the user must carefully read this Operator's Manual and the *WARRANTY BOOK*. When operating the machine, the operator must comply with the recommendations.
- The machine may only be used and operated by persons qualified to drive agricultural tractors and agricultural machines and trained in the use of the machine.
- If the information contained 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 minimal 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.
- 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 guarantee.
- The machine may only be used when all the protective elements (ie. safety guards) 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 LINKING AND DISCONNECTING FROM TRACTOR

- Do NOT link 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 completion of coupling 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 linchpins.
- The agricultural tractor or other carrying vehicle to which the machine will be linked and coupled must be technically reliable and must fulfil the requirements of machine Manufacturer.
- Be especially careful when hitching the machine to carrying vehicle.
- When hitching, there must be nobody between the machine and the tractor. A person assisting in the hitching of the machine should stand in such a place (beyond the area of danger), in order to be continuously visible to the tractor driver.
- Exercise caution when disconnecting mower.
- Machine, which is disconnected from the tractor (carrying vehicle) must be supported on the slides or wheels (optional), and parking stand.

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 malfunction of the hydraulic system, the machine shall be disconnected from use until the malfunction is corrected.
- When connecting the hydraulic conduits to the tractor (vehicle), make sure that the tractor (vehicle) hydraulic system and plough 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 limitations of road conditions and construction 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 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 tractor three-point linkage (*if possible*) or loader arm shall be locked in the up position to prevent accidental lowering.

- The plough linkage must be locked in transport position (*applies to pivot three-point linkage cat. II-III*)
- 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 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.
- 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 work 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 switched off and the ignition key removed. Immobilise tractor with parking brake. Ensure that unauthorised persons do not have access to the vehicle.

- 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 guarantee.
- Regularly check technical condition and mounting of all guards and protective elements.
- The paint coating should be cleaned off before beginning welding work. Burning paint fumes are poisonous for people and animals. Welding work should be carried out in a well lit and well ventilated space.
- During welding work pay attention to flammable or fusible elements (parts of the hydraulic systems, plastic parts). If there is a risk that they will catch fire or be damaged, they should be removed or covered with non-flammable material before commencing welding work. Before beginning work prepare a CO₂ or foam extinguisher.
- In the event of work requiring the machine to be raised, use properly certified hydraulic or mechanical lifts. 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 PLOUGH 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 plough while reversing. Lift machine when reversing.
- In severe conditions (heavy snow, frozen snow, ice adhering to the ground) it is recommended to work with mouldboards set in fixed positions A or B (FIGURE 3.1)

2.2 DESCRIPTION OF MINIMAL RISK

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

- using the mower for purposes other than those for which it is intended,
- being between the tractor and the machine while the engine is working and when the machine is being attached,
- being on the machine while the engine is working,
- 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 unauthorised persons or persons under the influence of alcohol or other intoxicating substances,
- cleaning, maintenance and technical checks when tractor is connected and engine is running.

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

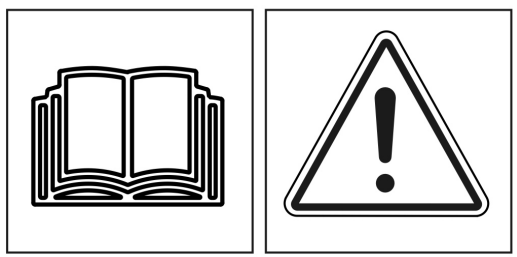
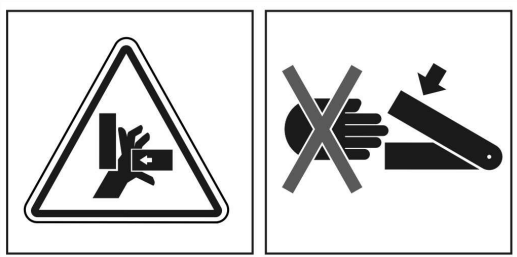
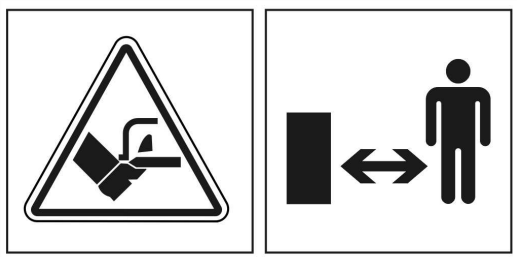
- prudent and unhurried operation of the machine,
- sensible application of the remarks and recommendations contained in the Operator's Manual,
- carrying out repair and maintenance work in line with operating safety rules,
- carrying out repair and maintenance work by persons trained to do so,
- using close fitting protective clothing,

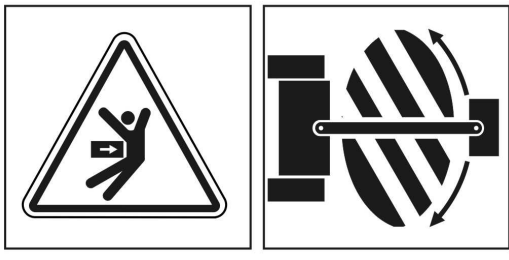


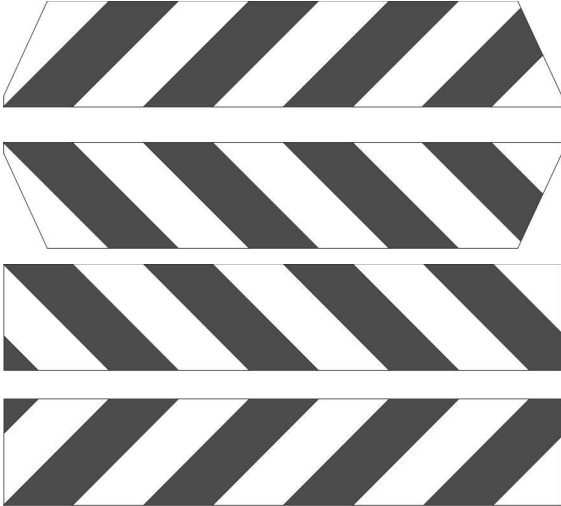

- ensuring unauthorised persons have no access to the machine, especially children,
- maintaining safe distance from forbidden or dangerous places
- a ban on being on the machine when it is operating


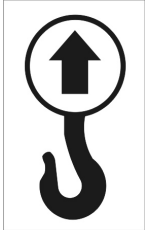
2.3 INFORMATION AND WARNING DECALS

All signs should always be legible and clean, visible to the operator and also to persons possibly being in the vicinity of working machine. 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>

ITEM	SYMBOL	DESCRIPTION
4		<p>When implement is in use the 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>
5		<p>Thrown out objects, endanger the whole body. Keep a safe distance from the operating machine.</p>
6		<p>Pressurised liquid. Keep a safe distance.</p>
7		<p>Outline marking.</p> <p>Outline marking. (option without rims)</p>
8		<p>Manufacturer</p>

ITEM	SYMBOL	DESCRIPTION
9		Machine model
10		Transport suspension points

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

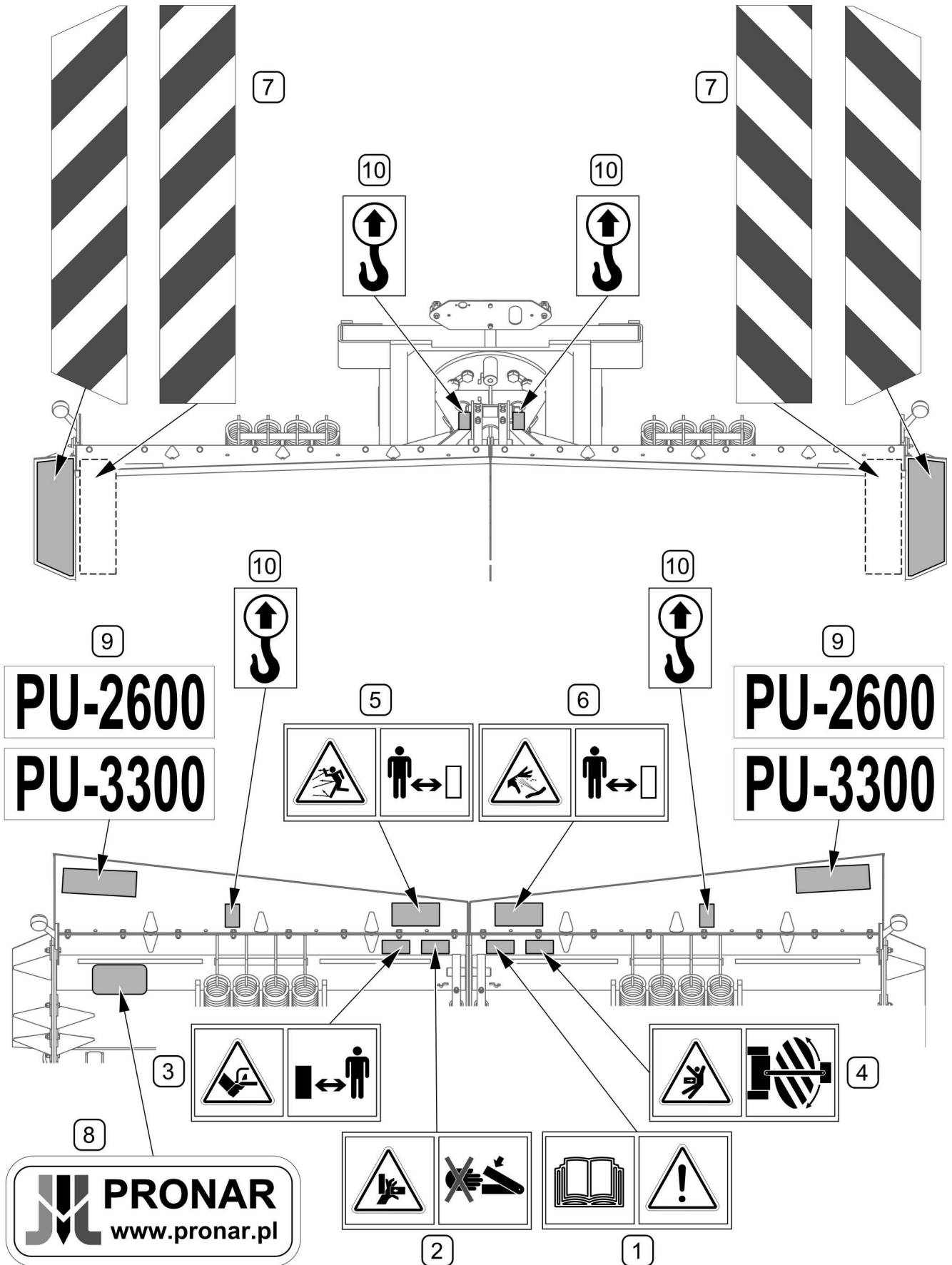


FIGURE 2.1 Locations of information and warning decals.

Meaning of symbols (TABLE 2.1)

SECTION

3

**DESIGN AND
OPERATION**

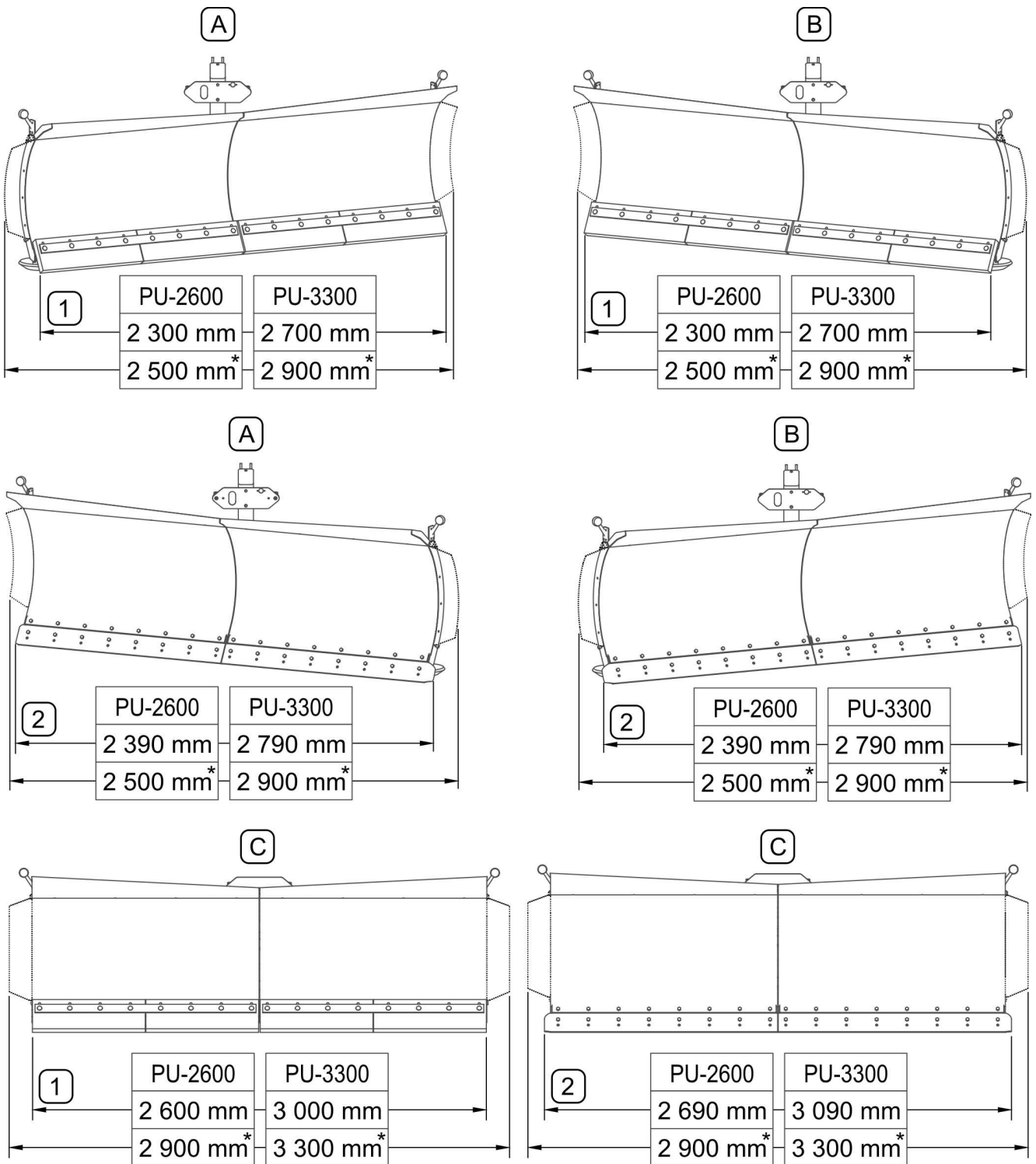
3.1 TECHNICAL SPECIFICATION

TABLE 3.1 BASIC TECHNICAL SPECIFICATION

Plough model	Unit	PU-2600	PU-3300
	Mounting method: - three point linkage - front loader - other	- - - - -	cat. II-III according to ISO 730-1 (<i>pivot</i>) cat. II according to ISO 730-1 (<i>swing</i>) ŁC-1650 (<i>swing</i>) EURO (<i>swing</i>) EURO-SMS (<i>swing</i>) mounting plate for individual installation (<i>swing</i>)
Width depending on the operating position (FIGURE 3.1) with rubber strips: - A, B - C with metal strips: - A, B - C	mm	2,300 (2,500*) 2,600 (2,900*) 2,390 (2,500*) 2,690 (2,900*)	2,700 (2,900*) 3,000 (3,300*) 2,790 (2,900*) 3,090 (3,300*)
Working height of plough blades: minimum / maximum	mm	970 / 1040	
Number of working positions	-	2 fixed (<i>intermediate positions possible</i>)	
Operation	-	hydraulic	
Number of hydraulic cylinders	item	2	
Power supply	-	external hydraulic system (<i>carrying vehicle</i>)	
Type of collecting strips	-	swing, rubber or metal	
Weight of machine ready for operation: - with pivot front three-point linkage cat. II-III ISO 730-1 - with swing three-point linkage cat. II according to ISO 730-1 - with EURO-SMS mount, - with ŁC-1650, EURO mount - with mounting plate	kg	660 725 728 738 796	680 745 748 758 816
Weight of additional equipment: - wheels (2 off) - side rims (2 pc)	kg	40 18	
Power demand	hp (kW)	80÷150 (59÷110)	
Maximum working speed	km/h	10 6 (<i>for front loaders</i>)	
Other information	-	Single person operation	

* - plough equipped with a side rims

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



* - plough equipped with a side rims

FIGURE 3.1 Width depending on the operating position:

A, B- fixed working positions, C-intermediate position "straight" (1) - dimensions for the ploughs with rubber strips, (2) - dimensions for the ploughs with metal strips

3.2 GENERAL DESIGN

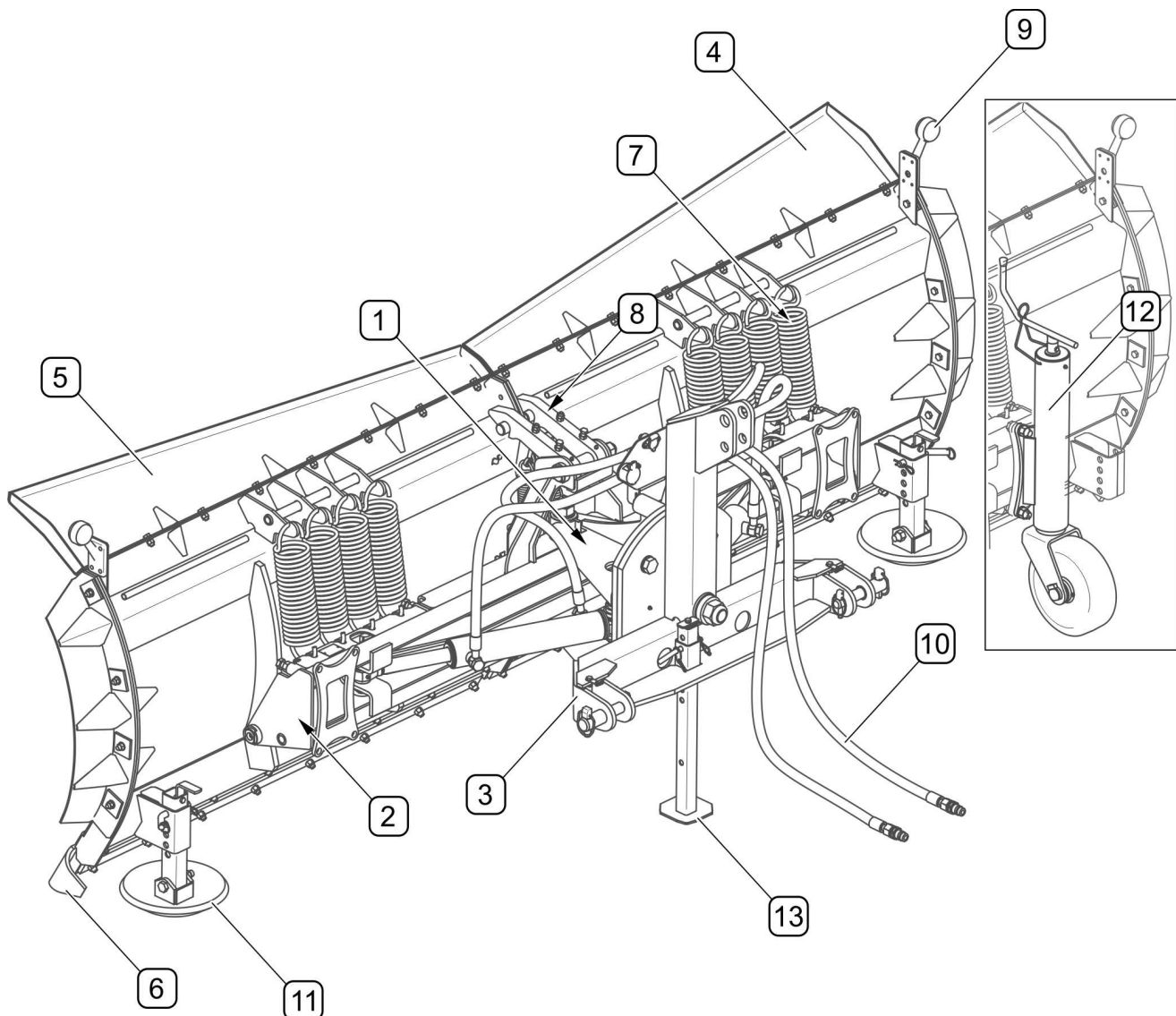


FIGURE 3.2 General design

(1) - cylinder frame; (2) - mouldboard frame, (3) - linkage, (4) - right mouldboard; (5) - left mouldboard; (6) - collecting strips, (7) - tensioning springs, (8) - protection mechanism ratchet, (9) - clear lamps wiring; (10) - hydraulic system (11) - slides, (12) - wheels (optional) (13) - parking stand

PU-2600/PU-3300 plough (FIGURE 3.2) consists of a mouldboard frame(2), which is attached to cylinder frame (1) by means of a rod. Right (4) and left (5) mouldboard and attached independently to mouldboard frame. When an obstacle is encountered mouldboards can independently swing forward and back thanks to the springs (7). Rubber or metal collecting strips (6) are attached to each mouldboard (*depending o plough option*). Using a suitable linkage (3) plough is linked to a tractor or front loader. During operation, plough is

rests on the ground on two slides (11) or wheels (12), whose height can be adjusted. Parking stand (13) is used to support the plough when it is disconnected from the carrying vehicle. Optionally, the plough can be equipped with different linkage systems such as attaching to LC-1650 front loader or EURO-mount, three-point linkage cat II (*swing*) (FIGURE 4.1)

3.3 HYDRAULIC SYSTEM

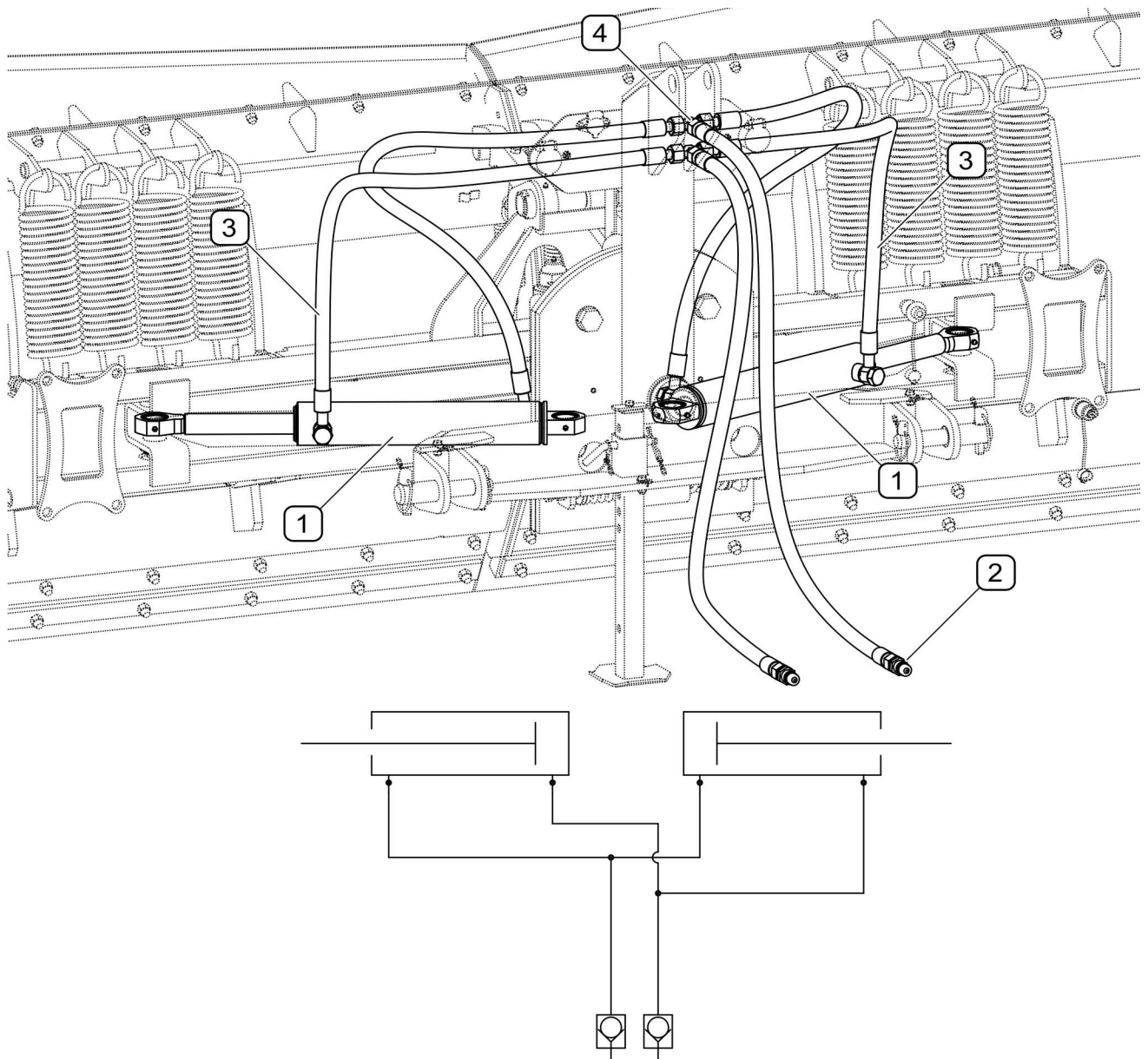


FIGURE 3.3 Hydraulic system design

(1) - hydraulic cylinder, (2) - quick coupler, (3) - conduits, (4) - Tee junction

Plough mouldboard working position can be adjusted by means of two hydraulic cylinders (1) supplied with hydraulic conduits (3). Hydraulic conduits terminated with quick couplers (2) are

used for connecting plough hydraulic system with tractor (carrying vehicle) external hydraulic system. Plough hydraulic cylinders are controlled from operator cab through the tractor (carrying vehicle) external hydraulic system.

3.4 ELECTRICAL SYSTEM

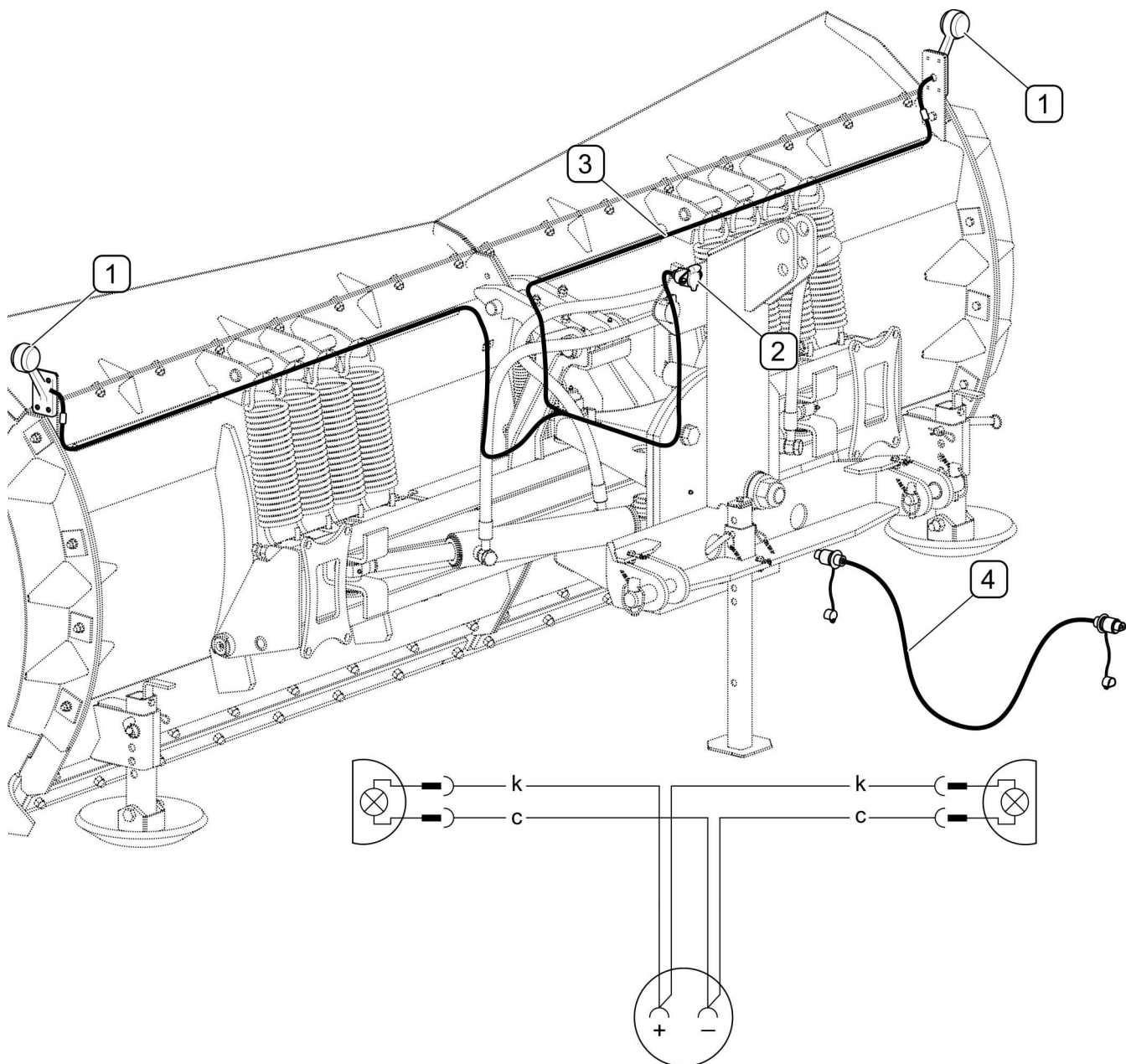


FIGURE 3.4 Electrical system components

(1) - clearance lamp, (2) - 3 pin socket, (3) - wiring harness, (4) - power cord, c- black; k-red

Plough clearance lamp electrical system (FIGURE 3.4) consists of two side clearance lamps (1) and wiring harness terminated with a 3-pin socket (2). Plough electrical system is connected to tractor (carrying vehicle) system using a cable connection (4). In the Pronar

tractors an additional connector is provided in headlights wiring harness, which connects to a 3 pin socket. To control the socket from operator cab, place an additional switch on the console (*if not pre-installed*) and connect it to the appropriate connectors included in the wiring harness powering headlights.

3.5 OVERLOAD SAFETY DEVICE

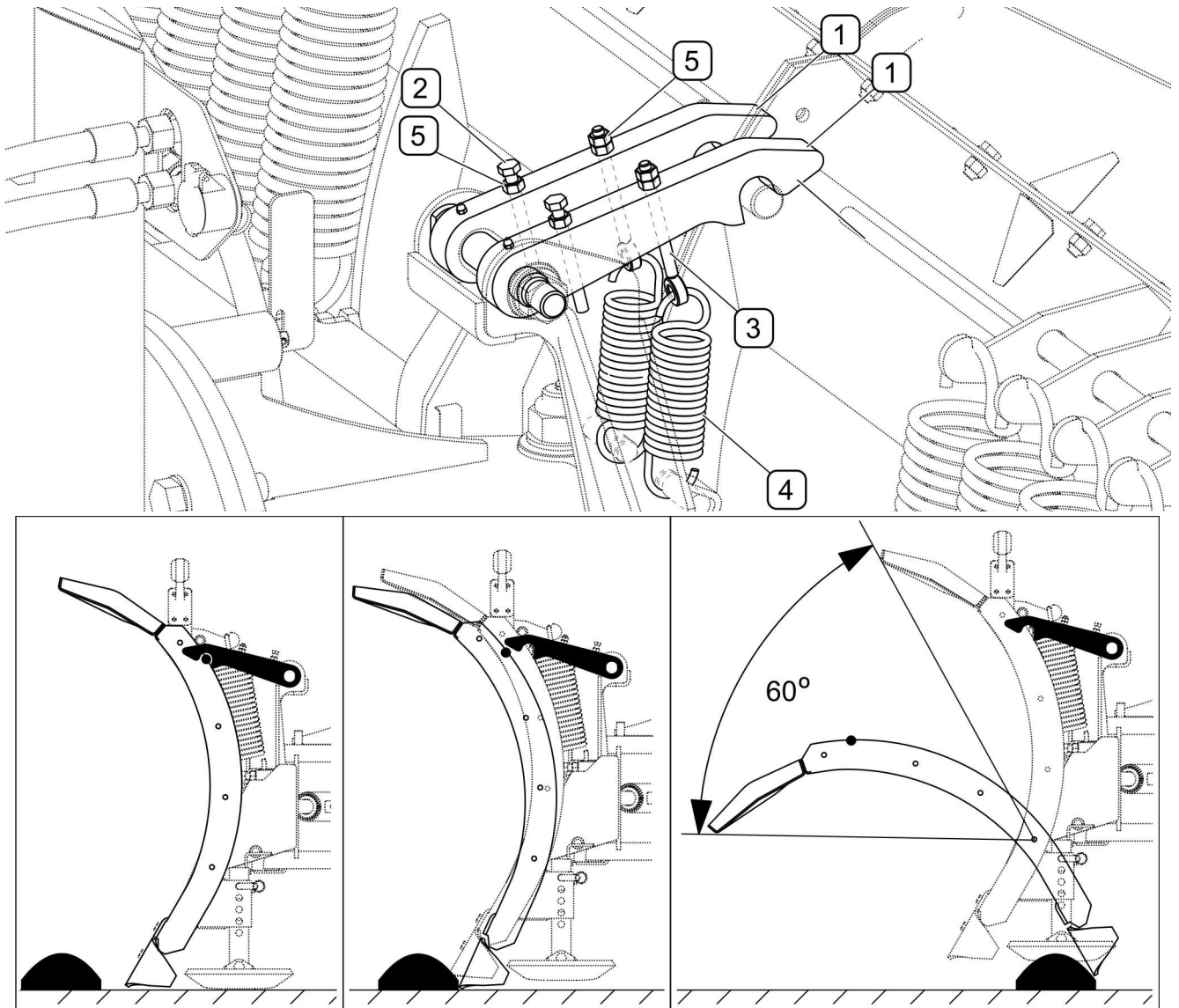


FIGURE 3.5 Overload safety device design

(1) - latch, (2) - limiter bolt, (3) - spring tensioner, (4) - latch spring; (5) - counter nut;

PU-2600/PU-3300 ploughs feature an overload safety device protecting against overload due to too excessive resistance by obstacles encountered on the surface (protruding gutters, stones, etc.). Upon encountering an obstacle is mouldboard pawl is unlocked allowing the forward swing, which combined with the "floating" suspension system allows the elevation of

the entire system. After passing the obstacle, thanks to the springs mouldboards go back and lock in working position, if the volume of snow pushed permits.

SECTION

4

**CORRECT
USE**

4.1 PREPARING FOR WORK

DANGER



Before using the plough, 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 normal 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 plough 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 the technical condition of the linkage components,

**ATTENTION!**

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

The technical condition before starting the machine must be a 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 other 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 your plough 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 guarantee, 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	SERVICE OPERATION	FREQUENCY
Technical condition of blades and collecting strips.	Visually inspect and if necessary replace according to section " <i>REPLACEMENT OF COLLECTING STRIPS</i> "	Before beginning work
Technical condition of slides or wheels (option)	check the technical condition, if complete and correctly mounted.	
Technical condition of linkage	check the technical condition, if complete and correctly mounted.	
Technical condition of the hydraulic system.	Visually inspect the technical condition	
Technical condition of clearance lamps electrical components.	Visually inspect the technical condition, check the operation	
Check of all main nut and bolt connections are properly tightened	Torque values should be according to table (5.7)	Once a week
Lubrication	Lubricate elements according to table „ <i>LUBRICATION</i> ".	According to table (5.6)



ATTENTION!

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

4.3 HITCHING TO CARRYING VEHICLE

The PU-2600/PU-3300 plough may only be mounted on a tractor (carrying vehicle) fulfilling the requirements contained in table 1.1 "AGRICULTURAL TRACTOR (CARRYING VEHICLE) REQUIREMENTS".



ATTENTION!

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



DANGER

When hitching, there must be nobody between the machine and the tractor (carrying vehicle). A person assisting in the hitching of the machine should stand in such a place (beyond the area of danger), in order to be continuously visible to the tractor driver.

Exercise caution when hitching the machine to carrying vehicle.



ATTENTION!

Plow equipped with a hitching system A (FIGURE 4.1) should be mounted only to the carrying vehicle equipped with a floating section linkage.

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

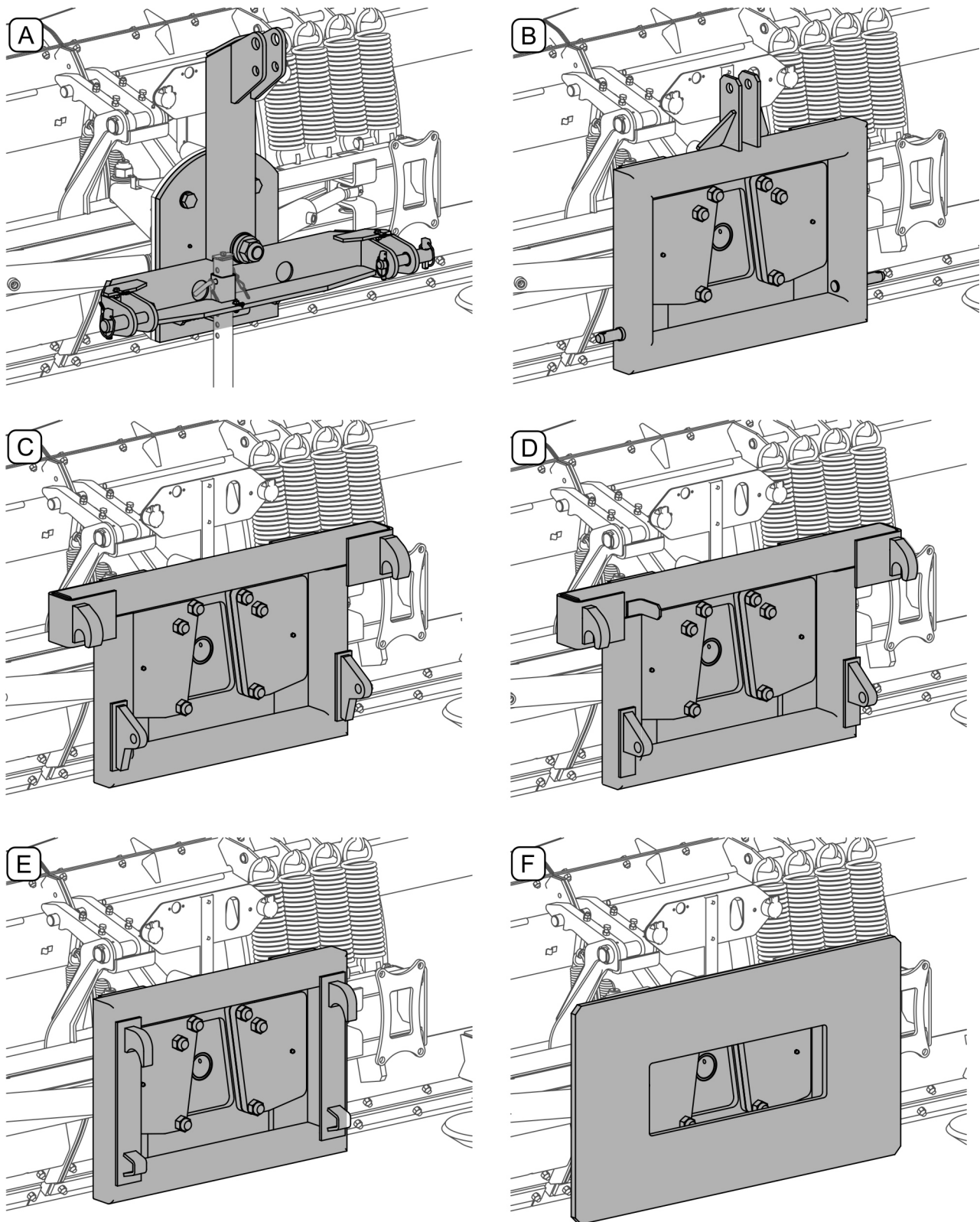


FIGURE 4.1 Types of linkage systems

(A)- three-point linkage cat. II-III (pivot); (B)- three-point linkage cat. II (swing), (C) - linkage for loaders with EURO (swing) mount; (D) - linkage for the LC-1650 loader (swing); (E) - linkage for loaders with EURO-SMS (swing) mount , (F) - mounting plate (swing) for individual installation, without fittings

4.3.1 HITCHING TO THE THREE POINT LINKAGE

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

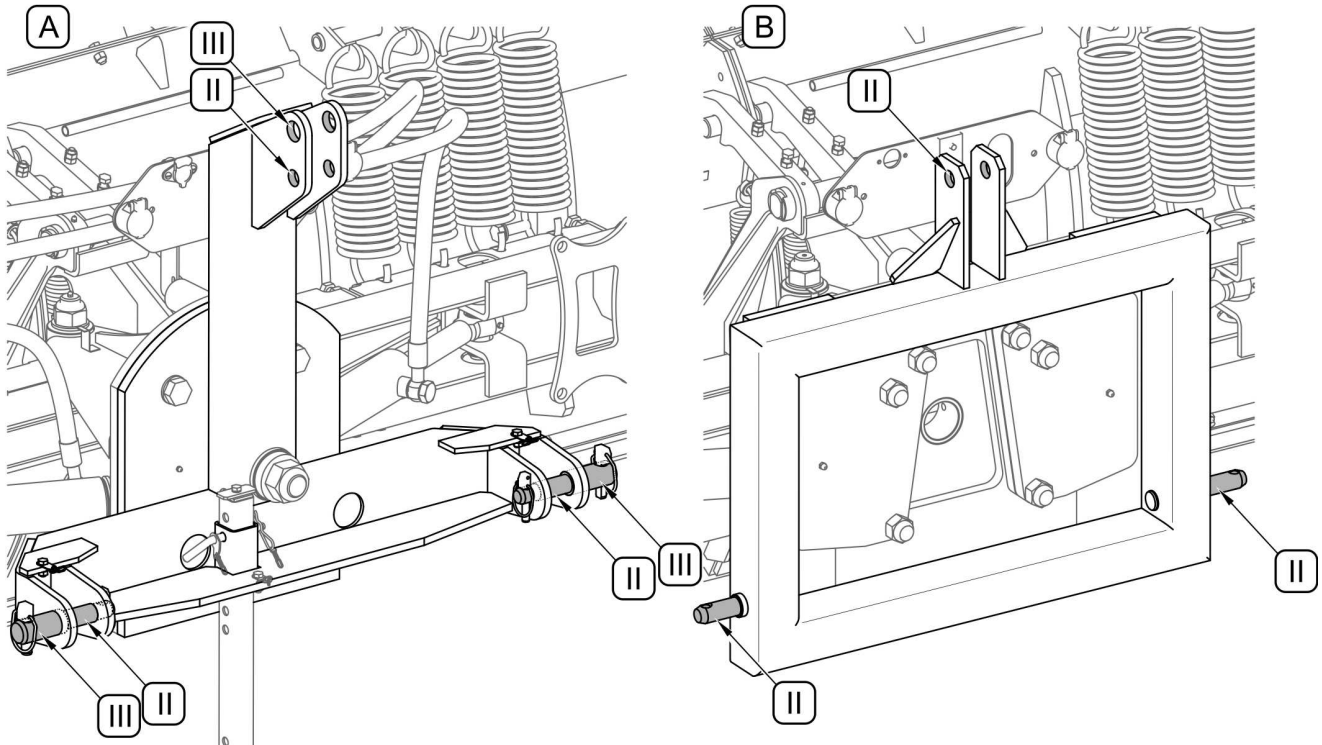


FIGURE 4.2 Three-point linkage categories according to ISO 730-1

(A) - linkage cat. II i III (pivot); (B) - linkage cat. II (swing); (II) - category II linkage; (III)- category III linkage

Hitching the plough to tractor three-point linkage do the following:

- move the lower rod of tractor three-point linkage to the lower linking points of the plough. Set lower rods at an appropriate height,
- switch off tractor's engine and prevent it from moving,
- connect the lower pins of the plough linkage with three-point linkage and secure with linchpins,
- in the case of the hook linkage place balls on plough linkage pins, secure with linchpins and lift the pins until balls lock in hooks,
- connect tractor upper link (central connector) to the plough upper attachment point and secure with linchpin,
- in tractors equipped with lower linkage with tensioner, lateral plough movements must be eliminated by appropriate adjustment of the lower link stabilisers; it is

recommended that both the lower links of the three-point linkage are set at the same height,

- Lift plough using tractor three point linkage.
- raise the parking stand.



DANGER

To mount machine on tractor (carrying vehicle) use only genuine pins and safeguard lynchpins.

4.3.2 HITCHING TO FRONT LOADER

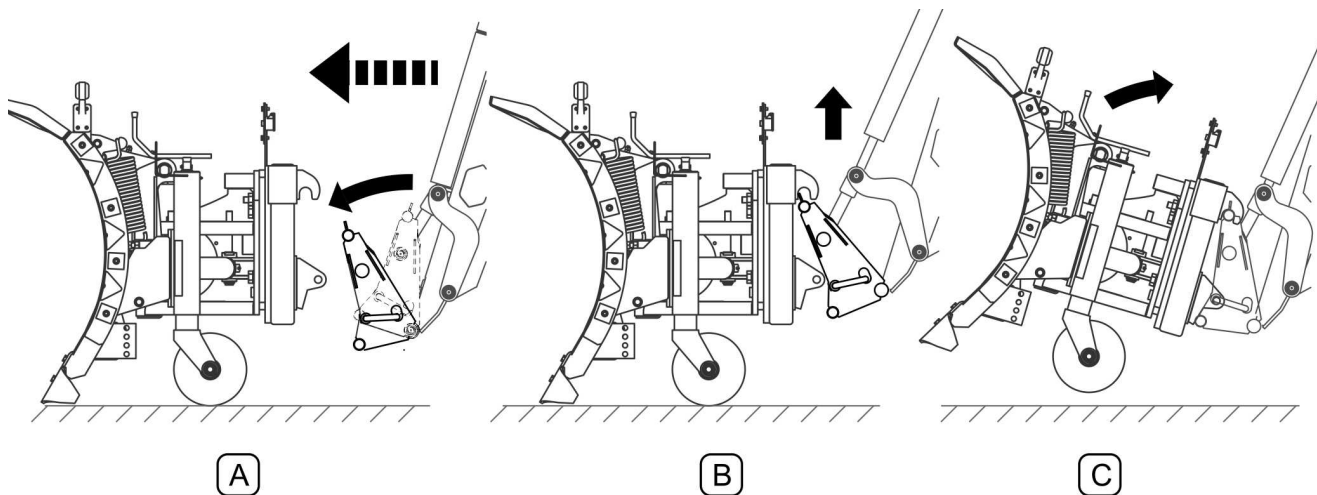


FIGURE 4.3 Hitching to front loader

(A), (B),(C)- next stages of connecting



IMPORTANT!

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

In order to hitch plough to front loader (FIGURE 4.3):

- 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 4.4)

The described method of connecting is indicative and may vary depending on the loader model. A detailed method of connecting attachments is provided in front loader operator's manual.

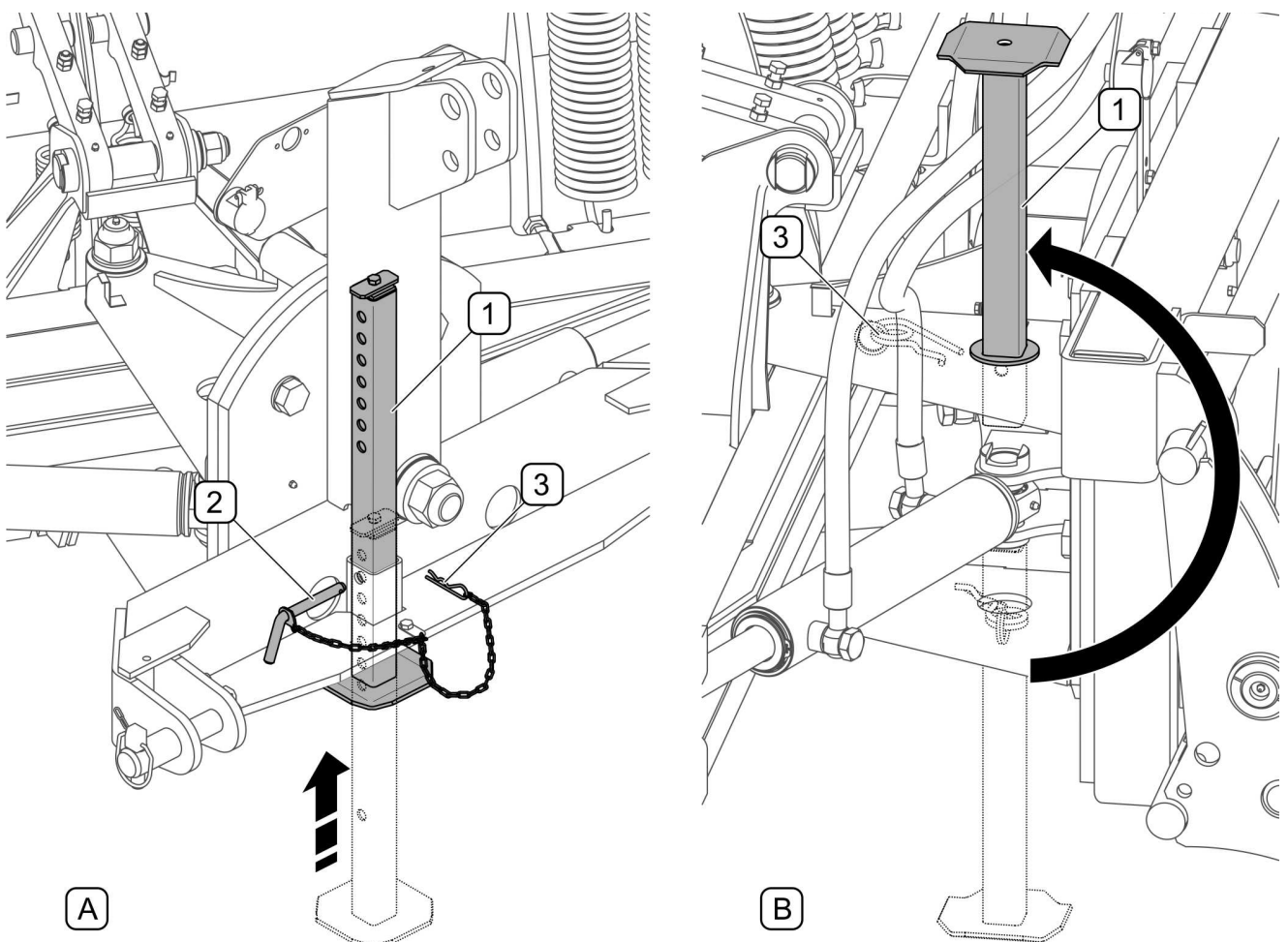


FIGURE 4.4 Raising parking stand.

(A) - linkage cat. II-III (pivot), (B) - swing linkage; (1) - support; (2) - pin; (3) - locking linchpin

In ploughs with (pivot) three-point linkage cat. II-III (A) after mounting the plough on the carrying vehicle insert parking stand (1) in the guide upwards (FIGURE 4.4) and secure its position using a pin (2) and secure with spring linchpin (3).

In ploughs with swing linkage (e.g. three-point linkage cat. II, for ŁC-1650 loader, EURO-SMS) after linking to the carrying vehicle, remove the support inserted into the lower opening of cylinder frame, reverse it to put in the upper frame opening (FIGURE 4.4) and secure with linchpin (3)

4.4 CONNECTING HYDRAULIC AND ELECTRICAL SYSTEM

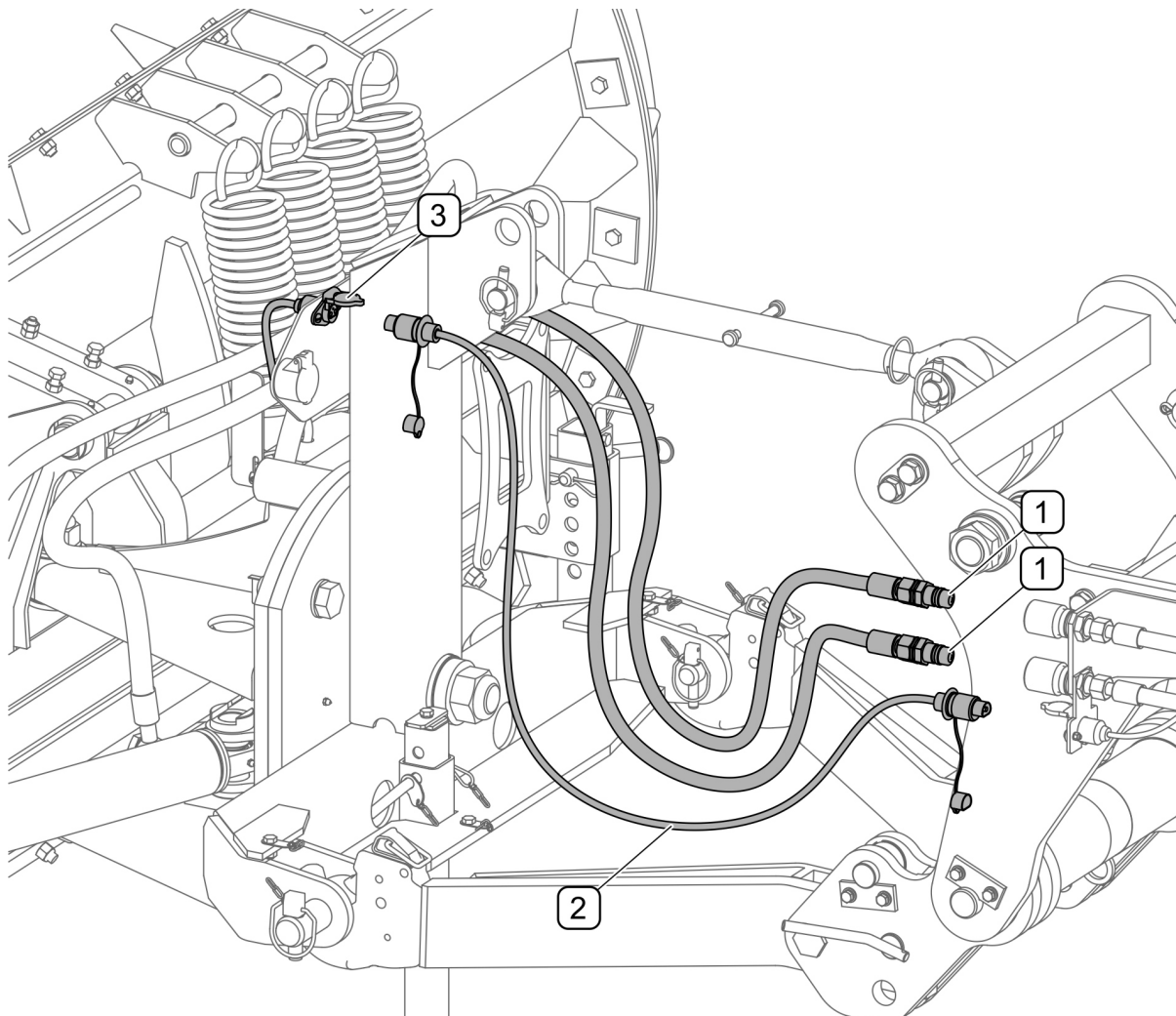


FIGURE 4.5 Connecting hydraulic and electrical system to tractor

(1) - hydraulic conduit plugs, (2) - electrical wire connection, (3) - 3 pin socket;



DANGER

Prior to connecting individual system conduits the user must carefully read the tractor (carrying vehicle) operator's manual and observe all Manufacturer's recommendations.

Connect plough control hydraulic conduit connectors (1) to the tractor single section external hydraulic outlets (FIGURE 4.5). Clearance lamps socket (3) must be connected with a cable (2) to 3 pin socket on the tractor. Arrange electrical wires so as to prevent their damage during operation.

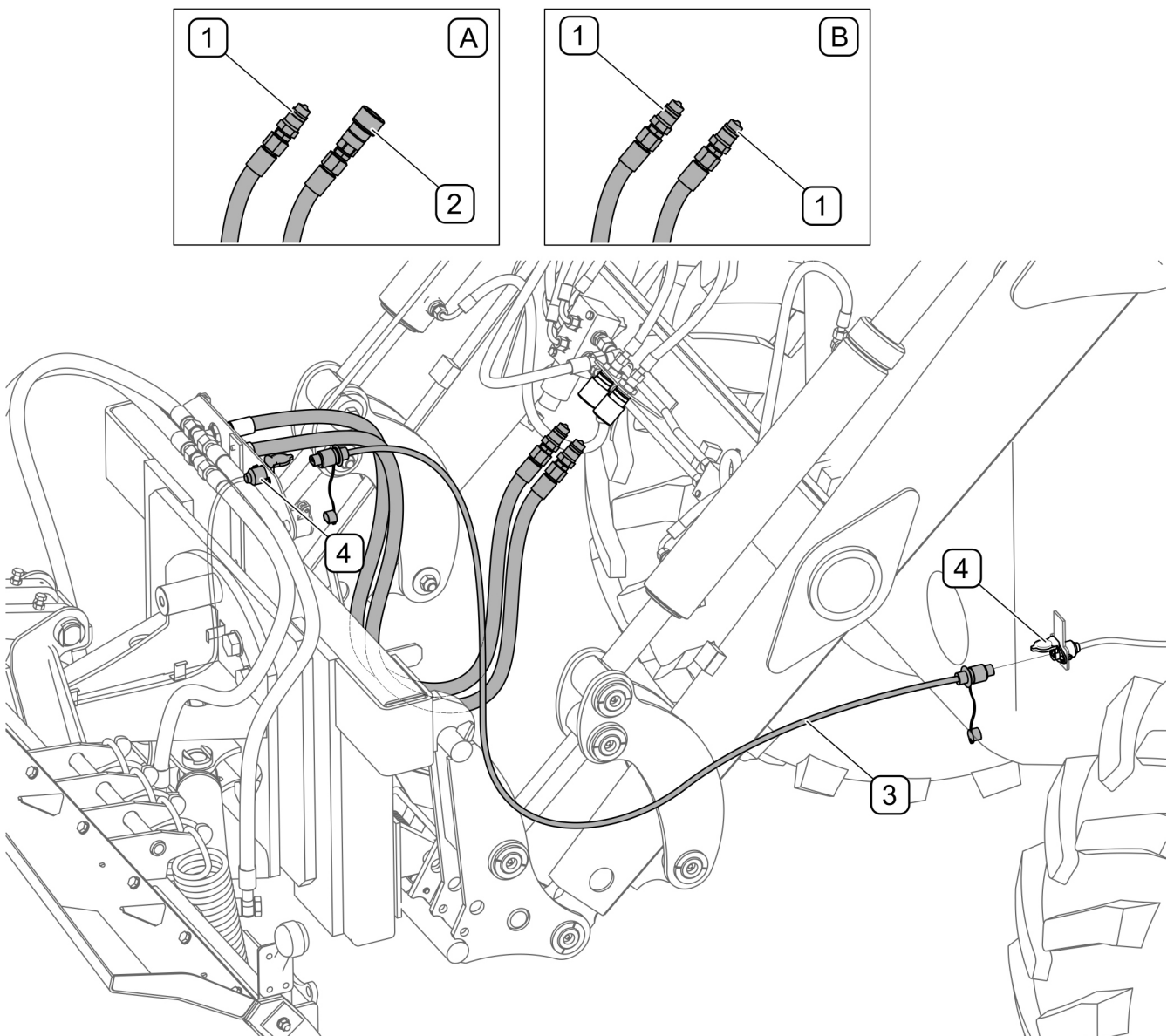


FIGURE 4.6 Connecting hydraulic and electrical system to loader

(A) - hydraulic system for the EURO loaders (B) - hydraulic system for the LC-1650 loader,
 (1) - hydraulic connector (plug), (2) - hydraulic connector (socket), (3) - electrical wire connection;
 (4) - 3 pin socket;

**DANGER**

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

Connect plough control hydraulic conduit connectors (1), (2) (FIGURE 4.6) to the loader external hydraulic outlets. Plough compatible with ŁC-1650 front loader has two hydraulic plugs (1) while the plough compatible with the EURO mount loaders has a plug (1) and socket (2). Clearance lamps plug (3) must be connected to 3-pin sockets (4) of the plough and tractor. Arrange electrical wires and hydraulic conduits so as to prevent their damage during operation.

**ATTENTION!**

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

**ATTENTION!**

When lifting the plough linked to front loader pay attention to the electric cord connected to the tractor, which can be damaged by lifting the boom too high.

4.5 PLOUGH OPERATION

4.5.1 POSITIONING PLOUGH BODY

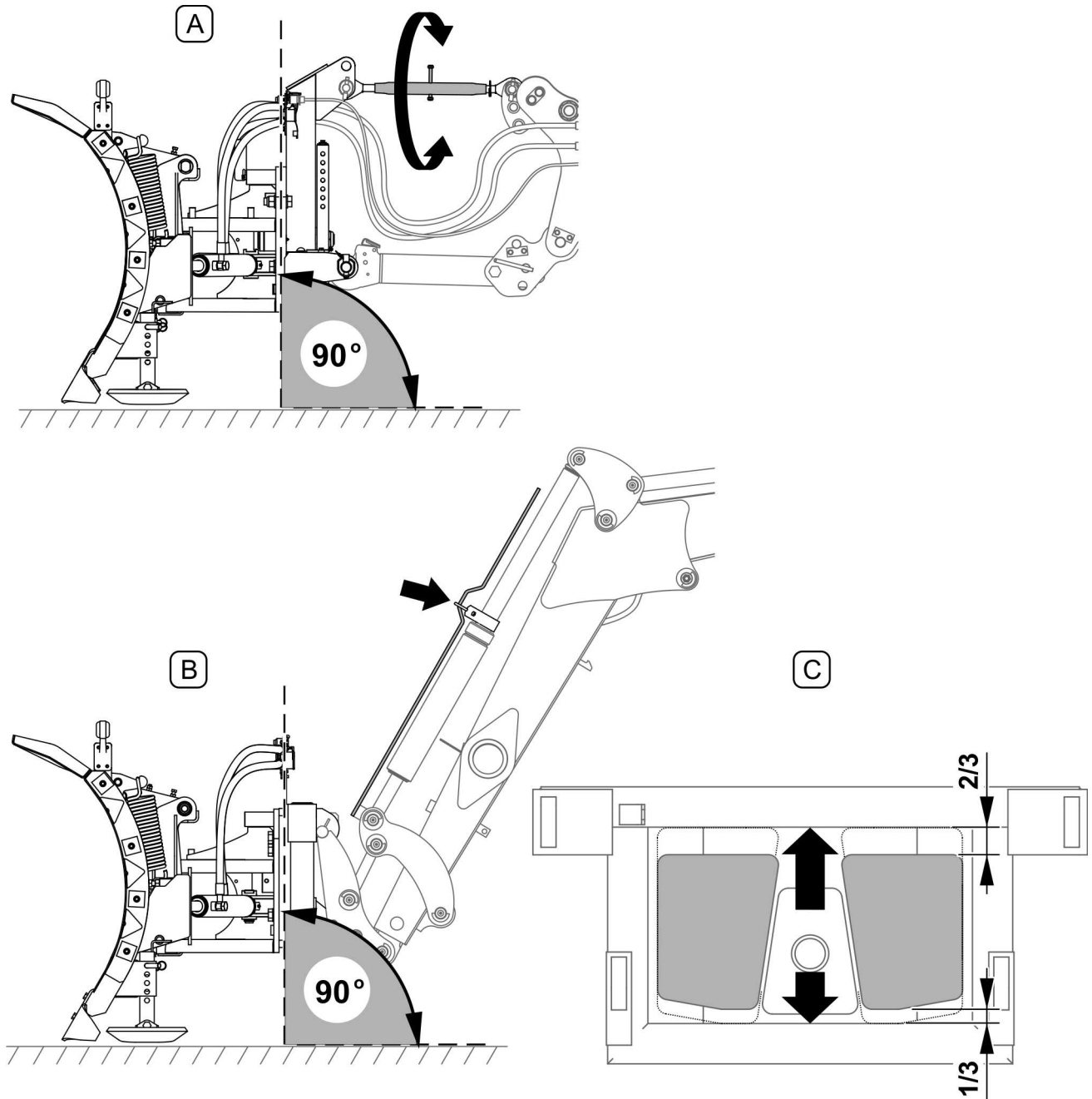


FIGURE 4.7 Positioning plough body

(A) - carrying vehicles with three-point linkage, (B) - front loaders (eg LC-1650), (C) - setting the ground tracking range in swing linkage.

For optimum operation, set the plough body (FIGURE 4.7) at an angle of 90° to ground surface. In carrying vehicles with three-point linkage this is done by controlling the central link, while in front loaders (B) by positioning a mounting frame (e.g., using implement position

indicator, if any). Plough with the swing linkage (eg three-point linkage cat. II, EURO-SMS mount, for EURO, LC-1650 loaders) must be set so that when plough rests on the ground the range of 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, C). When working with the swing linkage plough, make sure that carrying vehicle (tractor three-point linkage or loader boom) linkage is fixed - do not work in a floating position. Boom must not exert load on the plough during work.

4.5.2 UNLOCK THE TRANSPORT POSITION

PU-2600/PU-3300 ploughs with three-point linkage (pivot) cat. II and III have a transport position lock to prevent the plough from tilting on the sides.

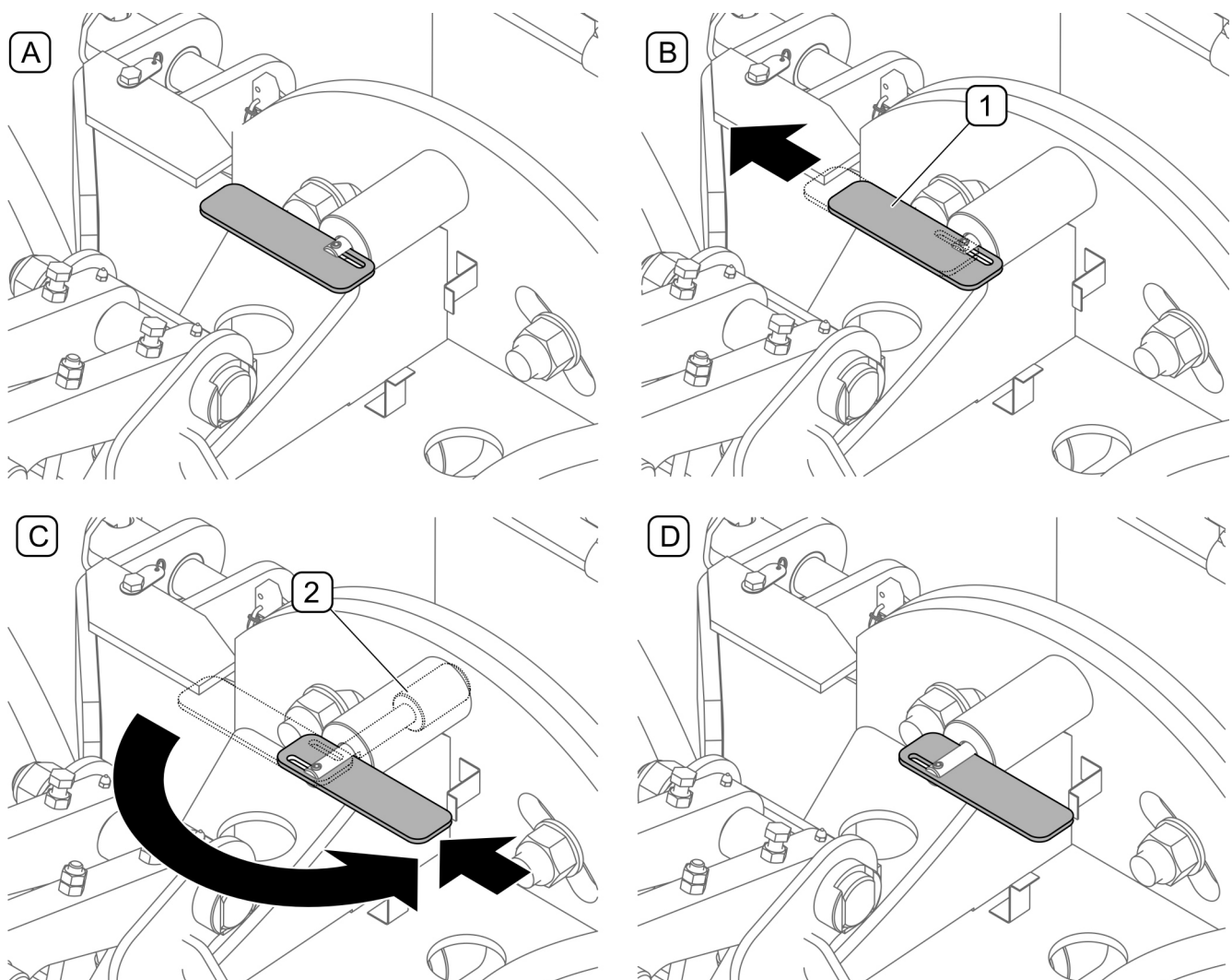


FIGURE 4.8 unlock the transport position

(1) - latch bracket, (2) - latch bolt, (A) - transport position (latch locked) (B), (C) - the next steps, (D) - working position (latch unlocked)

To remove the lock:

- Move the latch bracket (1) in the extreme outer position of the oblong hole (FIGURE 4.8, B)
- Turn bracket by 180°, latch bolt (2) will be ejected from the lock (FIGURE 4.8, C)
- Move the lock handle (2) in the extreme inner position of the inner oblong hole to lock the latch in the open position.

4.5.3 ADJUSTING PLOUGH WORKING POSITIONS

PU-2600/PU-3300 plough has the ability to set two fixed working positions and intermediate positions. In order to change the plough working position use a manifold lever that controls a relevant section of tractor external hydraulics. For a plough attached to the front loader, change in the operating position is done using the implement hydraulics control lever.



DANGER

The plough is controlled from the operator cab.

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

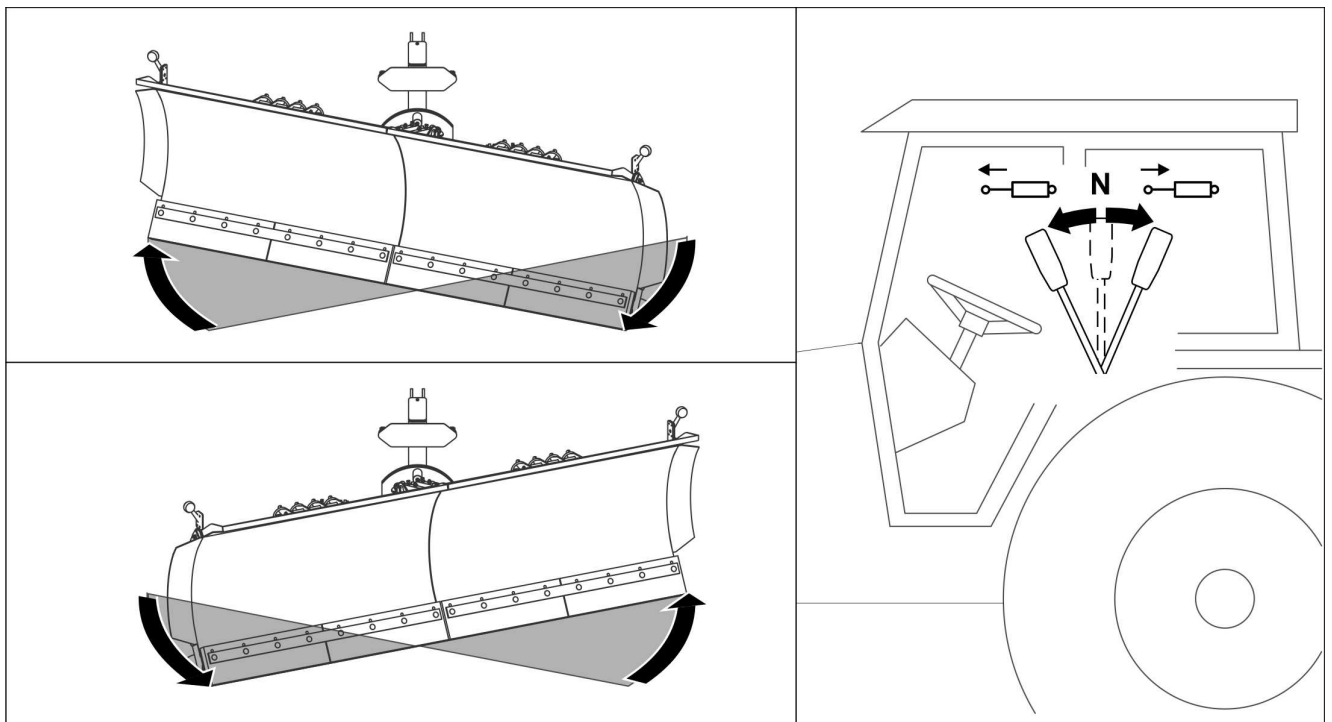



FIGURE 4.9 Setting working position




IMPORTANT!

It is not recommended to operate the machine in heavy duty condition with a speed of more than 6 km/h.

Plough working speed depends on the quantity and quality of collected material but also on the type of terrain. It is not recommended to operate a snowplough attached to front loader in difficult conditions.

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

4.5.4 SETTING WORKING HEIGHT



DANGER

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

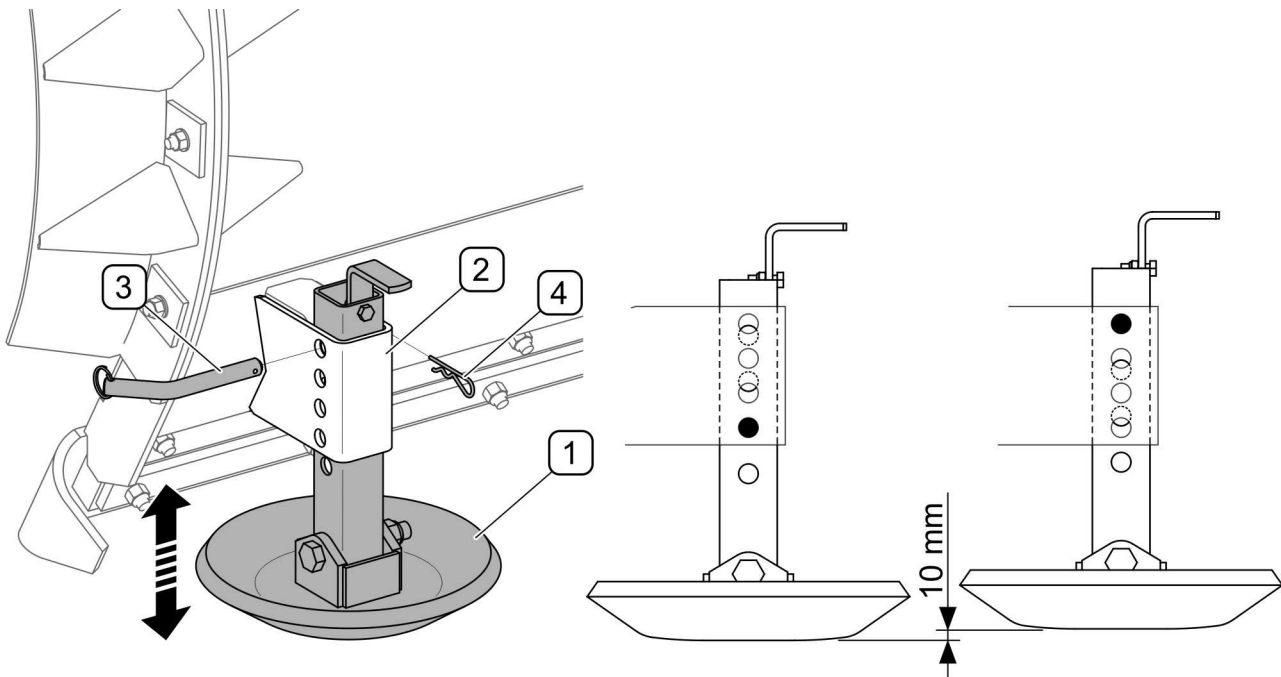


FIGURE 4.10 Height adjustment in ploughs equipped with slides.

(1) - slide, (2) - slide guide (3) - pin, (4) - locking linchpin

In ploughs PU-2600/PU-3300 equipped with slides (FIGURE 4.10) height adjustment is performed by unlocking pin (3) and the ejection or withdrawal of the slide (1) in the guide (2). Location of the slide in the guide can be changed with 10 mm increments by inserting the securing pin in the suitable hole of the guide. When the height is set, slides must be protected with a pin (3) and spring linchpin (4). Slides of the left and right blade should be put forward at the same height. The recommended distance of the collecting strips from the swept area is 5 to 10 mm. Adjustment of the left and right slide is carried out in the same way.

In ploughs equipped with wheels, height adjustment is performed by withdrawal or insertion of wheel (1) in the body (2) by turning the knob (3). The knob is protected by a lock (4). After setting wheel height appropriately set knob (3) and secure with lock (4). It is recommended that both wheels are set at the same height.

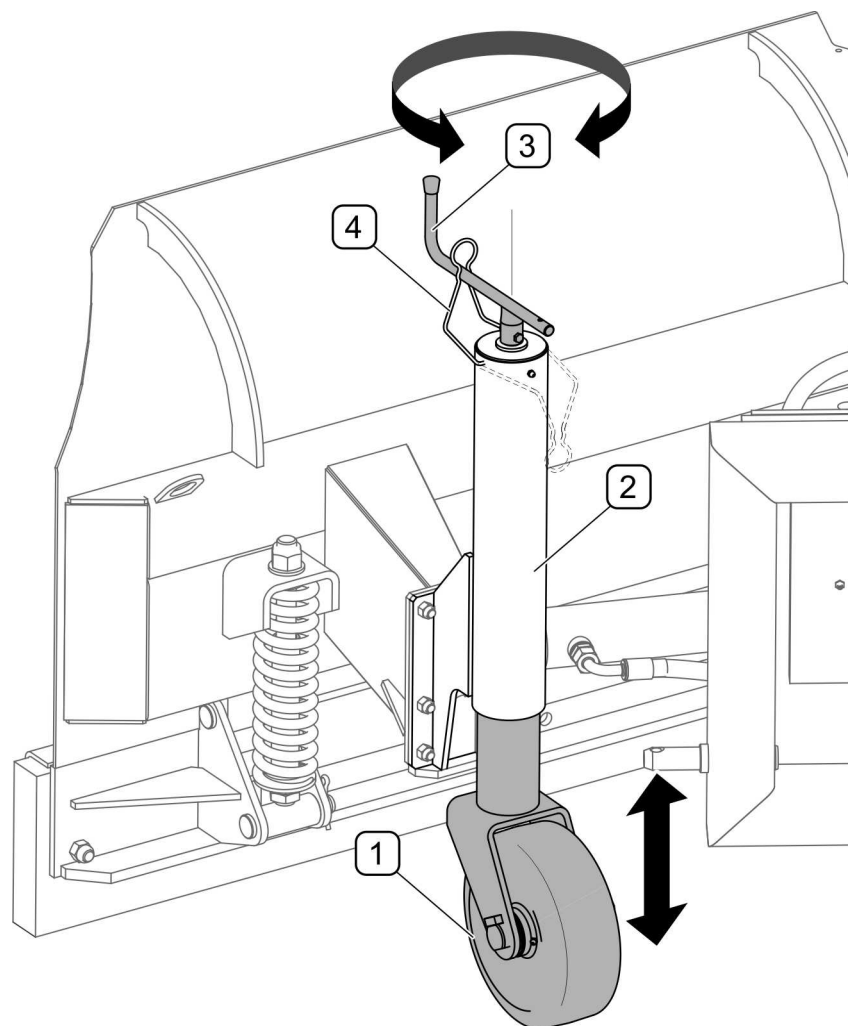


FIGURE 4.11 Height adjustment in ploughs equipped with wheels.

(1) - wheel; (2) - body; (3) - knob; (4) - knob lock

4.6 DRIVING ON PUBLIC ROADS

When driving on public roads, respect the road traffic regulations, exercise caution and prudence. If the clearing with plough 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 plough is correctly attached to the tractor (carrying vehicle), and linkage is properly secured.
- Permissible design speed and maximum speed allowed by road traffic law must not be exceeded. Speed of travel should be adjusted to prevailing road conditions and other conditions.
- While driving on public roads turn on clearance lamps.
- While working a plough turn the orange beacon light in tractor.
- If plough obscures carrying vehicle lights during work or transport, carrying vehicle must be fitted with extra headlights.
- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the trailer 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 carrying vehicle.
- When driving with raised plough set it so as not to obscure the lights or restrict the visibility of the operator.
- When driving with raised implement, secure the tractor (carrying vehicle) linkage against falling or accidental dropping.

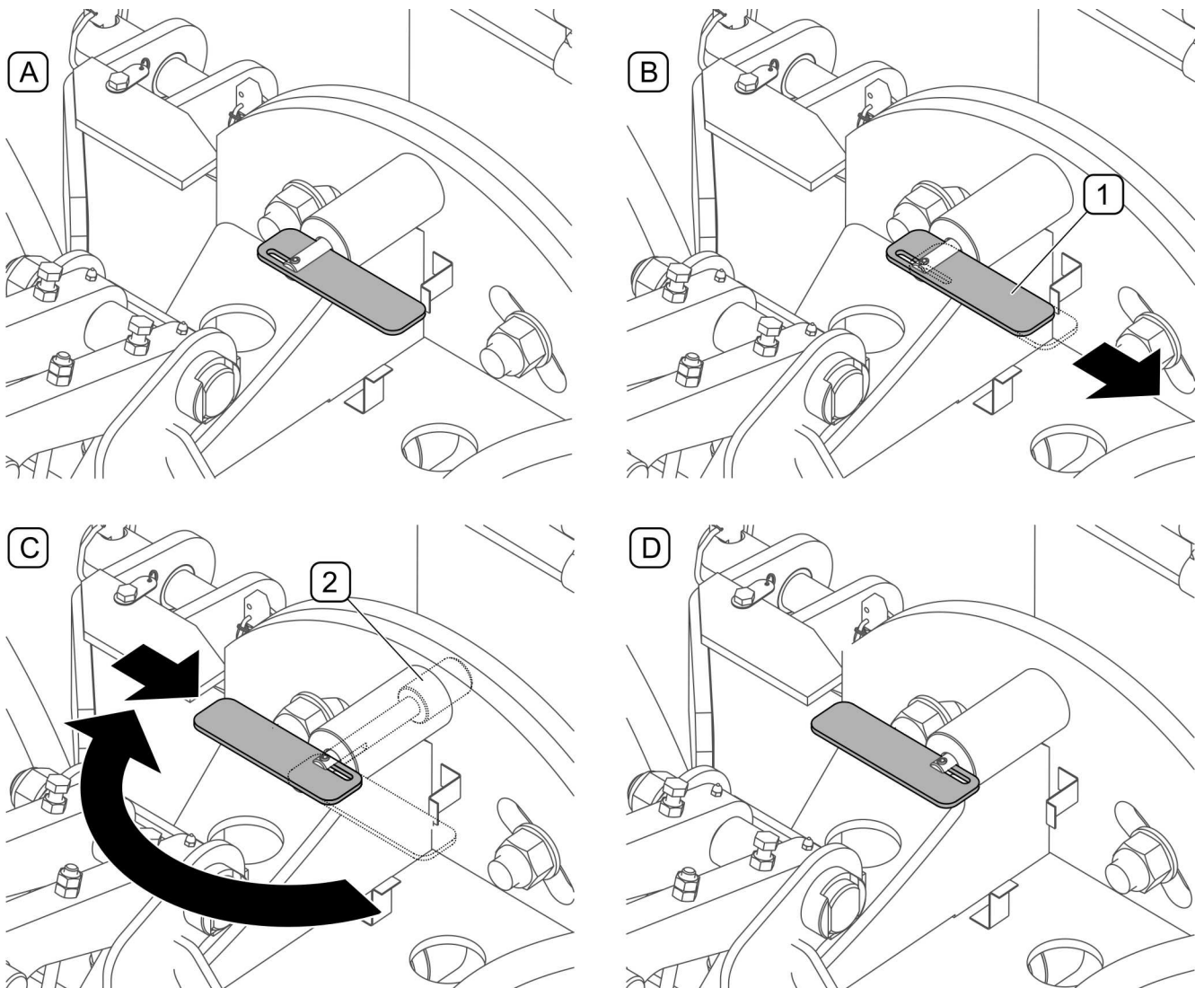


FIGURE 4.12 Lock the transport position

(1) - latch bracket; (2) - latch bolt; (A) - working position (latch unlocked); (B), (C) - the next steps, (D) - transport position (latch locked);

In ploughs with (pivot) three-point linkage cat. II-III, lock linkage (FIGURE 4.12) when transporting a raised plough to prevent it tilting to the sides. In order to do this:

- Move the latch bracket (1) in the extreme outer position of the oblong hole (FIGURE 4.12, B)
- Turn bracket by 180°, latch bolt (2) will be inserted in the lock (FIGURE 4.12, C)
- Move the lock handle (2) in the extreme inner position of the inner oblong hole to lock the latch in the closed position.

4.7 DISCONNECTING THE PLOUGH

In ploughs with (*pivot*) three-point linkage cat. II-III before disconnecting from the carrying vehicle it is advisable to lock the linkage system in the transport position (FIGURE 4.12)

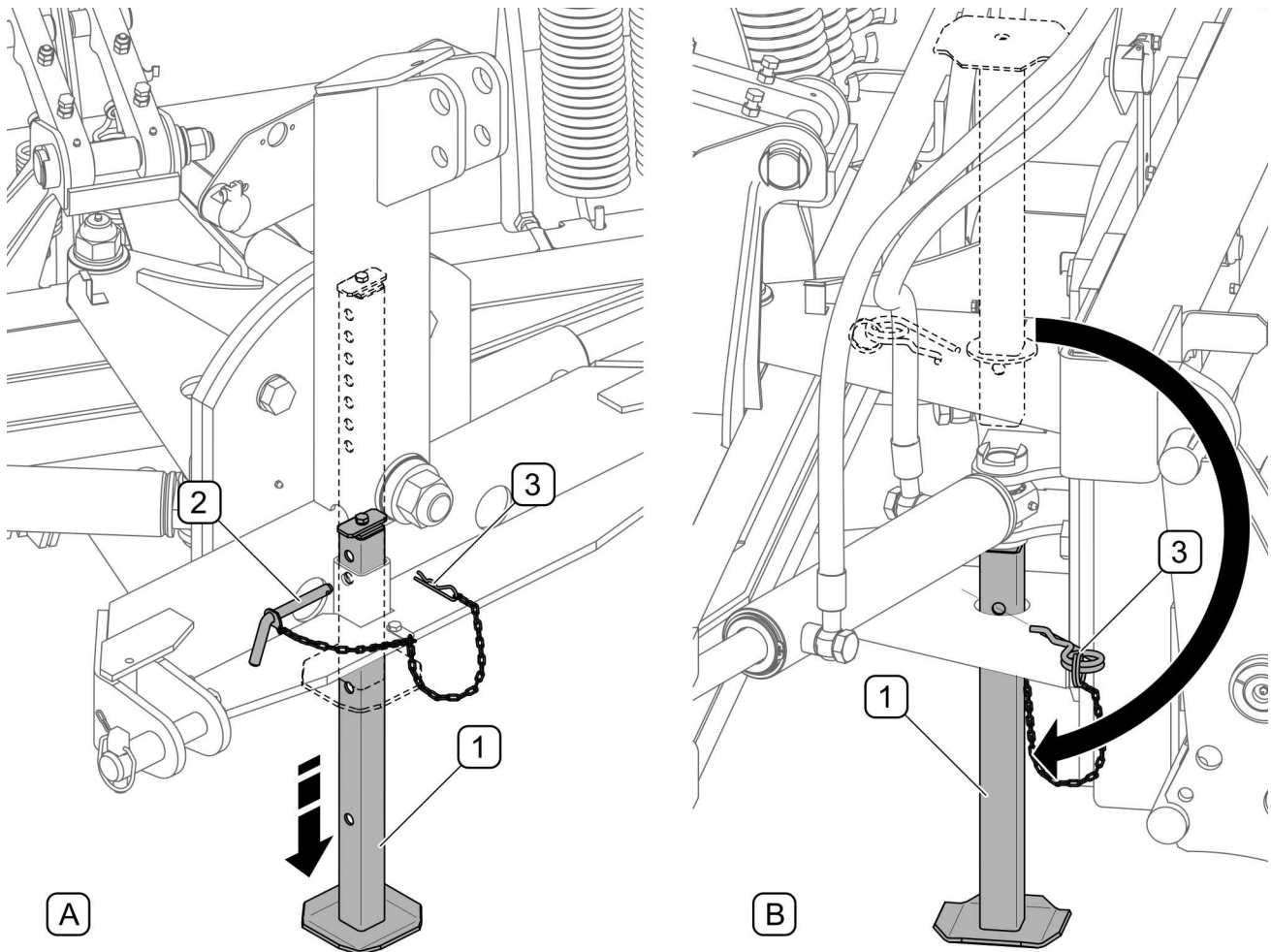


FIGURE 4.13 Lower parking stand

(A)- linkage cat. II-III (*pivot*), (B) - swing linkage; (1)- parking stand; (2)- pin; (3)- locking linchpin



DANGER

Reduce pressure prior to disconnecting the hydraulic system.

In order to disconnect the plough from the carrying vehicle, proceed as follows:

- in a pivot linkage system (FIGURE 4.13 A) remove the cotter pin (3) and pin (2), lower parking stand (1), set at the correct height, insert the pin (2) and lock with a linchpin (3),
- in a swing linkage system (FIGURE 4.13, B) parking stand (1) inserted in the upper opening of the cylinder frame should be removed, reversed, and inserted in the lower opening of the frame and secured with linchpin (3),
- lower the plough 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 hydraulic conduit plugs and clearance lamps power lead,
- Protect hydraulic system plugs (1) against soiling by inserting them into sockets (2), secure clearance lamps electrical cable plug (3) with a stopper (FIGURE 4.14).
- Disconnect the plough from the tractor (carrying vehicle) linkage.

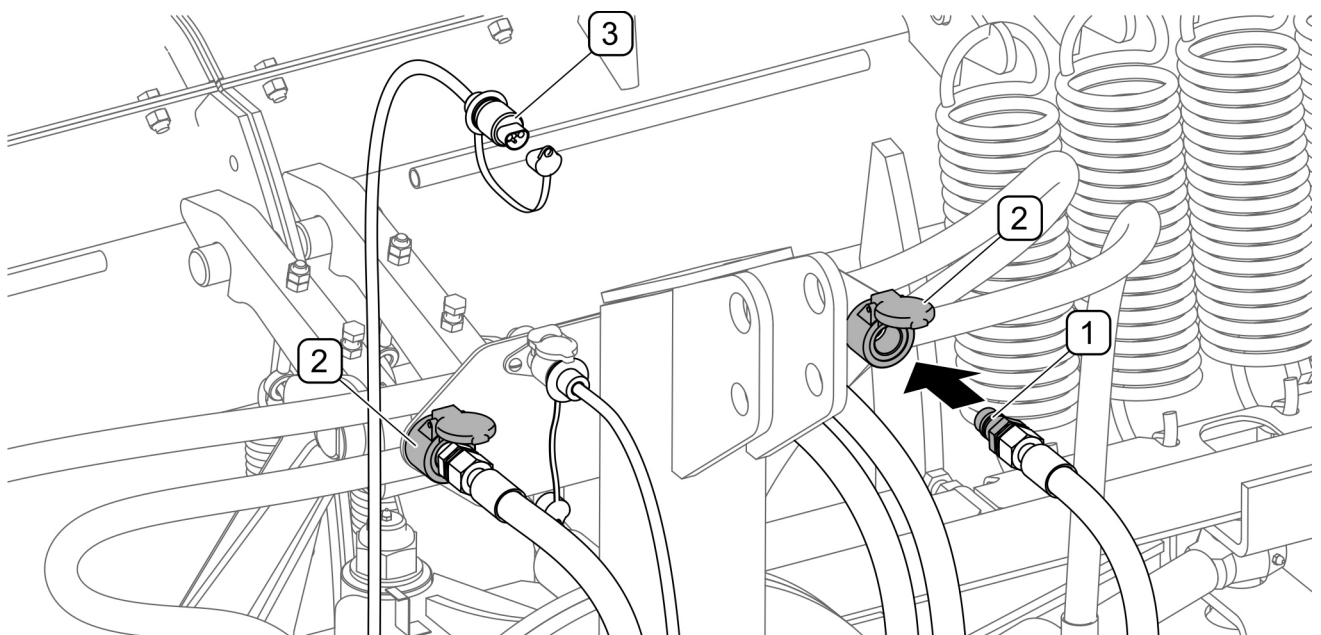


FIGURE 4.14 Protecting hydraulic and electrical system plugs.

(1) - hydraulic plugs, (2) - protecting sockets, (2) - electrical system plug

SECTION

5

MAINTENANCE

5.1 ADJUST OVERLOAD SAFETY DEVICE

If latches (1) of the overload safety device (FIGURE 5.1) disengage too often, using tensioners (3) increase spring (2) tension. In the case of a reverse situation - reduce the springs tension. Spring tension adjustment is carried out separately for each latch.

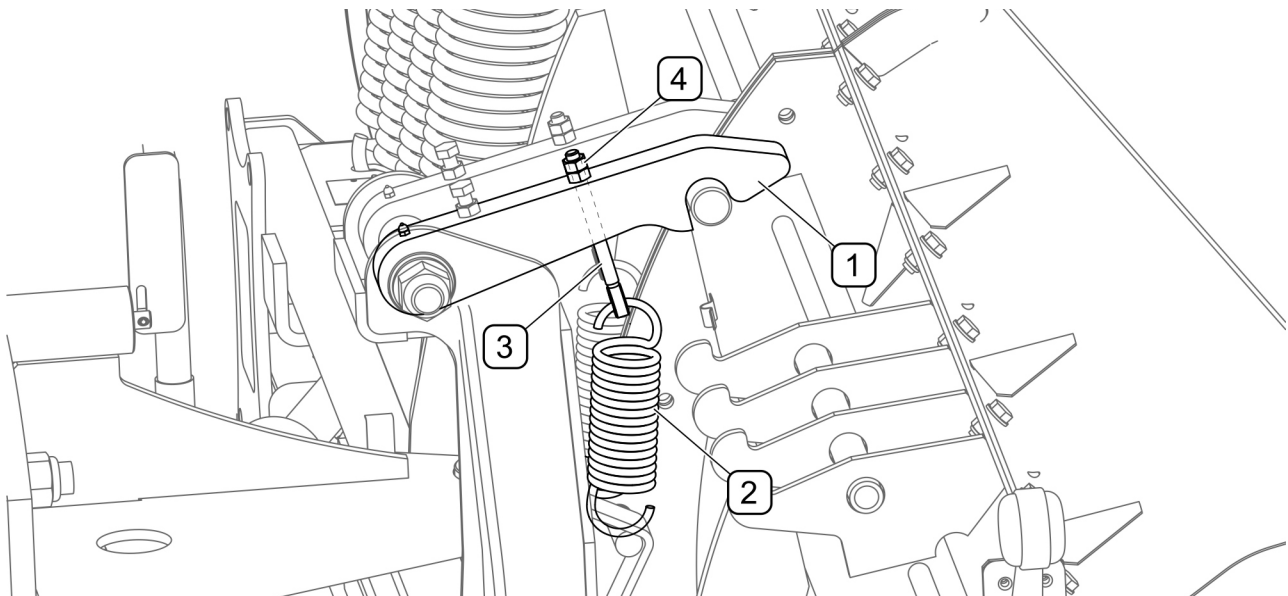


FIGURE 5.1 Latch spring tension adjustment

(1) - latch, (2) - latch spring, (3) - spring tensioner, (4) - counter nut;



ATTENTION!

Incorrect latch spring (2) tension latches can cause damage to the plough or carrying vehicle (FIGURE 5.1)

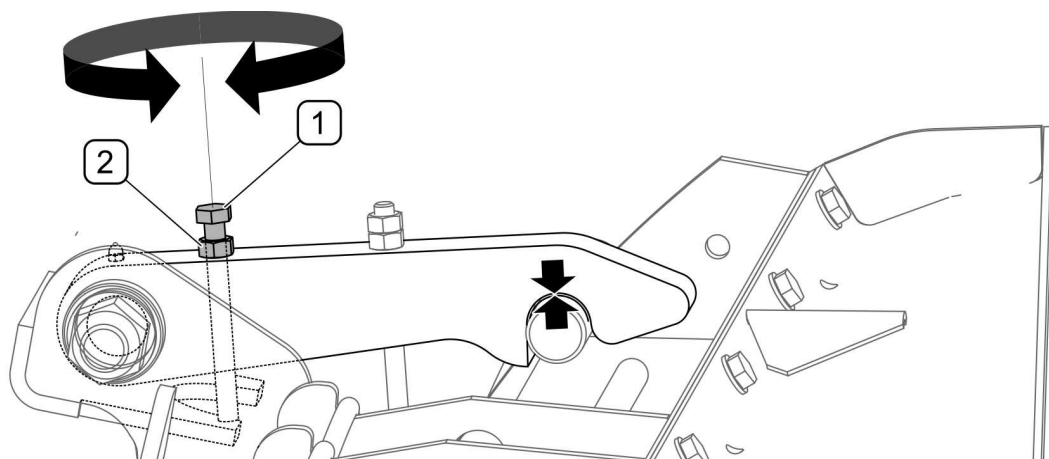


FIGURE 5.2 Adjust latch limiters

(1) - limiter bolt, (2) - counter nut;

To ensure proper locking of latches on the mouldboard pins limiter bolt height has to be adjusted. Latch limiter adjustment (FIGURE 5.2) involves setting its height relative to the mouldboard pins.

To adjust latch limiters (FIGURE 5.2):

- Loosen lock nut (2) locking the bolt (1),
- by turning the bolt (1) clockwise or counter-clockwise adjust the latch so that it touches mouldboard pin but is not supported on it.
- lock the limiter (1) with a counter nut (2).

Proceed the same way with the other latch.

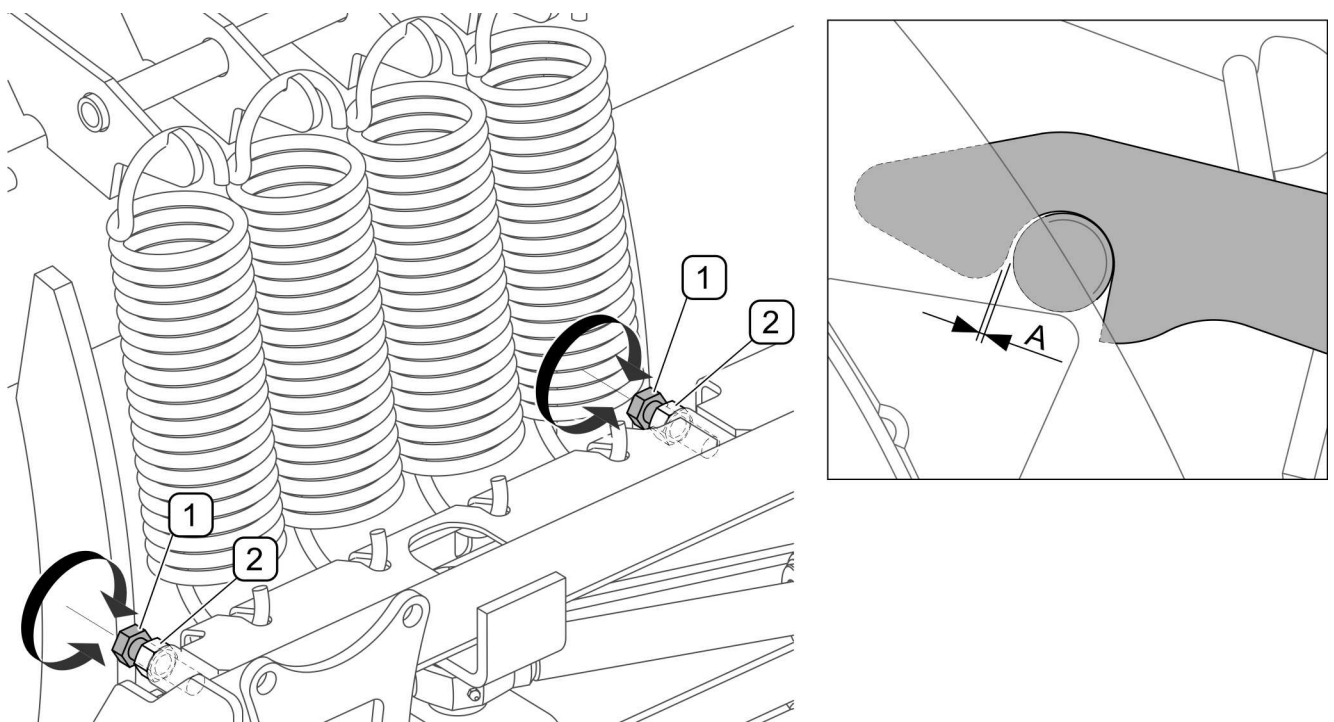


FIGURE 5.3 Adjust mouldboard pin clearance


(1) - limiter bolt, (2) - counter nut; (A) - a minimum clearance of 0.5 mm

Adjusting mouldboard pin clearance in latches (FIGURE 5.3) is intended to prevent latches from being knocked out. To adjust the mouldboard pin clearance:

- unscrew the counter nuts (2),
- by turning limiter bolts (1) clockwise or anticlockwise adjust clearance to the required value (A),
- tighten the counter nuts (2),


Proceed the same way with the other mouldboard pin.

5.2 CHECKING AND REPLACEMENT OF COLLECTING STRIPS



DANGER

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



DANGER

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

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, protect it from falling and immobilise the tractor (turn off the engine and engage the parking brake.)

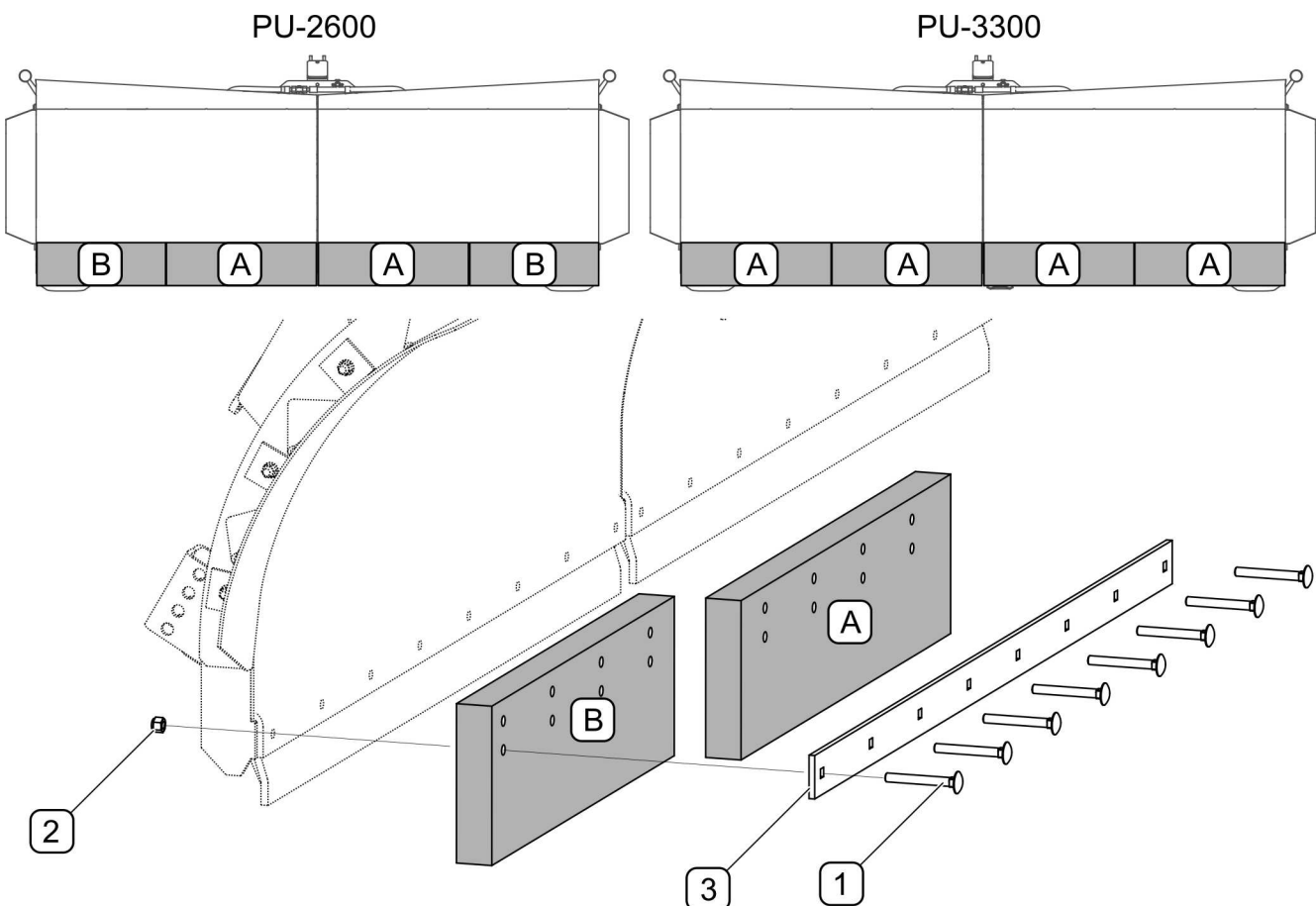


FIGURE 5.4 Replacing rubber collecting strip

(A), (B)- rubber collecting strip segment; (1)- bolts; (2)- nuts; (3)- clamping strip;

Rubber collecting strip (FIGURE 5.4) consists of two segments (A, B). To remove the segments of the strip, unscrew the nuts (2), remove bolts (1) and remove the clamp strip (3).

The rubber collecting strips have two rows of horizontal mounting holes. Brand new collecting strips are mounted on the lower holes and when strip wears down it can be mounted on the upper holes to lower the strip by 40 mm. Excessively worn or damaged collecting strips must be replaced.

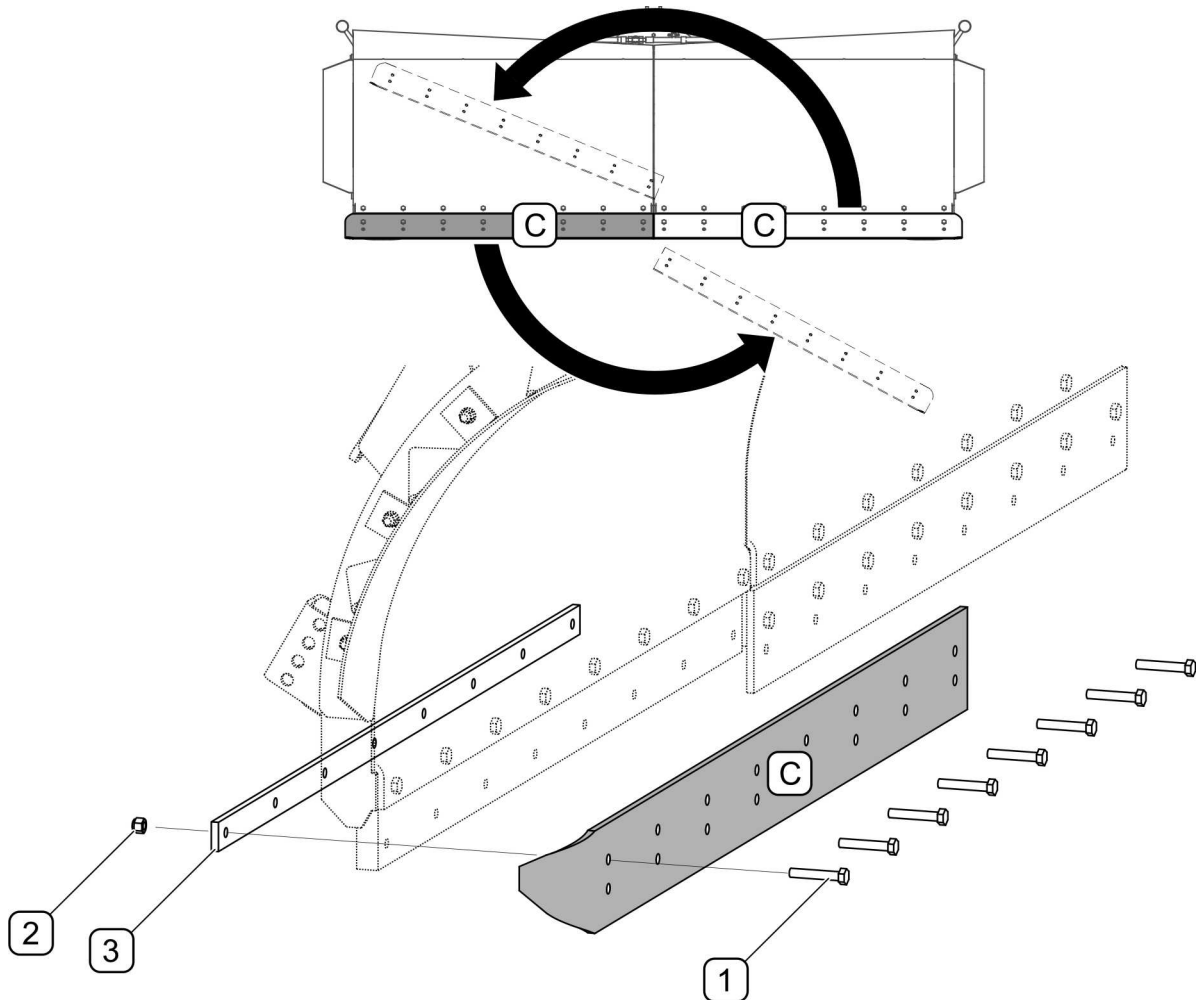


FIGURE 5.5 Replacing metal collecting strip

(C)- metal collecting strip; (1)- bolts; (2)- nuts; (3)- clamping strip;

To remove the metal collecting strips (FIGURE 5.5) undo the nuts (2), remove fixing bolts (1), remove clamping strip(3) and collecting strip (C). If the bottom of metal collecting strips is worn down, they can be reversed and swapped, ie. collecting strip of the right blade is swapped with the collecting strip of the left blade. When both collecting strips are worn or damaged, they must be replaced.

When collecting strips are replaced it is recommended that working height is checked and possibly adjusted (see 4.5.4 *SETTING WORKING HEIGHT*)

TABLE 5.1 The types of collecting strips in PU-2600 ploughs

Marking FIGURE 5.4	Name / Catalogue No.	Number of items	
		Blade right	Blade left
Rubber collecting strip			
A	Rubber / 79RPN-17.00.00.01	1	1
B	Rubber / 79RPN-17.00.00.01-01	1	1
Metal collecting strip			
C	Collecting strip / 79RPN-21.00.00.02-01	1	1

TABLE 5.2 THE TYPES OF COLLECTING STRIPS IN PU-3300 PLOUGHS

Marking FIGURE 5.4	Name / Catalogue No.	Number of items	
		Blade right	Blade left
Rubber collecting strip			
A	Rubber / 79RPN-17.00.00.01	2	2
Metal collecting strip			
C	Collecting strip / 79RPN-21.00.00.02	1	1



ATTENTION!

Each time snowplough hits an obstacle technical condition of collecting strips and their mounting should be carried out.

5.3 SLIDE REPLACEMENT

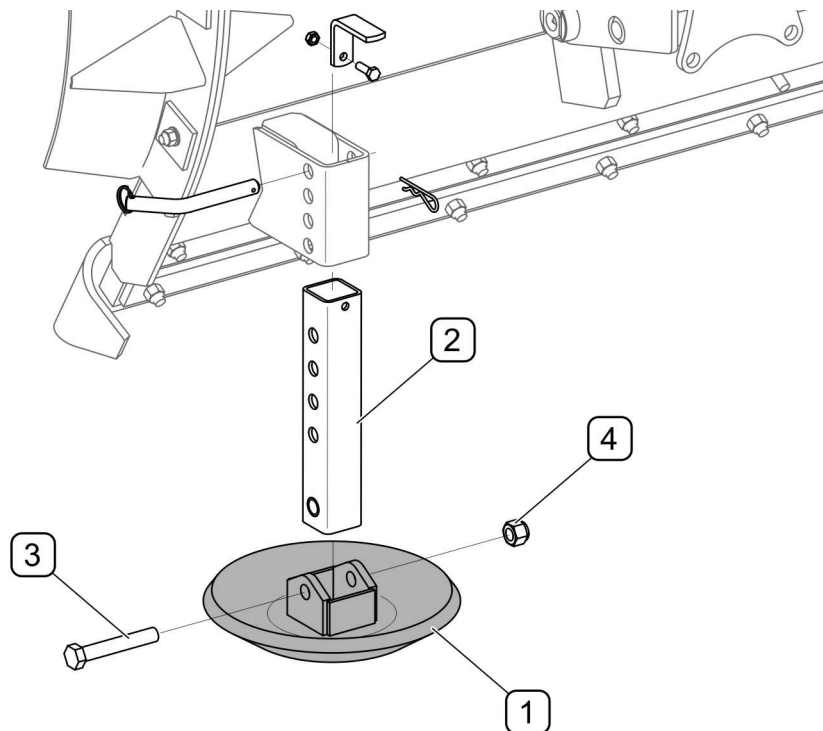


FIGURE 5.6 Slide replacement

(1)-slide; (2)- slider; (3)- bolt; (4)- nut;

Excessively worn or damaged slides must be replaced (FIGURE 5.6). 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 front three-point linkage, protect it from falling and immobilise the tractor (turn off the engine and engage the parking brake.) Undo the nut (4), remove fixing bolt (3) of the slide (1) with slider (2). Check the slide and other elements for damage or excessive wear. The list of slide working components including catalogue numbers is shown in TABLE 5.3

TABLE 5.3 A LIST OF SLIDE COMPONENTS

Marking FIGURE 5.6	Name / Catalogue No.	Number of items.
1	Slide / 126RPN-05.01.00.00	1
2	Slider / 79RPN-20.01.00.00	1
3	Bolt M16x100-8,8 PN-EN ISO 4014	1
4	Self locking nut M16 according to PN-EN 7040	1

5.4 HYDRAULIC SYSTEM OPERATION

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

- checking tightness of cylinders hydraulic connections,
- Checking technical condition of hydraulic connections 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.

In a new machine, the hydraulic system is filled with HL32 hydraulic oil. The oil applied because of its composition 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 5.4 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 ram cylinders are completely extended. In the event of confirmation of oil on hydraulic ram cylinder bodies ascertain origin of leak. Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of "droplets" stop using the machine until faults are remedied.



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



DANGER

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



DANGER

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

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.

5.5 ELECTRICAL SYSTEM OPERATION,

Electrical system maintenance involves periodic inspection of clearance lamps and their wiring. After connecting the wiring to the plough and tractor (carrying vehicle), check that lamps operate correctly. To replace bulb (3) in a clearance lamp (1), remove lamp cover (2) from flexible casing.

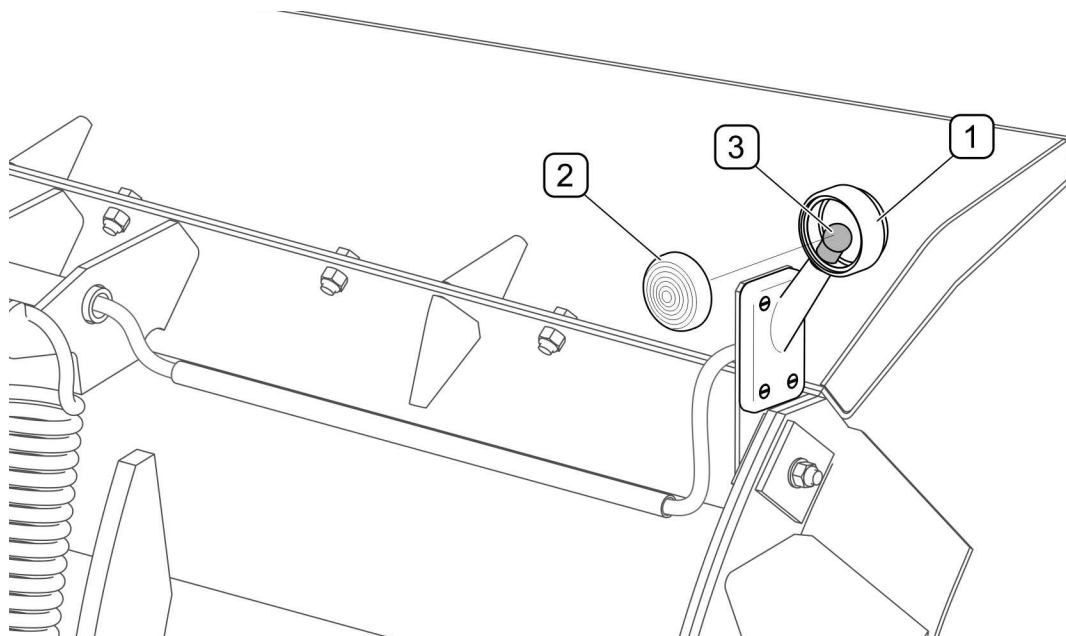


FIGURE 5.7 Change bulbs

(1) - clearance lamp; (2) - clearance lamp cover; (3) - bulb;

TABLE 5.5 A LIST OF CLEARANCE LAMP COMPONENTS

LAMP TYPE	BULB TYPE	NUMBER OF ITEMS.
Right clearance lamp 127,023 or 00	R5W, 12V	1
Left clearance lamp 127,022 or 00	R5W, 12V	1

**DANGER**

Do not independently repair electrical system, except items described in chapter ELECTRICAL SYSTEM MAINTENANCE. All electrical system repairs must be performed only by suitably qualified personnel.

5.6 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 permanent grease is recommended for lubrication.

**DANGER**

Lubrication may only be performed when plough is lowered, and resting on the ground. Before commencing lubrication switch off engine, remove key from ignition and engage tractor parking brake.



When using the mower 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.

TABLE 5.6 LUBRICATION POINTS AND LUBRICATION FREQUENCY

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
A	Mouldboard pins	4	permanent grease	50 hours
B	Frame pin	2		50 hours
C	Latches	2		50 hours
D	Wheel column bolt *	2		50 hours
E	Wheel bearing *	2		10 hours
F	Pivot three-point linkage frame axis *	1		20 hours
G	Cylinder ram eye	2		50 hours
H	Hydraulic cylinder eye	2		50 hours
I	Pivot three-point linkage front plate *	2		20 hours
J	Swing linkage skid plate *	2		20 hours

* – if applicable

Marking description in Item column (TABLE 5.6) conforms with numbering shown (FIGURE 5.8)

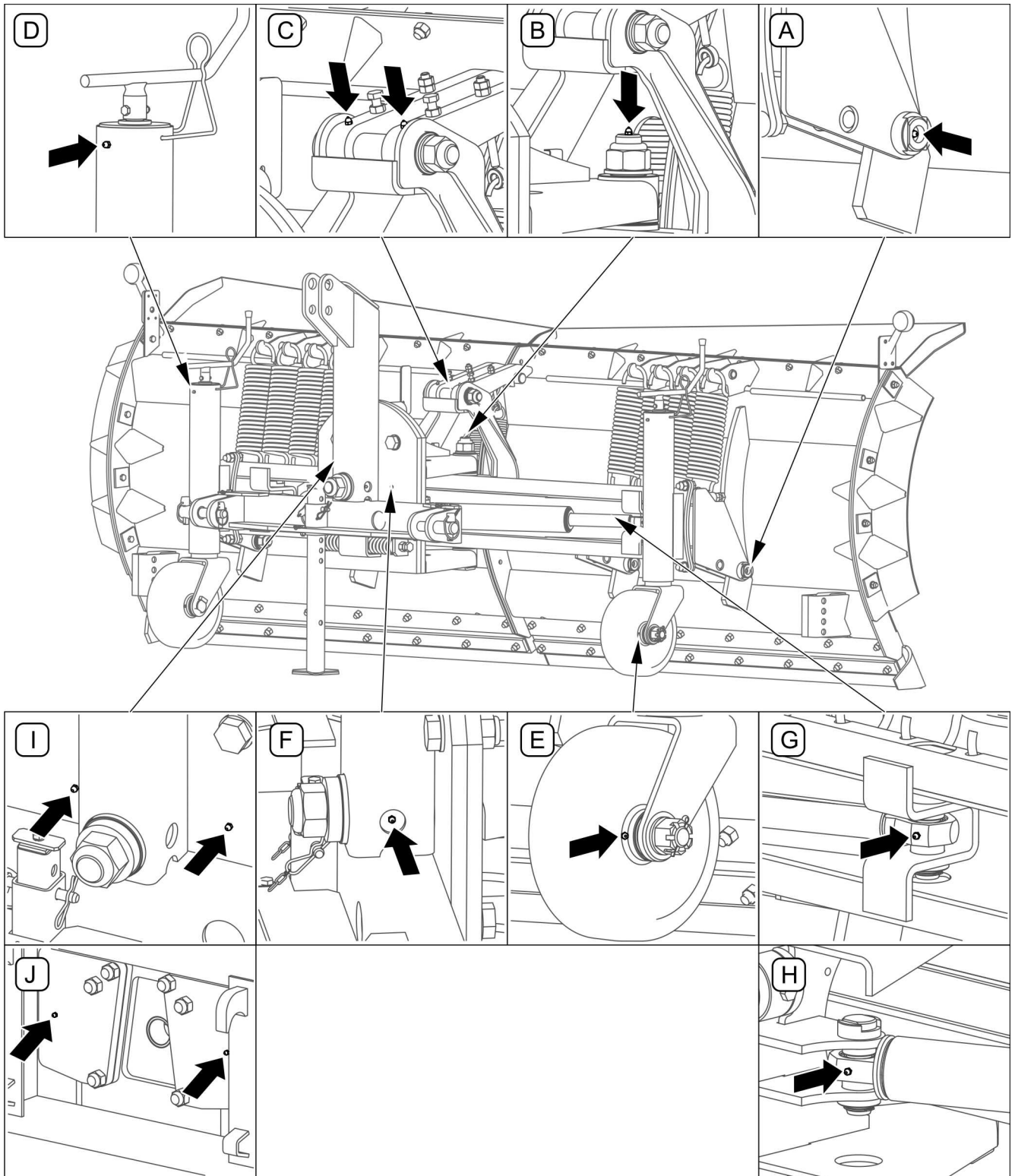


FIGURE 5.8 Lubrication points

Lubrication points described in table 5.6

5.7 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.

Protect hydraulic connectors against soiling (see FIGURE 4.14). Connect clearance lamps wiring to plough and protect against weathering.

5.8 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 torque values apply to non-greased steel bolts (TABLE 5.7).



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 5.7 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

5.9 TROUBLESHOOTING

TABLE 5.8 TROUBLESHOOTING

TYPE OF FAULT	CAUSE	REMEDY
Plough working position cannot be adjusted	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
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
	Transport position lock is engaged	Disengage the lock (see FIGURE 4.8)
Clearance lamps do not work	Electrical system not connected	Connect electrical system to tractor (carrying vehicle). Connect power to 3-pin socket in tractor (carrying vehicle)
	Blown light bulb in clearance lamp	Replace light bulbs
	Faulty electrical wiring in plough or tractor (carrying vehicle)	Repair at authorised service point
Mouldboards are frequently disengaged by the overload safety device.	Overload safety device latches are incorrectly set.	Check and adjust according to operator's manual
	Ploughing speed is too high relative to the amount of snow	Reduce ploughing speed accordingly

NOTES

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