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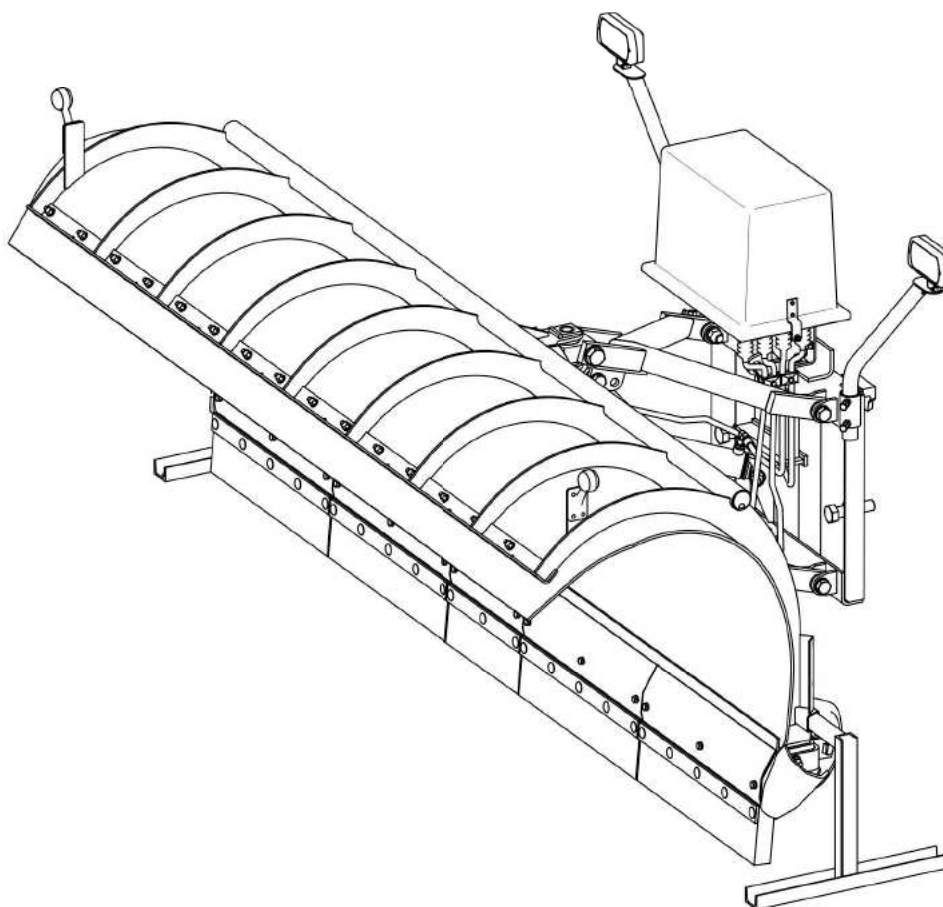
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OPERATOR'S MANUAL

SNOW PLOUGH

PRONAR PU-S25H / PU-S32H / PU-S35H

TRANSLATION OF THE ORIGINAL INSTRUCTIONS



ISSUE 1A-10-2010

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SNOW PLOUGH

PRONAR PU-S25H / PU-S32H / PU-S35H

MACHINE IDENTIFICATION

TYPE:

.....

SERIAL NUMBER:

[illegible]

INTRODUCTION

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

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

The manual describes the basic safety rules and operation of 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 machine was purchased or to the Manufacturer.

MANUFACTURER'S ADDRESS:

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SYMBOLS APPEARING IN THIS OPERATOR'S MANUAL

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



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

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



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

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



Additional tips and advice for machine operation are marked:



and also preceded by the word „**TIP**”.

DIRECTIONS USED IN THIS OPERATOR'S MANUAL

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

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

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EC DECLARATION OF CONFORMITY OF THE MACHINERY

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

Description and identification of the machinery			
Generic denomination and function:	Snow plough		
Type:	PU- S25H	PU- S32H	PU- S35H
Model:	—	—	—
Serial number:			
Commercial name:	Snow plough PRONAR PU- S25H Snow plough PRONAR PU- S32H Snow plough PRONAR PU- S35H		

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 -12- 16

Place and date

Z-CA DYREKTORA
d/s technicznych
członek zarządu
Roman Omelaniuk

Full name of the empowered person
position, signature

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SECTION

1

BASIC INFORMATION

1.1 IDENTIFICATION

 PRONAR Sp. z o.o. 17-210 Narew ul. Mickiewicza 101A		
Nazwa	A	
Typ	B	Nr seryjny C
Rok prod.	D	KJ F
Masa	E kg	
G		

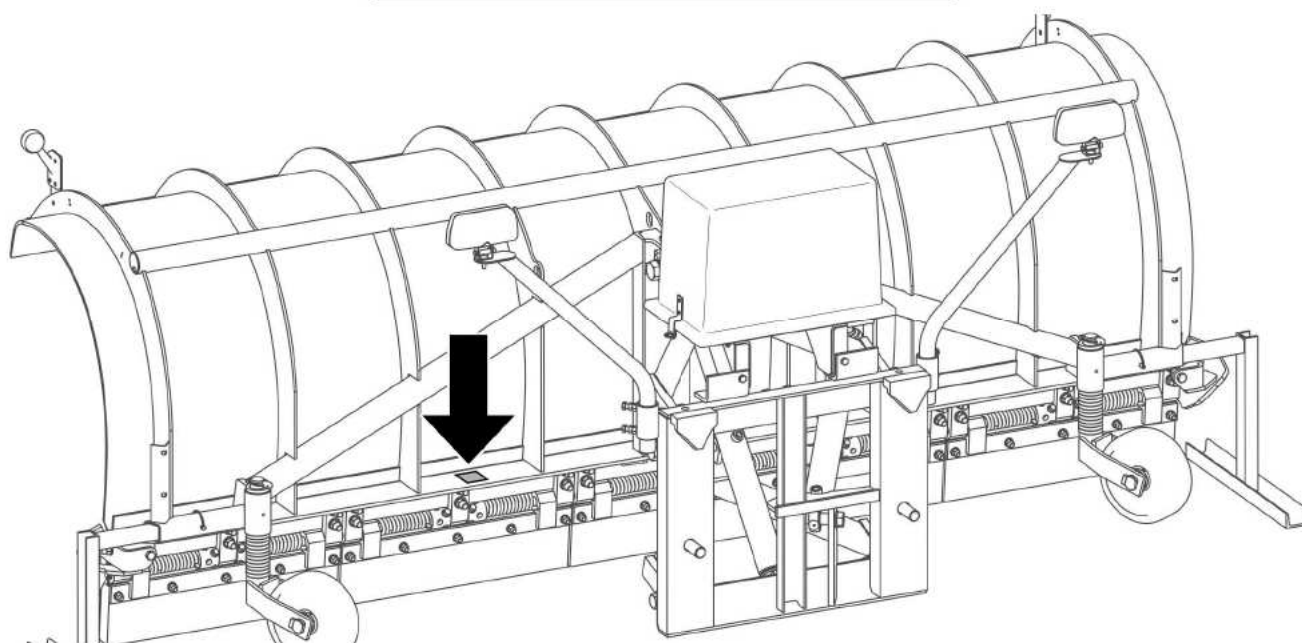


FIG. 1.1 Location of the data plate

Meaning of data plate items (FIG. 1.1):

A - machine name

B – type,

C – serial number

D – year of manufacture

E – machine tare weight [kg]

F – Quality Control stamp

G – additional information e.g. 12V - PD, ("12V"-supply voltage, PD-in floating setting, with hydraulic press-down function)

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

PRONAR PU-S25H / PU-S32H / PU-S35H ploughs are designed for removing loose snow and snowdrift from roads, squares and other hard road surfaces such as asphalt, concrete paving blocks, paving, concrete. Use for other purposes is not in accord with design.

It is not recommended to remove icy, compacted or compressed and considerably thick layer of snow frozen to road surface.

Depending on the equipment, the ploughs can be mounted on trucks and special vehicles that are equipped with head plate according to DIN standard and 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 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

TAB. 1.1 Carrying vehicle requirements

		REQUIREMENTS		
	UNIT	PU-S25H	PU-S32H	PU-S35H
Mounting method Mounting plate according to DIN 76060	—	TYPE B	TYPE A	
Electrical system Voltage of electrical control system and lighting system	V	12 or 24		
Connection type	—	High current socket on the front of the vehicle		
Carrying vehicle load capacity	t	up to 6	up to 8, <i>with the drive on 2 or more axles</i> or above 8	
Other requirements Beacon light	—	orange light		

1.3 OPTIONAL EQUIPMENT

The plough equipment includes:

- Operator's Manual
- Warranty Book
- control system panel with a wiring harness and a multi-pin plug;
- bolts that secure the plough to mounting plate;
- high current socket with electrical supply lead

Equipment version:

- rubber plough blades without shock absorbers,
- rubber plough blades with shock absorbers,
- steel plough blades with shock absorbers and running wheels,
- running wheels (*if not included in the plough equipment*),
- 24V or 12V power supply (*depending on voltage in carrying vehicle's electrical system*)
- electro-hydraulic control with "floating" position,
- electro-hydraulic control with "floating" position and press-down function

Additional fittings and optional equipment

- type B mounting plate according to DIN 76060 standard (*for the PU-S25H plough*)
- type A mounting plate according to DIN 76060 standard (*for the PU-S32H / PU-S35H ploughs*)

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:

- collecting blades,
- bulbs,
- fuses,
- 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.

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 straps 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.

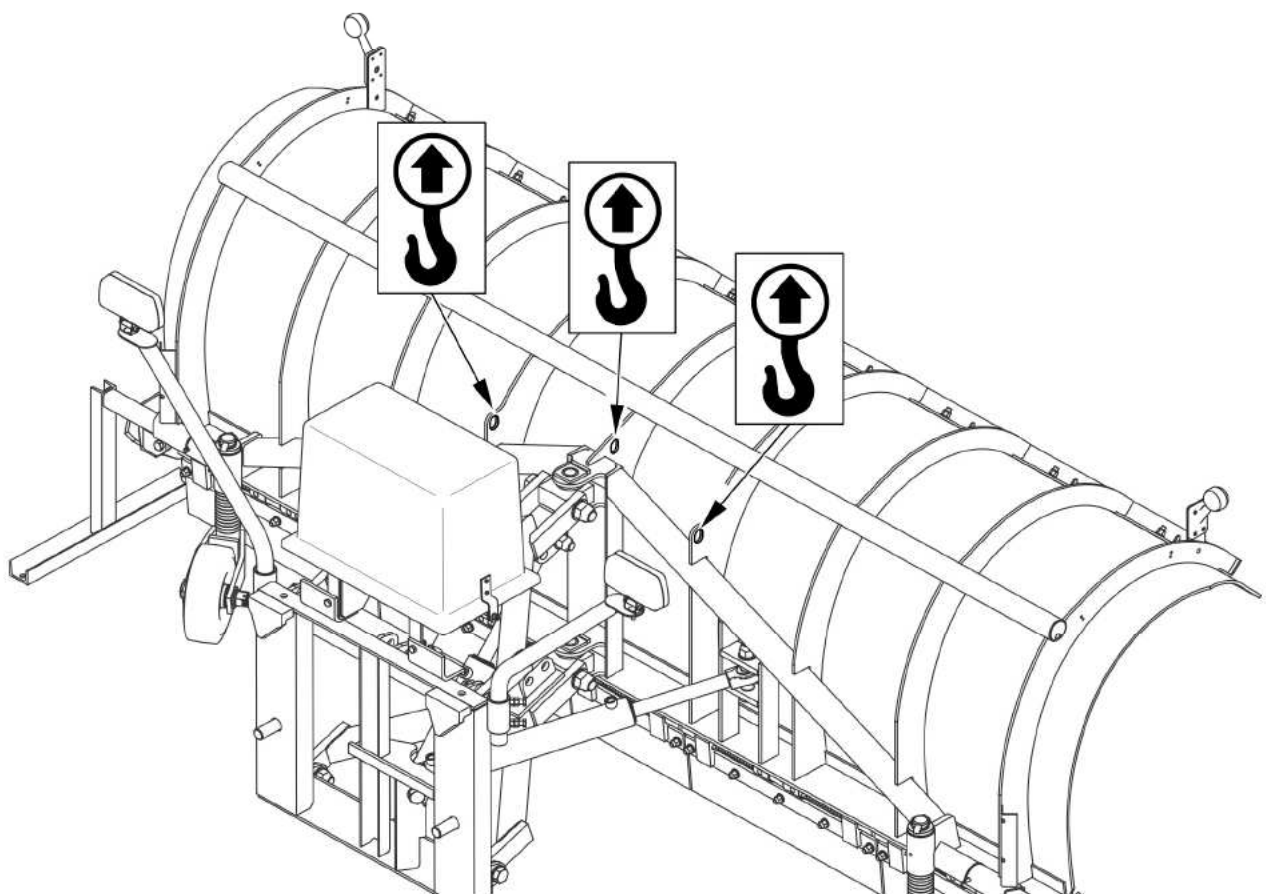


FIG. 1.2 **Transport lugs**

The machine should be attached to lifting equipment in places specially designed for this purpose (FIG. 1.2), i.e. by the holes in the mouldboard frame brackets. 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 cables. During the loading work particular care should be taken not to damage paint coating.

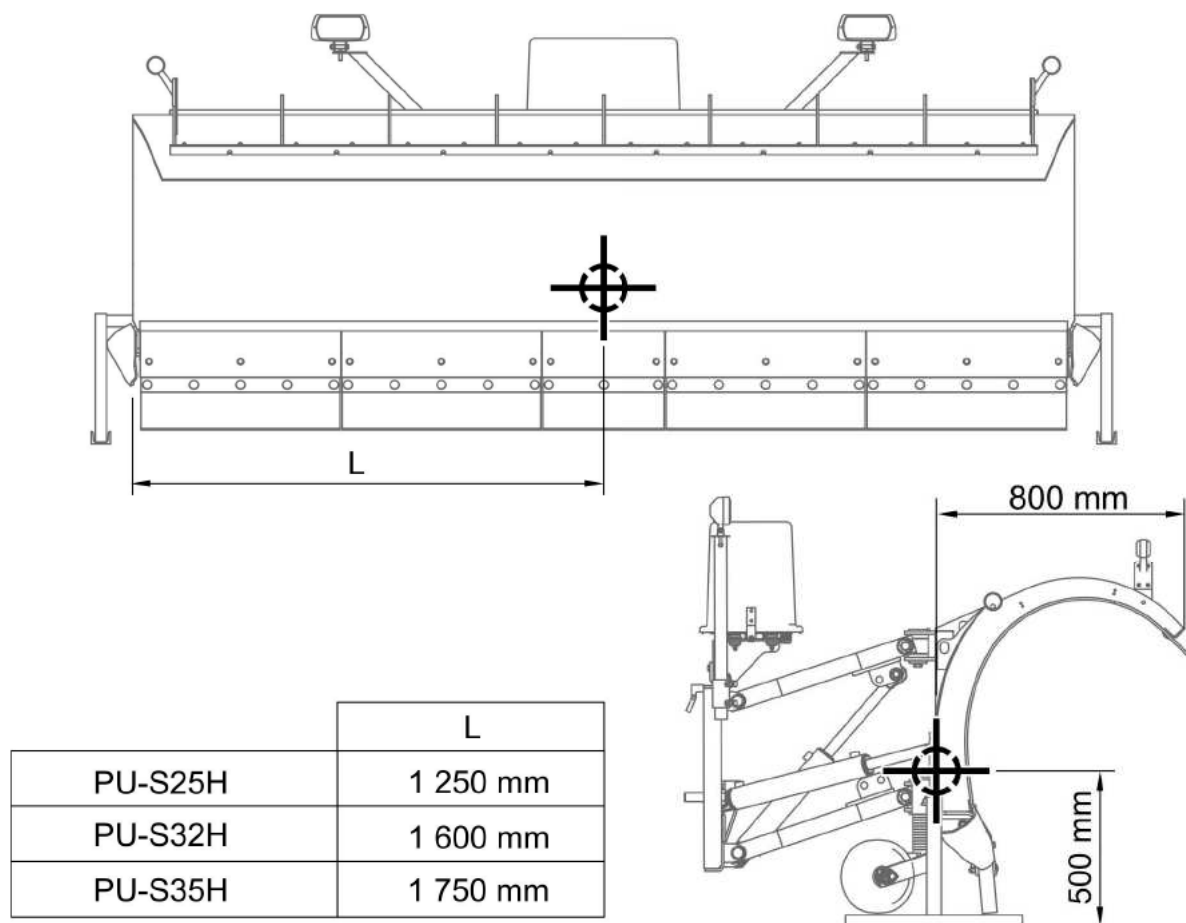


FIG. 1.3 Centre of gravity



ATTENTION!

Centre of gravity, depending on the version varies in the ± 50 mm range.

**ATTENTION!**

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

**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.

1.6 ENVIRONMENTAL HAZARDS

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

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

1.7 WITHDRAWAL FROM USE

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

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

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



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 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 carrying vehicle, 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, bolts, linchpins) 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 carrying vehicle, if the linkage system of the machine is not compatible with the linkage system of the carrying vehicle.
- After completion of coupling the machine, check the safeguards. Carefully read the carrying vehicle Operator's Manual.
- To link the machine to the carrying vehicle use only linking elements envisaged by the Manufacturer.
- The 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 carrying vehicle. Exercise caution when disconnecting mower.
- Machine, which is disconnected from the carrying vehicle must be supported on the parking stands.

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.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may find its way under the skin and cause infections. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. In the event of contact of oil with skin wash the area of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene).
- Use the hydraulic oil recommended by the Manufacturer. Never mix two types of oil.

- Used oil or oil, which has lost its properties, should be stored in original containers or replacement containers resistant to action of hydrocarbons. Replacement containers must be clearly marked and appropriately stored.
- Do not store hydraulic oil in packaging designed for storing food or foodstuffs.
- Rubber hydraulic conduits must be replaced every 4 years regardless of their technical condition.
- Repair and replacement of hydraulic system elements should be entrusted to the appropriately qualified persons.

2.1.4 TRANSPORTING THE MACHINE

- When driving on public roads, comply with the road traffic regulations. in force in the country, in which the machine is used.
- Do not exceed the permitted speed arising from road conditions and design limitations. Adjust travel speed to the prevailing road conditions and other limitations arising from road traffic regulations limits.
- Do NOT leave machine raised and unsecured while the carrying vehicle is parked. When parked, the machine should be lowered.
- Do NOT ride on the machine or transport any materials on it.
- Before using the machine always check its technical condition, especially in terms of safety. In particular, check the technical condition of the hitch and hydraulic and electrical system.
- When driving with raised implement, use transport lock.
- 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.
- 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 carrying vehicle engine switched off and the ignition key removed. Immobilise the carrying vehicle with parking brake and ensure that unauthorised persons do not have access to the tractor cab.
- Should it be necessary to change individual parts, use only original parts. Non-adherence to these requirements may put the user and other people's health and life at risk, and also damage the machine and invalidate the guarantee.
- Regularly check technical condition and mounting of all guards and protective elements.
- Do NOT weld, drill holes in, cut or heat the main structural elements, which have a direct impact on the machine operation safety.
- In the event of work requiring the machine to be raised, use properly certified hoists or lifting devices. After lifting the machine, stable and durable supports must also be used. Do NOT perform service or repair work under raised and unsupported machine.
- 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 on 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 carrying vehicle is obliged to ensure proper visibility of the machine and the working area.
- While working a plough turn the orange beacon light (the carrying vehicle equipment)
- 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 carrying vehicle and the machine.
- Take special care and reduce vehicle speed when passing by or overtaking.
- Do NOT operate the plough while reversing. While reversing, lift plough.
- In severe conditions it is recommended to work with the mouldboard set in the extreme left or right position.

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 carrying vehicle 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 carrying vehicle is connected and engine is running.

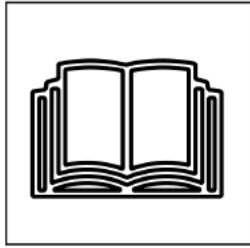








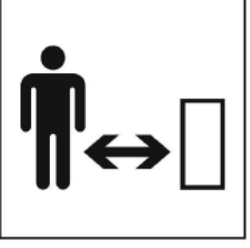


The minimal risk may be kept to a minimum by following the recommendations below:





- 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.

TAB. 2.1 Information and warning decals

ITEM	SYMBOL	DESCRIPTION
1	 	Before starting work, carefully read the Operator's Manual.
2	 	Do not reach into crushing space because elements may move. Danger of crushing hands or fingers.
3	 	When implement is in use there must be no bystanders in designated areas. If any work is required in these areas, make sure the carrying vehicle is stationary, and whether the implement is disconnected from the power source.
4	 	Thrown out objects, endanger the whole body. Keep a safe distance from the operating machine.
5	 	Pressurised liquid. Keep a safe distance.
6	 	Side outline marking

ITEM	SYMBOL	DESCRIPTION
7		Upper outline marking
8		Manufacturer
9		Plough model
10		Lifting equipment attachment points while loading the machine

Numbers in the item column correspond to decals (FIG. 2.1)

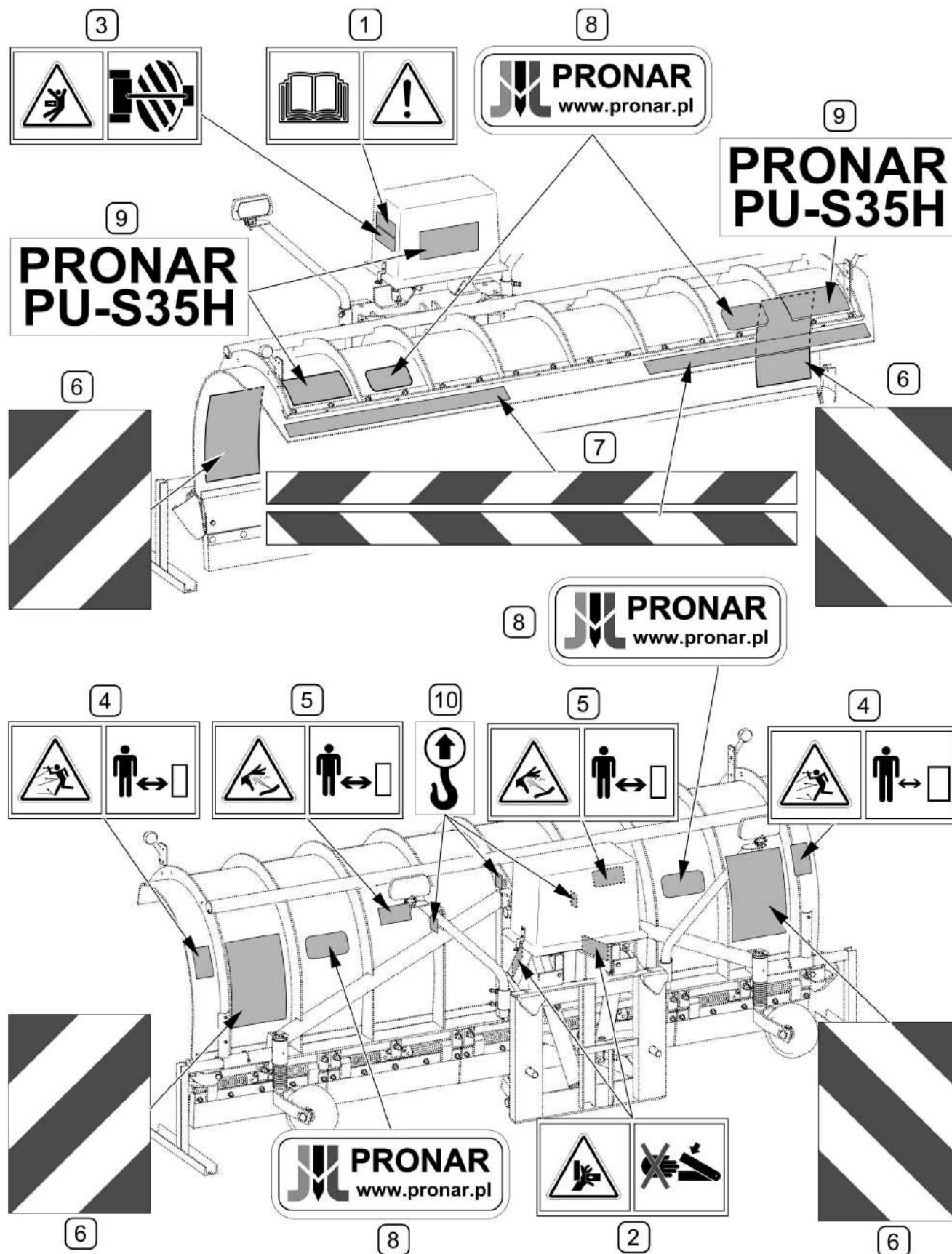


FIG. 2.1 Locations of information and warning decals.

Meaning of symbols (TAB. 2.1)

SECTION

3

**DESIGN AND
OPERATION**

3.1 TECHNICAL SPECIFICATION

TAB. 3.1 BASIC TECHNICAL SPECIFICATION

	Unit			
Plough model		PU-S25H	PU-S32H	PU-S35H
Mounting method:				
Working width (FIG. 3.1): – angle of 30° (A, B)	mm	2,155	2,745	2,970
– straight (C)	mm	2,460	3,143	3,400
Working height	mm	930	1,070	
Total width: – angle of 30°	mm	2,514	3,173	3,415
– straight	mm	2,692	3,374	3,634
Total height	mm			
Total length: – angle of 30°	mm	2,100	2,385	2,470
– straight	mm	1,510	1,760	1,738
Number of working positions	-	2 fixed (intermediate positions possible)		
Power supply	-	electro-hydraulic power supply: - with floating position, - with floating position and press-down function		
Operation	-	with the aid of the control panel, from the operator cab		
Electric power supply	V	24 or 12 (depending on the carrying vehicle electrical system)		
Types of collecting blades (optional)	-	- rubber plough blades with shock absorbers - rubber plough blades without shock absorbers - metal plough blades with shock absorbers		
Number of hydraulic cylinders	item	2		
Weight of machine ready for operation: minimum / maximum (depending on version and equipment)	kg	335 / 380	600 / 650	650 / 710
Working speed (depending on amount of snow and road conditions)	km/h	20 – 60		
Other information	-	Single person operation		

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

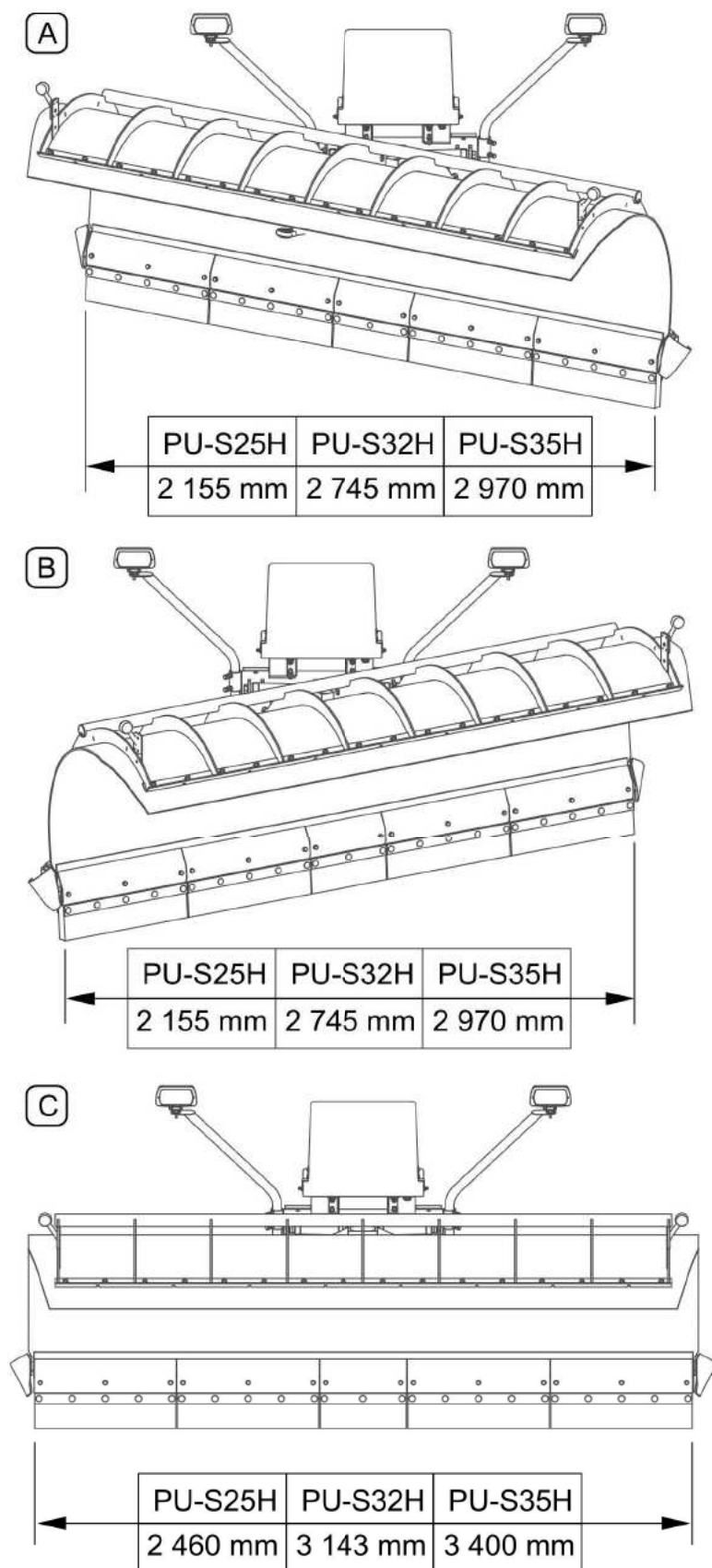


FIG. 3.1 Width depending on the operating position:

(A, B) - fixed working positions; (C) - intermediate "straight" position

3.2 GENERAL DESIGN

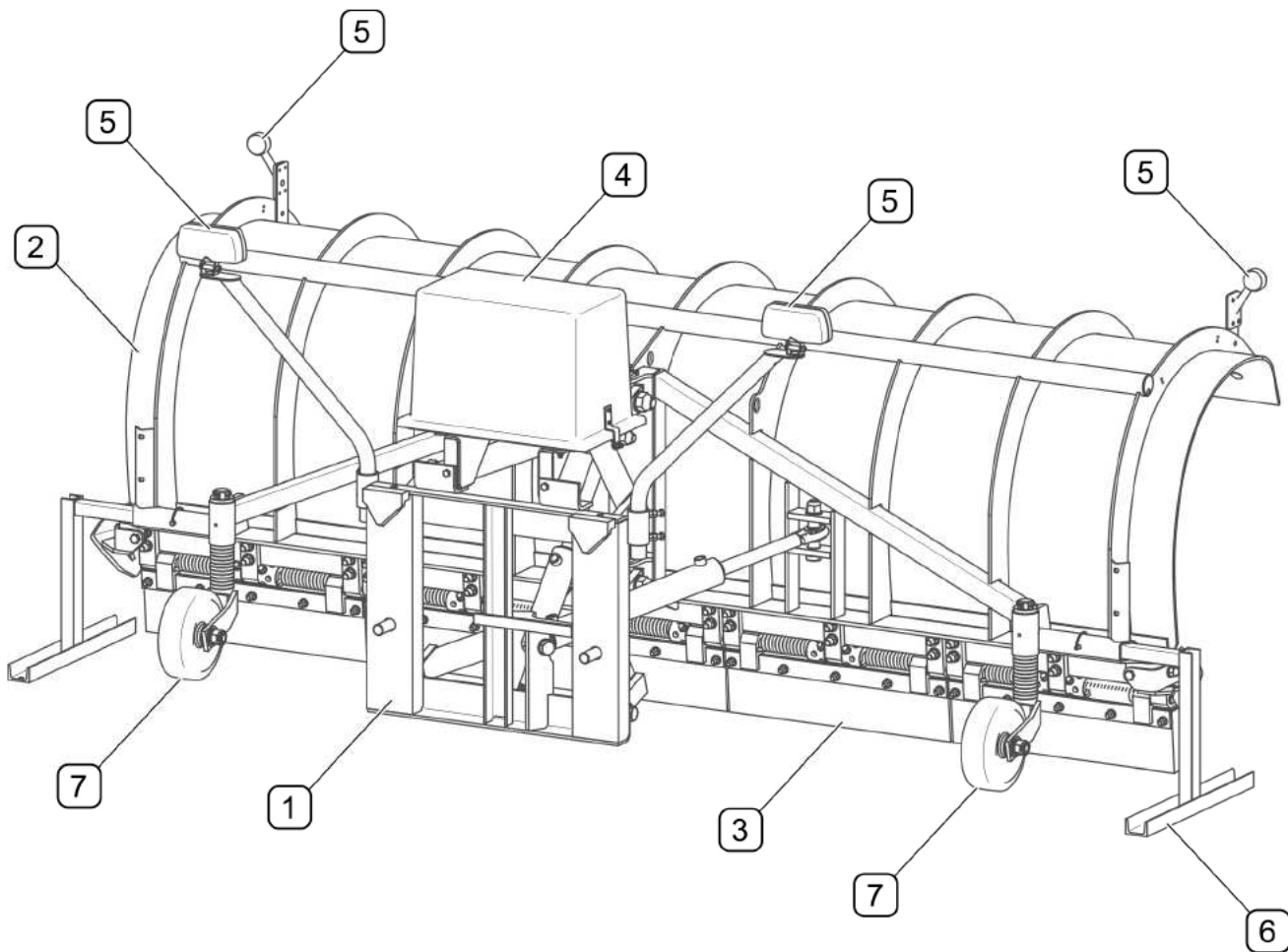


FIG. 3.2 General design

(1) - linkage; (2) - mouldboard; (3) - plough blades; (4) - electro-hydraulic power supply; (5)- electric lighting system; (6) - parking stands; (7) - wheels (option)

PU-S25H / PU-S32H / PU-S35H ploughs are equipped with a centrally positioned plastic mouldboard (2) attached to the steel frame. Rubber or metal plough blades are attached under the mouldboard (depending on plough equipment). Optionally, the plough can be equipped with plough blades with shock absorbers. When an obstacle is encountered the plough blades can swing and return to working position thanks to the springs. During operation, plough is rests on the ground on two wheels (7), whose height can be adjusted. Linkage (1) allows linking the plough with carrying vehicles equipped with type A or B mounting plate according to DIN 76060 standard (depending on the plough model). Parking stands (6) are used to support the plough when it is disconnected from the carrying vehicle.

3.3 HYDRAULIC SYSTEM

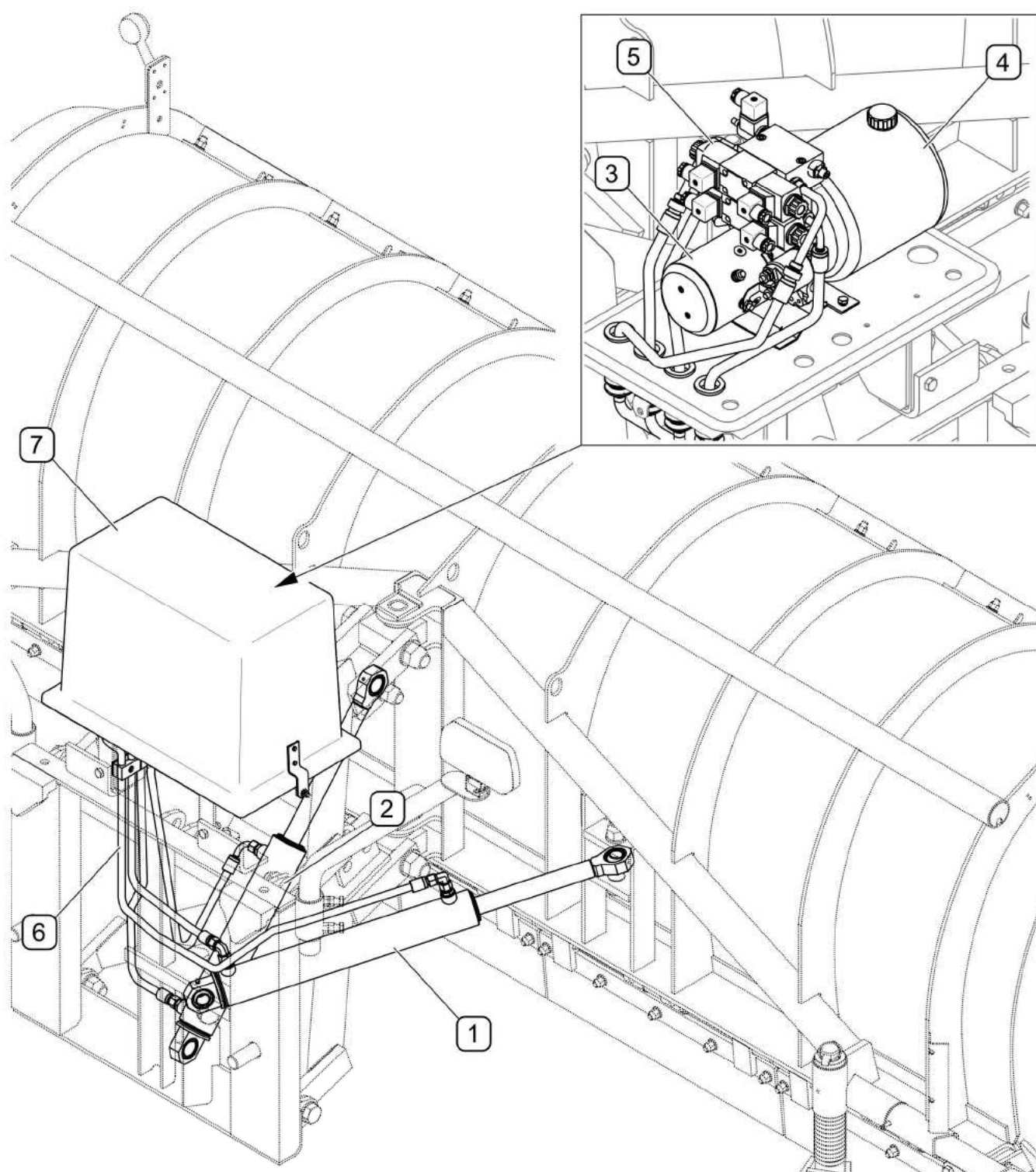


FIG. 3.3 **Hydraulic system design**

(1) - mouldboard turning cylinder; (2) - mouldboard lifting cylinder; (3) - motor with a pump;
(4) - oil tank; (5) - a set of hydraulic solenoid valves; (6) - hydraulic conduits; (7) - housing

Changing the mouldboard operating position and the plough lifting and lowering are done using hydraulic cylinders (1) and (2) supplied with hydraulic conduits (6) from electro-hydraulic power supply located under housing (7). The electro-hydraulic power supply is controlled from control panel.

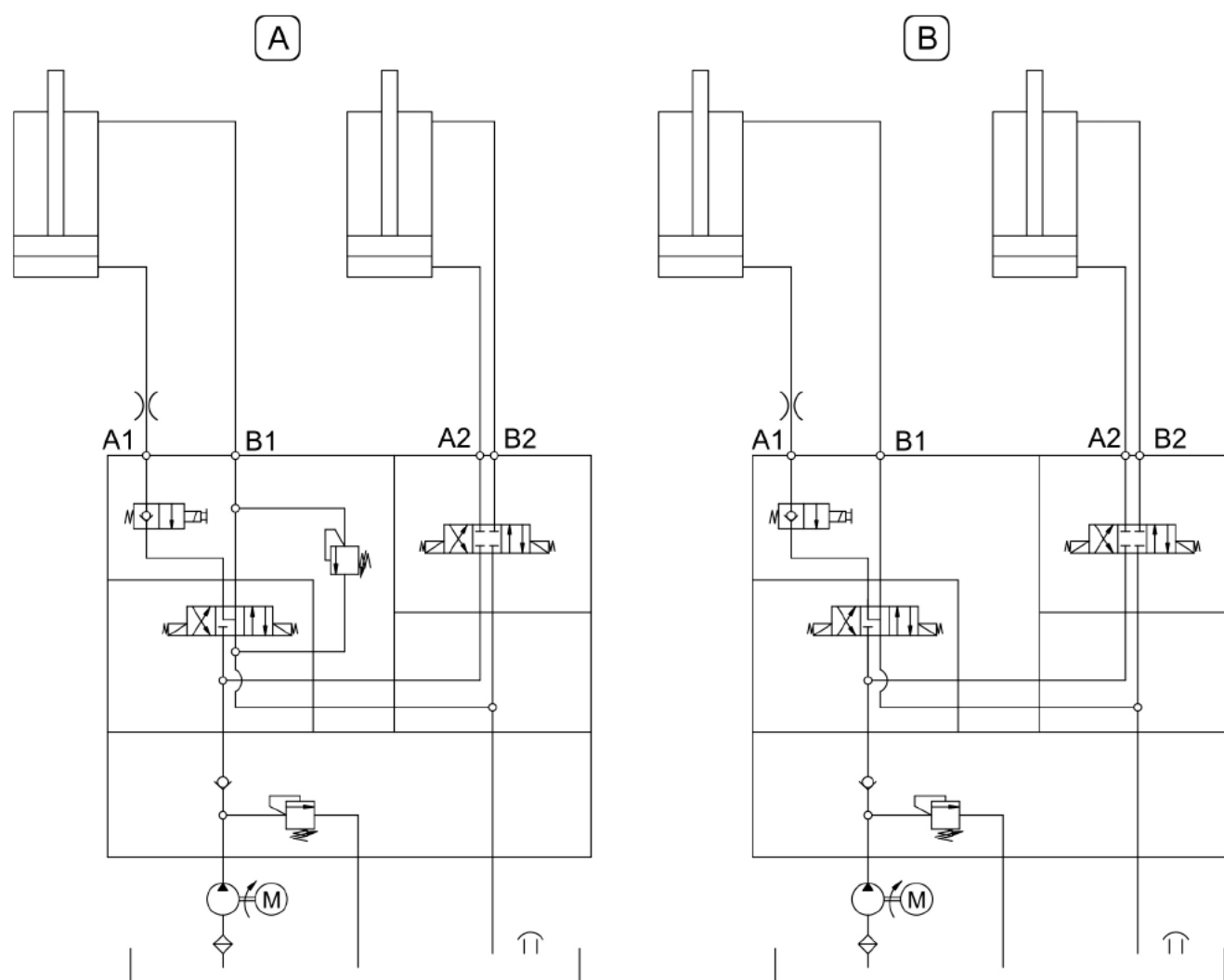


FIG. 3.4 Hydraulic system concept diagram

(A) - hydraulic system with floating position and hydraulic press-down function; (B) - hydraulic system with floating position.

3.4 ELECTRICAL SYSTEM

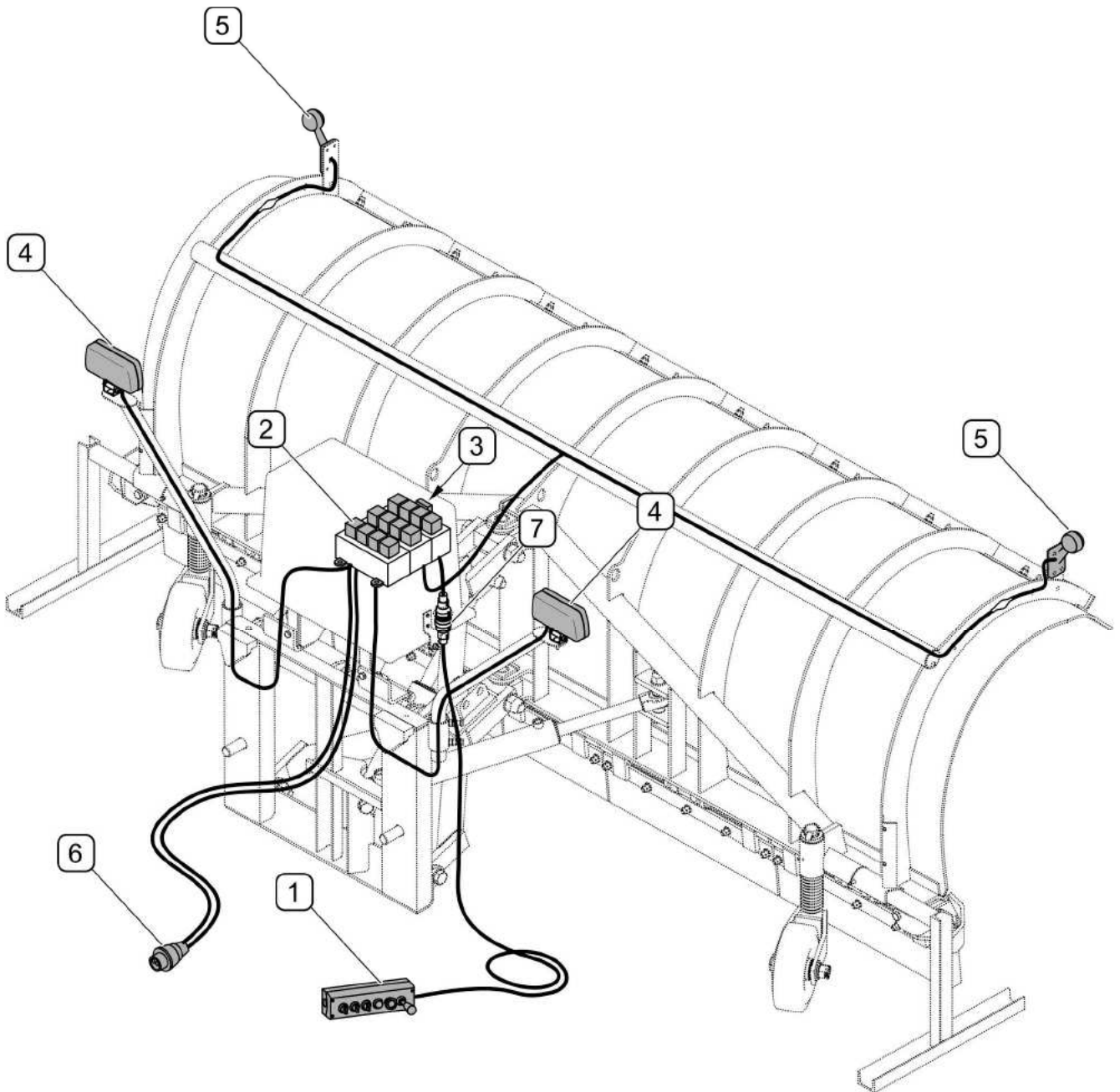


FIG. 3.5 **Electrical system components**

(1) - control panel; (2) - relays; (3) - 20A fuse; (4) - additional lights; (5) - clearance lights; (6) - high current supply plug; (7) - control connector

The plough electrical system controls the electro-hydraulic power supply and lighting system. The plough is controlled by control panel (1). The panel is connected to relays (2) via connector (7). The lighting system consists of additional lights (4) installed on brackets and clearance lamps (5) installed on plough mouldboard. High current socket installed on the

front of the carrying vehicle is required to connect the supply plug (6) of the plough's electrical system.

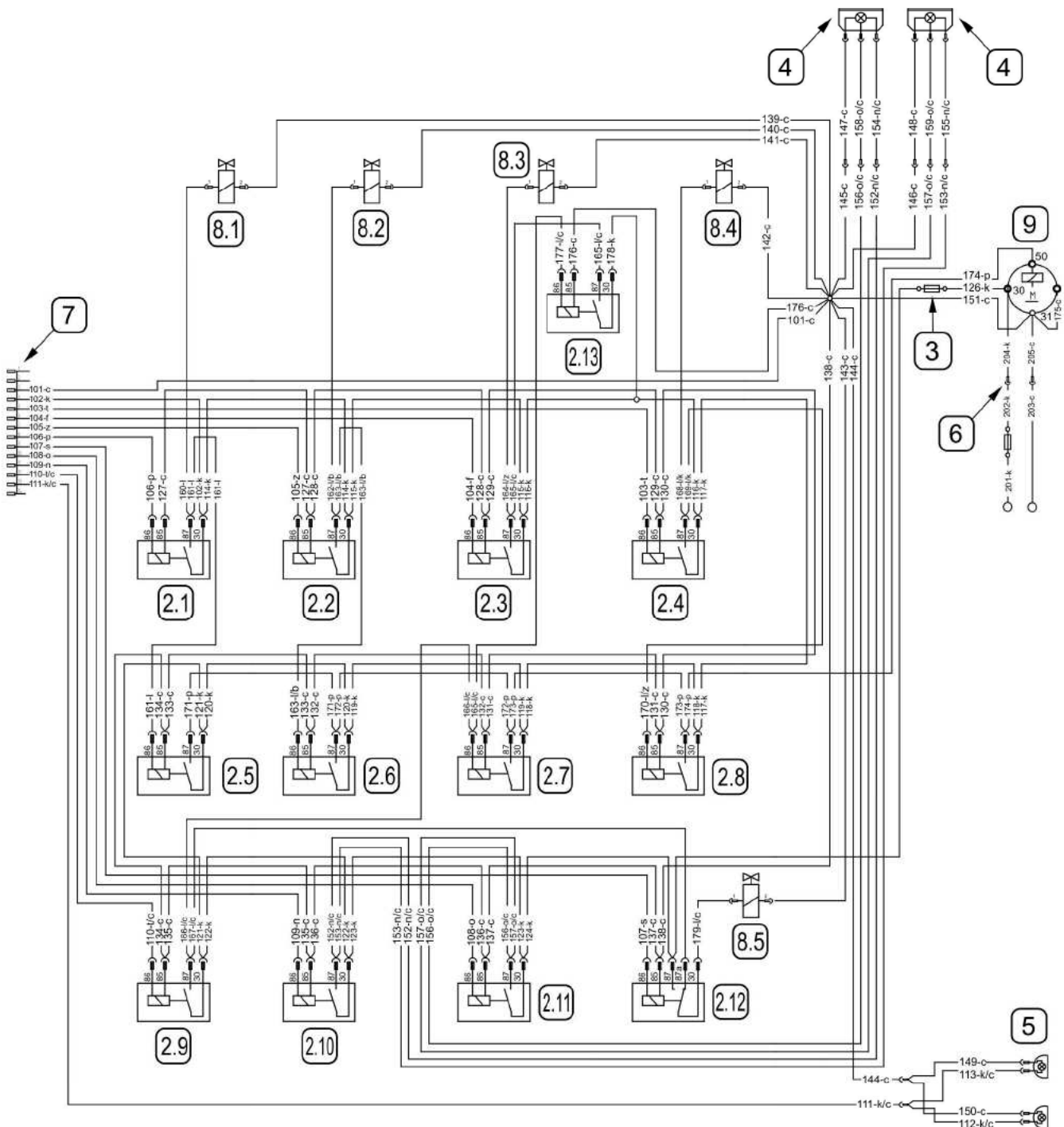


FIG. 3.6 Plough electrical system diagram

(2.1) - right turning control relay; (2.2) - left turning control relay; (2.3) - floating function relay; (2.4) - lifting relay; (2.5) - motor relay-to the right; (2.6) - motor relay-to the left; (2.7) - lowering and press-down relay; (2.8) - motor relay-lifting; (2.9) - lowering and press-down relay 1; (2.10) - high beam relay; (2.11) - dipped beam relay; (2.12) - linking relay; (2.13) - lowering and press-down relay 2; (3) - 20A fuse; (4) - additional lights; (5) - clearance

lights; (6) - high current supply plug; (7) - control connector; (8.1) - control solenoid valve - to the right; (8.2) - control solenoid valve - to the left; (8.3) - floating function solenoid valve; (8.4) - lifting solenoid valve; (8.5) - linking solenoid valve; (9) - electric motor

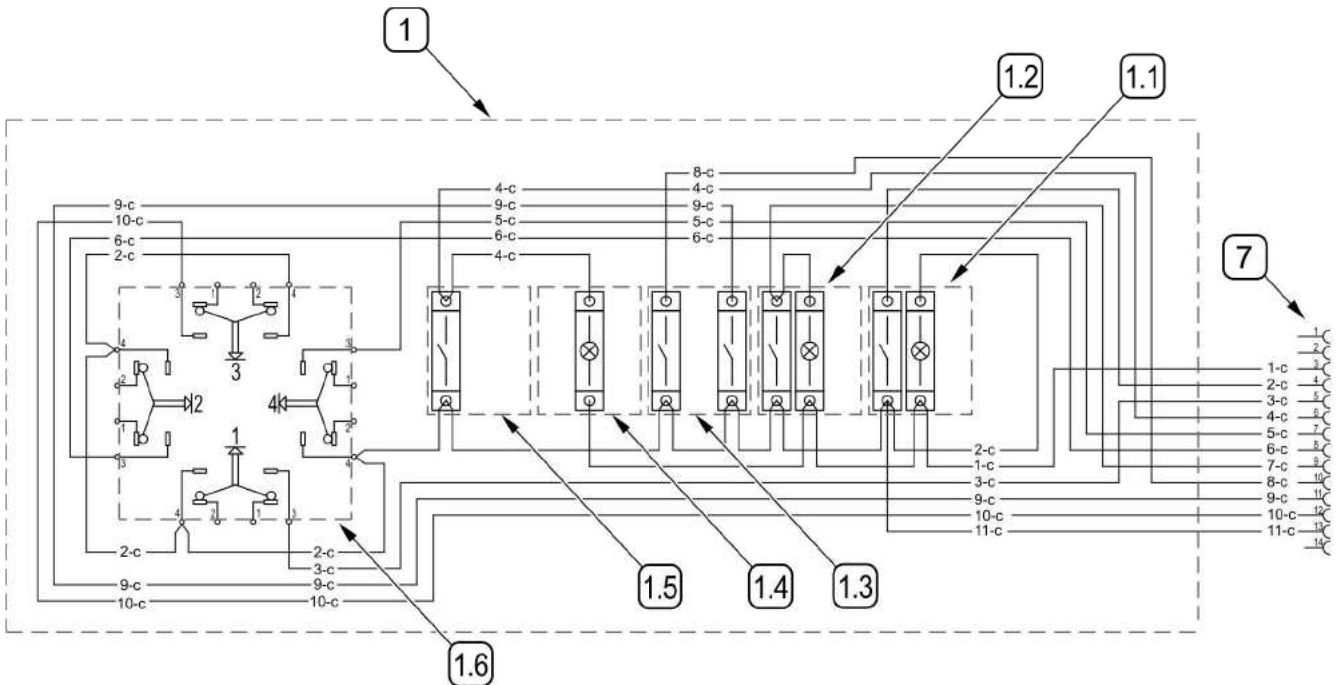


FIG. 3.7 The control panel electrical system diagram

(1) - control panel; (1.1) - control panel and clearance lights main switch; (1.2) - linking function switch; (1.3) - light switch; (1.4) - floating function indicator light; (1.5) - "floating" function switch; (1.6) - multifunction lever; (7) - control connector;

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 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. Prior to connecting to the carrying vehicle, machine operator must verify the machine 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 system parameters as well as connection sockets 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 technical condition of mouldboard, collecting plough blades and wheels,
- 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 no cause for concern.

If all the above checks have been performed and there is no doubt as to the machine's good technical condition, it can be connected to carrying vehicle, started and all its individual systems checked. In order to do this:

- hitch the machine to a carrying vehicle (see „*HITCHING TO CARRYING VEHICLE*”),
- after connection of electrical system wiring, check the correct operation of individual plough functions and operation of lighting system and inspect tightness of the system and hydraulic cylinders,

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!**

After mounting the plough on the carrying vehicle, set additional headlights in such a manner as not to dazzle oncoming drivers.

**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

TAB. 4.1 TECHNICAL INSPECTION SCHEDULE

DESCRIPTION	SERVICE OPERATION	FREQUENCY
Technical condition of mouldboard and collecting plough blades	Visually inspect and if necessary replace according to section 5 „CHECKING AND REPLACEMENT OF COLLECTING PLOUGH BLADES”	Before beginning work
Technical condition of wheels (option)	check the technical condition, if complete and correctly mounted.	
Technical condition of the linkage and locking bolts	Check the technical condition, if complete and correctly mounted.	
Technical condition of the hydraulic system.	Visually inspect the technical condition	
Technical condition of the electrical system and lighting system components	Visually inspect the technical condition, check the operation	
Check of all main nut and bolt connections are properly tightened	Tightening torque values should be according to table 5.6 (except places where special engineering solution are used - table 5.7)	Once a week
Lubrication	Lubricate elements according to table „LUBRICATION”.	According to table 5.5



ATTENTION!

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

4.3 HITCHING TO VEHICLE

PU-S25H / PU-S32H / PU-S35H ploughs may only be mounted on a carrying vehicle meeting the requirements listed in table 1.1 *CARRYING VEHICLE REQUIREMENTS*.



ATTENTION!

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



DANGER

When hitching, there must be nobody between the machine and the carrying vehicle. Exercise caution when hitching the machine to carrying vehicle.

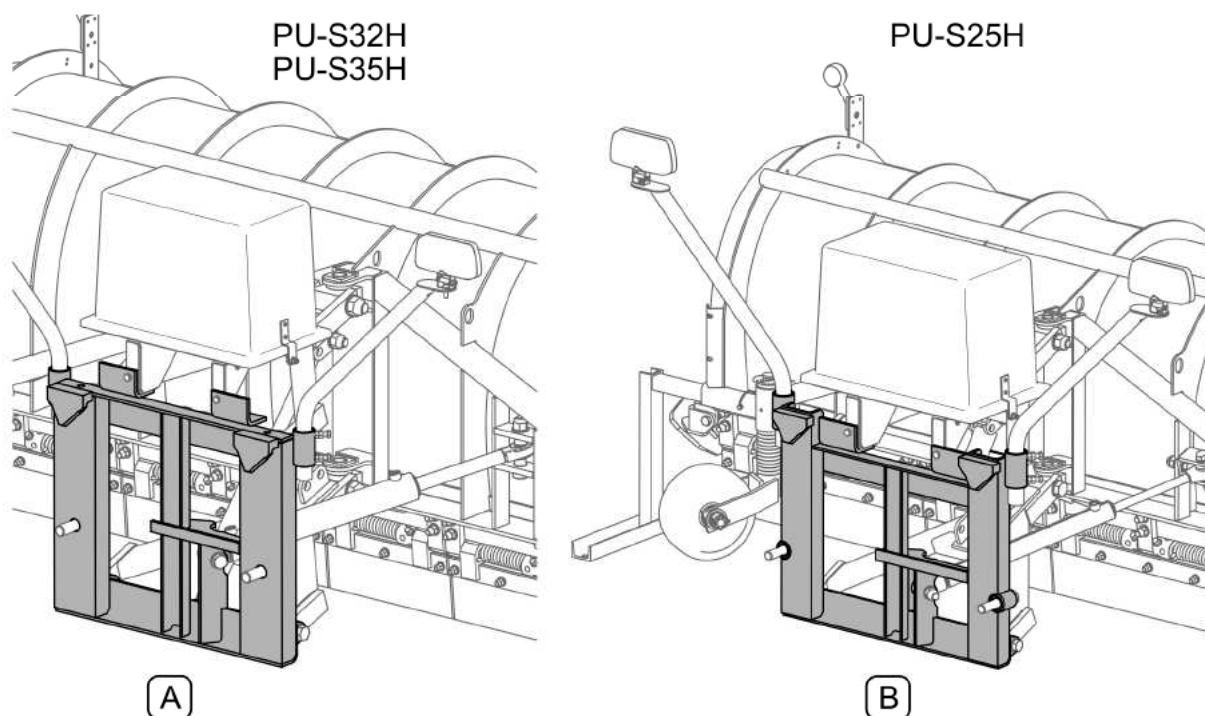


FIG. 4.1 Types of linkage system depending on the plough model

(A) - type A according to DIN 76060; (B) - type B according to DIN 76060

The linkage system of PU-S25H (B) plough complies with DIN 76060 standard (type B), while PU-S32H and PU-S35H ploughs are equipped with linkage system of type A (FIG. 4.1).

The carrying vehicle head plate should be mounted horizontally (axially with regard to the vehicle). The upper edge of the plate should be located at the following height from the ground:

- 900 \pm 60 mm, B type plate for PU-S25H plough
- 980 \pm 60 mm, A type plate for PU-S32H and PU-S35H ploughs

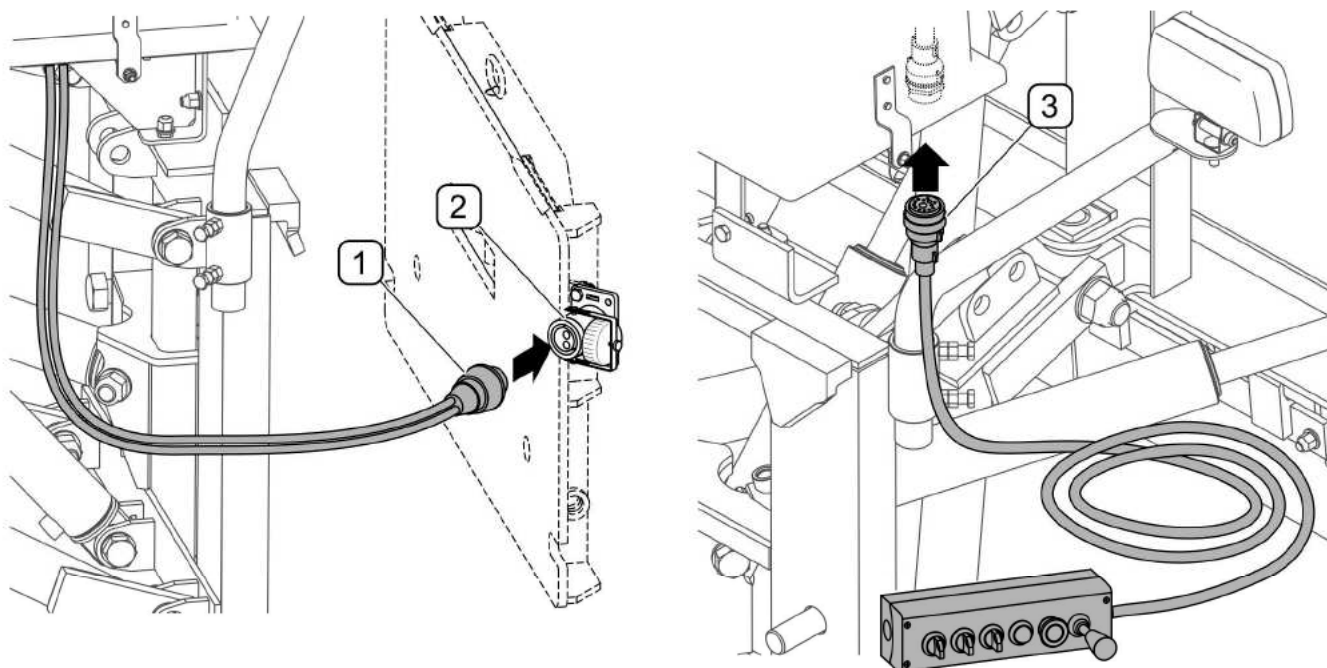


FIG. 4.2 Connecting the control panel and electrical system power supply

(1) - supply conduit plug; (2) - high current socket; (3) - control panel plug

PU-S25H/PU-S32/PU-S35H ploughs are designed for connecting to high current socket (2). Depending on voltage in carrying vehicle electrical system, the plough can be equipped with 12V or 24V electrical system. The method of connecting the supply conduit to the high current socket is described in point *INSTALLATION OF ADDITIONAL EQUIPMENT*.

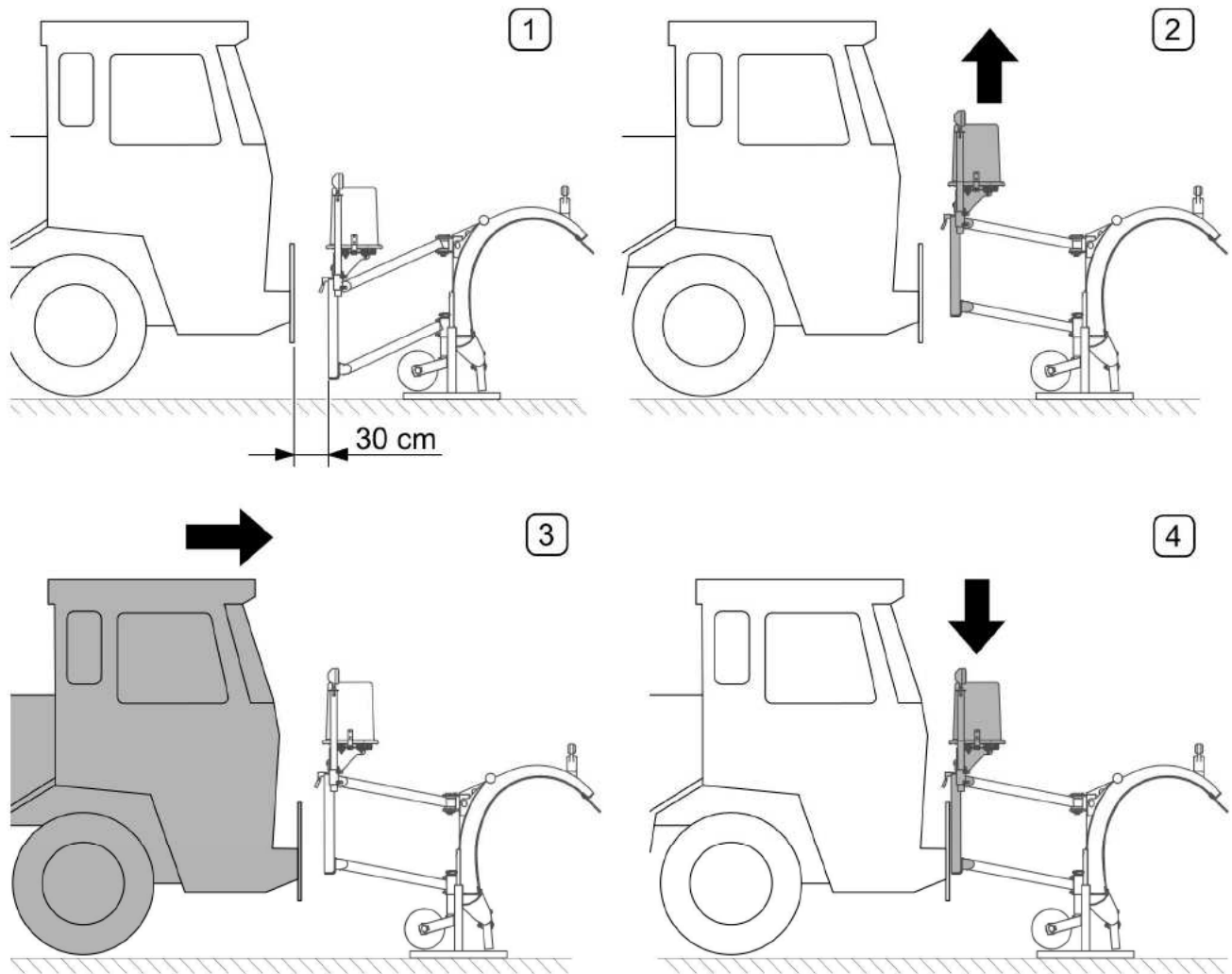


FIG. 4.3 Mounting the plough on the carrying vehicle

(1,2,3,4) - successive stages of mounting the plough on the carrying vehicle

Check the linkage compatibility before mounting the plough on the carrying vehicle.

To mount the plough to the carrying vehicle (FIG. 4.3):

- 1) Drive the carrying vehicle to the plough linkage system to a distance of about 30 cm from the linkage and immobilise the vehicle with parking brake. Connect the plough supply conduit plug (1) to socket (2) installed on the front of the carrying vehicle (FIG. 4.2). Connect the control panel plug (3) to the electro-hydraulic power supply box.
- 2) Using the control panel, set the plough linkage in such a manner as to position the mounting hooks above the seats of the carrying vehicle head plate. Set "linking" switch (FIG. 4.10) on the control panel to (I) "ON" position.
- 3) Drive the carrying vehicle carefully to the plough linkage plate, engage the parking brake.

- 4) If the mounting hooks and the carrying vehicle head plate are correctly aligned, switch off "linking" switch (FIG. 4.10) and lower the linkage until the plough mounting hooks are set in the seats of the carrying vehicle head plate. Lift the plough and check if correctly mounted. Secure the plough linkage frame with two bolts (FIG. 4.4). Dismantle both parking stands (FIG. 4.5). Place the control panel in the operator cab in an easily accessible place.



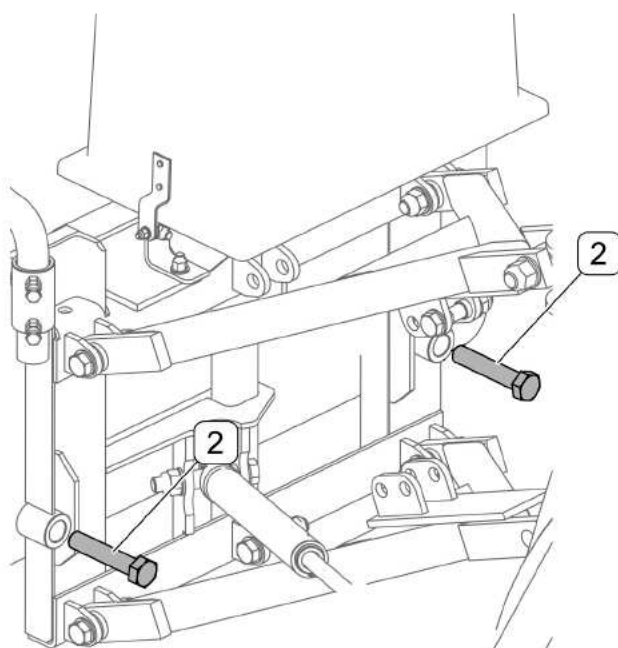
DANGER

To link the machine to the carrying vehicle use only linking elements envisaged by the Manufacturer.

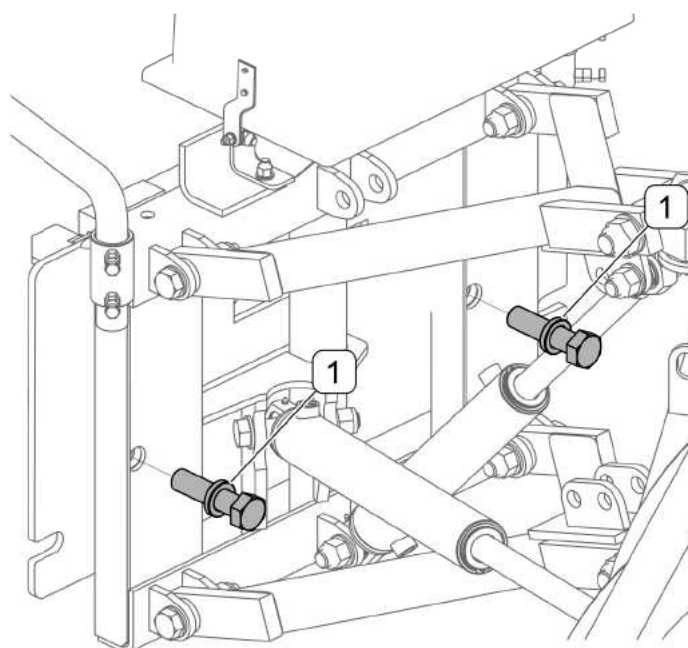


ATTENTION!

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



PU-S25H



PU-S32H / PU-S35H

FIG. 4.4 Bolts securing the plough linkage plate

(1) - 220N-95050000 bolt (PU-S32H / PU-S35H); (2) - M24x120-8.8 bolt (PU-S25H)

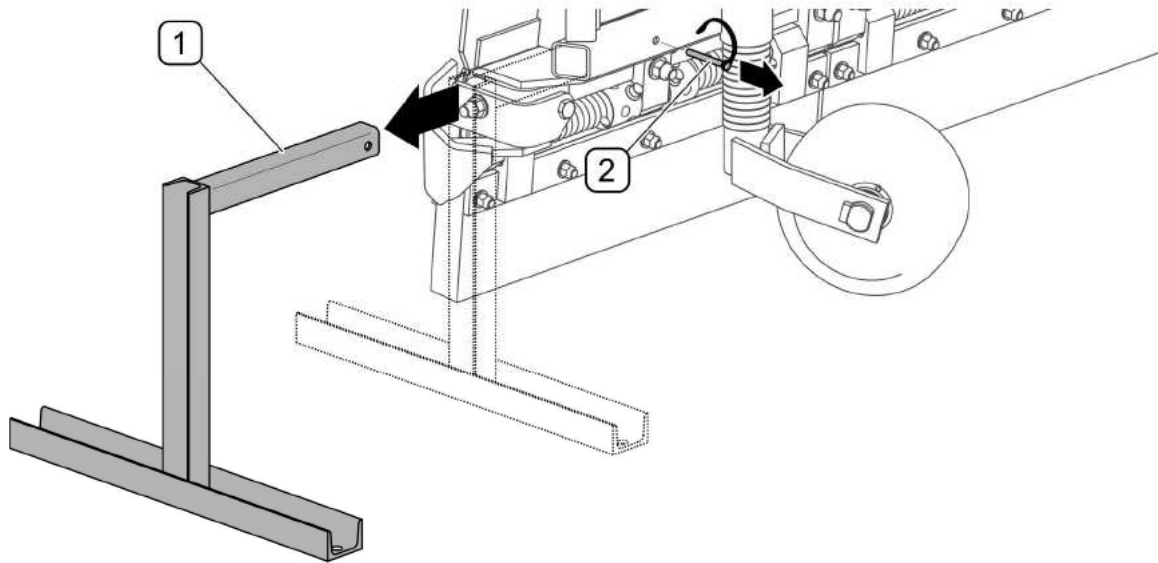


FIG. 4.5 Dismantling parking stands

(1) - parking stand; (2) - locking linchpin

The plough is equipped with two parking stands (FIG. 4.5). To dismantle the parking stands:

- lift the plough mounted on a carrying vehicle,
- take out locking linchpin (2) and dismantle parking stand (1) from the guide,
- dismantle the second parking stand in the same way.

4.4 BALLASTING THE CARRYING VEHICLE

It is recommended to ballast the carrying vehicle rear axle after the plough is fitted. Amount of additional ballast can be calculated using the following formula (FIG. 4.6):

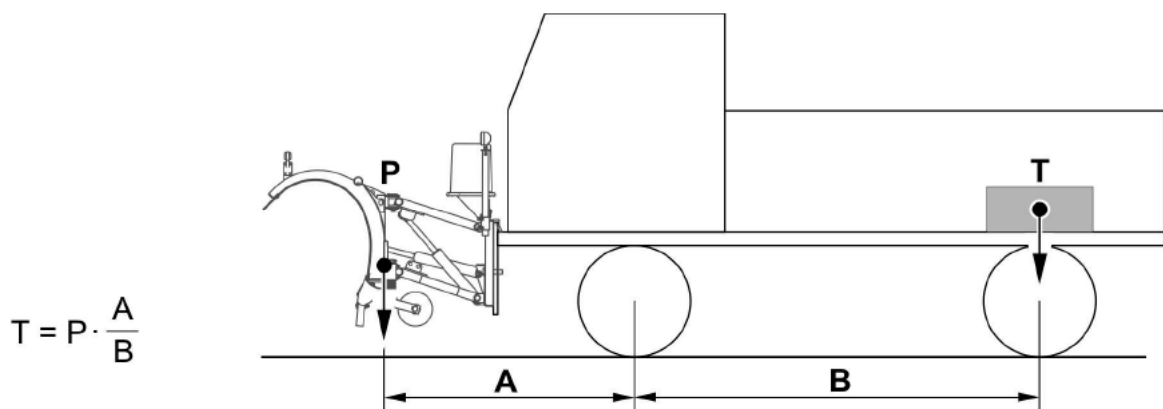


FIG. 4.6 Ballasting the carrying vehicle

A - distance between the plough centre of gravity and the front axle; (B) - carrying vehicle axle base; (P) - plough weight; (T) - additional ballast

Additional ballast e.g. concrete blocks or bags filled with sand should be placed above the vehicle rear axle.

4.5 PLOUGH OPERATION

4.5.1 DISASSEMBLY OF TRANSPORT LOCK

If the plough linkage system has been locked in upper transport position, release the transport lock before lowering the plough (FIG. 4.7). In order to do this:

- raise the plough to the extreme upper position, immobilise the vehicle with parking brake,
- take out securing cotter pin (3),
- take out lower pin (2) fixing the cable (1),
- suspend both cable ends at upper fixing point (A)

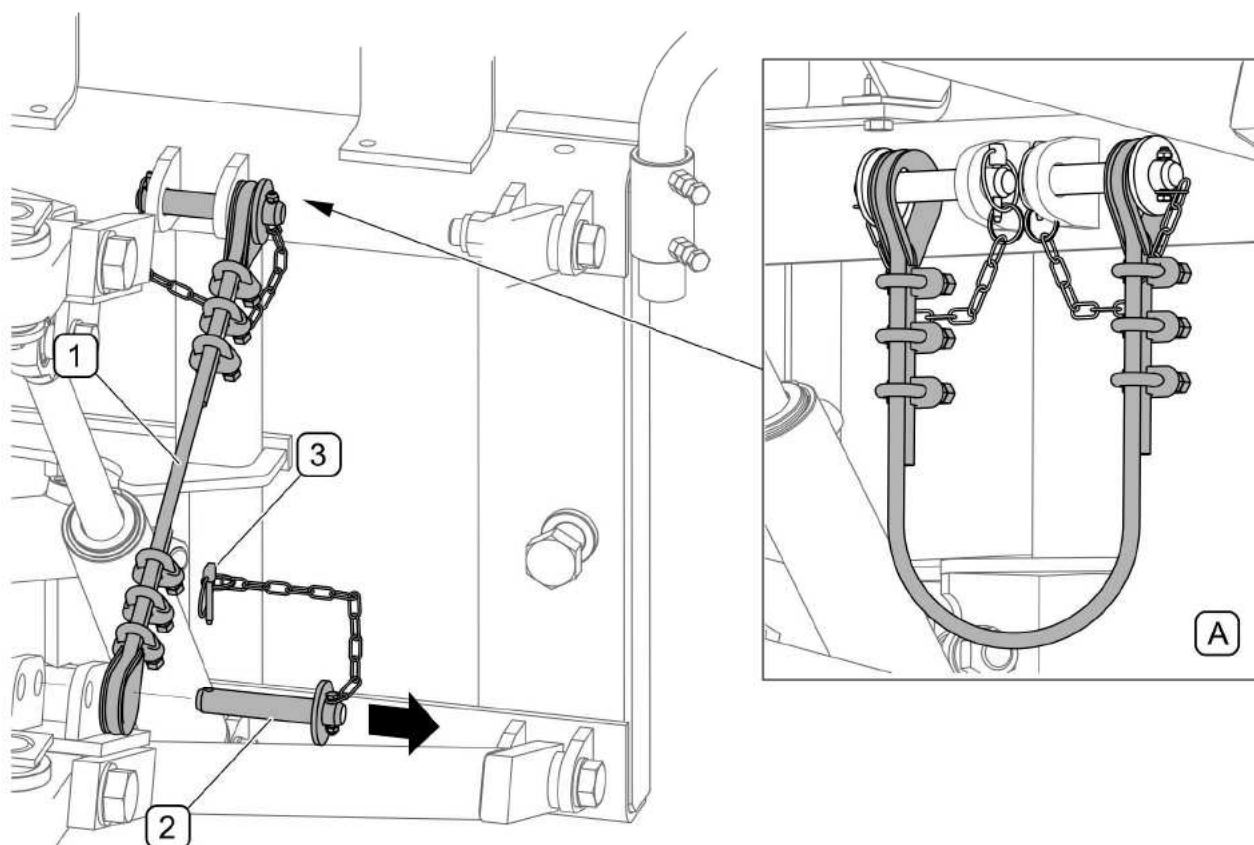


FIG. 4.7 Release the transport lock

(1) - securing cable; (2) - pin; (3) - linchpin; (A) - method of cable attachment during plough operation

4.5.2 CONTROL PANEL

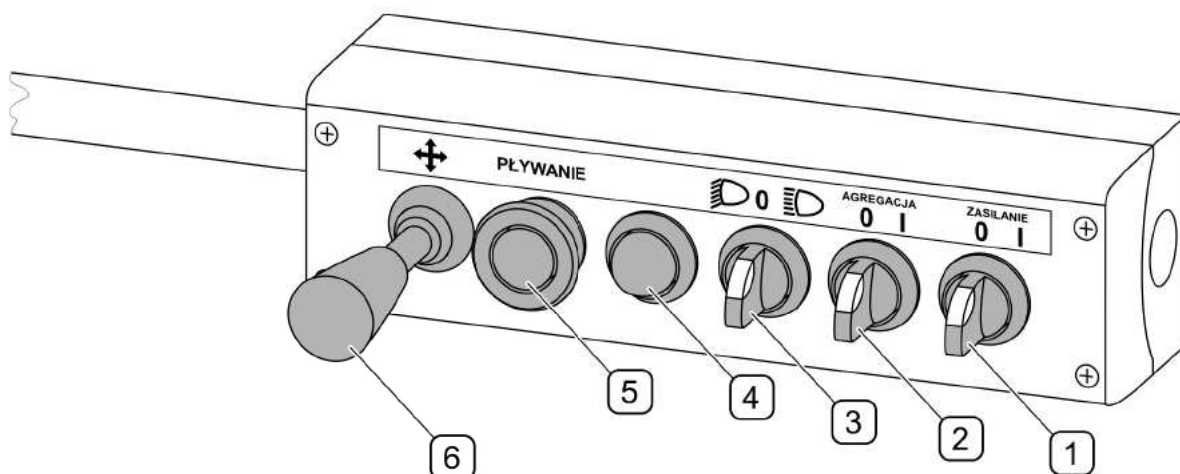


FIG. 4.8 Arrangement of controls on the control panel

(1) - main switch of control panel and clearance lights; (2) - linking function switch; (3) - light switch; (4) - floating function activation lamp; (5) - floating function switch; (6) - multifunction lever - joystick;

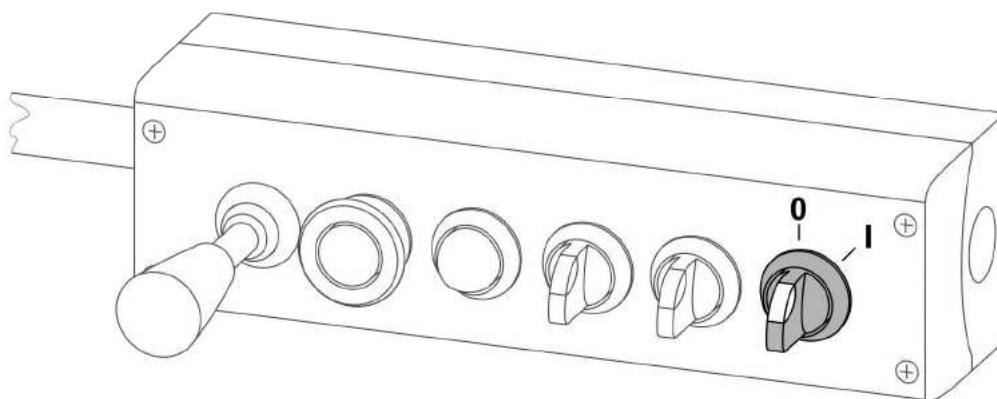


FIG. 4.9 Control panel and clearance lights main switch

(0) - control panel is switched off; (I) - control panel and the plough clearance lights are switched on

Control panel is protected against accidental use by the main switch (FIG. 4.9). If the switch is turned clockwise to position (I), the control panel power supply and clearance lights are on. If set in (I) "ON" position, the main switch is backlit. The main switch must be ON during plough operation and transport.

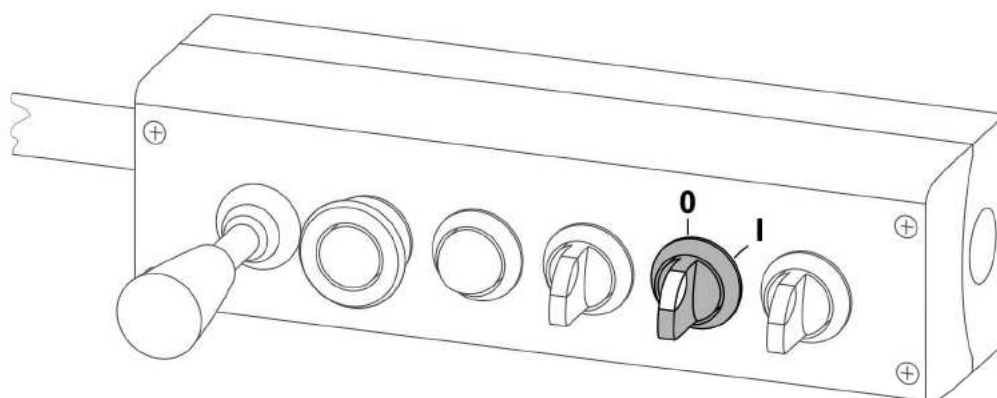


FIG. 4.10 Linking function switch

Linking function is used only during mounting and disconnecting the plough from the carrying vehicle. If the switch is set in (I) "ON" position, the linkage system is blocked at a previously set height. If set in (I) "ON" position, the linking function switch is backlit. During plough operation and transport, linking function switch should be set to (0) OFF position.

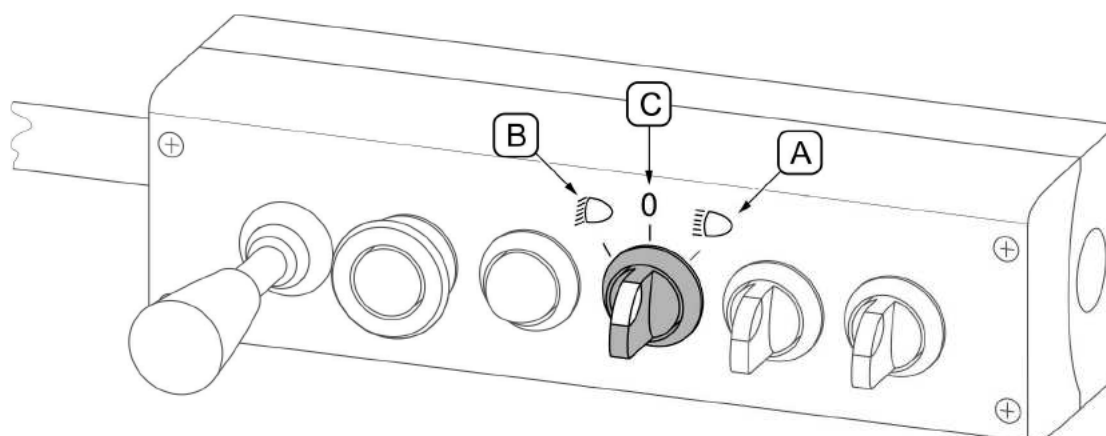


FIG. 4.11 Additional lights switch

(A) - high beam ON; (B) - low beam ON; (C) - lights OFF.

Additional lights switch (FIG. 4.11) controls the lights installed on brackets of the plough linkage. Turning switch to the extreme left position (B) switches on low beam. Turning switch to the extreme right position (A) switches on high beam. Turning switch to the central position (C) switches off all additional lights (*except clearance lights, which are switched off by the main switch*).

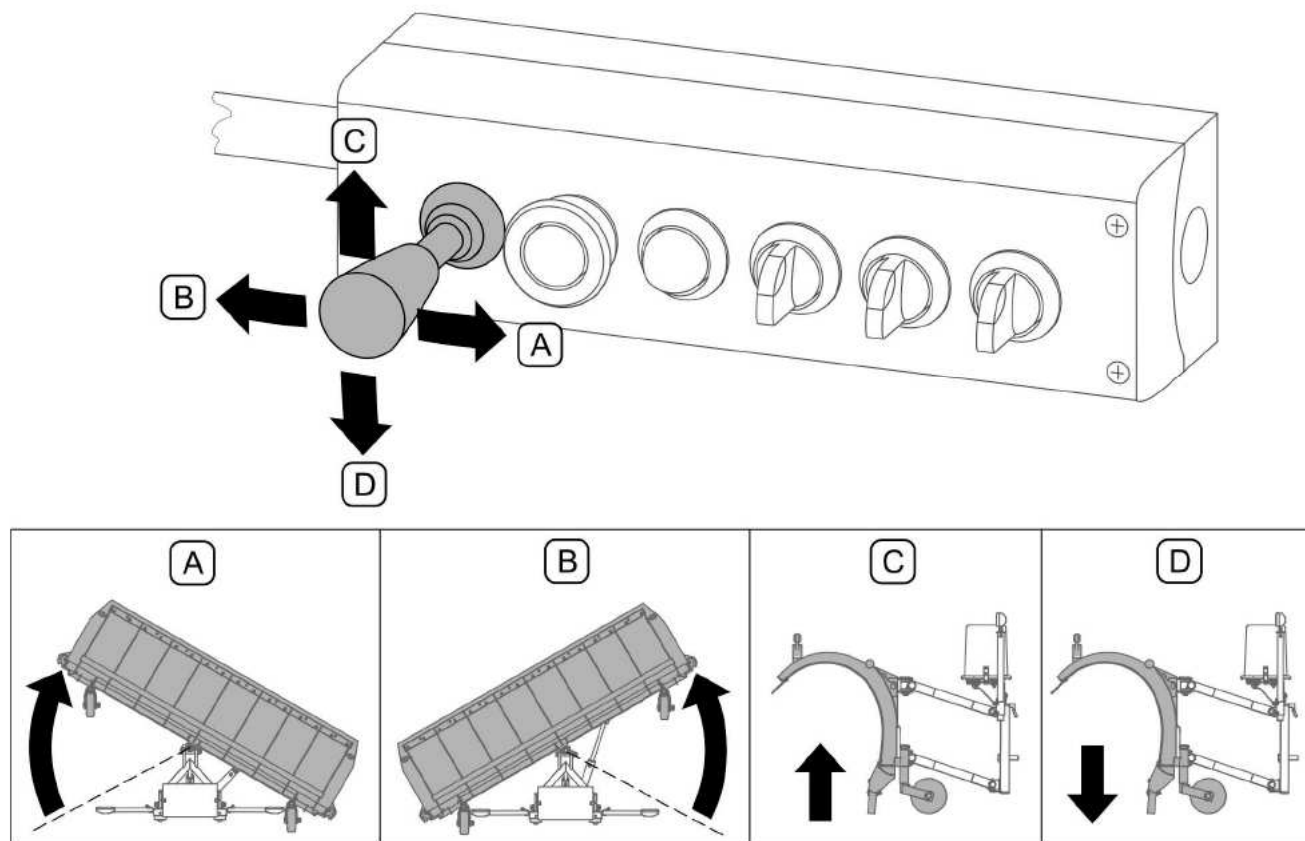


FIG. 4.12 Setting working position

(A) - turning mouldboard to the right; (B) - turning mouldboard to the left; (C) - lifting; (D) - lowering

PU-S25H / PU-S32H / PU-S35H ploughs can be set in two fixed working positions and intermediate positions. In order to change the plough working position, the control panel should be ON (main switch should be set to position „I“). Plough mouldboard position is changed by means of multifunction lever (FIG. 4.12). When the multifunction lever is set to the right position (A), the mouldboard turns to the right. When the multifunction lever is set to position (B), the mouldboard turns to the left. The plough lifting takes place when the multifunction lever is moved forward to position (C). To lower the plough, move the lever backwards to position (D). To set the mouldboard in intermediate position, release pressure on the multifunction lever at a proper moment. The lever will be set in the central (neutral) position.



DANGER

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

**IMPORTANT!**

Do NOT operate the plough while reversing. The plough should be raised while reversing.

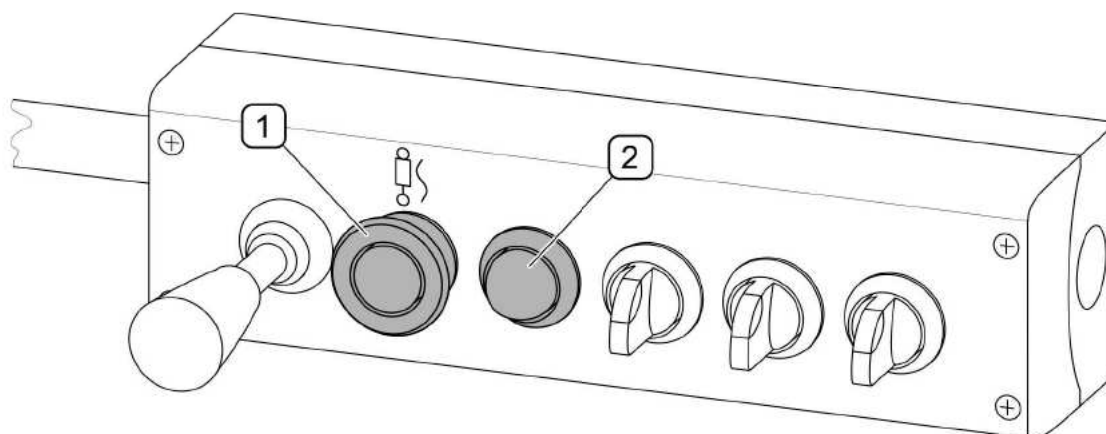


FIG. 4.13 floating function switch

(1) - floating function switch; (2) - floating function activation lamp.

floating function (FIG. 4.13) is switched on with push-button (1). Activation of floating function is signalled by green lamp (2). When push-button (1) is pressed again, floating function and lamp (2) are switched off. Floating function enables ground surface tracking during snow clearing i.e. the plough linkage system can adjust to uneven surface. Floating function protects the plough against damage during operation.

**DANGER**

After activation of floating function with the plough in lifted position, the plough mouldboard will lower until it is supported on the ground.

**IMPORTANT!**

The use of floating function during snow clearing is recommended in order to protect the plough against damage. Carrying vehicle weight must not be transferred to the plough.

4.5.3 HYDRAULIC PRESS-DOWN FUNCTION (OPTION)

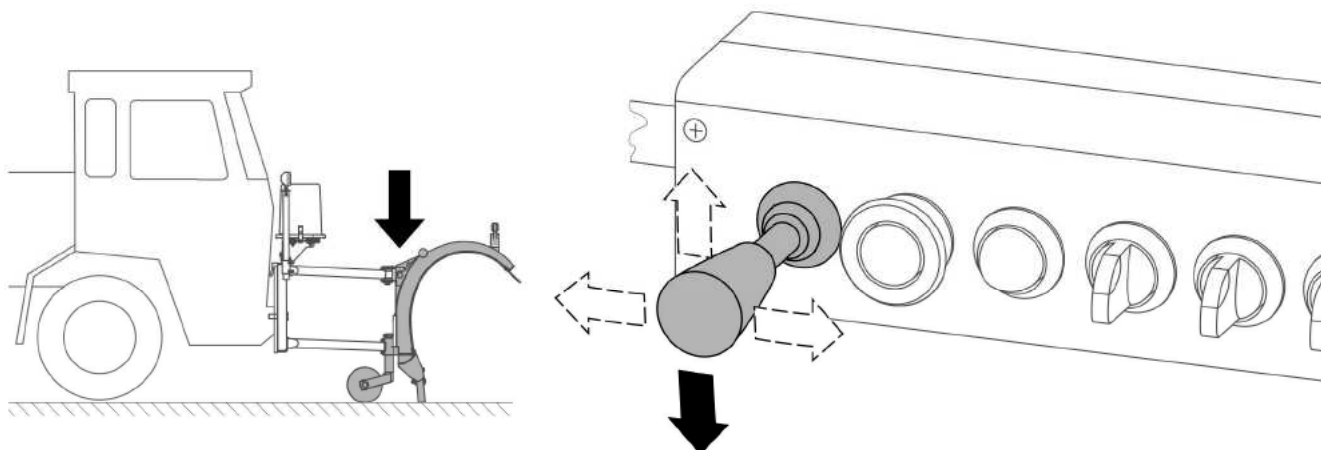


FIG. 4.14 Hydraulic press-down function

In ploughs with hydraulic press-down function (option), after lowering the plough and holding the multifunction lever in "lowering" position, the plough blades are pressed down to the ground. When the lever is released, hydraulic press-down function is switched off.

IMPORTANT!



Prolonged operation with hydraulic press-down function activated causes excessive wear of plough blades, discharging of batteries, activation of thermal protection of electric motor in electro-hydraulic power supply.

Hydraulic press-down function is recommended to be used only if the plough is equipped with rubber plough blades with shock absorbers or rigid rubber plough blades and if the plough wheels are dismantled or lifted.

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.

Working height adjustment (FIG. 4.15) in ploughs equipped with wheels is carried out by proper setting of wheel height. Wheel 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. Wheels are recommended to be set in such a manner as to ensure that the plough blade lightly touches cleaned surface. Right and left wheel heights should be the same.

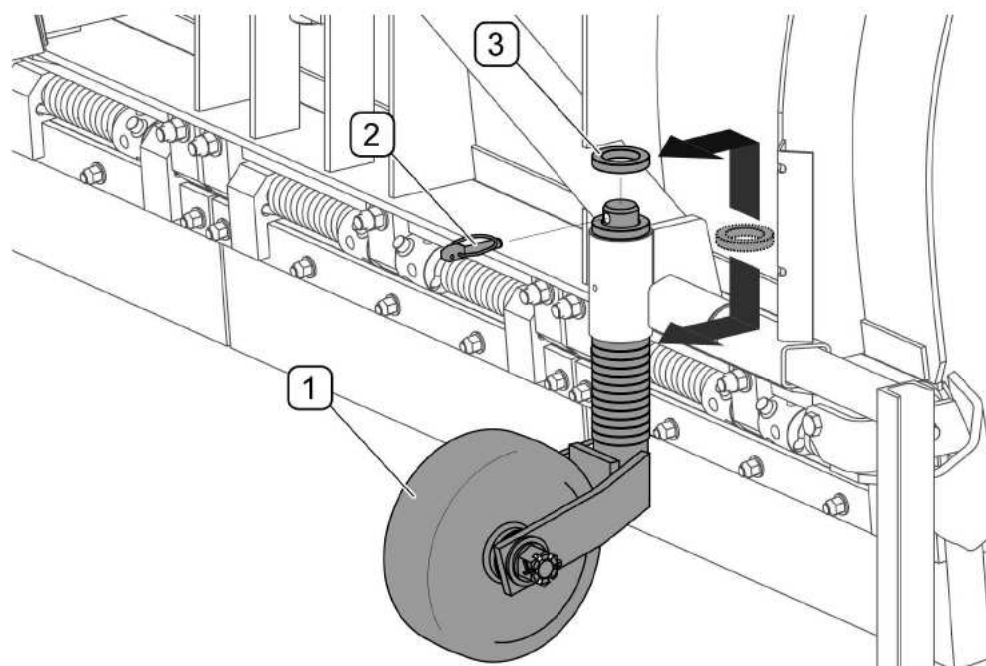


FIG. 4.15 Working height adjustment

(1) - wheel; (2) - securing cotter pin; (3) - spacer washer

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 or promenade special attention should be paid to the bystanders likely to be near the working machine. Listed below are the key guidelines.

- Before moving off make sure that there are no bystanders, especially children, near the machine and the carrying vehicle. Take care that the driver has sufficient visibility.
- Make sure that the plough is correctly attached to the 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 and additional lights of the plough.
- While working a plough turn the orange beacon light.

- Avoid ruts, depressions, ditches or driving on roadside slopes. Driving across such obstacles could cause the machine and the carrying vehicle 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 plough raised reduce speed due to dynamic loads and the risk of damaging the machine or carrying vehicle.
- When transporting a raised plough, protect the linkage against falling or accidental dropping with transport lock (FIG. 4.16).

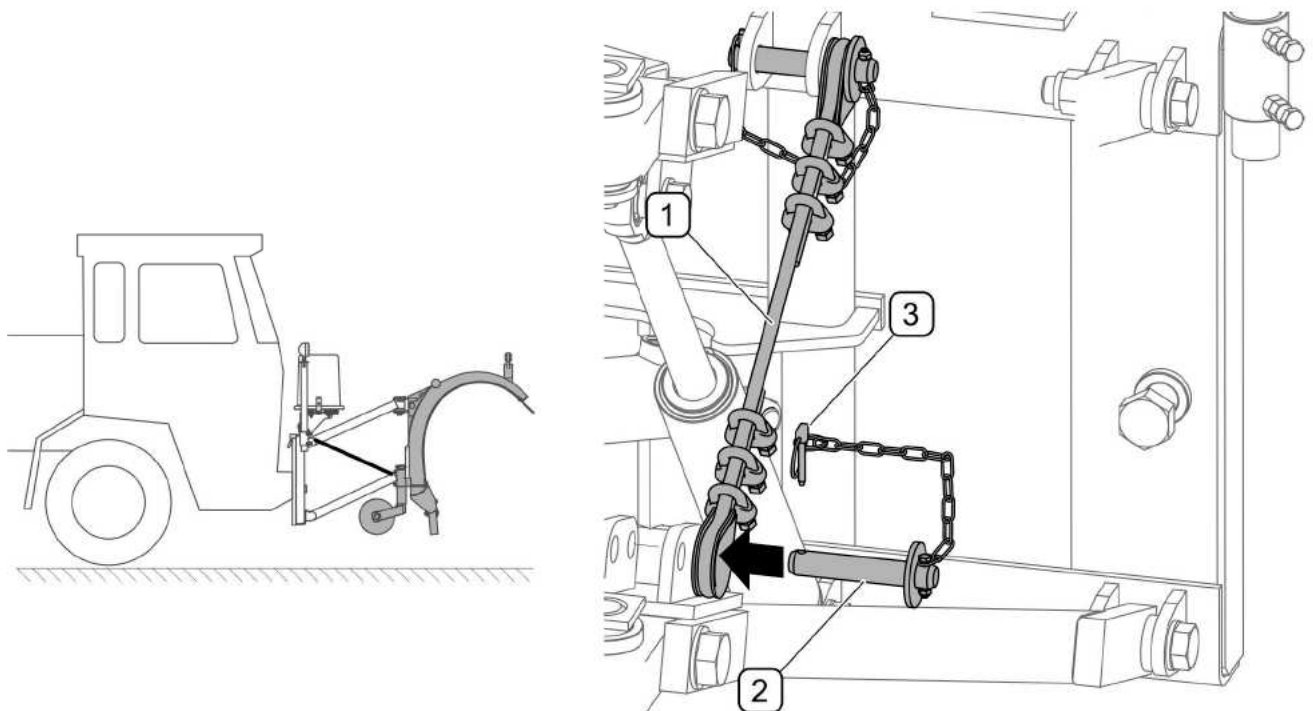


FIG. 4.16 Transport lock mounting

(1) - cable; (2) - pin; (3) - cotter pin

In order to protect the linkage system in transport position (FIG. 4.16):

- raise the plough to the extreme upper position, immobilise the vehicle with parking brake,
- connect the plough linkage frame to lower rocker arm using cable (1) and pins (2),
- secure the pins with linchpins (3).

4.7 DISCONNECTING THE PLOUGH

To disconnect the plough, park the carrying vehicle with the plough on level surface and immobilise with parking brake. Install both parking stands (FIG. 4.17).

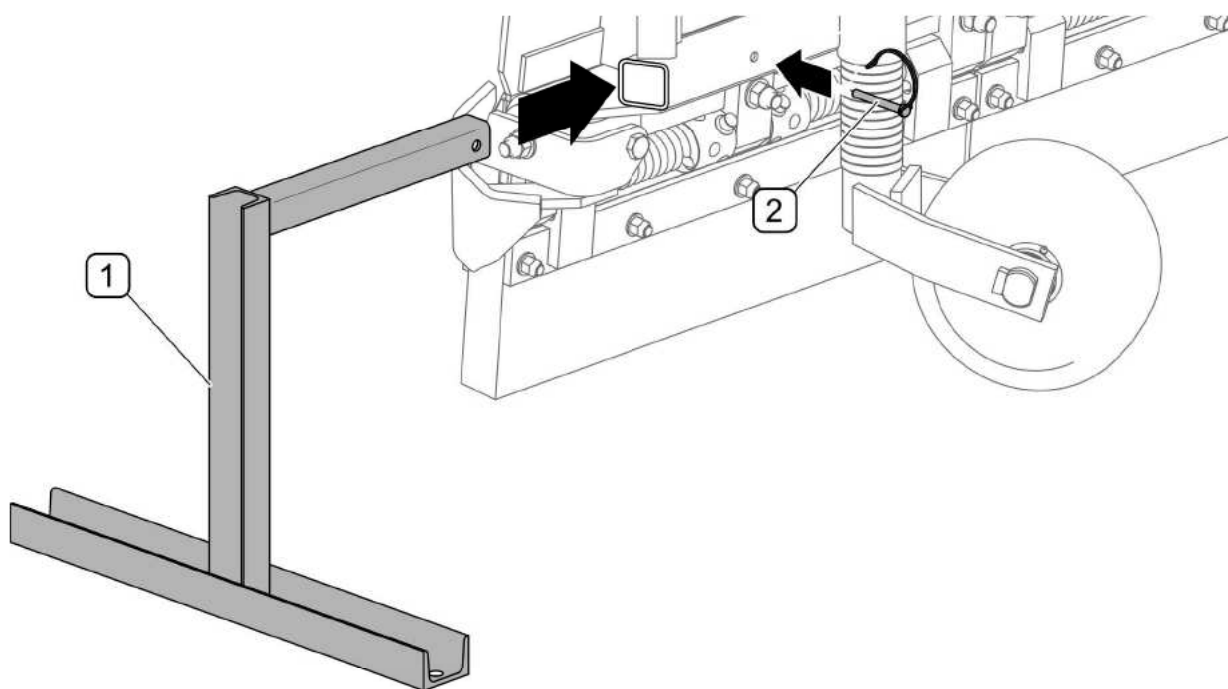


FIG. 4.17 **Installing the parking stands**

(1) - parking stand; (2) - locking linchpin

Successive stages of plough disconnecting (FIG. 4.18):

- 1) Set floating position for a short time and lower the plough until it fully rests on the ground.
- 2) Unscrew two bolts fixing the plough linkage frame.
- 3) Set "linking" switch (FIG. 4.10) on the control panel to (I) "ON" position. Using the control panel, set the plough linkage in such a manner as to position the mounting hooks above the seats of the carrying vehicle head plate.
- 4) Drive the carrying vehicle about 30 cm away from the plough and engage the parking brake.
- 5) Disconnect the plough supply conduit plug from the socket installed on the front of the carrying vehicle.
- 6) Disconnect the control panel from the electro-hydraulic power supply box.

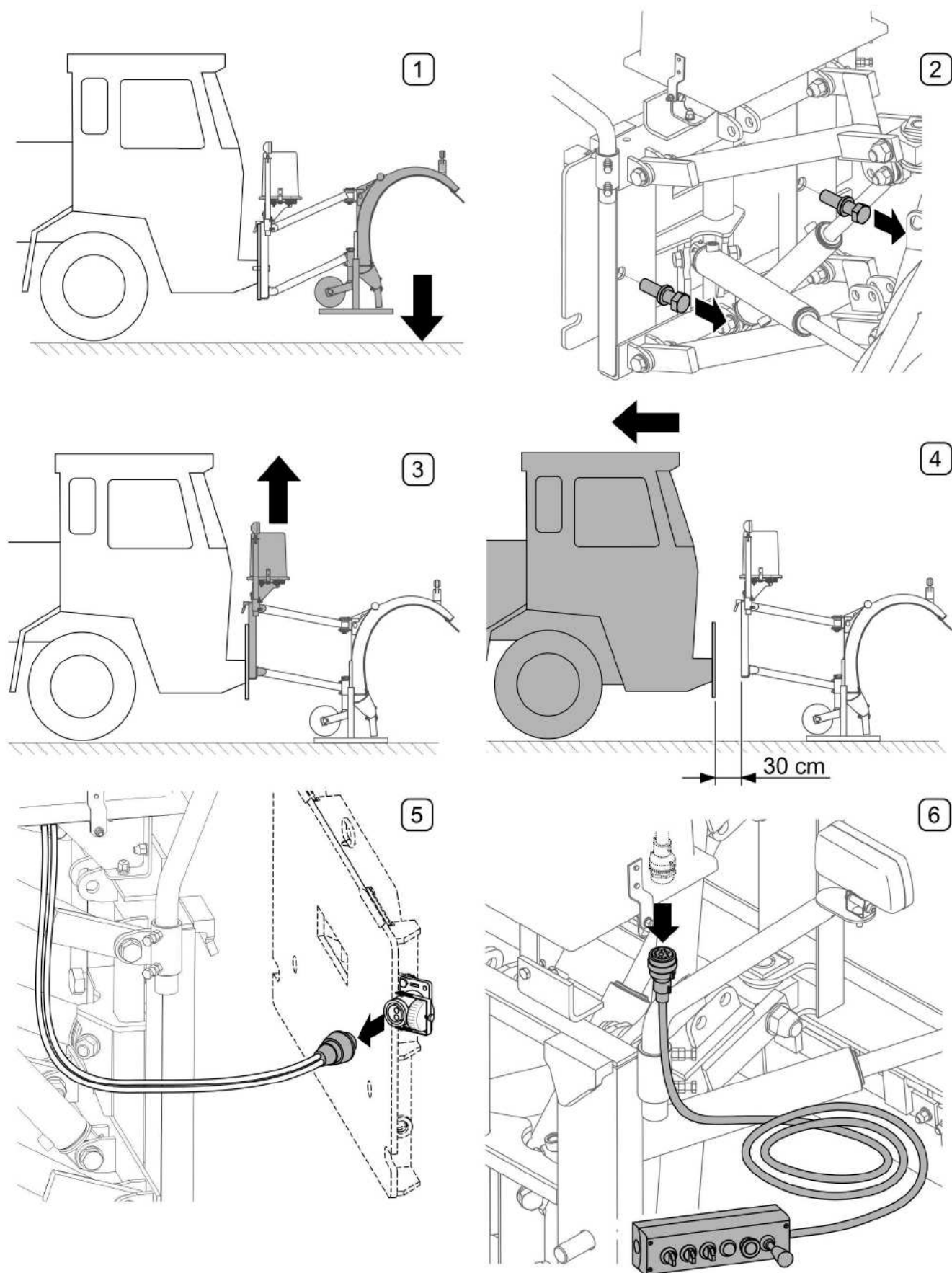


FIG. 4.18 **Disconnecting the plough from the carrying vehicle**
 (1,2,3,4,5,6) - successive stages of disconnecting the plough from the carrying vehicle

4.8 INSTALLATION OF ADDITIONAL EQUIPMENT

4.8.1 INSTALLATION OF HIGH CURRENT SOCKET IN THE CARRYING VEHICLE



ATTENTION!

Work on electrical system must be carried out by suitably qualified personnel.

Proper high current socket installed on the front of the carrying vehicle is required for plough operation. If the carrying vehicle is not equipped with such a socket or is equipped with a different type of socket, carry out the socket installation according to the diagram (FIG. 4.19).

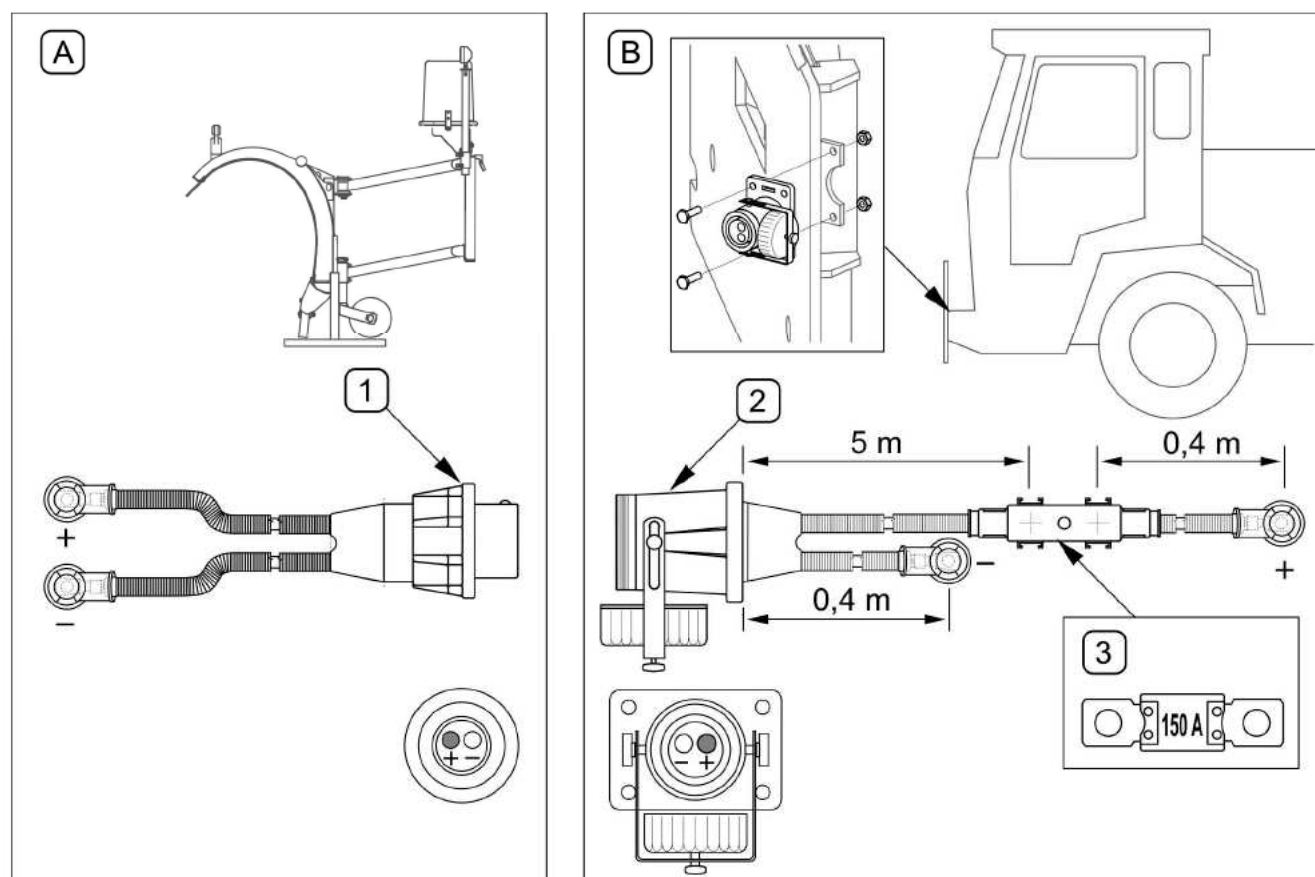


FIG. 4.19 Installation diagram of the plough electrical supply system

(A) - the plough electrical system components; (B) - 220N-70020000 plough supply conduit ;
(1) - plug; (2) - socket; (3) - MEGAVAL 150A fuse

Supply conduit (B) of 220N-70020000 plough has a 150A MEGAVAL fuse installed on „+” supply conduit.

4.8.2 INSTALLING WHEELS

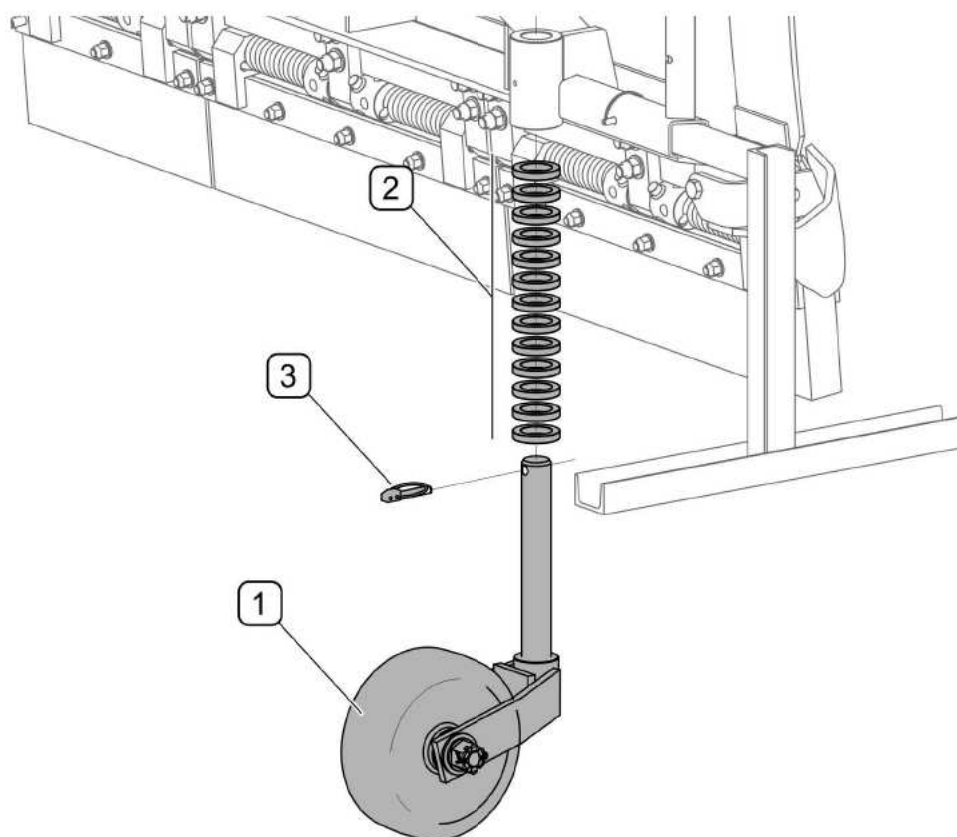


FIG. 4.20 **Installing wheels**

(1) - wheel; (2) - spacer washers; (3) - securing cotter pin

The plough has special sleeves on the frame for mounting 2 wheels (option), catalogue No. 220N-30000000. Slide a wheel (1), together with a bracket, from below to the sleeve and install a sufficient number of spacer washers (2) and protect with a linchpin (3). Wheel adjustment method is described in point **SETTING WORKING HEIGHT 4.5.4 SETTING WORKING HEIGHT**. Wheels must be always used in the plough equipped with metal plough blades with shock absorbers.

4.8.3 INSTALLING FENDERS

Optionally, the plough can be equipped with the right fender and the left fender, which are used for protecting the plough blades' sides during working near kerbs. Fenders (FIG. 4.21) are mounted to the plough frame with bolts (2), washers (4) and nuts (3). The right fender and the left fender are mounted in the same way.

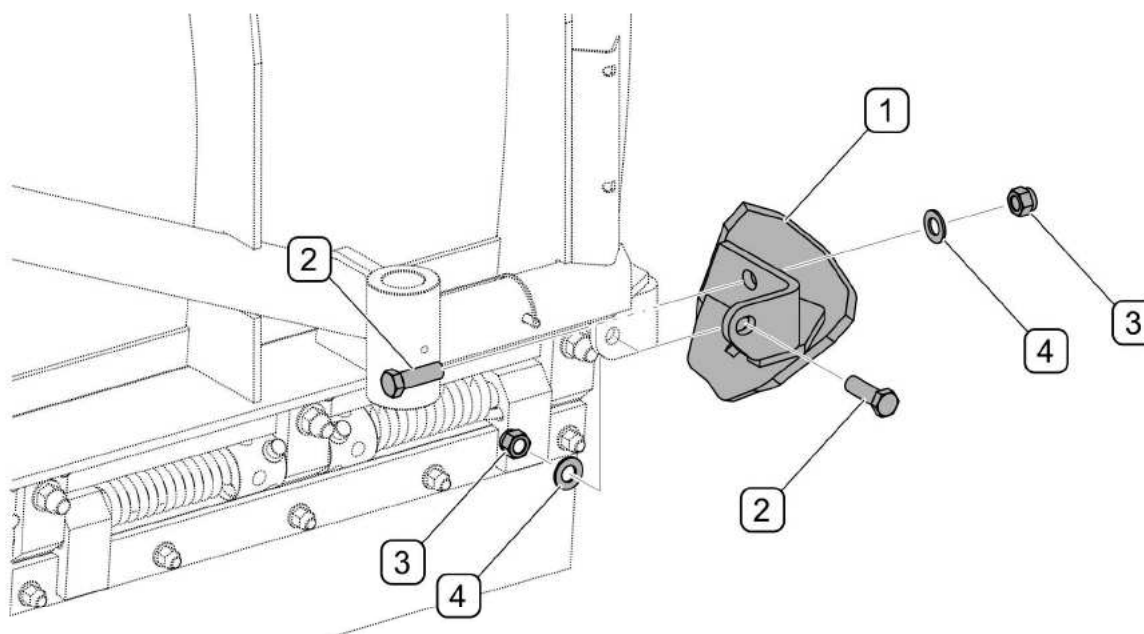


FIG. 4.21 Installing fenders

(1) - fender; (2) - M16x50-8.8 bolt; (3) - M16 nut; (4) - 16-100HV washer

Fender type depends on the type of collecting blades (TAB. 4.2)

TAB. 4.2 Fender types

COLLECTING PLOUGH BLADE TYPE	FENDER NAME AND CATALOGUE NO.
plough blades with shock absorbers rubber or metal	Right fender, complete 220N-07000000P
	Left fender, complete 220N-07000000L
rigid rubber plough blades	Right fender, complete 220N-10000000P
	Right fender, complete 220N-10000000L

SECTION

5

MAINTENANCE

5.1 CHECKING AND REPLACEMENT OF COLLECTING PLOUGH BLADES



DANGER

During inspection and replacement of plough blades, switch off vehicle's engine and remove the key from the ignition.



DANGER

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

Excessively worn or damaged plough blades must be replaced.

Before replacing the plough blades, support the plough with parking stands, turn off the engine and immobilise vehicle with parking brake.

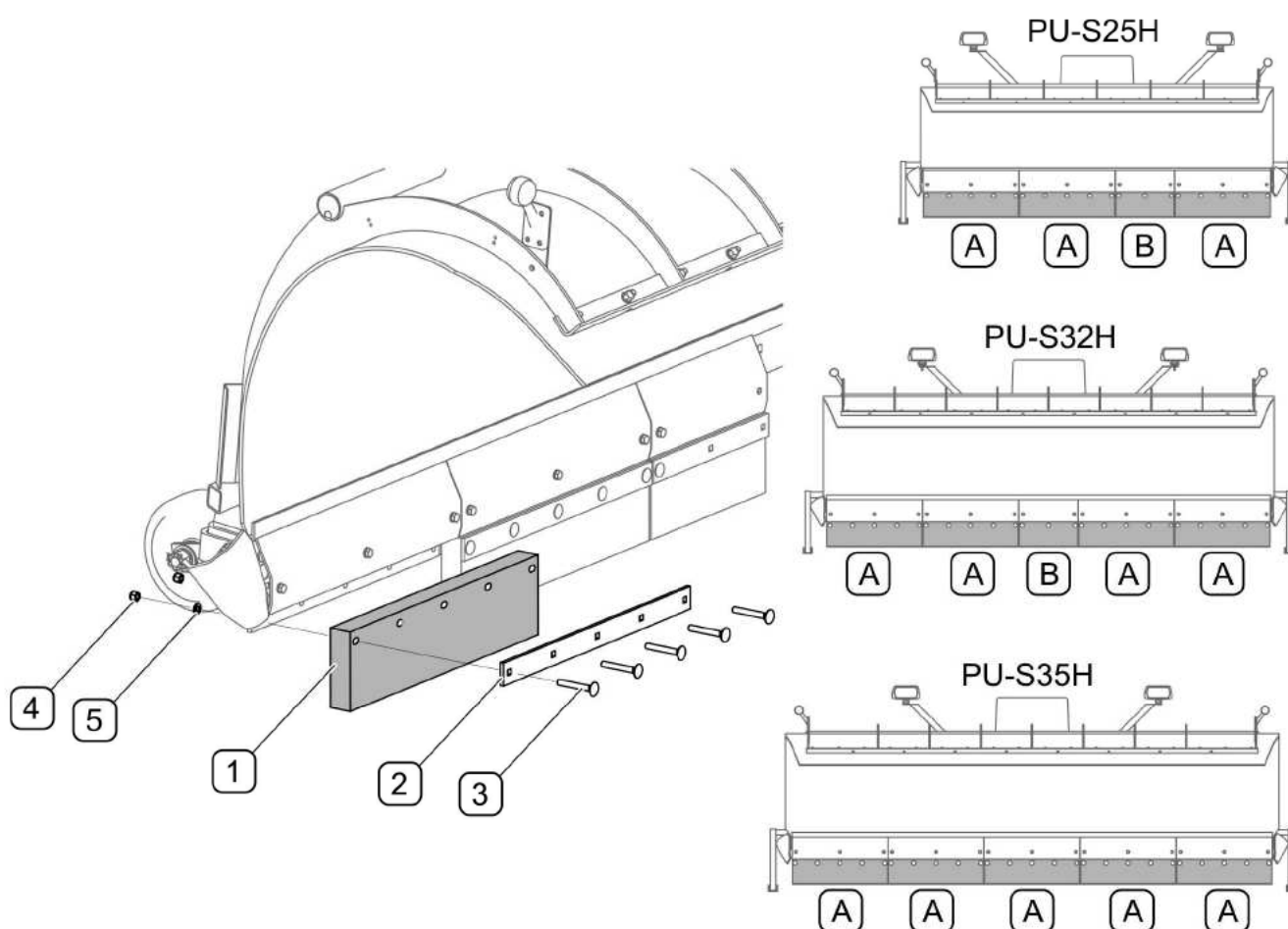


FIG. 5.1 Replacement of rubber plough blades

(1) - rubber plough blade; (2) - clamping strip; (3) - Z M12x90-8.8 bolt; (4) - M12 nut; (5) - Z12,2 spring washer; (A) - long segment; (B) - short segment

To remove a rubber plough blade (FIG. 5.1), unscrew nuts (4) of an appropriate segment, remove bolts (3) and remove the clamp strip (2). Fit an appropriate segment of plough blade (A) or (B), depending on the plough model (TAB. 5.1). Install in reverse order.

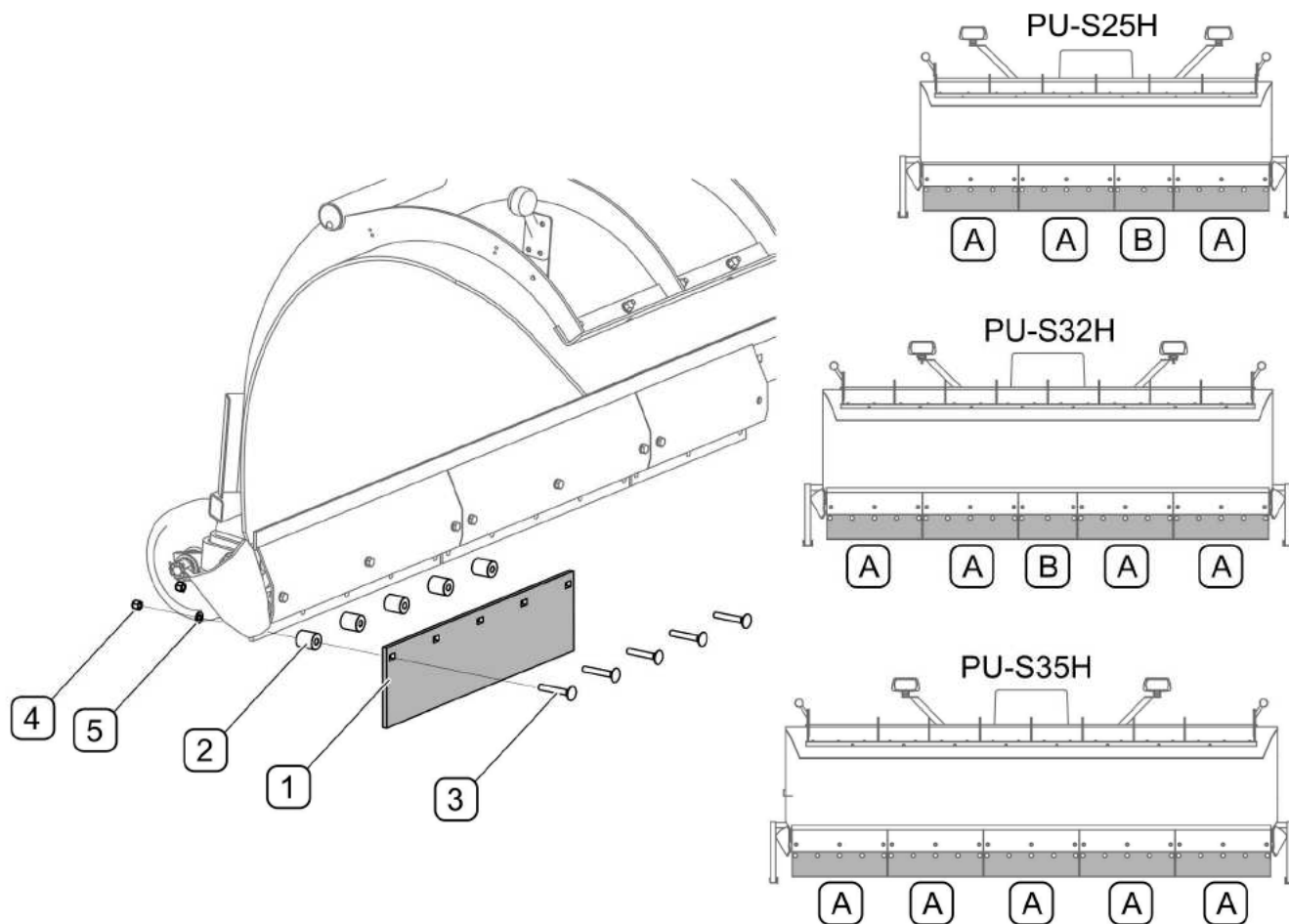


FIG. 5.2 Replacement of metal plough blades

(1) - metal plough blade; (2) - sleeve; (3) - Z M12x80-8.8 bolt; (4) - M12 nut; (5) - Z12,2 spring washer; (A) - long segment; (B) - short segment

To remove a metal plough blade (FIG. 5.2), unscrew nuts (4) of an appropriate segment, remove bolts (3) and sleeves (2). Fit an appropriate segment of plough blade (A) or (B), depending on the plough model (TAB. 5.2). Install in reverse order.

TAB. 5.1 Types of rubber plough blades, depending on the plough model

Marking FIG. 5.1	Name/ catalogue No.	PU-S25H	PU-S32H	PU-S35H
		Number of items		
A	Long rubber plough blade / 220N-05000006	3	4	5
B	Short rubber plough blade / 220N-05000006-01	1	1	—

TAB. 5.2 Types of metal plough blades, depending on the plough model

Marking FIG. 5.2	Name/ catalogue No.	PU-S25H	PU-S32H	PU-S35H
		Number of items		
A	Long metal plough blade / 220N-08000001	3	4	5
B	Short metal plough blade / 220N-08000001-01	1	1	—

**ATTENTION!**

Each time the plough hits an obstacle, technical condition of plough blades and their mounting should be checked.

5.2 HYDRAULIC SYSTEM OPERATION

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

- checking oil level and changing oil in the tank of the electro-hydraulic power supply;
- checking tightness of cylinders hydraulic connections,
- checking technical condition of hydraulic conduits;

**DANGER**

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

**ATTENTION!**

Before you begin, visually inspect the hydraulic system components.

The tank of the electro-hydraulic power supply has a filler plug with an oil level dipstick. To check oil level in the tank:

- set the plough in such a manner as to ensure that the oil tank (1) is positioned horizontally,
- unscrew nuts (5) and remove housing (3),
- unscrew filler plug (2) and check the oil level on the oil level dipstick,

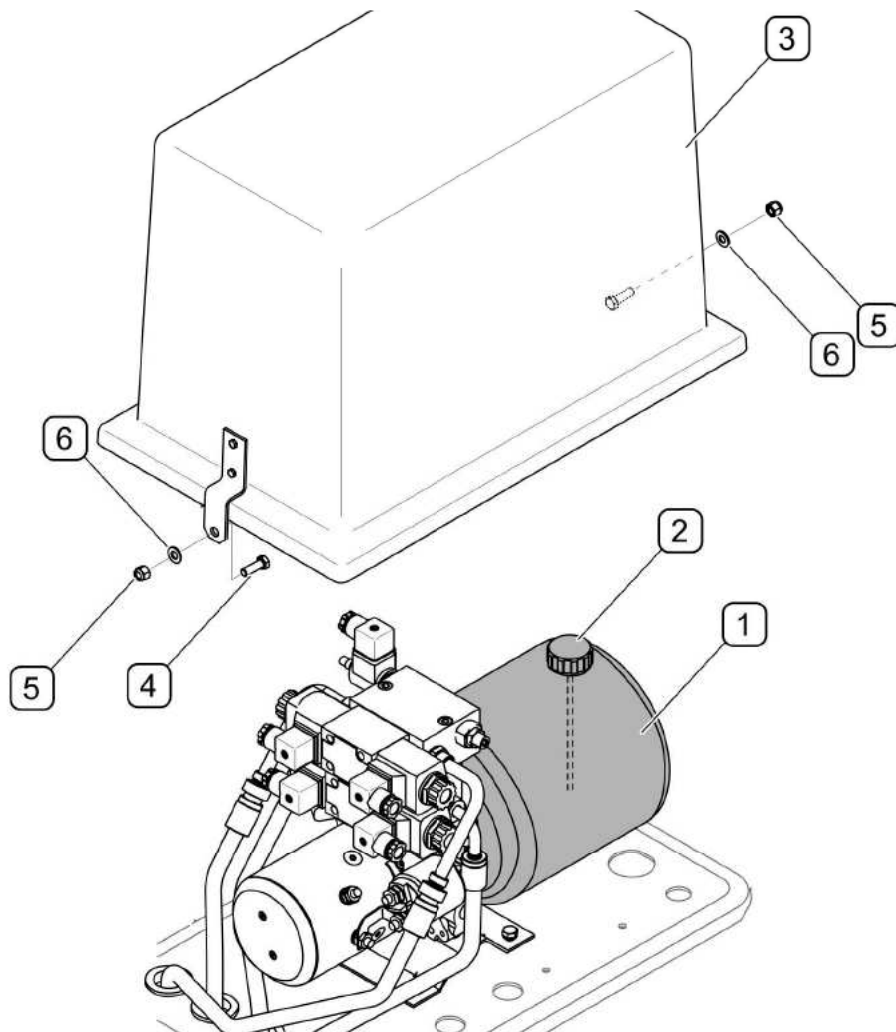


FIG. 5.3 **Checking oil level**

(1) - oil tank; (2) - filler plug with an oil level dipstick; (3) - housing of electro-hydraulic power supply; (4) - M8x25 bolt; (5) - M8 nut; (6) - washer 8

**TIP**

The plough's hydraulic system is factory filled with 4 litres of HL32 hydraulic oil.



It is recommended to change oil the electro-hydraulic power supply tank once a year (after the season).

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.

TAB. 5.3 HL32 HYDRAULIC OIL CHARACTERISTICS

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

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

The hydraulic system should be completely tight sealed. Inspect the seals when hydraulic 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.

5.3 ELECTRICAL SYSTEM OPERATION,

Electrical system maintenance is conducted during the periodical checking the operation of control and lighting system. To replace bulb (2) of clearance lamp (A), take out lens (1) from flexible housing (FIG. 5.4). Bulb (4) in additional light (B) is accessible after unscrewing screws (5) and removing lens (3). List of lighting elements is included in TAB. 5.4

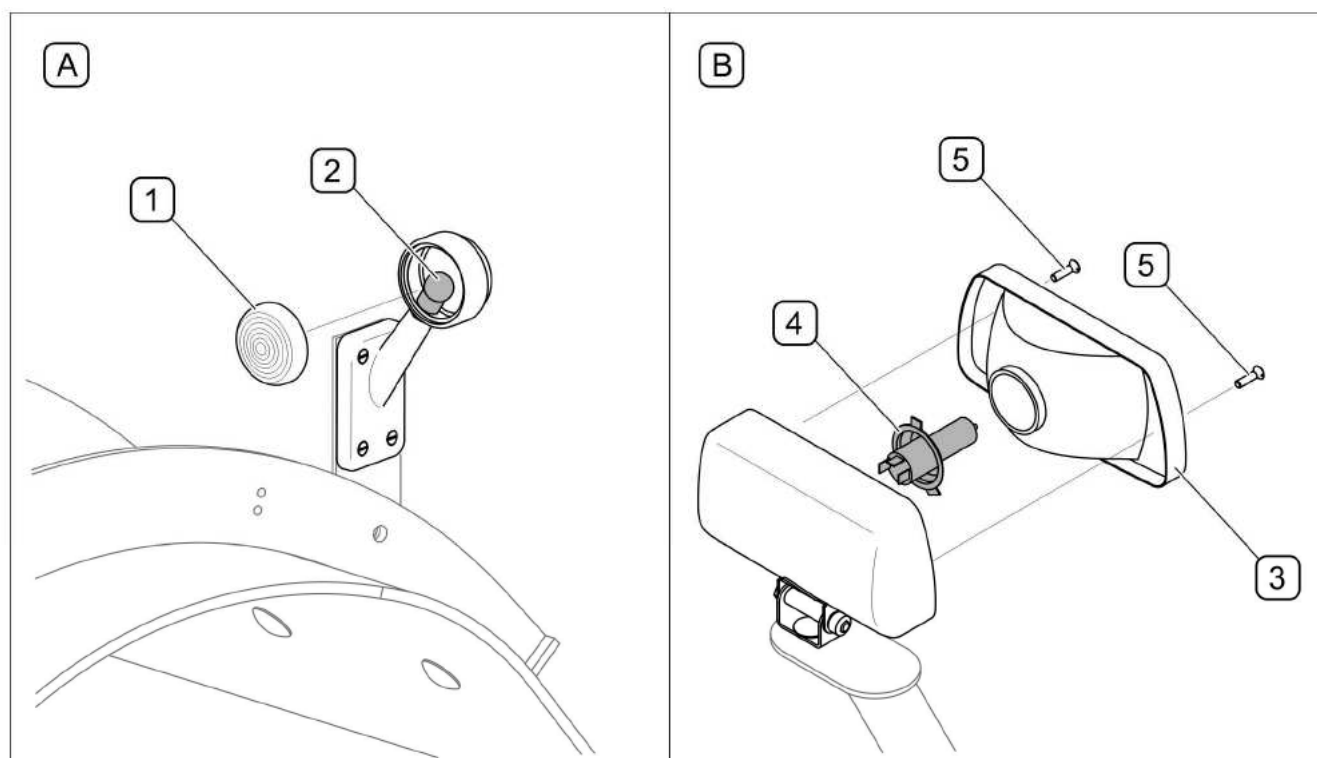


FIG. 5.4 Change bulbs

(A) - clearance lamp; (B) - additional light; (1) - clearance lamp lens; (2) - R5W 12V bulb (or 24V, depending on the carrying vehicle's electrical system); (3) - light lens; (4) - H4 75/70W 12V bulb (or 24V, depending on the carrying vehicle's electrical system)



DANGER

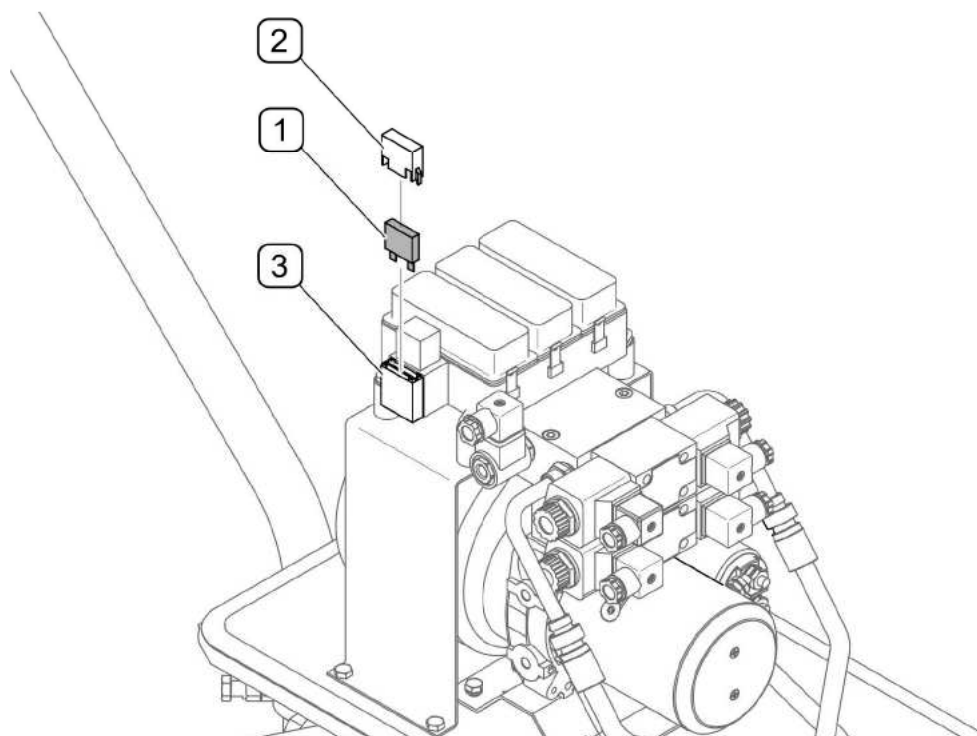
Do not independently repair electrical system, except items described in chapter ELECTRICAL SYSTEM MAINTENANCE. All electrical system repairs must be performed only by suitably qualified personnel.

TAB. 5.4 LIST OF LIGHTING COMPONENTS

LAMP TYPE	BULB TYPE	NUMBER OF ITEMS.
Right clearance lamp 127 023 00 00	R5W, 12V (or 24V*)	1
Left clearance lamp 127 022 00 00	R5W, 12V (or 24V*)	1
Front light RE.25677. H4	H4 75/70W, 12V (or 24V*)	2

* - depending on the carrying vehicle's electrical system

Fuse (1) of the plough's electrical system is located under the cover of electro-hydraulic power supply, next to the relay box. To check the fuse, remove housing (2) and take the fuse out of the base (3). Blown fuse should be replaced with a new 20A MAXIVAL fuse.

**FIG. 5.5 Fuse of the plough's electrical system**

(1) - 20A MAXIVAL fuse ; (2) - housing; (3) - fuse base

If the vehicle's electrical system is equipped with a 220N-70020000 supply wiring harness made by PRONAR, additional 150A MEGAVAL fuse (1) is located inside the housing (2) on „+” supply conduit FIG. 5.6).

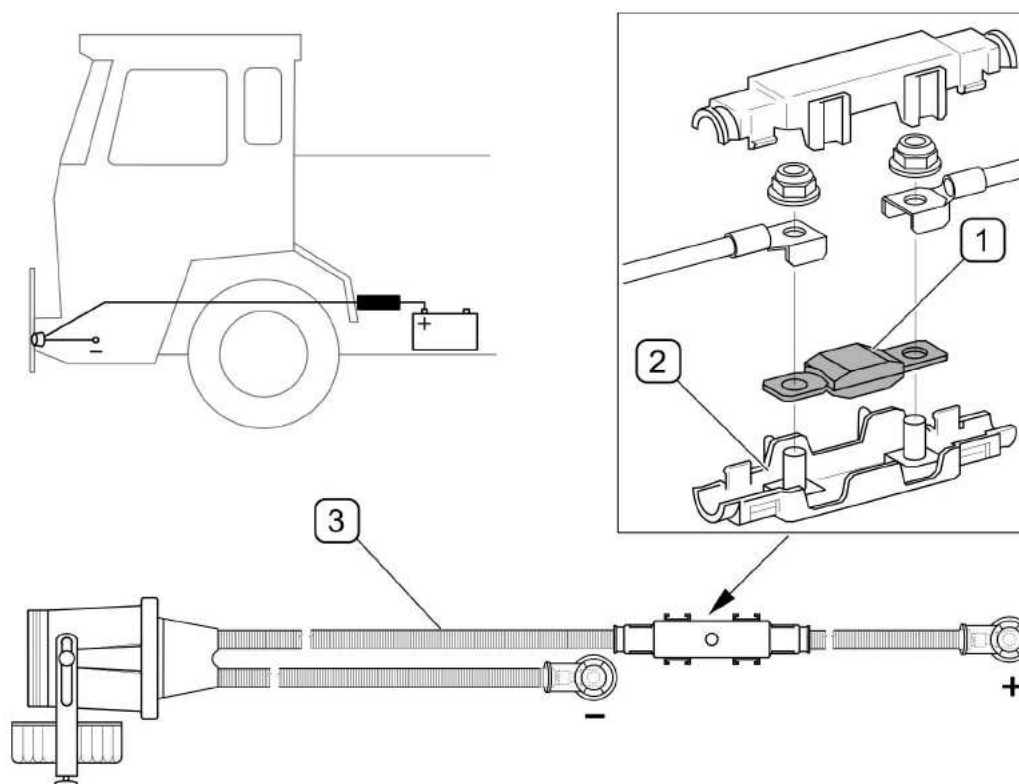


FIG. 5.6 Fuse of the carrying vehicle's electrical system

(1) - 150A MEGAVAL fuse; (2) - fuse housing; (3) - supply wiring harness with a high current socket

5.4 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. LT-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 lubricating, switch off engine, remove key from ignition and engage carrying vehicle brake.



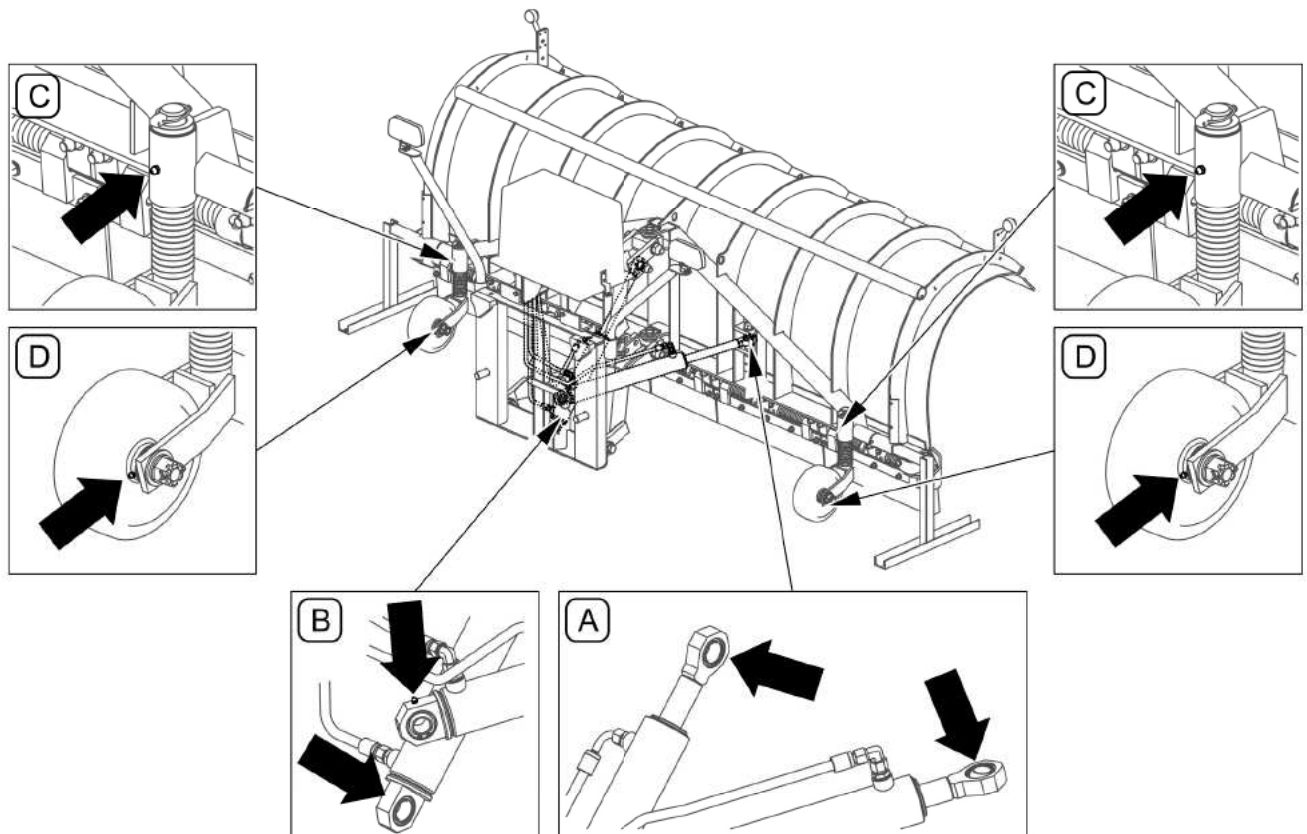
When using the mower the user is obliged to observe lubrication instructions according to attached schedule. Excess lubrication substance causes depositing additional contaminants in places requiring lubrication, therefore it is essential to keep individual machine elements clean.

TAB. 5.5 LUBRICATION POINTS AND LUBRICATION FREQUENCY

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
A	Cylinder ram eye	2	permanent grease	50 hours
B	Hydraulic cylinder eye	2		50 hours
C	Wheel rotation sleeve*	2		50 hours
D	Wheel bearings *	2		10 hours

* – if wheels are installed

Marking description in Item column (TAB. 5.5) conforms with numbering shown (FIG. 5.7)

**FIG. 5.7 Lubrication points**

Lubrication points described in table 5.5

5.5 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 the plough 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.

Plough should be placed on parking stands. Control panel should be disconnected from the plough and protected against adverse weather conditions.

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 torque values apply to non-greased steel bolts TAB. 5.6



ATTENTION!

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

TAB. 5.6 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

The above-mentioned parameters do not apply to places featuring special engineering solutions

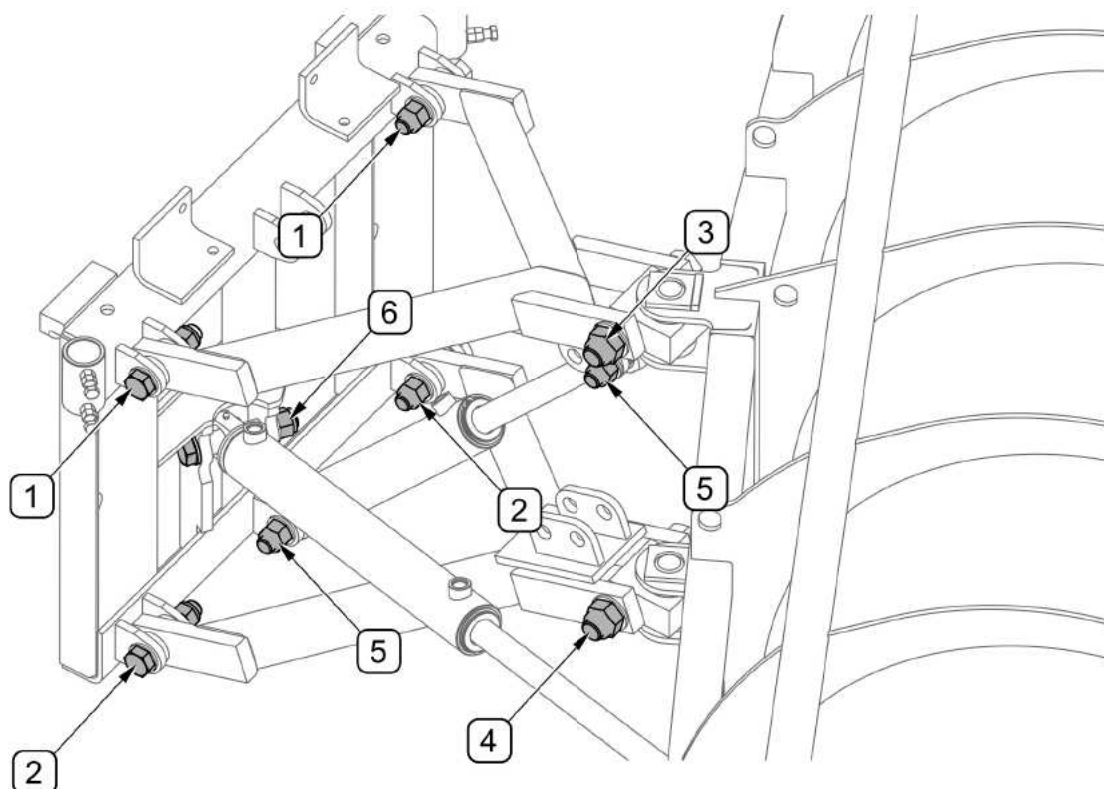


FIG. 5.8 Special engineering solutions

Marking description is presented in TAB. 5.7



ATTENTION!

Fasteners in the places featuring special engineering solutions (FIG. 5.8) should be tightened only to eliminate clearance.

TAB. 5.7 SPECIAL ENGINEERING SOLUTIONS

MARKING (FIG. 5.8)	CONNECTION NAME	NUMBER OF LOCATIONS
1	Fixing of upper rocker arm to the linkage frame	2
2	Fixing of lower rocker arm to the linkage frame	2
3	FIXING OF UPPER ROCKER to mouldboard	1
4	FIXING OF LOWER ROCKER to mouldboard	1
5	Fixing of lifting cylinder	2
6	Fixing of turn cylinder	2

5.7 TROUBLESHOOTING

TAB. 5.8 TROUBLESHOOTING

TYPE OF FAULT	CAUSE	REMEDY
Plough position cannot be changed	The electrical system is not connected to the carrying vehicle	Connect the connector to high current socket in the carrying vehicle.
	Control panel is not connected	Connect control panel
	Main switch of control panel is off	Set main switch of control panel in „I” position
	Transport position lock is engaged	Disengage transport position lock
	Fuses are blown	Check and, if necessary, replace the fuse of the plough electrical system and the fuse in the supply conduit in the carrying vehicle (if installed)
	Overheated electric motor of the electro-hydraulic power supply	Wait until the motor is has cooled down
	Electro-hydraulic power supply is damaged	Repair at authorised service point
	The plough hydraulic system is damaged	Repair at authorised service point
Plough scoops snow unevenly	Incorrectly positioned wheels	Check and adjust according to operator's manual
	Excessively worn collecting plough blades	Check and replace if necessary
No lighting	Electrical system not connected	Connect electrical system
	Burned-out bulb in lamp	Replace light bulbs
	The plough electrical system is damaged	Repair at authorised service point
	Control panel components are damaged	Repair at authorised service point

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