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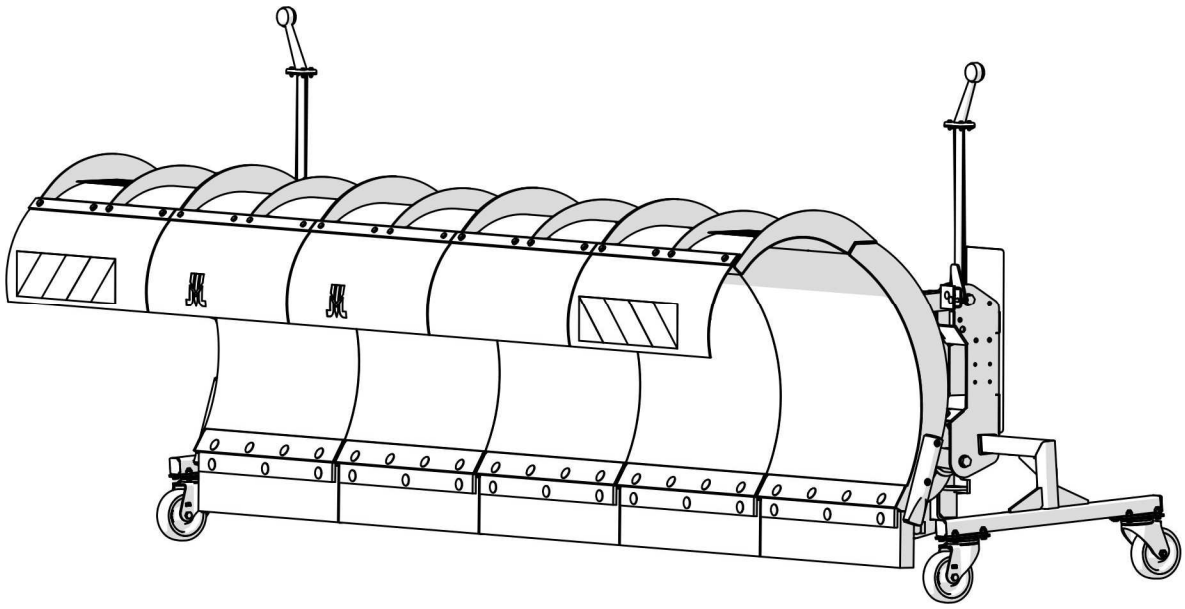
OPERATOR`S MANUAL

SNOW PLOUGH

PRONAR PUS-S27 / PUS-S32 / PUS-S34 / PUS-S36 / PUS-S40

TRANSLATION OF THE ORIGINAL COPY OF THE MANUAL



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SNOW PLOUGH

PRONAR PUS-S27 / PUS-S32 / PUS-S34 / PUS-S36 / PUS-S40

MACHINE IDENTIFICATION

TYPE: ……

SERIAL NUMBER: | | | | | | |

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

The manual describes the basic safety rules and operation of snow plough. If the information stated in the Operator's Manual needs clarification then the user should refer for assistance to the sale point where the machine was purchased or to the Manufacturer.

MANUFACTURER'S ADDRESS:

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SYMBOLS APPEARING IN THIS OPERATOR'S MANUAL

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

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

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

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

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

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

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:	**PUS-S27**	**PUS-S32**	**PUS-S34**	**PUS-S36**	**PUS-S40**
Model:	–	–	–	–	–
Serial number:					
Commercial name:	**Snow plough PRONAR PUS-S27** **Snow plough PRONAR PUS-S32** **Snow plough PRONAR PUS-S34** **Snow plough PRONAR PUS-S36** **Snow plough PRONAR PUS-S40**				

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.

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

Narew, the 2014-12-01

Place and date

Full name of the empowered person
position, signature

TABLE OF CONTENTS

SECTION

1

BASIC INFORMATION

1.1 IDENTIFICATION

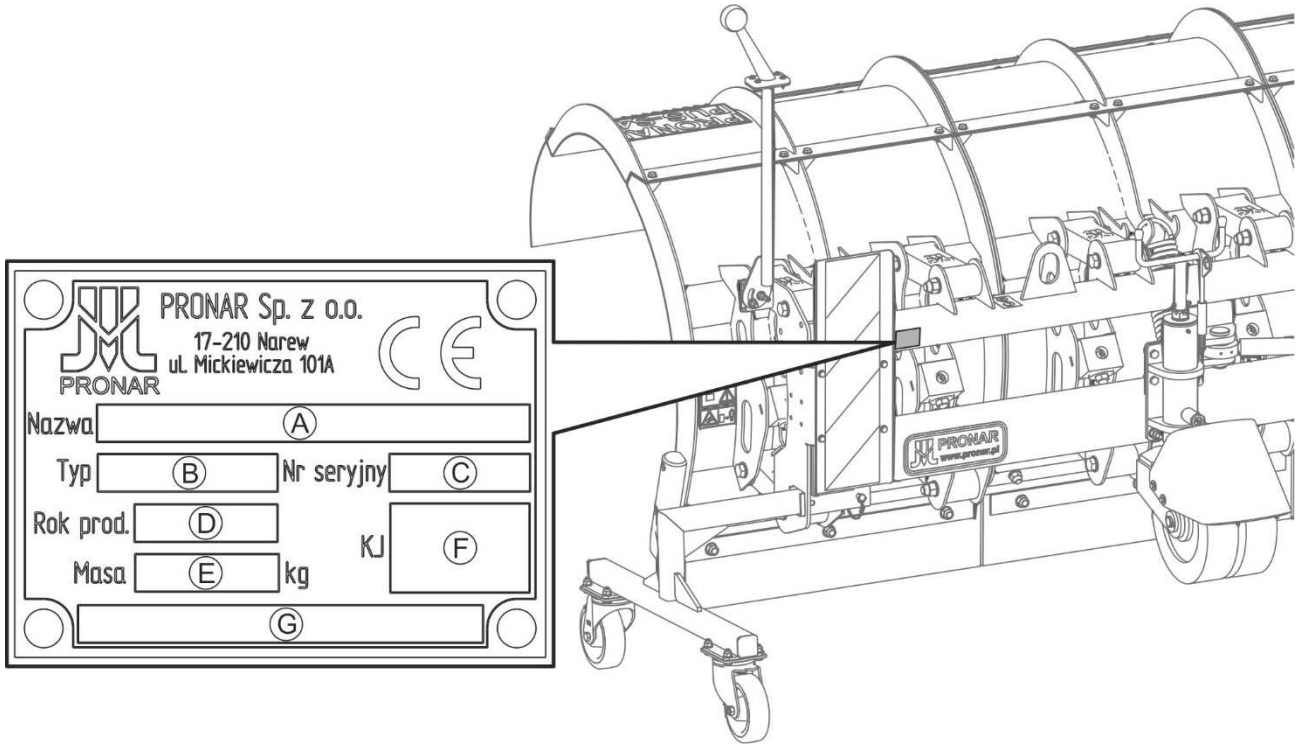


FIGURE 1.1 Location of the data plate

Meaning of data plate items (FIGURE 1.1):

A - machine name

B – type

C – serial number

D – year of manufacture

E – machine tare weight [kg]

F – Quality Control stamp

G – additional information e.g. supply voltage

The factory number is stamped into the data plate and on the machine frame beside 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 PUS-S27 / PUS-S32 / PUS-S34 / PUS-S36 / PUS-S40 snowploughs are designed for removing loose or packed snow and snowdrift from roads, squares and other hard road surfaces such as asphalt, concrete paving blocks, paving and concrete. The use of the machine for other purposes should be regarded as improper.

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 snowploughs can be mounted on trucks and special vehicles that are equipped with the front mounting plate 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 the vehicle and are familiar with the road traffic regulations and transport regulations.

ATTENTION

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 Carrying vehicle requirements

		REQUIREMENTS
Mounting method	-	Front mounting plate acc. to DIN 76060 - TYPE A, TYPE B (option) or SETRA (option)
Electrical system		Installed power supply wiring harness with a socket (snowplough equipment)
Electrical system voltage	V	24
Hydraulic system		
Snowplough's hydraulic system:		Number of quick couplers in a carrying vehicle:
- 2 pairs of quick couplers (size: ½" ISO 16028)	-	2 pairs of hydraulic quick coupler sockets including 1 pair with floating position
- 1 pair of quick couplers (size: ½" ISO 7241-1 mushroom type) (option)	-	1 pair of hydraulic quick coupler sockets
Power-Pack electro-hydraulic power supply (option)	-	none
Other requirements		
Equipment of carrying vehicle	–	beacon light *(orange light)*

1.3 EQUIPMENT

The snow plough equipment includes:

1. Operator`s Manual
2. WARRANTY BOOK
3. control panel with a wiring harness and a plug (depending on equipment version)
4. power supply wiring harness installed in the carrying vehicle

Equipment versions:

1. Linkage:

- linkage acc. to DIN 76060 standard type A or
- linkage acc. to DIN 76060 standard type B or
- SETRA linkage

2. Blades:

- rubber blades (ensure protection of cleared surfaces against scratching) or
- perforated blades (for removing ice layers) or
- "Kuper" type blades (for clearing highways and expressways)

3. Hydraulic system:

- hydraulic system - 2 pairs of quick couplers (size: ½" ISO 16028 or
- hydraulic system - 1 pair of quick couplers (size: ½" ISO 7241-1 or
- hydraulic system - Power-Pack

4 support wheels or "Kuper" type slides

Equipment options:

- dust screen
- additional lights
- warning banners
- 2 pressure springs for mouldboard section (standard – 1 pc.)

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 Warranty Service. The repair period is specified in the WARRANTY BOOK.

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

- collecting blades,
- bulbs,
- fuses *(if present)*
- support wheels or slides *(if present)*,
- fenders

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

The user loses the warranty in case of damage resulting from:

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

TIP

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

For detailed Terms & Conditions of Warranty, please refer to the WARRANTY BOOK attached to each machine.

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

1.5 TRANSPORT

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

Delivery is either by transport on a vehicle or independently, 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.

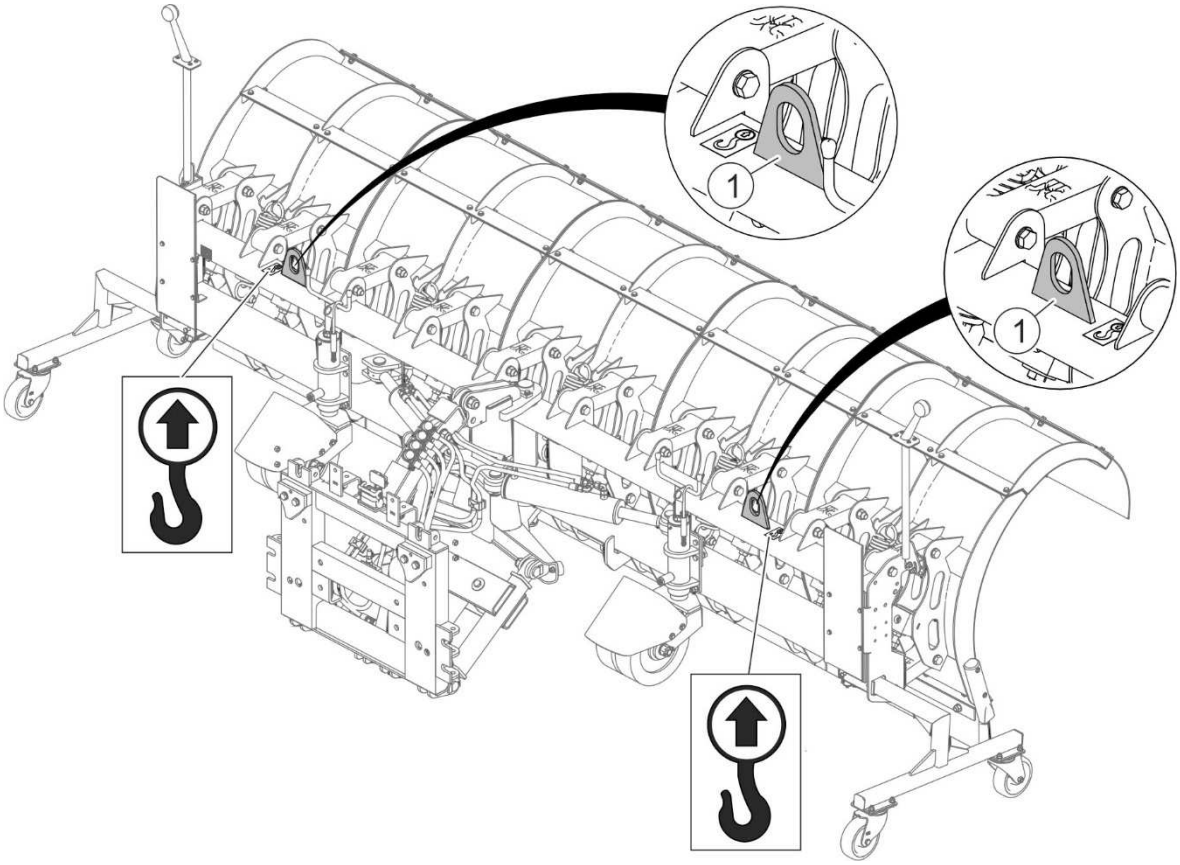


FIGURE 1.2 Transport lugs

(1) - transport lugs

The machine should be attached to lifting equipment in places specially designed for this purpose (FIGURE 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.

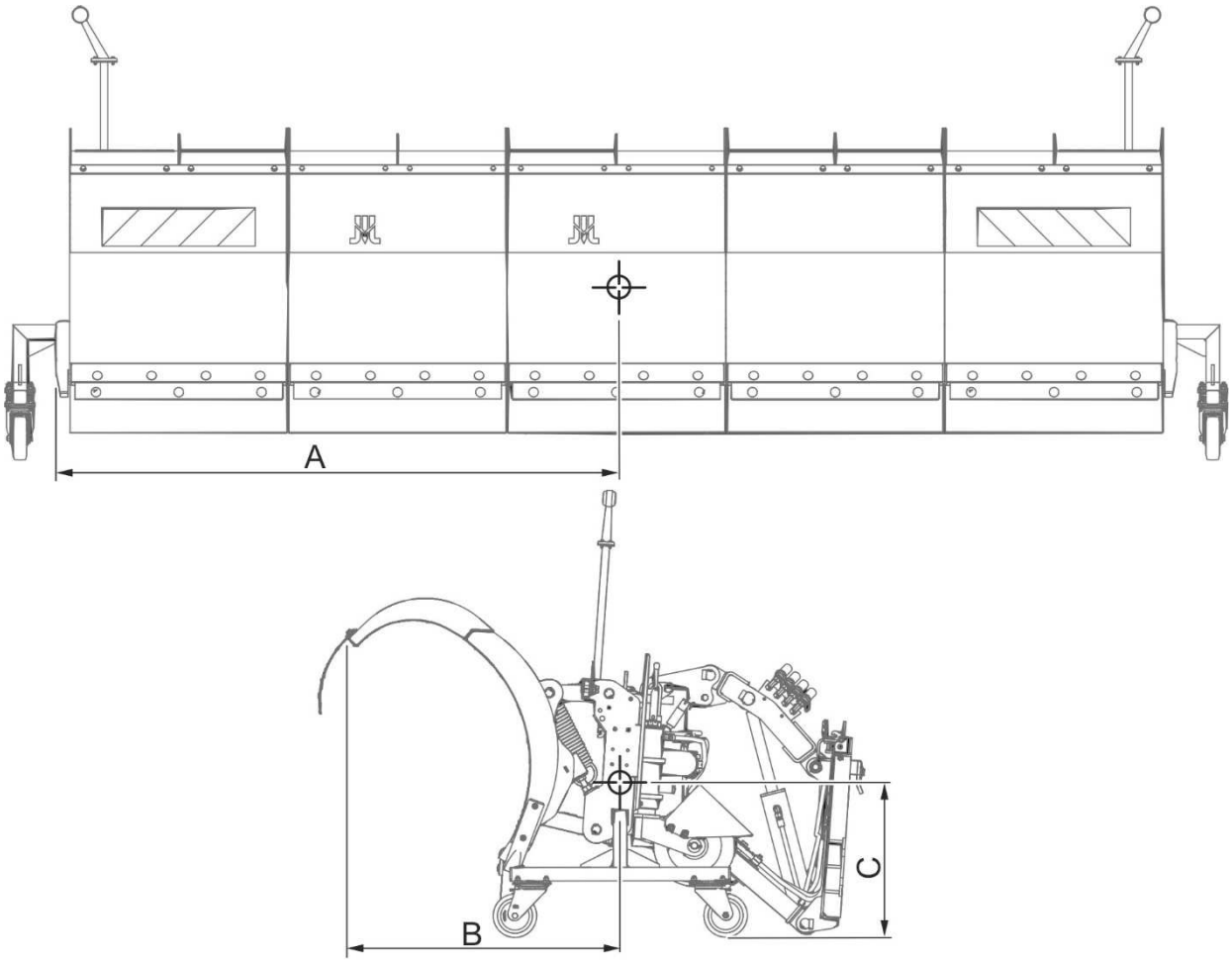


FIGURE 1.3 Centre of gravity.

TABLE 1.2 Centre of gravity.

		Snow plough model				
Dimension (FIGURE 1.3)	**Unit**	**PUS-S27**	**PUS-S32**	**PUS-S34**	**PUS-S36**	**PUS-S40**
A	mm	1410	1665	1760	1865	2060
B	mm	1000	975	970	960	945
C	mm	590	600	600	605	610

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

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

1.7 WITHDRAWAL FROM USE

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. Used oil and also rubber and plastic elements should be taken to the appropriate facilities dealing with the recycling of this type of waste.

ATTENTION

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

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

SECTION

2

SAFETY ADVICE

2.1 BASIC SAFETY RULES

2.1.1 USE OF MACHINE

- Before using the machine, the user must carefully read this Operator's Manual and the *WARRANTY BOOK*. When operating the machine, the operator must comply with all recommendations contained in the Operator's Manual.
- The machine may only be used and operated by persons qualified to drive carrying vehicle and trained in the use of the machine.
- If the information in this Operator's Manual is difficult to understand, contact the dealer, who runs an manufacturer authorised service, or contact the manufacturer directly.
- Careless and incorrect 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 residual risk, and for this reason the fundamental basis for using this machine should be the application of safety rules and sensible behaviour.
- The machine must never be used by persons, who are not authorised to drive 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 (i.e. safety guards, bolts, cotter pins) are technically sound and correctly positioned. In the event of loss or destruction of the safety guards, they must be replaced with new ones.

2.1.2 HITCHING AND UNHITCHING FROM CARRYING VEHICLE

- Carefully read the carrying vehicle Operator's Manual.

- Do NOT hitch the machine to a carrying vehicle, if the linkage system of the machine is not compatible with the linkage system of the carrying vehicle.
- To hitch the machine to the carrying vehicle use only linking elements recommended by the Manufacturer.
- The carrying vehicle to which the machine will be hitched must be technically reliable and must fulfil the requirements specified by the machine Manufacturer.
- Be especially careful when hitching the machine to carrying vehicle.
- After completion of hitching the machine, check the safeguards.
- When hitching, there must be nobody between the machine and the carrying vehicle. Exercise caution when unhitching the machine.
- 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 the hydraulic system malfunction, discontinue using the machine until the malfunction is corrected.
- In the event of injuries being caused by pressurised hydraulic oil, contact a doctor immediately. Hydraulic oil may 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 lines must be replaced every 4 years regardless of their technical condition.
- Repair and replacement of hydraulic system elements should be entrusted to the appropriately qualified persons.

2.1.4 TRANSPORTING THE MACHINE

- When driving on public roads, 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 the 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 machine, 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 Service authorised by the manufacturer. It is recommended that necessary repairs to machine should be undertaken by specialised workshops.
- In the event of any fault or damage, do not use the machine until the fault has been corrected.
- During work on the machine use the proper, close-fitting protective clothing, gloves and appropriate tools. When working on hydraulic systems it is recommended to use oil resistant gloves and protective goggles.
- Any modification to the machine frees PRONAR from any responsibility for damage or detriment to health which may arise as a result.

- 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 turned 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 warranty.
- Regularly check technical condition and mounting of all guards and protective elements.
- Do NOT weld, drill holes in, cut or heat the main structural elements, which have a direct impact on the machine operation safety.
- In the event of work requiring the machine to be raised, use properly certified 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 SNOW 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 operator 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 tractor'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 RESIDUAL RISK

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

- using the machine for purposes other than those for which it is intended,
- being between the carrying vehicle and the machine while the engine is running and when the machine is being attached,
- being on the machine while the engine is running,
- operating the machine with removed or faulty safety guards,
- not maintaining safe distance from the danger zone or being within the zones while the machine is operating,
- operation of the machine by 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.

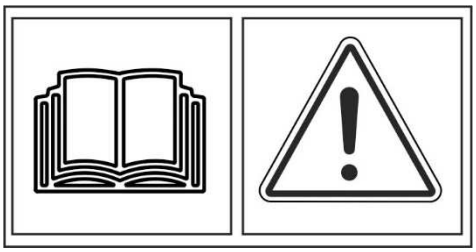
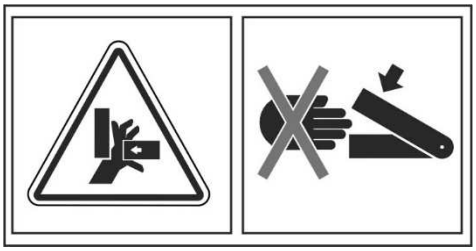
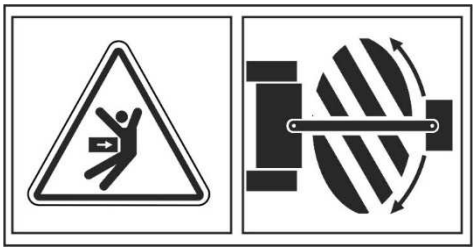
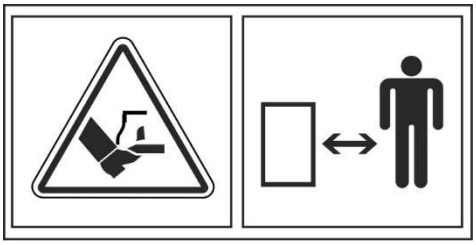
The residual risk may be kept to a minimum by following the recommendations below:

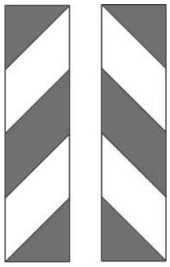
- operate the machine in prudent and unhurried manner,
- reasonably apply all the remarks and recommendations stated in the Operator's Manual,
- carry out repairs and maintenance work in line with operating safety rules,
- carrying out repair and maintenance work by persons trained to do so,
- use close fitting protective clothing,
- ensure unauthorised persons have no access to the machine, especially children,
- maintain a safe distance from forbidden or dangerous places
- do not climb on the machine when it is operating

2.3 INFORMATION AND WARNING DECALS

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

TABLE 2.1 Information and warning decals

ITEM	SYMBOL	DESCRIPTION
1		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		Keep a safe distance from machine when engine is running. Risk of injury to foot or leg!

ITEM	SYMBOL	DESCRIPTION
5		Side outline marking
6		Upper outline marking
7		Manufacturer
8		Snow plough model
9		Lifting equipment attachment points while loading the machine

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

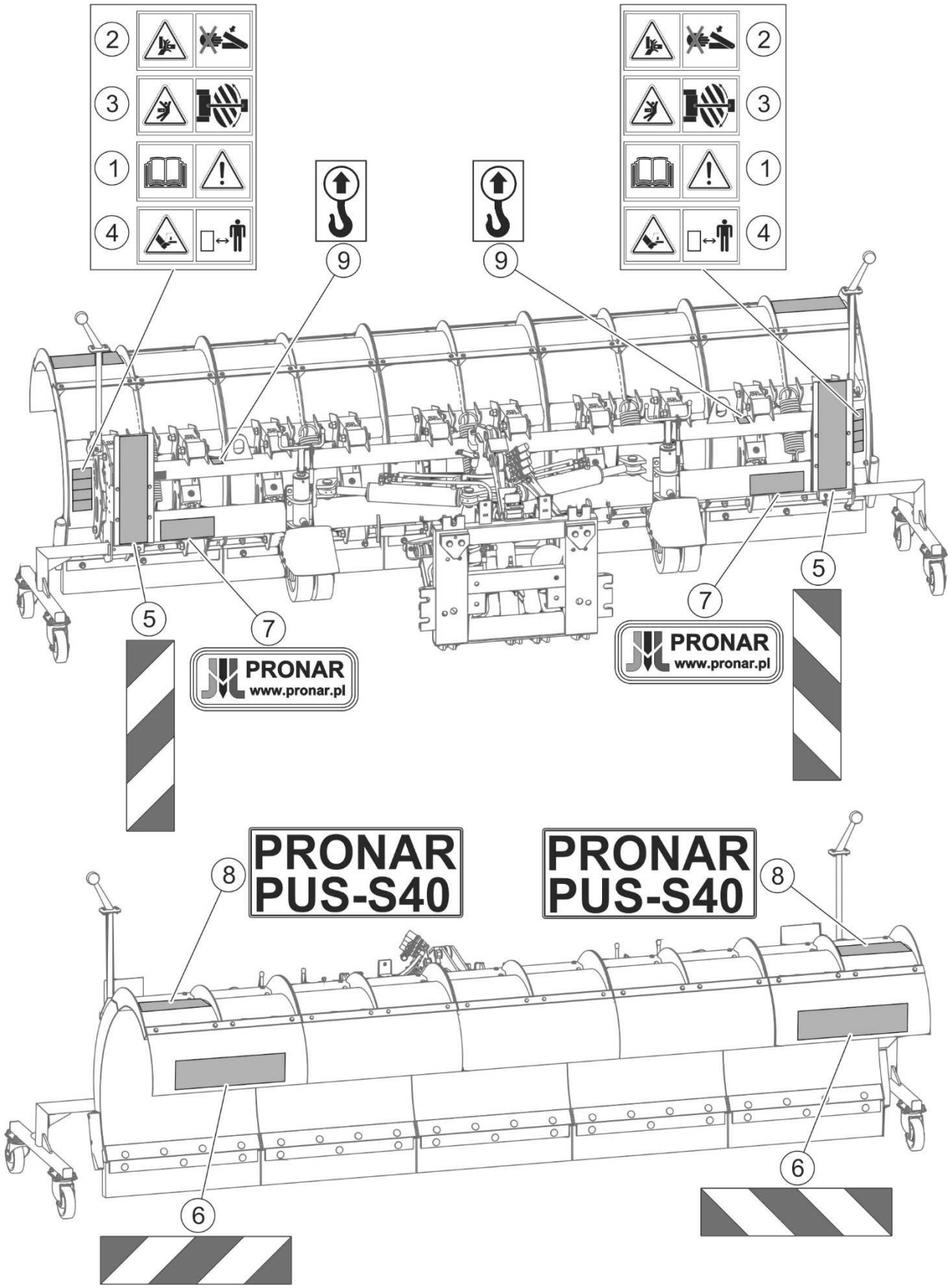


FIGURE 2.1 Locations of information and warning decals.

Meaning of symbols (TABLE 2.1)

SECTION

3

DESIGN AND OPERATION

3.1 TECHNICAL SPECIFICATION

TABLE 3.1 BASIC TECHNICAL DATA

	Unit					
Snow plough model		PUS-S27	PUS-S32	PUS-S34	PUS-S36	PUS-S40
Working width (FIGURE 3.1): – angle of 30°(A, B) – straight (C)	 mm mm	 2,350 2,710	 2,790 3,220	 2,960 3,420	 3,135 3,620	 3,490 4,025
Working height	mm	1,040				
Total width *(with parking stands, the snowplough set perpendicularly to driving direction (forwards)*	mm	3200	3700	3900	4100	4500
Minimum transport width *(the snowplough set at angle of 30°)*	mm	2810	3250	3420	3590	3950
Minimum length *(the snowplough set perpendicularly to driving direction (forwards)*	mm	2800				
Total height *(with parking stands, without additional lights)* **- with clearance lamps*	mm	1 170 (1 610*)				
Height of obstacle - travel of segment between the lower fender and the upper fender	mm	up to 110				
Number of segments	pc.	3	4	4	4	5
Control	-	with the aid of the external hydraulic system of the carrying vehicle or optionally, using the control panel in the operator cab				
Electrical system voltage	V	24				
Weight with basic equipment (*snowplough + support wheels + rubber blades + hydraulic system, 2 pairs of quick couplers*)	kg	930	1,030	1,050	1,100	1,200
Maximum working speed *(depending on amount of snow and road conditions)*	km/h	60				

	Unit					
Snow plough model		PUS-S27	PUS-S32	PUS-S34	PUS-S36	PUS-S40
Equipment versions	-	rubber collecting blades				
	-	perforated collecting blades (option)				
	-	Kuper collecting blades (option)				
	-	Hydraulic system - 2 pairs of quick couplers (size: ½" ISO 16028, dry disconnect couplers)				
	-	Hydraulic system - 1 pair of quick couplers (size: ½" ISO 7241-1, mushroom type) (option)				
	-	POWER-PACK hydraulic system (option)				
	-	Jockey wheels				
	-	Kuper slides (option)				
Equipment options	-	dust screen				
	-	additional lights (low beams and high beams)				
	-	warning banners				
	-	2 pressing springs per segment				
Other information	-	single person operation				

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

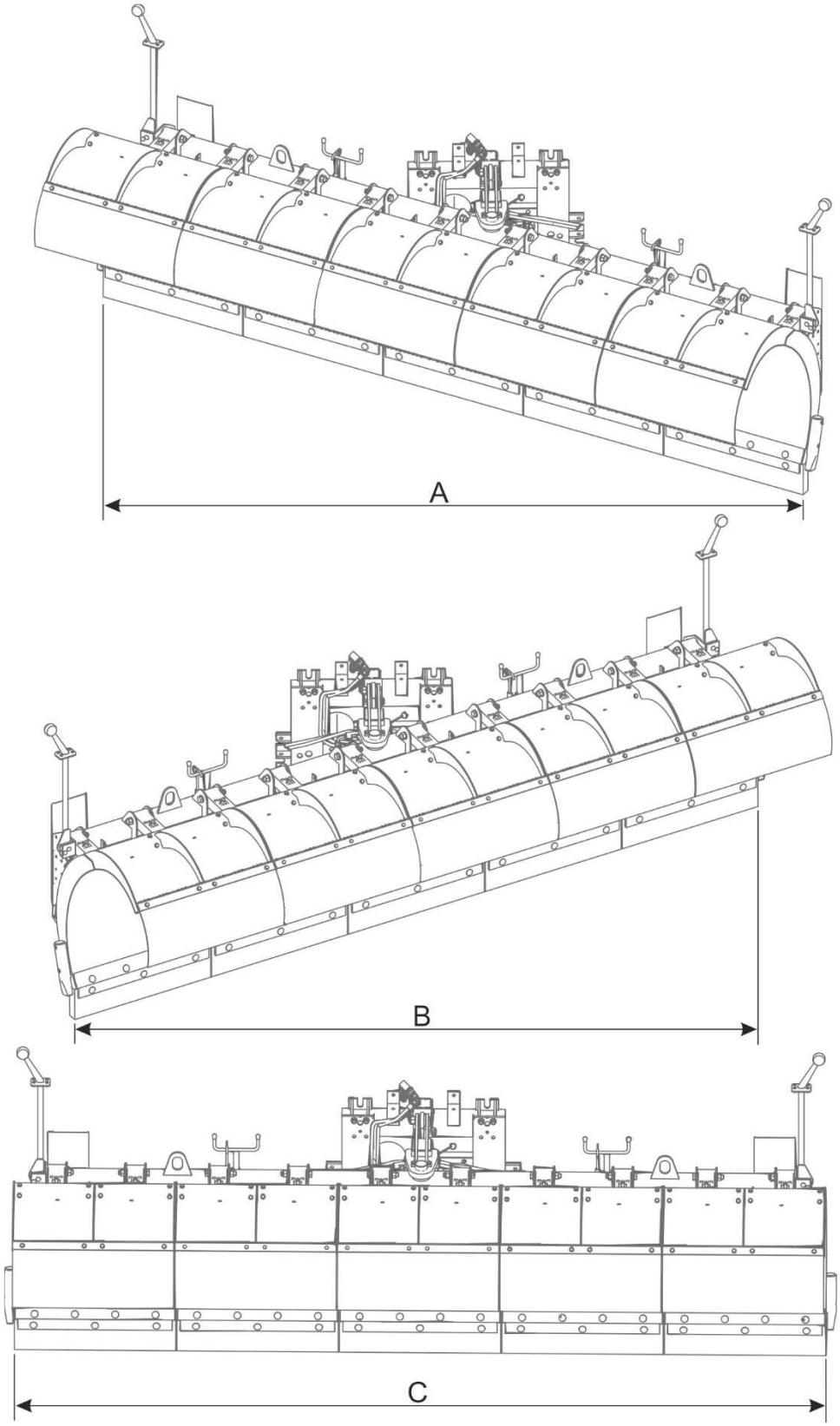


FIGURE 3.1 Width depending on the operating position:

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

3.2 GENERAL DESIGN

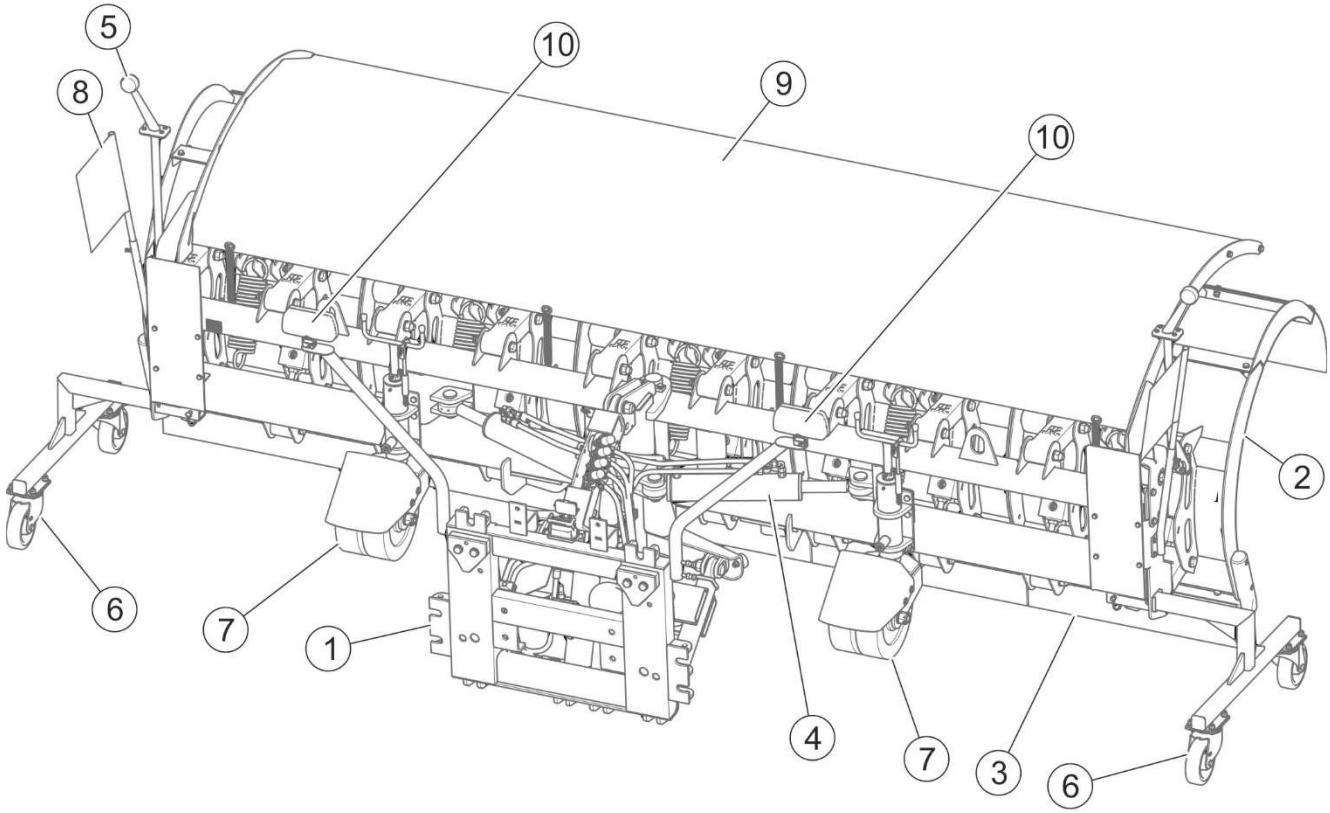


FIGURE 3.2 General design *(hydraulic system version - 2 pairs of quick couplers)*
(1) - linkage; (2) – movable mouldboard segment; (3) - blades; (4) - hydraulic system; (5) - clearance lamps; (6) - parking stands; (7) - support wheels; (8) – warning flags (option); (9) - shield protecting against snow dust (option); (10) - additional lights (option).

PUS-S27 / PUS-S32 / PUS-S34 / PUS-S36 / PUS-S40 snowploughs (FIGURE 3.2) are equipped with a centrally positioned mouldboard consisting of metal segments (2). Each segment is mounted on 4 rockers and on one or two (optionally) pressure springs. Thanks to the springs, each mouldboard segment can swing and return to working position when an obstacle is encountered. Rubber, perforated or Kuper blades (3) (depending on equipment) are installed under each mouldboard segment. During operation, the snowplough is supported on the ground on two support wheels (7) or slides (option), whose height can be adjusted. Linkage (1) makes it possible to hitch the snowplough to a carrying vehicle equipped with a front mounting plate of A or B type according to DIN 76060 or SETRA mounting plate (depending on equipment version). Parking stands with wheels (6) make it possible to support and transport the snowplough unhitched from the carrying vehicle on the yard or to hitch the snowplough to the carrying vehicle.

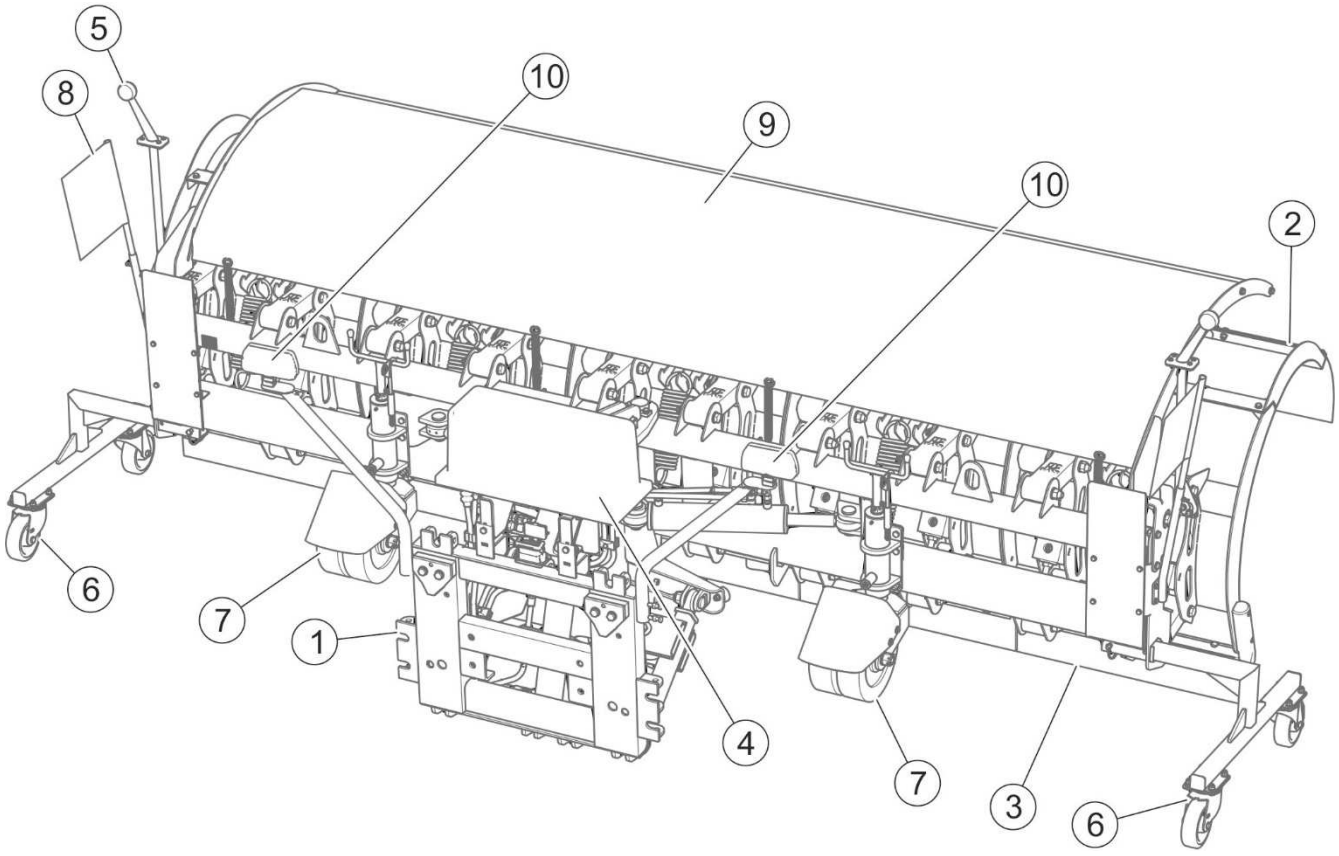


FIGURE 3.3 General design *(hydraulic system version - 1 pair of quick couplers or Power-Pack)*

(1) - linkage; (2) - movable mouldboard segment; (3) - blades; (4) – hydraulic system with 1 pair of quick couplers or Power-Pack; (5) - clearance lamps; (6) - parking stands; (7) - support wheels; (8) – warning flags (option); (9) - shield protecting against snow dust (option); (10) - additional lights (option).

Depending on the carrying vehicle version, PUS-S27 / PUS-S32 / PUS-S34 / PUS-S36 / PUS-S40 snowploughs can be equipped with the hydraulic system supplied by two pairs of quick couplers from the carrying vehicle (FIGURE 3.4), one pair of hydraulic quick couplers from the carrying vehicle (FIGURE 3.5) or their own hydraulic supply system (Power-Pack) (FIGURE 3.6).

Changing the mouldboard working position and the snowplough lifting and lowering are done using hydraulic cylinders.

The hydraulic system with one pair of hydraulic quick couplers or its own hydraulic supply system (Power-Pack) is controlled using the control panel.

3.3 HYDRAULIC SYSTEM

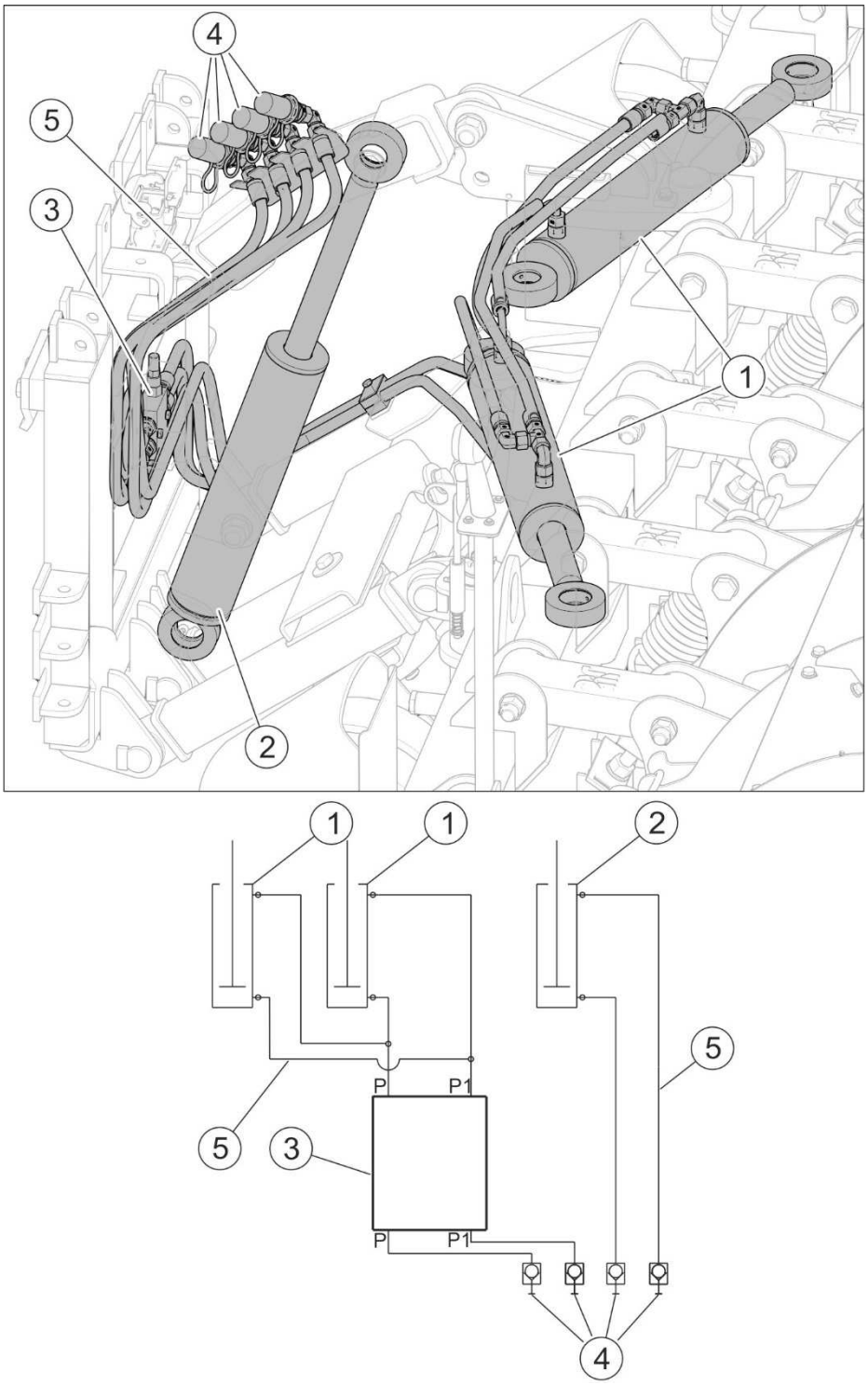


FIGURE 3.4 Design and diagram of hydraulic system *(hydraulic system version - 2 pairs of quick couplers)*

(1) - snowplough frame turning cylinders; (2) - snowplough frame rising cylinder; (3) – valve; (4) - hydraulic conduit connectors; (5) - hydraulic conduits

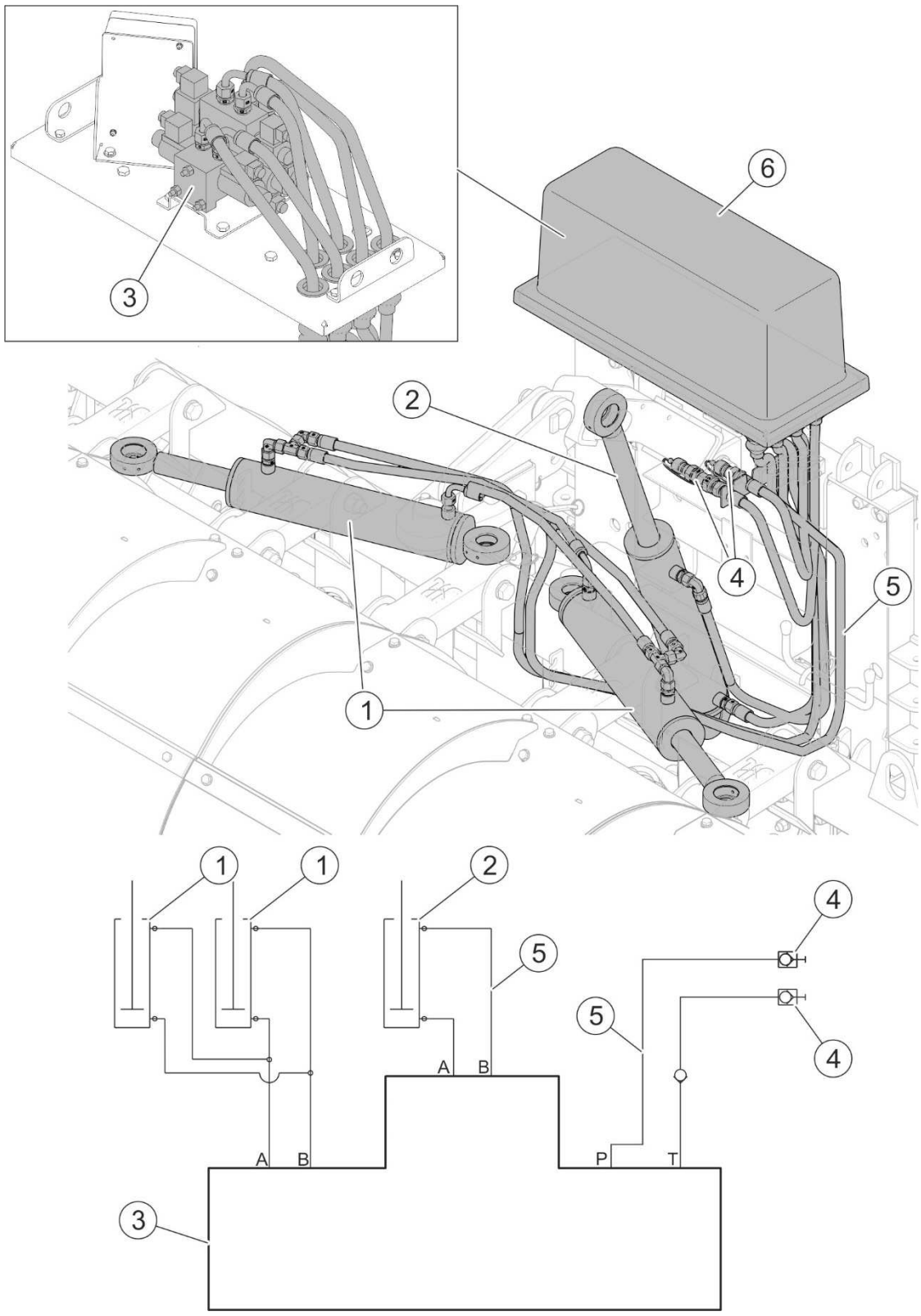


FIGURE 3.5 Design and diagram of hydraulic system *(hydraulic system version - 1 pair of quick couplers)*

(1) - snowplough frame turning cylinders; (2) - snowplough frame rising cylinder; (3) - set of hydraulic solenoid valves; (4) - hydraulic conduit connectors; (5) - hydraulic conduits; (6) - housing of the set of hydraulic solenoid valves

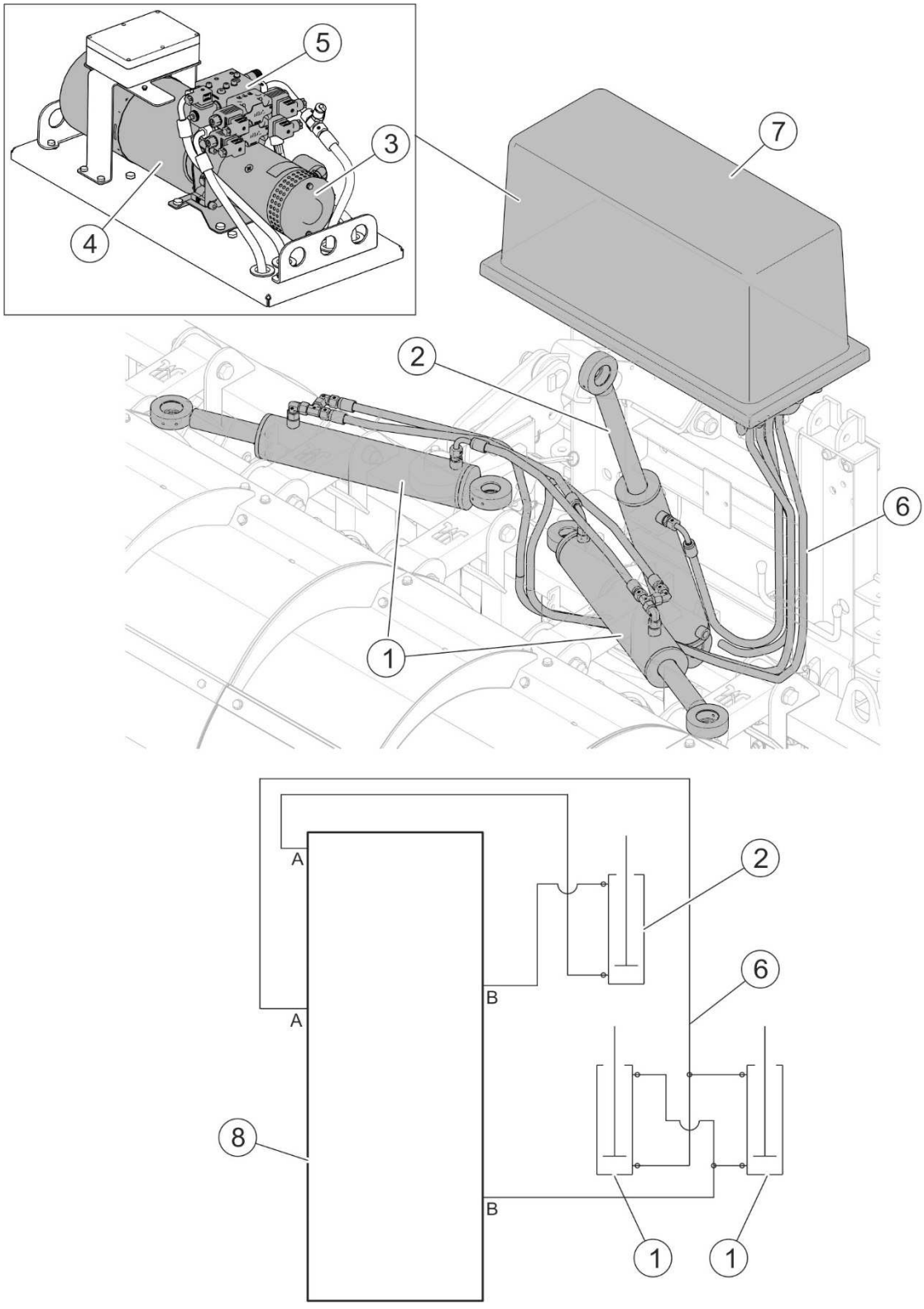


FIGURE 3.6 Design of hydraulic system *(hydraulic system version with its own Power-Pack hydraulic supply system)*

(1) - snowplough frame turning cylinders; (2) - snowplough frame rising cylinder; (3) - motor with a pump; (4) - oil tank; (5) - a set of hydraulic solenoid valves; (6) - hydraulic lines; (7) – housing; (8) – Power-Pack electro-hydraulic power supply.

3.4 ELECTRICAL SYSTEM

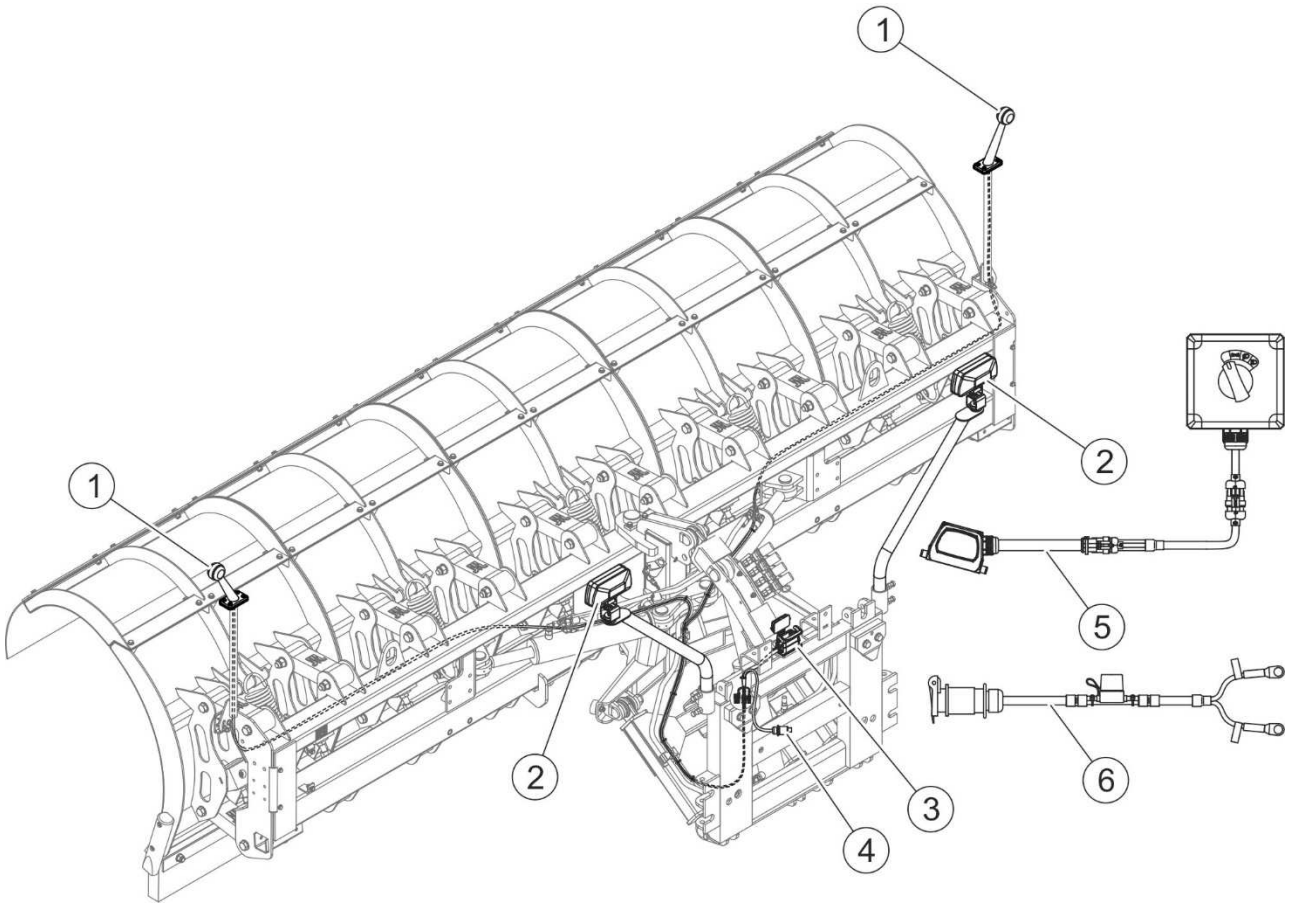


FIGURE 3.7 Design of electrical system ***(version of snowplough's hydraulic system - 2 pairs of quick couplers)***

(1) - clearance lights; (2) – additional lights (option); (3) - control socket; (4) - power supply plug; (5) – control wiring harness with control panel; (6) – power supply wiring harness on the carrying vehicle.

The electrical system of the snowploughs equipped with the hydraulic system with two pairs of quick couplers (FIGURE 3.7) is used for supplying the lighting system.

The lighting system consists of clearance lamps (1) and optional additional lights (2) installed on brackets. The snowplough's electrical system is connected to the carrying vehicle using the power supply wiring harness (6) installed permanently on the carrying vehicle. The socket of the power supply wiring harness (6) should be installed at the front of the carrying vehicle. The other end of the power supply wiring harness (6) should be connected to the carrying vehicle's battery. The snowplough's power supply plug (4) should be connected to the socket of the power supply wiring harness (6). The lights are controlled by means of the control panel with the control wiring harness (5), which should be connected to the snowplough's control socket (3).

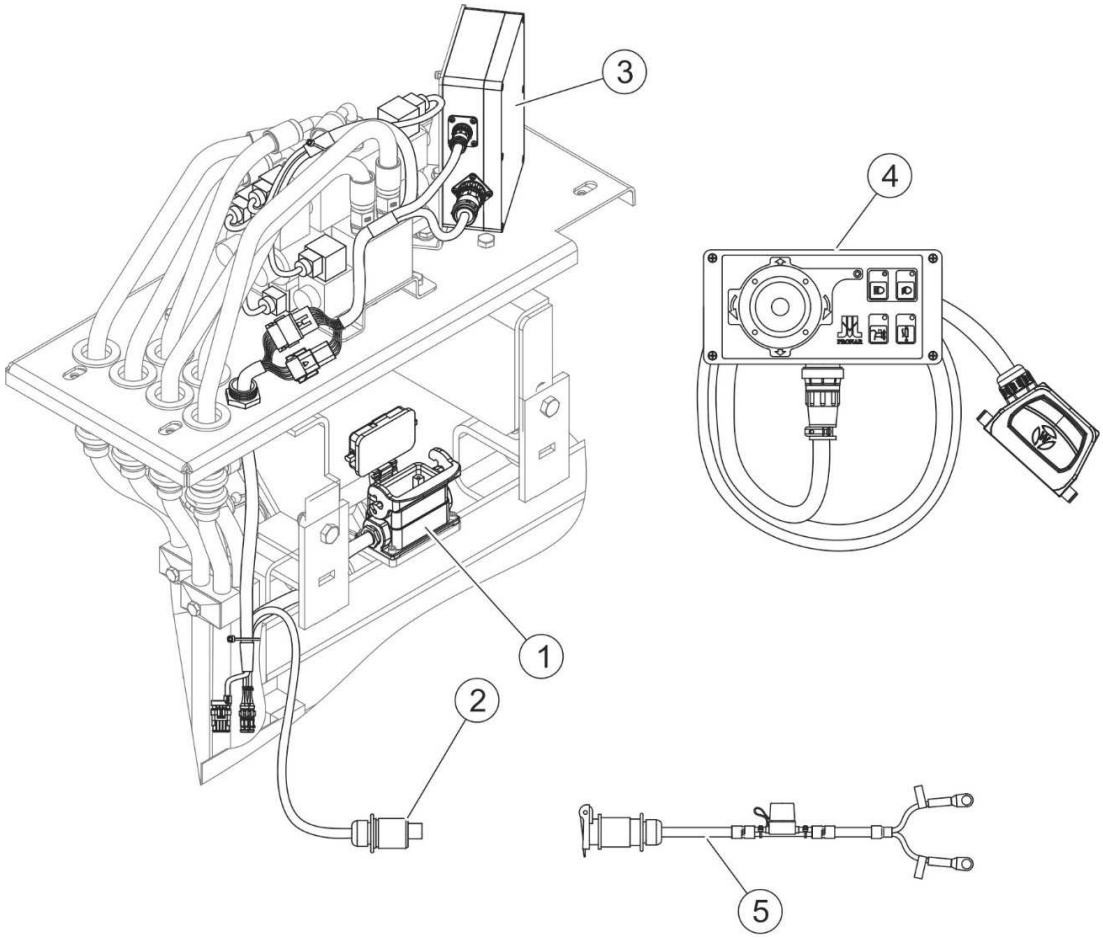


FIGURE 3.8 Design of electrical system *(version of snowplough's hydraulic system - 1 pair of quick couplers)*

(1) - control socket; (2) - power supply plug; (3) – actuator module; (4) – control wiring harness with control panel; (5) – power supply wiring harness on the carrying vehicle.

The electrical system of the snowploughs equipped with the hydraulic system with one pair of quick couplers (FIGURE 3.8) is used for supplying the lighting system (clearance lamps and optional additional lights) and for supplying the block of solenoid valves.

The snowplough is controlled using the control panel (4) with the control wiring harness, which should be connected to the control socket (1) on the snowplough. The control panel controls the solenoid valves and the lights through the actuator module (3).

The snowplough's electrical system is connected to the carrying vehicle using the power supply wiring harness (5) installed permanently on the carrying vehicle. The socket of the power supply wiring harness (5) should be installed at the front of the carrying vehicle. The other end of the power supply wiring harness (5) should be connected to the carrying vehicle's battery. The snowplough's power supply plug (2) should be connected to the socket of the power supply wiring harness (5).

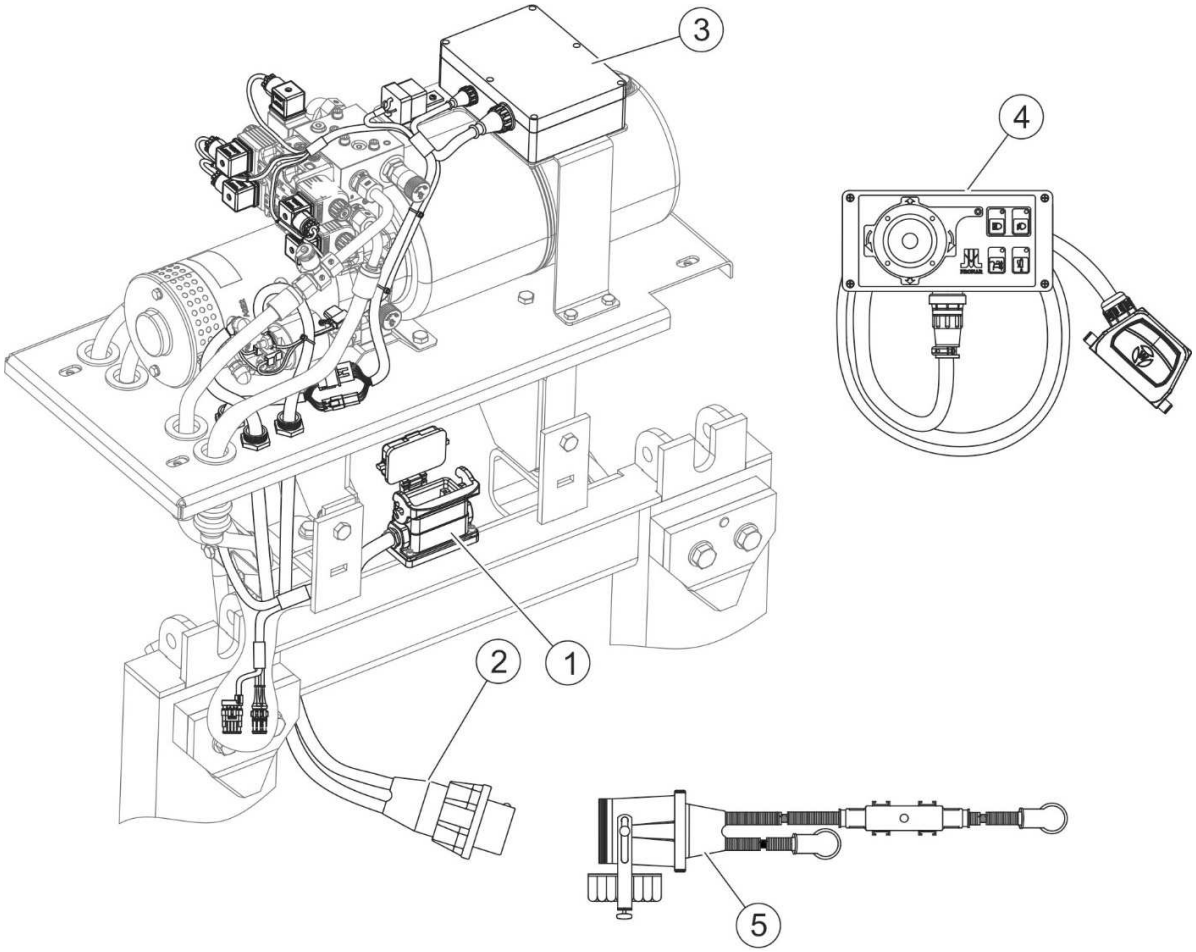


FIGURE 3.9 Design of electrical system *(the snowplough with its own Power-Pack hydraulic supply system)*

(1) - control socket; (2) - power supply plug; (3) – actuator module; (4) – control wiring harness with control panel; (5) – power supply wiring harness.

The electrical system of the snowplough equipped with its own Power-Pack hydraulic supply system (FIGURE 3.9) is used for supplying the lighting system (clearance lamps and optional additional lights) and for supplying the Power-Pack electro-hydraulic power supply.

The snowplough is controlled using the control panel (4) with the control wiring harness, which should be connected to the control socket (1) on the snowplough. The control panel controls the solenoid valves, the electric motor and the lights through the actuator module (3).

The snowplough's electrical system is connected to the carrying vehicle using the power supply wiring harness (5) installed permanently on the carrying vehicle. The socket of the power supply wiring harness (5) should be installed at the front of the carrying vehicle. The other end of the power supply wiring harness (5) should be connected to the carrying vehicle's battery. The snowplough's power supply plug (2) should be connected to the socket of the power supply wiring harness (5).

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 incorrect 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 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 snowplough linkage with suspension system of the carrying vehicle,
- make sure that electrical system parameters as well as connection sockets are compatible,
- make sure that hydraulic 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 blades and support wheels,

- check technical condition of the linkage components,

ATTENTION

Non-adherence to the recommendations contained in the Operator's Manual or incorrect 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 „*4.3 HITCHING TO VEHICLE*"),
- after connecting the electrical and hydraulic system wiring (if present), check the correct operation of individual snowplough 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, find 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 snowplough on the carrying vehicle, set the optional additional lights (if installed) 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 use, check individual elements according to guidelines presented in Table 4.1.

TABLE 4.1 TECHNICAL INSPECTION SCHEDULE

DESCRIPTION	MAINTENANCE ACTIVITIES	FREQUENCY
Technical condition of mouldboard and collecting blades	Visually inspect and if necessary replace according to Section 5 CHECKING AND REPLACEMENT OF COLLECTING BLADES	Before starting work
Technical condition of support wheels	Check technical condition, if complete and correctly mounted.	
Technical condition of the linkage, locking bolts and pins.	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 if all main nut and bolt connections are properly tightened	Tightening torque values should be according to Table 5.7 in Section 5	Once a week
Lubrication	Lubricate the components according to section "*LUBRICATION*".	According to Table 5.6

ATTENTION

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

4.3 HITCHING TO VEHICLE

PUS-S27 / PUS-S32 / PUS-S34 / PUS-S36 / PUS-S40 ploughs *may only be mounted on a carrying vehicle meeting the requirements listed in Table 1.1.*1 Carrying vehicle requirements.

DANGER

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

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

4.3.1 MOUNTING THE LINKAGE'S FRONT PLATE ON THE CARRYING VEHICLE

ATTENTION

The work connected with mounting the linkage's front plate on the carrying vehicle must be performed only by suitably qualified personnel.

As standard, the snowplough linkage (FIGURE 4.1) complies with DIN 76060 standard (type A). Optionally, the snowploughs can be equipped with the linkage in compliance with DIN 76060 standard (type B) or SETRA linkage.

ATTENTION

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

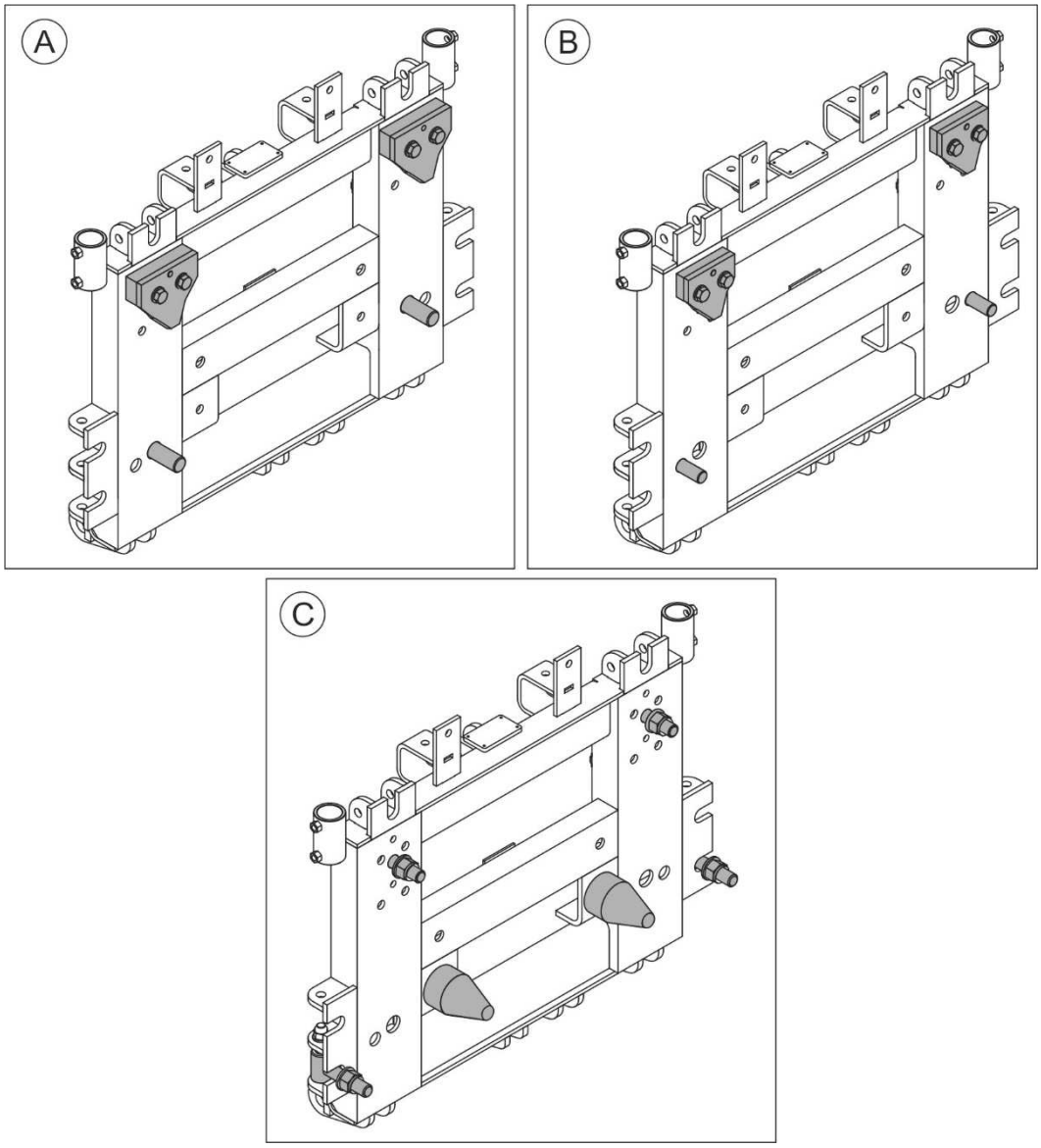


FIGURE 4.1 Types of linkage systems.

(A) – DIN 76060 type A linkage; (B) - DIN 76060 type B linkage (option); (C) - SETRA linkage (option).

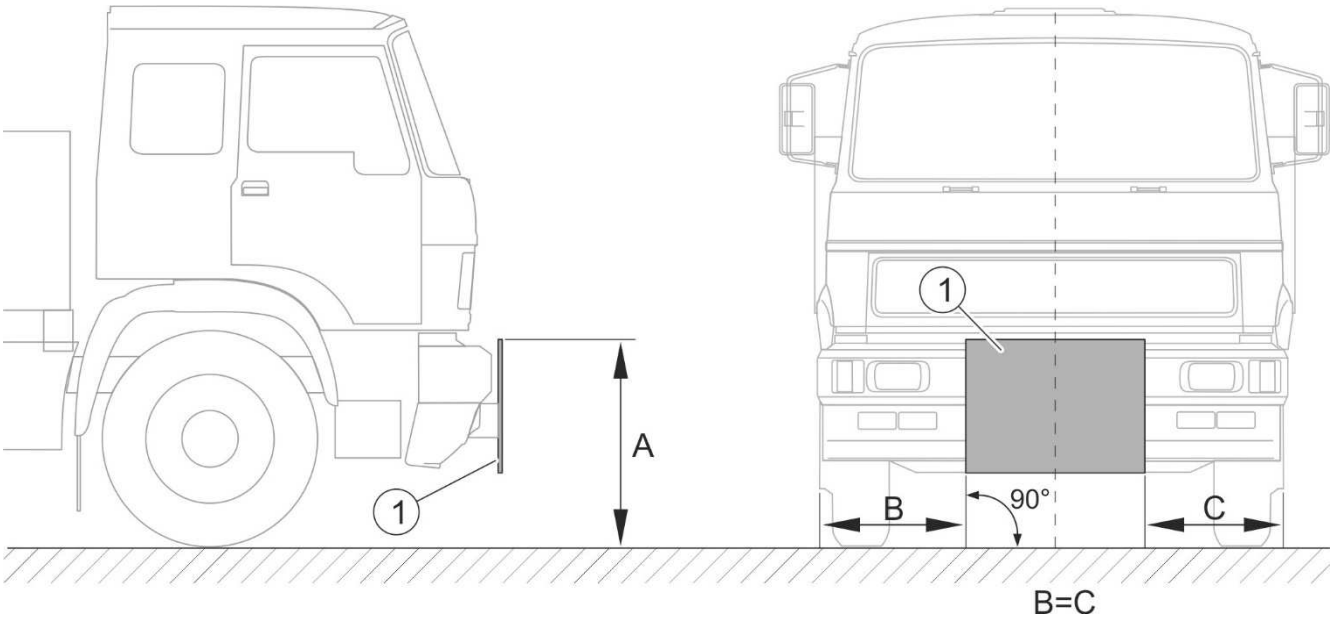


FIGURE 4.2 Mounting the front plate.

(1) – front plate of linkage; (A) – height from the top edge of the plate to the ground; (B), (C) – distance between the side edge of the plate and the carrying vehicle edge.

The front plate should be mounted vertically in the carrying vehicle's axis of symmetry (FIGURE 4.2). The height (A) (FIGURE 4.2) from the top edge of the plate to the ground should be:

- 980 ±60 mm, type A plate
- 900 ±60 mm, type B plate

4.3.2 INSTALLATION OF THE POWER SUPPLY WIRING HARNESS ON THE CARRYING VEHICLE

ATTENTION

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

Proper electric socket (depending on the snowplough version) installed on the front of the carrying vehicle is required for the snowplough operation (FIGURE 4.3). If the carrying vehicle is not equipped with such a socket or is equipped with a different type of socket, install the power supply wiring harness included in the snowplough equipment.

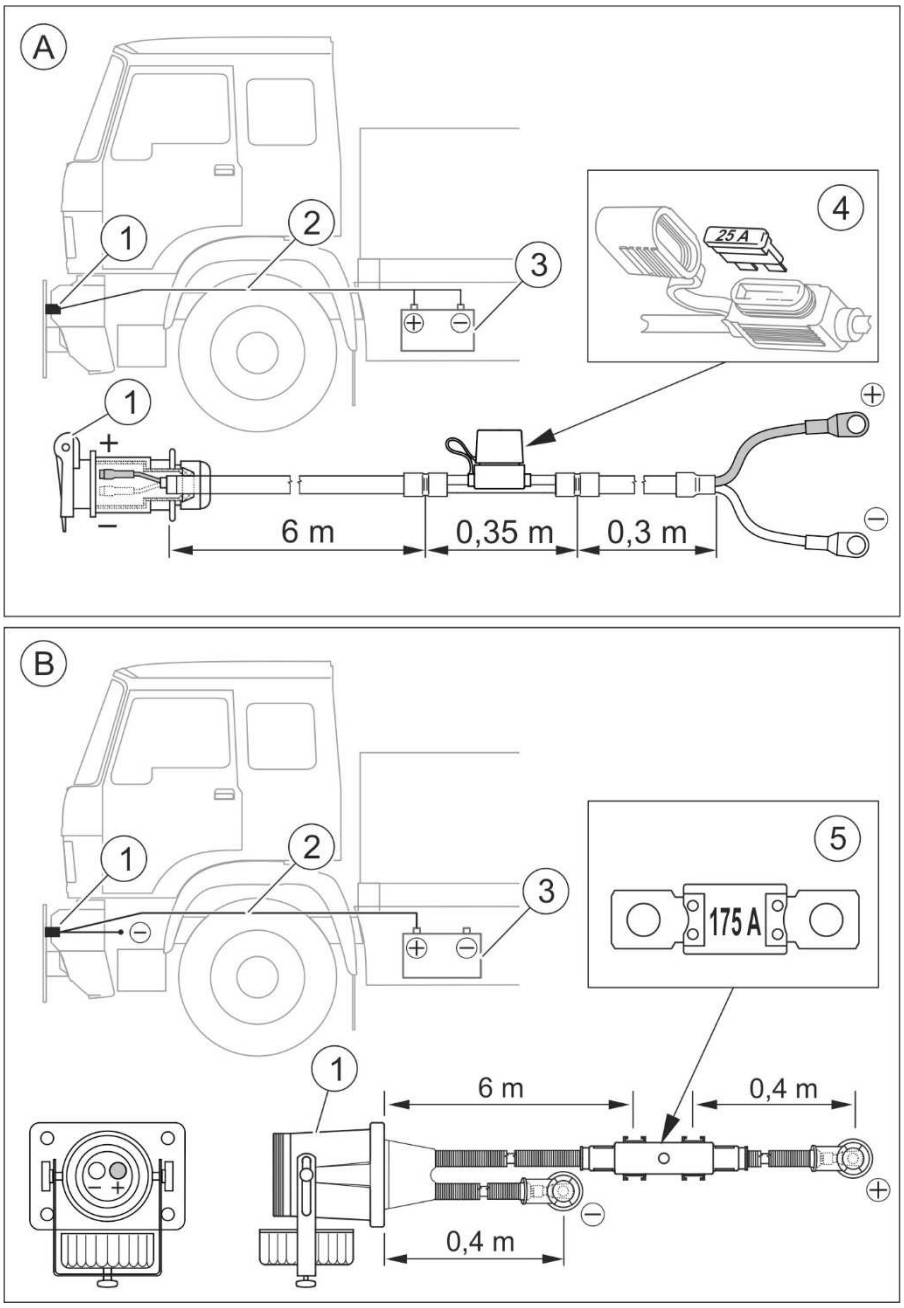


FIGURE 4.3 Installation diagram of the power supply wiring harness on the carrying

(A) – power supply wiring harness for the snowplough with the hydraulic system (2 pairs of quick couplers or 1 pair of quick couplers); (B) – power supply wiring harness for the snowplough with its own Power-Pack hydraulic supply system; (1) - socket; (2) – power supply wiring harness; (3) – battery; (4) - UNIVAL 25A fuse; (5) - MEGAVAL 175A fuse.

4.3.3 CONNECTING SNOWPLOUGH HYDRAULIC AND ELECTRICAL SYSTEMS

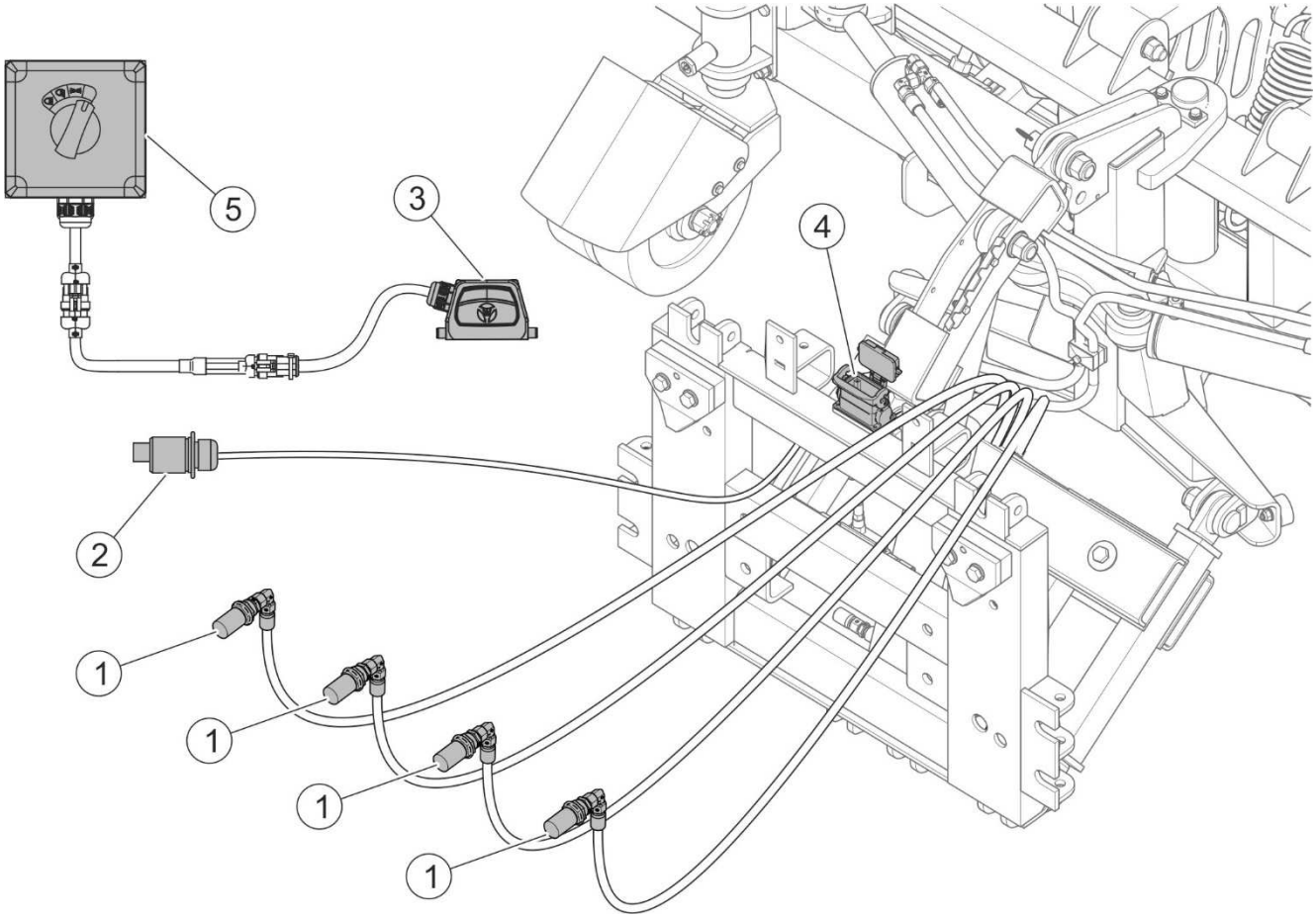


FIGURE 4.4 Connecting the snowplough's hydraulic system and electrical system (*version of snowplough's hydraulic system - 2 pairs of quick couplers*)

(1) - mouldboard control hydraulic couplers; (2) - power supply plug; (3) - control panel plug; (4) - control socket; (5) – control panel for snowplough lights.

The snowploughs with the hydraulic system with 2 pairs of quick couplers are designed for connecting to the carrying vehicle's external hydraulic system equipped with two sections.

The pair of hydraulic quick couplers (1) (FIGURE 4.4) responsible for the mouldboard rising/lowering control circuit should be connected to the section of the carrying vehicle's external hydraulic system with the floating function. The second pair of quick couplers (1) should be connected to the second section of the carrying vehicle's external hydraulic system.

The snowplough's power supply plug (2) should be connected to the socket of the power supply wiring harness installed on the carrying vehicle (FIGURE 4.3). The lights are controlled by means of the control panel (5), which should be connected to the snowplough's control socket (4) using the plug (3).

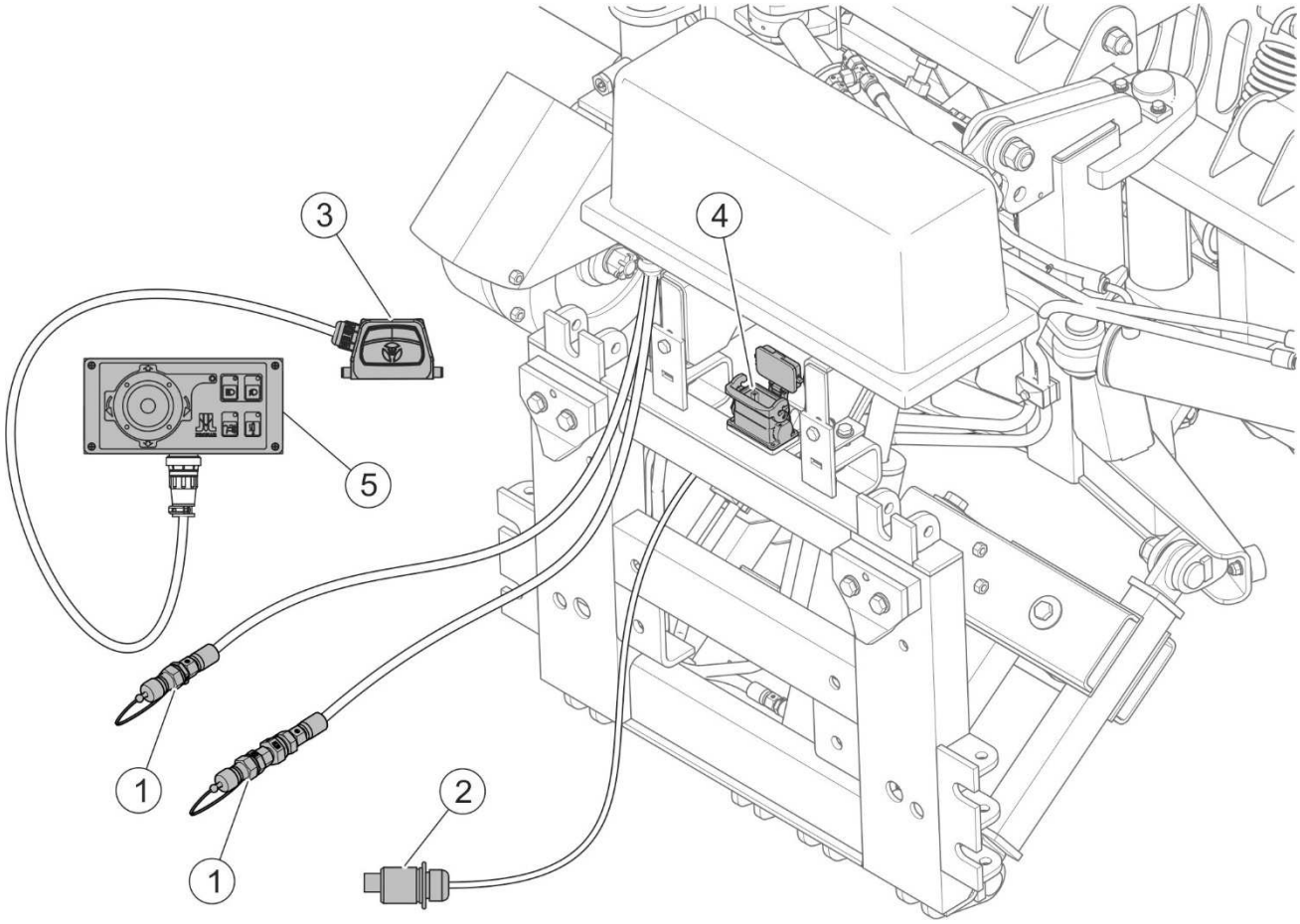


FIGURE 4.5 Connecting the snowplough's hydraulic system and electrical system ***(version of snowplough's hydraulic system - 1 pair of quick couplers)***

(1) - hydraulic couplers; (2) - power supply plug; (3) - control panel plug; (4) - control socket; (5) – snowplough control panel.

The snowploughs with the hydraulic system with 1 pair of quick couplers are designed for connecting to the carrying vehicle's external hydraulic system equipped with one section.

The pair of hydraulic quick couplers (1) (FIGURE 4.5) should be connected to the quick couplers of the section of the carrying vehicle's external hydraulic system.

The snowplough's power supply plug (2) should be connected to the socket of the power supply wiring harness installed on the carrying vehicle (FIGURE 4.3). The snowplough's mouldboard and lights are controlled by means of the control panel (5), which should be connected to the snowplough's control socket (4) using the plug (3).

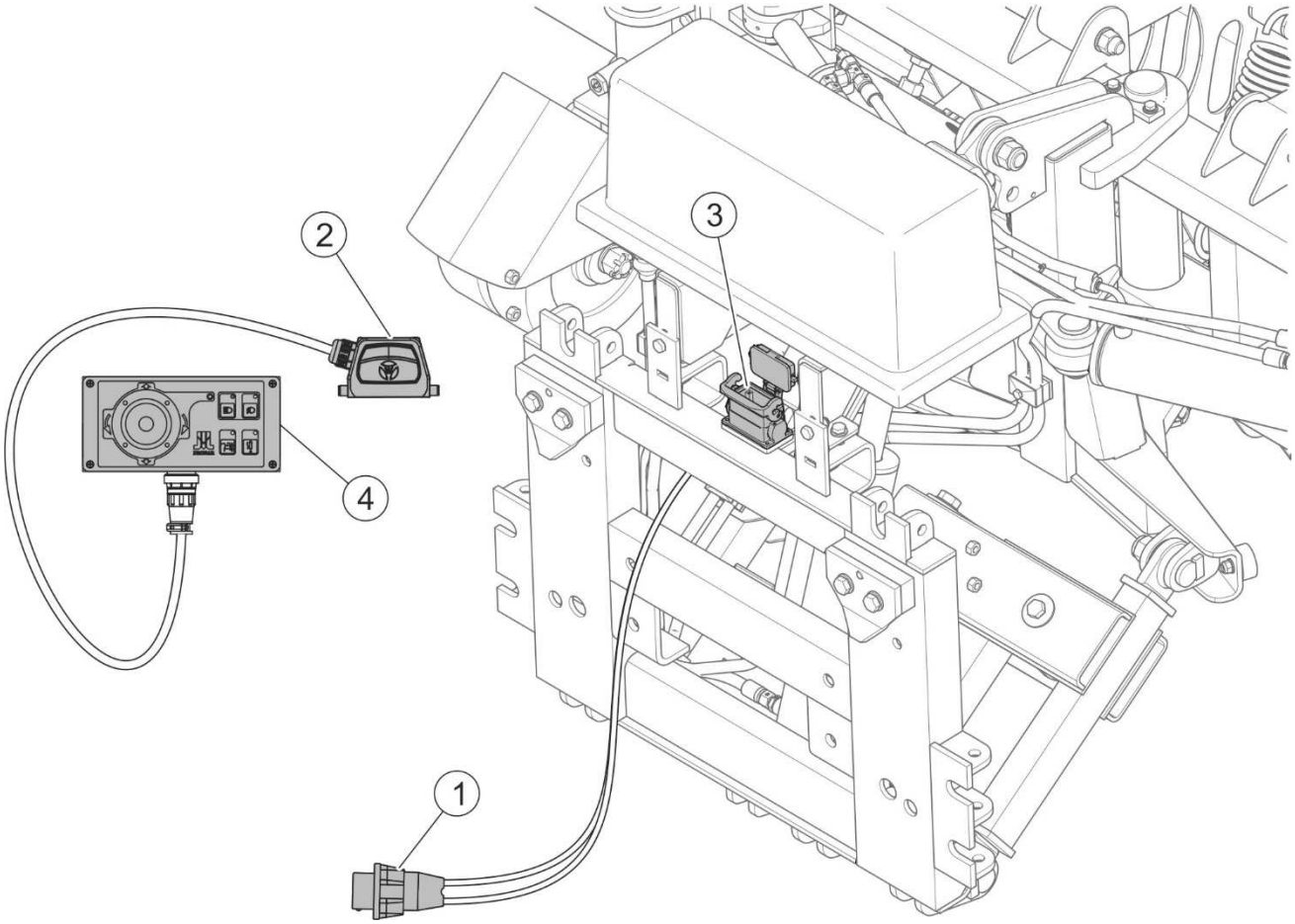


FIGURE 4.6 Connecting the snowplough's hydraulic system and electrical system *(the snowplough with its own Power-Pack hydraulic supply system)*

(1) - power supply plug; (2) - control panel plug; (3) - control socket; (4) – snowplough control panel.

The snowploughs with their own Power-Pack hydraulic supply system are designed for connecting to the carrying vehicle without the external hydraulic system.

The snowplough's power supply plug (1) (FIGURE 4.6) should be only connected to the socket of the power supply wiring harness installed on the carrying vehicle (FIGURE 4.3). The snowplough's mouldboard and lights are controlled by means of the control panel (4), which should be connected to the snowplough's control socket (3) using the plug (2).

4.3.4 CONTROL PANEL - LINKING FUNCTION

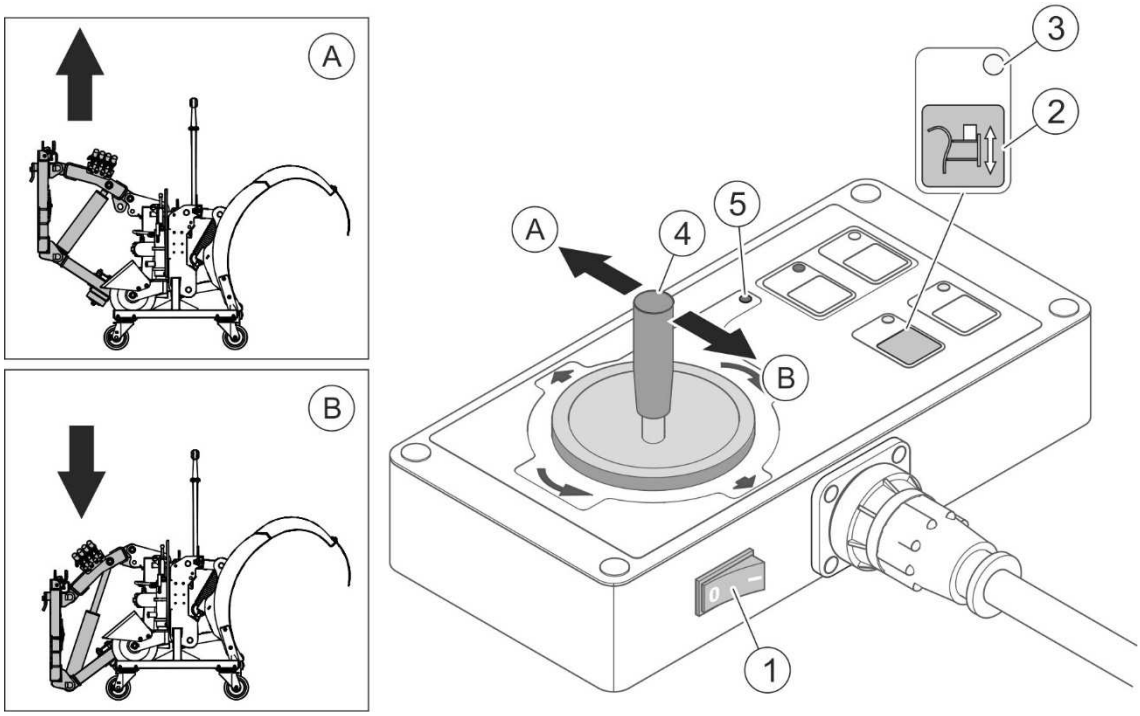


FIGURE 4.7 Control panel - "linking" function

(1) - main switch of control panel; (2) - linking function switch; (3) - linking function ON indicator light; (4) - joystick; (5) - Power-Pack ON indicator light; (A) - linkage rising; (B) - linkage lowering

The "linking" function is available in the control panel for the snowploughs equipped with the hydraulic system with one pair of hydraulic quick couplers or its own hydraulic supply system (Power-Pack). Linking function is used only during mounting and disconnecting the plough from the carrying vehicle.

Linking function is activated using switch (2) on the control panel (FIGURE 4.7). When the linking function is activated, yellow indicator light (2) lights up. In this mode, if joystick (4) is set in position (A), the linkage is raised and if joystick is set in position (B), the snowplough linkage is lowered. When the linking function is deactivated using switch (2), yellow indicator light (3) will go out. Activation of the linking function causes deactivation of the floating function (FIGURE 4.17) (if it was activated before).

The "linking" function switch must be OFF during snowplough operation and transport.

4.3.5 MOUNTING THE PLOUGH ON THE CARRYING VEHICLE

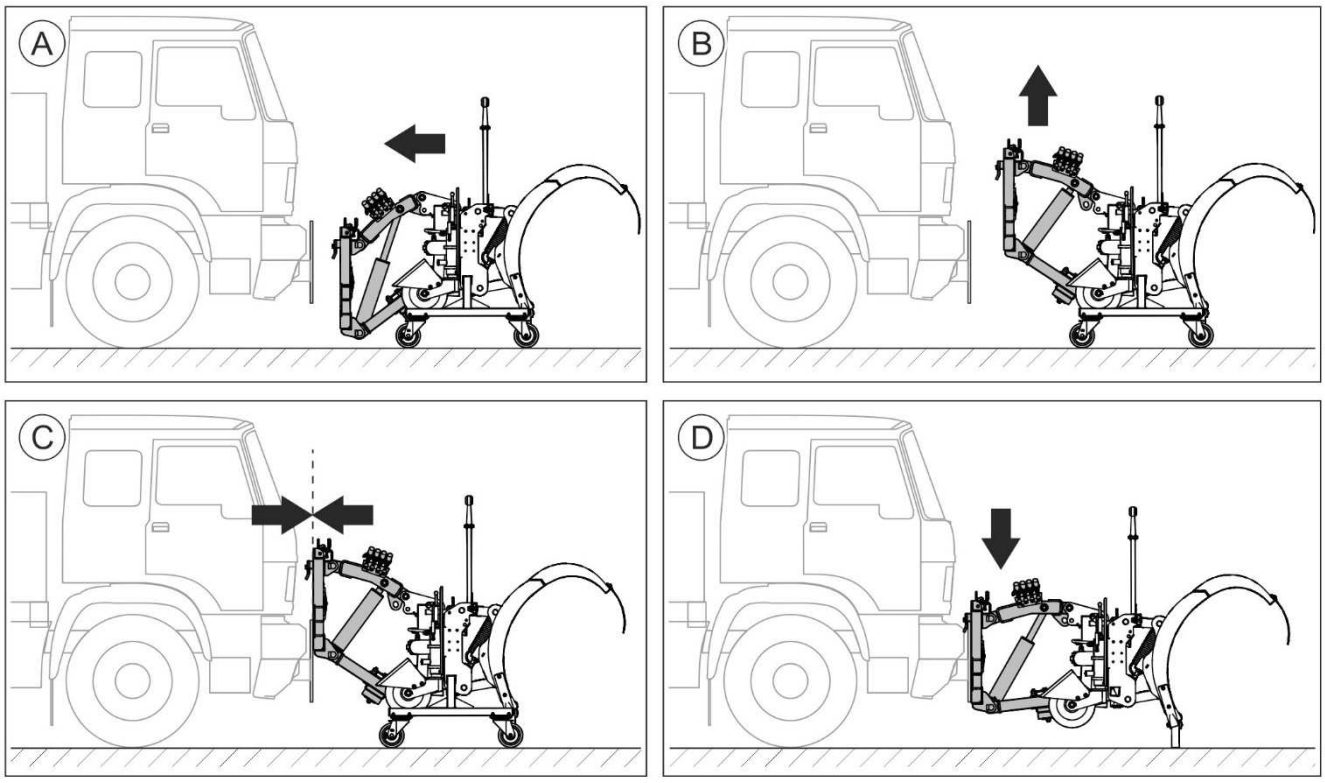


FIGURE 4.8 Mounting the plough on the carrying vehicle

(A,B,C,D) - successive stages of mounting the plough on the carrying vehicle

DANGER

To hitch the machine to the carrying vehicle use only linking elements recommended by the Manufacturer.

ATTENTION

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

Check the compatibility of the carrying vehicle's linkage with the snowplough's linkage before mounting the snowplough on the carrying vehicle.

Mounting stages for the snowplough with the hydraulic system with 2 pairs of quick couplers (FIGURE 4.8):

A) Bring the snowplough set on the parking stands with wheels close to the carrying vehicle's mounting plate. Connect two pairs of the snowplough's hydraulic system conduits to corresponding connectors of the carrying vehicle's external hydraulic system (FIGURE 4.4). Connect the snowplough's control panel wiring harness to the control socket on the snowplough. Place the control panel in the operator cab in an easily accessible place. Connect the snowplough's electrical system connection to the socket of the carrying vehicle's power supply wiring harness (FIGURE 4.3).

B) Unlock transport protection (FIGURE 4.12). Using the external hydraulic system of the carrying vehicle, set the snowplough's linkage in such a manner as to position the hooks of the snowplough's linkage plate above the seats of the carrying vehicle's mounting plate.

C) Bring the snowplough close to the carrying vehicle until the snowplough's linkage plate touches the carrying vehicle's mounting plate.

D) If the hooks and the carrying vehicle's mounting plate are correctly aligned, lower the snowplough's linkage by controlling the external hydraulic system of the carrying vehicle until the hooks are set in the seats of the carrying vehicle's mounting plate. Protect the mounting plate and the carrying vehicle's linkage against disconnecting using bolts (FIGURE 4.9). Raise the snowplough and check if correctly mounted. Dismantle both parking stands of the snowplough (FIGURE 4.10).

Mounting stages for the snowplough with the hydraulic system with 1 pairs of quick couplers (FIGURE 4.8):

A) Bring the snowplough set on the parking stands with wheels close to the carrying vehicle's mounting plate. Connect one pair of the snowplough's hydraulic system conduits to corresponding connectors of the carrying vehicle's external hydraulic system (FIGURE 4.5). Connect the snowplough's control panel wiring harness to the control socket on the snowplough. Place the control panel in the operator cab in an easily accessible place. Connect the snowplough's electrical system connection to the socket of the carrying vehicle's power supply wiring harness (FIGURE 4.3).

B) Unlock transport protection (FIGURE 4.12). Start the control panel using switch (1) (FIGURE 4.7) and activate the "linking" function using push-button (2) – yellow indicator light (3) located next to the push-button will light up. Using the multifunction

lever (joystick) (4) on the control panel, raise the snowplough linkage in such a manner as to position the hooks of the snowplough linkage plate above the seats of the carrying vehicle' mounting plate.

C) Bring the snowplough close to the carrying vehicle until the snowplough's linkage plate touches the carrying vehicle's mounting plate.

D) If the hooks and the carrying vehicle's mounting plate are correctly aligned, lower the snowplough's linkage using joystick until the hooks are set in the seats of the carrying vehicle's mounting plate. Deactivate "linking" function using push-button (2) (FIGURE 4.7) – yellow indicator light (3) located next to the push-button will go out. Protect the mounting plate and the carrying vehicle's linkage against disconnecting using bolts (FIGURE 4.9). Raise the snowplough and check if correctly mounted. Dismantle both parking stands of the snowplough (FIGURE 4.10).

Mounting stages for the snowplough with its own Power-Pack hydraulic supply system (FIGURE 4.8):

A) Bring the snowplough set on the parking stands with wheels close to the carrying vehicle's mounting plate. Connect the snowplough's control panel wiring harness to the control socket on the snowplough. Place the control panel in the operator cab in an easily accessible place. Connect the snowplough's electrical system connection to the socket of the carrying vehicle's power supply wiring harness (FIGURE 4.3).

B) Unlock transport protection (FIGURE 4.12). Start the control panel using switch (1) (FIGURE 4.7) and activate the "linking" function using push-button (2) – yellow indicator light (3) located next to the push-button will light up. Using the multifunction lever (joystick) (4) on the control panel, raise the snowplough linkage in such a manner as to position the hooks of the snowplough linkage plate above the seats of the carrying vehicle' mounting plate.

C) Bring the snowplough close to the carrying vehicle until the snowplough's linkage plate touches the carrying vehicle's mounting plate.

D) If the hooks and the carrying vehicle's mounting plate are correctly aligned, lower the snowplough's linkage using joystick until the hooks are set in the seats of the carrying vehicle's mounting plate. Deactivate "linking" function using push-button (2) (FIGURE 4.7) – yellow indicator light (3) located next to the push-button will go out. Protect the mounting plate and the carrying vehicle's linkage against disconnecting using bolts

(FIGURE 4.9). Raise the snowplough and check if correctly mounted. Dismantle both parking stands of the snowplough (FIGURE 4.10).

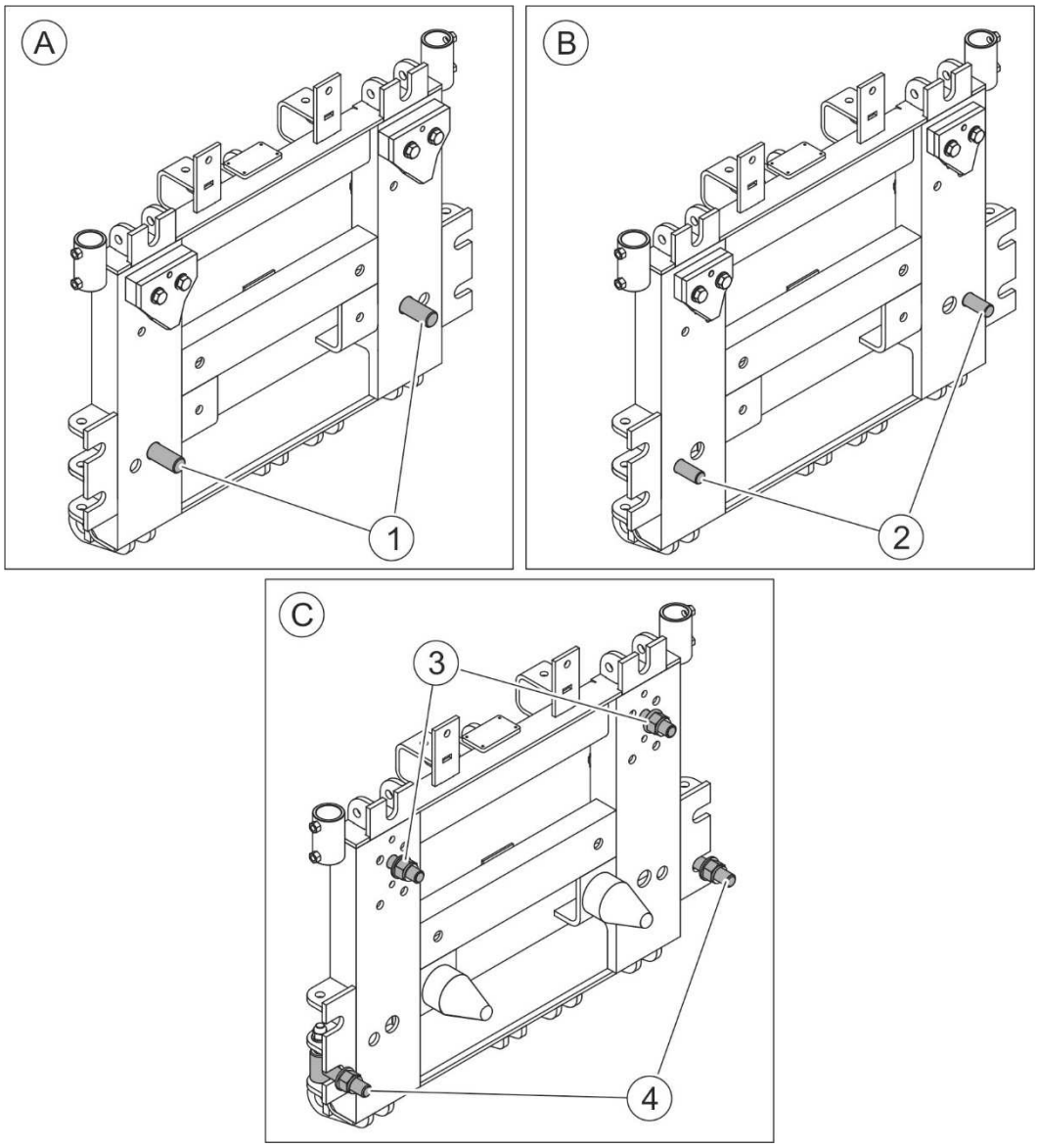


FIGURE 4.9 Bolts securing the plough linkage plate

(A) - DIN 76060 type A linkage; (B) - DIN 76060 type B linkage (option); (C) - SETRA linkage (option); (1) - M30x70 bolts (2 pcs); (2) - M24x60 bolts (2 pcs); (3) - M24x60 bolts (2 pcs); (4) - 416N-21010000 bolts (2 pcs)

4.3.6 DISMANTLING THE PARKING STANDS

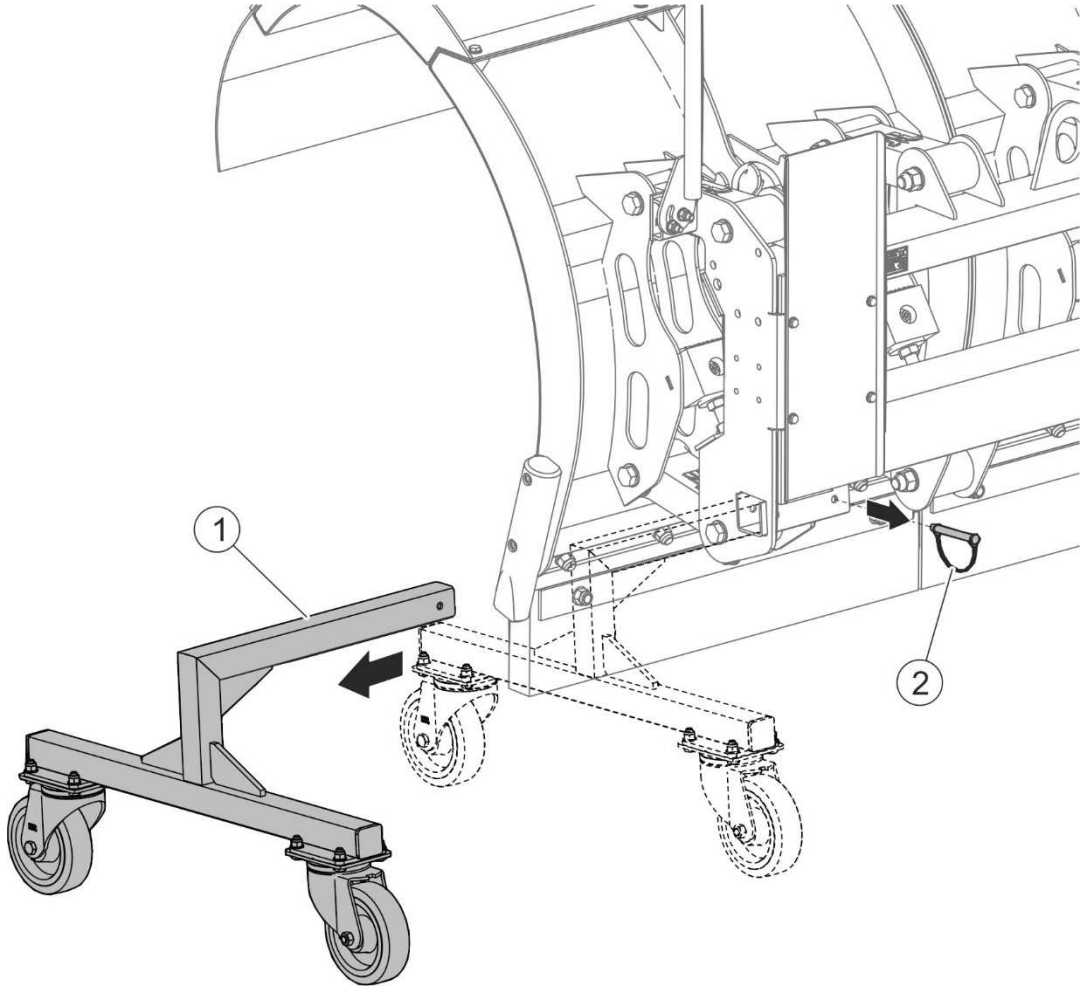


FIGURE 4.10 Dismantling the parking stands

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

The snowplough is equipped with two parking stands on wheels (FIGURE 4.10). To dismantle the parking stands:

- lift the plough mounted on a carrying vehicle,
- take out locking cotter pin (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 (FIGURE 4.11):

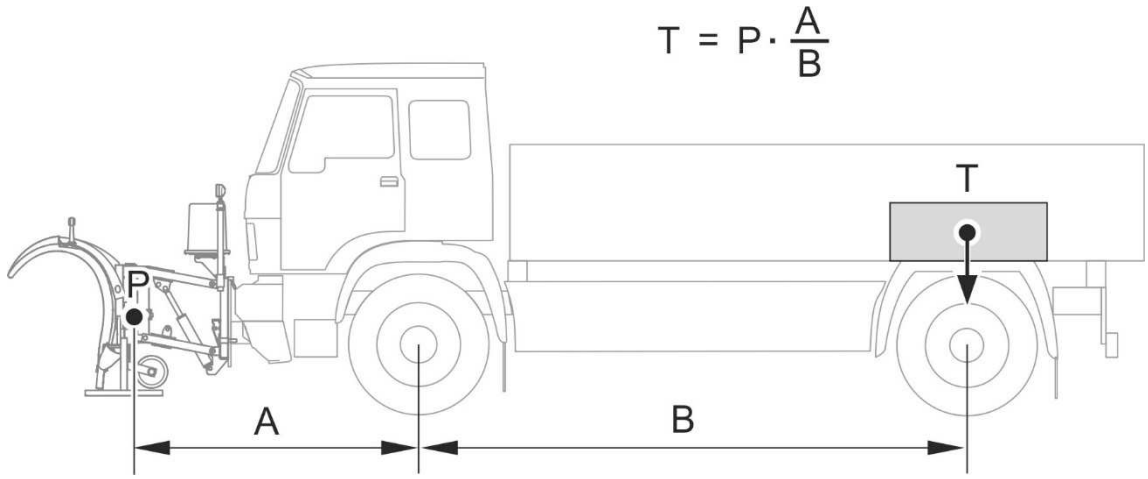


FIGURE 4.11 Ballasting the carrying vehicle

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

4.5 SNOW PLOUGH OPERATION

4.5.1 DISASSEMBLY OF TRANSPORT LOCK

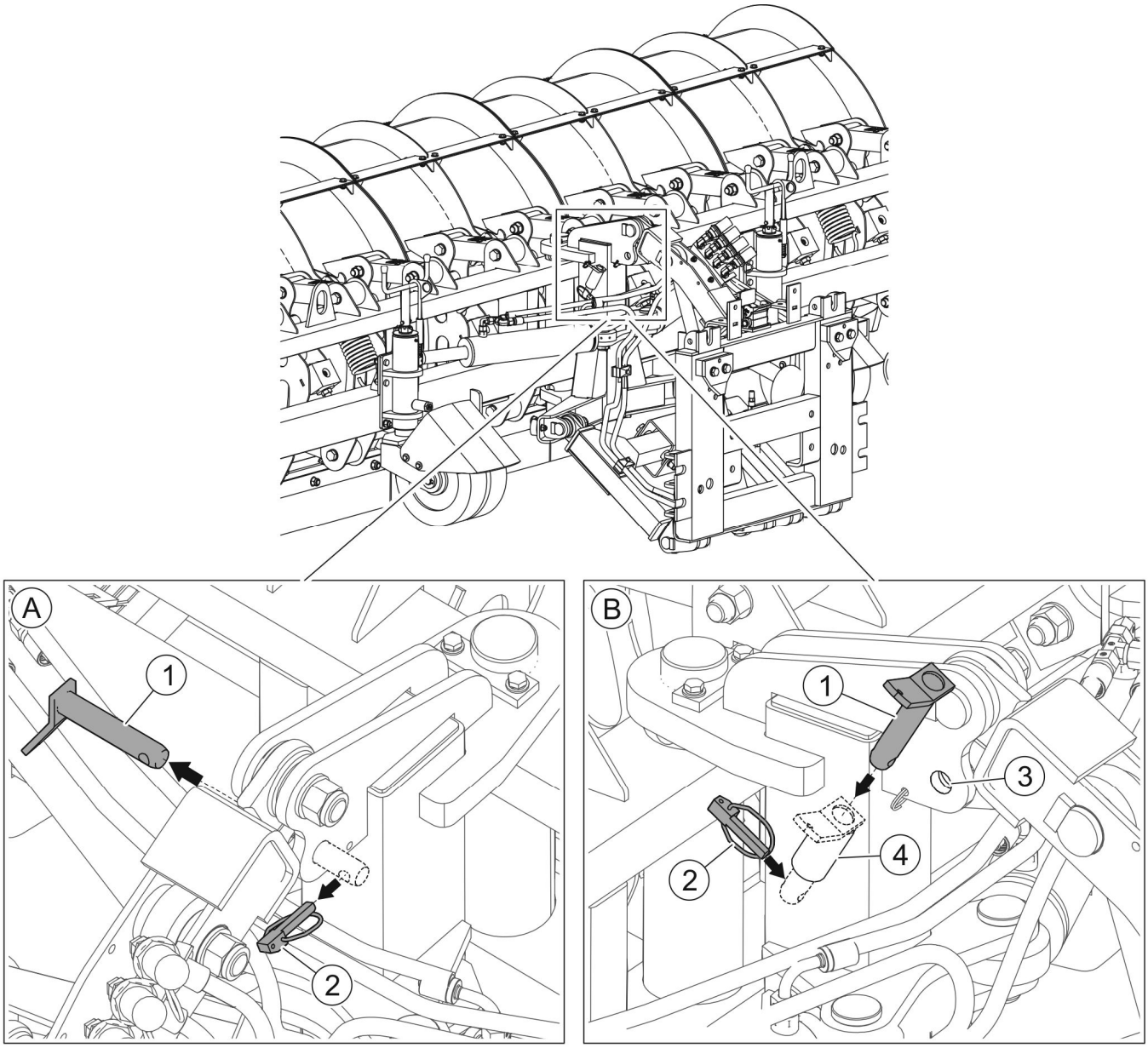


FIGURE 4.12 Release the transport lock

(1) – transport lock; (2) - cotter pin; (3) – transport lock opening; (4) – sleeve.

If the snowplough linkage has been locked in the upper transport position, release the transport lock before lowering the snowplough (FIGURE 4.12). In order to do this:

- raise the plough to the extreme upper position, immobilise the vehicle with parking brake,
- take out securing cotter pin (2),

- take out transport lock pin (1) from opening (3),
- insert the transport lock pin (1) into sleeve (4) and secure with cotter pin (2).

4.5.2 SNOWPLOUGH'S CONTROL PANEL

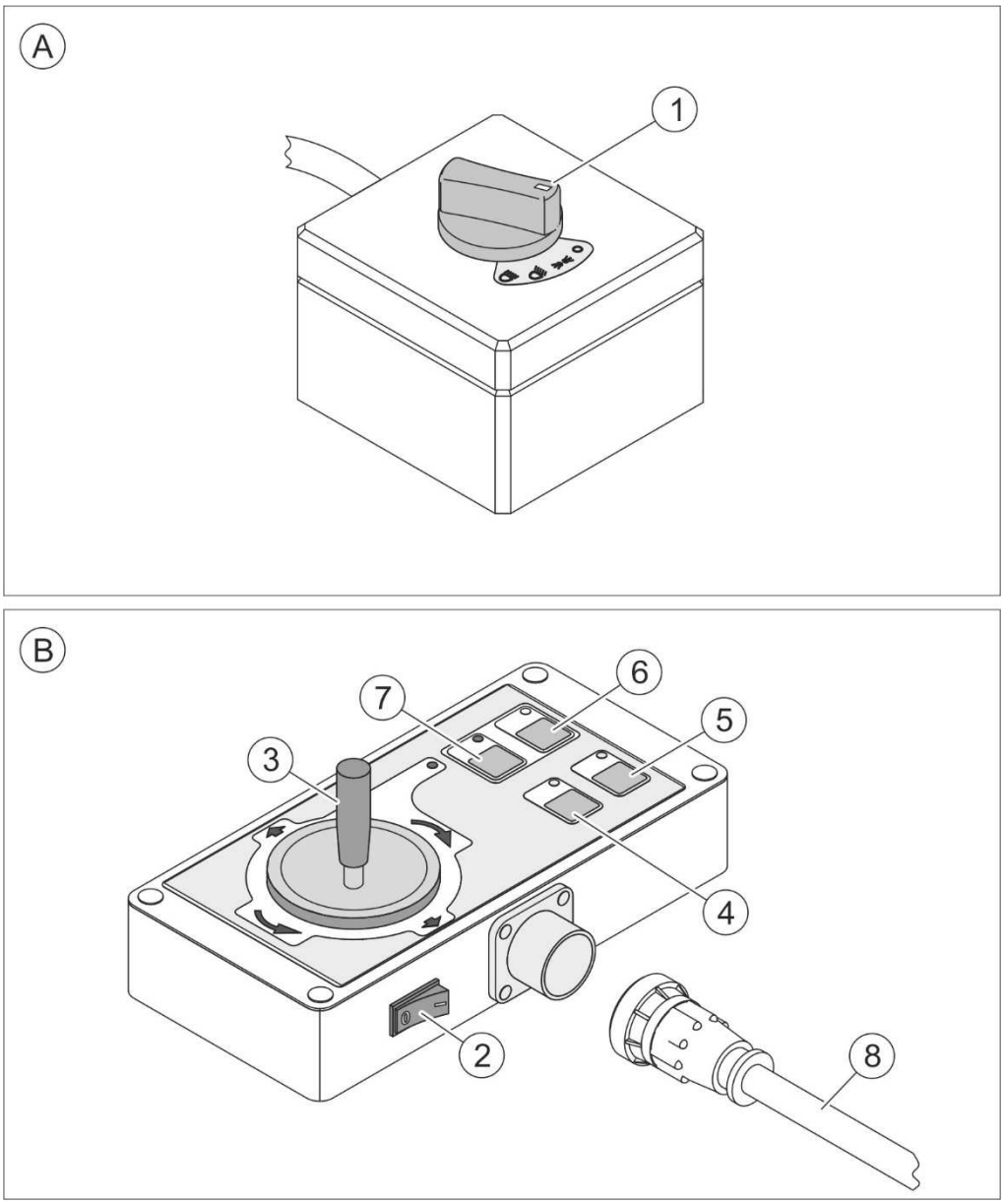


FIGURE 4.13 Control panel – general design.

(A) - control panel for the snowplough equipped with the hydraulic system with two pairs of hydraulic quick couplers; (B) - control panel for the snowplough equipped with the hydraulic system with 1 pair of hydraulic quick couplers or its own Power-Pack hydraulic supply system; (1) – lighting system switch; (2) - main switch of control panel and clearance light; (3) – multifunction lever (joystick); (4) – "linking" function switch; (5) – floating position switch; (6) – low beams switch; (7) – high beams switch; (8) – connection lead.

Control panel (A) (FIGURE 4.13) is used for switching on the clearance lamps and optional additional lights.

Control panel (B) (FIGURE 4.13) is used for switching on the clearance lamps and optional additional lights and for controlling the snowplough position during hitching and operation.

Control panel (B) is protected against accidental use by the main switch (1). When the switch (1) is ON, the clearance light on the snowplough mouldboard and the complete control panel are ON. The main switch must be ON during plough operation and transport.

4.5.3 CONTROLLING THE SNOWPLOUGH'S LIGHTS

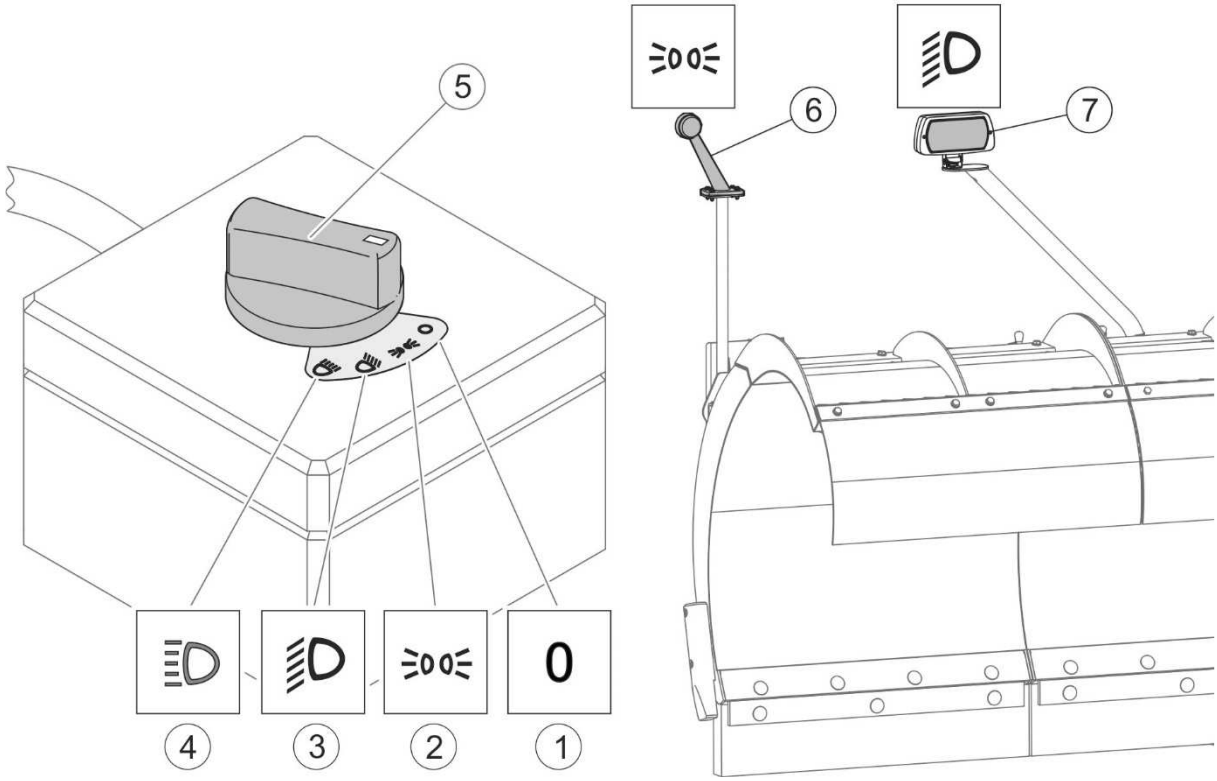


FIGURE 4.14 Switching the lights on. (*the snowplough equipped with the hydraulic system with two pairs of quick couplers)*

(1) - lights OFF; (2) – clearance light ON; (3) – low beams and clearance light ON; (4) – high beams and clearance light ON; (5) – light switch; (6) – clearance light lamp; (7) – additional light lamp (low beams and high beams) (option).

The snowplough is equipped with clearance lights (6) (FIGURE 4.14) and optional additional lights (low beams and high beams) (7). In the snowplough controlled by the external hydraulic system of the carrying vehicle through 2 pairs of quick couplers, the lights are switch on using switch (5). Turn the switch to position (2) to switch on the clearance lights (6). Turn the switch (5) to position (3) (low beams) or (4) (high beams) to switch on the additional

lights (7) (option). To switch off clearance lights and additional lights, turn switch (5) to position (1).

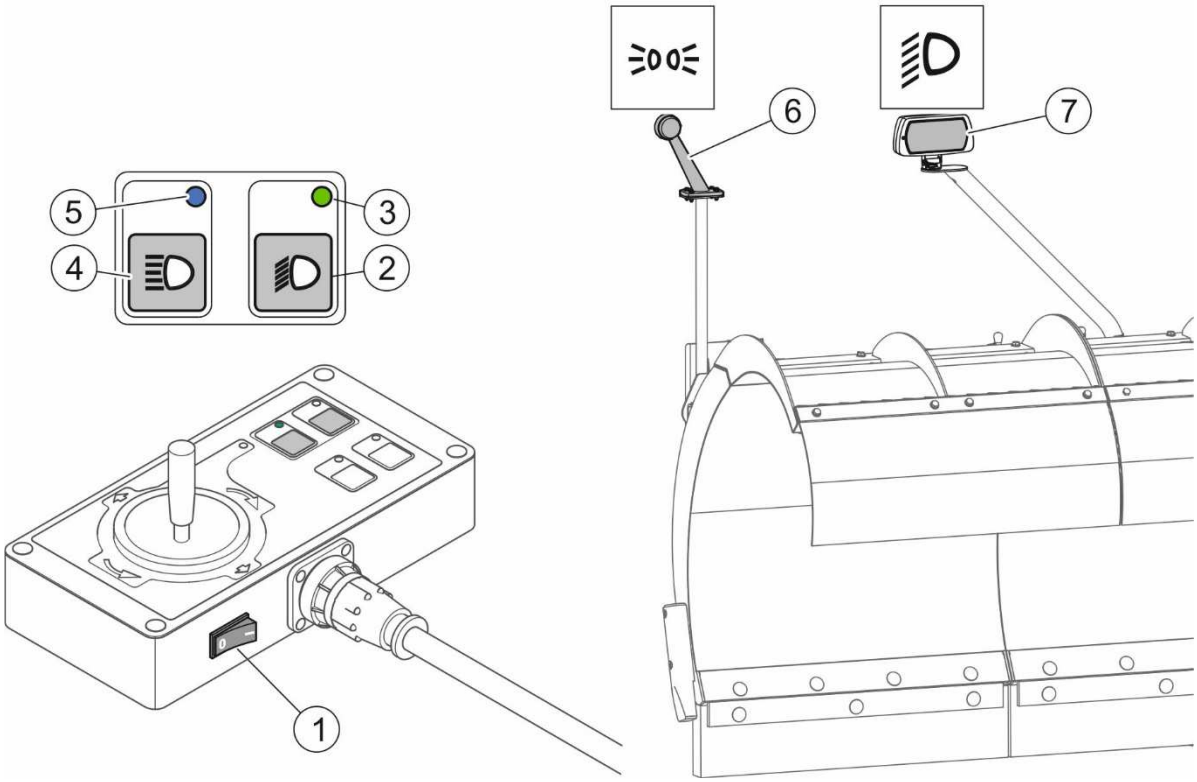


**FIGURE 4.15 Switching the lights on. (*the snowplough equipped with the hydraulic system with 1 pair of quick couplers or its own Power-Pack hydraulic supply*

(1) - main switch of control panel and clearance lights; (2) – low beams switch; (3) - low beams ON indicator light; (4) – high beams switch; (5) - high beams ON indicator light; (6) – clearance light lamp; (7) – additional light lamp (low beams and high beams) (option).

In the snowplough equipped with the hydraulic system with 1 pair of quick couplers or its own Power-Pack hydraulic supply system, clearance lamps (6) (FIGURE 4.15) are switched on when the control panel is activated by means of the main switch (1).

To make it possible to switch on the additional lights (7) (low beams and high beams) (option), the control panel must be active (main switch (1) must be in position „I”- ON).

The switch (2) is used for switching on and off the low beams. Activation of the lights by means of switch (2) is signalled by green indicator light (3). When the switch (2) is pressed again, the low beams and indicator light (3) go out. The switch (4) is used for switching on and off the high beams. Activation of the lights by means of switch (4) is signalled by blue indicator light (5). When the switch (4) is pressed again, the high beams and indicator light (5) go out.

4.5.4 ADJUSTING THE SNOW PLOUGH WORKING POSITIONS

DANGER

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

The snowplough's mouldboard can be raised, lowered and turned to the right/left within the range of ±30°. Depending on the type of the carrying vehicle's hydraulic system, the snowplough can be controlled by the external hydraulic system or Power-Pack electro-hydraulic power supply.

In the snowplough controlled by the carrying vehicle's external hydraulic system through two pairs of quick couplers, the working position change is performed by means of a corresponding hydraulic section of the carrying vehicle.

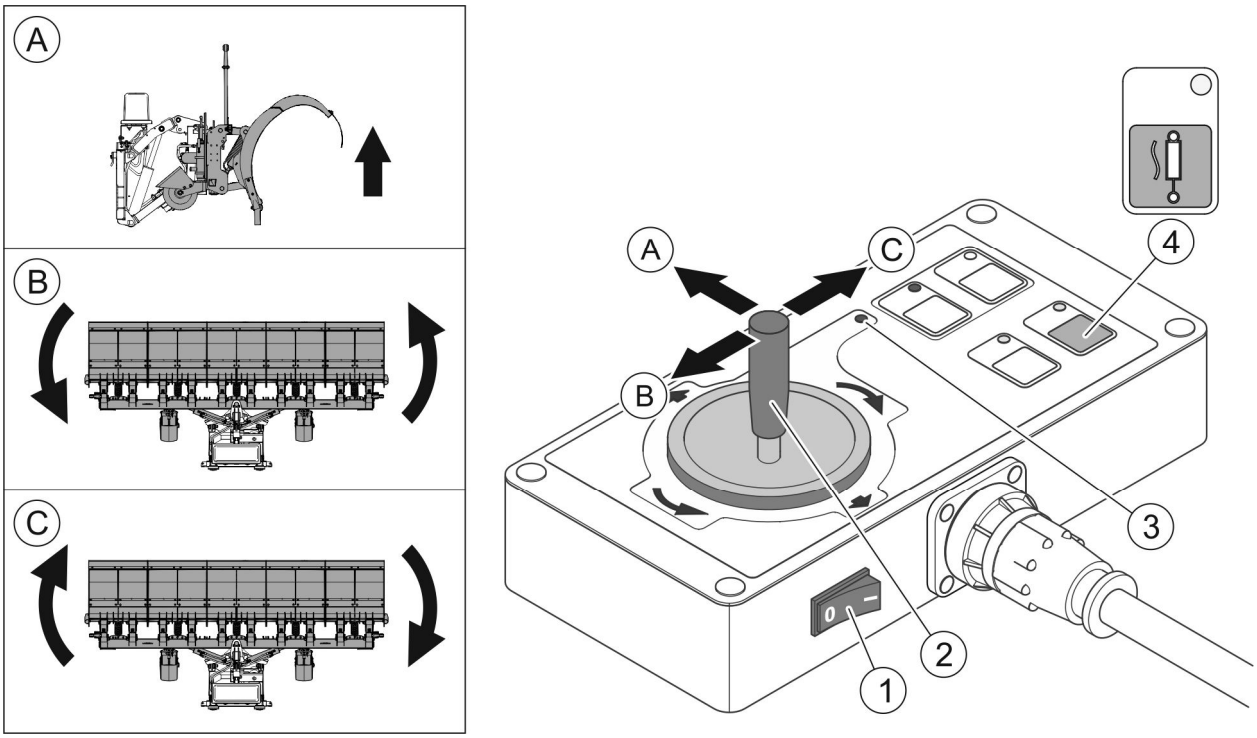


FIGURE 4.16 Control panel - changing the mouldboard working position.

(A) – rising the mouldboard; (B) - turning the mouldboard to the left; (C) - turning the mouldboard to the right; (1) - main switch of control panel; (2) – multifunction lever - joystick; (3) - control panel ON and Power-Pack electro-hydraulic power supply ON indicator light; (4) - floating position switch.

In the snowploughs equipped with the hydraulic system with one pair of quick couplers or Power-Pack electro-hydraulic power supply, the working position change is performed by means of the control panel (FIGURE 4.16).

In order to change the snowplough's working position, the control panel should be active (main switch (1) (FIGURE 4.16) should be set to position „I" - ON). Plough mouldboard position is changed by means of joystick (2). When the multifunction lever is set to the left position (B), the mouldboard turns to the left. When the multifunction lever is set to position (C), the mouldboard turns to the right. The plough lifting takes place when the multifunction lever is moved forward to position (A). The snowplough's mouldboard can be lowered only by switching on the floating function by means of floating function switch (4). When the multifunction lever is set to position (A), (B) or (C), the indicator light (3) lights up to indicate that the control panel is active and Power-Pack electro-hydraulic power supply is working.

ATTENTION

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

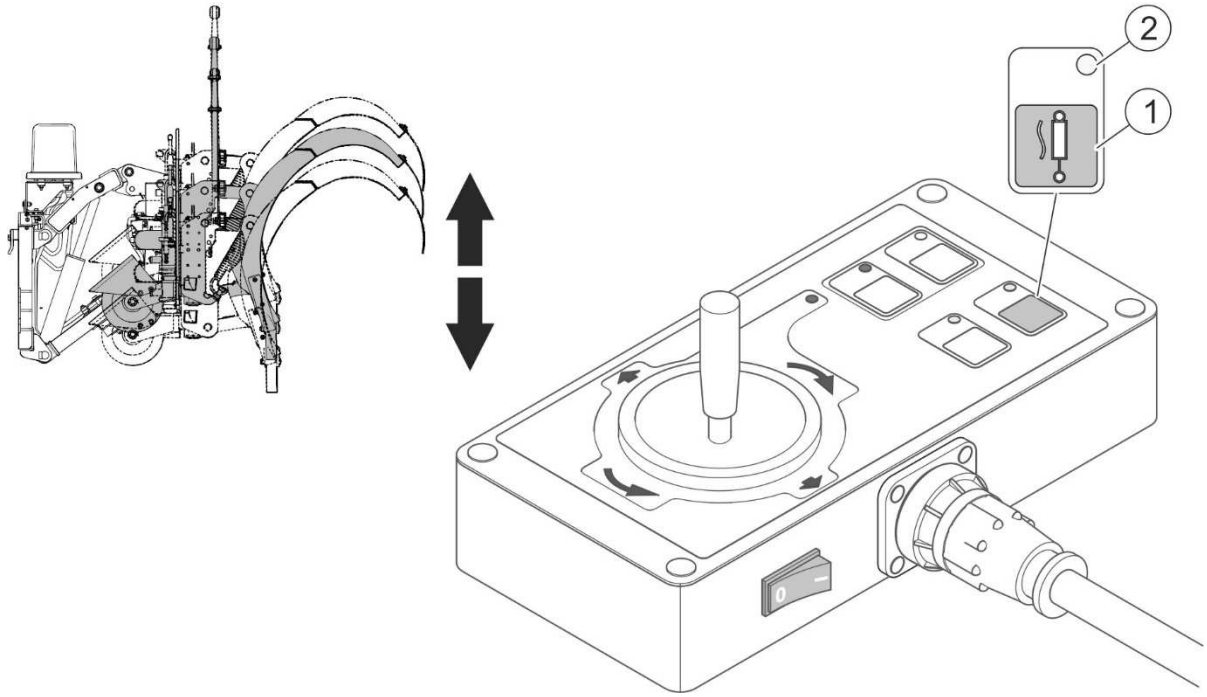


FIGURE 4.17 Control panel - floating function switch

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

Floating function enables ground surface tracking during snow clearing i.e. the snowplough mouldboard can adjust to uneven surface. Floating function protects the snowplough against damage during operation.

The floating function (FIGURE 4.17) is switched on with push-button (1). Activation of the floating function is signalled by yellow indicator light (2). When push-button (1) is pressed again, the floating function will be switched off and the indicator light (2) will go out.

DANGER

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

ATTENTION

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.

4.5.5 SETTING WORKING HEIGHT

DANGER

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

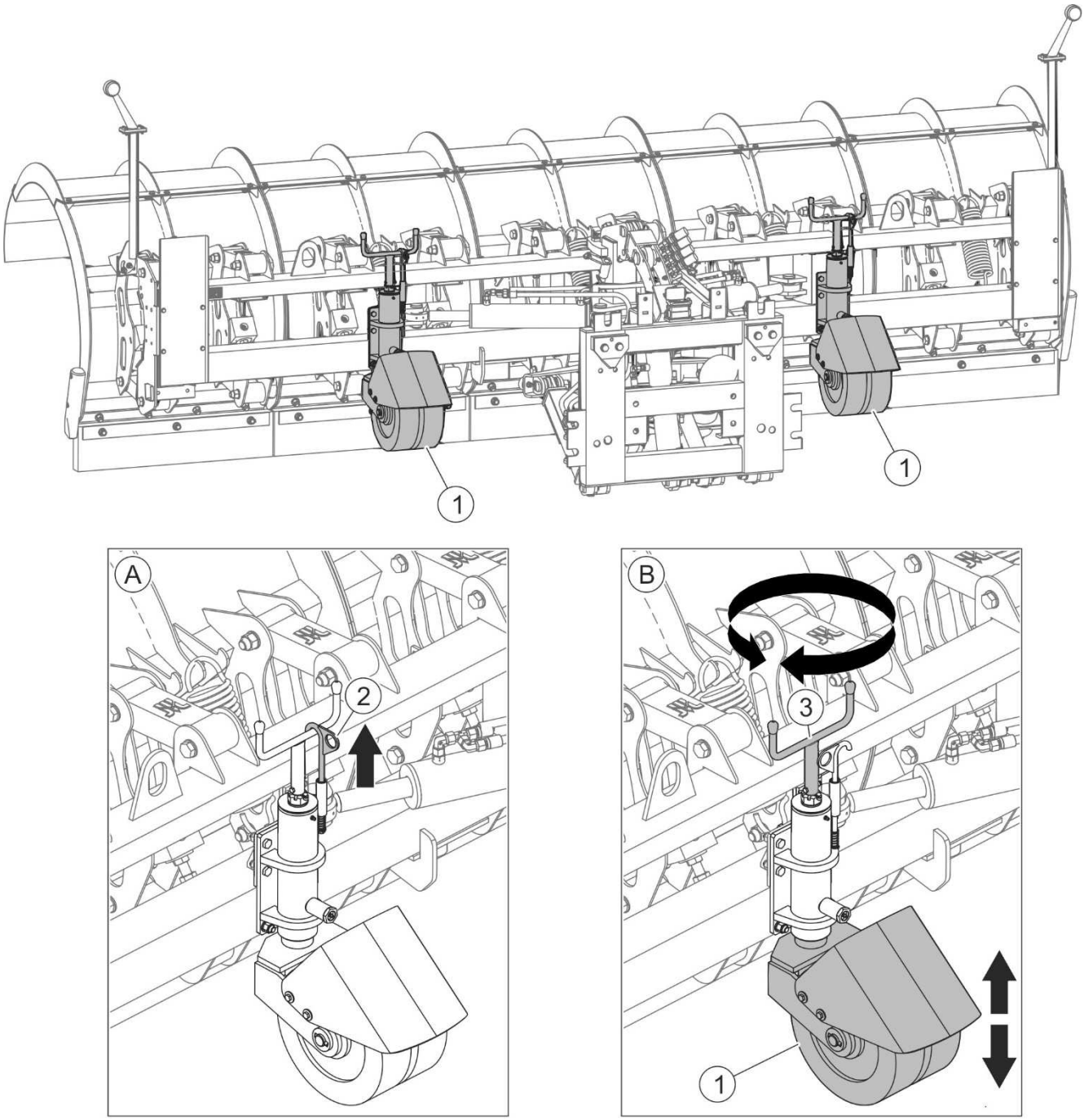


FIGURE 4.18 Working height adjustment in the snowploughs equipped with support

(1) - support wheels; (2) - handle lock; (3) - handle

Working height adjustment (FIGURE 4.18) in ploughs equipped with support wheels is carried out by proper setting of wheel height. Adjustment of wheel (1) height is performed by means of handle (3). Unlock the handle by removing the lock (2) from the handle (3). Turn the handle to set an appropriate snowplough working height and secure the handle (3) with the lock (2). It is recommended that both wheels are set at the same height.

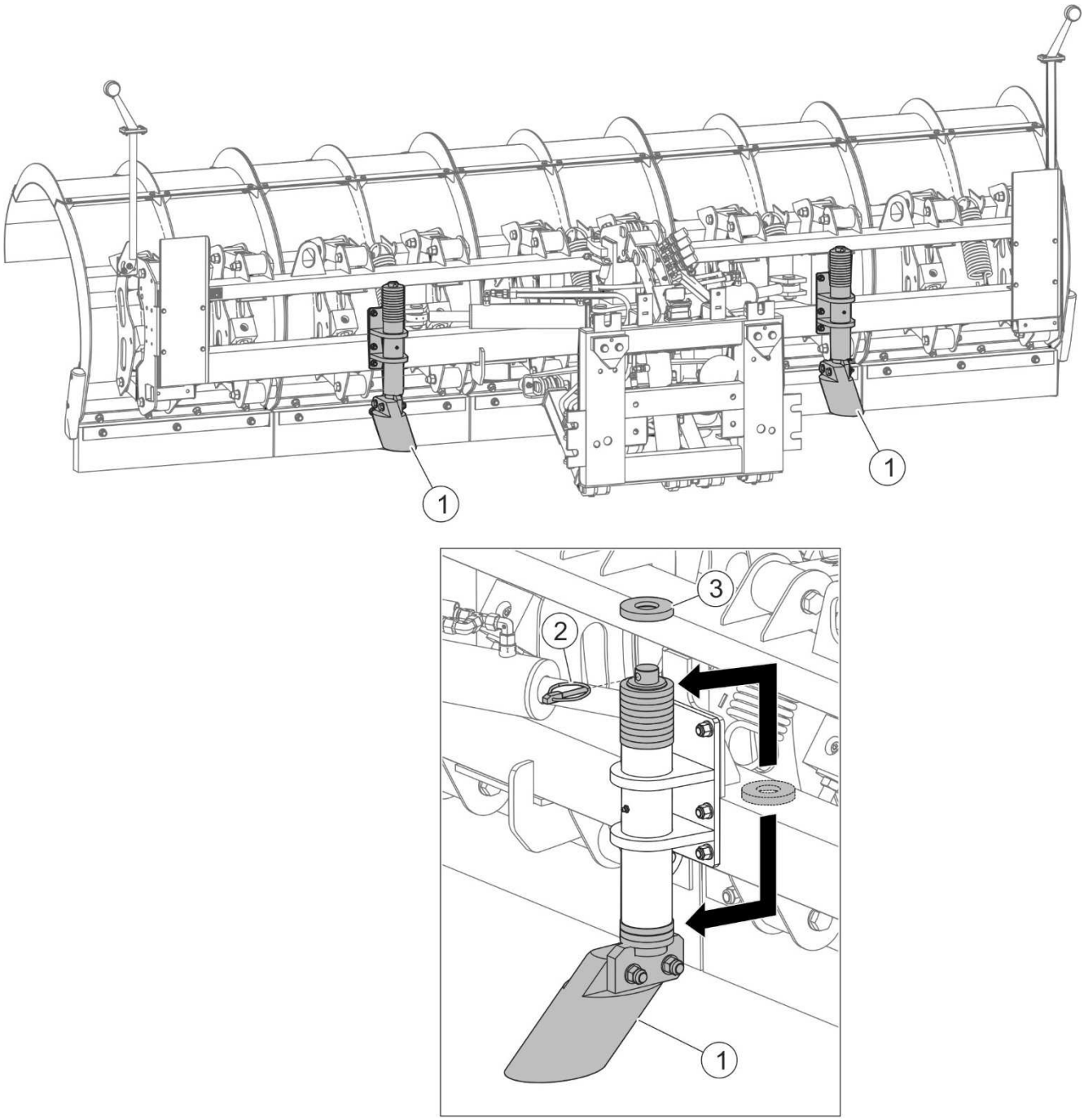


FIGURE 4.19 Working height adjustment in the snowploughs equipped with Kuper
(1) - Kuper slides; (2) - securing cotter pin; (3) - spacer washer

Working height adjustment (FIGURE 4.15) in ploughs equipped with Kuper slides is carried out by proper setting of slides height. Slides height is adjusted with the use of 10 mm-high

spacer washers. In order to lift slides (1), take out cotter pin (2) and relocate spacer washers above the slides bracket. Right and left slide heights should be the same.

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. Ensure that the driver has sufficient visibility.
- Make sure that the plough is correctly attached to the carrying vehicle, and linkage is properly secured.
- The maximum working speed and the maximum speed allowed by road traffic regulations must not be exceeded. Speed of travel should be adjusted to prevailing road conditions and other conditions.
- While driving on public roads turn on clearance lamps and optional 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 (FIGURE 4.20).

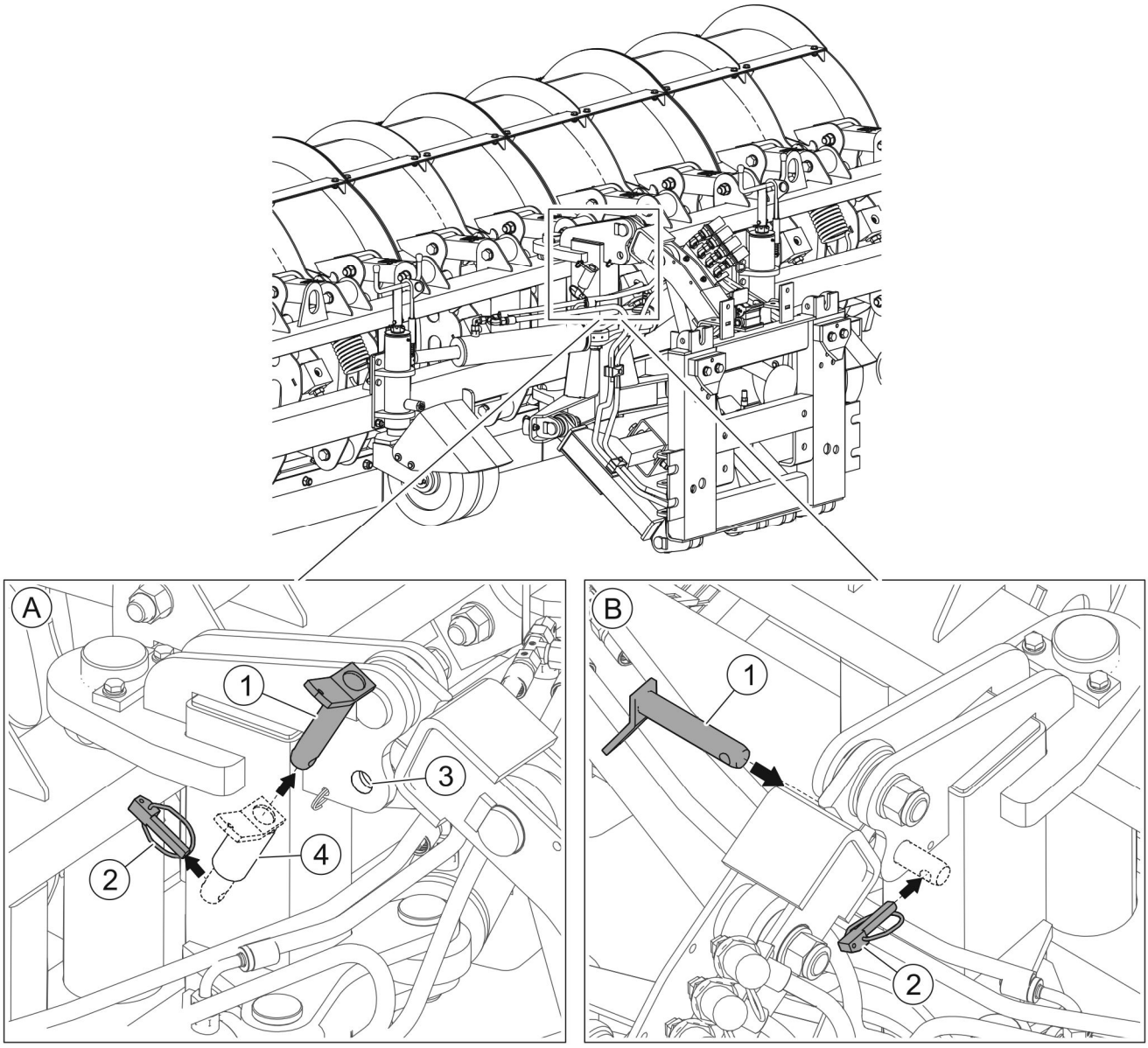


FIGURE 4.20 Transport lock mounting

(1) – transport lock; (2) - cotter pin; (3) – transport lock opening; (4) – sleeve.

In order to protect the linkage system in transport position (FIGURE 4.20):

- raise the plough to the extreme upper position, immobilise the vehicle with parking brake,
- take out securing cotter pin (2),
- take out transport lock pin (1) from sleeve (4),
- insert the transport lock pin (1) into sleeve (3) and secure with cotter pin (2).

4.7 DISCONNECTING THE PLOUGH

To disconnect the plough, park the carrying vehicle with the plough on level surface and immobilise with parking brake.

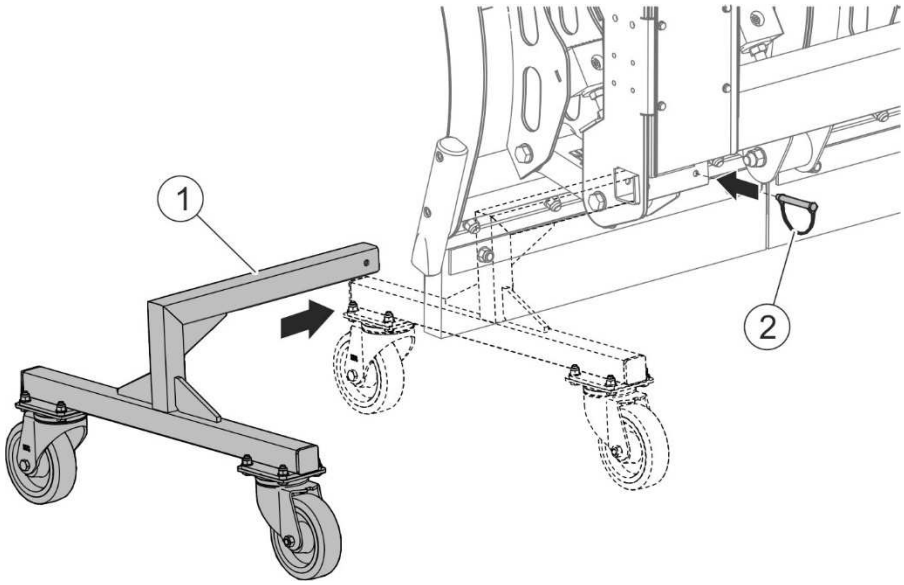


FIGURE 4.21 Installing the parking stands

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

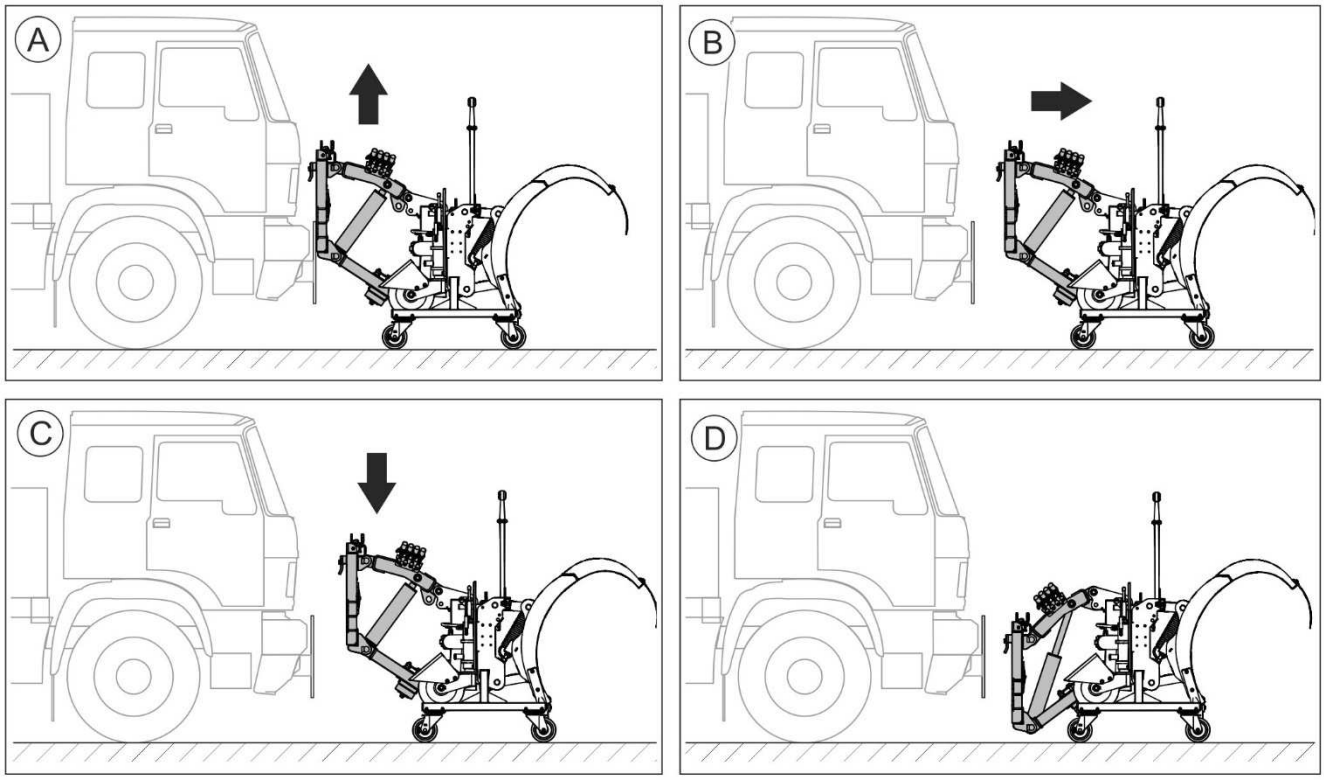


FIGURE 4.22 Disconnecting the snowplough from the carrying vehicle.

(A,B,C,D) - successive stages of disconnecting the snowplough from the carrying vehicle.

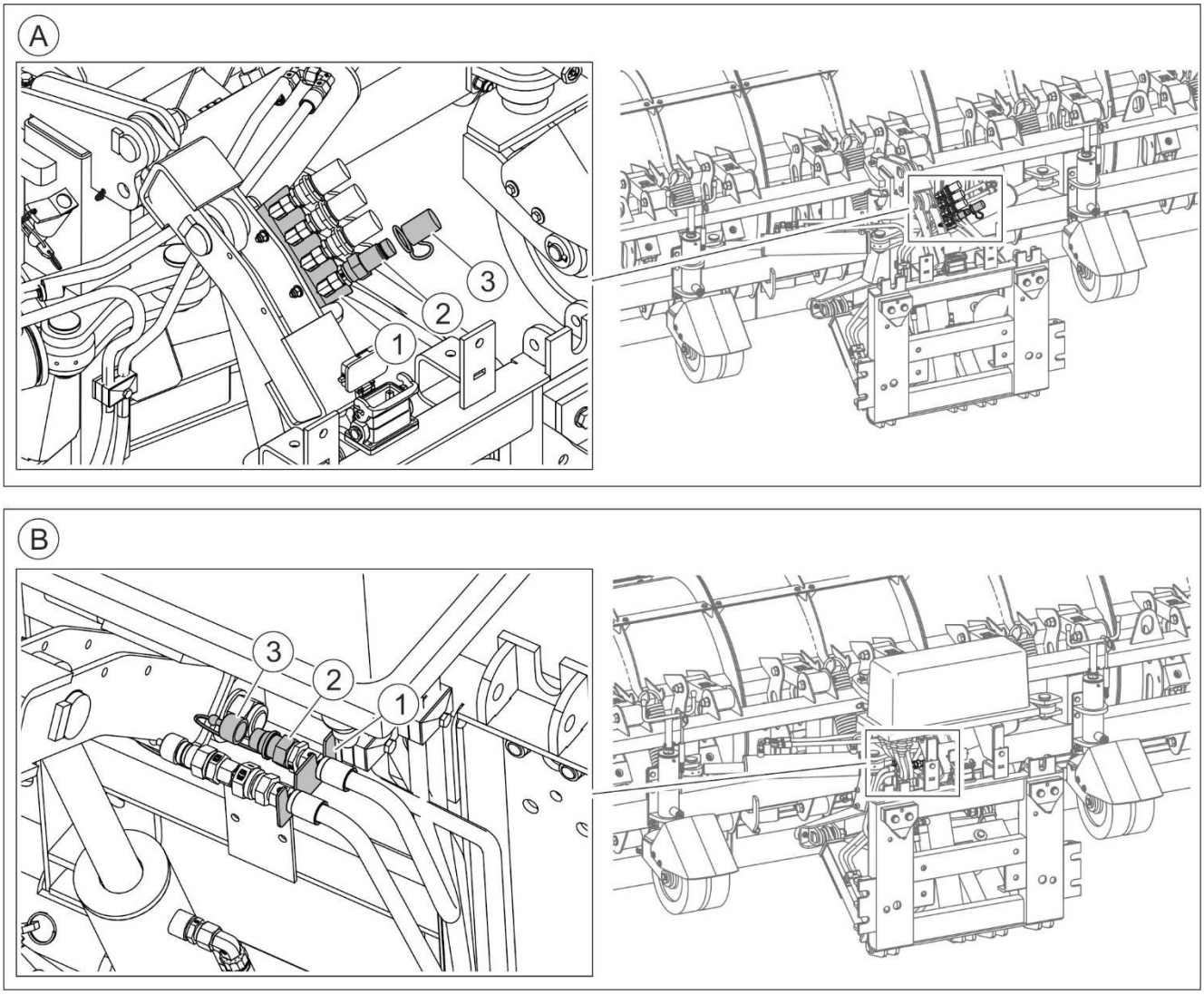


FIGURE 4.23 Protection of hydraulic quick couplers.

(A) – snowplough equipped with the hydraulic system with 2 pairs of quick couplers; (B) – snowplough equipped with the hydraulic system with 1 pair of quick couplers; (1) – quick coupler bracket; (2) – hydraulic quick couplers; (3) – protective plug.

Disconnecting stages for the snowplough equipped with the hydraulic system with 2 pairs of quick couplers (FIGURE 4.22):

A) Install both parking stands of the snowplough (FIGURE 4.21). Using the external hydraulic system of the carrying vehicle, carefully lower the snowplough until its supports fully rest on the ground. Unlock the mounting plate from the carrying vehicle's linkage (FIGURE 4.9). Using the external hydraulic system of the carrying vehicle, raise the snowplough's linkage in such a manner as to position the hooks of the snowplough's linkage plate above the seats of the carrying vehicle's mounting plate.

B) Drive the snowplough away from the carrying vehicle to a distance of about 30 cm.

C) Lower the snowplough linkage frame to the lower position.

D) Disconnect two pairs of quick couplers of the snowplough's hydraulic system conduits from the connectors of the carrying vehicle's external hydraulic system (FIGURE 4.4). Protect the conduit quick couplers with plugs and place them in the bracket on the snowplough's frame (A) (FIGURE 4.23). Disconnect the snowplough's control panel wiring harness together with the panel from the control socket on the snowplough and protect it against adverse weather conditions. Disconnect the snowplough's electrical system connection from the socket of the carrying vehicle's power supply wiring harness (FIGURE 4.3) and secure it with a plug.

Disconnecting stages for the snowplough equipped with the hydraulic system with 1 pair of quick couplers (FIGURE 4.22):

A) Install both parking stands of the snowplough (FIGURE 4.21). Activate the floating position for a short time on the snowplough's control panel and carefully lower the snowplough until its supports fully rest on the ground. Unlock the mounting plate from the carrying vehicle's linkage (FIGURE 4.9). Activate the "linking" function on the control panel (FIGURE 4.7). Using the joystick, raise the snowplough linkage in such a manner as to position the hooks of the snowplough linkage plate above the seats of the carrying vehicle' mounting plate.

B) Drive the snowplough away from the carrying vehicle to a distance of about 30 cm.

C) Lower the snowplough linkage frame to the lower position. Turn off the main switch of control panel.

D) Disconnect the pair of quick couplers of the snowplough's hydraulic system conduits from the connectors of the carrying vehicle's external hydraulic system (FIGURE 4.5). Protect the conduit quick couplers with plugs and place them in the bracket on the snowplough's frame (B) (FIGURE 4.23). Disconnect the snowplough's control panel wiring harness together with the panel from the control socket on the snowplough and protect it against adverse weather conditions. Disconnect the snowplough's electrical system connection from the socket of the carrying vehicle's power supply wiring harness (FIGURE 4.3) and secure it with a plug.

Disconnecting stages for the snowplough equipped with its own Power-Pack hydraulic supply system (FIGURE 4.22):

A) Install both parking stands of the snowplough (FIGURE 4.21). Activate the floating position (FIGURE 4.17) for a short time on the snowplough's control panel and

carefully lower the snowplough until its supports fully rest on the ground. Unlock the mounting plate from the carrying vehicle's linkage (FIGURE 4.9). Activate the "linking" function on the control panel (FIGURE 4.7). Using the joystick, raise the snowplough linkage in such a manner as to position the hooks of the snowplough linkage plate above the seats of the carrying vehicle' mounting plate.

B) Drive the snowplough away from the carrying vehicle to a distance of about 30 cm.

C) Lower the snowplough linkage frame to the lower position. Turn off the main switch of control panel.

D) Disconnect the snowplough's control panel wiring harness together with the panel from the control socket on the snowplough and protect it against adverse weather conditions. Disconnect the snowplough's electrical system connection from the socket of the carrying vehicle's power supply wiring harness (FIGURE 4.3) and secure it with a plug.

SECTION

5

MAINTENANCE

5.1 CHECKING AND REPLACEMENT OF COLLECTING BLADES

DANGER

During inspection and replacement of the snow plough blades, turn 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 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.

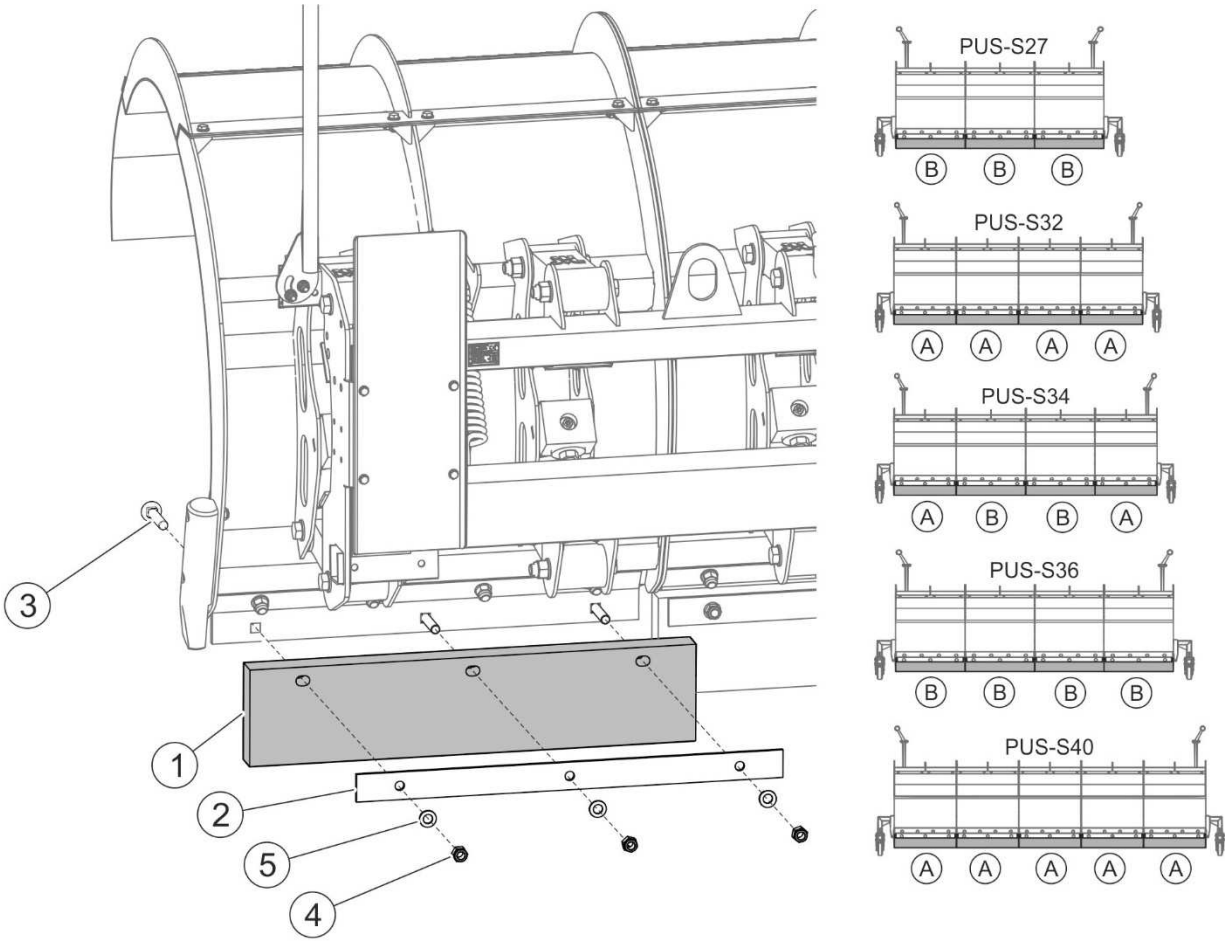


FIGURE 5.1 Replace rubber blades.

(1) - rubber plough blade; (2) - clamping strip; (3) - bolt; (4) - nut; (5) - spring washer; (A) - short segment; (B) - long segment

To remove a rubber plough blade (FIGURE 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 (TABLE 5.1). Install in reverse order.

TABLE 5.1 Types of rubber plough blades, depending on the plough model

		PUS-S27	**PUS-S32**	**PUS-S34**	**PUS-S36**	**PUS-S40**
Marking FIGURE 5.1	**Name/ part number**	Number of items				
A	Short rubber plough blade / 416N-20000003	-	4	2	-	5
B	Long rubber plough blade / 440N-03000003	3	-	2	4	-

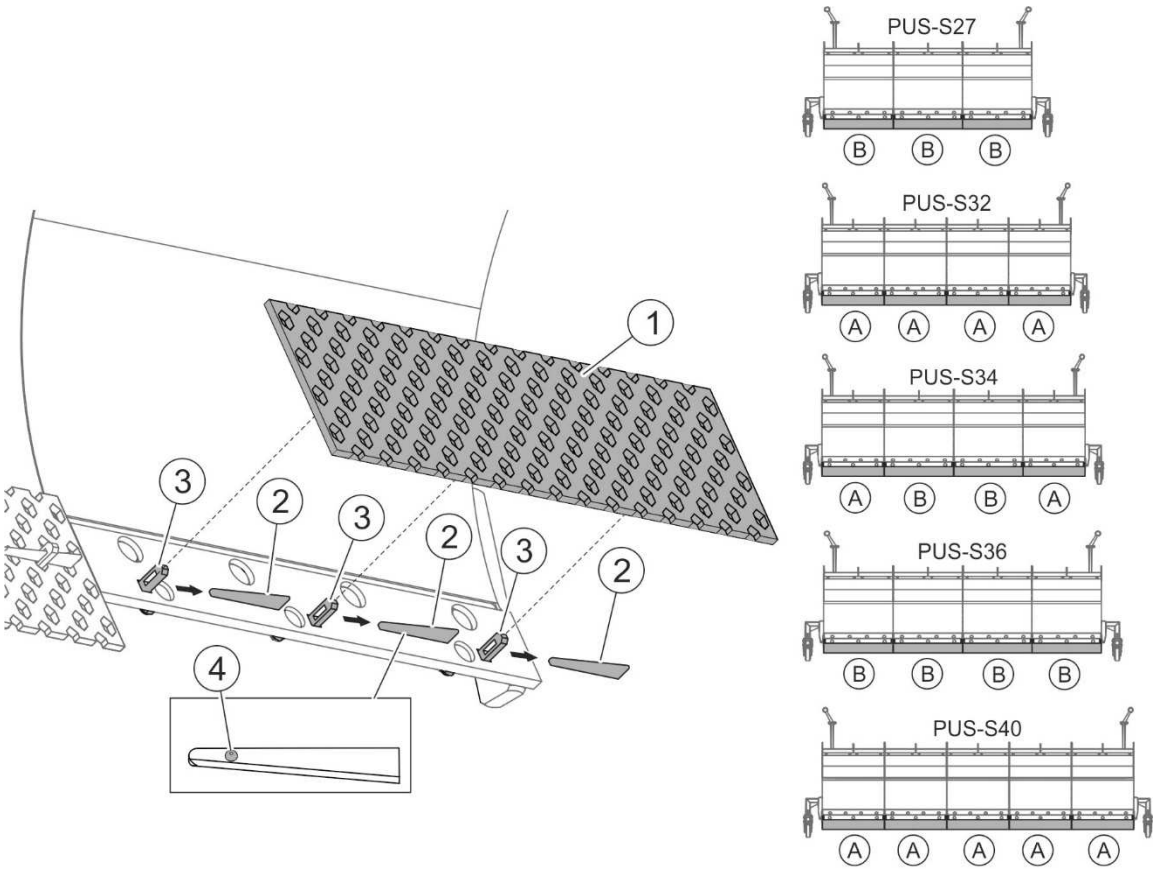


FIGURE 5.2 Replacement of perforated blades (option).

(1) - perforated blade; (2) - wedge; (3) - bolt for wedge; (4) - wedge protrusion; (A) - short segment; (B) - long segment

To remove perforated blade (1) (FIGURE 5.2) knock wedges (2) out of bolt holes (3) and then, take the blade off the bolts (3). After installation of proper blade segment (A) or (B), depending on the snowplough model (TABLE 5.2), force the wedges (2) into the bolt holes (3). Wedges (2) should be installed with protrusions (4) directed upwards.

TABLE 5.2 Types of perforated snowplough blades, depending on the snowplough model

		PUS-S27	**PUS-S32**	**PUS-S34**	**PUS-S36**	**PUS-S40**
Marking FIGURE 5.2	**Name/ part number**	Number of items				
A	Short perforated plough blade / 1258079	-	4	2	-	5
B	Long perforated plough blade / 440N-05000002	3	-	2	4	-

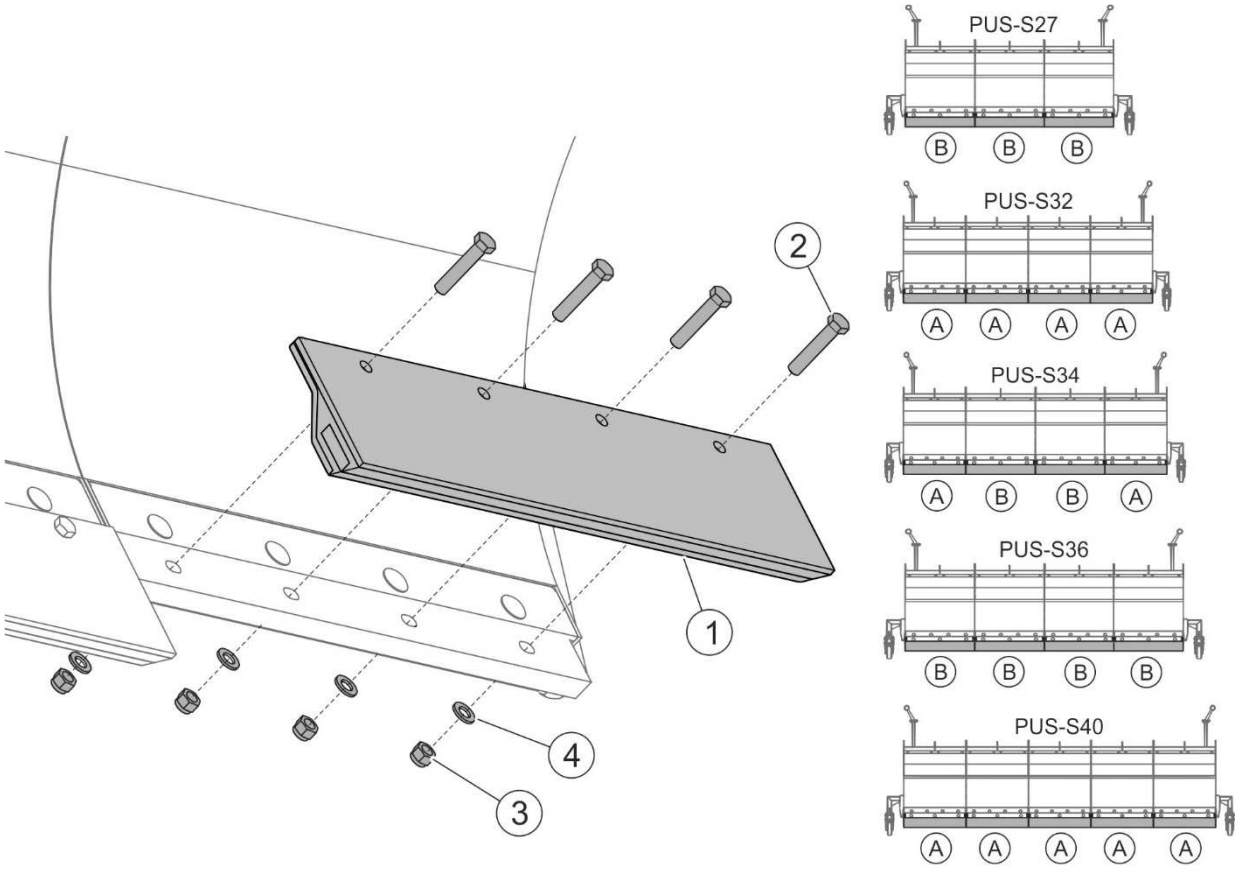


FIGURE 5.3 Replacement of Kuper type blades.

(1) - Kuper type blade; (2) - bolt; (3) - nut; (4) - washer; (A) - short segment; (B) - long segment.

To remove a Kuper type blade (1) (FIGURE 5.3), undo nuts (3) of an appropriate segment, take out bolts (2) and remove the blade (1). Fit an appropriate blade segment (A) or (B), depending on the snowplough model (TABLE 5.1). Install in reverse order.

TABLE 5.3 Types of Kuper snowplough blades, depending on the snowplough model

		PUS-S27	**PUS-S32**	**PUS-S34**	**PUS-S36**	**PUS-S40**
Marking FIGURE 5.3	**Name/ part number**	Number of items				
A	Short Kuper plough blade / 371085502-8	-	4	2	-	5
B	Long Kuper plough blade / 371022502-9	3	-	2	4	-

ATTENTION

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

5.2 ADJUSTMENT OF MOULDBOARD SEGMENTS

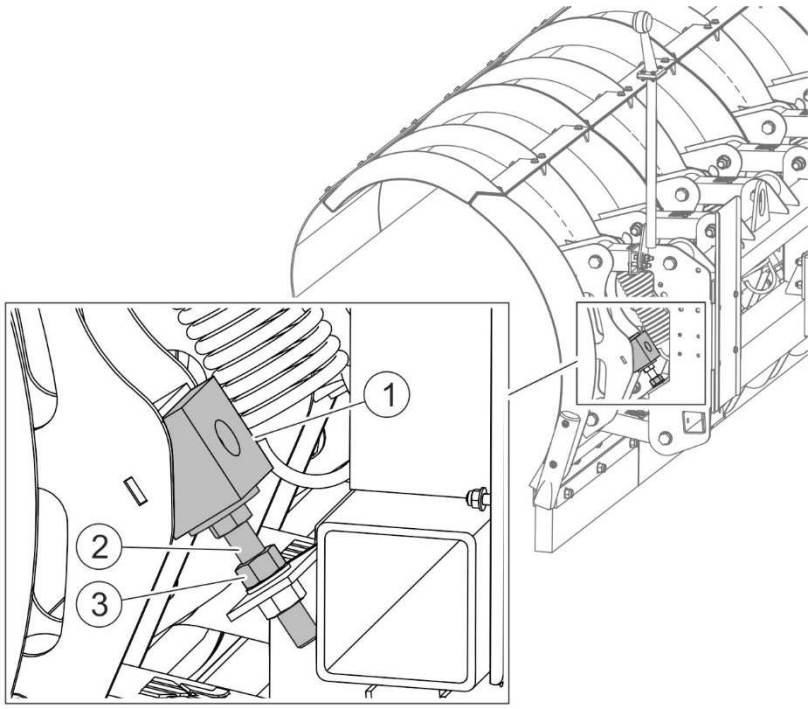


FIGURE 5.4 Adjustment of mouldboard segment

(1) - fender; (2) – bumper; (3) - counter nut.

DANGER

Adjustment of mouldboard segments is performed when the machine is raised. After rising the machine, turn off the engine, immobilise the vehicle with parking brake and ensure that unauthorised persons do not have access to the vehicle cab. Secure the snowplough mouldboard against lowering.

When an obstacle is encountered, individual mouldboard segments can independently raise and return to working position thanks to shock absorbing springs. The working height of each mouldboard segment can be adjusted by changing the distance between fender (1) (FIGURE 5.4) and the mouldboard segment bracket.

The mouldboard segment height is adjusted by means of bumper (2) after loosening counter nut (3). When appropriate mouldboard segment height is set, tighten counter nut (3).

TIP

During the adjustment, set the mouldboard segments in such a manner as to ensure that front surfaces of individual blade segments form a single plane perpendicular to the road surface.

5.3 REPLACEMENT OF FENDERS

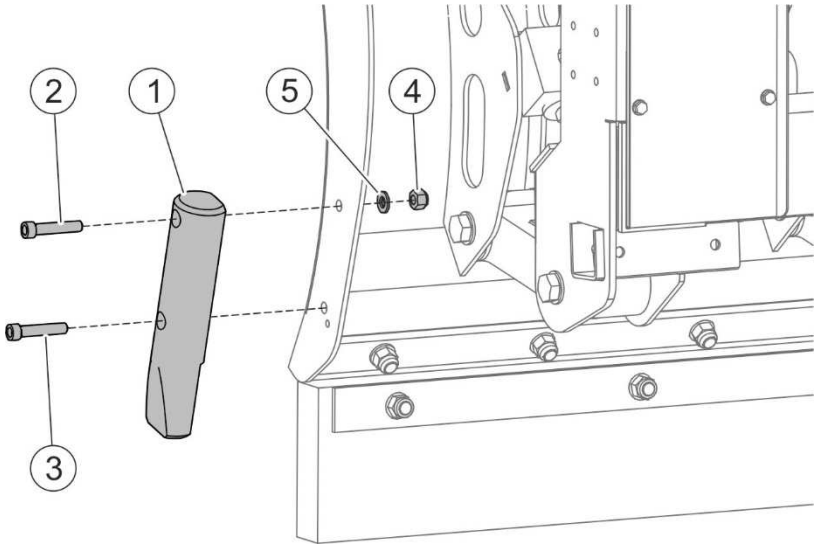


FIGURE 5.5 Installation of fenders

(1) - fender; (2) - bolt; (3) - bolt; (4) - nut; (5) - washer

The snowplough is equipped with the right fender and the left fender, which are used for protecting the snowplough blades' sides while working near kerbs. Fenders (FIGURE 5.5) are attached to the mouldboard by means of two bolts (2) and (3). Bolt (2) is secured with nut (4) and washer (5). Installed bolt (3) is secured using a threadlocker. The right fender and the left fender are replaced in the same way.

ATTENTION

Technical condition of the fenders and their mounting should be checked periodically and each time the snowplough hits an obstacle.

5.4 INSTALLATION OF SHIELD PROTECTING AGAINST SNOW DUST

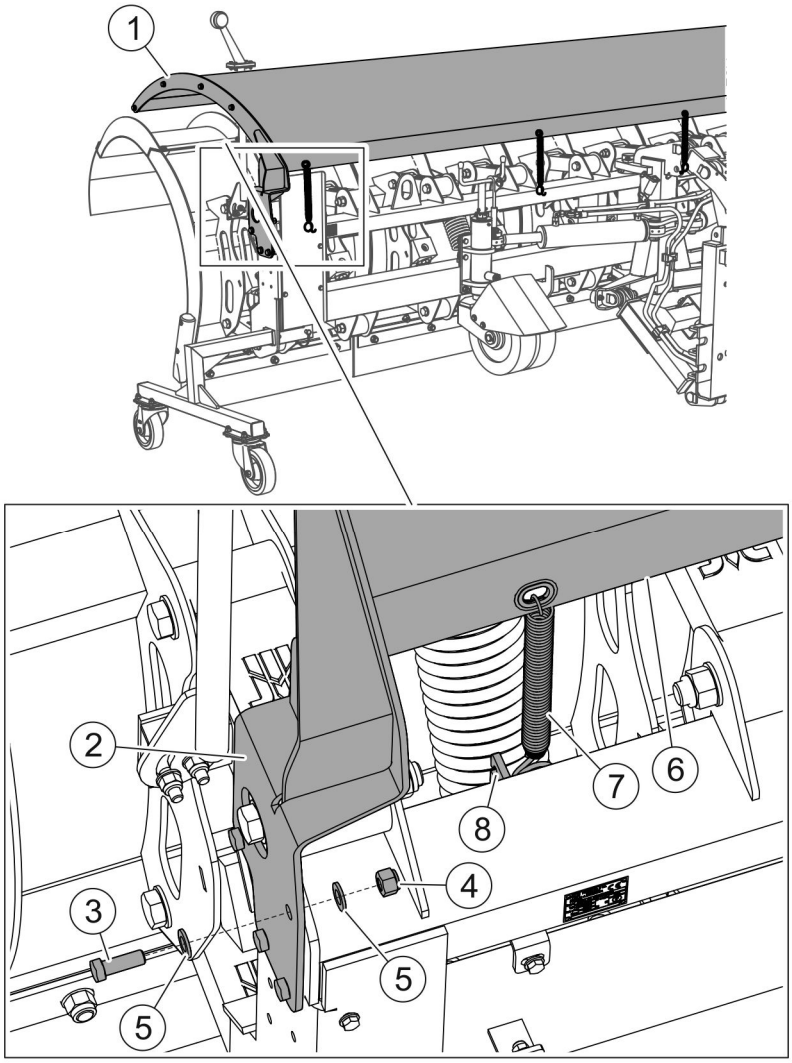


FIGURE 5.6 Installation of shield protecting against snow dust.

(1) – shield protecting against snow dust;; (2) – shield bracket; (3) - bolt; (4) - nut; (5) – washer; (6) – shield tarpaulin cover; (7) – spring; (8) – spring bracket.

The snowploughs can be optionally equipped with a shield protecting against snow dust (1) (FIGURE 5.6). To install the shield, attach brackets (2) to the snowplough frame using eight bolts (3) on both sides of the shield. After attaching the brackets (2), tighten the shield tarpaulin cover (6) using spring (7).

5.5 HYDRAULIC SYSTEM OPERATION

DANGER

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

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
  (snowploughs with Power-Pack hydraulic supply system)
- checking tightness of cylinders hydraulic connections,
- checking technical condition of hydraulic lines;
- checking technical condition and leak tightness of hydraulic connectors.

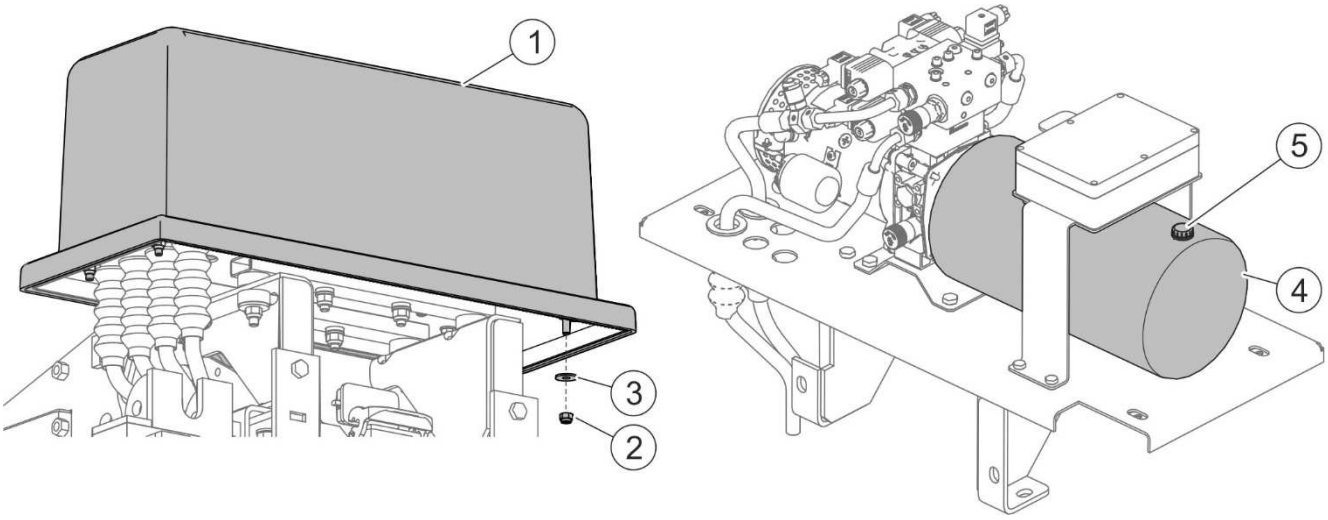


FIGURE 5.7 Checking oil level *(snowploughs with Power-Pack hydraulic supply system)*

(1) - housing of the electro-hydraulic power supply; (2) - nut; (3) - washer; (4) - oil tank; (5) - oil filler plug.

The oil tank (4) of the electro-hydraulic power supply (FIGURE 5.7) is located under the housing (1). To check oil level in the tank:

- set the plough in such a manner as to ensure that the oil tank (4) is positioned horizontally,
- undo four nuts (2) and remove housing (1),

- after unscrewing the oil filler plug (5), the correct oil level in the tank (4) should be 100-120 mm from the tank bottom when the mouldboard is lowered (the mouldboard rising cylinder is withdrawn).
- if necessary, supplement oil to the required level.

TIP

The snowplough's hydraulic system and oil tank are factory filled with HL32 hydraulic oil.

The correct oil level in the tank of the Power-Pack electro-hydraulic power supply should be 100-120 mm from the tank bottom when the mouldboard is lowered (the mouldboard rising cylinder is withdrawn).

The oil in the tank of the electro-hydraulic power supply should be changed once a year (after the working

season) (this applies to snowploughs with Power-Pack).

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, ^0C	Above 210°C
6	Maximum operating temperature, ^0C	80

Because of its composition the oil applied is not classified as a dangerous substance, however long-term action on the skin or eyes may cause irritation. In the event of contact of oil with skin wash the place of contact with water and soap. Do NOT apply organic solvents (petrol, kerosene). Contaminated clothing should be changed to prevent access of oil to skin. In the event of contact of oil with eye, rinse with large quantity of water and in the event of the occurrence of irritation consult a doctor. Hydraulic oil in normal conditions is not harmful to the respiratory tract. A hazard only occurs when oil is strongly atomised (oil vapour), or in the case of fire during which toxic compounds may be released.

DANGER

Oil fires should be quenched with carbon dioxide (CO_2), foam or extinguisher steam. Do NOT use water for fire extinguishing!

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

The hydraulic system should be completely tight sealed. Inspect the seals when the hydraulic cylinder is completely extended. If oil is found on hydraulic cylinder body, check origin of leak. Minimum leaks are permissible with symptoms of "sweating", however in the event of noticing leaks in the form of "droplets" stop using the machine until faults are remedied.

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

DANGER

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

DANGER

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

In the event oil leak is detected in hydraulic line connections, tighten the connections, and if this does not remedy the problem, replace the leaking hydraulic line or connection. Always exchange each mechanically damaged component.

ATTENTION

The hydraulic system is vented automatically during machine operation.

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

5.6 ELECTRICAL SYSTEM MAINTENANCE

Electrical system maintenance is conducted during the periodical checking the operation of control system and lighting system.

Light-emitting diodes (LED) are used as the source of light in clearance lights (A) (FIGURE 5.8) Thanks to this, the lamps are maintenance-free because there is no need to change bulbs.

Halogen bulbs are used as the source of light in additional lights (option) (B) (FIGURE 5.8). Bulb (2) in additional light (B) is accessible after unscrewing screws (3) and removing lens (1). List of lighting elements is included in TABLE 5.5

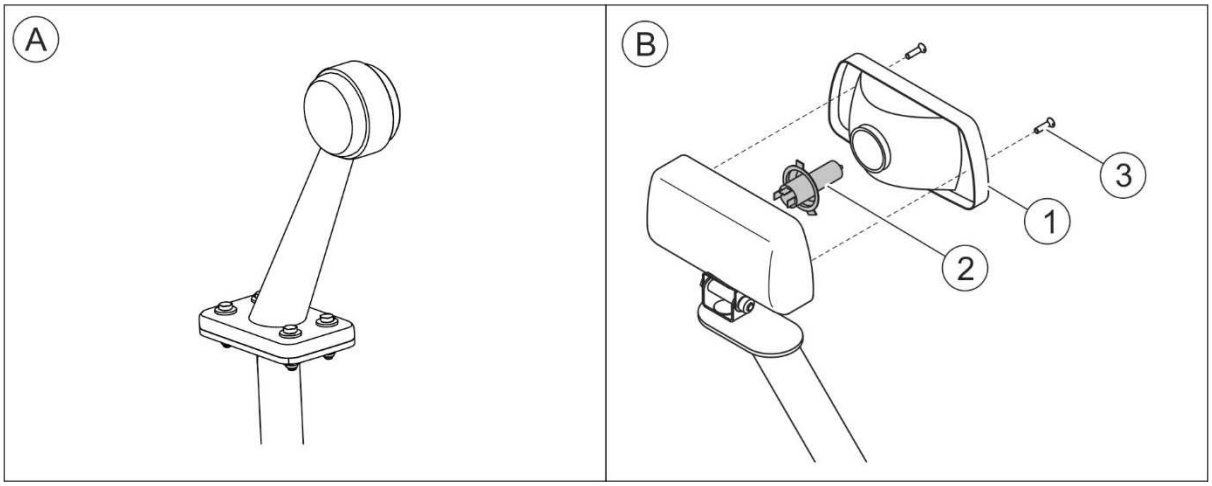


FIGURE 5.8 Replacement of bulbs in additional lights (option)

(A) - clearance lamp; (B) - additional light; (1) - light lens; (2) - bulb H4 75/70W 24V; (3) – screws.

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.

TABLE 5.5 LIST OF LIGHTING COMPONENTS

LAMP TYPE	BULB TYPE	NUMBER OF items
Right clearance lamp 295BCP	LED	1
Left clearance lamp 295BCL	LED	1
Additional light* RE.25677. H4	H4 75/70W, 24V	2

* - option

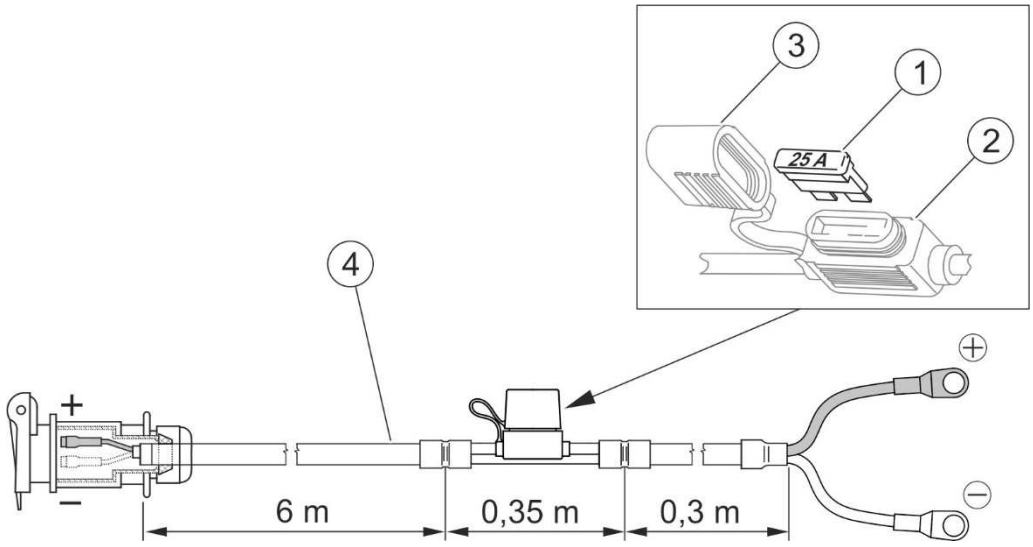


FIGURE 5.9 Fuses of power supply wiring harness (*snowplough with hydraulic system - 2 pairs of quick couplers or 1 pair of quick couplers*).

(1) - UNIVAL 25A fuse; (2) - fuse holder; (3) – protective cover; (4) - power supply wiring harness installed in the carrying vehicle.

On the wiring harness (4) (FIGURE 5.9) supplying the electrical system of the snowplough with the hydraulic system (2 pairs of quick couplers or 1 pair of quick couplers), there is a UNIVAL 25A fuse (1). To replace the fuse, remove protective cover (3) and take the fuse (1) out from holder (2).

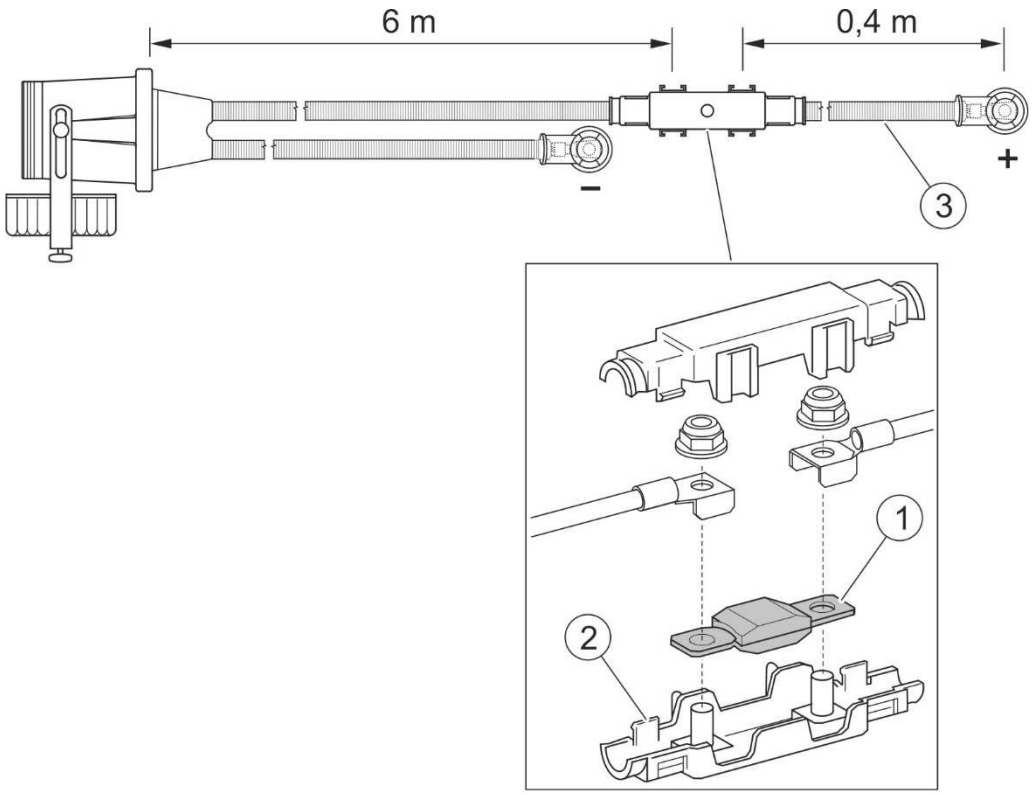


FIGURE 5.10 Fuse of power supply wiring harness (*snowplough with* Power-Pack hydraulic supply system).

(1) - 175A MEGAVAL fuse; (2) - fuse holder; (3) - power supply wiring harness with a high current socket installed in the carrying vehicle

On the wiring harness (3) (FIGURE 5.10) supplying the electrical system of the snowplough with Power-Pack hydraulic supply system, there is a 175A MEGAVAL fuse (1). To change the fuse, undo nuts fixing the leads inside the fuse holder (2).

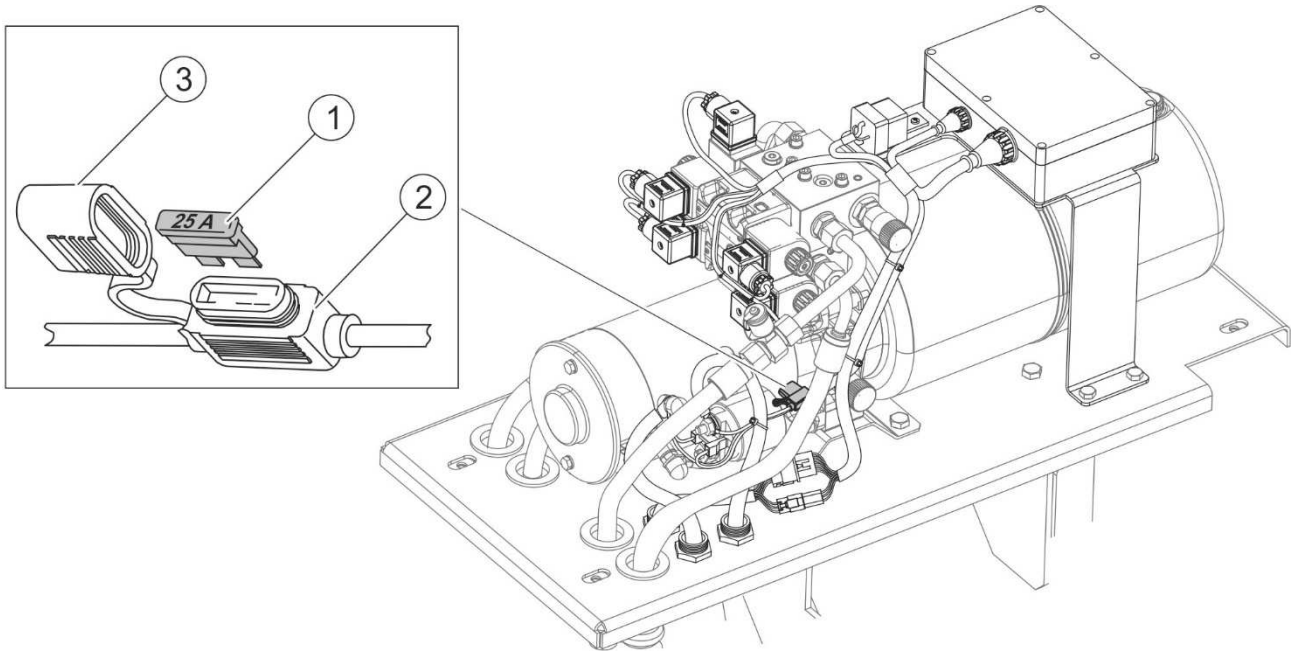


FIGURE 5.11 Fuse of the solenoid valves of the Power-Pack electro-hydraulic power supply.

(1) - UNIVAL 25A fuse; (2) - fuse holder; (3) - protective cover

To replace the fuse of the solenoid valves of the Power-Pack electro-hydraulic power supply, remove the housing of the electro-hydraulic power supply, remove the protective cover (3) and take out the fuse (1) from the holder (2).

5.7 LUBRICATION

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

DANGER

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

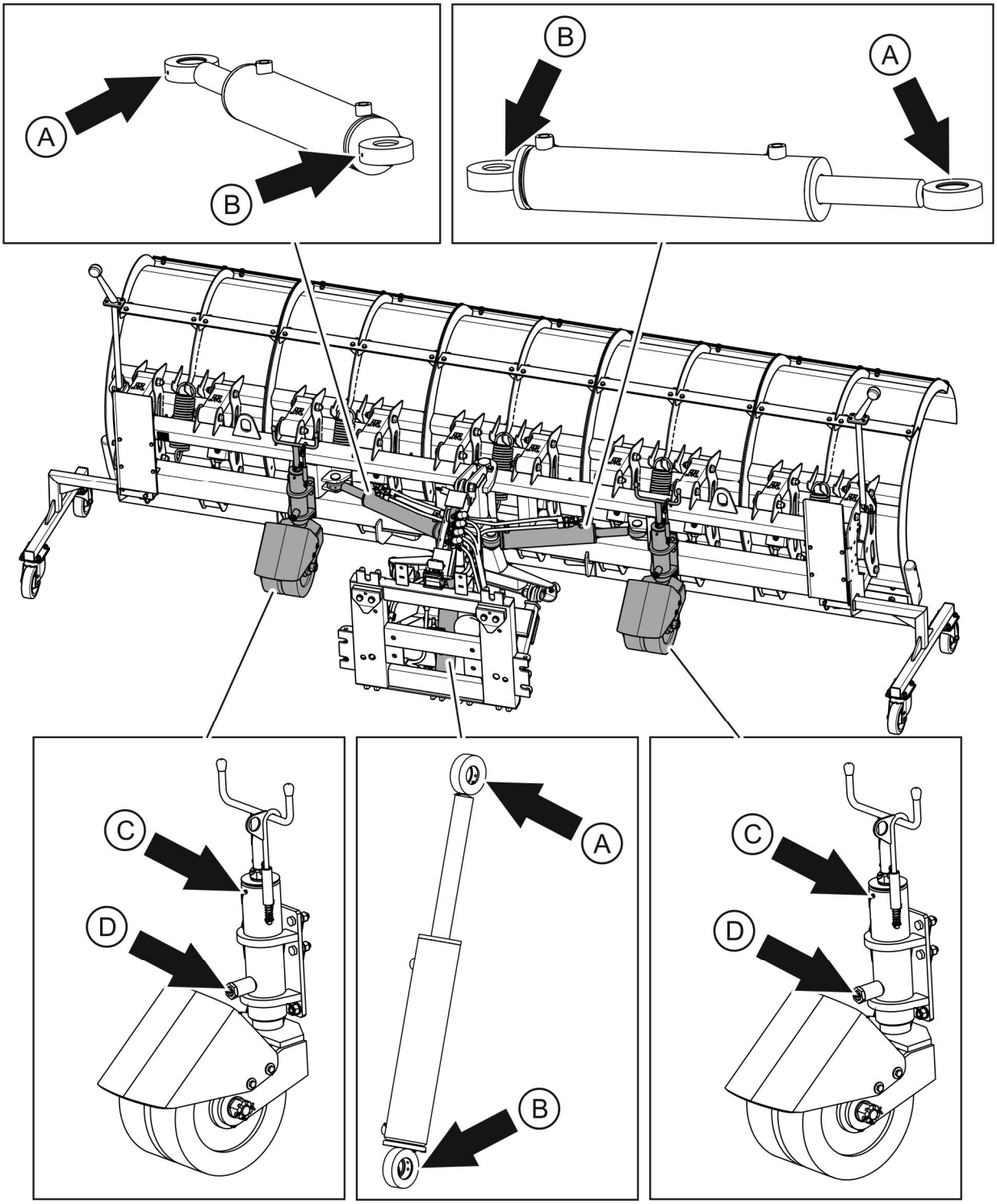


FIGURE 5.12 Lubrication points

Lubrication points are described in table 5.6

TABLE 5.6 LUBRICATION POINTS AND LUBRICATION FREQUENCY

ITEM	NAME	NUMBER OF LUBRICATION POINTS	TYPE OF GREASE	LUBRICATION FREQUENCY
A	Cylinder rod eye	3	grease	50 hours
B	Hydraulic cylinder eye	3		50 hours
C	Support wheel bearing	2		50 hours
D	Support wheel lock	2		50 hours

Marking description in Item column (TABLE 5.6) conforms with numbering shown (FIGURE 5.12)

5.8 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 lines and electrical wires. 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 a prolonged work stoppage, it is essential to lubricate all components regardless of the date of the last lubrication.

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

5.9 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 cause damage to 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

5.10 TROUBLESHOOTING

TABLE 5.8 TROUBLESHOOTING

TYPE OF FAULT	CAUSE	REMEDY
Plough position cannot be changed	The electrical system is not connected to the carrying vehicle *(depending on the snowplough version)*	Connect the plug to electrical socket in the carrying vehicle.
	The hydraulic system is not connected to the carrying vehicle	Connect quick-couplers to a proper section of the carrying vehicle's hydraulic system.
	Main switch of control panel is off	Set main switch of control panel in „I" position
	Damaged fuse on the power supply wiring harness	Check and, if necessary, replace the fuse on the power supply wiring harness in the carrying vehicle
	Transport position lock is engaged	Disengage transport position lock
	The plough hydraulic system is damaged	Repair at an authorised service point
	Electro-hydraulic power supply is damaged *(depending on the snowplough version)*	Repair at an authorised service point
Plough scoops snow unevenly	Incorrectly positioned support wheels	Check and adjust according to the Operator's Manual
	Excessively worn collecting plough blades	Check and replace if necessary
	Incorrectly positioned mouldboard segments	Check and adjust according to operator's manual
No lighting	Electrical system not connected	Connect electrical system
	Main switch of control panel is off *(depending on the snowplough version)*	Set main switch of control panel in „I" position
	The plough electrical system is damaged	Repair at an authorised service point
	Control panel components are damaged	Repair at an authorised service point
	Damaged fuse on the power supply wiring harness	Check and replace fuse if necessary
	Damaged lamps or conductors	Repair at an authorised service point

NOTES