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FARM SHELLER TIPPER TRAILER „KAMIENIARKA” / „QUARRY MACHINE” /

T701

INSTRUCTION FOR USE AND SERVICING

Identification of the machine

Symbol /Type: T701
KTM Number: 1026-634-847-723
Factory Number:

The factory number is engraved on the data plate and on the front beam of the trailer frame.
The name plate is riveted to the load carrying body.

While purchasing the trailer it must be checked conformity of factory numbers placed on the trailer with the number written down in the *Guarantee certificate*, in the sales documents and in the *instruction for use and servicing*.

The hydraulic installation has been filled with the hydraulic oil HL32

Mark of quality control

The instruction and catalogue of spare parts are binding with the annex No..... dated.....

Information contained in the publication is up-to-date for the day of the elaboration. As a result of improvements some sizes and figures contained in this publication may not correspond to the factual state of the machine delivered to the user.

The manufacturer reserves itself the right to introduce, in the manufactured machines, structural alterations facilitating servicing and improving quality of their operation without making current changes in the instruction and in the catalogue.

Comments and remarks on the structure and action of the machine please sent to the Manufacturer's address. This information will allow objective evaluation of the machine and will be helpful as guidelines in their further modernization.

Information on essential structural alterations are delivered to the user by means of informative supplements (annexes) attached to the instruction.

ATTENTION!

The instruction for use and service constitutes the basic equipment of the machine

Before starting exploitation the user must get acquainted with contents of this instruction and observe all recommendations contained in it. It will guarantee safe servicing and failure-free operation of the machine.

The machine has been designed in accordance with binding standards, documents and currently binding legal provisions.



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Symbol/Typ	T701	Masa wł.	<input type="text"/> kg
Rok prod.	<input type="text"/>	Dop. m. całk.	<input type="text"/> kg
Nr fabr.	<input type="text"/>		
Nr św. hom.	<input type="text"/>	Ładowność	<input type="text"/> kg
		Dop. obc. zacz.	<input type="text"/> kN
		Dop. obc. osi	<input type="text"/> kN
			<input type="text"/> kN

FIGURE 1 PATTERN OF DATA PLATE

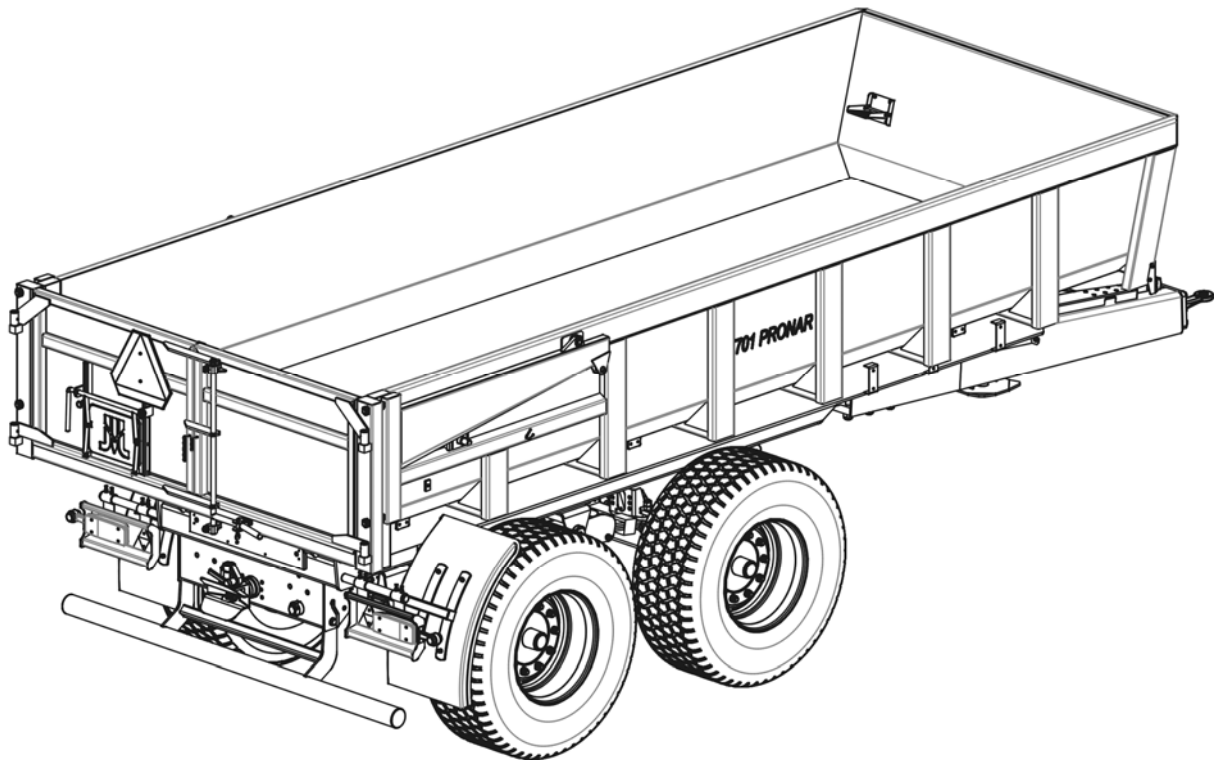
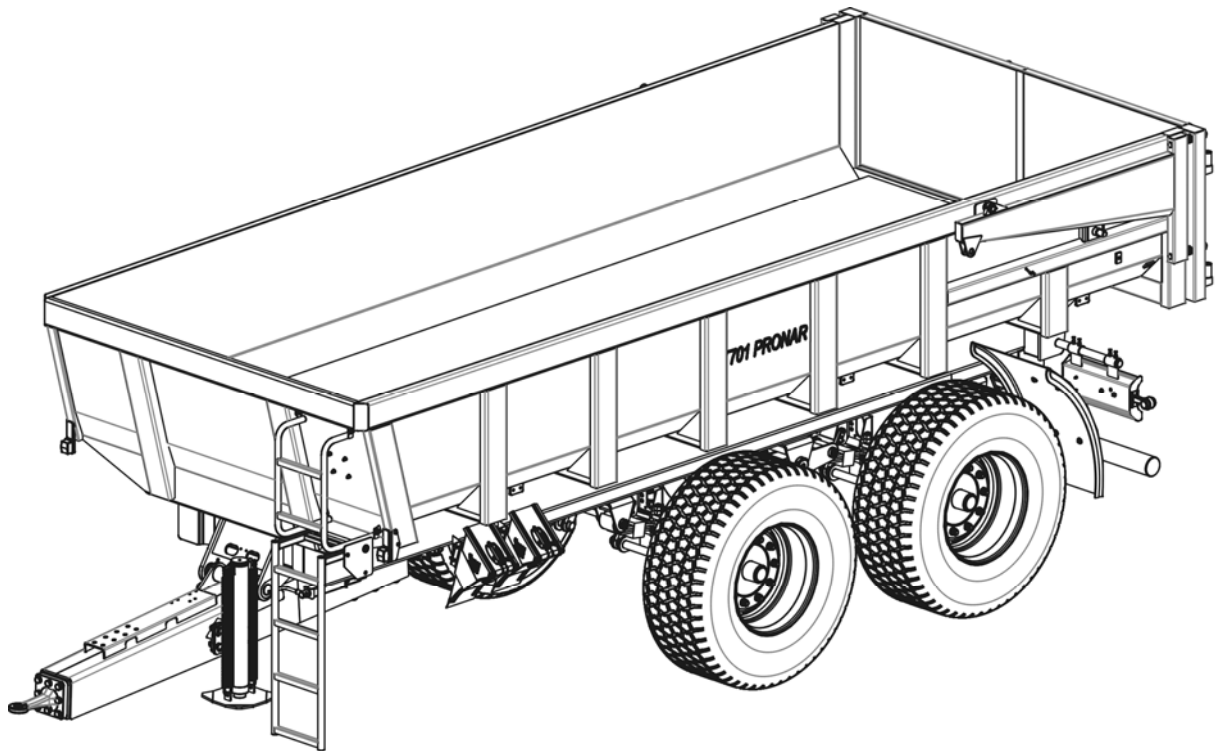


FIGURE 2 FARM SHELLLED TIPPER TRAILER T701

TABLE OF CONTENTS

1 INTRODUCTION	6
1.1 BASIC INFORMATION	6
1.2 APPROPRIATION OF THE TRAILER	6
2 SAFETY OF USE	8
2.1 BASIC RULES OF SAFETY	8
2.2 CONNECTING TO AND DISCONNECTING FROM THE TRACTOR	9
2.3 LOADING AND UNLOADING OF THE TRAILER	9
2.4 PNEUMATIC AND HYDRAULIC INSTALLATION	9
2.5 TYRES	10
2.6 MAINTENANCE	10
2.7 RULES OF MOVEMENT ON PUBLIC ROADS	10
2.8 DESCRIPTION OF RESIDUAL RISK	11
2.9 INFORMATION AND WARNING LABELS	12
3 ADDITIONAL INFORMATION	16
3.1 EQUIPMENT	16
3.2 WARRANTY TERMS	16
3.3 TRANSPORT	17
3.4 WITHDRAWAL OF THE TRAILER FROM USE	17
4 INFORMATION RELATING TO USE	18
4.1 TECHNICAL CHARACTERISTICS	18
4.2 BSTRUCTURE AND PRINCIPLE OF OPERATION	19
4.2.1 Chassis	19
4.2.2 Load carrying body	24
4.2.3 Hydraulic dump installation	25
4.2.4 Braking system	26
4.2.5 Parking brake	26
4.2.6 Electric installation, lighting, signalling	29
4.2.7 Hydraulic installation of simple support	31
5 RULES OF USE	32
5.1 PREPARATION FOR OPERATION	32
5.2 CONNECTING WITH THE TRACTOR	32
5.3 LOADING OF THE LOAD CARRYING BODY	33
5.4 RULES OF USE OF TYRES	34

5.5 UNLOADING OF THE LOAD CARRYING BODY	35
5.6 DISCONNECTING FROM THE TRACTOR	35
6 SERVICING INSTRUCTIONS	36
6.1 GROUND WHEELS' BEARINGS ADJUSTMENT	36
6.2 BRAKES ADJUSTMENT	37
6.3 SERVICING OF THE PNEUMATIC INSTALLATION	39
6.4 SERVICING OF THE HYDRAULIC INSTALLATION	39
6.5 LUBRICATION	40
6.6 SERVICING OF SUSPENSION	41
6.7 REGULATION OF FASTENING OF DRAUGHT BAR	44

1 INTRODUCTION

1.1 BASIC INFORMATION

The instruction describes basic rules of safe use and servicing of farm shelled trailer.

If information contained in the instruction appears not fully comprehensible it is necessary to turn for help to the sales point in which the trailer has been purchased or to the Manufacturer.

Particularly important information and recommendations the observance of which is utterly necessary are distinguished in the text through printing in bold type or preceded with the word „ATTENTION“.

Information, description of threats and precautions as well as recommendations and orders connected with safety of use, in contents of the instruction, are distinguished with the sign:



as well as mentioned in the chapter „Safety of use“.

1.2 APPROPRIATION OF THE TRAILER

The trailer is for transportation of heavy materials such as: debris, stones, broken stone, gravel, and use during construction works, earth works, demolition works, within the area of the farm and on public roads.

The braking system as well as the lighting and signalling system meets requirements resulting from provisions of road traffic.

Admissible speed of the trailer moving on public roads in Poland equals 30 km/h (according to the law dated June 20, 1997, „Law on road traffic“, article 20). Restrictions connected with binding law on road traffic must be observed in countries in which the trailer is exploited. However the velocity of the trailer may not be higher than the admissible structural speed of 30 km/h (standard design).

The trailer is adapted to cooperation with farm tractors equipped with external hydraulic installation as well as lower transport hitch, with minimum vertical load capacity of 30 kN.

The trailer must not be used inconsistently with its appropriation and particularly:

UWAGA



- to transport people and animals
- to transport in bulk not protected toxic materials when there is possibility to cause environmental contamination.
- to transport machines and equipment when their location of centre of gravity negatively influences the stability of the trailer.
- to transport loads, machines which influence non-uniform loading and overload of running axes
- to transport non-fixed loads which may change their position on the platform of the load carrying body during travelling

2 SAFETY OF USE

2.1 BASIC RULES OF SAFETY



- Before starting exploitation of the trailer the user should get acquainted thoroughly with the contents of this instruction. In the course of exploitation all recommendations contained in it must be observed.
- If information contained in the instruction is not comprehensible you must contact the seller conducting authorized technical service on behalf of the Manufacturer or directly contact the Manufacturer.
- Careless and improper use and servicing of the trailer as well as non-observance of recommendations contained in this instruction creates threat to health.
- Non-observance of rules of safe use creates threat to health of attending persons and strangers.
- It is warned of existence of residue risk of threats, therefore application of rules of safe use and reasonable conduct should be the basic principle of using the trailer.
- It is forbidden to use the machine by persons non-qualified to drive farm tractors including by children and intoxicated persons.
- It is forbidden to use the trailer inconsistently with its appropriation. Everybody who uses the trailer in a manner inconsistent with appropriation, he takes, in this way, full responsibility for all consequences resulted from improper use.
- It is forbidden to use the trailer inconsistently with its appropriation. Everybody who uses the trailer in a manner inconsistent with appropriation, he takes, in this way, full responsibility for all consequences resulted from improper use of the trailer.
- Any modifications relieve the company PRONAR Narew from responsibility for arisen damages or detriment to health.
- Before each use of the trailer you must check its technical state. In particular you must check the technical state of the hitch system, driving road system, braking installation and light signalling.

- Climbing up the trailer is possible only when there is absolute standstill of the trailer and the engine of the tractor is switched off.
- The trailer disconnected from the tractor must be braked. If the trailer is standing on a slope or height it must be additionally secured against rolling through putting wedges or other elements without sharp edges under the wheels.
- It is forbidden to drive with lifted load carrying body as well as to transport people and animals on the trailer.
- The trailer is marked with information and warning inscriptions in form of labels mentioned in the table 1. The user of the trailer is obliged to take care of readability of warning inscriptions and symbols placed on the machine during the whole period of use. In case of damage or destroying of them they must be replaced for new ones. Labels with inscriptions and symbols are to be purchased at the Manufacturer.

2.2 CONNECTING TO AND DISCONNECTING FROM THE TRACTOR

- During combining the trailer with the tractor you must use exclusively the lower transport hitch. Check the protection.
- You must keep particular care during connecting the trailer.
- In the course of connecting nobody may stay between the trailer and the tractor.
- Disconnecting of the trailer from the tractor is forbidden when the load carrying body is lifted with the telescopic servo-motor. You must keep particular care during disconnecting of the trailer.

2.3 LOADING AND UNLOADING OF THE TRAILER

- It is forbidden to exceed admissible trailer load capacity because it threatens safety of road traffic and may cause damage to the machine.
- A load must be uniformly distributed on the trailer.
- It must be observed that nobody will stay near the load carrying body and the sliding load.
- During lifting of the load carrying body it must be kept safe distance from electricity lines.
- Tilting of the load carrying body may be performed only in flat and hard subsoil.
- During opening of locks and walls particular care must be taken due to pressing of load against the walls

2.4 PNEUMATIC AND HYDRAULIC INSTALLATION

- The hydraulic Installation is under high pressure during operation
- You must regularly check technical condition of connections as well as hydraulic and pneumatic conduits.
- In case of failure of the hydraulic or pneumatic installation the trailer must be switched off from operation until the time of removal of failure.
- During connecting of hydraulic conduits to the tractor, you must pay attention so that the hydraulic installation of the tractor will not be under pressure.

2.5 TYRES

- During works connected with tyres you must pay attention so that the trailer will be secured against rolling through putting wedges attached to the machine under the wheels.
- Repair works at wheels and tyres should be performed by persons trained and qualified to this aim. These works should be performed with use of properly selected tools.
- After each mounting of wheels you must tighten nuts after the first 50 km of road driving and next check tightening of them every 100 km.
- You must regularly check pressure of tyres.

2.6 MAINTENANCE

- In case of ascertaining of any defects in action or damage the trailer must be taken out of use until the time of repair.
- During servicing of the trailer you must use protective gloves and appropriate tools.
- It is forbidden to perform servicing and repair works under the loaded or lifted and unsupported load carrying body.
- Servicing and repair actions must be performed applying general rules of work safety and hygiene. In case of cut the wound must be washed out and disinfected immediately. In case of suffering of more serious injuries you must seek medical advice.
- Repair, maintenance and cleaning works must be performed only when the engine of the tractor is switched off and the ignition key is taken out from ignition switch.
- You must control state of screw joints.
- Before welding or electric works the trailer must be disconnected from permanent inflow of electric current.
- During the guarantee period all repairs may be conducted only by the guarantee service station authorized by the Manufacturer.
- In case of necessity of replacement of particular elements you must use only original elements or elements indicated by the Manufacturer. Non-complying with these requirements may create threat to life or health of strangers or persons servicing the trailer and also may contribute to damage of the machine.

2.7 RULES OF MOVEMENT ON PUBLIC ROADS

- During driving on public roads you must adapt to the road traffic provisions.
- Exceeding of the admissible load capacity of the trailer may cause its damage and also may threaten safety of road traffic.
- You must not exceed the admissible speed. Adapt speed to road conditions.
- It is forbidden to leave the non-secured trailer. Securing consists in braking with the manual parking brake.
- For the time of driving on public roads the trailer should be equipped with the attested or officially certified warning reflective triangle.
- On the rear retractable frame there must be placed the triangular board distinguishing slow-moving vehicles if the trailer is the last vehicle in the group (figure 3).

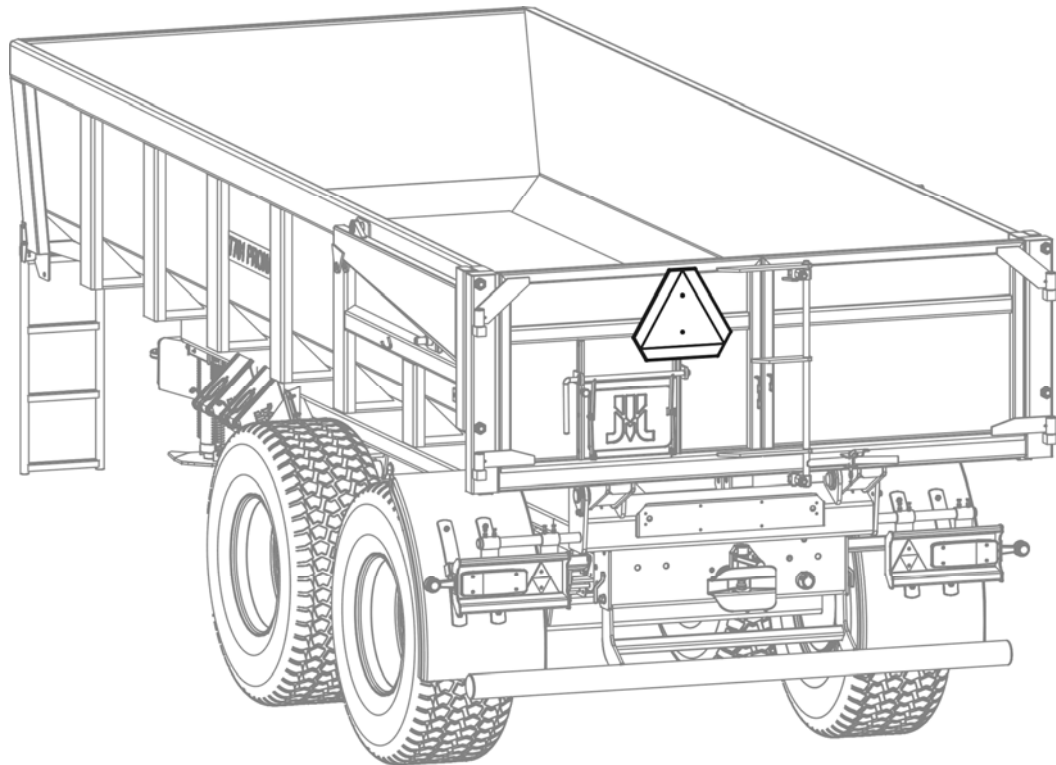


FIGURE 3 LOCATION OF THE TRIANGULAR BOARD OF SLOW-MOVING VEHICLES.

2.8 DESCRIPTION OF RESIDUAL RISK

The company Pronar Sp. z o. o. in Narwia has made all efforts in order to eliminate risk of unfortunate accident. However there exists a certain residual risk which may bring to an accident and it is connected first of all with actions described below

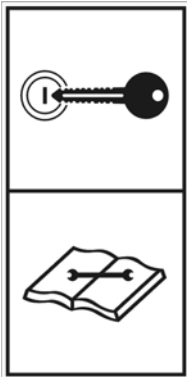



- use of the trailer to other purposes than described in the instruction
- staying between the tractor and the trailer during operation of the engine and in the course of connecting the trailer
- servicing of the trailer by persons being under influence of drink or other narcotic agents
- servicing of the trailer by unauthorized persons
- staying on the machine during operation
- cleaning, maintenance and technical inspection of the trailer



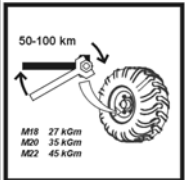
Residual risk may be reduced to minimum, applying the following recommendations:

- prudent and leisurely servicing of the machine
- reasonable application of comments contained in the *Instruction for use and servicing*
- keeping safe distance from forbidden and dangerous places
- ban on staying on the machine during its operation
- performance of maintenance and repair works by trained persons
- use of protective clothing
- securing of the machine against access of persons unauthorized to servicing and especially children



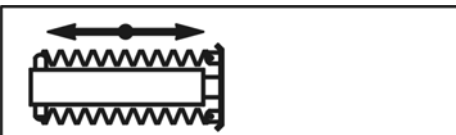



2.9 INFORMATION AND WARNING LABELS

TABLE 1 INFORMATION AND WARNING LABELS

ITEM	SYMBOL	MEANING	ITEM	SYMBOL	MEANING
1		Switch off the engine and take out the key before starting of servicing or repair actions	3		Before starting actions of servicing, secure the load carrying body
2		Read the <i>Instruction for use and servicing</i>	4		Keep special care during operation in the proximity of power lines

ITEM	SYMBOL	MEANING
5		Keep safe distance during closing of rear flap
6	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <h1 style="margin: 0;">T701 PRONAR</h1> </div>	Type of trailer
7	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <h2 style="margin: 0;">xxx kPa</h2> </div>	Air pressure in tyres*
8	<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <h2 style="margin: 0;">30 kN</h2> </div>	Minimum vertical load capacity of the hitch of the tractor
9		Lubricate according to recommendations contained in the <i>Instruction for use and servicing</i>
10		Control the condition of screw joints of driving axles
11	<div style="display: inline-block; border: 1px solid black; padding: 5px; margin-right: 10px;">1</div> <div style="display: inline-block; border: 1px solid black; padding: 5px;">2</div>	Switching of circuits I and II of the dump hydraulic installation of the trailer
12	<div style="display: inline-block; border: 1px solid black; padding: 5px; margin-right: 10px;">O</div> <div style="display: inline-block; border: 1px solid black; padding: 5px;">Z</div>	Position of cut-off valve in the hydraulic installation of support <input type="checkbox"/> open / <input checked="" type="checkbox"/> closed

* - air pressure depends on applied tyres

13		Lifting of rear flap
14		Lowering of rear flap
15		Lifting / lowering of support
16		Lifting / lowering of load carrying body
17		Hydraulic braking Installation
18		Place of fastening

Arrangement of information and warning labels is presented on the figure (4). Labels not specified on the figure have been placed on hydraulic conduits in proximity of the joint or in proximity of hydraulic conduits.

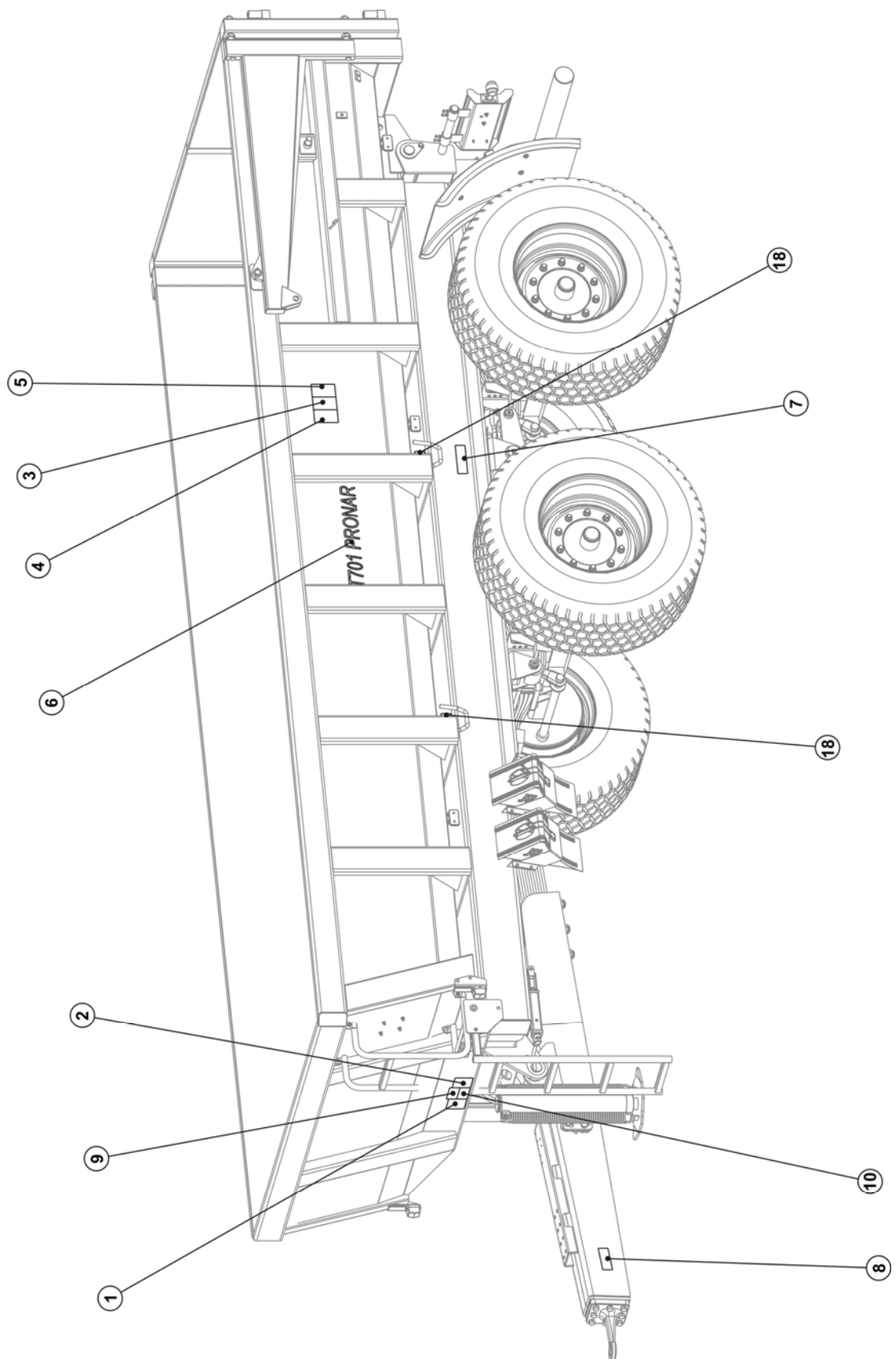


FIGURE 4 ARRANGEMENT OF INFORMATION AND WARNING LABELS

3 ADDITIONAL INFORMATION

3.1 EQUIPMENT

In the composition of the trailer there are:

- *Instruction for use and servicing*
- *Guarantee card*
- jointing conductor of electric installation

At customer's wish the Manufacturer may equip the trailer with the following elements of the additional equipment:

- warning reflective triangle
- board distinguishing slow-moving vehicles
- chute
- rear hitch
- axles and braking system adapted to speed of driving of 40 km/h
- bogie type suspension
- rear torsional axle steered passively (dragged wheels)
- load carrying body made of abrasion-resisting steel

3.2 WARRANTY TERMS

The company "PRONAR" Sp. z o.o. in Narwia guarantees efficient operation of the machine during its use according to the technical and exploitation conditions described in the *Instruction for use and servicing*.

Defects disclosed within the guarantee period will be remedied by Guarantee Service within the time limit not longer than 14 working days from the date of receipt of machine for repair by the Guarantee Service or within the other agreed term.

Parts and subassemblies of machines which undergo wear under normal exploitation conditions before lapsing of the guarantee period: tyres and brake linings worn due to exploitation, mechanical damages and damages resulted from improper exploitation, regulation and maintenance.

Detailed conditions of guarantee are given in the *Guarantee card* attached to the newly purchased trailer.

ATTENTION



You must request from the seller to fill in the *Guarantee card* and claim coupons in detail. Lack of e.g. date of sale or the seal of the selling point expose the user to non-recognition of possible claims.

3.3 TRANSPORT

The trailer is prepared for sale in the complete mounted state and it does not require packaging. Only technical and operating documentation of the trailer, jointing conductor of electric installation and possibly the warning triangle are subject to packaging.

Delivery to the user takes place by means of truck transport or by means of independent transport in connection with the tractor.

ATTENTION



In case of independent transport the operator of the tractor should get acquainted with contents of this service instruction and observe recommendations contained in it. In case of truck transport the trailer is fastened on the platform of the transporting vehicle according to the safety requirements during transportation. The driver of the truck, during transportation of the trailer, should maintain particular care. It results from the fact of shifting upwards of the centre of gravity of the vehicle with loaded machine.

3.4 WITHDRAWAL OF THE TRAILER FROM USE

In case of taking decision by the user on withdrawal of the machine from use, the whole trailer must be delivered to the scrap depot designated by the Starost. Dismounted parts remained after repair must be delivered to a purchasing centre of secondary materials.

The certificate obtained from the scrap depot is the basis for removal of the trailer from the registration.

4 INFORMATION RELATING TO USE

4.1 TECHNICAL CHARACTERISTICS

TABLE 2 BASIC TECHNICAL DATA (STANDARD EQUIPMENT)

ITEM	CONTENTS	UNIT OF MEASURE	T701
1	Overall length	mm	7 360
2	Overall width	mm	2 550
3	Overall height	mm	2 210
4	Type of suspension	-	tandem, on unguided axis, on 4 springs
5	Wheel track	mm	1 960
6	Axle base	mm	1 500
	Internal dimension o load carrying body:		
	- length (top/bottom)	mm/mm	5 750/5 570
	- width(front/rear)	mm/mm	2 200/2 300
	-height	mm	800
7	Loading capacity	m ³	10.2
8	Loading surface	m ²	123.05
9	Height of loading surface	mm	1410
10	Tyres	-	385/65R22.5 regeneratable
11	Tare Wright of the vehicle	kg	6 160
12	Structurally admissible total weight	kg	24 000
13	Admissible load capacity	kg	17 840
14	Inclination angle of the load carrying body	(°)	60
15	Voltage in electric installation	V	12
16	Admissible speed	km/h	30
17	Hydraulic oil demand	l	40
18	Vertical load of draught bar	kg	3 000

ATTENTION



In dependence on additional equipment of the trailer :

- design for 40 km/h
- wheels (445/65R22.5 REG, 560/60R22.5 161D, 600/55-22.5 16PR)
- bogie type suspension
- rear torsional axle steered passively
- load carrying body made of abrasion-resisting steel

some technical parameters may be changed.

Independently of design of the trailer (standard 30km/h, optional 40 km/h), restrictions connected with law on road traffic binding in a given country must be observed. It is forbidden to move with velocity higher than the admissible structural speed of 30 km/h.

4.2 BSTRUCTURE AND PRINCIPLE OF OPERATION

4.2.1 Chassis

The chassis of the trailer T701 may be manufactured in two versions – with the tandem type suspension (figure 5) and with the bogie type suspension (figure 6). The lower frame (1) is a welded structure of steel sections. The basic bearing elements are two longitudinal members connected with cross-bars between them. In the middle part there is socket appropriated for seating of 2 hydraulic servomotors (9) of the dump of the load carrying body.

In the rear part of the frame there is the wheel set of the tandem type (figure 5, item (4)) or of bogie type (figure 6, item (4)) and elements of the rear lighting assembly (11).

Two rigid travelling axes (2) and (3) are connected to the suspension. The travelling axes are made of quadratic bar ended with journals on which, on cone bearings, there are seated hubs of ground wheels. The ground wheels are single wheels equipped with shoe brakes actuated with mechanical cam expanders. In dependence of equipment the rear rigid axle may be replaced by torsional axle steered passively (dragged wheels).

The carriage spring suspension of the tandem type consists of two parabolic carriage springs (1) (figure (9)) connected with the rocker arm, the whole is connected by means of pins (4), (5) and (6). To the suspension there are fastened two travelling axles by means of fastening bolts (3) and carriage spring plates.

The carriage spring suspension of the bogie type consists of leaf carriage spring (1) (figure (10)) mounted in the rocker arm by means of pin. To the carriage spring there are screwed down travelling axles – the front axle (3) and the rear one (4) by means of fastening bolts and carriage spring plates.

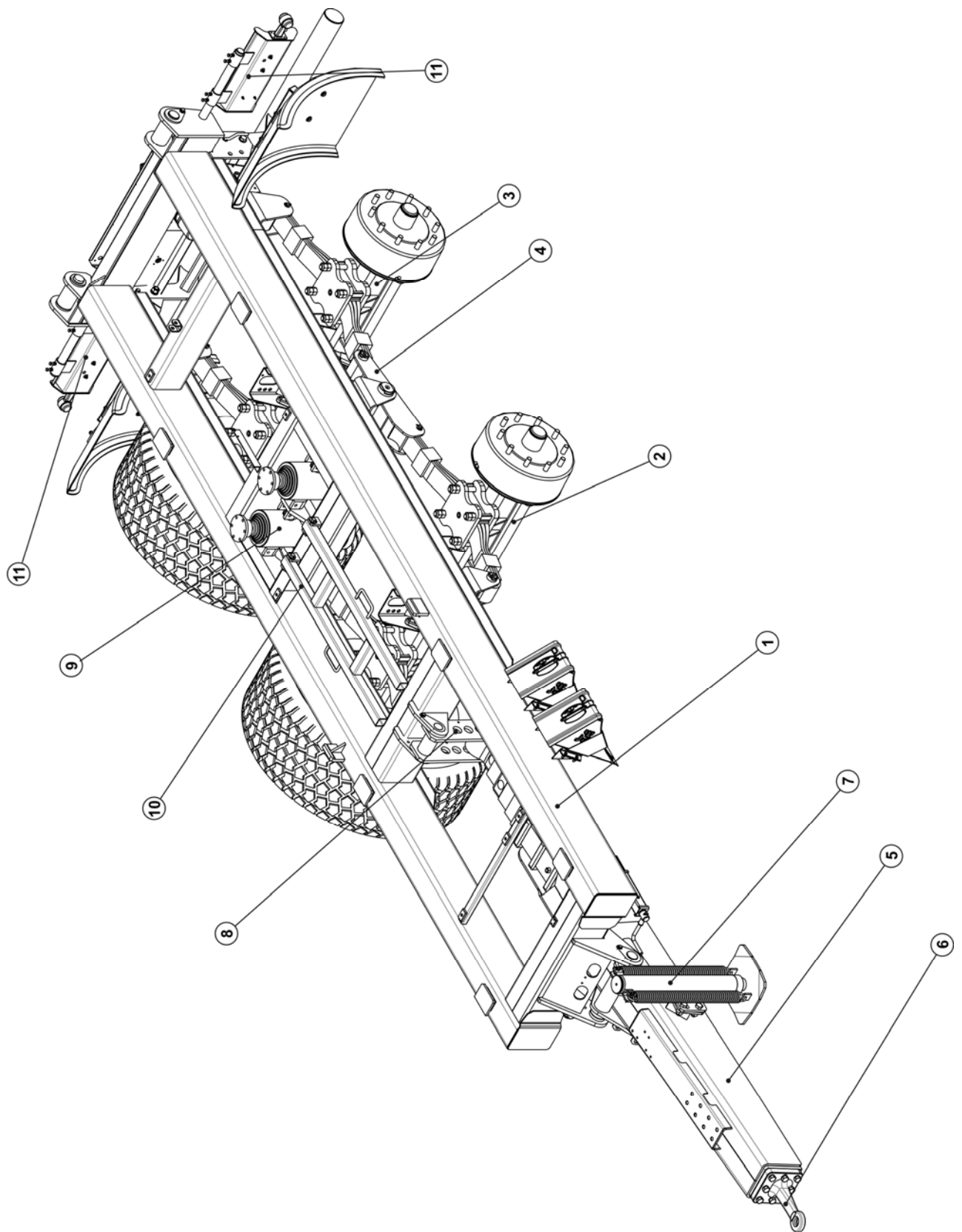


FIGURE 5 CHASSIS WITH THE TANDEM TYPE SUSPENSION

1 - BOTTOM FRAME, 2 - FRONT AXLE, 3 - REAR AXLE, 4 - TANDEM SUSPENSION, 5 - DRAUGHT BAR, 6 - FLEXIBLE CONNECTOR OF THE DRAUGHT BAR, 7 - HYDRAULIC SUPPORT, 8 - ROCKER ARM OF THE DRAUGHT BAR, 9 - HYDRAULIC SERVO-MOTOR, 10 - SUPPORT OF THE LOAD CARRYING BODY, 11 - LIGHTING BEAM (LEFT /RIGHT)

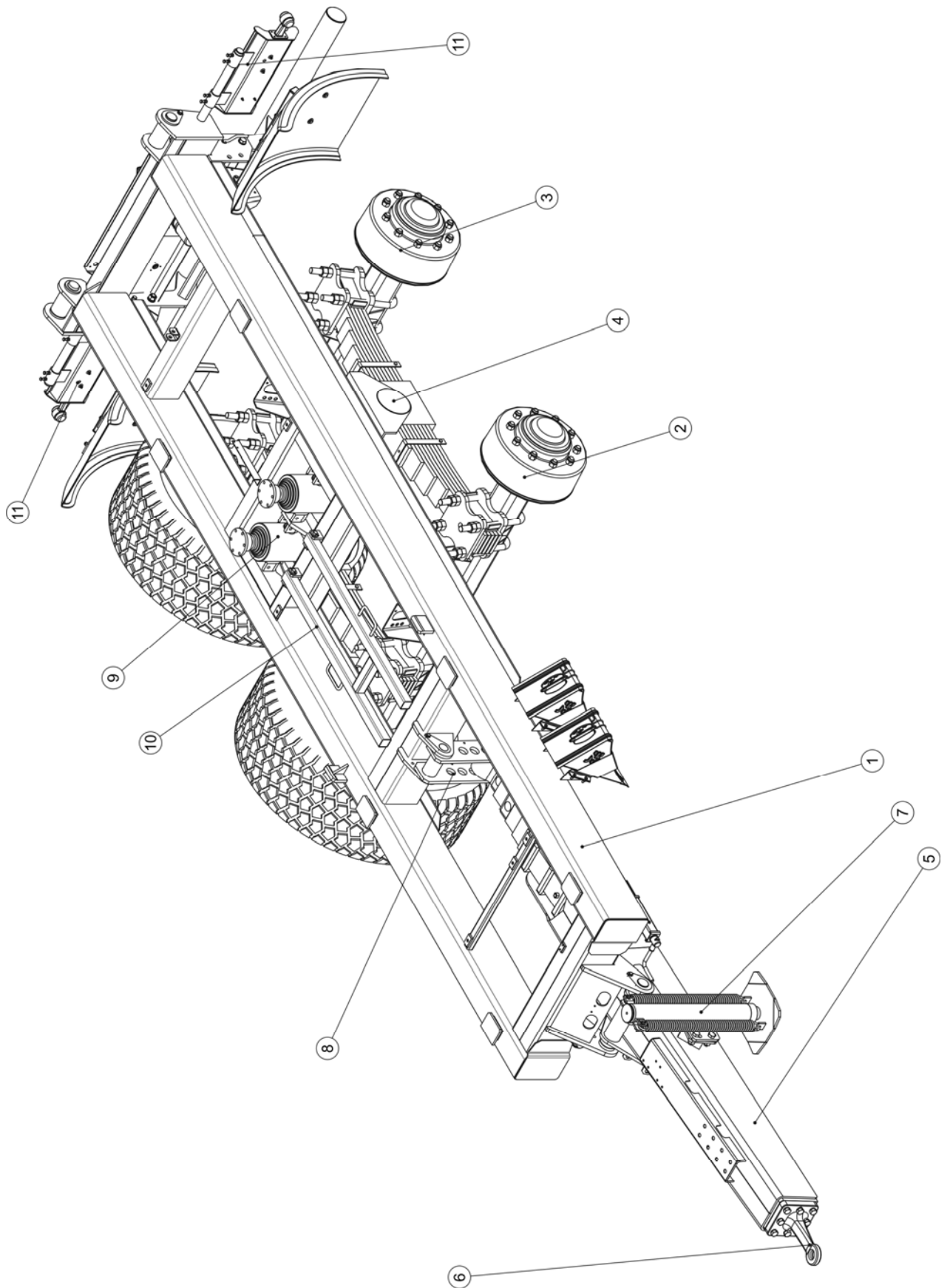


FIGURE 6 CHASSIS WITH THE BOGIE TYPE SUSPENSION

1 - BOTTOM FRAME, 2 - FRONT AXLE, 3 - REAR AXLE, 4 - BOGIE TYPE SUSPENSION, 5 - DRAUGHT BAR, 6 - FLEXIBLE CONNECTOR OF THE DRAUGHT BAR, 7 - HYDRAULIC SUPPORT, 8 - ROCKER ARM OF THE DRAUGHT BAR, 9 - HYDRAULIC SERVO-MOTOR, 10 - SUPPORT OF THE LOAD CARRYING BODY, 11 - LIGHTING BEAM (LEFT /RIGHT)

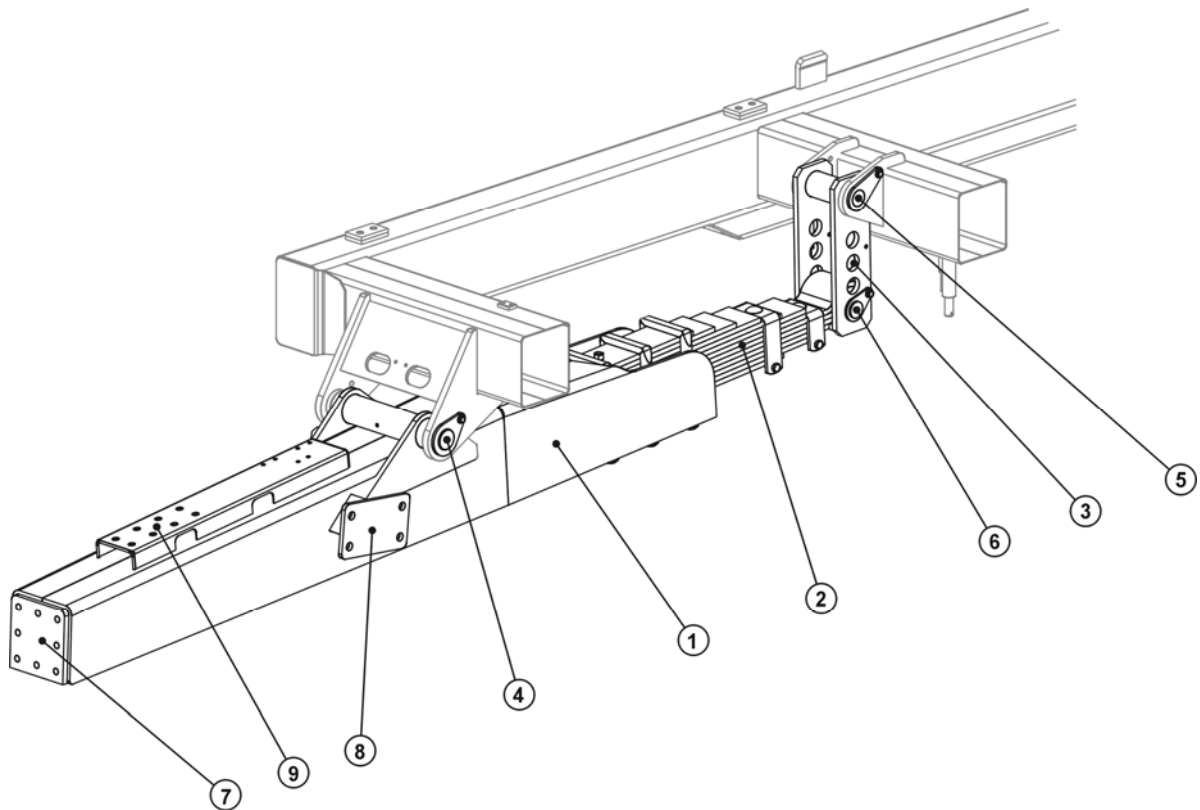


FIGURE 7 SPRINGING DRAUGHT BAR

1 – FRAME OF DRAUGHT BAR, 2 – LEAF CARRIAGE SPRING, 3 – ROCKER ARM OF DRAUGHT BAR, 4 – PIN OF DRAUGHT BAR, 5 – PIN OF ROCKER ARM I, 6 - PIN OF ROCKER ARM II, 7 – FRONT PLATE FOR MOUNTING OF FLEXIBLE CONNECTOR, 8 – PLATE FOR MOUNTING OF SUPPORT, 9 – CHANNEL SECTION

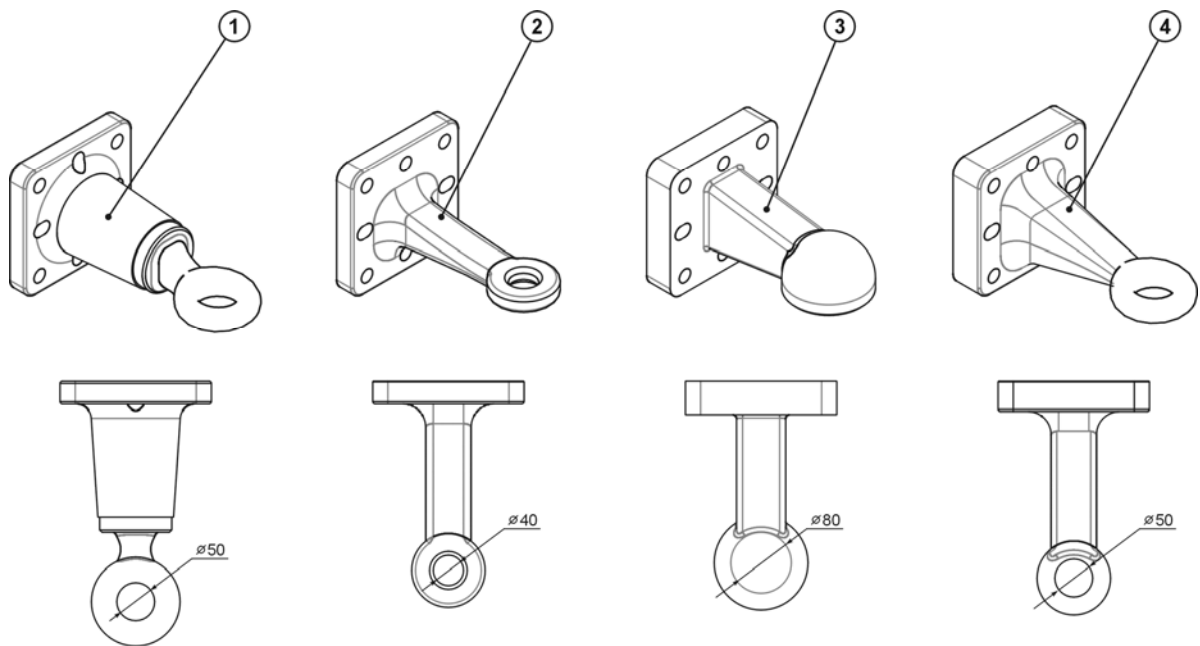


FIGURE 8 FLEXIBLE CONNECTORS

1 – ROTARY FLEXIBLE CONNECTOR $\varnothing 50$, 2 – FLEXIBLE CONNECTOR $\varnothing 40$, 3 – BALL-SHAPED KULISTE FLEXIBLE CONNECTOR $\varnothing 80$, 4 – FLEXIBLE CONNECTOR $\varnothing 50$,

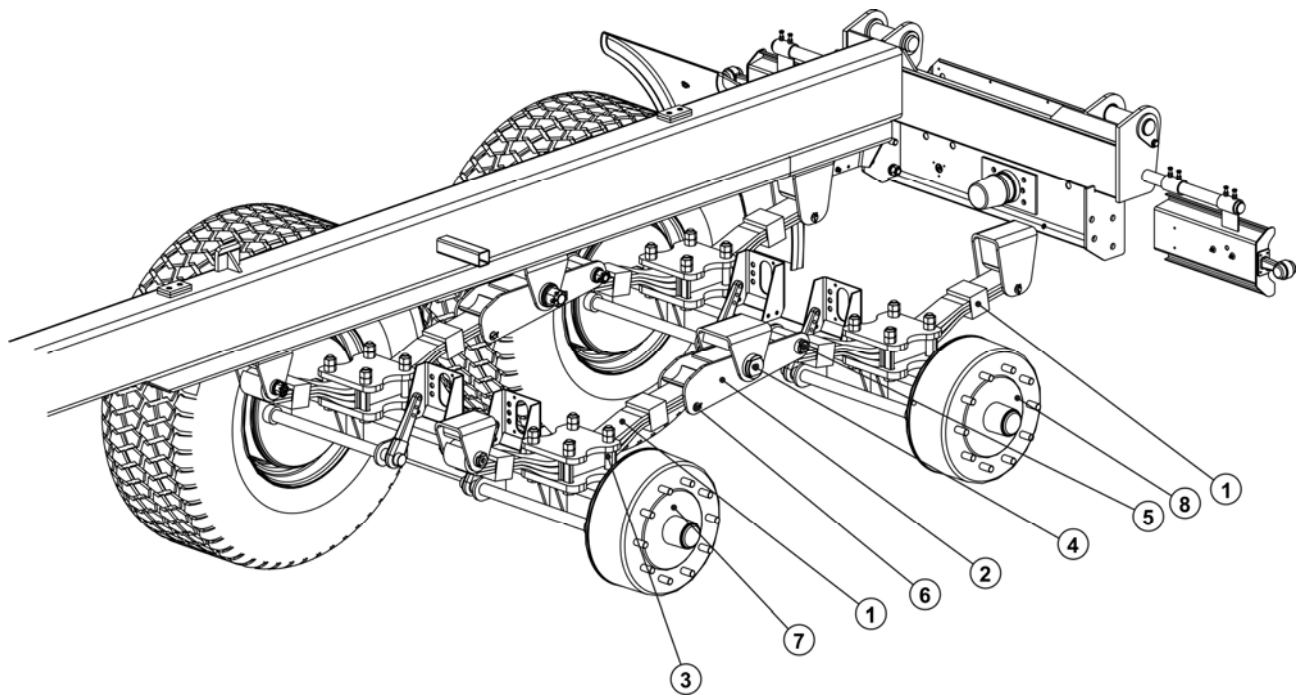


FIGURE 9 TANDEM TYPE SPRINGING SUSPENSION

1 – PARABOLIC CARRIAGE SPRING, 2 – ROCKER ARM OF CARRIAGE SPRING, 3 – FASTENING BOLTS, 4 – PIN OF ROCKER ARM WAHACZA, 5 – PIN OF CARRIAGE SPRING I, 6 – PIN OF CARRIAGE SPRING II, 7 – FRONT AXLE, 8 – REAR AXLE

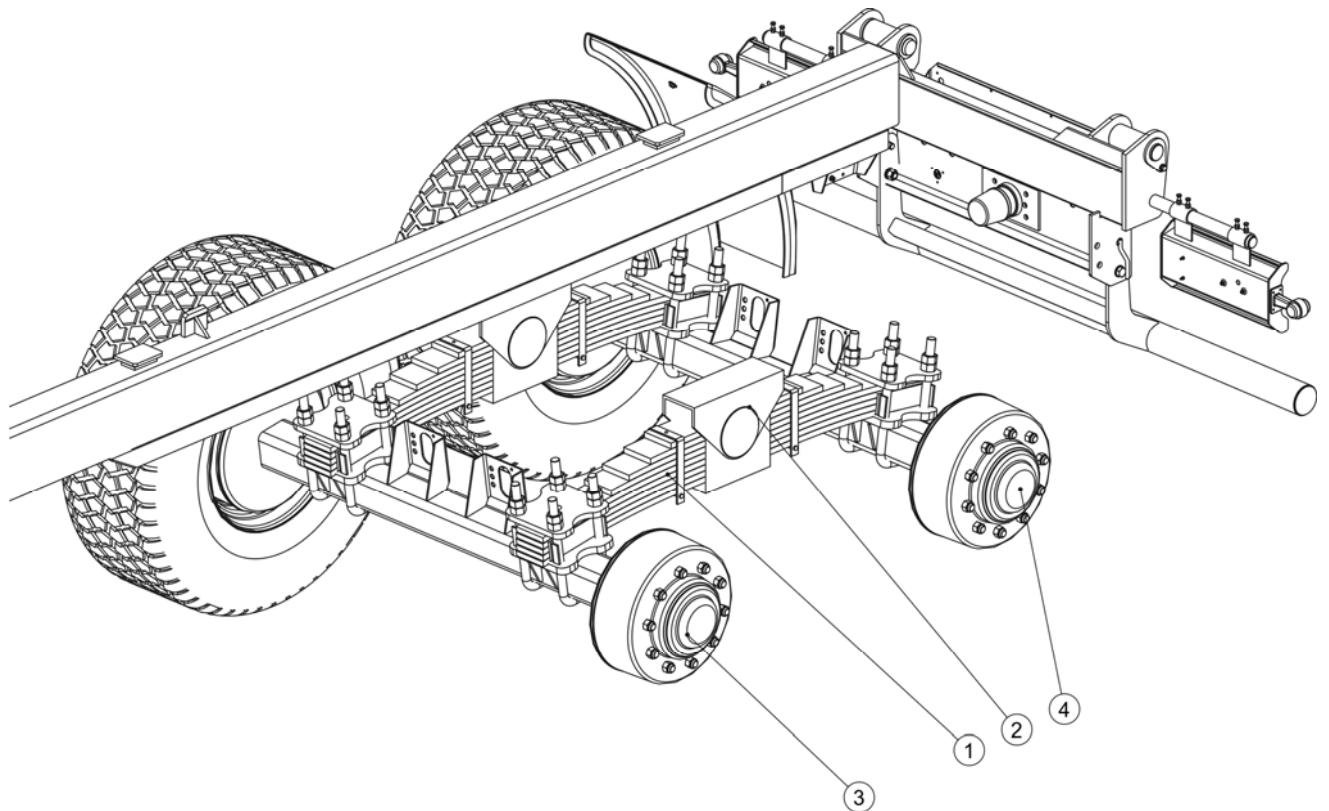


FIGURE 10 BOGIE TYPE SPRINGING SUSPENSION

1 – PARABOLIC CARRIAGE SPRING, 2 – ROCKER ARM OF CARRIAGE SPRING, 3 – FRONT AXLE, 4 – REAR AXLE

4.2.2 Load carrying body

The load carrying body is a welded structure. On the front wall there is mounted the folding ladder (7) and the board step (8) located inside the load carrying body. In the rear part there is located the rear flap, opened and closed by means of hydraulic servo-motors (10). The rear flap is equipped with the left door (4) and the right door (5) opened aside. In the left door there is installed the chute (6) designated for unloading of loose materials.

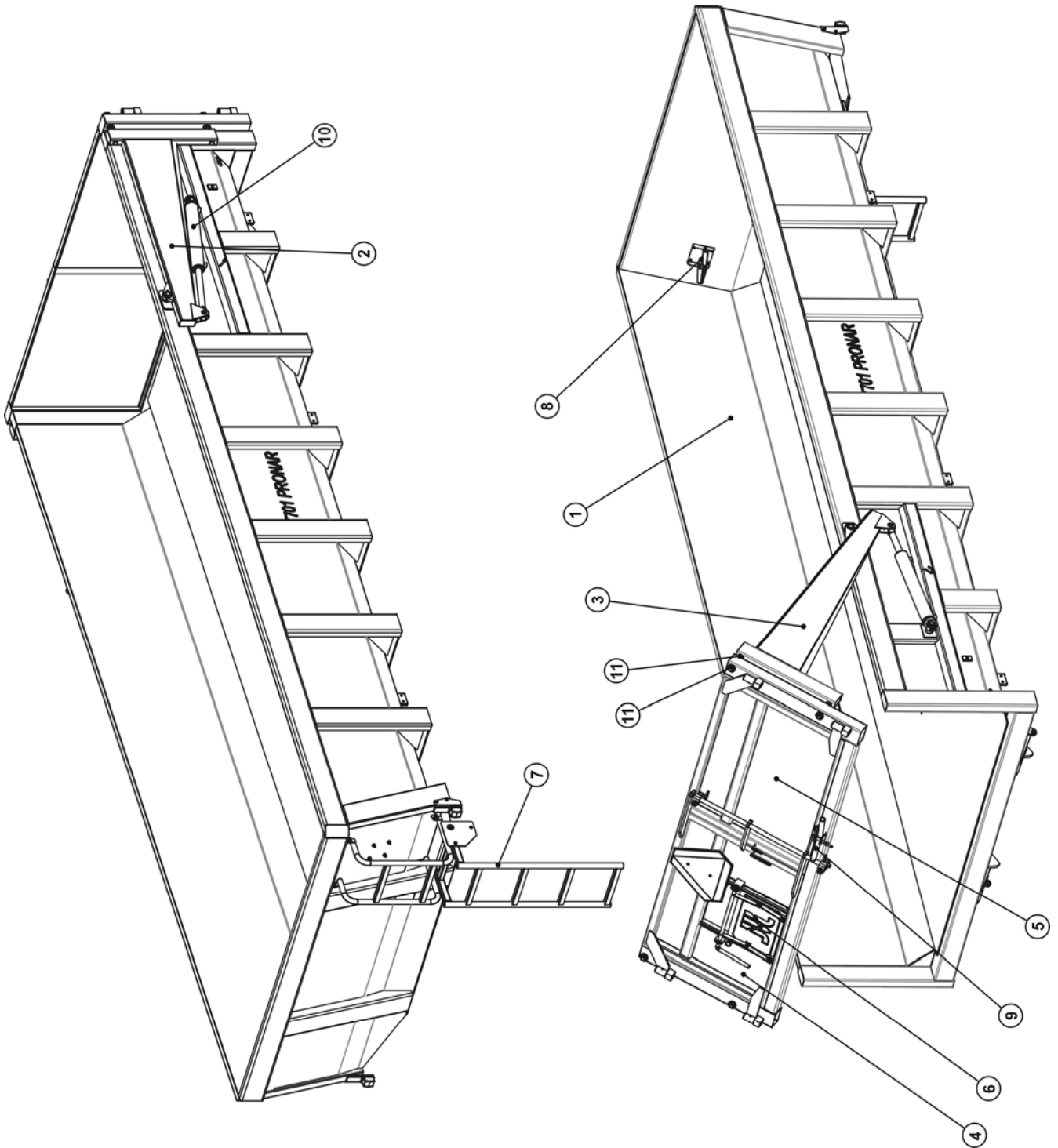


FIGURE 11 LOAD CARRYING BODY

1 – LOAD CARRYING BODY, 2 – LEFT WING, 3 – RIGHT WING, 4 – LEFT DOOR, 5 – RIGHT DOOR, 6 – CHUTE, 7 – LADDER, 8 – STEP, 9 – LEVER OF CLOSING, 10 – HYDRAULIC SERVOMOTOR, 11 – REGULATING NUTS

4.2.3 Hydraulic dump installation

Hydraulic dump installation serves for self-acting unloading of the trailer through inclining the load carrying body backwards. The hydraulic installation of the unloading mechanism is fed with oil from the hydraulic system of the tractor. The oil divider of external hydraulic system of the tractor serves for steering of lifting the load carrying body.

In the trailer, the installation consists of two independent circuits:

- circuit **a** - for feeding the hydraulic cylinders (1) of the trailer,
- circuit **b** - for feeding the hydraulic cylinders of the second trailer in case of connection of two trailers to the tractor.

The steering valve (5) serves for switching these circuits. The lever of this valve may take two positions:

- **1** - opened dump circuit of the first trailer
- **2** - opened dump circuit of the second trailer

In the trailer equipped with bogie type suspension, the installation has the additional circuit **c**, serving for self-acting interlocking of the suspension by means of hydraulic servomotors (2), (this circuit does not exist in the standard design).

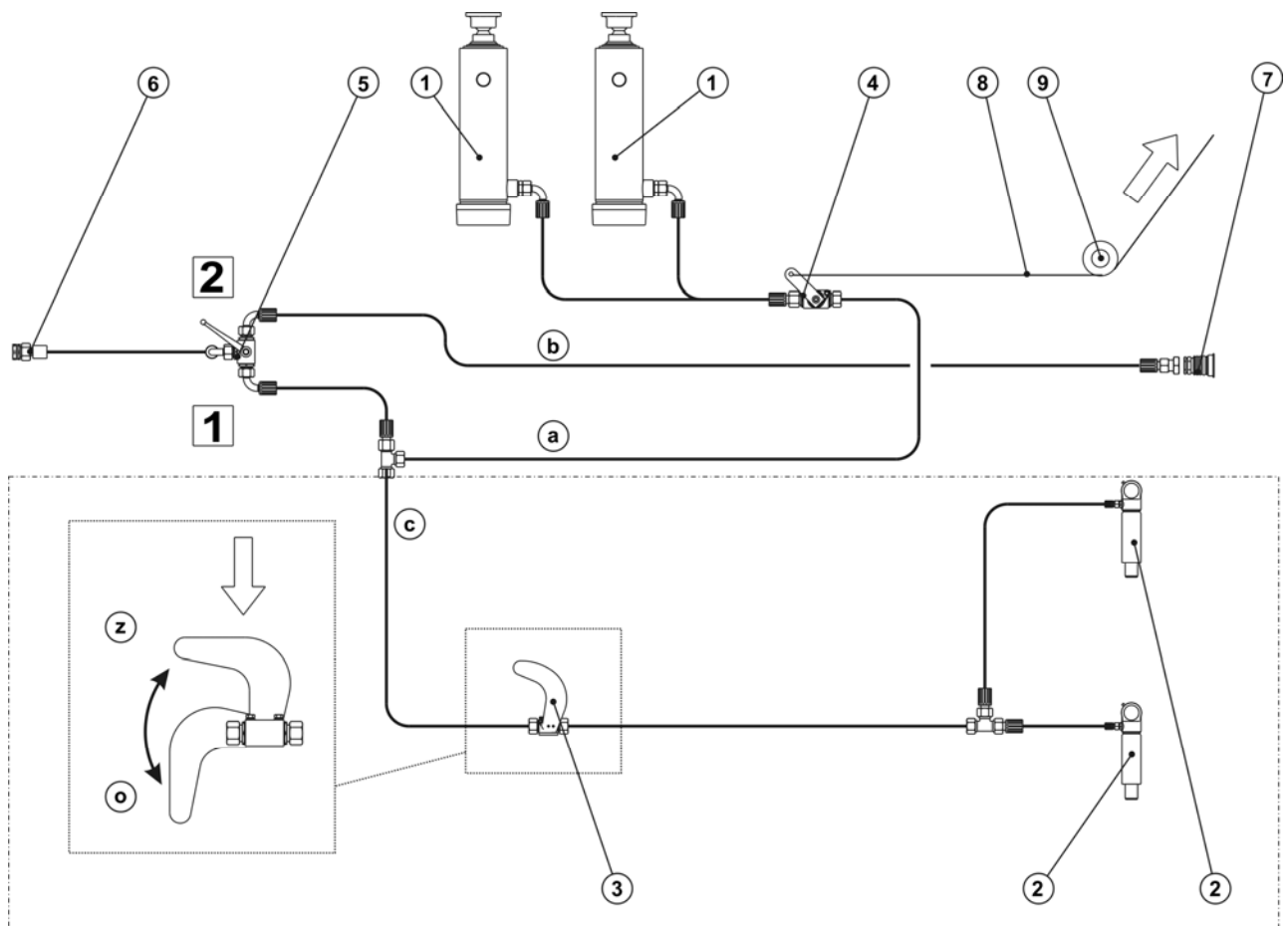


FIGURE 12 SCHEME OF DUMP INSTALLATION

1 – HYDRAULIC SERVO-MOTOR OF DUMP, 2 – HYDRAULIC SERVO-MOTOR FOR INTERLOCKING OF SUSPENSION, 3 – CUT-OFF VALVE WITH STEERING CAM, 4 – CUT-OFF VALVE, 5 – STEERING VALVE, 6 – PLUG OF COUPLING VALVE, 7 – SEAT OF COUPLING VALVE, 8 – LINE STEERING THE CUT-OFF VALVE, 9 – ROLLER

Steering the operation of this circuits takes place through the cut-off valve (3), equipped with properly shaped cam. In the initial phase of lifting the load carrying body the valve remains

opened. The valve cam sliding on the frame of the load carrying body causes gradual reduction of inflow of oil to servomotors (2), till the moment of total cut-off of feeding (position (z)). In the next phase of dump, oil inflows exclusively to hydraulic servomotors (1). At the moment of gaining of maximum dump angle of the load carrying body, the cut-off valve (4), steered with the line (8), breaks inflow of oil to the hydraulic servomotors (1). The line (8) is fastened to grips of the load carrying body and to the valve (4).

ATTENTION



The cut-off valve (4) limits angle of inclination of the load carrying body. The length of line steering this valve is regulated by the Manufacturer and it should not be regulated in the course of use of the trailer.

4.2.4 Braking system

The trailer is equipped with braking system which includes:

- working brake steered pneumatically or hydraulically
- parking brake steered manually by means of crank mechanism

The working brake is actuated from the tractor driver's workplace through pressing the brake pedal of the tractor. The structure of pneumatic brake ensures self-acting actuation of the brake of the trailer during unforeseen disconnection of the pneumatic installation of the trailer and tractor.

The trailer is equipped with steering valve applied in two-line systems (figure (15)). The task of the valve is to actuate brakes of the trailer simultaneously with switching on of the tractor brake. Additionally, in case of unforeseen disconnection of the conduit located between the trailer and the tractor, the steering valve automatically actuates the trailer brake. The applied valve has the system releasing the brake (1), utilized in case when the trailer is disconnected from the tractor. After connecting the air conduit to the tractor, the releasing device automatically switches over to the position enabling normal operation of brakes.

The three-range regulator of braking force (figure (16)), applied in one of types of pneumatic installations adapts braking force to present state of loading of the trailer. Switching over to proper mode of operation is conducted manually by the driver by means of lever (1) before starting of driving. The regulator has three positions of operation: „Without load”, „Half of load”, „Full load”.

Automatic regulator of braking force applied in braking system serves for fluent steering of braking force in dependence on degree of loading of the trailer. The regulator does not require servicing.

4.2.5 Parking brake

The parking brake of the trailer serves for immobilizing of the trailer in the course of standstill. The structure of the braking system consists of crank mechanism actuating the brake and steel ropes fastened to the lever of expander in the front axis of the driving road system. Before starting of driving you must ensure yourself whether the parking brake is unlocked.

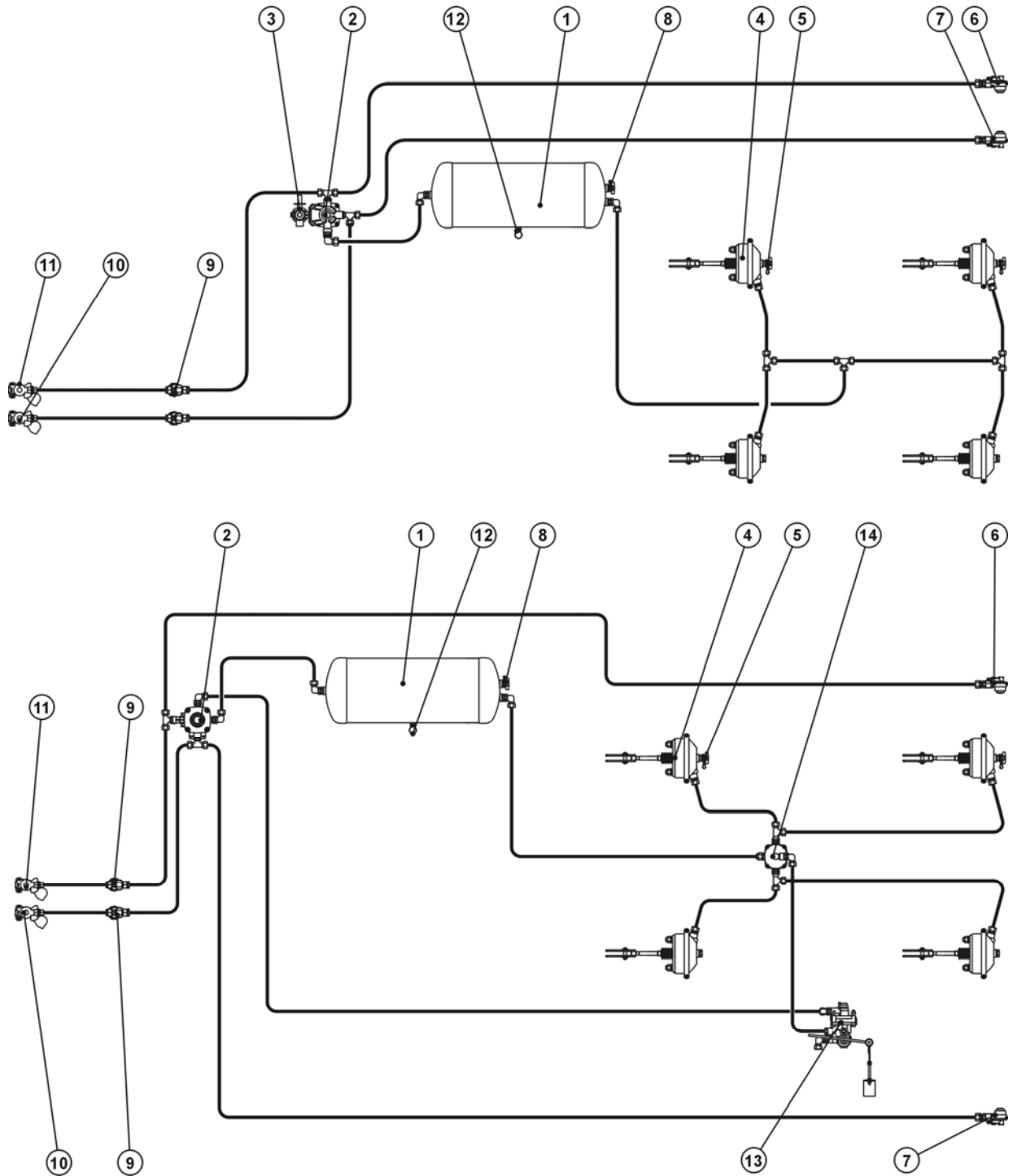


FIGURE 13 SCHEME OF PNEUMATIC TWO-LINE BRAKING INSTALLATION WITH THREE-POSITION REGULATOR AND AUTOMATIC REGULATOR

1 - AIR TANK, 2 - STEERING VALVE, 3 - THREE-RANGE REGULATOR OF BRAKING FORCE, 4 - PNEUMATIC SERVO-MOTOR, 5 - CONTROL JOINT, 6 - FEEDING SOCKET (RED), 7 - FEEDING SOCKET (YELLOW), 8 - CONTROL JOINT, 9 - AIR FILTER, 10 - JOINT (YELLOW), 11 - JOINT (RED), 12 - DRAINAGE VALVE OF THE TANK, 13 - AUTOMATIC REGULATOR OF BRAKING FORCE, 14 - RELAY VALVE

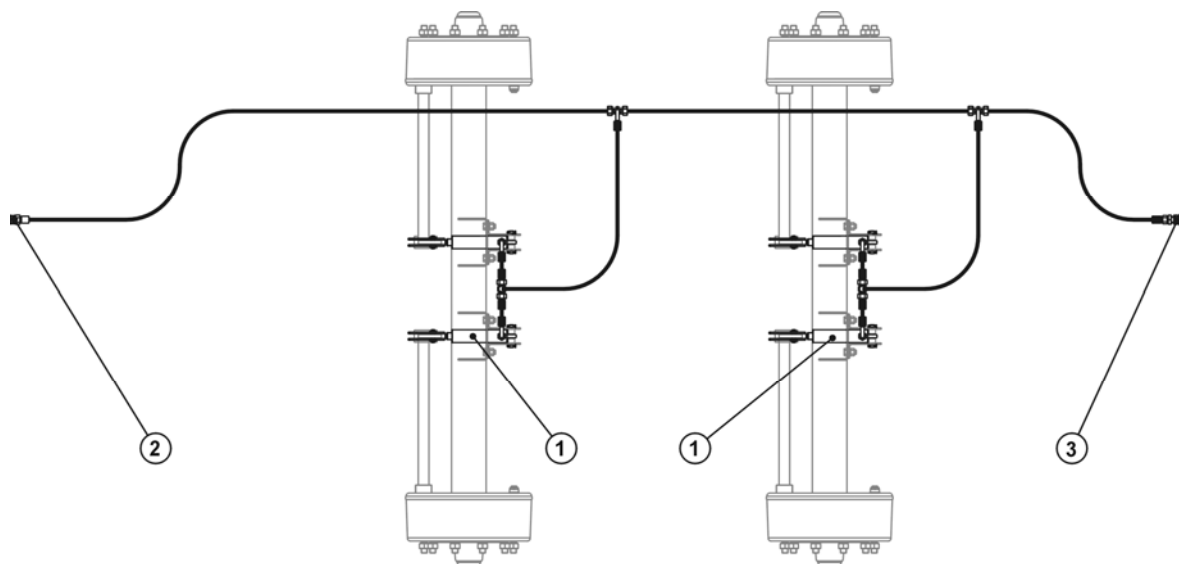


FIGURE 14 SCHEME OF HYDRAULIC BRAKING INSTALLATION

1 – HYDRAULIC SERVOMOTOR, 2 – JOINT OF CONDUIT, PLUG (FOR CONNECTION WITH TRACTOR), 3 – SOCKET FOR CONNECTION OF THE SECOND TRAILER

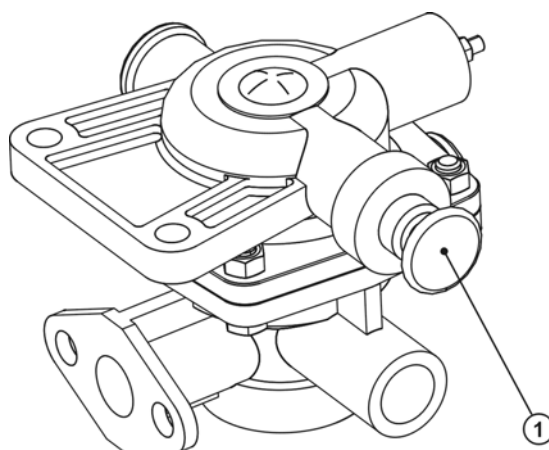


FIGURE 15 STEERING VALVE

1 – PUSH BUTTON OF THE DEVICE RELEASING THE BRAKE OF THE TRAILER

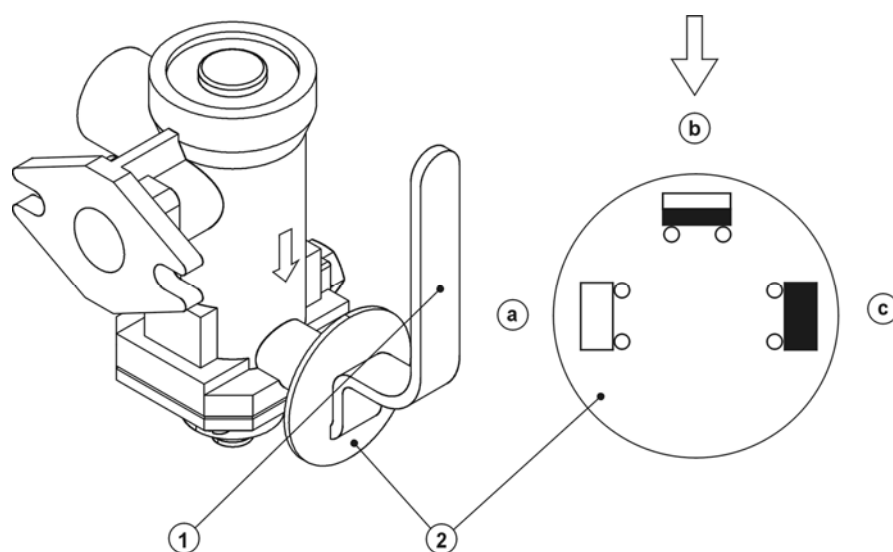


FIGURE 16 THREE RANGE REGULATOR OF BRAKING FORCE

1 – LEVER, 2 – DISC, A – POSITION „WITHOUT LOAD”, B – POSITION „HALF- LOAD”, 3 – POSITION „FULL LOAD”

4.2.6 Electric installation, lighting, signalling

The electric installation of the trailer is adapted for feeding from the direct current source 12 V. Connection of the electric installation of the trailer with the tractor must be made by means of an appropriate jointing conductor.

Arrangement of elements of electric installation and signalling reflective lamps of the trailer has been shown on the figure (17).

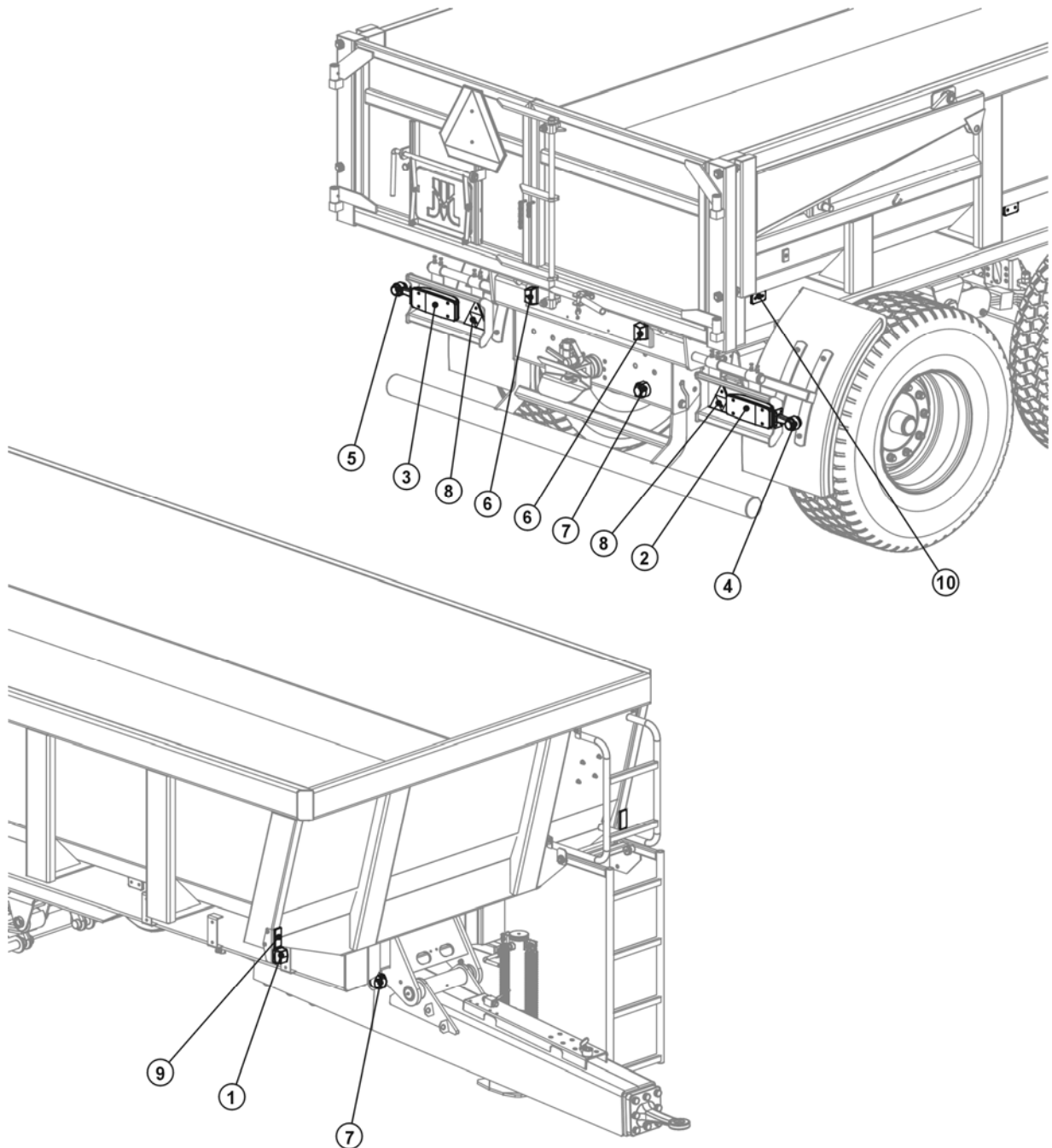


FIGURE 17 ARRANGEMENT OF ELEMENTS OF ELECTRIC INSTALLATION AND REFLECTIVE LAMPS

1 - RIGHT (LEFT) FRONT PARKING LAMP, 2, (3) - RIGHT (LEFT) REAR COMBINED LAMP,, 4, (5) - RIGHT (LEFT) REAR CONTOUR LAMP, 6- NUMBER PLATE ILLUMINATION LAMP 7- SEVEN-CONTACT SOCKET, 8 - REFLECTIVE TRIANGLE, 9 - WHITE REFLECTIVE LAMP, 10 - ORANGE SIDE CONTOUR LAMP

4.2.7 Hydraulic installation of simple support

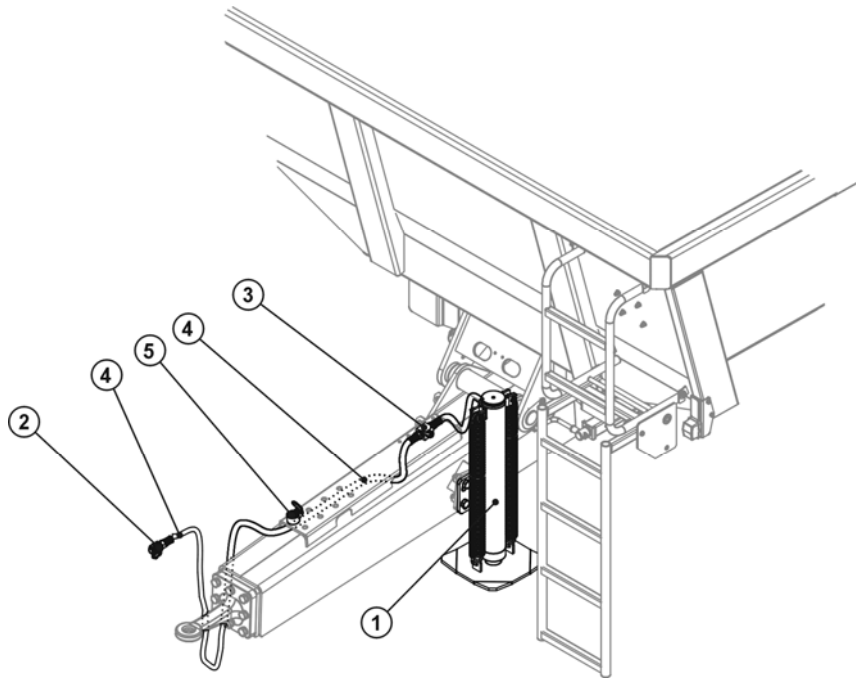


FIGURE 19 HYDRAULIC INSTALLATION OF SIMPLE SUPPORT

1 – HYDRAULIC SIMPLE SUPPORT, 2 – PLUG, 3 – CUT OFF VALVE, 4 – HYDRAULIC CONDUITS, 5 – PLUG SOCKET

5 RULES OF USE

5.1 PREPARATION FOR OPERATION

Within the framework of preparation of the trailer for operation you must check:

1. condition of tyres of road wheels and air pressure in tyres
2. tightening of nuts fastening the road wheels and flexible connector
3. condition of remaining screw connections
4. efficiency of the lighting and signalling system of the trailer
5. functioning of braking system of the trailer
6. correctness of functioning of the hydraulic unloading system

5.2 CONNECTING WITH THE TRACTOR

Before start of connecting the trailer with the tractor you must check if the trailer is braked with the manual parking brake

In order to connect the trailer with the tractor you must perform the following actions:

7. Set the eye of the draught bar at the proper height.
8. Precise setting of height of the draught bar eye can be achieved by means of support. In case of hydraulic support, move back the tractor and connect the hydraulic conduit of the support to it and then release the valve securing the supports and set the draught bar eye to proper height. If the trailer is equipped with the support with gear, regulation of height of the draught bar takes place by means of crank of the gear.
9. Moving back the tractor, connect the draught bar eye with the lower transport hitch and check its protection.
10. Connect conduits of electric, hydraulic and braking installation with the tractor.
11. Release the parking brake of the trailer.

ATTENTION



During connection strangers must not stay between the trailer and the tractor.

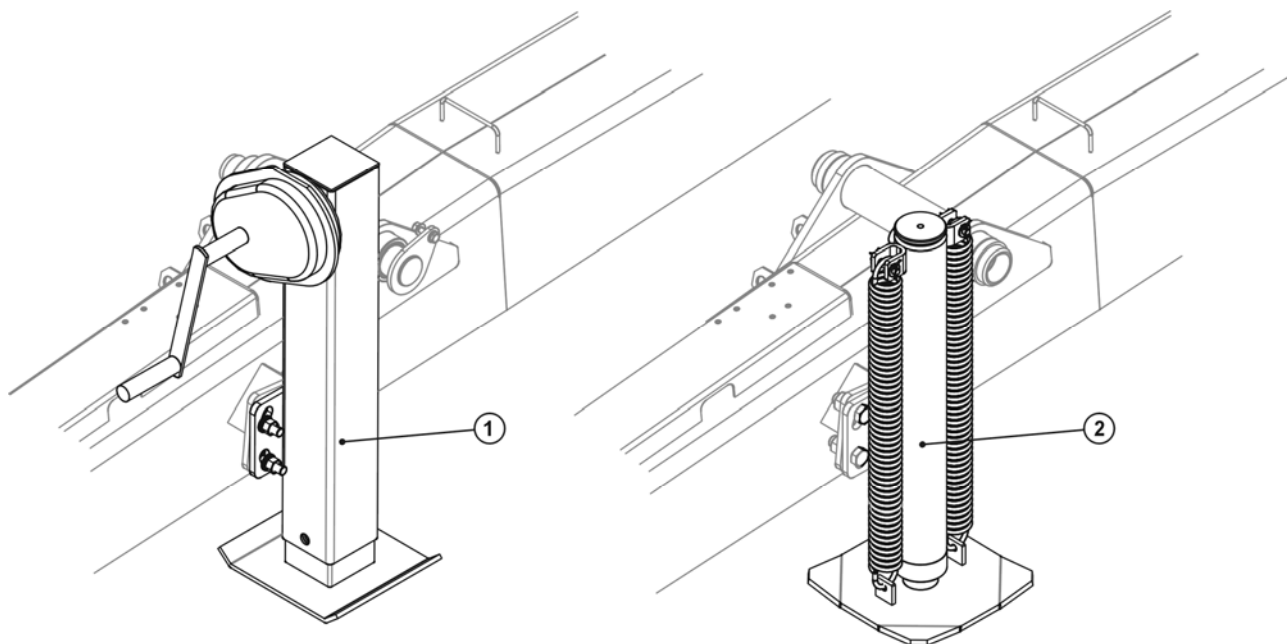


FIGURE 20 SUPPORTS

1 – SUPPORT WITH MECHANICAL GEAR, 2 – SIMPLE HYDRAULIC SUPPORT

5.3 LOADING OF THE LOAD CARRYING BODY

The loading of the load carrying body may take place only when the trailer is connected with the tractor and positioned on horizontal subsoil. You must aim at uniform distribution of the loading in the load carrying body.

During loading it is recommended to use crane, loader or conveyor. Before starting of loading you must check if the rear flap, chute and doors are closed.

During transport of materials exerting point pressure on the floor of the load carrying body you must underlay thick boards. In table 3 there have been specified densities of the most often transported materials. **As it results from the table, in many cases it is not admitted to use total capacity of the trailer because it leads to exceeding of nominal load capacity.** Therefore during loading you must take care in order not to cause overloading of the trailer.

During transport of machines it takes place shifting of centre of gravity upwards and in this connection the risk of occurring of the following hazards increases: loss of stability of the trailer, overturning of the trailer, loss of strength of trailer elements, uncontrolled movements of the body uneven area.

Light materials of large volume may be loaded even above the walls of the load carrying body with paying special attention to stability of the trailer and protection of roads against littering.

ATTENTION



It is forbidden to exceed admissible load capacity of the trailer because it threatens security of road traffic and may cause damage of the machine.

TABLE 3 APPROXIMATE DENSITIES OF THE MOST OFTEN TRANSPORTED MATERIALS.

Material	DENSITY [KG/M ³]	Material	DENSITY [KG/M ³]
CONCRETE	1800 – 2800	COAL	1200 – 1600
CLINKER BRICK	1600 – 1900	SOIL	1200 – 1600
CEMENT (POWDER)	1300 – 2000	GRAVEL	1800 – 1850
CLAY	1500 – 2600	DEBRIS	1050
SAND	1400 – 1650	STONE (CRUSHED)	2200
LIME (POWDER)	900 – 1300		1200 – 1600

5.4 RULES OF USE OF TYRES

12. During works connected with assembling and disassembling of tyres the trailer must be secured against self-acting displacement.
13. Repair or replacement of tyres should be conducted by persons trained to this aim and with use of appropriate tools.
14. After each assembling of the wheel you must tighten nuts after the first 50 km of driving, and then check their tightening every 100 km.
15. Control regularly and keep proper pressure in tyres according to the instruction (especially after longer break of non-using the trailer).
16. Pressure of tyres should also be checked during intensive full day's operation. It must be taken into account the fact that increase of tyres temperature may increase pressure even by 1 bar. In case of such increase of temperature and pressure it must be reduced load or speed.
17. Never reduce pressure through venting in case of increase of pressure due to action of temperature.
18. Valves must be secured by means of appropriate nuts in order to avoid pollution of them.
19. Do not exceed the maximum speed of the trailer.
20. During full day's cycle of operation you must make at least one hour break at noon.
21. Observe 30 minutes breaks for cooling tyres after driving 75 km or after 150 minutes of continuous driving in dependence on what occurs first.
22. You must avoid holes sudden and changeable manoeuvres and high speed during turning.

5.5 UNLOADING OF THE LOAD CARRYING BODY

Unloading of the trailer takes place through inclining of the load carrying body backwards.

ATTENTION



It is forbidden to lift the loaded load carrying body when the rear flap, doors or chute are closed.

Self-acting unloading must be conducted by performing the following actions with keeping their sequence:

23. Position the trailer on flat subsoil, brake the tractor and the trailer by means of parking brake. The tractor must be positioned for driving straight ahead during unloading.
 24. Pin with grip joining the load carrying body with the lower frame must be placed on the side of planned direction of sliding.
 25. Open the rear flap by means of hydraulic servo-motors, door or chute.
 26. Cause inclining the load carrying body backwards through its lifting with the hydraulic servomotors.
-

ATTENTION



- Inclination of the load carrying body may be performed only on hard and flat subsoil.
 - It must be observed that during unloading nobody will stay near the inclined load carrying body and sliding load.
 - Inclining the load carrying body may be performed only when the trailer is connected with the tractor.
 - It is forbidden to incline the load carrying body during strong blasts of wind.
 - During closing of rear flap must keep special care because injuries may be the cause of serious detriment to health.
 - It is forbidden to move and drive with the lifted load carrying body.
 - During opening of rear flap or door you must pay special attention due to pressing of the load on the walls.
-

5.6 DISCONNECTING FROM THE TRACTOR

In order to disconnect the trailer from the tractor you must perform the following actions:

27. Brake the trailer with the manual parking brake after stopping the tractor.
28. Position the trailer on subsoil at the proper height by means of the hydraulic support.
29. Secure with the valve securing the support (it relates to the hydraulic support only).
30. Disconnect conduits of the electrical, hydraulic and braking installation from the tractor and secure endings of these conduits against contamination.
31. Disconnect the flexible connector of the draught bar of the trailer from the hitch of the tractor and drive away with the tractor.

6 SERVICING INSTRUCTIONS

6.1 GROUND WHEELS' BEARINGS ADJUSTMENT

In the newly purchased trailer, after driving of the first 500 km, and in the course of further use – after driving the next 1500-2000 km – you must check and in case of necessity regulate play of bearings of road wheels.

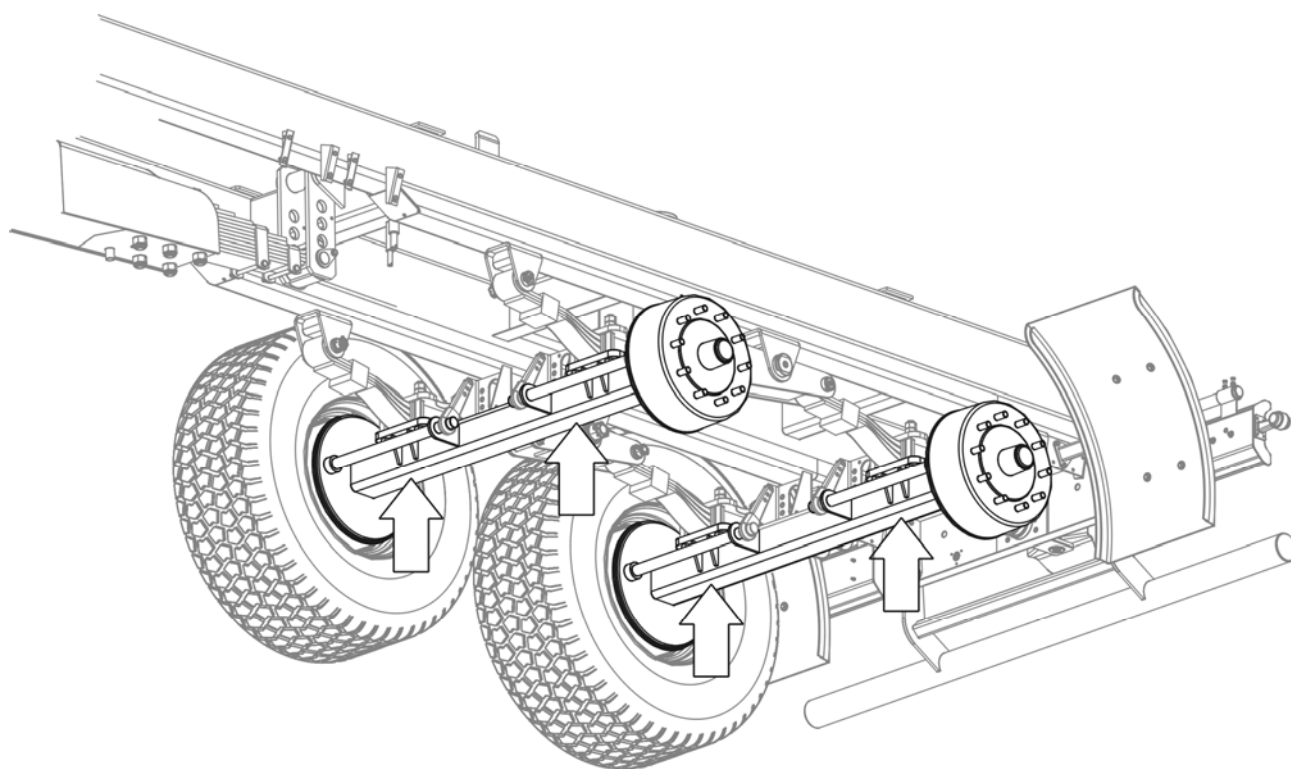


FIGURE 21 POINTS OF SUPPORT OF THE TRAILER

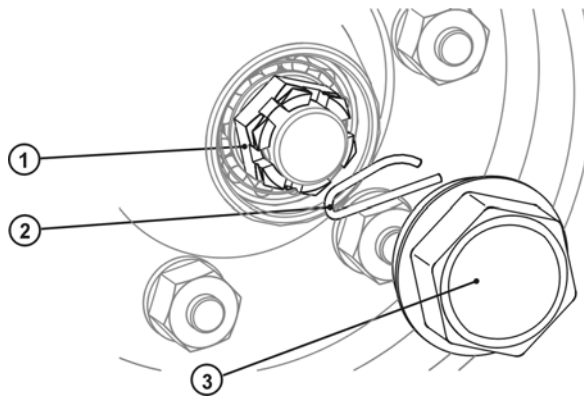


FIGURE 22 BEARINGS ADJUSTMENT

1 – CASTELLATED NUT, 2 – SECURING COTTER PIN, 3 – COVER OF HUB

To this aim you must connect the trailer with the tractor, brake the tractor, put blocking wedges under the wheels of the trailer. Subsequently lift the wheels by means of a proper hoist. The hoist must be placed under driving axle between bow bolts fastening the carriage spring to the axle (figure (21)). Check the play of bearings.

If the wheel shows excessive play, dismantle the cover of the hub (3) and take out the cotter pin (2) securing the castellated nut (1). Rotating the wheel, simultaneously tighten the castellated nut until total braking of the wheel. Unscrew the nut by 1/3 of revolution, until the nearest groove for the cotter pin is in line with opening in the journal.

Secure the castellated nut (1) with the cotter pin (2) and mount the cover of the hub (3). The wheel should rotate fluently, without jams and perceptible resistances non-coming from rubbing of brake shoes against the drum.

6.2 BRAKES ADJUSTMENT

Brakes adjustment must be conducted when:

- in consequence of wear and tear of lining of brake shoes, excessive play appears between the lining and the drum and the efficiency of braking decreases,
- brakes of wheels brake non-uniformly and non-simultaneously.

In case of correctly regulated brakes, braking of road wheels of the trailer must take place at the same time. Regulation of brakes consists in changing of position of the arm of the expander (2) (figure (23)) against the shaft of the expander (1). To this aim you must regulate, with regulating screw (3), the position of the lever in the proper direction, that means:

- backwards – if the brake brakes too late
- forwards - if braking takes place too early

Adjustment must be conducted separately for each wheel. After correct brakes adjustment, during full braking, the arms of expanders should create the angle of 90⁰ with the piston rod of the pneumatic servomotor.

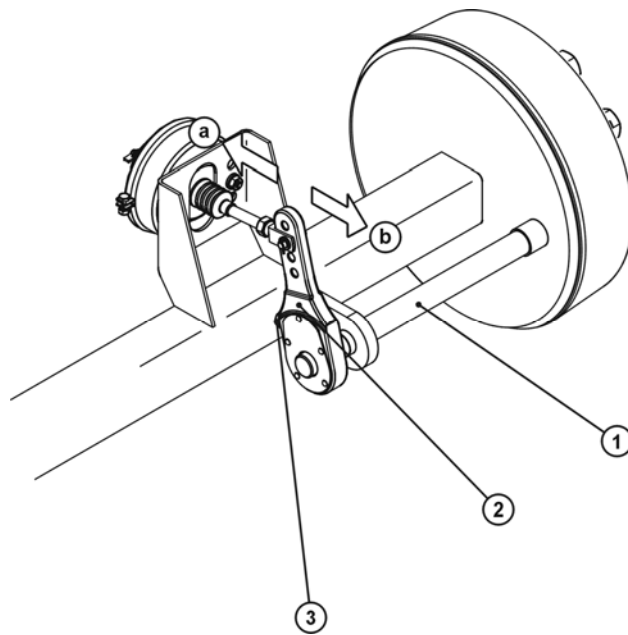


FIGURE 23 ELEMENTS OF BRAKES ADJUSTMENT

1 – SHAFT OF EXPANDER, 2 – LEVER OF EXPANDER, 3 – REGULATED SCREW

Adjustment of the parking brake must be conducted in case of stretching the line or loosening the clamps of the line of the parking brake. The length of the line of the parking brake should be so selected that during total release of the working and parking brake the line will be loose and hang down 1 ÷ 2 cm.

ATTENTION



In case of properly adjusted brakes the braking force of the trailer should achieve values not lower than those specified in the table 4.

TABLE 4 BRAKING FORCE

SPEED (KM/H)	BRAKING FORCE WITH USE OF MAIN BRAKE (KN)	BRAKING FORCE WITH USE OF PARKING BRAKE (KN)
25	72	43
40	120	43

The difference of braking forces of the left and right wheel may not be greater than 30% considering that the greater force constitutes 100%.

ATTENTION



Braking force of the trailer is the sum of braking forces of all wheels of the trailer.

6.3 SERVICING OF THE PNEUMATIC INSTALLATION

Within the framework of servicing of the trailer, you must conduct control of tightness of the pneumatic installation, paying special attention to places of all connections. Tightness of the system must be checked at nominal pressure in the system of about 600 kPa (6,0 kg/ cm²).

If conduits, gaskets and other elements of the system are damaged, compressed air will get outside in places of damages with characteristic hissing or in case of small leaks in form of air bubbles. Small leaks can be detected through coating checked elements with washing fluid. Then the damaged gaskets or conduits causing leaks must be replaced for new ones. If the cause of leakage is outflow of air from the servomotor – the servomotor must be replaced for new one.

Periodically condensate of water gathering in the air tank must be removed from this tank. To this aim you must deflect the stem of the drainage valve placed in the lower part of the tank. Compressed air being in the air tank will cause removing water outside. After release of the stem the valve should close automatically and break outflow of air from the tank.

Once a year before winter period you must screw out the drainage valve and clean from gathered dirt.

6.4 SERVICING OF THE HYDRAULIC INSTALLATION

You must absolutely observe the rule that the oil in the hydraulic system of the trailer and the oil in the external hydraulic installation of the tractor will be of the same type. Use of different grades of oil is inadmissible. **In the new trailer the installation is filled with the hydraulic oil HL32.** The hydraulic installation of the trailer should be tight totally.

Checking of tightness of the hydraulic system consists in connection of the trailer with the tractor, actuation of the hydraulic cylinders, keeping in the position of maximum sliding-out of cylinders for 30 seconds.

In case of ascertaining of oil leak on connections of hydraulic conduits, the coupling must be tightened, if this does not cause removal of defect – you must replace the conduit or elements of coupling for new ones. If leak of oil occurs beyond the joint, (untight conduit of the installation) must be replaced for a new one. Each damage, of mechanical nature, of a subassembly requires replacement of it for a new one.

In case of ascertaining of oiling up on the housing of the hydraulic servomotor you must check the nature of leakage. During total sliding-out of cylinder of the servomotor you must check places of seals. Small leaks with symptoms of "sweating" are admissible and in case of noticing of leaks of the "droplet" type you must stop exploitation of the trailer until the time of removal of the defect.

ATTENTION



It is inadmissible to use the trailer with untight hydraulic system of dump. Condition of the hydraulic installation should be controlled currently during use of the trailer.

In case of intensive exploitation of the hydraulic system you must replace hydraulic conduits for new ones every 4 years.

6.5 LUBRICATION

Lubrication of the trailer must be conducted in places presented on the figures 24 and 25 and specified in the table 4 “Lubricating points of the trailer”.

TABLE 5 LUBRICATING POINTS OF THE TRAILER

NO. ON FIG. 24 AND 25	PLACE OF LUBRICATION	NUMBER OF LUBRICATING POINTS	TYPE OF GREASE	FREQUENCY AND WAY OF LUBRICATION
1	Bearings of servo-motor of the rear flap	2	solid	every 3 - 4 months
2	Pins of rotation of flap wings	2	solid	every 3 - 4 months
3	Pins of dump	2	solid	every 3 - 4 months
4	Ball-and-socket joint of the dump servomotor	2	solid	every 6 months
5	Socket of fastening of servomotors	4	solid	every 6 months
6	Pins of support of load carrying body	2	solid	every 6 months
7	Mechanism of hand brake	1	solid	every 3 - 4 months
8	Flexible connector (it relates to rotary flexible connector only)	1	solid	every 3 - 4 months
9	Pin of draught bar	1	solid	every 3 - 4 months
10	Pins of rocker arm	2	solid	every 3 - 4 months
11	Bearings of ground wheels	4	solid	change the grease every 2 years
12	Sleeves of shafts of expanders	8	solid	every 6 months
13	Pin of carriage spring	4	solid	1 – once a month
14	Pin of rocker arm	2	solid	1 – once a month
15	Sliding surface of rocker arm	4	solid	1 – once a month
16	Hinge of the rear flap	4	solid	every 3 - 4 months
17	Rear hitch	1	solid	1 – once a month

TABLE 5 LUBRICATING POINTS OF THE TRAILER, CONT.

NO. ON FIG. 23 AND 24	PLACE OF LUBRICATION	NUMBER OF LUBRICATING POINTS	TYPE OF GREASE	FREQUENCY AND WAY OF LUBRICATION
18	Guiding openings of door lock	3	solid	1 – once a month
19	Lever of damper	2	solid	every 3 - 4 months
20	Interlocking hooks	2	solid	1 – once a month
21	Pins of flexible connector of damper	4	solid	every 3 - 4 months
22	Guides of damper	2	solid	every 3 - 4 months
23	Axis of ladder	2	solid	every 3 - 4 months
24	Pin of fastening of servomotor and lever	4	solid	1 – once a month
25	Leaf carriage spring of draught bar	1	**	every 3 - 4 months
26	Parabolic carriage spring	4	**	every 3 - 4 months
27	Pins of rollers guiding steel ropes*	4	solid	every 3 - 4 months

* - not shown on the figure

** - see *Servicing of suspension*

6.6 SERVICING OF SUSPENSION

Servicing of the carriage spring system of tandem and bogie type consists in periodical lubrication in places specified in the table 5 and current control of the condition of spring leaves.

The surface between spring leaves must be secured with penetrating lubricating and anticorrosive agent. You must not allow gathering thick layer of dried mud on carriage springs.

ATTENTION



In case of noticing a crack of a spring leaf in any carriage spring, the trailer must be taken out from operation until the defect is removed.

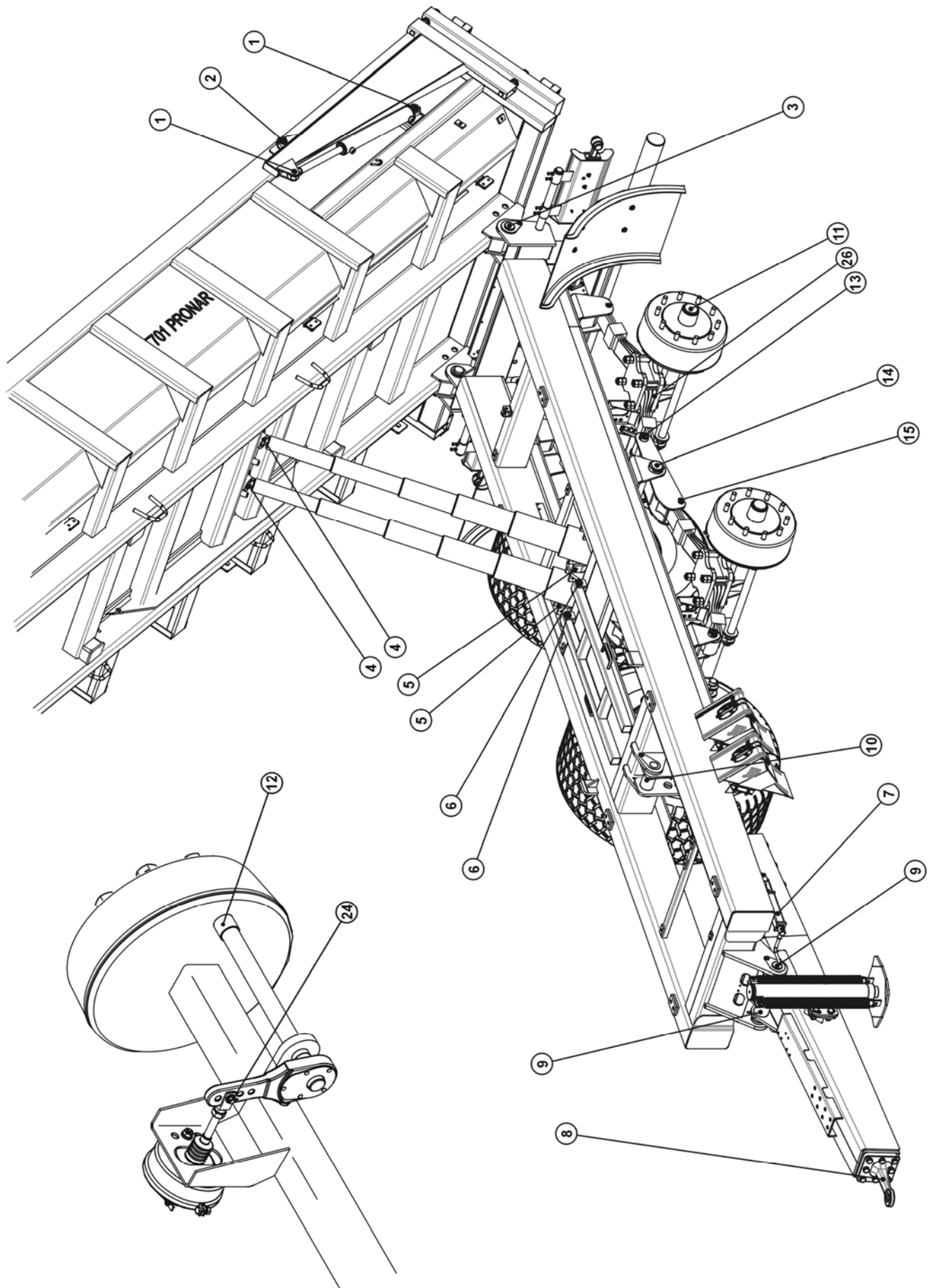


FIGURE 24 LUBRICATING POINTS OF THE TRAILER

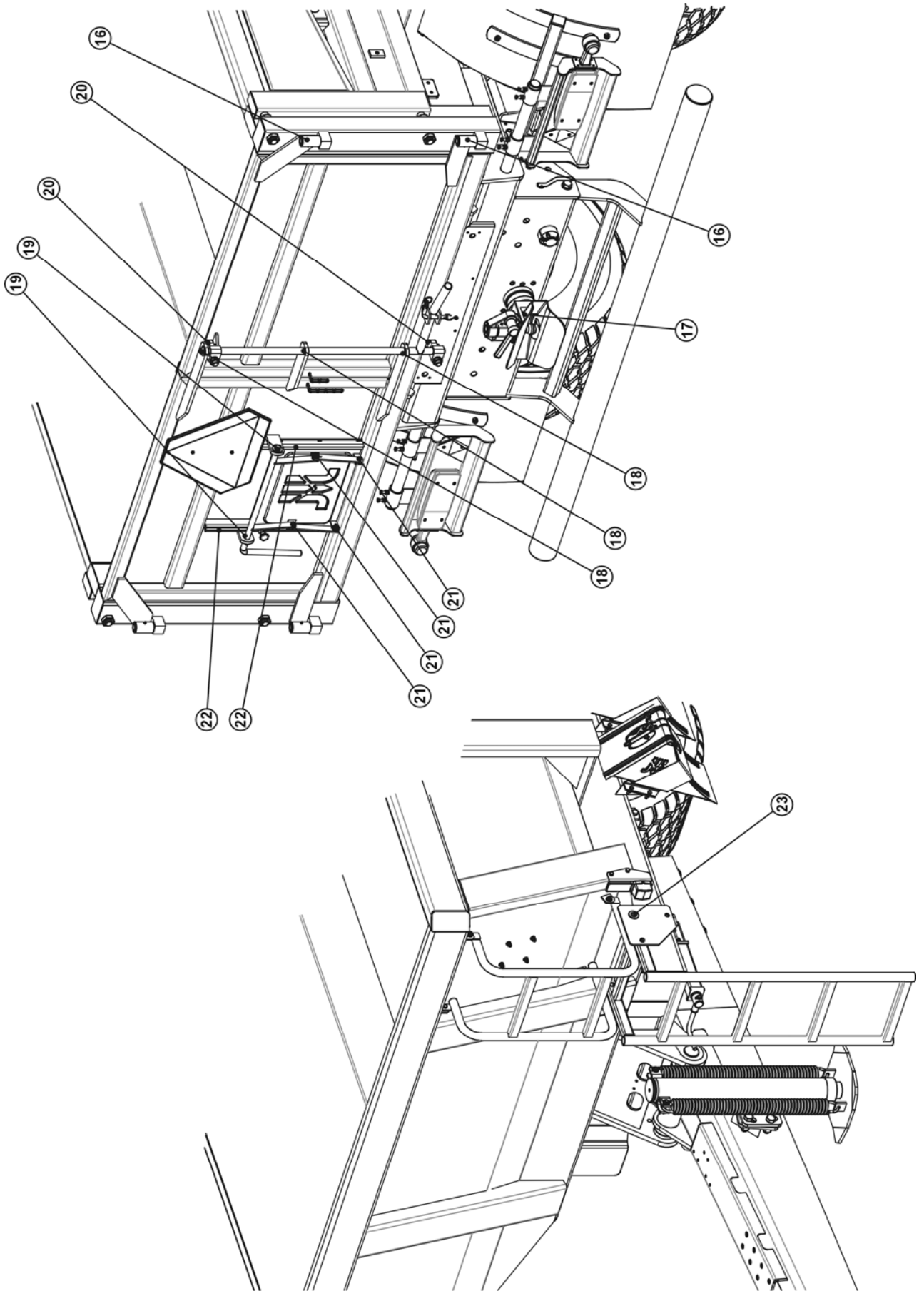


FIGURE 25 LUBRICATING POINTS OF THE TRAILER

6.7 REGULATION OF FASTENING OF DRAUGHT BAR

The shelled trailer T701 has the self-aligning draught bar, fastened by means of the pin under the front beam of the lower frame (1) and rocker arm (4). In case of necessity of regulation of position of the draught bar you must perform particular actions:

- brake the trailer with parking brake
- secure the trailer against rolling through putting wedges under wheels
- support the trailer under the front beam (1) (from both sides of draught bar) or left or right longitudinal member of the lower frame by means of supports of proper height
- support the draught bar by means of a hoist in place indicated on figure (26) with arrow
- dismantle the pin (3)
- regulating height of the hoist, establish new position of the draught bar against the rocker arm
- assemble the pin (3), check the protection

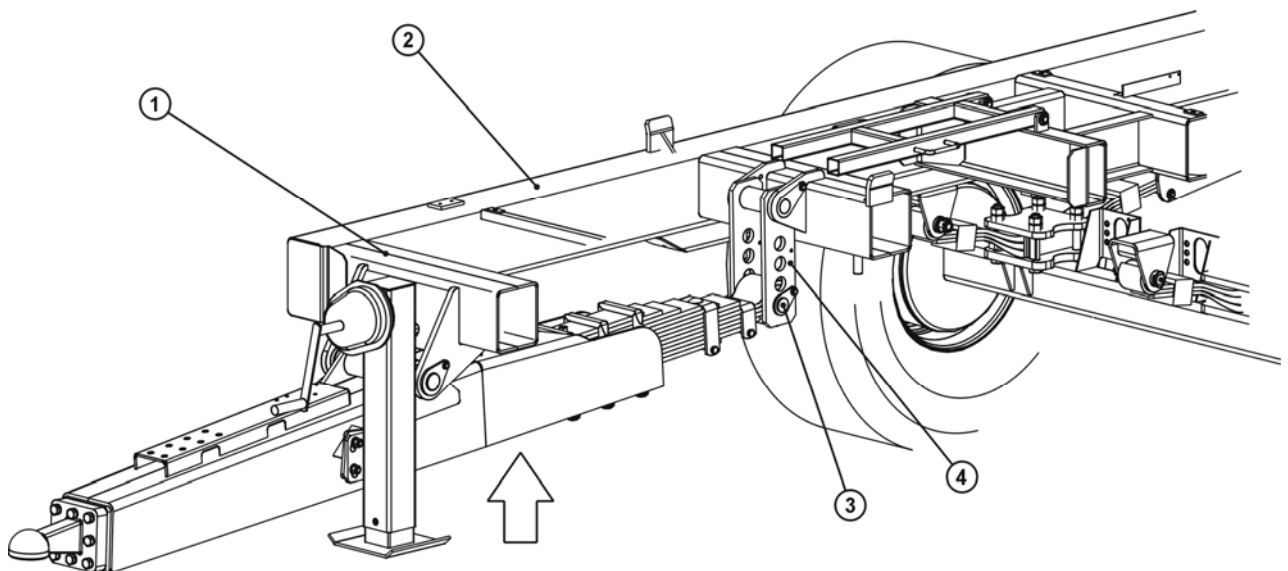


FIGURE 26 REGULATION OF FASTENING OF THE DRAUGHT BAR OF THE TRAILER

1 – FRONT BEAM OF LOWER FRAME, 2 – LONGITUDINAL MEMBER OF THE LOWER FRAME, 3 – PIN OF FASTENING OF THE CARRIAGE SPRING OF THE DRAUGHT BAR, 4 – ROCKER ARM OF THE DRAUGHT BAR

ATTENTION



- In case of ascertaining of any incorrectness in action or damage of systems and subassemblies of the trailer, the machine must be taken out of use until the time of repair and removal of defect
- It is forbidden to perform servicing or repair works when the engine is running.
- Servicing and repair actions must be performed applying general rules of work safety and hygiene. In case of cut the wound must be washed out and disinfected immediately. In case of suffering of more serious injuries you must seek medical advice.