

KH-KIPPER TIPPER OPERATION MANUAL

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INTRODUCTION

The manual was prepared in order to explain the proper way of use and maintenance of tipper manufactured by KH-Kipper company.

Before attempting to work, it is necessary to familiarize with the servicing and principles of maintenance of the tipper described in the manual herein. One shall remember that the most frequent reason of equipment damage is its improper use and maintenance.

In the event of damages and the necessity of carrying out repair, fill in the complaint filling form (page 65) and send it via fax to the sales department of KH-Kipper company (+48 41 301 13 03) or fill in the filling form on www.kh-kipper.pl website in "Service" tab.

Remember that KH-Kipper will not consider claims or complaints regarding the equipment which result from its improper use and maintenance or defective performance of the repair.

At the same time we are asking you to fill in "Customer's satisfaction" filling form (page 71) after the following periods of use: 6 months, 12 months, and 24 months. The sheet will let us know your opinion about our products and improve thereof in accordance with your expectations and needs. Please accept our thanks for filling in the aforementioned filling form and sending it to our company.

We are constantly trying to develop and improve the construction of our product, wherever possible, so that your vehicles had new solutions and new possibilities. This is why your product may be equipped in some solutions which have not been described yet in the manual herein.

Regards,

KH-Kipper

1. General safety measures.

The operator of heavy equipment shall realize the threats resulting from servicing of the type of devices. The observance of the following manual shall increase the safety of work and operation of the tipper. KH-Kipper company is not responsible for damages caused by improper operation and maintenance of the equipment or its improper use.

- 1. It is not allowed to lift the load bed in the event the vehicle may overturn.**
- 2. The load in the load bed shall be evenly distributed.**

Uneven distribution of the load may lead to overloading of hydraulic system elements as well as it essentially increases the risk of the vehicle overturning.

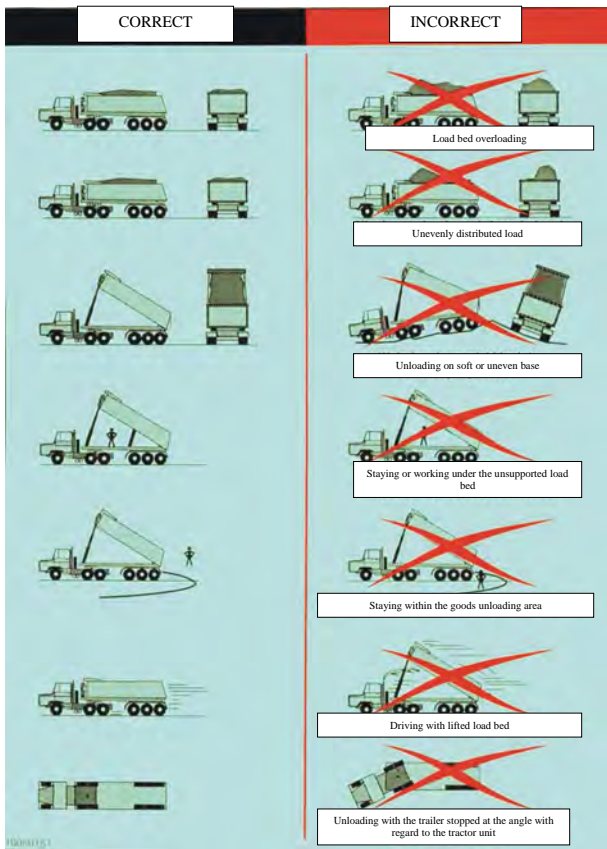
- 3. The personnel are not allowed to stand on the load bed or in its surrounding while uploading and unloading.**
- 4. Before unloading, it is necessary to make sure that the vehicle is located on even and hardened base. It is not allowed to carry out unloading on uneven, unstable area and during adverse atmospheric conditions (a storm, strong winds, etc.)**
- 5. Before starting the unloading it is necessary to take out the pin which supports the tipper tailgate.**
- 6. It is not allowed to carry out unloading with the tailgate closed (while the unloading is performed backwards) and with the side gates closed (while the unloading is performed sideward).**
- 7. While unloading of 3-way tippers sideward, the tailgate has to be closed and during backward unloading, the side gates of the load bed have to be closed.**
- 8. Before unloading, check whether the load bed does not collide with the external structures while lifting it (e.g. electrical lines).**
- 9. It is not allowed to attach the power take-offs while the vehicle is in gear. Before attaching the power take-off, it is necessary to engage the parking brake. After the unloading is completed, it is necessary to turn off the power take-off.**
- 10. It is not allowed to stay under the lifted load bed. In the event it is necessary, one shall secure the load bed with a repair support.**
- 11. Special attention shall be paid to loads which may freeze during the transportation. It may lead to losing the tipper stability while unloading and lead to its overturning. It is not allowed to continue the unloading when, as a result of lifting the load bed; the load does not slide off the bed.**
- 12. In the event the hazard of the vehicle overturning is obvious, stop the bed lifting immediately, slowly lower the bed and find the reason of it.**

13. If, while lifting the load bed, the vehicle starts overturning, move to a safe place immediately.
14. If the vehicle starts overturning when you are in the cabin:
 - remain in the cabin,
 - bracket on the chair,
 - hold the driving wheel,
 - never jump out of the cabin when the vehicle is overturning.
15. After the unloading is completed, make sure that the load bed is empty.
16. It is necessary to remember about proper technical servicing of the tipper, regular performance of servicing activities and inspections planned. Non-performance of the planned inspection leads to losing the guarantee.
17. It is not allowed to expose the piston rods of the hydraulic engine to the influence of adverse atmospheric conditions (rain, snow). It may lead to corrosion of the piston rod surfaces and damage of the servomotor.

IT IS NOT ALLOWED TO:

- Overload the tipper,
- Drive the tipper with unevenly distributed load,
- Unload the tipper on uneven or instable base,
- Stay under the unsupported load bed,
- Drive the tipper with the bed lifted,
- Make any changes in the installation present,
- Change the pressure values set in the factory,
- Adjust the tipping angle on your own,
- Drive the tipper without the pins which secures the tailgate from opening,
- Unload the tipper with the gates closed,
- Unload the tipper with the ladders unfolded,
- Unload the tipper backwards with the flap door not protected from opening or opened and not fixed to the side gates (French door).

GENERAL PRINCIPLES OF THE TIPPER OPERATION



2. Description of KH-Kipper tipper.

The full mechanism of the tipper adjusted to the chassis is composed of:

- intermediate frame
- load bed



Fig. 1. Example of bodywork – tipper

- systems:
 - hydraulic system (fig. 2, hydraulic system diagrams – item 7)
 - pneumatic system
 - electrical system

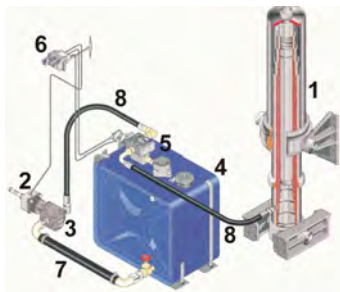


Fig. 2 Example of hydraulic system of the rear tipper

The main parts of the hydraulic system (per fig. 2):

- hydraulic servomotor – 1
- power take-off – 2
- pump – 3
- oil tank with a reverse filter – 4
- main isolation valve – 5
- pneumatic control system fixed in the cabin – 6
- suction hydraulic hose – 7
- pressure hydraulic hose – 8
- pneumatic tipping angle limiter.

The electric system of the tipper is limited by the light signalization and sound installation optionally for the purposes of turning on the power take-off and load bed lifting. Most often, the chassis manufacturer equips the vehicle with a separate inspection lamp on the switchboard, or possibly on the control panel.

3. The principle of the tipper's operation.

Tipper's are equipped in the hydraulic system used for the bed dumping controlled pneumatically. The system is supplied via a hydraulic pump driven most often by the gearbox with the use of power take-off. After the power take-off is started, a pump is turned on which pumps the hydraulic oil from the tank to the isolation valve. In the neutral position of the pneumatic servomotor lever, the oil freely returns via the valve to the tank. After the pneumatic servomotor is reset with the use of the lever to the lifting position, the hydraulic oil is pumped to the hydraulic servomotor which lifts the load bed. In the load bed end position, lifting is stopped by means of a knock-off valve and oil circulates from the pump via the valve to the tank instead of going to the servomotor. In the moment the servomotor lever's position is changed to the lowering position, the oil flow from the servomotor to the oil tank is opened in the isolation valve and the load bed is lowered.

In the tipper's manufactured by KH-Kipper pneumatic control of the following is possible:

- hooks which block the tailgate,
- hooks which block the side gates,
- hydraulically opened and closed gate,
- power take-off,
- load bed lifting and lowering,
- isolation valve which divides the oil stream flow to the tipper or the trailer,
- isolation valve which divides the oil stream flow to the tipper or crane (or other hydraulic receivers, e.g. a winch).

3.1. Pneumatic control valve.

The tipper control takes place from the driver's cabin with the use of special controllers located there. The number of controllers depends on the technical specification of the bodywork.

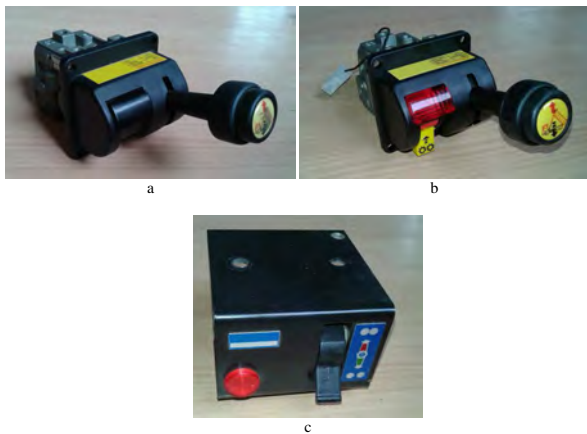


Fig. 3. Examples of pneumatic controllers: a) pneumatic controller, b) pneumatic controller with integrated switch e.g. for the gate opening, attaching the power take-off, c) servicing switch, e.g. for PTO or three-way valve.

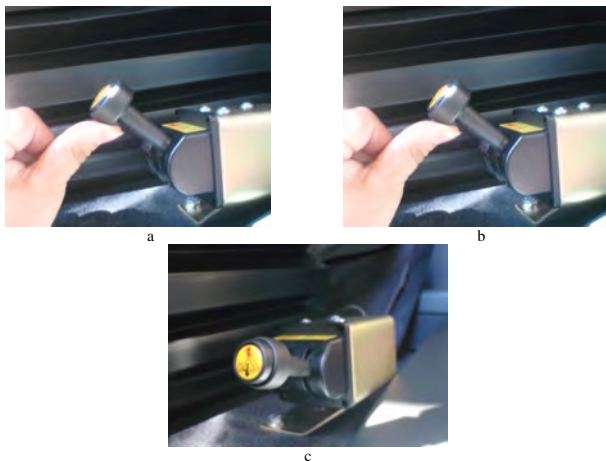


Fig. 4. Pneumatic valve which controls load bed lifting and lowering: a) load bed lifting, b) load bed lowering, c) neutral position.

3.2. Power take-off control

If the vehicle has a factory installed power take-off control, it is necessary to familiarize with the chassis operation manual.

In the event the chassis manufacturer did not equip the vehicle in power take-off control, it takes place with the use of the pneumatic switch (fig. 3 c).

In order to turn on the power take-off, it is necessary to:

1. Stop the car and engage the parking brake.
2. Push the clutch.
3. Set the gearshift in neutral position.
4. Turn on the power take-off by means of setting the pneumatic servomotor lever in “engaged” position. The control light on the controller shall turn on in order to signal the power take-off switching on.
5. Release the clutch.

The power take-off factory installed by the chassis manufacturer shall be turned on in a similar way. A switch located on the switchboard marked with the applicable symbol (fig. 5) shall be used for it.



Fig. 5. Examples of switches and symbols of power take-offs.



Attention

If the hydraulic system is not in use, the pneumatic switch shall be set in the position “disengaged”. The original switch shall be set the same.

Power take-off turning off:

1. Push the clutch.
2. Set the gearshift in the neutral position.
3. Turn off the power take-off by means of setting the controller lever in “disengaged” position.
4. Check whether the control light is switched off.
5. Release the clutch.

The power take-off factory installed by the chassis manufacturer shall be turned off in a similar way. A switch located on the switchboard marked with the applicable symbol (fig. 5) shall be used for it.



Attention

It is not allowed to drive the vehicle with the power take-off turned on due to the possibility of damaging the vehicle and the elements of the bodywork hydraulic system. Always turn off the power take-off after the tipper is not longer in operation.

3.3. Tailgate and side gates locking system

The load bed may be equipped in mechanically or pneumatically openable tailgate locks.

In case of mechanical locking, the tailgate may be unlocked automatically with the load bed lifting and closed after it is lowered down by means of tension members (fig. 6) or manually - by means of a lever located at the bed bottom (fig. 7).



Fig. 6. Examples of tensions members for opening / closing of the tailgate.



Fig. 7. The lever for opening / closing tailgate hooks; a) closed position, b) open position.

As far as mechanically opened side gates are concerned, the level located on the front wall of the load bed is most often used for the purposes of opening hooks and gate releasing (fig. 8).



Fig. 8. The lever for opening / closing the side gate hooks: a) closed position, b) open position.

Moving the lever into “open” position (fig. 8 b) may lead to opening of the load bed bottom hooks what would make it possible to tilt it while unloading.

With the pneumatically controlled locks, in order to open the tailgate it is necessary to take out the pin which secures the hooks. On the controller with the integrated load bed lifting switch, the yellow switch has to be pushed upwards to the “open” position (fig. 9). Then the pneumatic servomotor lever has to be switched to the lifting position.



Fig. 9. Opening of the gate with the use of the switch integrated with the load bed lifting controller.

The situation is similar with 3-way tippers, in which pneumatic locking of the side gates is assured. A separate controller is fixed for each side.

One has to remember that the gate will be closed properly only if the controller is switched into “closed” position when the load bed is lowered down completely. If the switch is recontrolled earlier, it will lead to quick closing of hooks and the gate will not be locked.

After the hooks are closed, it is necessary to check the accuracy of the gate locking and secure the hooks with the protective bolts.

3.4. Hydraulically opened and closed gate control.

3-way tippers of KH-Kipper company may be equipped in HYDRO-BOARD system – gates opened and closed with the use of hydraulic servomotors included in the tipper's hydraulic system. The gate's movements are controlled by means of a pneumatic control valve (fig. 10).



Fig. 10. Pneumatic control valve for the hydraulic gate: a) gate opening, b) gate closing.

In order to open the hydraulic gate, it is necessary to switch the lever of the pneumatic control valve into "open" position (fig. 10 a). After opening the gate, the valve has to be set in the neutral position. In order to close, the valve lever has to be set in the "closed" position (fig. 10 b).

Every type of bodywork equipped in the hydraulically opened and closed gate has throttle valves which are responsible for the speed of the gate opening and closing. They are located in the rear part of the vehicle on the bodywork intermediate frame (fig. 11).

In the event the gate operation slows down / accelerates while it is working or the gate stops, it is necessary to adjust the speed of its stroke by means of:

- countering of the throttle valve knob,
- turning the throttle valve knob until the desired operation speed of the gate is achieved,
- securing the knob with the counter against the repeated change of the position.

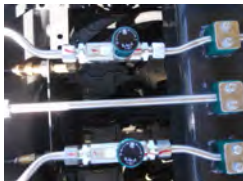


Fig. 11. Throttle valves of the hydraulic gate.



Attention

One shall check whether the gate was properly protected with locks after closing it.



Attention

It is necessary to avoid setting the throttle valve with too high value as the gate may operate very quickly what may lead to safety hazard. Improper adjustment may lead to damages to the bodywork which will not be subject to guarantee repairs.



Attention

While adjusting the valves it is necessary to remember to put the repair support.

3.5. Operation with the rear tipper

The rear tipper is a tipper which allows for unloading the goods backwards only.

The most often it is equipped in a centrally located hydraulic servomotor on the load bed front wall. Most tippers are also equipped in mechanically opened tailgate locks.

Activities to be performed while tipper unloading:

1. Stop the vehicle in the place of unloading pursuant to safety principles.
2. Turn on the power take-off (in accordance with item 3.2.).
3. In case of pneumatically opened locks before the unloading it is necessary to take out the pin which secures the side against opening and open the tailgate locks (pursuant to item 3.3.).
4. Move the pneumatic servomotor lever to “lifting” position (fig. 12, position “I”).



Fig. 12. Pneumatic valve which controls load bed lifting and lowering: "I" - load bed lifting; "0" - neutral position; "II" - load bed lowering.



Attention

It is not allowed to continue load bed lifting if the tailgate locks are not open or the vehicle starts to tilt.



Attention

It is not allowed to lock the controller lever permanently in the lifting position.



Attention

Load bed lifting shall be carried out without increasing the engine rotational speed. Lifting the load bed till the end with high engine rotational speed may lead to damaging the servomotor.

5. When the servomotor reaches the protrusion final position (the knock-off valve operates), set the controller lever in the neutral position (fig. 12, position "0").
6. Load bed lowering takes place by means of moving the controller lever in the "lowering" position (fig. 12, position "II"). After the load bed is lowered completely, it is necessary to set the controller in neutral position (fig. 12, position "0").

Load bed lifting / lowering may be stopped at any time by means of setting the controller lever in neutral position.

3.6. 2-way, 3-way tipper operation

2-way tipper is a tipper the unloading of which takes place in two directions: left - rear (most often used); right – rear; right - left (the most rarely used).

3-way tipper is a tipper which allows for unloading in three directions, backwards and sideward.

Activities to be performed while tipper unloading:

1. Stop the vehicle in the place of unloading pursuant to safety principles.
2. Before the unloading one shall make sure that both securing bolts (1 – fig. 13) are placed in the hinges on the side to which the goods shall be unloaded. For safety reasons, pins and hinges are constructed in such a way so that it was not possible to put the pins in the hinges located on the load bed diagonal, as such location may lead to damaging the bodywork.

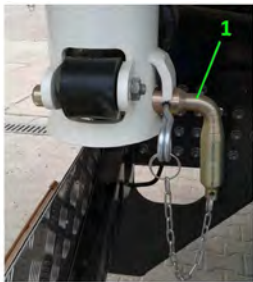


Fig. 13. Safety pin

3. Turn on the power take-off (in accordance with item 3.2.).
4. Before the unloading it is necessary to take out the pin which secures the gate against opening and open the gate locks pursuant to item 3.3. of the manual herein.
5. Move the pneumatic servomotor lever to “lifting” position (fig. 14, position “I”). The hydraulic oil will be pumped to the servomotor what will cause its protrusion.
6. When the servomotor reaches the final protrusion position (the knock-off valve operates), set the controller lever in the neutral position (fig. 14, position “0”).

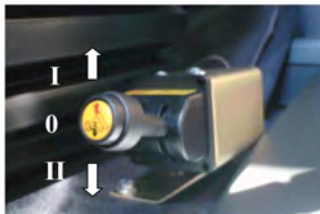


Fig. 14. Pneumatic valve which controls load bed lifting and lowering: “I” – load bed lifting; “0” – neutral position, “II” – load bed lowering”.

7. In case of a tipper with HYDROBOARD system one shall use applicable pneumatic servomotor for the purposes of opening the side gate.



Attention

Special attention shall be paid while unloading the goods to the side of the hydraulic gate so that while the load bed lifting it was opened with the maximum angle of 90 degrees (fig. 15). If the opening is wider during the unloading it may lead to damaging the bodywork and the vehicle.



Fig. 15. Hydraulic gate opened for the purposes of unloading loose materials.



Attention

Before load bed lowering one shall make sure that the hydraulic gate is not covered with the material being unloaded. If so, it is necessary to leave the unloading place slowly and clean the gate before the load bed lowering. The necessity for leaving the unloading place when the gate is covered with the goods is the only exception when a driver may move the tipper with the load bed lifted. However, he has to be extremely careful and make sure that the drive shall not cause any hazard.

8. After the unloading is completed, the load bed shall be lowered and the hydraulic gate shall be closed by means of moving the pneumatic servomotor lever to “lowering” position (fig. 14, position “II”). After closing the gate, set the controller lever in the neutral position (fig. 14, position “0”).



Attention

Before closing the hydraulic gate one shall make sure that there are no remains of the transported material on it, including especially whether there are not any on the gate hinge. If such is the case, the hydraulic gate shall be cleaned before closing. Closing the gate with the goods remains left may lead to its damage, which shall not be repaired in terms of guarantee claims.

Lifting / Lowering of the load bed may be stopped at any time by means of setting the controller lever in the neutral position.



Attention

Before the unloading always check the accuracy of location of safety pins in the hinges. It is not allowed to lift the load bed with the safety pins not protected against falling out, with one pin only or without the pins at all.



Attention

It is not allowed to continue the load bed lifting if the tailgate locks are not open or if the vehicle starts to tilt.

3.7. Operation of a tipper for light transportation of W3F type

As indicated by the name, it is light bodywork. The gates are made of steel or aluminium sections. The bodywork is intended mostly for two- or three-axis chassis. It is often present in connection with a hydraulic crane. It is mainly used for the purposes of transportation of solid packed materials - e.g. palletes, blocks, logs. It is also used for the transportation of loose materials which are unloaded by the hydraulic servomotor. However, the tipper, due to its lighter structure, will not be suitable for transportation of each type of material and in any amount. This is why the issue of uploading shall be approached to reasonably and carefully as every time the tipper is overloaded or the materials characterize with too great fraction, it may be damaged. Too much pressure on the gates may lead to their opening and safety hazard.



Fig. 16. Example of W3F type bodywork.



Attention

Due to the lighter structure of the bed loads, we would like to inform that KH-Kipper company shall not be liable on the grounds of damaging the bodyworks caused by the transportation of excessive amounts of materials. Such damages shall not be subject to guarantee repairs.

The gates of W3F type tippers may characterize with various ways of locking - structural changes are continuously being introduced, which aim at improvement of the tippers' functionality and ergonomics, this is why not all solutions applied may be discussed in the manual herein.

Opening of gates

Tipper's of W3F type have gates which may be opened both, from the bottom (for the purposes of unloading loose materials) and from the top (for the purposes of uploading / unloading of e.g. palettes and transportation of longer elements).

Opening of bottom locks takes place by means of a lever located on the tipper's front wall. Moving the lever to open position (fig. 17 b) causes unlocking of the gate bottom hooks and allows for tilting it while load bed emptying.



Fig. 17. Side gate lever: a) closed position, b) open position.

Gate closing takes place by means of moving the lever to closed position. One shall remember that the gate shall be closed after the load bed is lowered down completely.

Opening of upper locks

The lever for opening the gate upper locks is located on the front and rear post of the load bed (fig. 18). In order to release the gate locks it is necessary to pull the lever to unlock the gate. While releasing the second lock, one shall support the gate so that it did not fall. After releasing the lock, the gate has to be lowered down.

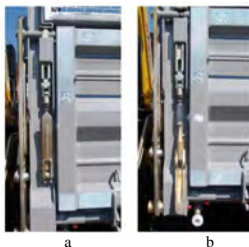


Fig. 18. Example of side gates' locks: a) closed position, b) open position.

In order to make it easier to lift and lower the side gates to the bottom, the tippers may be equipped in spring steering (fig. 19), which eliminates the gate weight during the operations.



Fig. 19. Example of the spring steering system for the side gates.



Attention

While opening the gate upper locks, it is necessary to hold the gate vertically as after opening the locks it may fall down itself. After releasing the manual locks, we lower the gate making sure it does not damage anything.

Lifting of the load bed with the gates lowered to the bottom may cause damage of the gates and vehicle elements.

Simultaneous opening of upper and bottom locks will cause the gate collapse.



Attention

In order to unload the loose materials only bottom locks have to be opened. Opening of the upper locks when the load bed is loaded with the loose material may lead to health hazard and vehicle damage.

Unloading:

1. Stop the vehicle for the purposes of unloading pursuant to safety principles.
2. Before the unloading, make sure that both safety pins are placed in the hinges on the side to which the goods shall be unloaded.
3. Take out the pin which secures the side against opening and open the tailgate locks pursuant to the manual.
4. Turn on the power take-off pursuant to item 3.2.

5. Move the pneumatic controller lever to "lifting" position (fig. 20, position "I"). The hydraulic oil will be pumped to the servomotor what shall cause its protrusion.



c

Fig. 20. Pneumatic valve which controls the load bed lifting and lowering: "I" load bed lifting; "0" – neutral position, "II" – load bed lowering.



Attention

Do not lock the controller lever permanently in the lifting position.



Attention

Lifting shall be carried out without increasing the engine rotational speed. Load bed lifting till the end with high speed may cause servomotor damage.

6. When the servomotor reaches the protrusion final position (the knock-off valve operates), set the controller lever in the neutral position (fig. 12, position "0").
7. After the end of the unloading, the load bed has to be lowered down by means of moving the controller lever in the "lowering" position (fig. 12, position "II") and gates have to be closed with the use of a lever pursuant to the manual herein.



Attention

Before the unloading always check the accuracy of location of safety pins in the hinges. It is not allowed to lift the load bed with the safety pins not protected against falling out, with one pin only or without the pins at all.



Attention

It is not allowed to continue load bed lifting if the tailgate locks are not open or the vehicle starts to tilt.

Lifting / lowering of the load bed may be stopped at any time by means of moving the controller lever to neutral position.



Attention

One has to remember that it is not allowed to drive the tipper with the load bed lifted.

3.8. Lowering of the load bed.

In order to lower the load bed it is necessary to:

1. Move the pneumatic controller lever to the lowering position (fig. 21. a)



Fig. 21. Pneumatic valve which controls the load bed lifting and lowering: a) load bed lowering, b) neutral position.

It is possible to increase the speed of the load bed lowering by means of adjusting the controller lever shift towards lowering.

2. When the load bed is completely lowered down, it is necessary to move the controller lever to neutral position (fig. 21. b).



Attention

The controller lever after lowering the load bed has to be in the neutral position in order not to make it possible for the hydraulic oil to flow completely from the servomotor to the tank. Keeping oil in the servomotor after lowering the load bed prevents from the servomotor sealing damage.

3. Close all the locks of side gates. In case of gates controlled pneumatically by means of moving the lever of the applicable controller to closed position. In case of gates controlled mechanically it shall be realized by means of an applicable lever pursuant to the manual herein.
4. Engage all the locks.

Lowering of the load bed may be stopped at any time after moving the controller lever into neutral position.

4. Technical servicing.

4.1. Servicing programme.

In order to assure adequate operation of KH-Kipper tipper and its all systems and elements, technical inspections of the equipment have to be carried out pursuant to table 1.

Table 1
Inspection plan

Description	D	W	H	Y	Remarks
Oil level	C				Fill up to the maximum*
Pneumatic lines					Check for damage and leakiness
Hydraulic lines	C				Check for damage and leakiness
Greasing points		C/G			Check the amount of grease and fill up
Servomotor	C	C/CL			Do not clean with steam
Screws and nuts		C			Check if tightened (pursuant to table 2)
Servomotor bottom brackets		G			Grease
Servomotor top brackets	(1)	G			Grease
Servomotor lug	(2)	G			Grease
Servomotor cradle	(3)	G			Grease
Servomotor ball and socket joint	(3)	G			Grease
Load bed hinges					Grease
Flap lock mechanism					Grease
Hyfix holder fastener	(4)	G			Grease
Stabilising agent top pivot	(5)	G	G		Grease
Stabilising agent middle pivot	(5)	G	G		Grease
Stabilising agent bottom pivot	(5)	G	G		Grease
Servomotor pivot	(5)	G			Grease
Oil filter	(6)	C	E		Fixed in the tank
Air filter	(6)				Fixed in the tank
Hydraulic oil	(6)		E	E	See oil list
Load bed drainage openings	(4)	C			Take out the protecting pins
Interior cleaning	(6)			CL	Do not apply steam

Key:

D – Daily

W – Weekly (50 operating hours)

H – Semi-yearly (750 operating hours)

Y – Yearly (1500 operating hours)

C – Check

G – Grease

CL – Clean

E – Exchange

(1) – Only FC servomotors

(2) – Only FE servomotors

(3) – Only 3-way tippers

(4) – Not all models

(5) – Only tippers with scissor system

(6) – Do not contaminate the environment

* – Max. level visible in the indicator

Table 2

Torques for screw connections

Connection name	Size	Torque [Nm]
Front servomotor fixing	M16 kl. 10.9	270
Tipper hinges	M16 kl. 10.9	270
Intermediate frame rigid fixing	M14 kl. 10.9	170
Intermediate frame rigid fixing	M16 kl. 10.9	270
Intermediate frame flexible fixing:		
- Renault	M14 kl. 10.9	160
- Iveco	M16 kl. 10.9	220
- Scania	M14 kl. 10.9	170
- Mercedes Benz	M14 kl. 10.9	160
- Mercedes Benz	M14 x 1.5 kl. 10.9	180
- MAN	M14 kl. 10.9	160
- MAN	M14 x 1.5 kl. 10.9	180
- Volvo	M14 kl. 10.9	180
Other screw connections applied in KH-Kipper bodyworks conform to torque values specified in PN-82/M-82054 Polish Standard.		

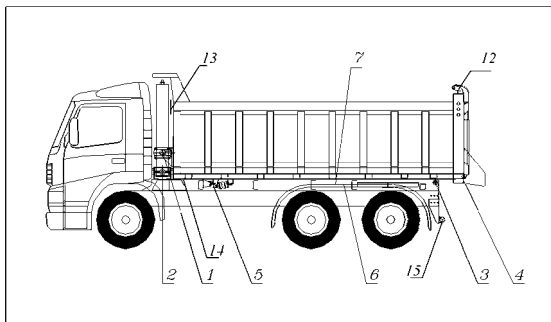
4.2. A list of greasing points.

Fig. 22. Greasing points of the rear tipper

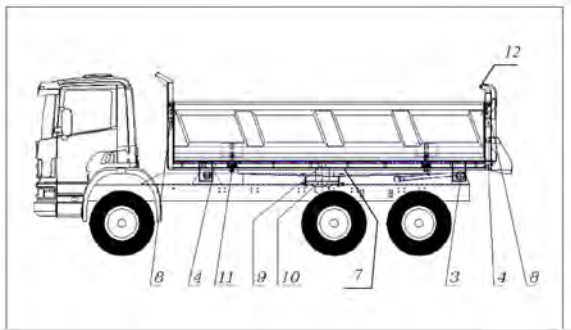


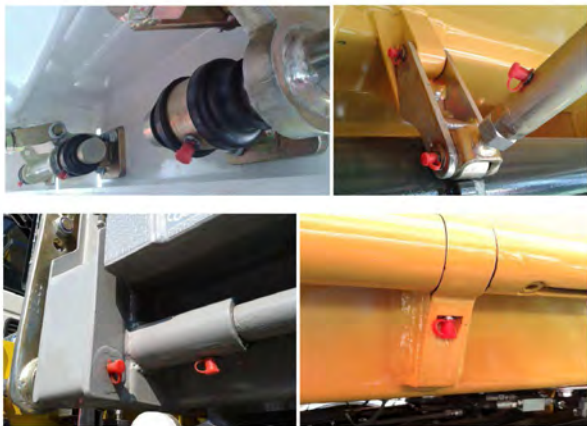
Fig. 22. Greasing points of 3-way heavy tipper of W3H type and light tipper of W3F type.

Greasing points (per fig: 22, 23):

1. Servomotor top fixing (optionally)
2. Servomotor bottom bracket (optionally)
3. Load bed hinges / Leisinger socket balls



4. Gate closing locks mechanism



5. HYFIX fastener



6. Stabilising agent



7. Repair support



8. Gate closing mechanism



9. Servomotor top lug



10. Servomotor cradle (optionally)



11. Gate closing mechanism (servomotors)



12. Tailgate upper hinges



13. Spare tyre crane



14. Spare tyre winch



15. Folding bumper



Depending on the bodywork type some of the above greasing points may not be present.

4.3. Hydraulic oils

- In order to avoid hydraulic system damage, it is recommended to apply oils of viscosity coefficient from 75 to 16 mm²/s.
- It is recommended to apply oil coolers when the oil temperature exceeds 65 Celsius degrees (applies to tippers used in hot climate).

Table 3

Hydraulic oils recommended for tippers and for tipper + car crane systems

A	B	C	D	E
15	-18°C	+5°C	+38°C	80
22	-10°C	+16°C	+48°C	100
32	0°C	+23°C	+58°C	100
46	+5°C	+30°C	+65°C	100
68	+10°C	+38°C	+65°C	100

Key:

- A - ISO VG oil class
- B - the lowest starting temperature, viscosity of 400 mm²/s
- C - oil temperature – minimum, viscosity 75 mm²/s
- D - oil temperature – maximum, viscosity 16 mm²/s
- E - viscosity coefficient

Hydraulic oil applied:.....

**Attention**

Used oils make up hazardous waste and shall be adequately managed.

Used oil, oil filters and cloths soaked with oil shall always be stored in the place specified for their collection.

It is not allowed to drain waste oils to waters or soil.

It is not allowed to mix waste oils with other hazardous wastes while their collection or storage.

The owner of wastes in the form of waste oils obtained as a result of business activity performed shall hand over the wastes to the entity which guarantees their management pursuant to binding law.

Detailed rules concerning the procedures to be taken with regard to used oils are specified by the following legal documents:

- Directive No. 75/439/EEC as of June 16th, 1975,
- Directive No. 87/101/EEC as of December 22nd, 1986,
- Directive No. 94/21/EC as of June 27th, 1994,
- The Act on wastes as of April 27th, 2001,
- The Ordinance of the Minister of Economy and Labour as of August 4th, 2004 on detailed ways of proceeding with waste oils.

4.4. Additional equipment operation

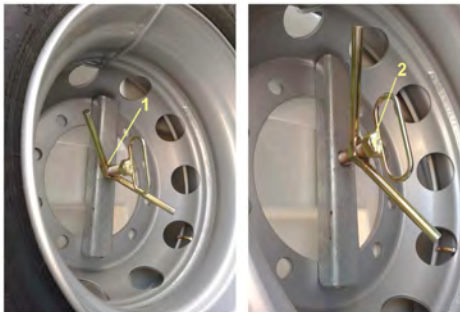
4.4.1. Spare tyre winch operation



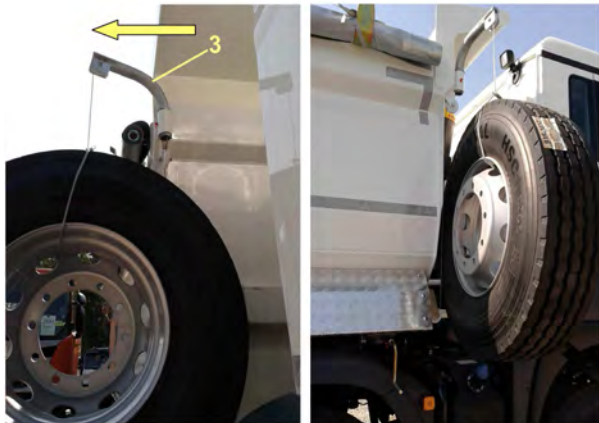
Fig. 24. Spare tyre winch

Activities to be taken while taking off the spare tyre:

1. Turn off the fixing (1) of the spare tyre and the screw (2)



2. Move the spare tyre on the crane (3) towards outside.



3. Rotate the crank (4) of the winch until the wheel is lowered down completely.



Attention

One shall use only the crank for the purposes of operating the winch. It is not allowed to use pneumatic or electric devices for operating the winch due to the possibility of damaging its mechanism.

4. Release the rope hook (5).



Attention

While lowering the wheel, one shall stay far away from the place on which the wheel is to be lowered down.

It is not allowed to stay or move under the spare tyre hanging on the rope.



Attention

If the damaged wheel cannot be put back on the fixing, the spare tyre rope shall be protected from free movement (fig. 25).



Fig. 25. Example of the way of securing the spare tyre rope.

4.4.2. Operation of tarpaulin.

Simple tarpaulin systems which cover the transported cargo are most often fixed. They are rolled up to the front wall or side gate (fig. 26).



a



b

Fig. 26. Tarpaulin: a) rolled up to the front wall, b) rolled up to the side gate.

Tarpaulin rolled up to the front wall

In order to unroll the tarpaulin, one shall access the load bed by means of the ladder located on the front wall (fig. 27).



Fig. 27. The ladder on the front wall.

After getting on the load bed, it is necessary to pull the tarpaulin at the same time unrolling it to the rear part of the vehicle.

After it is unrolled, get off the bodywork and secure the tarpaulin by means of a flexible rope using the hooks placed on the side gates and on the tailgate (fig. 28).



Fig. 28. Tarpaulin laid down in a correct manner.

The tarpaulin is rolled up after unfastening the protective rope and rolling it up with the help of a crank to the fixing located on the front wall.

Tarpaulin rolled up to the side

In order to lay down the tarpaulin, one shall enter the bodywork rear chute using the ladder located at the back of the load bed (fig. 29) and holders and steps on the bodywork.



Fig. 29. Rear ladder

By means of the crank located at the end of tarpaulin (fig. 30) it can be laid down until the whole load bed is covered. At the back of the load bed, the tarpaulin strip is rolled on the tailgate and at the front on the pipe located on the front wall.



Fig. 30. Tarpaulin crank to the side

After laying down, the tarpaulin is protected by means of a flexible rope using hooks located on the tailgate and side gates (fig. 31).



Fig. 31. Tarpaulin laid down in a correct manner

The tarpaulin is rolled up by means of releasing the flexible roper and rolling up the tarpaulin on the transportation holders located on the side gate. Manual or automatic tarpaulin systems are rarely used. Their advantage is the possibility of using thereof from the base or directly from the driver's cabin. Automatic tarpaulin system used by KH-Kipper company (fig. 32) makes it possible to cover the cargo with the use of the crank located in front of the bodywork or with the use of an electric engine steered via a remote control. The system, after rolling up is located under the front roof and after unrolling covers the load bed completely.



Fig. 32. Automatic tarpaulin system

4.4.3. Side barriers

KH-Kipper bodyworks are equipped in side collision protection barriers (fig. 33), which have the ability of lifting in order to make access to the vehicle equipment, e.g. a spare tyre, a battery, easier.



Fig. 33. Collision protection barriers

In order to lift the barriers and get easier access to the vehicle elements it is necessary to release the pins and lift the barrier upwards. In order to secure it against falling down, it is also necessary to secure them with a pin in top position. One of the openings located on the support leg is used for it to assure the desired barrier tilt angle (fig. 34).





Fig. 34. Lifting of collision protection barrier

After the completion of works the barriers have to be folded again by means of releasing the safety pins, lowering the barriers down to vertical position and securing them with pins.

4.4.4. Folding bumper

KH-Kipper tippers may be equipped in folding rear bumpers. It is used for example while working with a tipper with an asphalt finisher. In such a situation, the bumper lowered down would collide with the asphalt finisher table and it would not be possible to supply asphalt from the tipper onto its loading table. In the driving position, the bumper has to be lowered down (fig. 35).



Fig. 35. Folding bumper in lowered position

In order to lift the bumper it is necessary to:

- release the two safety pins on the arms by means of pulling the lever in order to lock thereof in horizontal position,



- lift the bumper beam upwards and secure it in the position using the pins,



In order to again lower the bumper to driving position, the safety pins have to be released.



After lowering the bumper down, it has to be secured with the use of pins (pin levers in vertical positions).



One has to make sure that the pins are properly secured so that the bumper did not move while driving.



Attention

While moving the bumper's beam stay cautious so that its automatic movement did not cause the servicing person's injury.

4.4.5. Exhaust gas heating system

KH-Kipper tippers may be equipped in exhaust gas floor heating system. It is possible due to the application of exhaust gases distribution valve (fig. 36) which allows for directing the exhaust gases to the vehicle exhaust system or to hollow passages in the load bed floor.



Fig. 36. Exhaust gases distribution valve

The exhaust gases which go through the hollow passages of the load bed heat it. It prevents from freezing of the transported cargo to the load bed at low temperatures and helps to maintain high temperatures of the cargo which cannot be cooled down - for example hot asphalt.

After unloading, the valve lever has to be resteeered in such a way so that the exhaust gases were passing through the vehicle exhaust system.



Attention

Touching of exhaust system elements may lead to burning.

Due to temperature deviations present while using the exhaust gas heating system inside the load bed structural sections, it is natural to find water there. In order not to allow for excessive collection of water in the sections and as a result to their damage caused, e.g. by corrosion, they are equipped in drainage openings (fig. 36) through which collected water may freely flow.

It is necessary to regularly drain the sections pursuant to the inspection plan (table 1). In order to allow for water flowing out through drainage openings, safety pins have to be taken out.

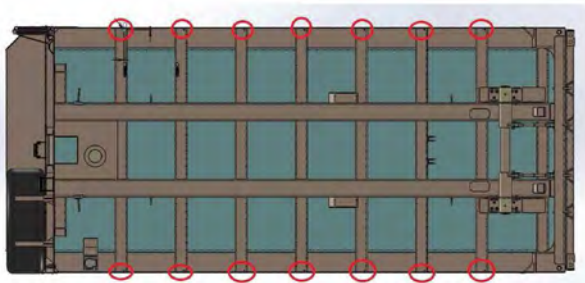


Fig. 37. Example of distribution of drainage openings.

4.4.6. HYFIX lock

KH-Kipper tippers are equipped in the load bed HYFIX lock. It stabilizes the empty load bed and does not allow for its moving while driving in accidental terrain. It prevents from formation of sub-pressure in the hydraulic servomotor which protects it against damages.



Fig. 38. Hyfix lock – example of fixing.

Lock adjustment involves screwing it with the use of a locknut. properly adjusted lock has a nut screwed for about 30 mm (for 3-axis vehicles) or 40 mm (for 4-axis vehicles) from the beginning of the screw - size "a" on fig. 38.



Attention

One has to be careful not to close the lock when the load bed is lifted. The load bed falling on the closed lock may cause its mechanical damage and also damage of the lock lung located on the load bed. This type of damage is not subject to guarantee repairs.

5. Exchange system.

5.1. Work safety

1. The device may be serviced by the driver holding applicable driving license, being trained in the device operation with special regard to safety.
2. The device shall be maintained in perfect technical condition.
3. The device shall be used only for the purposes which it was designed for.
4. It is not allowed to replace the exchangeable chassis with load.
5. It is not allowed to make mechanical, hydraulic or pneumatic connections with the vehicle engine operating.
6. It is not allowed to carry out works under the disassembled chassis.
7. Remain extremely cautious while disconnecting and connecting hydraulic or pneumatic lines.

5.2. Hydraulic exchangeable system

The application of exchangeable system allows for using the chassis with various bodyworks, e.g.: a tipper, a concrete mixer or other. The exchangeable system is assembled on the chassis and it is composed of an indirect frame and a hydraulic system (hydraulic system diagram – item 7.3.).

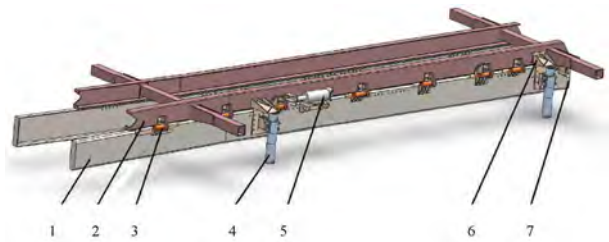


Fig. 39. Exchangeable hydraulic system

Main parts of the system (per fig. 39):

- chassis frame – 1
- bodywork auxiliary frame – 2
- pins and locking bushings – 3
- lifting / lowering servomotors – 4
- shift servomotors – 5
- lifting / lowering brackets – 6
- safety pins – 7

The exchangeable bodywork has an auxiliary frame with the elements which allow for its reposition, lifting / lowering, locking on the chassis.



Fig. 40. Tipper load bed on side brackets.



Fig. 41. Bodywork auxiliary frame bushings for locking on the chassis.

5.2.1. Assembly on the chassis.

1. The bodywork is placed on the side brackets on hardened horizontal pavement.
2. Drive the chassis under the bodywork so that the lifting / lowering servomotors (fig. 42) were located under the bodywork brackets.



Fig. 42. Lifting / lowering servomotor.

3. Stop the vehicle, engage the parking brake, start the power take-off.
4. With the help of the manual lever (description on the valve) of the hydraulic control valve (fig. 43) slid off the lifting / lowering servomotors and lift the bodywork.

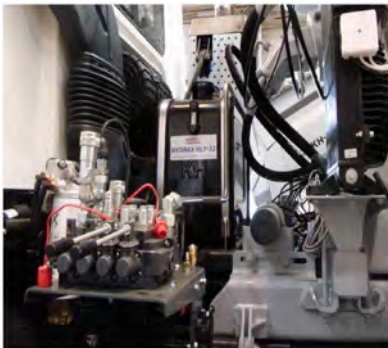


Fig. 43. Control valve



Fig. 44. Bodywork on servomotors

5. Take off the safety pins and disassemble the side brackets.
6. Move the manual lever of the control valve to lowering position and lower the bodywork on the chassis.
7. With the use of the manual lever of the control valve (fig. 43) start the shift servomotor (fig. 45) and move the bodywork to the front part of the vehicle.



Fig. 45. Shift servomotor

8. Lock the bodywork in the position with the use of pins on the back of the vehicle and secure the pins with locknuts (fig. 46).



Fig. 46. Pin and bushing before locking



Fig. 47. Safety pin with a cotter pin. Locked bodywork.

9. Turn off the power take-off, stop the engine.
10. Make all the mechanical (e.g. concrete mixer drive shaft, engine rotation control), hydraulic (tipper hydraulic installation), pneumatic (control valves) and electrical connections between the chassis and bodywork.
11. Check the operation of the bodywork pursuant to the vehicle operation manual.

5.2.2. Disassembly

1. Stop the vehicle on the hardened horizontal pavement in the place where the bodywork is stored.
2. Stop the engine, disengage the parking brake.
3. Disassemble all the mechanical (e.g. concrete mixer drive shaft, engine rotation control), hydraulic (tipper hydraulic installation), pneumatic (control valves) and electrical connections between the chassis and bodywork. Place the disconnected bodywork lines in the parking sockets (Fig. 10).

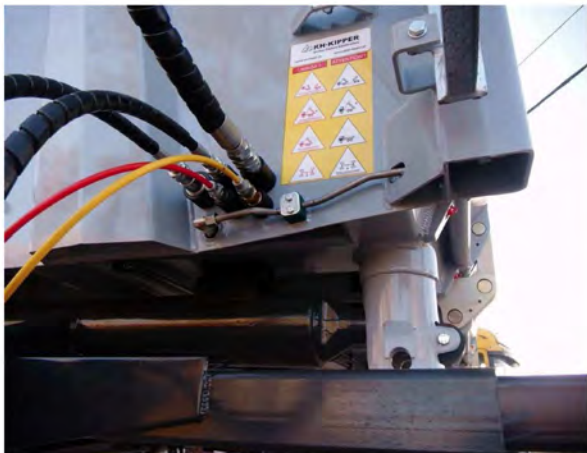


Fig. 48. Parking sockets for disconnected hydraulic and pneumatic lines of the bodywork

4. Take out the pins which secure the bodywork in the locked position (fig. 47).
5. Start the engine; turn on the power take-off.
6. With the use of the control valve manual lever start the shift servomotor and move the bodywork to the back of the vehicle, check whether the bodywork brackets are above the lifting / lowering servomotors.
7. With the use of the hydraulic control valve manual lever slid off the servomotors and lift the bodywork.
8. Assemble the side brackets to (fig. 40) and secure them with pins.
9. Lower the bodywork on the brackets, slid off the lifting / lowering servomotors completely.
10. Turn off the power take-off; drive the chassis from under the bodywork.
11. Secure the bodywork locking bushings with **LOTOS ET-43** grease or its equivalent.
12. Secure the sockets and plugs of disconnected electrical lines.

5.2.3. Servicing

- Everyday before starting work, it is necessary to visually check the technical condition of the bodywork fixing elements as well as hydraulic system tightness.
- In the event the elements are damaged, stop the operation of the exchangeable bodywork and proceed with repairs.
- Greasing of bushings and locking and safety pins shall be carried out with each change of the exchangeable bodywork with the use of **LOTOS LT-43** grease or its equivalent.

5.3. Mechanical exchangeable system

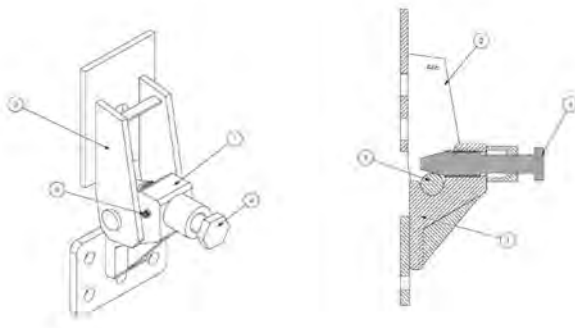


Fig. 49. Mechanical lock of the exchangeable system

The elements of the mechanical lock (per fig. 49):

- lock body – 1
- exchangeable bodywork holder – 2
- bodywork holder pin – 3
- lock screw – 4
- grease fitting -5

5.3.1. Assembly on chassis

1. Stop the vehicle on the horizontal surface and protect it against moving.
2. The exchangeable bodywork shall be lifted with the use of a crane device of sufficient load capacity.



Attention

It is necessary to observe crane device operation and safety manual.



Attention

The bodywork has to be lifted with the elements intended for it.

3. The bodywork shall be placed on the vehicle frame so that all pins (fig. 49 – 3) of the holder were located within the lock bodies (fig. 49 – 1).
4. Then, tighten the lock screws (fig. 49 – 4) with the torque of **300 Nm**.
5. Set the brackets into the driving position.
6. Make all electrical, hydraulic and pneumatic connections between the bodywork and the vehicle.
7. Connect the drives.

The disassembly shall be carried out in reverse sequence. Set and lock the brackets. Place the bodywork on hardened horizontal surface.

5.3.2. Servicing

- Everyday before starting work, it is necessary to visually check the technical condition of the lock elements as well as torques of the lock screws.
- Greasing shall be carried out with each change of the exchangeable bodywork with the use of **LOTOS LT-43** grease or its equivalent.
- In the event the lock elements are damaged, the exchangeable bodywork operation shall be stopped and repairs shall be carried out.

6. Causes of faults and their removal.

DETECTION AND DIAGNOSTICS OF FAULTS (FOR THE WHOLE SYSTEM)

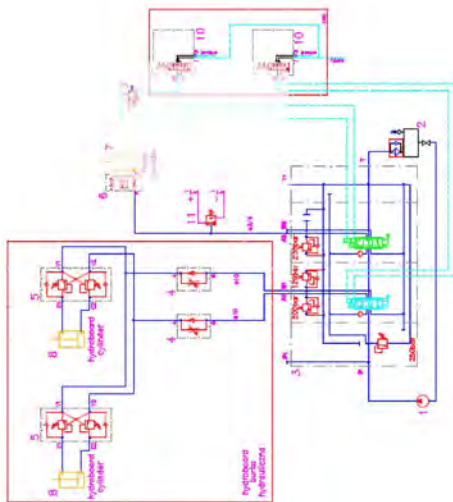
PROBLEM	MOŻLIWE PRZY- CZYNY	USUWANIE / KONTROLA
The servomotor does not slid off when the pneumatic controller is in the lifting position	<ol style="list-style-type: none"> 1. Power take-off is not turned on. 2. The pump does not supply oil. 3. No oil in the tank. 4. Closed cock which stops the oil from the tank 5. Too low air pressure 6. Servomotor connected with the wrong output of the isolation valve 	<ol style="list-style-type: none"> 1. Move the controller in the cabin to "engaged" "I" position. 2. Disconnect the hose by the valve which insulates P connection and check whether the oil flows 3. Fill in the oil tank 4. Open the stopcock 5. Check the air pressure 6. Connect the servomotor to output „C”
The servomotor lifts when the pneumatic controller is switched to position 2	Air lines are connected to the valve the other way round	Connect pursuant to the manual.
Proper air flow but the tipper servomotor valve is not operating	<ol style="list-style-type: none"> 1. Pneumatic controller fault 2. Bent or narrowed air line 	<ol style="list-style-type: none"> 1. Disconnect all the pneumatic lines with the exception of supply and outlet line. Check whether the air flows through the applicable inlet when the controller is set in the proper position. Replace the valve if faulty. 2. Check whether the lines do not have any sharp bends. Disconnect two air lines and check the air flow with proper air controller settings. If the air does not flow from the air lines' ends, the lines have to be replaced.
The servomotor lifts but does not fall or falls too slowly.	<ol style="list-style-type: none"> 1. The screw which adjusts the lowering speed is screwed in completely. 2. Automatic switching off valve operates incorrectly. 3. Damaged air controller. 4. Locked return filter. 5. Too high density of the oil used. 	<ol style="list-style-type: none"> 1. Turn the screw in anti-clockwise direction. 2. Look for the chapter on the switch valves in a separate manual. 3. Check the air flow in the lowering position. 4. Replace the filter. 5. Replace the oil with the proper one.

The servomotor falls when the clutch is engaged.	In the "P" inlet no return valve is assembled.	Contact with the supplier. Each valve has the element factory assembled in the supplied device.
Air flow is sufficient but the valve does not operate.	Internal leakage in the servomotor valve.	Place the air controller in the lowering position "2". Take out the pipe from the valve inlet "TIP". If the air gets in through the inlet, it means that the tank sealing ring is faulty.
The valve operates properly but suddenly stops.	1. Cracked air line. 2. Moveable mandrel locked by dirt. 3. Damaged valve of the automatic switch.	1. Replace the sealing ring. Check the air lines and replace them, if necessary. 2. Clean the hydraulic system. Clean the oil tank. Replace the servomotor valve, if necessary. 3. Check the valve of the automatic switch.
The servomotor jerks while lifting.	Air in the oil supplied.	Vent the pump by means of opening the pressure hose couplings a little.
The servomotor lifts very slowly.	Damaged pump. Too low air pressure.	Replace the pump. Check the air pressure, controller, lines and servomotor valve as previously.
The servomotor does not lift completely.	The overflow valve opens pushing the oil back to the tank. It is caused by too great load or by placing it too far in front of the tipper.	Find pressure at which the overflow valve opens by means of connecting the pressure gauge to the applicable inlet. The proper, recommended pressure value is given on the work type plate and pressure insert. If the pressure is not reached, contact the supplier. Fill up the oil in the tank.
The tipper load bed lowers down too quickly.	The lowering speed regulator screwed in completely.	Lift the servomotor for some height. Set the controller in the cabin in neutral "0" position. Screw the regulator until the moment the load bed falls with the proper speed.
The valve controller shaft does not move despite the proper air pressure.	The regulator's shaft locks or is disengaged.	Loosen 3 setting screws, by means of turning them with 1/2 rotation and try to turn on the valve again. The torque for the screws shall not exceed 15 Nm.
The servomotor does not lift smoothly.	Air in the system. The pump operates irregularly.	Vent the system; check the oil level in the tank. Replace the pump.

7. Hydraulic diagrams and a list of spare parts

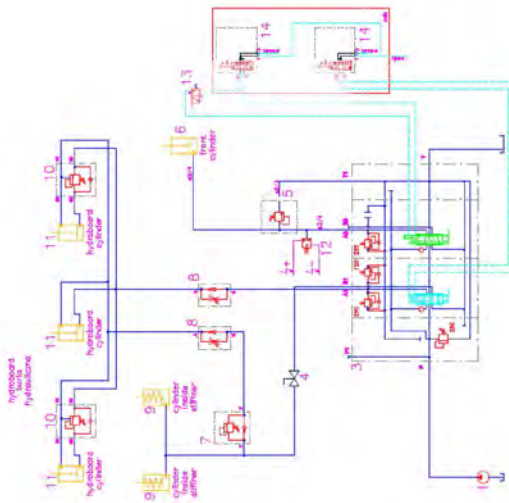
7.1. Hydraulic diagram of a rear tipper with optional hydraulic tailgate and a list of spare parts.

11	Pressure switch 148 80 790 DS HYVA
10	Pneumatic controller 147 50 667 H HYVA
9	Pneumatic knock-off valve
8	Side gate servomotor
7	Servomotor
6	Safety valve
5	VBCD safety valve
4	VRFU 90 3/8" throttle and return valve HYDROKRAK
3	2-section main valve pneumatically and manually controlled
2	Tank
1	Pump
Part no.	Parts name



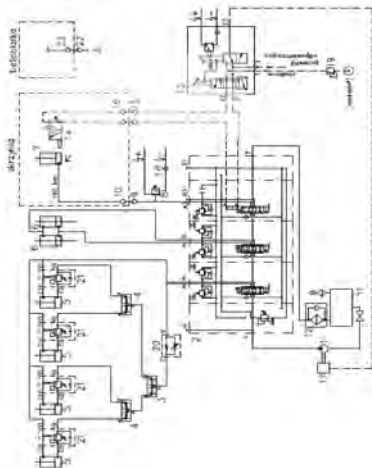
7.2. Hydraulic diagram of a 3-way tipper with optional hydraulic tailgate and a list of spare parts.

14	Pneumatic controller 147 50 667 H Hyva
13	Pneumatic knock-off valve
12	Pressure sensor 148 80 790 DS HYVA
11	Hydraulic gate servomotor
10	VBCD 3/8" SE-A HYDROKRAH safety valve
9	Stiffner's servomotor
8	VRFU 90 3/8" throttle and return valve HYDROKRAK
7	VS2C 3/8" HYDROKRAK sequence valve
6	Underfloor servomotor
5	VMP 3/4" HYDROKRAK safety valve
4	Manual valve
3	2-section or 3-section main valve pneumatically and manually controlled
2	
1	Pump
Part no.	Parts name



7.3. Hydraulic diagram of a bodywork with hydraulic exchangeable system

23	Connection terminal DN 7.2 G 3/8"
22	Quick-coupling DN 7.2 G 3/8"
21	Overflow and locking valve VBCD 3/8" SE-A
20	Throttle and return valve VRFU 90 3/8"
19	Flow valve 314 014 013 Holdex
18	Control light 019 64 000 H
17	PTO
16	Connection terminal DN 5 G 1/4"
15	Quick-coupling DN 5 G 1/4"
14	Pneumatic knock-off valve with the assembly plate 147 53 155
13	2-section pneumatic controller 147 50 646 H
12	Return filter
11	Oil tank
10	Quick-coupling 3/4" ISO 7241-1-A female part with a plug
9	Quick-coupling 3/4" ISO 7241-1-A male part with a plug
8	Pressure switch 148 80 790 DS with a cover 148 80 791
7	Hydraulic servomotor
6	Hydraulic servomotor
5	Hydraulic servomotor
4	Flow separator - EQ20
3	Flow separator - EQ20
2	3-section main valve pneumatically and manually controlled
1	Hydraulic pump
Part no.	Part name



EXAMPLE
EC DECLARATION OF CONFORMITY II A
WITH MACHINE DIRECTIVE 2006/42/EC

On behalf of *KH-Kipper Sp. z o.o., Kajetanów 130, 26-050 Zagnańsk – POLAND*, I herein declare that the product described below:

Bodywork:.....
Type:.....
Bodywork number:.....

assembled on the chassis:

Brand:.....
Type:.....
VIN:.....

was produced and/or assembled by us and meets all the requirements included in the Machine Directive 2006/42/EC published in the Official Journal of the European Union 157 as of June 9th, 2006 implemented on the power of the Ordinance of the Minister of Economy as of October 21st, 2008 (Journal of Laws 199 item 1228).

Person responsible for the preparation of technical documentation:

Name, Surname.....
Address:.....
Zip code / City:
Country:

The person responsible for the preparation of EC Declaration of conformity of the device:

Name, Surname.....
Position:
Address:.....
Zip code / City:

Standards related:

- PN – EN ISO 12100:2012 Safety of machinery - General principles for design - Risk assessment and risk reduction.
- PN – EN ISO 4413:2011 Hydraulic Drives and Controls - General rules and safety requirements for the systems and their components.
- PN – EN ISO 4414:2011 Pneumatic Drives and control - General rules and safety requirements for the systems and their components.

Declaration no.

XXXXXXXXXXXX

Kajetanów

.....
(date)

Issuing authority:

.....
(name, surname)

Date

KH-Kipper Sp. z o.o.
Kajetanów 130
26-050 Zagańsk
Tel.: 41 30 11 568, 9
Fax: 41 301 13 03

COMPLAINT FILLING FORM

Party lodging the complaint:

Company name

.....

Company address

.....

Company address / Contact

Type of bodywork:

Chassis brand:

Chassis VIN no.:

Bodywork factory no. (from the name plate):

Damage description:

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....
Reporting entity

Date

KH-Kipper Sp. z o.o.
Kajetanów 130
26-050 Zagańsk
Tel.: 41 30 11 568, 9
Fax: 41 301 13 03

COMPLAINT FILLING FORM

Party lodging the complaint:

Company name

.....

Company address

.....

Company address / Contact

Type of bodywork:

Chassis brand:

Chassis VIN no.:

Bodywork factory no. (from the name plate):

Damage description:

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Reporting entity

Date

KH-Kipper Sp. z o.o.
Kajetanów 130
26-050 Zagańsk
Tel.: 41 30 11 568, 9
Fax: 41 301 13 03

COMPLAINT FILLING FORM

Party lodging the complaint:

Company name

.....

Company address

.....

Company address / Contact

Type of bodywork:

Chassis brand:

Chassis VIN no.:

Bodywork factory no. (from the name plate):

Damage description:

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Reporting entity

Customer satisfaction survey

We kindly ask to fill in the survey below which shall be used for the purposes of determining the level of satisfaction of our Customers. It aims at collecting remarks and opinions concerning cooperation and the results obtained shall contribute to improving quality of services of KH-Kipper company.

- 1. Are you satisfied with the cooperation with KH-KIPPER company?**
 - Yes
 - Rather yes
 - It's hard to say
 - Rather no
 - No
- 2. How do you assess the level of customer's satisfaction (politeness, interest, solving problems)?**
 - Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 3. How do you assess the time of reaction to inquiries and orders?**
 - Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 4. How do you assess the quality of our products?**
 - Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 5. How do you assess the functionality of products, easiness of use, comfort?**
 - Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 6. How do you assess the professionalism of information given to you and technical consulting?**
 - Very well
 - Well
 - Indifferent
 - Poor
 - Bad

- 7. How do you assess the cooperation with KH-KIPPER company in comparison to other companies which deliver such products?**
- Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 8. How do you assess the availability of information about products?**
- Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 9. Please specify the source of information about our offer:**
- Advertisements in newspapers and articles
 - Websites
 - Catalogues and price lists
 - Entries in the fair catalogues or branch reports
 - Offers received via mail or electronic mail
 - Telephone contacts with the employee of KH-KIPPER company
 - Direct contact
 - Other:
- 10. What are the chances that your company will keep on cooperating with KH-KIPPER?**
- Very high
 - High
 - It's hard to say
 - Low
 - Very low
- 11. What opinion about KH-KIPPER company would you give to your acquaintances / contractors?**
- Very well
 - Well
 - I do not have any opinion on that
 - Bad
 - Very bad
- 12. What new products shall be introduced in the offer to make it full and more complex? What can we improve?**

Customer satisfaction survey

We kindly ask to fill in the survey below which shall be used for the purposes of determining the level of satisfaction of our Customers. It aims at collecting remarks and opinions concerning cooperation and the results obtained shall contribute to improving quality of services of KH-Kipper company.

13. Are you satisfied with the cooperation with KH-KIPPER company?

- Yes
- Rather yes
- It's hard to say
- Rather no
- No

14. How do you assess the level of customer's satisfaction (politeness, interest, solving problems)?

- Very well
- Well
- Indifferent
- Poor
- Bad

15. How do you assess the time of reaction to inquiries and orders?

- Very well
- Well
- Indifferent
- Poor
- Bad

16. How do you assess the quality of our products?

- Very well
- Well
- Indifferent
- Poor
- Bad

17. How do you assess the functionality of products, easiness of use, comfort?

- Very well
- Well
- Indifferent
- Poor
- Bad

18. How do you assess the professionalism of information given to you and technical consulting?

- Very well
- Well
- Indifferent
- Poor

- Bad
- 19. How do you assess the cooperation with KH-KIPPER company in comparison to other companies which deliver such products?**
- Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 20. How do you assess the availability of information about products?**
- Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 21. Please specify the source of information about our offer:**
- Advertisements in newspapers and articles
 - Websites
 - Catalogues and price lists
 - Entries in the fair catalogues or branch reports
 - Offers received via mail or electronic mail
 - Telephone contacts with the employee of KH-KIPPER company
 - Direct contact
 - Other:
- 22. What are the chances that your company will keep on cooperating with KH-KIPPER?**
- Very high
 - High
 - It's hard to say
 - Low
 - Very low
- 23. What opinion about KH-KIPPER company would you give to your acquaintances / contractors?**
- Very well
 - Well
 - I do not have any opinion on that
 - Bad
 - Very bad
- 24. What new products shall be introduced in the offer to make it full and more complex? What can we improve?**

Customer satisfaction survey

We kindly ask to fill in the survey below which shall be used for the purposes of determining the level of satisfaction of our Customers. It aims at collecting remarks and opinions concerning cooperation and the results obtained shall contribute to improving quality of services of KH-Kipper company.

25. Are you satisfied with the cooperation with KH-KIPPER company?

- Yes
- Rather yes
- It's hard to say
- Rather no
- No

26. How do you assess the level of customer's satisfaction (politeness, interest, solving problems)?

- Very well
- Well
- Indifferent
- Poor
- Bad

27. How do you assess the time of reaction to inquiries and orders?

- Very well
- Well
- Indifferent
- Poor
- Bad

28. How do you assess the quality of our products?

- Very well
- Well
- Indifferent
- Poor
- Bad

29. How do you assess the functionality of products, easiness of use, comfort?

- Very well
- Well
- Indifferent
- Poor
- Bad

30. How do you assess the professionalism of information given to you and technical consulting?

- Very well
- Well
- Indifferent
- Poor

- Bad
- 31. How do you assess the cooperation with KH-KIPPER company in comparison to other companies which deliver such products?**
- Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 32. How do you assess the availability of information about products?**
- Very well
 - Well
 - Indifferent
 - Poor
 - Bad
- 33. Please specify the source of information about our offer:**
- Advertisements in newspapers and articles
 - Websites
 - Catalogues and price lists
 - Entries in the fair catalogues or branch reports
 - Offers received via mail or electronic mail
 - Telephone contacts with the employee of KH-KIPPER company
 - Direct contact
 - Other:
- 34. What are the chances that your company will keep on cooperating with KH-KIPPER?**
- Very high
 - High
 - It's hard to say
 - Low
 - Very low
- 35. What opinion about KH-KIPPER company would you give to your acquaintances / contractors?**
- Very well
 - Well
 - I do not have any opinion on that
 - Bad
 - Very bad
- 36. What new products shall be introduced in the offer to make it full and more complex? What can we improve?**

