T930 FARMING TRAILER

OPERATING MANUAL

EDITION I, 2015 EN

METAL-FACH
16-100 SOKÓŁKA, ul. KRESOWA 62

IMPORTANT!

The latest Operating Manuals and Parts Catalogues are available on our website:
http://www.metalfach.com.pl/en/materialy-do-pobrania.html

TRAILER DATA:

Vehicle type:		Mono-axial farming truck trailer
Commercial designation:		Wheelbarrow
Type designation:		T930
Trailer identification number[1/]:		.....
Trailer manufacturer:		"METAL-FACH" Sp. z o.o. 16-100 Sokółka, Poland ul. Kresowa 62 Tel. +48 85 711 98 40 Fax: +48 85 711 90 65
Sold by:	Address:	....
	Tel./Fax:	....
Date of delivery:		.....
Owner/User:	Full name:	.....
	Address:	....
	Tel./Fax:	....

HINT

Hint: Please note down the tipper truck type and serial number – it will be required for contact with your authorised dealership.

[1/] The data is found on the trailer nameplate located on the trailer right frame side member.

CE DECLARATION OF CONFORMITY

FOR THE MACHINE

METAL-FACH Sp. z o.o.
ul. Kresowa 62
16-100 SOKÓŁKA
acting as the Manufacturer

declares under sole responsibility that the following machine:

FARMING TRUCK TRAILER
type/model: T930 .....
serial number: .....
year of manufacture: .....

to which this declaration applies, meets the following requirements:
- Directive 2006/42/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL dated 17 May 2006 on machines and the **Resolution of the Minister of Economy** of 21 October 2008 concerning general requirements for machinery (Journal of Laws No. 199, item 1228);
The following harmonised standards were used for compliance evaluation:

PN-EN 1853+A1:2009E	PN-EN ISO 13857:2010P
PN-EN ISO 4254-1:2009E	PN-EN ISO 12100:2012P

- and the following standards: PN-ISO 3600:1998, PN-ISO 11684:1998; and the Resolution of the Ministry of Infrastructure of 31 December 2002 on technical requirements for vehicles and the scope of their necessary equipment (Journal of Laws 2003 no. 32 item 262 as amended).

Safety Test Report no.:

Unit responsible for engineering documentation: Metal-Fach Engineering Department

This Declaration of Conformity becomes null and void if the machine is changed or modified in any manner without prior consent from the Manufacturer.

Sokółka

Chairman of the Management Board
Jacek Marek Kucharewicz

NAMEPLATE

In all correspondence, questions, and warranty issues, please state the type and identification number of the trailer.

METAL -FACH Sp. z o.o.
ul.Kresowa 62 Sokółka,Poland
tel.:+48 (085)711 98 40-45,fax:+48 (85) 711 90 65

Typ/Wariant	T930	Masa własna	1900	kg
Data prod.	2013	Nacisk na zaczep	20	kN
Nr fabr.		KJ		
Nr świadectwa homologacji	☒			
Dopuszczalna masa całkowita			7900	kg
Dopuszczalne obciążenie osi			59	kN

The identification data is found on the trailer nameplate located on the hitch beam. The serial number is stamped on the nameplate and underneath it.

THE MANUAL IS A PART OF THE TRAILER'S ESSENTIAL EQUIPMENT.

! It is forbidden to drive the trailer on public roads or operate the trailer without its nameplate or with an illegible nameplate.

TABLE OF CONTENTS

1. INTRODUCTION

These Operating Manual is intended to provide the product user with information concerning operation, servicing and maintenance of the machine. It contains operating performance data and the requirements for safe and professional operation of the machine which enable the best use of the product with the maximum operating life and reliability. It also contains information about ordering spare parts.
Thorough understanding of the Operating Manual will help the user avoid accidents, operate the machine efficiently and keep the warranty valid until the end of the warranty period.
Unauthorised modification of the trailer design will release the manufacturer from liability for resulting damage and losses.
METAL-FACH Sp. z o.o. reserves the right to introduce changes without prior notice and without assuming any obligations resulting from those changes.

ALL OPERATORS OF THIS AGRICULTURAL TRAILER MUST UNDERSTAND THE CONTENTS OF THE OPERATING INSTRUCTIONS BEFORE COMMENCING WORK. THE MANUAL IS A PART OF THE T930 FARMING TRAILER'S ESSENTIAL EQUIPMENT.

This is intended to follow the correct operation method for the trailer, its safety of use and maximum operating life. This is also the condition which ensures that your warranty rights are maintained.

1.1. INTENDED USE

The trailer is intended for transport of crops and other bulk or loose materials within a farm and on public roads. The trailer is unloaded manually or by tipping the load body to the rear. The trailer is designed for coupling with farming tractors equipped with an external power hydraulic system, an outlet for the electrical lighting and warning systems and the braking system as well as a transport hitch.

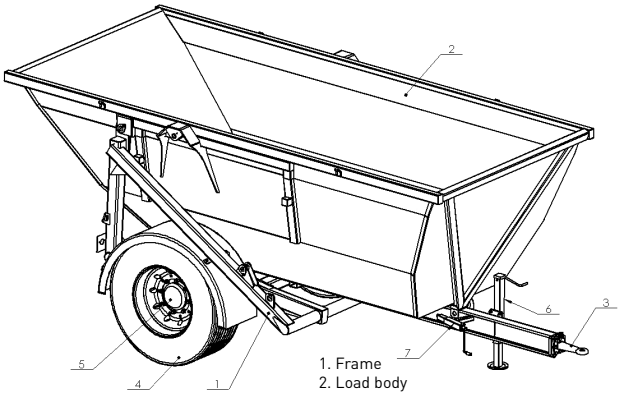
- Do not use this trailer to carry fuel, gas cylinders and similar loads due to the additional technical requirements applicable to transport of hazardous materials.
- Any use other than indicated above is unintended use. Do not use the trailer to transport: fuel, gas cylinders, or toxic materials that may cause environmental pollution. The manufacturer shall not be liable for any resulting damage as it is solely incurred by the owner.
- Intended use also includes compliance with the operating, servicing and maintenance requirements established by the manufacturer.
- The trailer shall only be used by persons who have understood the operating manual and who have been trained in hazards and first aid for accident victims.
- Follow all applicable laws for accident prevention and any other recognised rules of engineering safety, occupational health and road traffic safety.
- The manufacturer shall not be liable for damage resulting from any unauthorised modifications of this trailer's design.

1.2. EQUIPMENT

The essential equipment of each trailer includes:
- operating manual;
- warranty card with warranty conditions;
- safety support;
- two-line brake control system.

Upon customer's request the manufacturer can supply the trailer with the following optional accessories (available at extra charge): a slow-moving vehicle sign, and a single-line brake control system.

1.3. TRAILER DESIGN



1. Frame
2. Load body
3. Hitch
4. Road wheels
5. Axle
6. Support foot
7. Parking brake pull

2. GENERAL SAFETY RULES

2.1. SYMBOLS AND NOMENCLATURE

IMPORTANT!	Failure to comply with these guidelines may result in damage of equipment or its components.
WARNING!	This warning sign in the Operating Manual means that special caution shall be exercised due to hazards to persons and potential damage to the product.
ATTENTION!	It is important to carefully follow these notes or guidelines.

The "Qualified Persons" are persons who perform the required tasks by always using their education, experience and training, as well as their understanding of standards, definitions, accident prevention regulations and operating conditions; hence they are also capable of identifying and avoiding potential hazards. Among others, these persons are also required to understand first aid measures for the injured (e.g. by wounding). The term "operation" includes setting up, starting (preparation for use) and operation (starting, activating, powering off, etc.).
The term "maintenance in proper condition" includes checks and care (control, adjustments), servicing and repairs (troubleshooting).

Note all other (specially highlighted) indications for transport, assembly, operation, servicing and technical data (in the operating instructions, production records and on the machine itself). It is equally essential due to the potential (direct and indirect) hazards and their consequences, i.e. severe damage of human health and property.

2.2. OBLIGATORY NOTIFICATION

When the trailer is transferred to another user, the operating instructions shall be transferred as well, whereas the receiving user must undergo training according to the instructions.

2.3. GENERAL SAFETY REGULATIONS OF WORK AND USE

Each time before the start of work, inspect the trailer for work safety.

1. Aside from the guidelines in these operating instructions, follow the current general regulations for safety and accident prevention.
2. The affixed information and warning signs and text indicate important guidance for safe operation. Follow it for your safety.
3. Start the trailer only when all required equipment is connected and secured from unintended release or opening (e.g. the hitch and tow bar system, couplings, locks etc.).
4. Understand all equipment and controls, as well as their functions, before work.
5. The machine must not be used by persons who are intoxicated, irresponsible in behaviour or by children (underage).

2.3.1. SAFETY OF OPERATION

1. All work safety information shall also be given to all other users of the trailer.
2. Check the direct vicinity (for children and bystanders) before starting. Pay particular attention when visibility is poor.
3. Do not remain on the trailer while it is in motion, when coupling the trailer with a tractor and when loading or unloading the trailer.
4. After unloading the trailer, lower the load body completely. Never leave the trailer unattended with its load body raised.
5. Enter the trailer only when it has completely stopped and with the tractor engine stopped.
6. Lifting and lowering the load body shall always be controlled from the driver's seat.
7. Hitch the trailer according to regulations, couple only with recommended equipment and secure the tow bar hitch-ring to the tractor transport hitch.
8. Exercise extreme caution when coupling/decoupling the trailer with/ from the tractor.
9. Position the supports, safety equipment and ladders in such way as to ensure safety of operators.
10. Follow the maximum permissible axle loads, total weight and transport dimensions.
11. Do the following checks: coupling and functional test of brakes and lights; inspect the slow-moving vehicle sign and check other protective devices.
12. Do a functional test of lights and brakes before driving; prepare the trailer as recommended in Section "Travelling on public roads".
13. Mind the changes in vehicle behaviour, steerability and braking efficiency caused by the hitched trailer and its load.
14. When towing the trailer, mind the layout of loads and/or inertia, especially when the load is unevenly distributed.
15. Bystanders must not enter the work zone of the trailer when it is working.
16. Do not remain within the range of a load being discharged.
17. Start the hydraulic lift (tipping) of the load body only when:
    - the trailer is coupled with the tractor; AND
    - the trailer is parked on a hard and level ground; AND

- no persons remain in the unloading area; AND
- the tractor's axis is aligned with the trailer's axis; AND
- the machines are at a safe distance from all power lines; AND
- there are no strong gusts of wind.

18. If it is necessary to unload to the rear while parking on a slope, the trailer with the tractor must be parked in the uphill direction. If unloading to the side on a slope, tilt the load body to the side opposite to the trailer's direction of gradient.
19. During all work with the load body raised, secure it against falling with the support delivered with the trailer. Turn off the tractor engine and remove the ignition key.
20. Be careful to avoid crushing of fingers and hands.
21. Mind the warnings of crush and cut hazard areas when starting work with trailer. There is a risk of injury when coupling/decoupling the trailer with/from the tractor. When coupling/decoupling do not enter between the trailer and the tractor or stand behind the trailer if the trailer is not secured with wheel chocks or the parking brake.
22. No person is allowed to remain between the trailer and the tractor if the vehicle is not secured against rolling with parking brake and/or wheel chocks.
23. When parked, secure the tractor and the trailer against rolling.
24. Couple the trailer only with the upper hitch of a tractor that can transfer at least 20 kN of load.
25. Do not drive with the raised load body.
26. When raising the load body, maintain a safe distance from power lines. The C.2.30. sign acc. to PN-ISO 11684:1998 on the front wall of the trailer warns of power lines.
27. During all repair and maintenance works which require raising the load body, the body must be empty and secured with the mechanical support against accidental falling.
28. Always adapt your driving speed to the conditions. Avoid rapid turns when driving uphill or downhill.
29. Maintain a safe distance from the U-turn range of the tractor and trailer train.
30. When driving in reverse is necessary, ensure adequate visibility (and help of a signalling person, if necessary).
31. Mind the inertia of the trailer when cornering.
32. Additional securing of the load transported on the trailer (chains, tarpaulin, plastic sheet, nets, transport straps, etc.) may be applied only with tractor engine off and the ignition key removed.
33. Remove functional disturbances of attachments only with the engine turned off and the ignition key removed.
34. Enter the load body only after turning off the drive and stopping the tractor engine. Remove the ignition key.
35. Always turn off the engine and remove the ignition key before exiting the tractor. Engage the parking brake and secure the trailer with a wheel chock.
36. When travelling on public roads, the maximum permissible axle load of the trailer must not exceed 64 kN.
37. The maximum permissible pressure of the hydraulic system is 16 MPa.
38. The maximum permissible pneumatic pressure of the single-line system is 0.63 MPa or 0.8 MPa for the two-line system.
39. Prepare the trailer for work (connect the pneumatic and hydraulic hoses, etc.) with the tractor engine off and the ignition key removed.
40. The manufacturer delivers the trailer completely assembled.

2.3.2. TYRES

1. Make sure to secure the trailer from accidental movement when servicing the tyres.
2. The wheels and tyres shall be repaired by trained personnel with adequate tools.
3. Regularly check the tyre pressure. Follow the recommended pressure values.

4. Protect the tyres from sunlight during prolonged parking of the trailer.
5. Replace the wheels when the trailer is empty, if possible.

2.3.3. HYDRAULIC AND PNEUMATIC SYSTEMS

1. The hydraulic and pneumatic systems are under high pressure.
2. When connecting the hydraulic cylinder, follow the manufacturer's guidelines for connection of hydraulic lines.
3. When connecting the hydraulic and pneumatic lines with the hydraulic and pneumatic systems of the tractor, ensure that the valves on the tractor and the trailer are depressurised.
4. Periodically inspect the hydraulic and pneumatic connections. Replace all damaged and aged parts immediately. Replace the lines as recommended in the manufacturer's technical requirements. Replace the lines every five years unless damage is found earlier.
5. When inspecting for leak sources, overload the hydraulic system for several seconds (leaking of drops are not permitted).
6. The liquid (hydraulic oil) which escapes under high pressure may puncture the skin and cause severe injury. Immediately seek medical attention if injured. There is a danger of infection.
7. Before working on the hydraulic and/or pneumatic systems, depressurize the affected system and turn off the engine.
8. All repair work on the hydraulic and pneumatic systems may only be performed by authorised representatives of METAL-FACH Sp. z o.o. in Sokółka.

2.3.4. PERIODIC MAINTENANCE

1. All maintenance, repair and cleaning operations, as well as troubleshooting must be performed after turning the drive and the tractor engine off. Remove the ignition key.
2. Inspect all bolts and nuts periodically and retighten them if necessary. Replace regular bolts only with the bolts of the same quality and strength ratings.
3. When servicing under the raised and tipped AND unloaded load body, always secure the body with the support supplied with the trailer.
4. Use correct tools and safety gloves when replacing any parts.
5. After completing your work, thoroughly clean the trailer to leave no remains of the load on the load body.
6. Before electric works, arc welding and/or working on the electrical system, isolate the continuous electrical power supply.
7. The safety equipment wears out and therefore requires periodic adjustments, inspection and replacement when necessary.
8. Use only original spare parts recommended by the trailer manufacturer, i.e. METAL-FACH Sp. z o.o.
9. Store the trailer in sheltered areas (preferably on level and hardened ground) and in a manner which prevents injuries of people and animals.
10. Release all worn out parts to authorised recycling points while following all applicable environmental protection requirements.

2.3.5. TRAVELLING ON PUBLIC ROADS

1. Before departing, check that the trailer lighting is working and that the trailer identification is complete.
2. Follow the traffic code regulations when travelling on public roads.
3. Exceeding the permissible payload and driving speed may damage the trailer and compromise traffic safety.
4. Do not exceed the permissible driving speed of 30 km/h.
5. The trailer is designed for operation at grades of 8° maximum.
6. When travelling on public roads, the trailer must be equipped with a slow-moving vehicle sign in the trailer bracket installed in the bracket on the load body rear wall (included with the trailer).
7. Do not leave the loaded trailer on slopes and when it is not secured against rolling. Secure the trailer by engaging the parking brake and chocking the wheels.

2.4. WARNING SIGNS AND INFORMATION ON THE TRAILER

The warning signs and information on the trailer must not be removed. They are intended for safe handling of the trailer. If any information label is damaged or removed, order a spare one. Text and symbol label stickers are available from service agents or the trailer's manufacturer.

Item	Safety symbol (marking)	Meaning of the symbol (marking) or text	Location on the trailer
1.		Read the operating manual.	On the load body's front wall.
2.		Turn off the engine and remove the ignition key before servicing or repairs.	On the load body's front wall.
3.		Keep a safe distance from power lines.	On the load body's front wall.
4.		Do not reach into the crushing area if the parts may move.	On side walls.
5.		Install the support before entering the hazardous area.	On the chassis side frame beam, at the support.

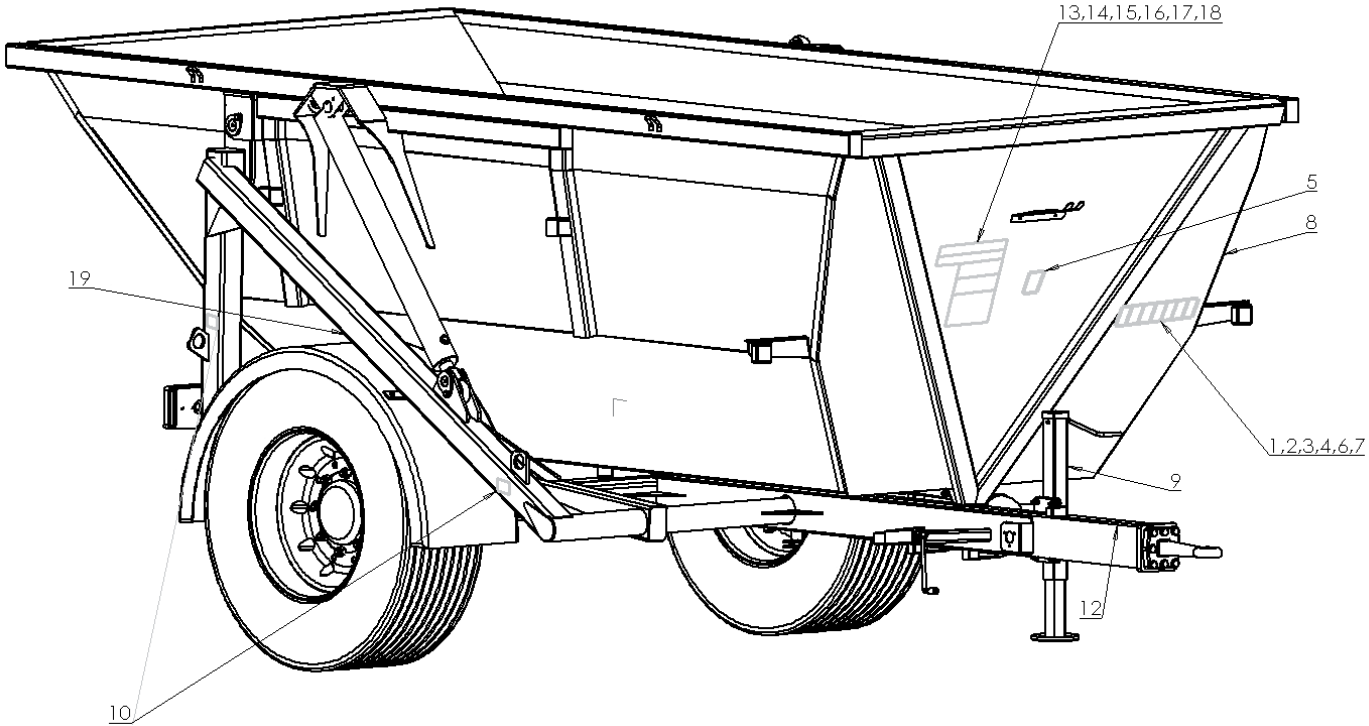
6.		Do not ride on the machine – use the passenger seat only.	On the load body front wall.
7.		Keep a safe distance from the machine.	On the load body's front wall.
8.		Do not stand on ladders and platforms while the tractor is moving.	At the ladder.
9.		Feet (toes) crushing hazard. Force applied from above.	At the support.
10.		Lifting point.	On the chassis frame side members.

11	Warning text on the trailer.	20 kN max.	On the tow bar.
12		**Caution!** Do not perform any checks or servicing under the loaded or tilted load body without the support.	At the support.
13		**Caution!** Do not remain within the range of discharged loads. Do not enter the trailer when it is hauled.	On the load body's front wall.
14		"Load capacity 6 t".	On the load body left and right wall.
15		Maximum hydraulic system pressure: 16 MPa.	Maximum hydraulic system pressure: 16 MPa
16		Maximum pneumatic system pressure: 0.6 MPa, single-line system, 0.8 MPa, two-line system.	On the load body front wall.
17		Approximate weight values of certain goods, see table in section 5.3 on page 19.	On the load body front wall.
18	Tyre pressure:	385/65 R22.5 8.5 bar.	Over the wheels.

ATTENTION!

The trailer user is required to keep the warning symbols and text on the trailer legible during its entire operating life.
If damaged or destroyed, replace them with new ones.

2.5. LOCATIONS OF SIGNS ON THE TRAILER



3. TECHNICAL CHARACTERISTICS

Item	Content	
I General data		
1.	Vehicle type	farming truck trailer
2.	Manufacturer	METAL-FACH Sp. z o.o. 16-100 Sokółka, ul. Kresowa 62
3.	Type (model)	T930
4.	Body type	Rocker
5.	Nameplate location	hitch beam
6.	S/N stamping location	On the nameplate and underneath
II Dimensions and weight		
7.	Length, mm	5180
8.	Width, mm	2450
9.	Height, mm	2030
10.	Number of axles, pcs.	1 (singe axle)
11.	Wheel track, mm	2050
12.	Front overhang, mm	3320
13.	Loading space size	
	- length, mm	4390
	- width, mm	2040
	- height, mm	1300
14.	- capacity, m^3	7.5 m^3
15.	Loading surface height, mm	2030
16.	Tow bar hitch-ring height, mm	560
17.	Tow bar hitch-ring diameter, mm	40
18.	Vehicle ramp clearance, mm	300
19.	Vehicle kerb weight, kg	1900
20.	Permissible vehicle overall weight, kg:	7900
	- per axle, kg	5900
	- on the hitch, kg	2000
21.	Maximum load, kN	
	- per axle, kN	59
	- on the tow bar hitch-ring (hitch), kN	20
22.	Permissible vehicle load capacity, kg	6000
III Suspension		
23.	Suspension type	Rigid, dependent, w/o suspension springs
IV Wheels and tyres		
24.	Number of wheels, pcs.	2
25.	Wheel disk size	22.5x11.75
26.	Tyre size	385/65 R 22.5 160 K/160 J, 22.5x11.75 385/55 R 22.5 160 K/160 J, 22.5x11.75
27.	Tyre pressure, kPa	850-900

V Braking system		
28.	Service brake	
	- type	mechanical, drum-type
	- control	pneumatic, positive pressure, two-line brake system (single-line system available on request)
	- no. of wheels operated	2 wheels
29.	Parking brake	
	- type	mechanical, drum-type
	- control	manual, by a screw gear
	- operated components	2 wheels on the axle
VI Electrical system		
30.	Rated voltage, V	12, feed by the driving tractor
VII Unloading mechanism		
31.	Mechanism type	Hydraulic
32.	No. of actuators/ members, pcs./pcs.	2/1
33.	Maximum load body tilt angle, back, °	87
34.	Maximum system pressure, MPa	16
35.	Hydraulic connection type	ZSR-6-13/200 or in acc. with PN-ISO 5675

VIII Operating data		
36.	Minimum U-turn diameter, left/right, mm	5160
37	Maximum speed, km/h	30
IX Additional information		
38.	Other information:	
	tractor hitch coupling	lower transport hitch
	driving tractor	35 kW minimum
	requirements for the driving tractor	minimum load transferred by the hitch: 20 kN

4. GENERAL DESCRIPTION OF DESIGN AND FUNCTION

The T930 trailer is a steel structure with the load body tipped to the rear. The trailer features a pneumatic service brake (with variable load braking force control) and a parking brake that is hand-operated via a screw gear, actuating the friction components of the axle service brake. The trailer features a complete signalling and warning system (an electrical system and reflective lights). The trailer is also suitable for use on public roads.
The trailer is manufactured in accordance with Directive 98/37/EC and the following harmonised standards: PN-EN 1853:2002, PN-EN ISO 4254-1:2006, PN-EN ISO 12100-1:2005, PN-EN ISO 12100-2:2005, PN-EN 294:1994.

4.1. CHASSIS

The trailer chassis is composed of the following subassemblies: bottom frame, hitch, support foot, wheel set and fastening components.
The bottom frame and the tow bar are welded structures made of steel sheet and profiles.
The trailer wheel set is composed of a single axle, land wheels and land wheel brakes.
The axle is made of a square bar terminated with plugs to which land wheel hubs are fixed with cone bearings. They are single wheels equipped with drum brakes with the shoes actuated by mechanical expander cams.

4.2. LOAD BODY

The loading space of the trailer is made of the following:
A sealed load body that rests on two pins which serve as the rotation axis during work. The body is tilted by two hydraulic actuators each with one end set on pins on the frame and the other end on the body.

4.3. LOAD BODY HYDRAULIC TIPPING MECHANISM

The hydraulic system is designed for automatic unloading of the trailer by tipping the load body backwards. The hydraulic tipping system is fed with oil from the tractor hydraulic system.

The hydraulic system includes: coupling valve plug, hydraulic lines, single-action hydraulic actuators, and connecting and fastening components. Fig. 1 shows the diagram of the load body hydraulic tipping system. The raising and lowering of the load body is controlled by the DCV in the tractor hydraulic system.

ATTENTION!	* The actuators limit the tilting angle of the body during the rearward tipping movement.

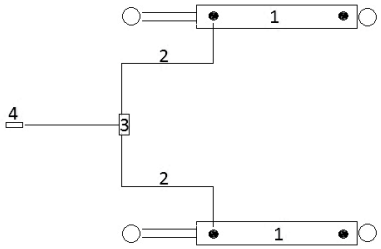


Fig. 1 Diagram of the load body hydraulic tipping system
1 - hydraulic actuator; 2 - hydraulic lines; 3 - cut-off valve; 4 - cut-off valve control cable; 5 - coupling valve plug.

4.4. ELECTRICAL SYSTEM (SIGNALLING AND WARNING)

The trailer electrical system is designed for 12 V DC supply from the driving tractor system.
Connect the trailer electrical system with the tractor system using an appropriate coupling cable.
The diagram of the electrical system and the trailer lights layout is shown in fig. 2 and 3.

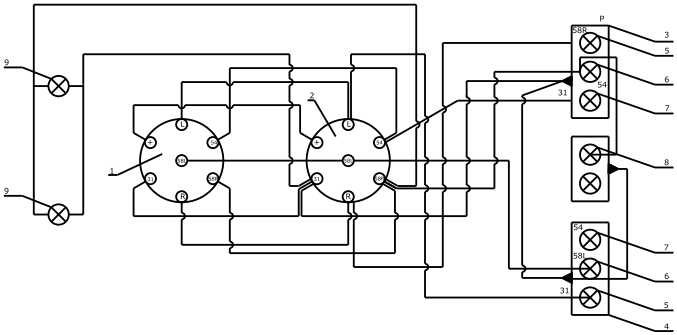


Fig. 2 Trailer's electrical system diagram
1 - 7-pin plug; 2 - 7-pin socket; 3 - right tail cluster lamp; 4 - left tail cluster lamp; 5 - turn indicator light bulbs; 6 - tail parking light bulbs; 7 - stop light bulbs; 8 - registration plate light bulbs; 9 - front parking light bulb.

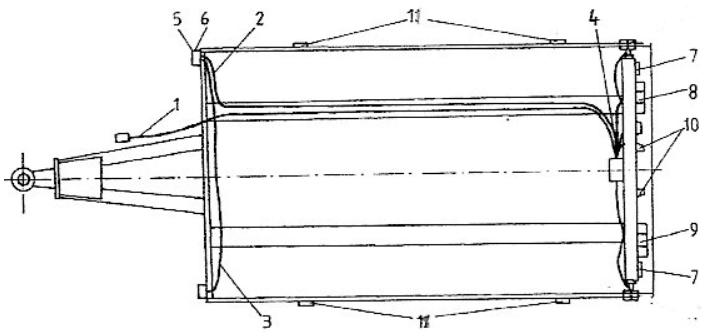


Fig. 3 Diagram of trailer lights layout
1 - cable harness with plug; 2 - right wire harness; 3 - front wire harness; 4 - rear wire harness; 5 - front parking lamp; 6 - front reflector (white); 7 - tail reflector (red); 8 - right tail cluster lamp; 9 - left tail cluster lamp; 10 - registration plate lamps; 11 - side reflector (yellow).

4.5. SUPPORT FOOT

The T930 trailer is equipped with a mechanically operated support foot. It is designed to support the tow bar when the trailer is decoupled from the tractor. The foot is installed on the tow bar beam.

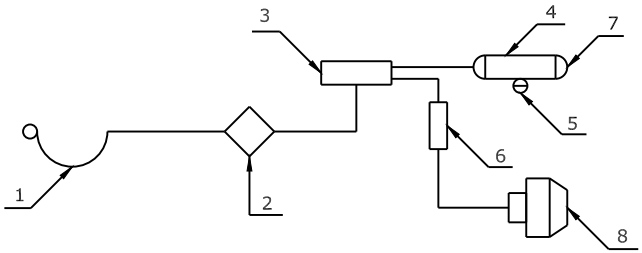
ATTENTION!	Do not rest the trailer on the support foot when it is loaded.

4.6. BRAKING SYSTEM

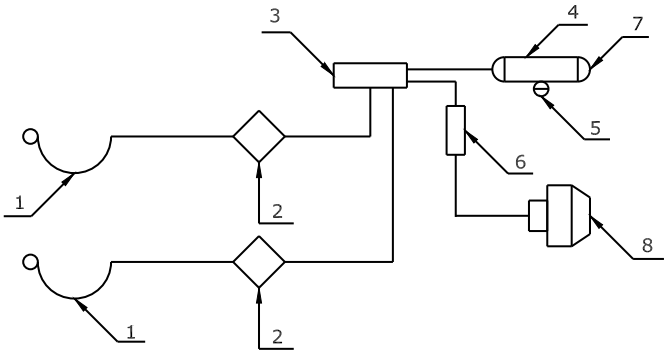
The T930 trailer is equipped with the following braking systems:

- Service brake: pneumatically actuated two-line system, operates the axle wheels; controlled from the driver's seat by pressing the tractor's brake lever;
- Parking brake: manual mechanical control via a crank lever mechanism and a screw gear, located on the right side of the trailer and operating the axle wheels.
- The service brake design ensures automatic braking of all trailer land wheels if the pneumatic system is accidentally decoupled between the trailer and the tractor. On customer's request, the trailer can be alternately equipped with a single-line braking system (i.e. for adaptation to tractors which support such system configuration).

Figure 4 shows the pneumatic braking system diagram:



a) single-line system;



b) two-line system.

Fig. 4 Pneumatic braking system diagram
1 - pneumatic connector plug for coupling with the tractor; 2 - air filter; 3 - control valve; 4 - air tank; 5 - water drain valve; 6 - manual braking force control; 7 - check connector; 8 - pneumatic membrane actuator.

5. STORAGE, SALE AND SHIPPING TO USER

5.1. STORAGE

- Protect the trailer against direct exposure to sunlight and rain. Park it with its land wheels and with the supports extended and locked (if the tyres can be exposed to sunlight, reduce their pressure).
- If the trailer is stored outdoors, periodically check for rainwater accumulation in the trailer. Note all damage to the paint coat. Clean and degrease spots of damaged paint. Next, repaint with the same colour and coat thickness.
- Long-term storage is allowed in sheltered rooms only.

5.2. SALE

- The buyer picks the trailer from the manufacturer or the sales representative on their own, or arranges for the shipping with the manufacturer.
- The trailer is sold as fully assembled and ready for operation, complete with the basic equipment listed in section 1.2 of this manual. All optional accessories or their parts are available at extra charge.
- The sales representative personnel is required to introduce the buyer to the design and operation of the trailer, along with safety requirements and warranty conditions.
- The buyer shall verify the following:
  - the trailer is complete, undamaged and with all basic equipment;
  - the nameplate located on the load body's front frame crosspiece and the surface under it has the serial number stamped that matches the data in the warranty card;
  - the warranty card has been properly filled out with the identification data on the nameplate.

5.3. SHIPPING TO USER

The trailer shall be transported from the sales representative on wheels coupled with a tractor or on a low-bed trailer. Before loading on a low-bed trailer, connect the farming trailer with the transport hitch and the braking lines of the tractor. Place the farming trailer on the low-bed trailer using the extended ramps. Next, secure the farm trailer with wheel chocks. Afterwards, disconnect the braking system and decouple from the tractor. Secure the farming trailer with special transport straps. Before unloading the transported trailer, first extend the low-bed trailer ramps and release the transport straps used to secure the farming trailer against falling down in transit. Approach with a tractor and connect the trailer braking system's cables. Next, remove the chocks from underneath the trailer's wheels. When all of the above has been completed, move the trailer off the low-bed.

6. INFORMATION REGARDING USE

6.1. COMMISSIONING THE TRAILER

WARNING!	*Use only tractors that are fit for service (with the transport hitch, the pneumatic and hydraulic systems, and the signalling/warning system working)

Do the following before commissioning the trailer:

- understand the names and locations of individual assemblies/components of the trailer;
- check the trailer tyre pressure;
- couple the trailer with the tractor:
  - set the tow bar hitch-ring of the trailer at the tractor's transport hitch height;
  - couple the hitch-ring with the trailer hitch;
  - secure the hitch pin against falling out;
  - turn off the tractor's engine;
  - engage the tractor's parking brake;
  - release the trailer's parking brake.
  - connect the appropriate sockets and plugs of the pneumatic, hydraulic and electrical systems;
- do the functional checks of the electrical, pneumatic and hydraulic systems of the tractor and of the trailer, and check leak tightness of the hydraulic and pneumatic systems on both vehicles;
- check all equipment, connections and safety against accidental release or breaking.

Perform all these actions each time before working with the trailer.

ATTENTION!	Only couple the trailer with the tractor transport hitch rated for the minimum load of 20 kN. No bystanders shall be present between the trailer and the tractor when the two are being coupled.

6.2. LOADING THE BODY

Load the body only when the trailer is coupled with the tractor, parked on level ground and with the tow bar in the forward driving direction.
Use mechanical loading equipment (cranes, loaders, conveyors, etc.) to load the trailer.
Spread the load evenly across the entire load body surface. When transporting materials that exert local pressure on the load body (e.g. large rocks), line the floor with thick planks first. This will reduce the surface load on the floor and protect it against damage.
If the transported materials protrude outside the trailer, follow the applicable traffic code regulations for proper marking of such loads.

ATTENTION!	• Do not exceed the permissible payload and permissible axle loads, otherwise the trailer can be damaged and the traffic safety compromised. • The transported load must be secured against shifting, generating excessive noise and falling down on the road.

Approximate weight values of certain goods
1 m^3 = kg

Soil	1400 – 2000	Legumes	760 – 820
Wheat	750 – 800	Construction rubble/ aggregate	1400 – 1850
Rape	700 – 720	Lime	600 – 1430
Potatoes	625 – 725	Hard coal	650 – 900
Sugar beets	600 – 700		

6.3. TRAVELLING ON PUBLIC ROADS

Before entering a public road, do the actions listed in section 6.1 and the following:

- install the slow-moving vehicle sign on the trailer (in the bracket on the rear wall);
- ensure that the transported load is secured from shifting and falling down on the road;
- check that the load does not exceed the permissible capacity or the permissible multiple axle load.

ATTENTION!

- Follow the traffic code regulations.
- In the first operating hours of the brakes, the drum brake shoes align themselves with the drums. The full braking effectiveness is achieved once the friction parts have run in.

6.4. UNLOADING

The load body can be unloaded manually, with mechanical equipment or by tipping the box with the hydraulic mechanism. Unload by tipping the load body by following these actions in the order presented below:

- align the tractor with the trailer's axis on as level terrain as possible;
- engage the tractor's parking brake;
- ensure that there are no hazards;
- tip the load body by operating the hydraulic actuator;
- after the load has been discharged, lower the body.

ATTENTION!

- If it is necessary to unload the trailer on a slope, it is allowed to tip the trailer body upwards (with the tractor and the trailer parked in the uphill direction).
- No person is allowed to remain near the tipped trailer body and within the range of discharged load.

ATTENTION!

- Do not decouple the trailer from the tractor when the load body is lifted.
- Before unloading by tipping the trailer load body, you must always verify that the pins have been removed on the correct side of the trailer. Failure to remove the pins may destroy the trailer!
- Do not transport any persons on the trailer.

Having discharged the load from the trailer, lower the load body and remove all remains of the transported material.

6.5. DECOUPLING FROM THE TRACTOR

Do the following actions to decouple the trailer from the tractor:

- stop the tractor with the trailer where the latter will be left, and engage the tractor parking brake;
- engage the trailer's parking brake;
- if the trailer stands on uneven or sloping ground, secure it against rolling down by chocking the wheels;
- disconnect the electrical, hydraulic and pneumatic lines from the tractor;
- remove the safety from the hitch pin and then remove the pin – this will decouple the tow bar from the hitch. Drive away with the tractor and reinstall the pin in the hitch.

ATTENTION!

Do not decouple the trailer from the tractor when:

- the load body is lifted;
- the trailer is not secured against rolling away.

7. MAINTENANCE

In order to maintain proper performance, the T930 trailer requires the following adjustments:
a) adjustment of the wheel bearing clearance;
b) adjustment of the braking system components.
c) adjustment of the load body hydraulic tipping mechanism.

ATTENTION!

*Do not perform any checks or maintenance under the loaded or tilted load body without the support in place.

7.1. WHEELS – BEARING CLEARANCE ADJUSTMENT

During the first operating hours of a newly purchased trailer (i.e. after approximately 100 km of mileage) and further operation (i.e. after the next 1500 or 2000 km), check the wheel bearing clearance and adjust, if necessary.
The procedure is:

- couple the trailer with the tractor and engage the tractor's parking brake;
- jack up one side of the trailer to lift the wheel from the ground on this side and secure it against falling;
- if the wheel has excessive clearance, remove the hub cap and remove the crown nut clevis pin;
- rotate the wheel and tighten the crown nut at the same time until the wheel stops turning;
- loosen the crown nut by 1/6 to 1/3 of the full turn, i.e. until the nearest clevis pin groove is aligned with the hub pivot hole;
- secure the nut with a new clevis pin, and reinstall and retighten the hub cap;

After a correct adjustment of bearing clearance, the wheel should rotate smoothly, without cogging or noticeable resistance (other than caused by rubbing of the brake shoes against the drum). Slight rubbing of the shoes against the drum, especially on a brand new trailer or following replacement of the shoes is normal. Do the final check of proper bearing clearance adjustment by travelling several kilometres and inspecting the hub heating by hand. Apart from incorrect clearance adjustment, significant rolling resistance of the wheels and heating of the hubs can also be caused by contaminants in grease or damage of bearings. These symptoms require removal of the wheel hub to be corrected, if found.

ATTENTION!

- Follow these rules when jacking up the trailer wheel:
- couple the trailer with the tractor, move to level ground and engage the tractor's parking brake;
- chock the wheel that is not being jacked up;
- place the jack under the axis and near the jacked up wheel, and lift the wheel so that it clears the ground.
- secure the wheel against falling by putting a prop of suitable height under the axis.

7.2. BRAKES

7.2.1. BRAKES – SERVICING THE BRAKE PNEUMATIC SYSTEM

When servicing the trailer, check the tightness and the condition of parts and connections of the braking system, and periodically drain the water condensate from the air tank.
Check the leak tightness of the system at the rated pressure of approx. 600 kPa for the single-line system and 800 kPa for the two-line system. Leaks are detected by a distinct hiss or air bubbles (after coating with soapy water) at the points of air escape from the system. If the leaks are

caused by damaged seals, lines or other parts (valves, actuators, etc.), replace them with new parts.
Drain the water from the air tank by tilting the drain valve stem to the side when the tank is pressurised; the drain valve must also be unscrewed from the tank and cleaned of accumulated dirt once a year, before the winter season.

7.2.2. BRAKES – ADJUSTMENT OF THE BRAKING SYSTEM COMPONENTS

When servicing the trailer, check the condition of parts and connections of the braking system, and periodically inspect the lubrication of control elements.
Adjust the brakes when the following occurs:

- there is excessive clearance between the shoes and the drum resulting from brake shoe pad wear, resulting in decreased braking performance;
- the wheel brakes work unevenly and out of sync.

With the properly adjusted brakes, the braking force (i.e. the total of braking forces at the circumference of the wheels) shall be at least 27% of the permissible total weight of the trailer when decelerating with the service brake; the braking force (i.e. the total of braking forces at the circumference of the wheels) when actuating the parking brake shall be at least 16% of the permissible total weight of the trailer. Both wheels of the same axle should brake evenly; the brake force differential between the left and right trailer side shall not exceed 30%, with 100% being the higher force.

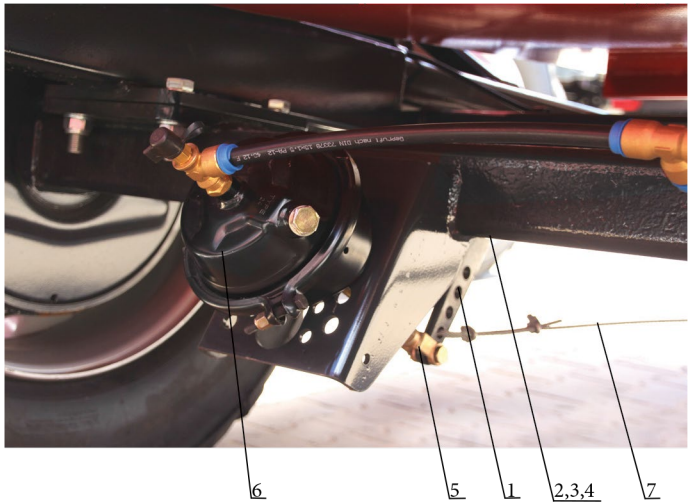


Fig. 6. Brake system components
1 - expander shaft lever (arm); 2 - adjusting comb; 3 - lever (arm) adjustment bolt with comb on the expander shaft; 4 - shoe expander shaft; 5 - the link (follower) that couples the pneumatic actuator rod with the expander shaft lever; 6 - pneumatic actuator; 7 - parking brake cable.

Adjust the brakes by changing the expander lever position against the expander shaft. To do this, jack up the wheel and while turning the wheel, realign the expander lever against the shaft (on the comb) to feel that the brake shoes slightly rub against the drum.
After a correct adjustment of friction components, the wheel should rotate smoothly, without cogging or evident resistance (not caused by rubbing

of the brake shoes against the drum). Slight rub of the shoes against the drum, especially on a brand new trailer or following replacement of the shoes is normal.
Braking force adjustment — the pressure is built in the pneumatic brake system by a three-unit controller with three control lever positions: empty, half-full and full.
After completing the adjustment, check and adjust the parking brake. The parking brake is adjusted by setting the cable length that couples the expander shaft lever with the engaging mechanism. The required sum of braking forces should be produced at the maximum force applied to the hand crank of 40 daN (at an approximately right angle between the cable and the expander shaft lever).

 **ATTENTION!**	• Follow these rules when jacking up the trailer wheel: • couple the trailer with the tractor, move to level ground and engage the tractor's parking brake; • chock the wheel that is not being jacked up; • place the jack under the axis and near the jacked up wheel, lift the wheel so that it clears the ground; • secure the wheel against falling by putting a prop of suitable height under the axis. • Before driving, periodically inspect all braking components for proper operation, tightness and clearance. Adjust or repair as necessary.

 **IMPORTANT INFORMATION!**	• Inspect the brake shoes at least each year. Replace worn pads. • In order to achieve the required braking performance after replacement of friction components, remember to run them in (by driving with frequent braking), which should be followed by readjustment.

7.3. HYDRAULIC SYSTEM

7.3.1. HYDRAULIC SYSTEM – SERVICING OF THE LOAD BODY HYDRAULIC TIPPING SYSTEM

The hydraulic oil of the trailer and the external hydraulic system oil (tractor) must always be of the same grade and type. DO NOT use different oil grades.
The trailer's hydraulic system must be absolutely leak tight. Check the leak tightness of the hydraulic system by tipping the load body backwards and overloading the hydraulic system for a few seconds. If there are oil leaks at the hydraulic connections, retighten them. If the problem persists, replace the hose or the connection fittings. If the hydraulic leak does not occur on any connector, replace the leaking hydraulic system component. Any and all mechanical damage to a component requires its replacement with the new one. The condition of the hydraulic system must be monitored continuously throughout the operating life of the trailer. When coupling the hydraulic systems of the tractor and of the trailer together, keep the couplings as clean as required.

7.3.2. HYDRAULIC SYSTEM – ADJUSTMENT OF THE LOAD BODY HYDRAULIC TIPPING MECHANISM

The hydraulic system features a safety cable (which acts as a tipping angle limiter of the load body) and a cut-off valve that isolates the oil flow to the hydraulic actuator when the body is tipped. No unauthorised person is allowed to make adjustments or remove the limiters due to safety concerns. The cut-off valve is intended to isolate the oil feed from the actuator before the maximum (permissible) tipping angle of the body is reached. Changing the length or breaking of the safety cable between the load body frame and the cut-off valve installed on the chassis frame may result in damage of the trailer or a risk of turning over the trailer.

 ATTENTION!	* Unauthorised persons must not adjust any hydraulic components.

7.4. WHEELS – TYRES

Servicing of the tyres involves checking their condition visually and checking the tyre pressure. It is also essential to check that the tyres have no cracks that expose or damage the carcass, and that the hubs, wheel disks and their fastening are in good condition.

 ATTENTION!	Regularly inspect the wheel nuts (i.e. the condition and tightness before each use of the trailer); retighten if necessary.

 IMPORTANT INFORMATION!	* After the first travels with loads and after each 100 km, inspect the following: • tightness of wheel nuts, retighten if necessary; • tyre pressure – correct tyre pressure is specified near the trailer wheels; • the specified tyre pressure applies to transport at the maximum permissible speed (at the maximum payload).

8. TROUBLESHOOTING

	Fault type	Cause	Rectification method
1.	Excessive heating of brake drums	Brake shoes are out of adjustment	Adjust per Section 6.2.2.
2.	Excessive heating of wheel hubs	Insufficient clearing of bearings Contamination in bearing grease	Adjust per Section 6.1.1. Remove the hub, replace the grease and adjust the bearings as indicated above.
3.	Grease flows out on the brake shoes	Damaged, worn out or improperly installed hub seal	Remove the hub, replace the worn/damaged seal and reinstall properly. Remove the grease from shoes and brakes, clean the friction components with extraction naphtha, reinstall the hub and adjust the bearings as indicated above.
4.	Uneven braking of wheels	Contamination or excessive wear of shoe pads, or the brake shoes are out of adjustment	Check the brake shoe pads, remove contaminants, replace worn out pads and readjust as per Section 6.2.2.
5.	Insufficient wheel braking performance.	Incorrect adjustment of the shoes and brake controls.	Adjust the brake shoes and control components per Section 6.2.2.
6.	Oil leak at the hydraulic connections	The connectors are made too loose or damage of connector seals.	Retighten and/or replace the line parts as necessary.
7.	Oil leak from the cut-off valve or the actuator.	Worn out or damaged seals, or mechanical damage of devices.	Replace the seals or the entire devices (units).
8.	Audible air leak from the system	Leak in the pneumatic system	Check the pneumatic lines and their connections, locate the leak, and retighten or replace the coupler as necessary.

9. PERIODIC MAINTENANCE

9.1. LUBRICATION

Lubrication is one of the most critical factors that condition good performance of individual assemblies and mechanisms of the trailer.
Timely lubrication and use of correct lubricants significantly reduces the risk of damage or premature wearing of individual parts.
Daily lubrication applies only to the days during which the trailer is operated.
Follow these rules when lubricating:

- clean the grease nipple before feeding the grease;
- feed the lubricant until fresh lubricant comes out of the gaps (through which the used lubricant is pushed out first);
- when finishing the lubrication, leave some lubricant on the nipple head.
- use oil to lubricate threaded joints, lever joints and similar parts of the trailer;
- inspect the lubrication of wheel hub bearings each year; add or replace the bearing lubricant;
- when replacing the lubricant, remove the hub, remove the used lubricant, inspect the bearings' condition (replace with new ones if necessary); after applying the fresh lubricant, adjust the bearing play.

WARNING!

* Use only quality bearing lubricants.
* Never drive without the hub cap; otherwise penetration by dirt (sand) will damage the wheel bearings.

Lubrication point	Lubricant grade	Lubrication frequency
Wheel hub bearings	ŁT 43	Every 6 months
Hydraulic actuator head sockets	Graphite grease	Once a year
Load body tipping system parts	ŁT 43	Every 6 months
Support foot components	ŁT 43	Every 6 months

OTHER LUBRICATION POINTS

- Regularly lubricate movable parts of locks, hinges and articulated joints.
- Pressure-feed the lubricant with a grease gun through clean nipples.
- Regularly lubricate movable parts of brakes (levers and pins).
- Lubricate the brake shoe axes only when necessary and only with a small amount of lubricant.

9.2. SERVICING AND MAINTENANCE

The transport capacity and long operating life of the farming trailer can only be assured if the machine is properly and reasonably operated within its design and functional capacities.
Even a slight negligence in operation may result in severe consequences.
A timely discovered fault is easy to remove at a minimum cost and effort, and with maximum effect.
Faults of the trailer can only be discovered soon if regular, periodic cleaning and thorough inspection is carried out.
Hence clean the trailer frequently to observe any damage and faults.
Also carry out periodic technical inspection of the trailer. Lubricate the trailer according the guidelines for lubrication.

Store the trailer in a sheltered area to protect it from weather conditions and deterioration. In order to preserve its proper performance, the trailer must be maintained, readily repaired and thoroughly supervised during its operating life. Daily servicing (before work) of the trailer includes a certain minimum of actions, i.e.:

- check the screwed components and their safeguards against accidental release;
- check the play of mechanisms and articulated joints;
- check the tightness of the hydraulic system and remove all leaks;
- check the tightness of the pneumatic system;
- functional checks of all mechanisms (the braking system primarily);
- check and perform lubrication according to the instructions;
- check the tyre pressure;
- if wall top sections are in use: do functional tests and check that the parts do not pose risk to traffic safety and operator's safety;
- functional check of the brake system and the warning and signalling system.

9.3. REPAIR INSTRUCTIONS

Small repairs required by accidental faults must be carried out with care for cleanliness, installation of all parts at their locations and adjustments essential to proper performance of the trailer.
Small repairs during operation (in the field) shall be done on site by service personnel.
All parts removed during repairs shall be stored in conditions that protect from dust and other contaminants. Pay particular attention to protection and cleanliness of bearings.
During field repairs, keep the area clean when reassembling the parts (the parts which fell to the ground shall be washed or at least cleaned of dirt to an extent that permits proper functioning).
During ongoing and general repairs, follow the engineering rules for disassembly and (re)assembly of parts and subassemblies to ensure proper quality and performance of work.
Do functional tests of trailer mechanisms after each repair.

10. DISPOSAL OF THE TRAILER

If the user decides to dispose of the trailer, hand over the entire vehicle to the nearest scrap collection point approved by local authorities. The proof of disposal issued by the collection point is essential for de-registration of the trailer. Recycle the parts which remain after repairs or have become obsolete.

11. RESIDUAL RISK

11.1. DESCRIPTION OF RESIDUAL RISKS

METAL-FACH Sp. z o.o. is liable for the design and build in order to eliminate all hazards; yet some residual risk is unavoidable in operation of the trailer.
The residual risk stems mostly from improper behaviour of the operator caused by lack of knowledge or attention. The greatest hazards occur during the following forbidden actions:

1. The trailer is operated by minors or persons who are unfamiliar with the operating instructions.
2. The trailer is operated by persons who are ill or under the influence of alcohol or other intoxicants.
3. The trailer is used for purposes other than specified in the operating manual.
4. A person is present between the tractor and the trailer with the tractor's engine running.
5. Bystanders, especially children are present near the working trailer.
6. The trailer is cleaned while working.
7. Manipulation of the moving elements while the trailer is working.
8. Checking the trailer's technical condition when it is running.
9. While presenting the residual risk the trailer is treated as designed according to the state of knowledge at the year of manufacture and maintaining the basic OH&S rules.

11.2. DESCRIPTION OF RESIDUAL RISKS

Follow these guidelines:

1. Always follow the safety regulations described in the Operating Manual.
2. Read and fully understand the Operating Manual.
3. Keep your hands out of hazardous spaces.
4. It is forbidden to operate the trailer in the presence of bystanders, in particular children.
5. Maintenance and repairs of the trailer shall only be performed by trained personnel.
6. The trailer shall only be operated by persons who have been trained in its operation and have familiarised themselves with the Operating Manual.
7. The trailer is protected against access by children.

Only then can you eliminate the residual risks to people and the environment when using this trailer.

ATTENTION!

The residual risks are present when the listed rules and indications are not followed.

12. AUTHORISED SERVICE

12.1. WARRANTY SERVICE

The manufacturer issues a warranty on conditions described in the warranty card. During the period covered by the warranty, repairs shall be made at authorised service stations or at the manufacturer's service point.

12.2. ONGOING REPAIRS

After the warranty period, authorised service stations perform periodical inspections, adjustments and repairs.

12.3. ORDERING SPARE PARTS

Spare parts should be ordered from resellers or directly from the manufacturer stating the name and surname of the user or company name and address, name, symbol, serial number and year of manufacture of the machine, catalogue name of the part, catalogue number of drawing or standard, number of ordered items and agreed terms of payment.

METAL-FACH

16-100 SOKÓŁKA	UL. KRESOWA 62

WARRANTY CARD

OF THE FARMING TIPPER TRAILER

T930

The warranty service is provided on behalf of the Manufacturer by:

filled out by the Dealer

Date of manufacture	.....	Date of sale	.....
Serial number	.....	Dealer's signature	.....
Customer's full name	.....		
Address	.... Customer's signature		

13. WARRANTY CONDITIONS

1. The manufacturer provides a trailer designed and built in compliance with the current standards. The manufacturer guarantees that the supplied trailer is free of manufacturing defects.
2. Metal-Fach Sp. z o.o. provides a 12–month warranty service for the trailer starting from the date of first sale, provided the trailer is used for its intended purpose and the recommendations contained in the manual are followed.
3. The properly filled in warranty card is the confirmation of the manufacturer's warranty; the acceptance of the warranty conditions must be confirmed with the customer's signature.
4. The quality warranty covers the machine defects caused by defective manufacturing, material defects and latent defects.
5. The warranty does not cover the assemblies and parts which are subject to normal wear and tear.
6. The warranty does not cover any mechanical damage or other damage resulting from improper use, improper maintenance or improper adjustment of the trailer.
7. The warranty does not cover any damage resulting from improper storage of the machine.
8. Any unauthorised modifications in the design of the machine by the user will automatically terminate the warranty.
9. The manufacturer shall not be held responsible for loss, damage or destruction of the product resulting from causes other than defects of the supplied machine.
10. During the warranty period the manufacturer will repair any defects which occurred as a result of the manufacturer's negligence.
11. The warranty repair shall be made within 14 working days of the notification/supply of the trailer to the designated service station or at another time agreed upon by the parties.
12. The warranty will be extended by the time required to complete the repair.
13. All repairs which are not covered by the warranty performed by authorised service stations are made at a full cost payable by the user. Before attempting non-warranty repairs, the authorised service will inform the user of the suggested cost, time and scope of the repair.
14. The Customer makes the decision whether to commence a payable repair of the trailer with a warranty valid at the time of repair.

ATTENTION!

Current information about the products is available at www.metalfach.com.pl.

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