FARMING HALF-PIPE TIPPER TRAILER T935

OPERATOR'S MANUAL

EDITION I, JUNE 2014 EN

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

CE DECLARATION OF CONFORMITY

FOR THE MACHINE

METAL-FACH COMPANY
ul. Kresowa 62
16-100 SOKÓŁKA
acting as the manufacturer

declares under sole responsibility that the following machine:

FARMING HALF-PIPE TIPPER TRAILER

type/model: T935
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 .....

President of Board,
Jacek Marek Kucharewicz

Symbols in the Operating Instructions

Legend:

 **CAUTION**	THIS SYMBOL REQUIRES SPECIAL ATTENTION TO THE TEXT DESCRIBING HAZARDS OR IMPORTANT INFORMATION ABOUT THE PRODUCT.

 **IMPORTANT**	THIS SYMBOL INDICATES ADDITIONAL INFORMATION WHICH ALLOWS TO OPTIMISE THE PRODUCT OPERATION.

 **WARNING!**	THIS IS A WARNING SYMBOL AND REQUIRES SPECIAL ATTENTION TO THE OPERATOR AND BYSTANDERS' SAFETY REQUIREMENTS OR SAFE OPERATION REQUIREMENTS.

Thank you for choosing our T935 farming truck half-pipe tipper trailer, a machine designed for efficient and reliable operation.

This Manual will let you fully use the advantages of our trailer.

The Manual contains a detailed table of contents followed by descriptions which will allow to easily identify the trailer and to make the best use of it.

The information regarding safety and comfort of operation, description of coupling with a tractor, operation, technical service activities and storage conditions are listed on the following pages of the manual.

A spare parts catalogue containing the list of the trailer major components allowing for easy ordering is attached to the Manual in a digital form on a CD. A printed version of the catalogue can be purchased at authorised service outlets or directly from the manufacturer.

Both the Manual and the Spare Parts Catalogue contain basic information on the product. The elements fitted to the equipment may be slightly different from those presented in the manual.

The manufacturer reserves the right to introduce changes without notice.

IMPORTANT

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

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1. TRAILER IDENTIFICATION, GENERAL SAFETY RULES

1.1. HALF-PIPE TRAILER IDENTIFICATION

The half-pipe tipper trailer is identified by its nameplate securely fastened to the main frame of the trailer.

The information presented on the half-pipe trailer nameplate is shown on the diagram below.

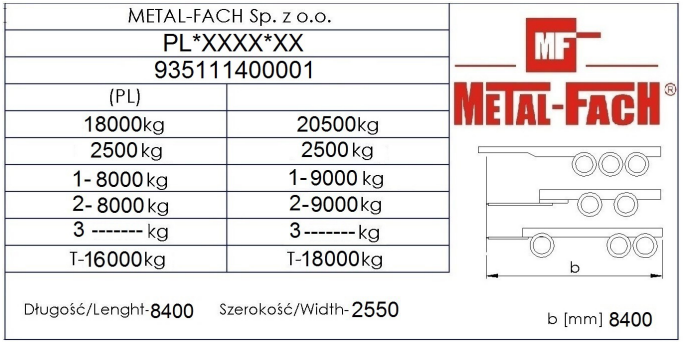

Fig. 1. Nameplate

ALL OPERATORS OF THIS TRAILER MUST UNDERSTAND THE CONTENTS OF THE OPERATING INSTRUCTIONS BEFORE COMMENCING WORK. THE MANUAL IS A PART OF THE T935 TRAILER ESSENTIAL EQUIPMENT.

1.2. TRAILER 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 intended for transport of crops and other bulk or loose materials within a farm and on public roads.The trailer is designed for coupling with farming tractors of varying power ratings, equipped with an external power hydraulic system, a power outlet for the electrical lighting and warning systems and the braking system of hitched machines, and a transport hitch.

CAUTION	• Do not use this trailer to carry fuel, gas cylinders and similar loads due to the compliance requirements for transport of hazardous materials. • 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. • 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, work medicine and road traffic safety. • The manufacturer shall not be liable for damage from any unauthorised modifications of this trailer's design.

The operator shall use the machine according to its intended use by performing activities associated with correct and safe operation and maintenance of the trailer by:

- reading and understand the rules of operation of the trailer
- safe and correct operation of the machine

- punctual and regular maintenance of the machine
- observance of general safety regulations
- observance of traffic regulations

1.3. TRAILER DESIGN

Main structural elements of T935 trailer: chassis, load carrying body, rear hatch, support foot and electric and hydraulic systems for tipping and steering lock.

1.3.1. CHASSIS

The chassis of T935 series trailers is available in two versions: tandem and bogie, made of steel sections. Two longitudinals with cross-bars welded between them act as the main load-bearing element. There is a socket in the centre of the frame for connection of tipping hydraulic servomotors. A loading body support is located in front of this socket. There are lugs in the rear of the frame to be used as pivotal points when the loading body is tipped backwards. Light strips are installed on the rear beam of the main chassis and marker lights are installed on longitudinals.

The wheelset of T935 trailer includes tandem or bogie type spring suspension and two wheel axes.

Tandem type suspension includes parabolic leaf springs joined with rocker arm as structural elements.

In bogie type suspension parabolic leaf springs are used. Wheel axes are fixed to both types of springs using spring plate and screws. The complete unit is attached to the bottom frame.

The drawbar has a spring and is coupled with the main frame using spring and bushings. A parking drawbar support is attached to the side of drawbar (depending on option: mechanical).

1.3.2. LOAD BODY

The load body is installed on the bottom frame of T935 trailer; the half-pipe body is made of plate and steel sections. Inspection windows are located at the bottom of the front body. Tipping pins located at the rear of the bottom frame act as axis of rotation during tipping of body to the back. The half-pipe body has a set of extensions. A platform is attached to the front wall for easy maintenance and use.

1.3.3. REAR GATE

The rear gate is located at the back of the load body; the load body may be opened and closed using hydraulic servo motors. Oil to servo motors is supplied from the tractor's external hydraulic system under pressure to hydraulic cylinders to open or close the gate.

There is a damper in the rear gate to enable better control over unloading; an optional hopper may be installed under the bottom edge of the damper.

Damper is controlled using tractor's external hydraulic system divider located in the cab.

1.3.4. SUPPORT FOOT

The support foot holds the drawbar at the appropriate height during coupling and uncoupling of the trailer with tractor. The foot is supplied by the tractor hydraulic system. It is controlled directly by distributor in the tractor.

1.3.5. STEERING LOCK HYDRAULIC SYSTEM

The steering lock hydraulic system is used for locking rear steering axle when the trailer is moving backwards. Oil under pressure is supplied to hydraulic servomotors used for locking the movement of rear axle from the tractor's hydraulic system.

1.3.6. BRAKING SYSTEM

The T935 trailer is equipped with the following braking systems:

- service brake: pneumatically actuated, two-line system (or single-line on request), acts on all wheels, controlled from the driver's seat by pressing the tractor's brake pedal;
- parking brake: mechanically controlled by hand via a crank lever mechanism and a screw gear, located on the left side of the trailer and operating the rear tandem axle wheels.

The service brake design ensures automatic braking of trailer land wheels if the pneumatic system is accidentally decoupled between the trailer and the tractor.

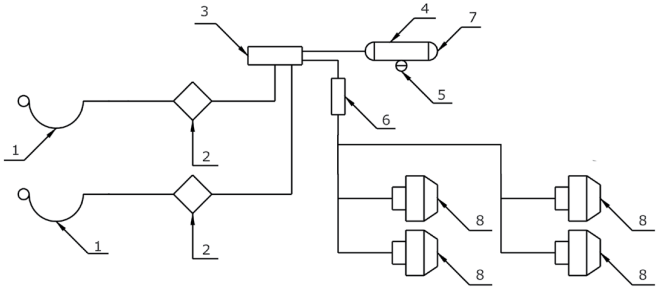

Fig. 2. Two-line pneumatic braking system diagram: 1 — 1st trailer pneumatic connector; 2 — air filter; 3 — control valve; 4 — air tank; 5 — water drain valve; 6 — manual braking force control; 7 — check connector; 8 — pneumatic membrane actuator, 9 — 2nd trailer pneumatic connector.

1.3.7. ELECTRICAL SYSTEM

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 by an appropriate coupling cable. The diagram of the electrical system and the trailer lights layout is shown in fig. 3 and 4.

The T935 half-pipe trailer electrical system includes rear cluster lights, front parking lights and marking lights.

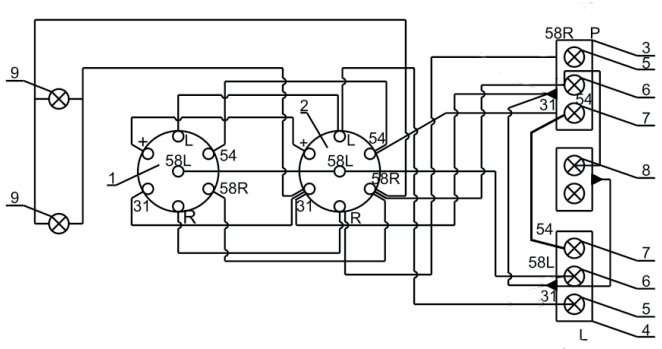

Fig. 3. Trailer's electrical system diagram
1 — 7-pin plug; 2 — 7-pin socket; 3 — right tail cluster lamp; 4 — left tail cluster lamp; 5 — turn indicator light bulbs; 6 — tail parking light bulbs; 7 — stop light bulbs; 8 — registration plate light bulbs; 9 — front parking light bulb.

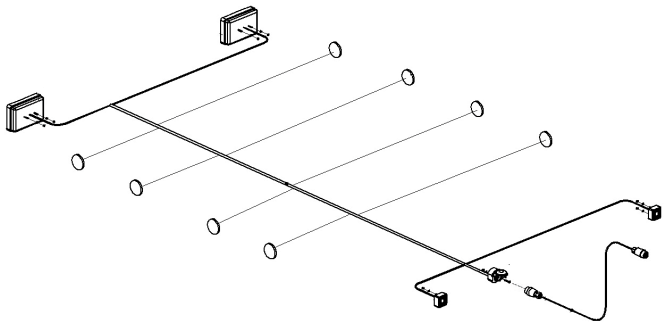

Fig. 4 Diagram of trailer lights layout

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 Instructions means that special caution shall be exercised due to hazards to persons and potential damage to the product.
CAUTION	It is important to carefully follow these notes or guidelines.

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 settings, starting (preparation for use) and operation (starting, commissioning, powering off, etc.).

The term "maintenance of proper condition" includes checks and care (inspection, adjustments), servicing and repairs (troubleshooting).

Note all other (specially highlighted) indications, such as:

- transport;
- assembly;

- operation;
- servicing
- technical data (in the Operating Instructions, production records and on the trailer itself).

It is all the same essential due to the potential (direct and indirect) hazards and their consequences being 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 ON WORK AND USE

Before each start of work, inspect the trailer for work safety.

1. Aside from the guidelines in these Operating Instructions, follow the 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, etc.).
4. Understand all equipment and controls, as well as their functions, before work. It is too late to learn that during work.
5. The trailer must not be used by persons who are under the influence of alcohol and/or other substances, and/or not trained or suitably licensed to operate motor vehicles.

2.3.1. SAFETY OF OPERATION

1. All work safety information shall be given to all other users of the trailer.
2. Check the direct environment (for children and bystanders) before start. Pay particular attention when visibility is poor.
3. Do not remain on the trailer 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. Lift and lower the load body only 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. When installing and removing supports, security/safety equipment and ladders, these types of equipment must always be positioned to ensure safety to 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. Also prepare the trailer as recommended in Section "Travelling on public roads".
13. Mind the changes in vehicle behaviour, steerability and braking efficiency due to 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. Do not remain within the range of a load being discharged.
16. 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
    - when the tractor's axis is aligned with the trailer, AND
    - the machines are at a safe distance from all power lines, AND
    - there are no strong gusts of wind.
17. 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.
18. 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.
19. Be careful to avoid crushing of fingers and hands during opening and closing of the load body walls.
20. Mind the warnings of crush and cut hazard areas when starting the 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.
21. 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.
22. When parked, secure the tractor and the trailer against rolling.
23. Do not drive with the lifted load body.
24. 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.
25. During all servicing or repair works which require lifting the load body, the body must be empty and secured with the mechanical support against accidental falling.
26. Always adapt your driving speed to the conditions. Avoid rapid turns when driving uphill or downhill.
27. Maintain a safe distance from the U-turn range of the tractor and trailer train.
28. Ensure adequate visibility (with the help of a signalling person, if necessary) when driving in reverse.
29. Mind the inertia of the trailer when cornering.
30. Additional protection for 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.
31. Remove functional disturbances of attachments only with the engine turned off and the ignition key removed.
32. Enter the load body surface only after turning off the drive and stopping the tractor engine. Remove the ignition key.
33. Always turn off the engine and remove the ignition key before exiting the tractor. Engage the parking brake and secure the trailer with the wheel chock.
34. The maximum permissible pressure of the hydraulic system is 16 MPa.
35. The maximum permissible pneumatic pressure of the single-line system is 0.63 MPa or 0.8 MPa for the two-line system.
36. Prepare the trailer for work (connect the hydraulic and pneumatic lines, etc.) with the tractor engine off and the ignition key removed.
37. The manufacturer delivers the trailer completely assembled.
38. All hydraulic lines must be replaced every 6 (six) years.
39. Noise — the equivalent sound pressure emission corrected by A characteristics (LpA) does not exceed 70 dB.

2.3.2. TYRES

1. Make sure to secure the trailer against 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. Maintain the recommended pressure values.
4. Protect the tyres from sunlight during prolonged parking of the trailer.
5. Replace the wheels with the trailer empty, if possible.

2.3.3. PNEUMATIC SYSTEM

1. The pneumatic system is under high pressure.
2. When connecting the pneumatic lines with the pneumatic system of the tractor, ensure that the valves on the tractor and the trailer are depressurised.
3. Periodically inspect the pneumatic connections. Replace all damaged and aged parts immediately. Replace the lines as recommended in the manufacturer's technical requirements. Replace hoses every 5 (five) years unless damage is found earlier.
4. Before attempting any work on the pneumatic system, depressurise it and turn off the tractor engine.
5. All repair work on the pneumatic system may only be performed by specialist services of the trailer's manufacturer.

2.3.4. HYDRAULIC SYSTEM

1. The hydraulic system is under high pressure.
2. Regularly inspect the technical condition of connections and hydraulic hoses. Oil leaks from the system are NOT ALLOWED.
3. The cut-off valve limits the load body tilt angle during tipping to the sides. It is prohibited to adjust the trailer during its use because the length of valve control cable is factory set.
4. In case of failure in hydraulic system, take the trailer out of use until the failure is eliminated.
5. When coupling the hydraulic lines to tractor verify that the hydraulic system of the tractor and trailer is depressurized. If necessary, reduce the remaining pressure in the system.
6. Use only hydraulic oil recommended by Metal-Fach.

 CAUTION	If injured by jets of hydraulic oil, immediately seek medical attention as the oil may penetrate skin and cause infections. Wash affected area with soap and water. DO NOT USE ORGANIC SOLVENTS (petrol, kerosene).

 CAUTION	If the hydraulic oil contaminates the eyes, flush the eyes with plenty of water. In case of irritation, seek attention of an ophthalmologist.

2.4. WARNING/INFORMATION SIGNS AND TEXT ON THE TRAILER

The warning signs and messages 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 no.	Safety symbol (marking)	Meaning of the symbol (marking) or text	Location on the machine
1.		Read the 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.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			
11.		Lifting point	On the chassis frame side members
12.		**Please note!** Do not perform any checks or servicing under the loaded or tilted load body without the support.	At the support
13.		**Please note!** 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 16 t"	On the load body left and right wall.
15.		"Load capacity 18 t"	On the load body left and right wall.
16.		Maximum hydraulic system pressure: 16 MPa	On the floor front crosspiece

CAUTION

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 with new ones.

2.5. LOCATIONS OF SIGNS ON THE MACHINE


MF
T935/2
14,15,16
1,2,3,4,5
6,7,8,10,13


MF
METAL-FACH
4

2.6. TECHNICAL CHARACTERISTICS

Item no.		Description	
I General data			
1.	Vehicle type	farming half-pipe tipper trailer	
2.	Manufacturer:	METAL-FACH Sp. z o.o. 16-100 Sokółka, ul. Kresowa 62	
3.	Type (model)	T935	
4.	Body type	platform	
5.	Nameplate location	chassis frame front crosspiece	
6.	S/N stamping location	on the nameplate and underneath	
II Dimensions and weight		**T935/1**	**T935/2**
7.	Length, mm	8260	8260
8.	Width, mm	2550	2550
9.	Height (w/top section), mm	2880 (3680*)	2880 (3680*)
10.	Number of axles, pcs.	2	2
11.	Wheel track, mm	1900	1900
12.	Loading room size		
	- length, mm	6700	6700
	- width, mm	2220	2220
	- height (w/top section), mm	1500 (2000*)	1500 (2000*)
13.	Cubic volume, m^3	22/29.5*	22/29.5*
14.	Kerb weight [kg]	5400 - 6000*	5400-6000*

15.	Rated load capacity [kg]	18100	16100
16.	Maximum total weight authorised, kg	20500	20500
17.	Maximum total weight technical, kg	23500	23500
18.	Tyre size	550/60-22.5	550/60-22.5
III. Standard accessories			
19.	Pneumatic double-line braking system with manual adjustment of braking force		
20.	Mechanical screw parking brake		
21.	Axes and mechanical suspension (parabolic leaf spring) — for 40 km/h		
22.	Lighting system 12 V		
23.	Hydraulic actuator		
24.	Tow bar with transverse spring		
25.	Chute orifice in rear gate		
26.	Working platform with railing		
27.	Manual rear hitch		
28.	Pneumatic socket, electrical, hydraulic for second trailer		
29.	Hydraulically-operated rear gate		
30.	Automatic locking of gates		
31.	Wedges for wheels 2 pcs.		
32.	Hydraulic support foot for drawbar		
IV. Additional item			
33.	Tarpaulin cover with supports		

34.	Load box lacquer coat (e.g. to match tractor's colour)
35.	Stream chute
36.	Top sections 500 mm
37.	Steering axle
38.	Front ball hitch Ø80 mm
39.	Warning triangle
	*depending on equipment

3. OPERATION INFORMATION

3.1. COMMISSIONING THE TRAILER

WARNING!

- Use only tractors that are fit for service (with the transport hitch, the pneumatic system 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 tyre pressure;
- couple the trailer with the tractor:
  - set the tow bar hitch-ring of the trailer at the trailer 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;
  - connect the appropriate sockets and plugs of the pneumatic 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, the connections and safety from accidental release or misalignment;
- release the trailer's parking brake.

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

CAUTION

Only couple the trailer with the tractor transport hitch rated for the minimum load of 25 kN. No bystanders shall remain between the trailer and the tractor when the two are being coupled.

3.2. COUPLING THE TRAILER WITH THE TRACTOR

The T935 farming trailer may be coupled to tractor provided all couplings (hydraulic, pneumatic and electric) as well as hitch in the trailer meet the manufacturer's requirements.

Use the procedure described below to couple the trailer with the tractor. Remember to immobilise the trailer.

COUPLING THE TRAILER WITH THE TRACTOR:

- Activate parking brake to make trailer stationary
- Align the tractor with the trailer's drawbar link.
- Move the tractor in reverse towards the trailer and connect the hydraulic support cable.
- Using the support, place the drawbar link so as it is possible to connect the machines.
- Move the tractor in reverse and connect the trailer to the coupling and check the tightness of coupling
- Stop the tractor's engine, close the cab to secure it against access by unauthorised persons.
- Connect pneumatic system's hoses.
- Connect the hydraulic system hoses: braking, tipping and rear brake
- Connect the electrical system cables.

CAUTION

No bystanders may stand between the machines during coupling of the tractor and trailer. During the coupling the tractor's operator shall caution and make sure that no bystanders remain in the danger zone.
Verify that the hydraulic system is depressurized before coupling the hydraulic lines.

Use the procedure described below to uncouple the trailer from the tractor.

DECOUPLING THE TRAILER:

- Activate parking brake on the trailer and tractor.
- Place wedges under wheels to secure the trailer against movement.
- Lower the support to the ground.
- Stop the tractor's engine, close the cab to secure it against access by unauthorised persons.
- Disconnect the electrical system lines from the tractor.
- Disconnect the pneumatic system lines from the tractor.
- Disconnect the hydraulic system hoses: braking, rear brake, support and tipping.
- Plug the line ends.
- Unlock the tractor coupling, uncouple the trailer link and move tractor away.

CAUTION

Exercise special care when disconnecting the trailer from the tractor. Do not remain between the trailer and the tractor if not necessary.

3.3. 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. Make sure that all wall and top section locks are engaged before loading the trailer.

Spread the load evenly across the entire load body surface.

When transporting materials that exert focused (topical) 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.

When transporting large volume materials, install the top sections of the load body walls. If the transported materials protrude from the trailer, follow the applicable traffic code regulations for proper marking of protruding loads. The user of the trailer is obliged to secure the load being transported against free movement and falling on the road.

CAUTION

Make sure that after lowering the rear gate, the hook lowers completely and locks the bolt of the rear gate.

CAUTION

Do not exceed the permissible load capacity of the trailer.
If possible distribute the load on the load body evenly.

Approximate weight values of certain goods 1 m³ = kg			
Soil	1600–1800	Legumes	760–820
Wheat	710–820	Construction rubble/ aggregate	1400–1850
Rape	700–750	Lime	900–1500
Potatoes	625–725	Hard coal	1200–1600
Sugar beets	650–700	Common bricks	1000–1200
Rye	640–760	Barley	600–750

3.4. SECURING LOAD

The user of the trailer is obliged to secure the load being transported against free movement and soiling the road. If you cannot prevent that, do not drive the on public roads.

When transporting materials which might damage the load body coat on contact, use appropriate packaging to prevent escaping of the materials (e.g. crates, drums, bags, etc.). Rinse the load body with water under high pressure after transporting such materials.

Use beams in case of materials which might exert spot loads on the load body floor.

3.5. LOAD TYPES

3.5.1. LOOSE LOADS

Loose materials shall be loaded using loaders, conveyors or manually. The load level must not be higher than wall or top section outline. After loading, distribute the load (seeds, sand, gravel or powders, etc.) evenly across the complete load body. Very fine granulated materials shall be transported in a perfectly sealed load body. Use silicone, film, profiled rubber seals or rope to seal the body. It is necessary to place a tarpaulin cover on the load to protect against falling of the material on the road and also help to prevent the risk of humidity entering the material in case of loose loads.

3.5.2. CHUNK OR LUMP LOADS

Chunk or lump loads usually include hard materials with significantly larger size than in case of loose loads. If the load body is not correctly prepared before, such materials may cause dents on walls and floor and grind lacquer coat. To prevent that, place thick plywood, planks or other insulating materials on the side walls and floor of the load body. Ignoring this may void warranty.

Such materials shall be loaded from low heights as it may fall on the load body's floor with high force even though it is protected.

3.5.3. DANGEROUS GOODS

According to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) such loads (defined in detail in the Agreement) must not be transported using farming trailers. Exceptions: pesticides and fertilizers may be transported using farming trailers in packaging defined in ADR.

3.5.4. LARGE VOLUME LOADS

Loading of low weight, large volume loads, e.g. hay, straw, green fodders, pressed cubes or bales, etc. shall be performed using appropriate tools: forks, bale catchers, etc. This type of load exceed the height of load body but pay particular attention to the stability of trailer and correct securing of load. Remember that high level of loading of the trailer is disadvantageous for stability.

3.5.5. PACKAGED GOODS

Goods being transported in packaging (bags, crates) shall be next to each other, starting from the front wall. If you need to place goods in layers, place individual lots alternatively. The load must be distributed tightly and on the complete area of the floor. Otherwise, the load may shift during transport. Due to the trailer load, packaged may be placed only under the load body wall outline or top section.

CAUTION

Due to numerous materials and tools which may be transported as well as various fixing and securing methods, it is impossible to describe all types of loads. Use your experience and common sense during loading.

 CAUTION	Incorrectly secured, moving load is a danger both for the tractor's operator and others on the road. Incorrect loading, securing of the trailer and overloading are the main reasons for transport accidents. The load must be distributed on the trailer in such a way that it does not endanger the trailer's stability and does not make driving of tractor and trailer set difficult.

 WARNING!	Make sure no bystanders are present in the loading/ unloading zone or near the load body being tipped.

3.6. LOAD TRANSPORT

Follow the traffic code regulations when travelling on public roads; act sensibly and carefully. You can find the most important instructions for driving the tractor coupled trailer below.

1. Make sure there are no bystanders near the trailer and tractor before moving. Make sure your visibility is correct. Check the correct coupling between trailer and tractor and whether the hitch is locked.
2. Do not exceed the allowable design speed as well as the speed defined in traffic code regulations. The speed of the tractor and trailer set must be adapted to road conditions.
3. Towing of the trailer is allowed on slopes up to 80 degrees; unloading is allowed only on horizontal ground.
4. When travelling on public roads, place a slow moving vehicle sign on the trailer, on the rear load body wall.
5. When reaching a turn or slope slow down accordingly.
6. Avoid driving on slopes and sharp turns.
7. Remember that the braking distance of a tractor and trailer set is significantly longer in relation to trailer load.
8. The set (trailer & tractor) operator must place a certified warning triangle on the trailer.
9. Activate parking brake and place wedges under wheels of an uncoupled trailer to secure against rolling.

 CAUTION	Do not overload the trailer, distrubute the load evenly on the area of the load body to avoid exerting excessive pressure on the trailer's axes. Exceeding the allowable load value of the trailer may lead to damages as well as voiding warrnaty.

3.7. UNLOADING THE TRAILER

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:

- Stop the trailer on a level and hard ground.
- Align the tractor with the trailer's axis.
- Engage the tractor's parking brake.
- Open the rear gate using actuators by moving hydraulic system distributor's lever in the tractor.
- Move the control lever for tipping hydraulic system circuits.
- Use the distributor lever in the operator's cab to tip load body; clean floor edges after unloading.
- Close the rear gate using actuators (until locked with locking hooks).
- Make sure the rear gate is correctly locked before starting.

CAUTION

- It is prohibited to unload the trailer if a second trailer is coupled.
- Do not drive with the lifted load body.
- It is prohibited to "jerk" the trailer in order to unload material difficult to unload.

3.8. STREAM CHUTE

Stream chute for trailers is available as an option. It is installed on the back wall of the trailer and is intended for unloading bulk materials. This enables precise metering of material to packaging (bags, grates). Use the lever to manually set the gap. To do that, loosen the locking screw to open the gate to the desired height and lock it with screw.

CAUTION

When unloading with chute, lifting the load body must be smooth and slow because the lifting it quick may exert very high loads on the rear part of the load body which endangers the stability of the machine.

4. STORAGE, SALE AND SHIPPING TO USER

4.1. STORAGE

- Protect the trailer against direct exposure to sunlight and rain. Park it with its land wheels chocked on a hard-paved ground (reduce tyre pressure and cover the tyres if there is a risk of exposure to sunlight).
- If the trailer is exposed to weather, 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.

4.2. SALES

- The buyer collects the trailer from the manufacturer or the sales representative on their own, or arranges the delivery with the manufacturer.
- The trailer is sold as fully assembled and ready for operation, complete with the basic equipment listed in this Manual. Optional equipment is available for 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 chassis front crosspiece 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.

4.3. SHIPPING TO USER

The trailer shall be transported from the sales representative on wheels as 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, extend the low-bed trailer ramps and release the transport straps used to secure the farming trailer from 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.

5. MAINTENANCE AND SERVICING

During the whole operation period of T935 trailer it is necessary to continuously check the technical condition and perform maintenance activities. The user of the trailer is obliged to perform the necessary maintenance and adjustment activities defined by "Metal - Fach" sp. z o.o.

5.1. 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.

To do so:

1. Couple the trailer with the tractor and engage the tractor parking brake.
2. Jack up one side of the trailer to lift the wheel from the ground on this side and secure the trailer against falling.
3. If the wheel has excessive clearance, remove the hub cap and remove the crown nut clevis pin.
4. Rotate the wheel and tighten the crown nut at the same time until the wheel stops turning.
5. 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.
6. 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 evident resistance (not 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 the grease or damage of bearings.These symptoms require removal of the wheel hub to be corrected, if found. These symptoms require removal of the wheel hub to be corrected, if found.

CAUTION

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.

5.2. BRAKES

5.2.1. 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. 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.

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.

5.2.2. 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 an excessive clearance between the shoes and the drum from the brake shoe 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 on the same axle should be stopped evenly; the brake force differential between the left and right trailer side shall not exceed 30%, with 100% being the higher force.

Park the trailer so that the rear wheels rotate freely. Loosen the nut (4) so that the arm (2) is able to move against the shaft (1). Retighten the nut (4) when the position of the shaft (1) against the arm (2) results in a slight rubbing of the brake shoes against the drum while turning the wheel. Repeat for the other wheel.

After the correct adjustment of friction components, the wheel should rotate smoothly, without cogging or evident resistance (other than 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.

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 the right angle between the cable and the expander shaft lever).

 CAUTION	Regularly inspect all braking components before driving for: • Proper operation • Tightness (seal) • Play and readjust or repair as necessary.

5.3. 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.

 CAUTION	• Regularly inspect the wheel nuts (i.e. the condition and tightness before each use of the trailer); retighten if necessary.
	• Periodically inspect the wheel nuts (i.e. the condition and tightness before each use of the trailer); retighten if necessary.
	• Nut tightening torques for different thread sizes:
	  • M18x1.5 = 270 Nm.
	  • M20x1.5 = 350 Nm.
	  • M22x1.5 = 475 Nm.

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

5.4. HYDRAULIC SYSTEM

5.4.1. 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.

5.4.2. SERVICING OF THE LOAD BODY HYDRAULIC TIPPING SYSTEM

The hydraulic system features a safety cable (which acts as a tipping angle limiter of the load body) and the cut-off valve that isolates the oil flow to the hydraulic actuator when the body is tipped. No unauthorised persons are 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 the cable between the load body frame and the cut-off valve may result in damage of the trailer or a risk of turning over the trailer.

5.5. LUBRICATION

Proper lubrication is one of the most critical factors that condition good performance of individual assemblies and mechanisms of the trailer.

Compliance to the manufacturer's guidelines for lubrication significantly reduces the risk of damage or premature wearing of individual parts.

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
Eye catch	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.

5.6. MAINTENANCE AND SERVICING

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, while producing the 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 from 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 mechanisms.
- Check and perform lubrication according to the instructions.
- Check the tyre pressure.
- Check the wall locks for proper engagement and security.
- Wall top sections 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.

6. AUTHORISED SERVICE

6.1. 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.

6.2. ONGOING MAINTENANCE

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

6.3. ORDERING SPARE PARTS

Spare parts should be ordered from authorised resellers or directly from the manufacturer stating the full name of the user or company name and address. Send your order with the name, symbol, serial number and year of manufacture of the machine, catalogue name of the part, catalogue number of drawing or standard, and number of ordered items. Then arrange the terms of payment.

7. DISMANTLING, DISPOSAL AND ENVIRONMENTAL PROTECTION

T935 farming tipping half-pipe trailer is made of environmentally-friendly materials. After its service life expires and further operation is no longer justified the trailer must be dismantled.

Due to the heavy weight of the parts it is required to use lifting devices such as a gantry crane or a forklift during the dismantling process.

Segregate the dismantled components. Pass the dismantled components to relevant collection points. Waste oil from the hydraulic system should be collected in sealed containers and released to a point which collects such waste.

 CAUTION	During disassembly of the trailer use proper protective clothing and shoes.

8. RESIDUAL RISKS

8.1. DESCRIPTION OF RESIDUAL RISKS

METAL-FACH Sp. z o.o. is liable for the design and build in order to eliminate all hazards, some partial 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:

- The trailer is operated by minors or persons who are not licensed for tractor driving, or who are unfamiliar with the Operating Instructions.
- The trailer is operated by persons who are ill or under the influence of alcohol or other intoxicants.
- The trailer is used for purposes other than specified in the Operating Instructions.
- A person is present between the tractor and the trailer with the tractor's engine running.
- Bystanders, especially children are present near the working trailer.
- The trailer is cleaned while working.
- Manipulation of the driving unit on the tractor and the moving elements of the trailer while the machines are working.
- Checking the trailer's technical condition while it is running.

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.

8.2. EVALUATION OF THE RESIDUAL RISK

Follow these guidelines:

1. Always follow the safety regulations described in the Operating Instructions.
2. Read and fully understand the Operating Instructions.
3. Keep your hands out of hazardous spaces.
4. It is forbidden to operate the trailer in the presence of bystanders and 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 Instructions.
7. The trailer is protected against access by children.
8. Only then can you eliminate the residual risks to people and the environment when using this trailer.

CAUTION

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

9. 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 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 to the construction of the machine introduced by the user will result in automatic termination of 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 is 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 such repairs, the service station 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.

CAUTION

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

METAL-FACH

16-100 SOKÓŁKA, POLAND	UL. KRESOWA 62

WARRANTY CARD

FOR HAL-PIPE TIPPING FARMING TRAILER

T935

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

filled out by the seller

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

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