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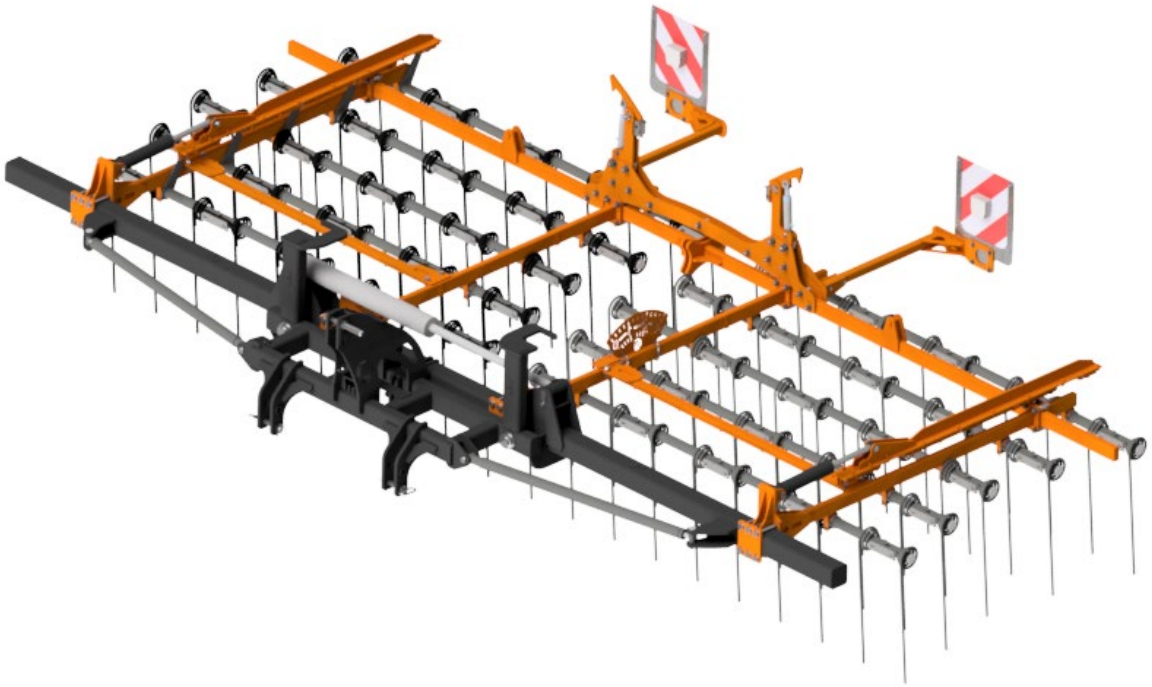
INSTRUCTION MANUAL

MBS STRAW BREAKER



Issue II
Gliwice 2022

EC DECLARATION OF CONFORMITY

FOR A MACHINE

In accordance with the Ordinance of the Minister of the Economy dated 21 October 2008 (Journal of Laws No. 199, item 1228)
and the Directive of the European Union no. 2006/42/EC of 17 May 2006

MANDAM Sp. z o.o.
ul. Toruńska 14
44-100 Gliwice

hereby declares at its sole responsibility that the following machine:

MBS STRAW BREAKER
type/model: .....
year of manufacture: .....
serial number: .....

under this declaration, complies with:
the **Ordinance** of the Ministry of Economy of 21 October 2008 on fundamental requirements for machinery (Journal of Laws No. 199, item 1228)
and the **Directive** of the European Union 2006/42/EC of 17 May 2006.

Persons responsible for the technical documentation for the machine: Jarosław Kudlek, Łukasz Jakus
ul. Toruńska 14, 44-100 Gliwice, Poland

For assessment of compliance the following standards have been applied:

PN-EN ISO 13857:2010
PN-EN ISO 4254-1:2016-02
PN-EN ISO 12100-1:2005/A1:2012
PN-EN ISO 12100-2:2005/A1:2012
PN-EN 982+A1:2008

This EC Declaration of Conformity shall be cancelled
if the machine is modified or redesigned without consent of the manufacturer.

Prezes Zarządu
Dyrektor
inż. Bronisław Jakus

V-ce Prezes Zarządu
Dyrektor ds. Techniczno-Organizacyjnych
mgr inż. Józef Seidel

Gliwice 07.06.2019
Place and date of issue

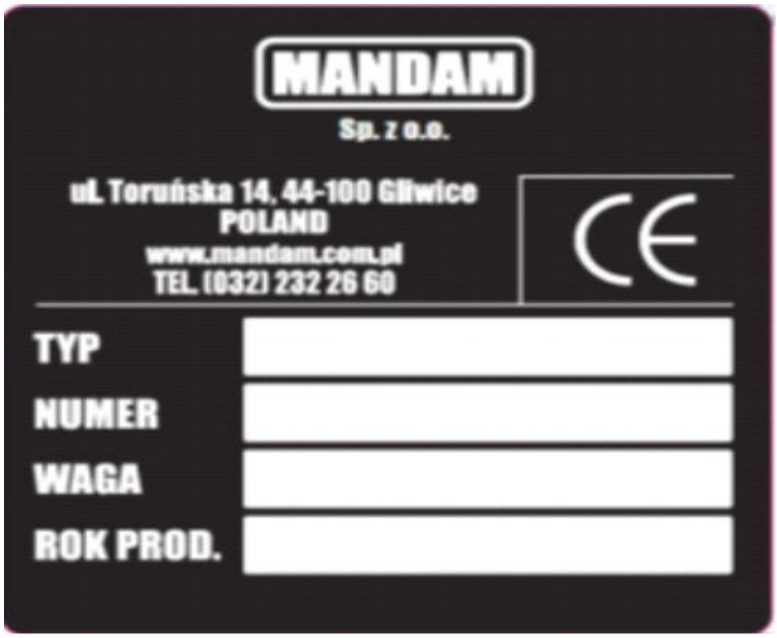
.....
First and last name, position held and signature of the person authorized

1. Introduction

Congratulations on your purchase of the MBS straw breaker. This instruction manual provides information on the hazards that may occur during implement use, operation, technical data and the most important indications and recommendations, the knowledge and use of which is a prerequisite for proper operation. Keep this manual for future reference. Should you have any problems with understanding any statement in the instruction manual, please contact the manufacturer.
The following mark indicates the guidelines that are important due to safety reasons:

Machine identification

Identification data of the straw breaker, including basic information on the manufacturer and the machine and CE marking, can be found on the rating plates placed on the load-bearing frame.



The warranty for the MBS straw breaker is valid for 12 months from the date of sale.

The warranty card constitutes an integral part of the machine.

Whenever you request any information on spare parts, provide the serial number.

For more information on spare parts:

- please visit our website at: http://mandam.com.pl/parts/
- call us at +48 668 662 289
- e-mail us at: czesci@mandam.com

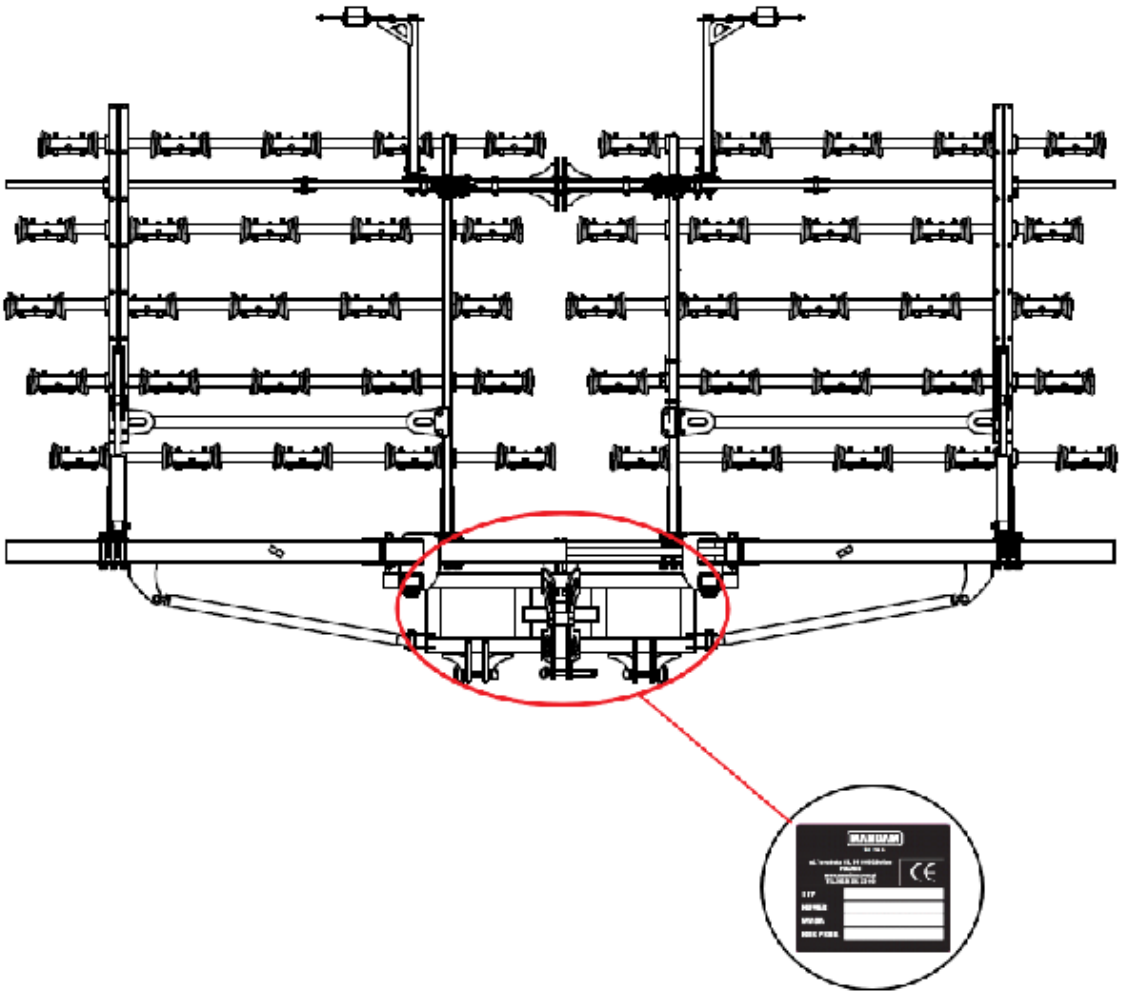


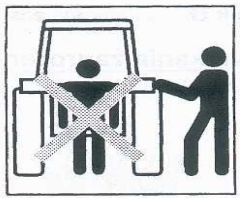
Fig. 1 View of the MBS straw breaker with the location of the rating plate.

1.1. Safety symbols and inscriptions

Remember! Special care must be taken when using the MBS straw breaker in case of areas marked with special information and warning signs (yellow stickers).

The following symbols and inscriptions can be found on the implement. Secure the symbols, signs and inscriptions against loss and make sure they are legible at all times. If lost or illegible, replace the signs and inscriptions with new ones. For information about the purchase of information and warning signs please contact MANDAM spare parts department.

Table 1 Information and warning signs

Safety sign	*Meaning of the safety sign*	*Location on the implement*
	Read the instruction manual prior to operating the implement	Drawbar adjacent to the mounting place of the upper fastener
	Danger of toe or foot crush	Drawbar adjacent to the mounting place of the upper fastener
	Keep clear from lift bars while controlling the lift	Drawbar adjacent to the mounting place of the upper fastener
	Keep clear from foldable and moving parts of the implement	Side frames
	Do not reach into the crushing zone if the components can move	Drawbar at the attachment points of the side frames

Safety sign	*Meaning of the safety sign*	*Location on the implement*
	Liquid jet under pressure – hazard of bodily injury	Cylinders

2. General information

2.1. Design of the MBS straw breaker

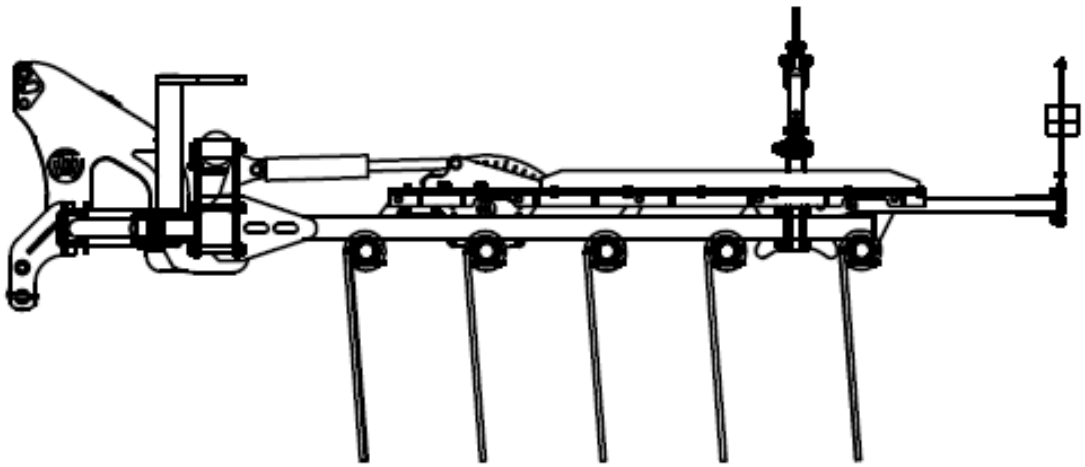


Fig. 2 Side view of the MBS breaker, with the claw working section visible.

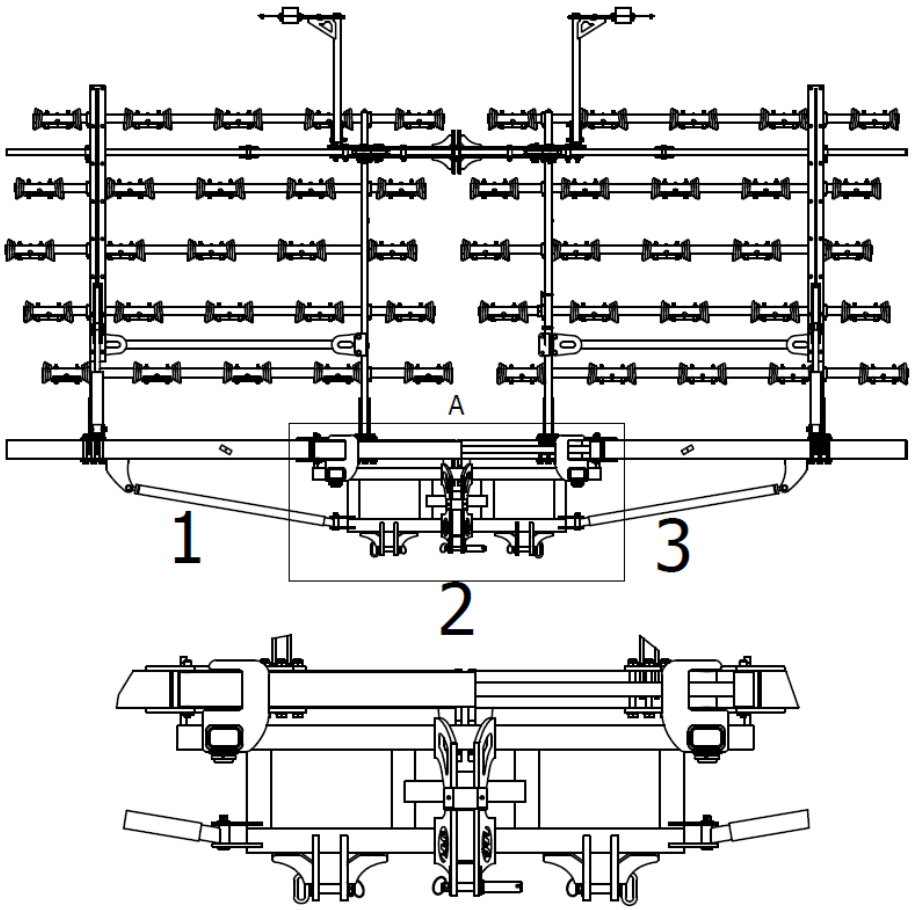


Fig. 3 Parts of the MBS straw breaker: 1 - right frame with working section, 2 - drawbar, 3 - left frame with working section.

2.2. Optional equipment:

1. **Lights**

Fig. 4 Lighting component.

2. Support wheel

Fig. 5 Support wheel assembly.

3. Disc beam

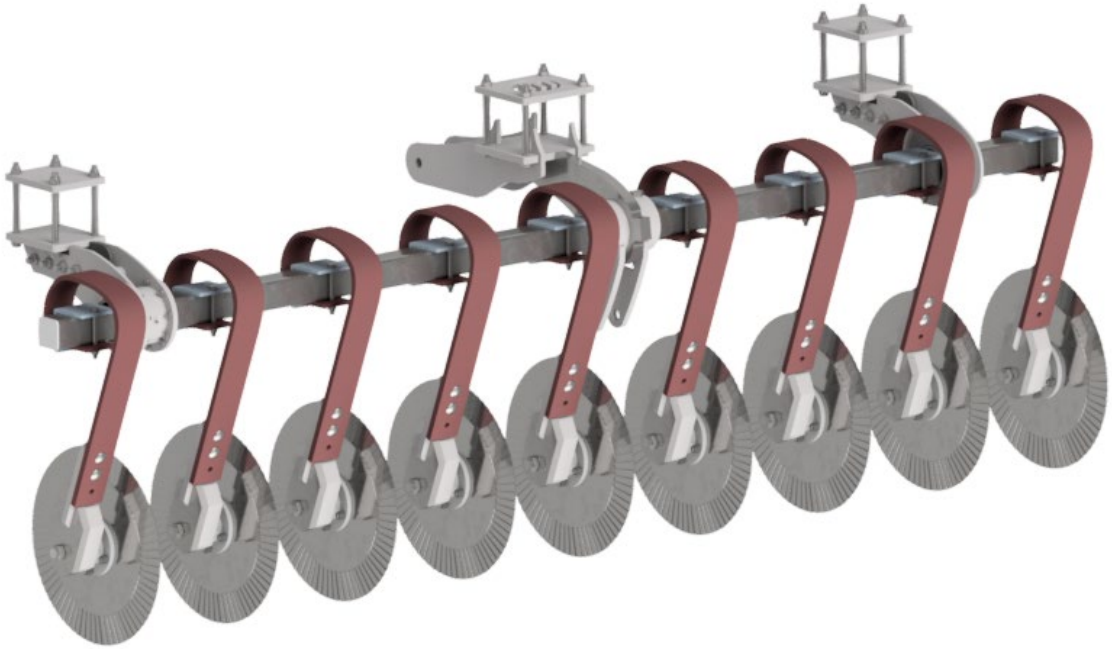


Fig. 6 Disc beam assembly.

2.3. Intended use of the MBS straw breaker

Straw breakers are designed to mechanically break and remove straw from the soil surface and aerate the soil by loosening the surface. With the MBS straw breaker, the field is cleared of excess straw and the soil is aerated, which accelerates plant growth.

CAUTION! The MBS straw breaker is designed exclusively for field processing. Using the implement for tasks that differ from the intended use shall be regarded as misuse, resulting in loss of warranty.

CAUTION! Failure to comply with the instruction manual shall also be construed as misuse. The manufacturer shall not be liable for any damage arising out of misuse.

3. General safety information

The MBS straw breaker may only be started, used and repaired by persons familiar with its operation and that of the tractor being used and the rules for its safe use and operation. The manufacturer shall not be liable for any unauthorised alternation of the straw breaker. Only genuine original MANDAM spare parts shall be used during the warranty period.

The straw breaker must be operated with all precautionary measures, in particular:

- each time before starting operation check the implement and the tractor whether their condition guarantees safety during operation and travel,
- minors under 16 years of age, ill, disabled or intoxicated persons (under the influence of alcohol or drugs) must not operate the implement,
- use protective clothing, footwear and gloves during maintenance work,
- do not exceed the maximum axle loads and transport dimensions,
- use only original cotter pins and pins,
- do not approach the implement when it is being lifted or lowered, folded or unfolded,
- do not stay between the implement and the tractor when the engine is running,
- move forward, lift and lower the implement slowly and smoothly without sudden jerks, making sure that nobody stays in the vicinity,
- do not reverse and make U-turns when the implement is lowered to the working position,
- when making U-turns do not use independent tractor brakes,
- during the operation and travel do not stand on the implement and do not put additional loads onto it,
- while making U-turns, pay due caution if anyone is in the vicinity,
- do not operate the straw breaker on slopes with the inclination exceeding 12°,
- any repairs, lubrication or cleaning of working components may be performed as long as the engine is not running and the straw breaker is lowered and unfolded,
- there is a hazard of head injury when you perform maintenance or replacement of parts under the implement without adequate protection – wear a hardhat,
- during a break in the work, always lower the implement to the ground and stop the tractor engine,

- secure the extensions from uncontrolled opening while stationary and during transport,
- driving and parking the implement on an unstable slope may cause sliding and soil slipping,
- store the implement in a manner preventing injury to people and animals.

3.1. Hitching and unhitching to a tractor

- Make sure that the implement is hitched to the tractor in accordance with the instructions, remembering to secure the bolts with cotter pins.
- While hitching the tractor with the straw breaker, do not stay between the implement and the tractor.
- The tractor used together with the straw breaker must be fully functional and in good working order. Do not attach the implement to a tractor with a defective hydraulic system.
- Remember to observe the following: balance of the tractor and the suspended straw breaker, tractor steerability and braking performance – the front axle load must not drop below 20% of the total tractor load – a kit of front weights.
- In the rest position the implement unhitched from the tractor shall maintain a stable balance.

3.2. Hydraulic system

The hydraulic system operates under high pressure. Take all precautionary measures, in particular:

- do not connect and disconnect hydraulic hoses when the tractor hydraulic system is pressurised (hydraulics set to neutral position),
- check regularly the conditions of connections and hydraulic hoses,
- do not use the implement until the hydraulic system is repaired.

CAUTION! On implements with folding side extensions, clean the machine thoroughly after use so that excessive soil residues do not put additional strain on the machine side extensions and thus on the cylinders!

3.3. Transport safety on public roads

For the period of transport, the side sections of the MBS straw breaker must be put in transport position using the hydraulic system. The breaker should be protected from unfolding by an automatic extension lock.

The clearance under the implement during the drive shall be at least 30 cm.

While transporting the straw breaker public roads, it is absolutely mandatory to use lights, an identification sign and reflective side lights.

Do not exceed the maximum travel speeds:

– up to 25 km/h on smooth (asphalt) roads,
– 6-10 km/h on country roads or cobblestones,
– up to 5 km/h on bumpy roads.

Adapt the drive speed to the road conditions to prevent the implement jumping on the tractor's three-point hitch. Maintain particular caution when passing and overtaking and on bends. The maximum implement working width on public roads is 3.0 m. Do not drive with the implement when the inclination of the slope with reference to the implement exceeds 7°.

WARNING! Failure to observe the above rules may pose hazard to the operator and other people and can lead to the implement damage. The user shall be liable for any damage caused by failure to observe the rules.

According to the road traffic safety regulations (Regulation of the Minister of Infrastructure of 31 December 2002, Journal of Laws No. 32 of 2002, item 262) – an implement unit consisting of an agricultural tractor and an agricultural implement hitched with the same must meet the requirements identical to those applying to the tractor itself.

CAUTION! The implement protruding outside the rear side outline of the tractor and obscuring tractor rear lights is a hazard for other vehicles driving on the roads. Driving on public roads without adequate marking if forbidden.

The machine's markings are:

- **two portable warning plates** mounted on the central frame of the machine. Rear-mounted plates should be equipped with combination and reflective red lights visible from the rear and white position lights visible from the front.

The manufacturer does not provide warning plates as standard equipment for the machine. Warning plates are commercially available. The warning plates must be securely fixed in the brackets and the plug must be connected to the tractor's electrical installation socket. Check the lights before transporting the implement.

Lift the implement and check the clearance between the lowermost part of the implement and the ground which shall be minimum 30 cm.

3.4. Residual risk description

Mandam Sp. z o.o. makes every effort to eliminate the risk of accidents. However, there is some residual risk that may result in an accident. The biggest hazard occurs when/during:

- using the implement for purposes other than described in the manual,
- operating the implement by people who are underage and do not have licences, are ill or intoxicated,
- presence of people and animals within the implement operating range,
- precautionary measures are not taken during transport and maneouvering with the tractor,
- anyone gets between the implement and the tractor while the tractor's engine is running,
- maintenance and when the service and operation recommendations are not observed,
- driving on public roads.

3.5. Residual risk assessment

The residual risk can be minimised by applying the following recommendations:

- operate the implement carefully and without undue haste,
- read the instruction manual carefully,
- keep a safe distance from hazard zones,
- do not stay on the implement and within the implement operating range when the engine is running,

- perform the maintenance in accordance with safety rules,
- wear safety clothes and a safety helmet while working under the implement,
- prevent the access of unauthorized personnel and especially children to the implement.

4. Information on operation and use

4.1. Preparation of the MBS straw breaker

Prior to operation check the technical condition of the straw breaker, in particular that of the working parts and screw and bolt connections.

CAUTION! The permissible loads on the axles and tyre load capacities must not be exceeded. The load on the front axle of the tractor must not be less than 20% of the normal load.

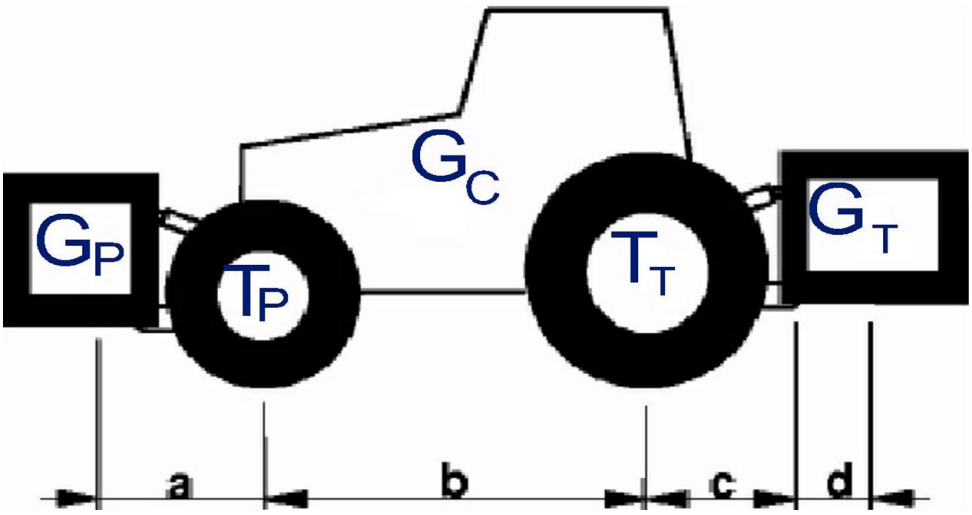


Fig. 7 Diagram with markings of tractor loads.

Axle load calculations

Key:

G_C – tractor's gross weight,

T_P – front axle load for the unhitched tractor,

T_T – rear axle load for the unhitched tractor,

G_P – total weight of the rear-mounted implement,

G_t – total weight of the front-mounted implement,

a – distance between the centre of gravity of the front-mounted implement and the axle centre,

b – tractor wheelbase,

c – distance between the rear axle centre and the centre point of the hitching pin of the rear-mounted implement,

d – distance of the centre of gravity of the implement from the hitching pins of the tractor (assume 1.5 m for hitched implements, and 3 m and 0.7 of weight for semi-hitched implements),

x – distance of the centre of gravity from the rear axle (assume 0.45 if the manufacturer does not provide this parameter).

Minimum load at the front in case of a rear-mounted implement:

$$G_{Pmin}=\frac{G_T\cdot(c+d)-T_P\cdot b+0{,}2\cdot G_C\cdot b}{a+b}$$

Actual load on the front axle

$$T_{Pcal}=\frac{G_P\cdot(a+b)+T_P\cdot b-G_T\cdot(c+d)}{b}$$

Actual total weight

$$G_{cal}=G_P+G_C+G_T$$

Actual load on the rear axle

$$T_{Tcal}=G_{cal}-T_{Pcal}$$

4.2. Hitching the straw breaker with the tractor

Tyre pressure in the tractor wheels must comply with the values recommended by the manufacturer. The lower bars of the three-point hitch should be at the same height, spaced correspondingly to the spacing of the hitch lower points. While attaching the machine to the tractor, the implement must be placed on hard and even ground.

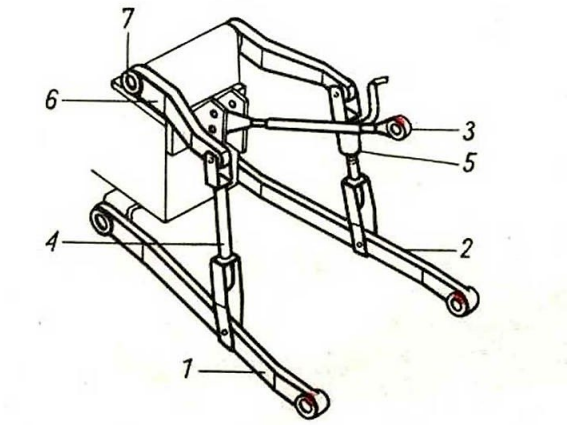


Fig. 8 Three-point hitch of the tractor: 1,2 – lower bars, 3 – upper fastener, 4 – left support rail, 5 – right support rail with adjustable length, 6 – lift arm, 7 – lift shaft

While attaching the MBS straw breaker to the tractor, complete the following steps:

- switch the tractor hydraulic system into adjustment position,
- remove lower hitch bolts (if the tractor three-point hitch is not equipped with hooks),
- reverse carefully, suspend the implement on the lower bars and secure,
- attach the tractor's upper fastener (in case of implements without chassis) – during the operation of the implement, the hitch point of the upper fastener at the machine must be higher than the attachment point of this fastener at the tractor,
- check the lifting, lowering of the straw breaker and the operation of the hydraulic system.

4.3. Operation and adjustment

Unlock the mechanical protection of the side sections before unfolding for use.

4.4. Protection against unfolding

The MBS straw breaker, when folded, must be secured against unfolding with an automatic side extension lock. The lock uses a mechanism consisting of a cylinder and a hook (Fig. 9).

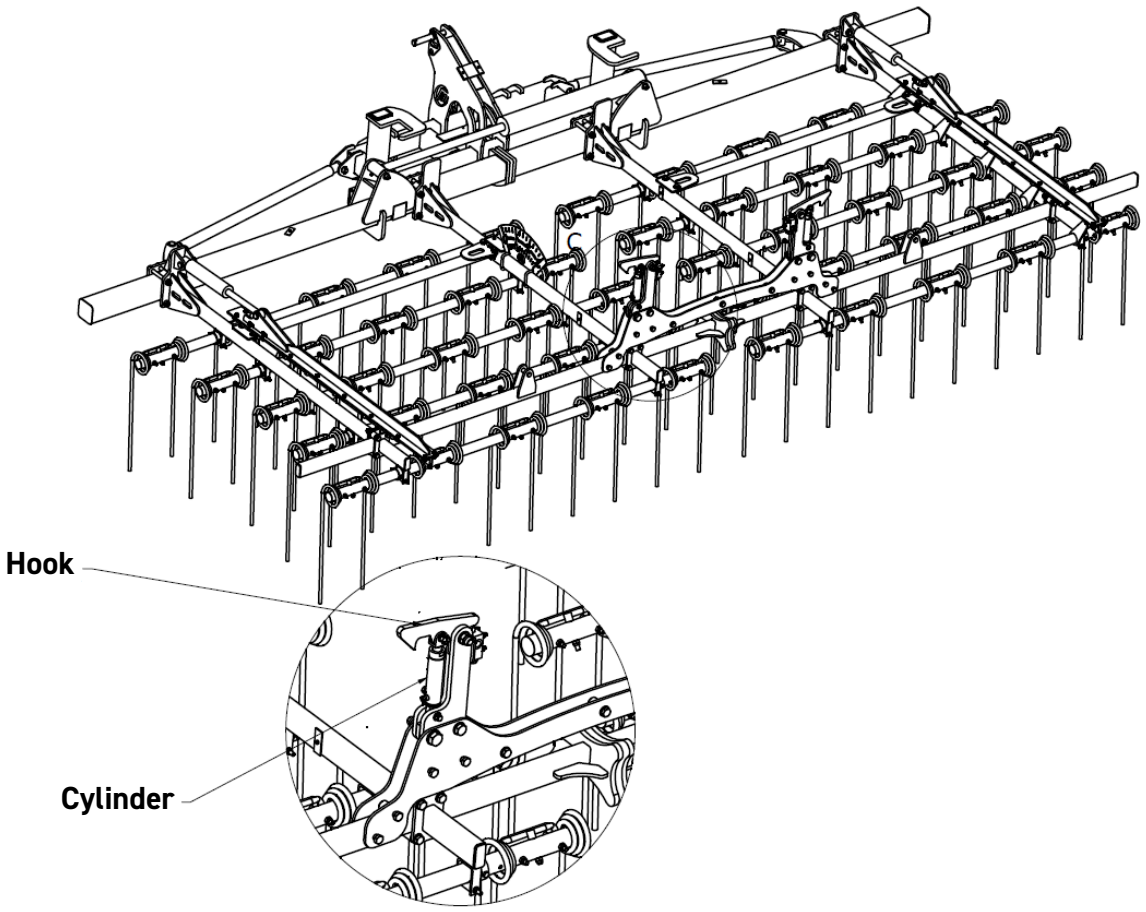


Fig. 9 Implement with automatic side extension locking mechanism

4.5. Implement opening sequence

Before unfolding the folding side the extensions of the machine, learn the opening sequence to perform this operation correctly.

1. First, raise the implement as much as possible to be able to fold it correctly, avoiding the risk of the folding arms catching on the ground during movement (Fig. 10).
2. Next, fold the implement side extensions hydraulically into the “closed” position to ensure that the side extension lock mechanism will unlock and allow the implement arms to be opened at a later stage. This operation is necessary each time the arms are opened (Fig. 10).

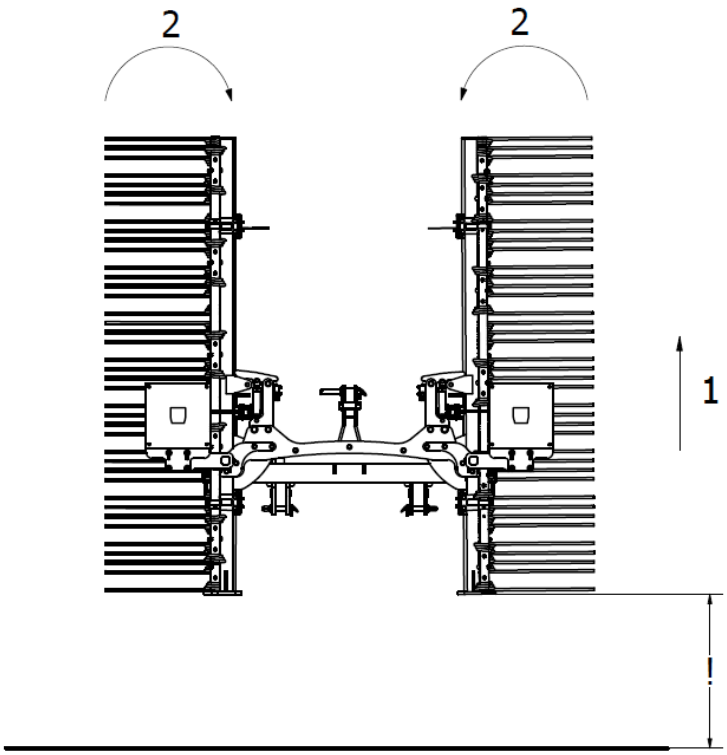


Fig. 10 Implement opening sequence: 1- raise the implement up to the maximum, 2- fold the side extensions into the “closed” position.

3. Then, after making sure that the hook of the hydraulic side extension lock mechanism allows the machine side extensions to be unlocked, proceed to open them fully (Fig. 11).

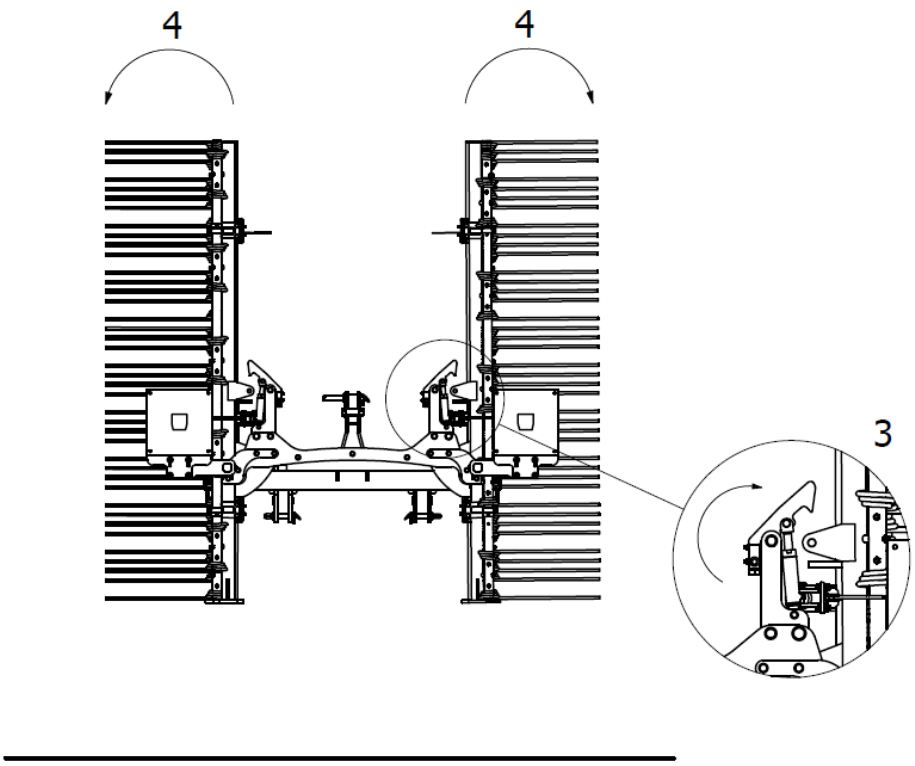


Fig. 11 Implement opening sequence: 3- release the hook of the hydraulic side extension lock mechanism, 4- open the implement side extensions.

4. When opening the implement's side extension arms, make sure that the ends of the arms are at the correct height to prevent them from catching on the ground (Fig. 12).

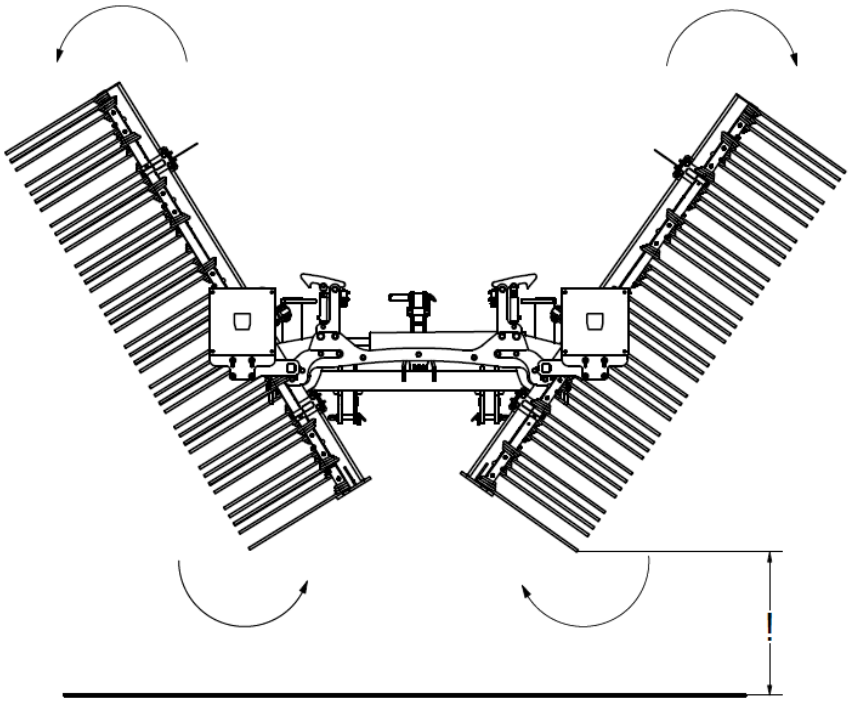


Fig. 12 Implement opening sequence: open the implement paying particular attention to the height of the arm ends from the ground.

5. To complete the opening sequence of the implement side extensions, wait until the hydraulic mechanism opens the arms to their end position. Do not interrupt the opening process of the arm side extensions without ensuring that they are fully open.

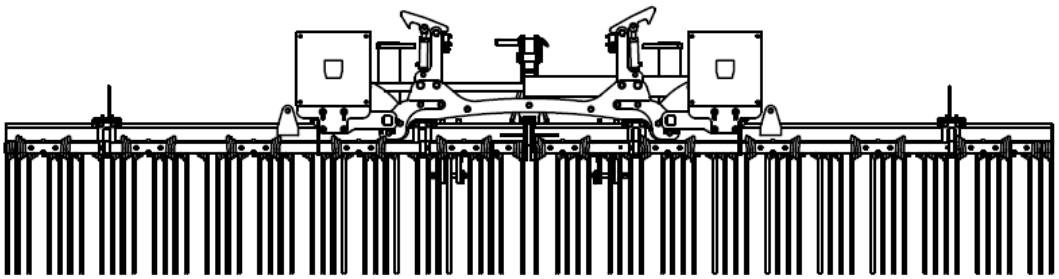


Fig. 13 View of the implement at the completion of the side extension opening sequence. The implement arms are fully open.

4.5.1. INTERLOCK ASSEMBLY INSTRUCTIONS

Pre-set the position of the claw assembly in the straw breaker before working in the field. Also level the machine lengthwise with the tractor upper fastener or with the tractor's turnbuckle or with the drawbar turnbuckle and laterally with the support rail of the right lower bar on the tractor. Then, make the first work passage to set the optimum working speed and to correct the adjustment based on an assessment of the correct operation of the individual components. **The recommended operating speed should be 10 - 15 km/h.** In a well-adjusted machine, the frame should be parallel to the ground and both working units must be equally recessed in the soil over the entire working width.

4.5.2. Claw tilt adjustment

The MBS straw breaker is equipped with hydraulic adjustment of claw tilt angle; by extending the actuator they are plumbed them and by retracting the actuator they are levelled. Adjust the claw angle only when the machine is lifted on the three-point hitch.

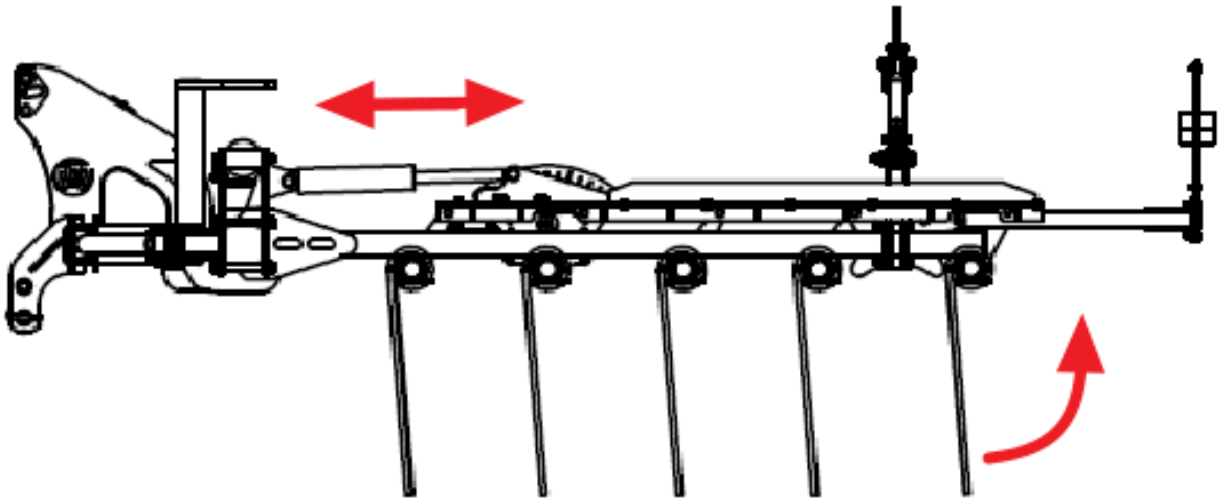


Fig. 14 Adjustment of claw tilt in the MBS straw breaker.

Table 2. MBS straw breaker – troubleshooting

Malfunction, defect	Cause	Solution
uneven digging in of working components,	improper levelling of the implement	level and align the implement lengthwise and crosswise
claws dig in excessively and increase work resistance	wrong tilt angle of working sections	adjust tilt with actuators

4.6. Maintenance and lubrication

- Clean the straw breaker from soil after each use and inspect the parts and assemblies. **Otherwise, in the case of the components being clogged with soil and the additional load occurring due to this, there may be a problem with the folding of the implement.**
- After the first 4 hours of operation, re-tighten all bolts and periodically check them for tightness. **Failure to do so will exacerbate play and backlash and result in damage to the implement.**
- Lubricate the lubrication points on the hinge bolts daily during the machine's service life.
- Use thread adhesive and only genuine screws and nuts when replacing worn parts.
- Always remember to tighten the screwed joints properly.

CAUTION! Periodic lubrication guarantees the long service life of the machine.

The long service life and efficiency of a machine depends to a large extent on regular lubrication. Use mineral greases for lubrication. Clean the lubrication points thoroughly before pressing or applying grease.

CAUTION! It is forbidden to work on a damaged machine caused by any event resulting in a broken, or deformed frame, roller or other assembly of the machine!

5. Operation

5.1. Daily maintenance

- Clean the MBS straw breaker from soil after each use and inspect the parts and assemblies. When cleaning, remove plant residues and ropes wound at the bearing points.
- After the first 4 hours of operation, re-tighten all bolts and periodically check them for tightness.
- Lubricate the lubrication points on the hinge bolts daily during the machine's service life.
- Use thread adhesive and only genuine screws and nuts when replacing worn parts.
- Always remember to tighten the bolt connections properly.

CAUTION! Periodic lubrication guarantees the long service life of the implement.

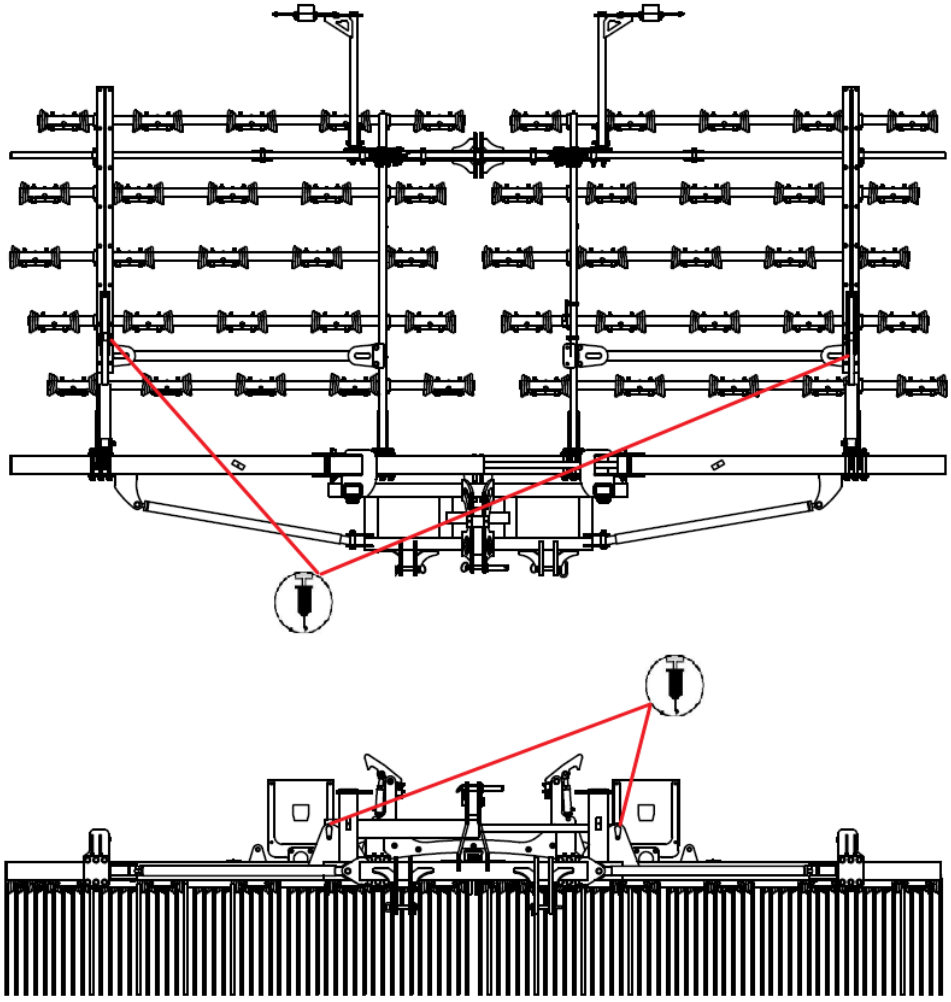


Fig. 15. MBS straw breaker lubrication points.

CAUTION! During maintenance and replacement works, the implement should be protected against overturning. It should be connected to the tractor with the parking brake on, and the tractor engine should be turned off. The side sections should be unfolded. During repairs and maintenance, use proper spanners and safety gloves; wear hardhat if necessary.

5.2. Post-season maintenance

After the end of the working season, thoroughly clean the straw breaker, repair the damaged paint coating and the worn working surfaces of the tines, strings and roller rings as well as the threads of the adjusting screws must be cleaned and protected against corrosion. In addition, perform complete lubrication. During idle periods, storage under a roof is recommended. However, if this is not possible, check the condition of the protection from time to time and supplement the grease washed away by the rain, if necessary.

5.3. Hydraulic system maintenance

Maintenance of the hydraulic system consists in visual inspections for leak tightness. Remember to insert pins into quick-fit connectors. If there is an oil leakage from connections of hydraulic hoses, the connector must be tightened. If the oil leakage is not remedied, replace the component or connector with a new one. If the leakage occurs outside the connector, replace the leaking hose with a new one. Mechanical damage also requires replacement of the component. It is recommended that the hydraulic hoses be replaced every 5 years.

If oil appears on the piston rod of the hydraulic cylinder, check for the nature of the leakage. Check the sealing once the piston rod is fully moved out. Small leakage which results in covering the piston rod with an oil film is acceptable (damaged wiper seal). If the amount of oil is greater or there are oil drops, shut down the unit for the period required to repair the malfunction (damaged sealing).

6. Replacement procedures

Replacement of working parts

The claws can be used almost until they are worn out – until the cross-section decreases significantly. However, it is advisable to replace the claws early enough before they break, for example, or bend, which can harm other parts of the implement. Parts working in the ground should be screwed using thread glue.

If the components of the machine are disassembled several times, it is necessary to inspect and replace (if required) connecting components such as bolts, washers or nuts, excessive wear of which can lead to uncontrolled loosening of the connected components, and consequent damage to the same.

When working with extremely worn working tools, working on the implement may cause excessive wear on other working parts. Tools should be replaced when their wear and tear exceeds the limits allowed by the manual. Otherwise damage may occur, for which the manufacturer SHALL NOT BE HELD RESPONSIBLE!

Replacement of cylinders

A malfunctioning cylinder (leakage, etc.) must be replaced. Dismount it to have it inspected by a specialised company. Cylinder replacement must be performed when the implement is unfolded.

Connect the cylinder to the system and with one side mounted repeat the operating cycle several times until the cylinder is completely filled with oil. Otherwise, the section being lowered may suddenly fall down.

7. Storage

The MBS straw breaker should be stored in a roofed place. If there is no roofed space, external storage is permitted. **The implement should be stored in a location where it is not hazardous to people and the environment.** If the implement is stored outdoors for a long time, repeat the maintenance activities on the workpieces as soon as the preservative layer disappears. The machine, when disconnected from the tractor, should stand on level and paved ground. Lower the implement gently so that it does not come into contact with hard surfaces. The implement should rest on support feet and be secured against movement. It is recommended to store the implement on a paved firm surface in roofed areas, inaccessible to unauthorised persons, bystanders and animals.

8. Disassembly and withdrawal from service and scrapping

CAUTION! Take all precautions during the disassembly: use appropriate tools and personal protective equipment. Dispose of the disassembled parts in accordance with the environmental protection requirements.

When operated in accordance with the guidelines in the instruction manual, the implement will have a long life; however, worn or damaged parts must be replaced. In the event of emergency damage (major cracks and deformation of the frames) impairing the quality of the machine operation and posing a risk to its further operation, the machine must be withdrawn from service.

Disassembly of the implement should be carried out by persons who are familiar with its design. These operations must be performed when the machine is placed on level, firm ground. Disassembled metal parts should be scrapped. Oil must be drained into a tight container and disposed of with the hoses at a disposal plant.

9. Technical characteristics

Table 3 Technical specifications of the MBS straw breaker

Type	Operating width	Number of tines	Min. power demand	Weight
	m	pcs.	HP	kg
MBS 6.0 H	6.0	50	80	1310
MBS 7.3 H	7.3	60	95	1370

10.Spare parts of the MBS straw breaker.

In order to search, find prices and order original spare parts visit our website at www.mandam.com.pl, “parts” tab.

There you can find catalogues and spare part sheets in PDF format, containing current part drawings and diagrams for each machine or implement, together with part numbers and prices.

Purchase orders for parts can be placed or enquiries related to the same can be sent directly from this website (tab: “contact/order”), or sent to the following e-mail address: czesci@mandam.com.pl

A purchase order should contain part numbers and quantities, as well as details of the ordering party/payer together with a contact phone number.

The parts are sent directly to the specified address on the COD basis.

If in doubt, please contact Mandam Spare Parts Department at: +48 32-232-2660 extension 39 or 45 or at + 48 668-66-22-89 (mobile).

Original MANDAM spare parts are also available from all authorised MANDAM distributors.