

MANDAM

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INSTRUCTION MANUAL

HYBRO weeder





CE DECLARATION OF CONFORMITY



FOR A MACHINE

Pursuant to the Ordinance of the Ministry of Economy of 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

Przedsiębiorstwo Produkcyjno-Handlowe „MANDAM” Sp. z o.o.

ul. Toruńska 2

44-100 Gliwice, Poland

hereby declares at its sole responsibility that the following machine:

HYBRO WEEDER

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.

The persons responsible for the technical documentation for the machine:

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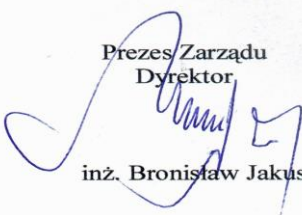
For assessment of compliance the following standards have been applied:

PN-EN ISO 13857:2010,
PN-EN ISO 4254-1:2009,
PN-EN ISO 12100-1:2005/A1:2009,
PN-EN ISO 12100-2:2005/A1:2009
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.

Gliwice, 18 April 2014
Place and date of issue

.....
Surname, first name, position
and signature of the
authorised person

Prezes Zarządu
Dyrektor

inż. Bronisław Jakus

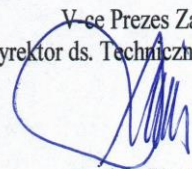
V-ce Prezes Zarządu
Dyrektor ds. Techniczno-Organizacyjnych

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1. Introduction

Congratulations on your purchase of the HYBRO weeder.

This instruction manual contains the information on hazards that may occur during work with the device, technical data and the most important guidelines and recommendations to be known and applied to ensure a 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:



The machine is provided with a name plate to be found on the main frame. The name plate presents basic data allowing the identification of the machine:

Type _____ Number _____

Weight _____ Year of manufacture _____

The warranty for the HYBRO weeder is valid for 24 months and runs from the date of sale.

The warranty card can be found at the end of the manual.

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/>
- or call us at +48 668 662 239
- e-mail: czeski@mandam.com.pl

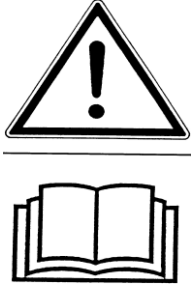

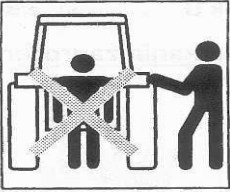

Machine identification




Identification data of the HYBRO weeder, 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.

1.1 SAFETY SIGNS AND INSCRIPTIONS

The following signs and inscriptions can be found on the machine. Protect the signs and safety inscriptions so that they cannot be lost or become illegible. If lost or illegible, replace the signs and inscriptions with new ones.

Table 1. Information and warning signs

Safety sign	Meaning of the safety sign	Location on the machine
	<p>Read the instruction manual prior to operating the machine.</p>	<p>Weeder frame adjacent to the mounting of the upper fastener</p>
	<p>Danger of toe or foot crush</p>	<p>Weeder frame adjacent to the mounting of the upper fastener</p>
	<p>Keep clear from lift bars while controlling the lift</p>	<p>Weeder frame adjacent to the mounting of the upper fastener</p>
	<p>Keep clear from foldable and moving parts of the machine</p>	<p>Front part of the mid frame adjacent to side frames</p>

Safety sign	Meaning of the safety sign	Location on the machine
	<p>Do not reach into the crushing zone if the elements can move</p>	<p>Mid frame adjacent to side frames</p>
	<p>Liquid jet under pressure - injury</p>	<p>Cylinders</p>
	<p>Fixing point for transport belts</p>	<p>Upper part of the drawbar (upper fastener bolt) Rear part of the frame:</p> <ul style="list-style-type: none"> • rigid frame (adjacent to the roller depth adjustment) • foldable frame (adjacent to the upper fastener bolt on the mid frame)

1.2. Hybro weeder design

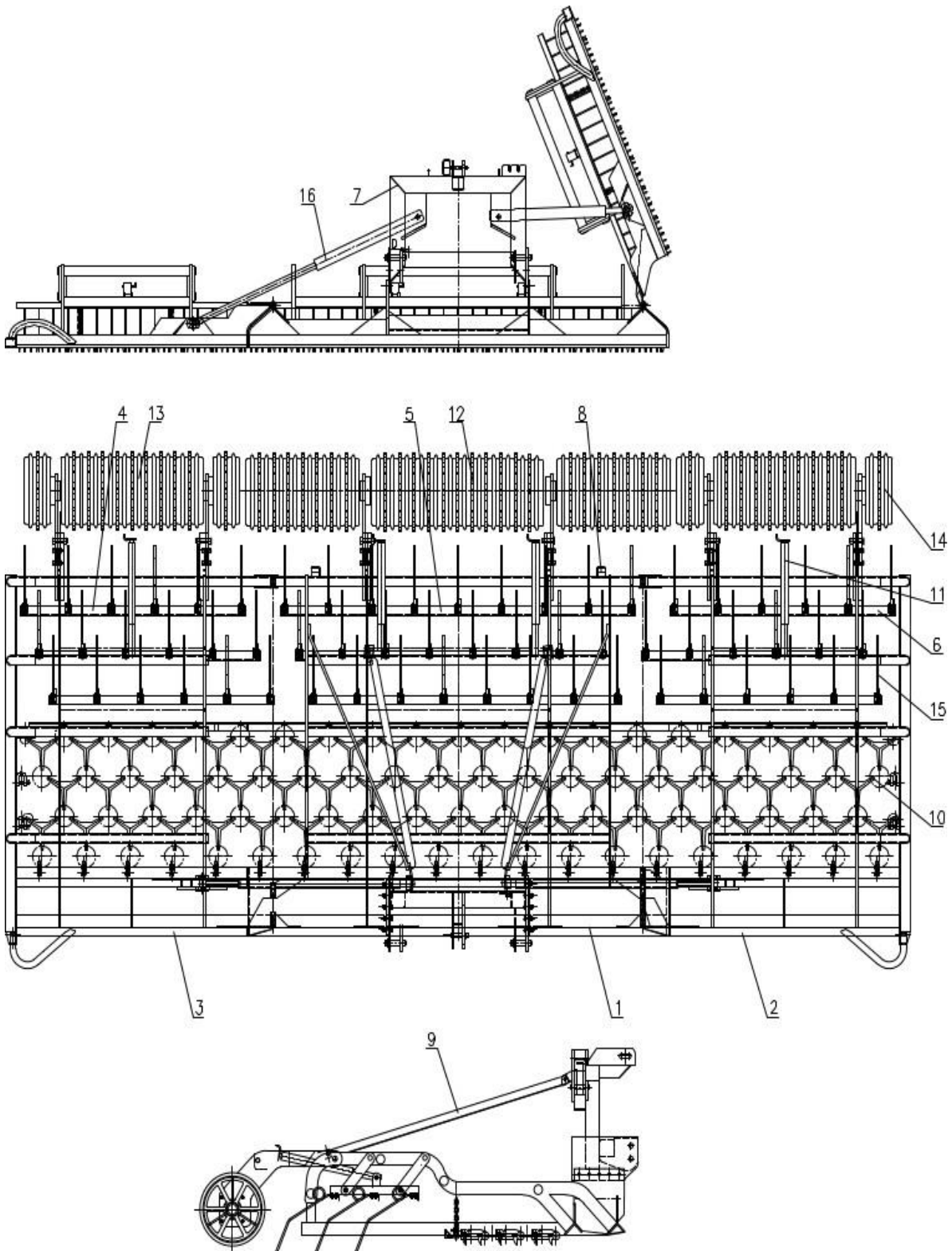


Fig. 1 Design of the HYBRO weeder: 1 - central frame, 2 - right side frame, 3 - left side frame, 4 - right side tool section, 5 - central tool section, 6 - left side tool section, 7 - drawbar, 8 - foot, 9 - strip, 10 - weeder grid, 11 - section adjustment mechanism, 12 - central cast iron shaft Ø525, 13 - right side cast iron shaft Ø525, 14 - left side cast iron shaft Ø525, 15 - spring tine, 16 - hydraulics

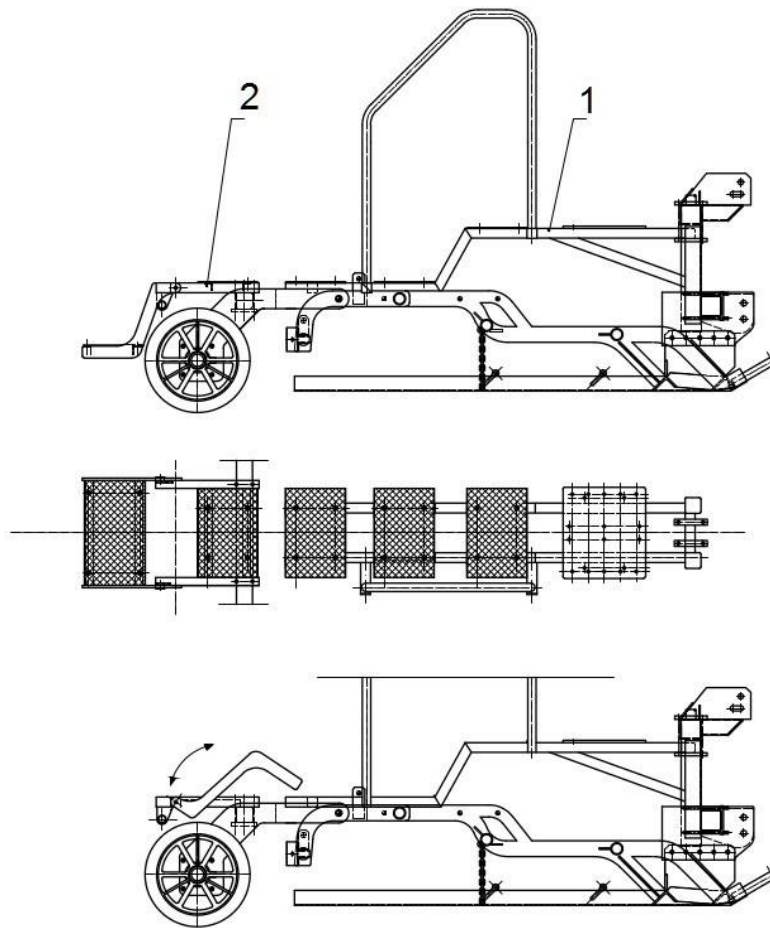


Fig. 2 Supporting structure of the HYBRO weeder: 1 - horizontal section of the supporting structure, 2 - rotating section of the supporting structure

2. Intended use of the Hybro weeder

The HYBRO weeder is designed to mechanically remove weeds and to aerate the soil by its agitation. It is used for grassland care at meadows and pastures, to aerate and thin the turf, which results in earlier beginning of the vegetation season and stimulates growth of new, stronger plants. It has a positive impact on the nutritional value of the fodder. The drag evens out molehills and levels the surface. If the machine is equipped with a sower, grass can easily be sown or fertilizer spread on the ground. The cast iron shaft presses the seeds into the soil; as a result, seedling emergence is improved, any spots in the turf are filled in sooner, and fertilizer dissolution and distribution in the soil is enhanced.



CAUTION! The weeder is designed for agricultural use only. Using the machine for tasks that differ from the intended use will be regarded as misuse, resulting in loss of warranty.



CAUTION! Failure to follow the guidelines included in this instruction manual will be regarded as misuse. The manufacturer shall not be liable for any damage arising out of misuse.

3. General safety information

The Hybro weeder can be operated and repaired only by persons familiar with its operation and the attached tractor as well as the rules of safe operation and maintenance of the machine. The manufacturer shall not be liable for any unauthorised alternation of the weeder. Only genuine parts manufactured by MANDAM are allowed during the warranty period.

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

- before every start-up, check Hybro and the tractor, make sure that their conditions guarantee safety of traffic and operation,
- persons under age, disabled or intoxicated (under the influence of alcohol or drugs) must not operate the machine,
- wear work clothes, shoes and gloves during maintenance,
- do not exceed permissible axle loads or transport dimensions,
- only genuine safety and split pins may be used,
- while using Hybro, no bystanders, in particular children can be present in the vicinity when the machine is being lowered, lifted, unfolded or dismounted,
- do not stay between the tractor and the weeder when the engine is running,
- move forward, lift and lower the weeder slowly and smoothly without sudden jerks, making sure that nobody stays in the vicinity,
- obey traffic rules while travelling on public roads and attach transport equipment such as lights as well as reflective and warning devices,
- do not stand on the machine or apply additional loads during operation and transport,
- while making U-turns, pay due caution if anyone is in the vicinity,
- any repairs, lubrication or cleaning of working components may be performed as long as the engine is not running and the unit is lowered and unfolded,
- while taking a break, lower the machine onto the ground and stop the tractor engine, store the machine properly so that no person or animal can be injured,
- no U-turns or reversing is allowed with the lowered machine.

3.1. Attaching the tractor

- Attaching the machine to the tractor must be carried out in accordance with the guidelines, bearing in mind the need to secure the suspension using bolts.
- While attaching the tractor to Hybro, it is forbidden for any person to stay between the machine and the tractor.
- The tractor used together with the weeder must be fully functional. It is forbidden to attach the machine to any tractor with a malfunctioning hydraulic system.

- Make sure that the tractor with the attached unit is stable, and the tractor steerability and stopping power can be maintained. The load on the front axle cannot decrease to less than 20% of the total load on the tractor axle - use a set of front-mounted weights (Chapter 4.1).
- When in resting position and disconnected from the tractor, the machine must be stable all the time.

3.2. Hydraulic system

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

- do not connect and disconnect hydraulic hoses when the tractor's hydraulic system is pressurised (hydraulics set to neutral),
- check regularly the conditions of connections and hydraulic hoses,
- while repairing a hydraulic or pneumatic malfunction, withdraw the machine from service.

3.3. Transport on public roads

For the period of transport, the side sections of the Hybro weeder must be put in transport position using the hydraulic system. Before folding, the machine must be lifted sufficiently high until the folded side sections do not collide with the ground.

The weeder must be protected against unfolding by means of the mechanical lock. When the machine is folded and unfolded, make sure to secure the lock with a string.

While in transport, the clearance under the machine must be at least 30 cm.

While transporting the unit on public roads, it is absolutely mandatory to use lights, an identification sign and reflective side lights in case it is attached to the rear three-point linkage.

While transporting, do not exceed the speed, which is:

- up to 20 km/h on smooth-surface (asphalt) roads,
- 6-10 km/h on field or sett paving roads,
- up to 5 km/h on bumpy roads.

Travelling speed must be adapted to the road and the existing conditions so that the roller cannot jump on the tractor suspension system and excessive loads on the machine frame and the tractor suspension system can be avoided.

Act with due caution when passing and overtaking or travelling at curves. The permissible width of the machine travelling on public roads is 3.0 m.



CAUTION! Any failure to observe the above rules may pose hazard to the operator and other people. It may result in damaging the machine as well. The user shall be liable for any damage caused by the failure to observe the rules!

3.4. Description of residual risk

Mandam Sp. z o. o. acts with due diligence to eliminate the risk of accidents. However, there is some residual risk that may result in an accident. The greatest risk is posed:

- if the machine is not used according to this manual,
- if the machine is operated by persons under age, disabled or intoxicated (under the influence of alcohol or drugs),
- if persons or animals are present within reach of the machine,
- if caution is not paid during transport and maneuvering with the tractor,
- if persons are standing on the machine or between the machine and the tractor when the engine is running,
- during operation when operation guidelines are not followed,
- when travelling on public roads.

3.5. Residual risk assessment

Residual risk may be reduced to a minimum provided the following recommendations are applied:

- operate the machine carefully and without rush,
- read the manual carefully,
- keep clear from hazardous zones,
- it is forbidden to stand on the machine or be present in the working zone when the engine is running,
- perform maintenance in accordance with safety rules,
- wear safety clothes and a safety helmet while working under the machine,
- prevent unauthorised persons from accessing the machine, in particular children.

4. General operation instructions

The HYBRO weeder is made up of the main frame and hydraulically lowered side arms which can be folded when the machine is transported. Other components are: drawbar and operating sections in the form of beams to which teeth and a cast iron drag are attached. The teeth are made of spring steel and guarantee thorough soil copying. The drags are joined by means of steel rings, thus creating a kind of grid which is hung on special brackets welded to the frame. The design of brackets and drag make it possible to dismount the grid and install it in the direction opposite to the factory-made.

The three-point linkage is located in the front part of the frame and is designed to hang the weeder on the hydraulic lift of the tractor. An oblong slot in the top lug (for attachment to the tractor's fastener) is designed to improve the machine's free movement against the ground.

All HYBRO weeder types with working width of more than 3 m are provided with a hydraulic system for lifting side sections.

4.1. Before using the Hybro weeder

Prior to operation check the technical condition of the machine, first of all that of the hydraulic system and screw connections. If there is any play in the screw connections, the screws shall be tightened. Worn or damaged hydraulic hoses shall be replaced immediately. Check if the spring tines of the HYBRO weeder are securely fastened. If necessary, lubricate the lubricating points (arm hinges).

After checking its technical condition, the HYBRO weeder may be attached to the tractor.

Tyre pressure in the tractor wheels must comply with the values recommended by the manufacturer. The lower bars of the three-point linkage should be at the same height, spaced correspondingly to the spacing of the lower points of suspension.



CAUTION! Do not exceed the permissible axle load and tyre carrying ability. The front axle load cannot be lower than 20%.

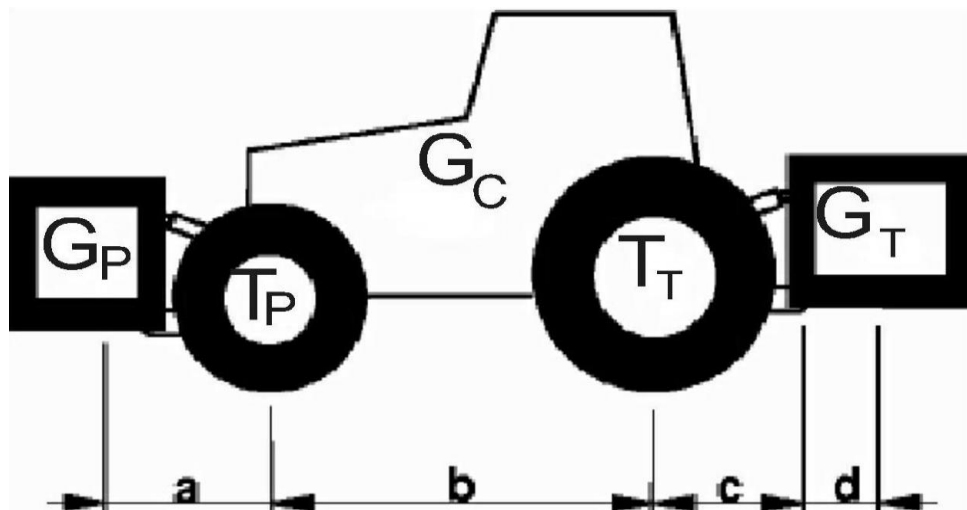


Fig. 3 Diagram of the markings of tractor loads.

Axle load calculations

Marking:

G_C - tractor weight,

T_P - front axle load if the tractor is empty,

T_T - rear axle load if the tractor is empty,

G_P - total weight of the rear-mounted machine,

G_T - total weight of the front-mounted machine,

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

b - tractor wheelbase,

c - distance between the rear axle centre and the centre point of the hitch bolt of the rear-mounted equipment,

d - distance between the machine's centre of gravity and the centre point of the hitch bolt (Hybro standard: 1.2 m, Hybro with the roller: 2 m),

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 if this is a rear-mounted machine:

$$G_{Pmin} = \frac{G_T \cdot (c + d) - T_p \cdot b + 0.2 \cdot G_c \cdot b}{a + b}$$

Actual load on the front axle:

$$T_{Ptotal} = \frac{G_p \cdot (a + b) + T_p \cdot b - G_T \cdot (c + d)}{b}$$

Actual total weight:

$$G_{total} = G_p + G_c + G_T$$

Actual load on the rear axle:

$$T_{Ttotal} = G_{total} - T_{Ptotal}$$

While attaching the weeder to the tractor, the machine must be placed on hard and even ground. While attaching the weeder to the three-point linkage of the tractor, complete the following steps:

- Switch the tractor hydraulic system into adjustment position.
- Remove lower hitch bolts (if the tractor lift is not equipped with hooks).
- Drive forwards carefully, suspend the machine on the lower bars and secure.
- Attach the tractor's upper fastener. During operation of the unit, the hitch point of the upper fastener at the unit must be higher than the attachment point of this fastener at the tractor.
- Check the operation of weeder lifting, lowering and the hydraulic system.



CAUTION! Coupling the tractor with the weeder must be performed carefully, at the tractor's minimum speed! When attaching the machine, make sure that no bystanders are present in the vicinity.

4.2. Adjustments

In the Hybro weeder, the working depth of the weeder's rear section is adjusted (Fig. 4) with a crank. It is also possible not to use spring tines when the machine is working.

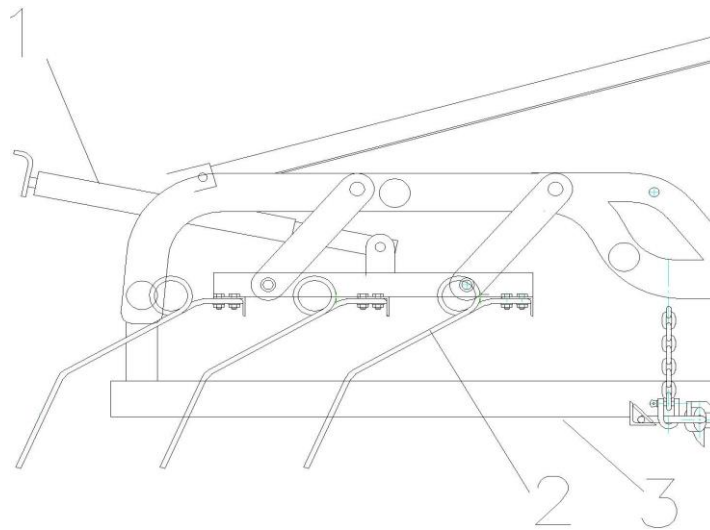


Fig. 4 Adjustments of the Hybro weeder sections: 1 - adjustment crank, 2 - weeder section, 3 - drag operating level

4.3. Protection of the hydraulic system

TELESCOPE - INTERLOCK PREVENTING SIDE ARMS OF THE AGRICULTURAL MACHINES FROM OPENING, ACC. TO THE DIRECTIVE 2006/42/EC (EU PATENT APPLICATION PENDING)

The telescope blocks the cylinders mechanically. When the machine arms are folded, the interlock automatically blocks the telescope mechanism and the arms are mechanically locked.

OPERATION OF THE TELESCOPE INTERLOCK

To release the telescope interlock, slide the cylinders all the way down by means of the tractor's hydraulic pump (close the arms completely), simultaneously pulling by the wire which must not be released until the machine's both arms are completely unfolded; the arms open under gravity or are forced open by the cylinders' movement (depending on whether the cylinders are single- or double-acting). The wire's condition and position should be monitored. The wire should lie slack over the machine, so that the operator has constant access to it from the tractor's cabin - the wire must not be blocked by any other element. When the machine is folded, the wire does not need to be tensioned, it is automatically locked.

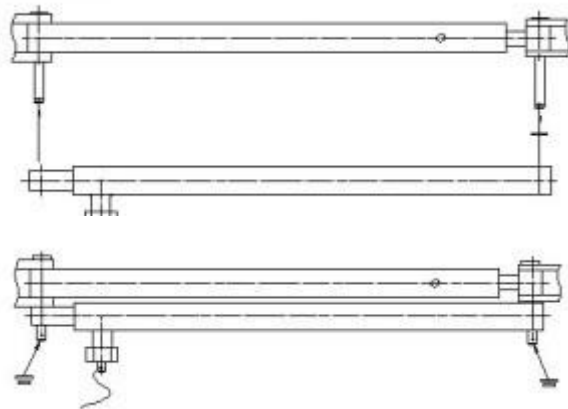
TELESCOPE INTERLOCK - ASSEMBLY INSTRUCTIONS



1. Remove the existing cylinder bolts



2. Replace them with new, longer bolts



3. Assemble the telescope on the bolts in parallel to the cylinder and secure it with safety pins

4. Hook the wire by the latch (telescope lock) and lead it to the tractor's cabin

Fig. 5 Telescope assembly

4.4. Operating the Hybro weeder

If the HYBRO weeder is hung correctly, it should move evenly behind the tractor during operation, and adhere with its entire area to the ground (the frame must be placed horizontally to the field surface). **Recommended working speed is 8 km/h.** The tractor may be reversed only if the weeder is lifted to its transport position. In the transport position of the HYBRO weeder during operation, outer sections of the machine do not need to be folded.

4.5. Maintenance

- After completing the work, lubricate roller bearings, hinges and cylinder bolts (**at least every 25 hours of operation**). For lubrication purposes, the grease of type ŁT-43 can be used.
- Once the work is completed, the soil residues must be removed from the roller. Inspect connection and sub-assemblies as well. Retighten loose screwed joints. Replace or refurbish any damaged or worn parts.
- Use only genuine screws and nuts when replacing worn parts.
- Always remember to tighten the screwed joints properly.
- Replace or refurbish any damaged or worn parts.
- Before a new work season is commenced, always add up the grease in the bearing units.

Hydraulic system maintenance

Maintenance of the hydraulic system (Fig. 6) consists in visual inspections to prove 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 element or the hose with a new one. If the leakage occurs outside the connector, the leaking hose must be replaced with a new one. Mechanical damage also requires replacement of the sub-unit. It is recommended that the hydraulic hoses should 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).

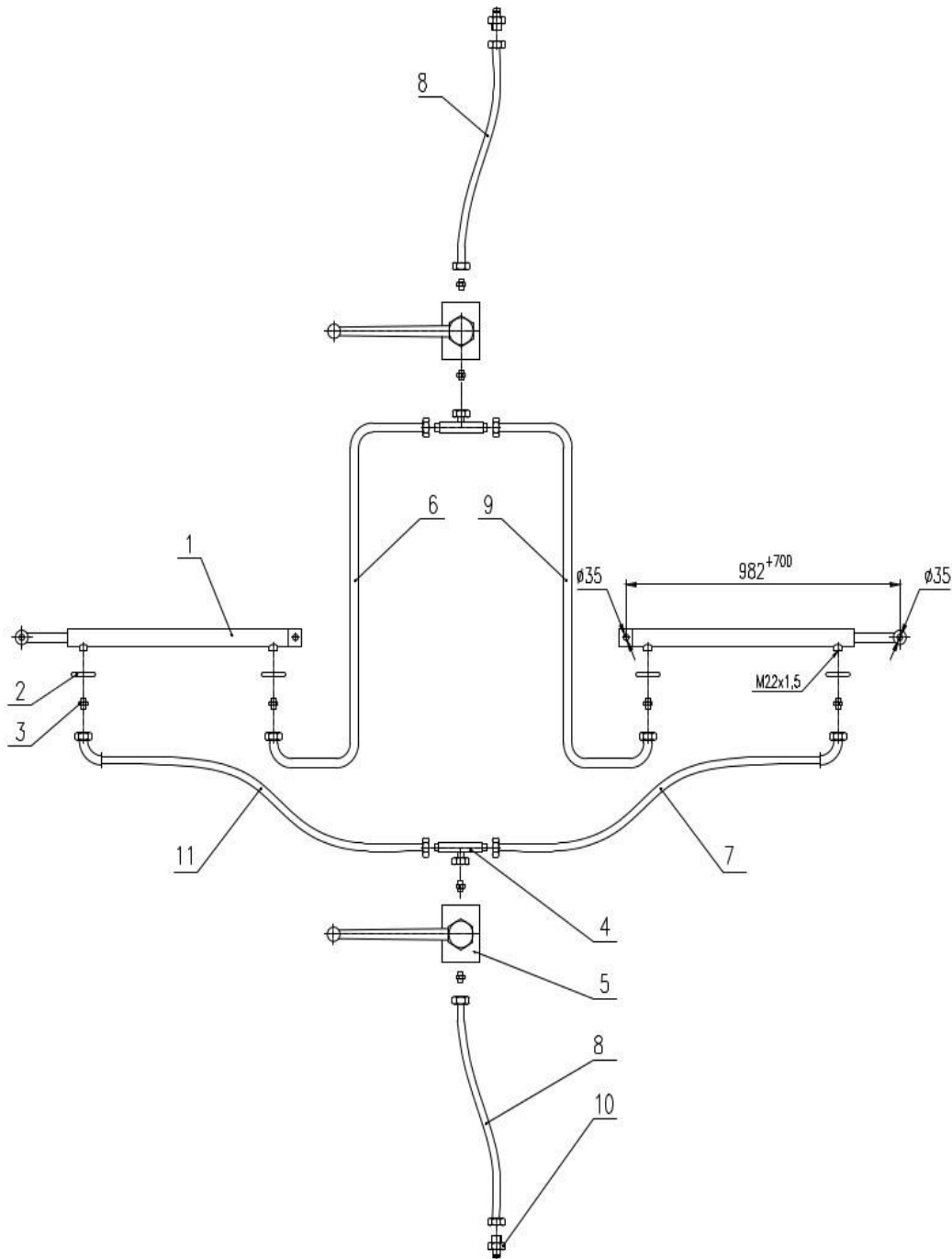


Fig. 6 Diagram of the hydraulic system of Hybro 4,0 H, 6,0 H, 8,0 H: 1 - cylinder, 2 - washer, 3 - straight reducer, 4 - three-way pipe, 5 - valve, 6 - hydraulic hose 0.7 m, hydraulic hose 1.25 m, hydraulic hose 1.35 m, hydraulic hose 0.8 m, 10 - quick coupling, 11 - hydraulic hose 1.5 m

4.6. Replacement procedures

Damaged bearings must be replaced:

- Place the machine on a horizontal surface.
- Unscrew the four bolts securing ball bearings on each side.
- Move the shaft away.
- Loose both headless bolts in each bearings to be able to pull the bearings out with the use of a puller.
- Place new bearings on the roller loosely.
- Draw the shaft between bearing plates and screw the bearings to the plates. Drive the headless screws with the use of a thread locking glue.

Damaged cylinders should be provided to a specialized regeneration company, or replaced. To re-assemble the cylinder, proceed as follows:

- connect the wires correctly (as they are connected in the other cylinder),
- first, install and secure the cylinder in the central frame,
- support the cylinder so that its piston does not collide with any part when it is pulled out,
- perform several working cycles to vent the cylinder (otherwise, the side frame will suddenly collapse, which may result in an accident or machine damage),
- place the cylinder in the frame's lug and secure it with a bolt.

5. Storage

When the work season is finished, the parts and the sub-units have to be inspected. If any part is found damaged or considerably worn, replace it with a new one. Areas of damaged paint must be cleaned out of dirt and rust. Apply anti-corrosive paint, and then apply a topcoat paint. Provide corrosive protection on the working surfaces of the weeder. If possible, store the weeder under a roof, protected against any access of unauthorised persons and animals. Hybro 4,0H, 6,0H, 8,0H shall be stored in an unfolded position.

6. Transport

For transporting the weeder, a three-point linkage on the tractor is used. Minimum clearance is 30 cm.

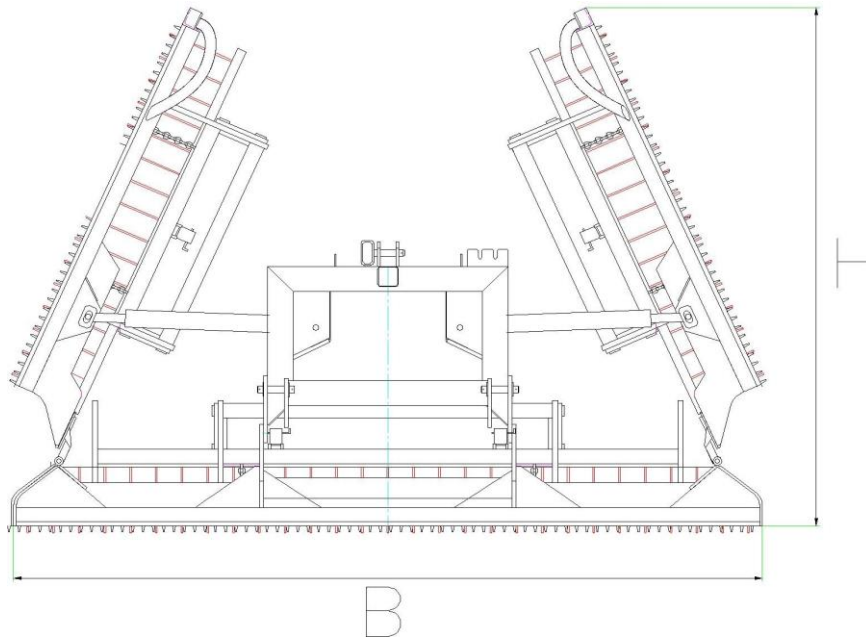


CAUTION! Travelling on public road with a machine the length and height of which is over 3.0 m and 4.0 m respectively is forbidden due to its excessive travel width.



CAUTION! While transporting the weeder attached to the rear-mounted three-point linkage, only tractors equipped with a set of front axle weights are allowed. In case of the front axle, place the additional load on the rear axle as required.

If the weeder is transported on the rear-mounted three-point linkage, before entering any public road, place an identification emblem for slow-driving vehicles in the bracket and position holders of reflective lights so that white reflective elements face the travelling direction of the tractor.



Type	H [m]	B [m]
Hybro 3,0	1.2	3
Hybro 4,0 H	1.2	2.9
Hybro 6,0 H	2.10	2.75
Hybro 8,0 H	2.90	2.75

7. Disassembly and withdrawal from service

If the degree of damage of the machine frame may pose hazard to life or cause an accident, withdraw the machine from service. The machine which is disassembled and withdrawn from use does not pose any particular threat to the natural environment. Hybro consists of elements made of steel and cast iron. Start disassembling the weeder by dismounting small parts (bolts, rings, etc.). Then, proceed with bigger parts. During disassembly, sort the parts by their material. Once disassembled, the weeder must be handed over to scrap metal yard which accepts steel for recycling. Wires and used oil should be disposed of at a waste management company.

8. Technical data of the Hybro weeder

		Hybro weeder type			
		HYBRO 3.0	HYBRO 4.0 H	HYBRO 6.0 H	HYBRO 8.0 H
Working width	[m]	3.00	4.00	6.00	8.00
Number of drags	[pcs]	26	41	59	77
Number of tines	[pcs]	28	41	61	79
Hydraulic system	-	-	+	+	+
Roller	-	optional	-	-	-
Sower	-	optional	optional	optional	optional
Supporting structure	-	optional	optional	optional	optional
Min. power demand	[kW]	40	50	65	85
Weight	[kg]	620	1150	1330	1510

9. GENERAL WARRANTY TERMS

- Only genuine spare parts for the machines manufactured by Mandam can ensure long-lasting and efficient operation. The parts for all machines manufactured by Mandam can be purchased in our dealer network or directly from the manufacturer.
- The warranty covers defects and damage arising from the manufacturer's fault caused by material defects, improper processing or assembly. The manufacturer, under the granted warranty, shall be obliged to the following actions, wherein the scope and total cost of a warranty repair shall be agreed between the Manufacturer and the other Party in each case:
 - a) repairing the claimed equipment free of charge,
 - b) providing the User with new, properly manufactured parts free of charge,
 - c) incurring the cost of labour and transport,
 - d) complete replacement of the equipment by a defect-free item if the actions stated in (a) and (b) are not successful in ensuring a proper operation of the equipment.
- Warranty servicing is performed by the Manufacturer or the assigned warranty service provider.
- The User shall report a warranty claim immediately, at the latest within 14 days after the occurrence of such damage.
- The warranty period shall be extended by the period of servicing such equipment.
- The Manufacturer will not accept any warranty claims if the equipment has been modified or repaired without the Manufacturer's knowledge or improperly stored, maintained or operated.
- If the User finds that the executed warranty service is insufficient, the User has the right to request the Seller to examine the issue with the participation of an expert to be assigned by both parties.



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WARRANTY CARD

HYBRO weeder

Type:

Serial number:

Year of manufacture:

Date of sale:

The warranty is valid for 24 months from the date of sale.
Warranty service will be performed on behalf of the Manufacturer by:

.....
(to be filled out by the seller)

.....
(manufacturer's stamp)

.....
(seller's stamp)

Present this warranty card when reporting a warranty claim.