

MANDAM

P.P.H. MANDAM Sp. z o.o.
ul. Toruńska 2 44-100 Gliwice, Poland
e-mail mandam@mandam.com.pl
Tel.: 032 232 26 60 Fax: 032 232 58 85
NIP (VAT no.): 648 000 16 74 REGON (Registration no.): P – 008173131

INSTRUCTION MANUAL

MWC/MWW CAMPBELL ROLLER

1.5. 2.5. 3.0; 4.0H 6.0H



Issue II
Gliwice 2014



EC 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

herby declares at its sole responsibility that the following machine:

ROLLER, TYPE MWC, MWW

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:

Jarosław Kudlek, Łukasz Jakus,
ul. Toruńska 2, 44-100 Gliwice, Poland


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.


President of the Board
inż. Bronisław Jakus

Gliwice, 29 December 2009
signature of the authorised person
Place and date of issue

Deputy President of the Board
Technical and Organizational Director

mgr inż. Józef Seidel

Surname, first name, position and

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1. Introduction

Congratulations on your purchase of the farming roller.

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 roller 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.

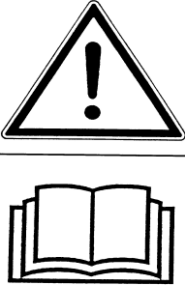



For more information on spare parts:




- please visit our website at: <http://mandam.com.pl/parts/>
- or call us at +48 668 662 239
- e-mail: czeski@mandam.com.pl

1.1 SAFETY SIGNS AND INSCRIPTIONS

The following signs and inscriptions can be found on the machine. Their meaning is provided in the table. 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>Subsoiler frame adjacent to the mounting of the upper fastener</p>
	<p>Danger of toe or foot crush</p>	<p>Subsoiler frame adjacent to the mounting of the upper fastener</p>
	<p>Keep clear from lift bars while controlling the lift</p>	<p>Subsoiler 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)</p> <p>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 Roller design

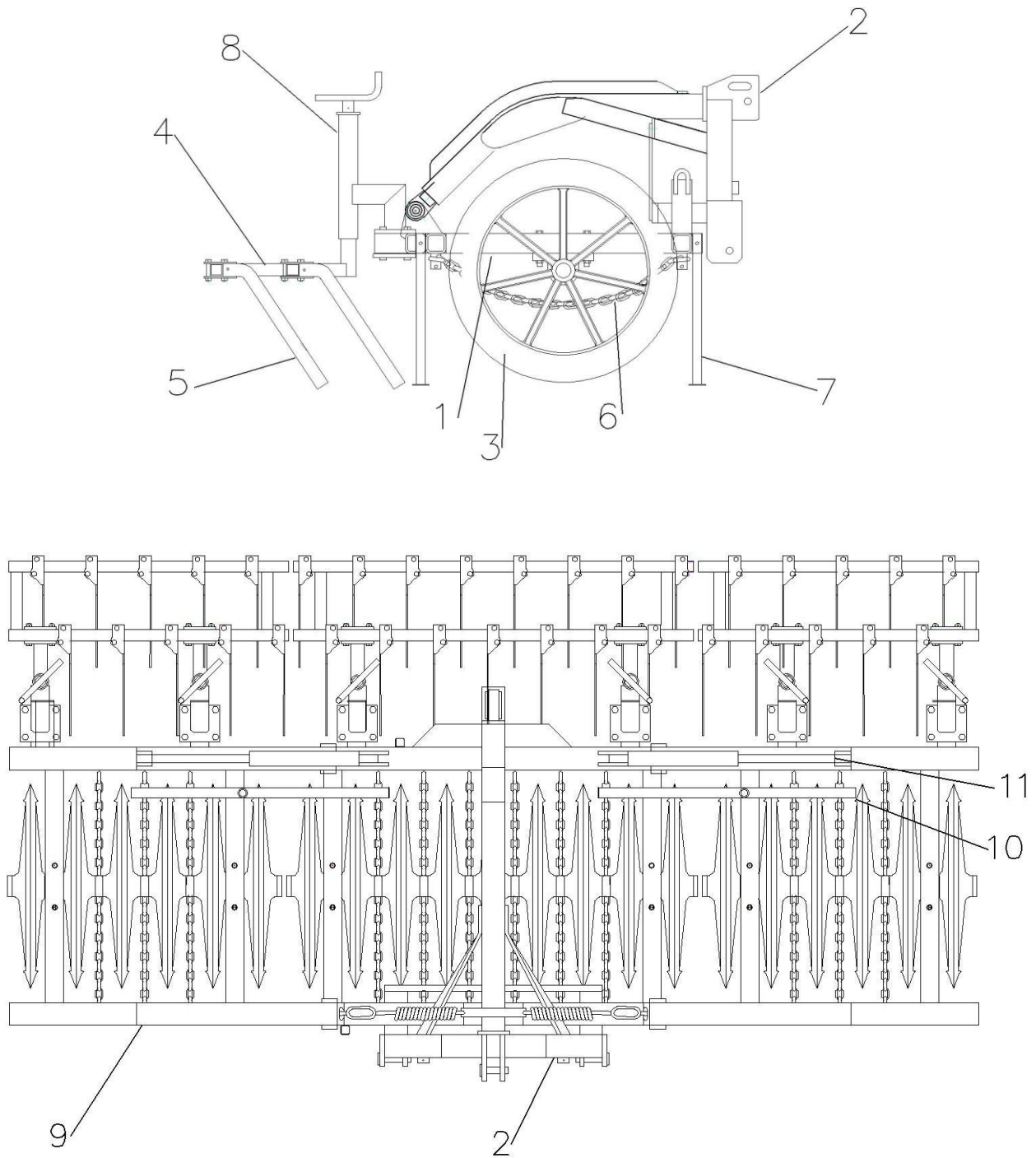


Fig. 1 Design of the MWC/MWW roller 1- frame, 2- drawbar, 3 - roller working wheel, 4 - smoothing harrow (MWW model only), 5 - tooth of the smoothing harrow, 6 - chain, 7 - support foot, 8 - smoothing harrow control crank, 9 - side frame, 10 - mechanical lock, 11 - cylinder

2. Intended use of the roller

The rollers are used for compacting the deeper layer of soil immediately after ploughing, before sowing. Its working elements are sparsely located narrow pulley rings that easily plunge into the soil, compacting the deeper layer and leaving its surface aerated. The top surface is additionally aerated by the wheel spokes. The cultivation ensures compacting and evening of the top layer of soil. A high weight per width metre results in good compaction and evening of the ploughed layer, and therefore there are no deep wheel ruts after subsequent passages. In addition, improved soil capillarity provides a much higher sprouting ability.

Campbell roller with a hitch for the front of the tractor is designed for tractors enabling front mounting of farming equipment and attachments. Such a location of the Campbell roller allows for connecting another machine at the back of the tractor, i.e. cultivation unit.

The roller may be additionally equipped with a front smoothing harrow (MWW) for crushing furrow slices and lumps on the field area. It is also designed to initially even the field area ensuring enhanced compaction and evenness of firm soil.



CAUTION! Tractors operated with the roller attached to the rear three-point linkage must be equipped with a set of front axle weights.



CAUTION! The rollers are designed for agricultural use only. Operating the rollers during tasks that differ from the intended use will be regarded as misuse. It is forbidden to use the rollers on soils with stones of considerable size scattered on the surface.

3. General safety information

The roller 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 roller.

The manufacturer shall not be liable for any unauthorised alternation of the roller. Only genuine parts manufactured by MANDAM are allowed during the warranty period.

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

- before every start-up, check the roller 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 the roller, no bystanders, in particular children can be present in the vicinity when the roller is being lowered, lifted, unfolded or dismounted,
- do not stay between the tractor and the roller when the engine is running,

- move forward, lift and lower the roller 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.

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 the roller, it is forbidden for any person to stay between the machine and the tractor.
- The tractor used together with the roller must be fully operable. It is forbidden to attach the roller 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.
- When in resting position and disconnected from the tractor, the machine must be stable all the time.
- The supporting foot must rest on a stable ground. It is forbidden to use any pads under the foot as it may result in support instability.

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 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 roller MWC/MWW 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 roller must be protected against unfolding by means of the mechanical lock.

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. The rolled attached to the front three-point linkage should feature side-marker and reflective lights. If the tractor's headlights are not visible, their equivalents should be installed on the machine.

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.



WARNING! 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. act 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 Campbell roller with its hitch at the front comprises three main elements:

- Main frame of the roller
- Working roller
- Smoothing harrow (optional)

The main frame is a load-bearing element of the entire structure and the working roller. The frame is composed of two elements: a three-point universal hitch (so-called front drawbar) and a load-bearing frame of the roller. It is made of hollow sections. The working roller is attached to the frame. The frame of the roller is equipped with two supporting feet that secure it from accidental tilt.

The roller drawbar is a structure component used to attach the roller to the tractor. The special design of the hitch allows for attaching the roller to the front three-point linkage of the tractor. The front drawbar is equipped with two rollers that make it possible to change the drawbar position with regard to the frame during the operation on the front three-point linkage of the tractor.

The working roller is an element comprising several iron casts located on the working roller axle equipped with bearings on two self-adjustable bearing units. The bearings are contamination and misalignment resistant, thanks to which the operation is trouble-free. Chains are pulled between the wheels to protect against soil sticking to the roller.

The smoothing harrow is a set of two rows of teeth working in front of the roller that crush and even the soil. It is mounted to the frame with a crank that is also used for its adjustment.

4.1. Before using the roller

The roller is usually supplied for sale in a ready-to-operate condition on the front three-point linkage. Due to transport limitations, the roller may be delivered with a disassembled harrow. Before commencing the work, the roller should be mounted on the frame on the opposite side of the tractor suspension system (Fig. 2).

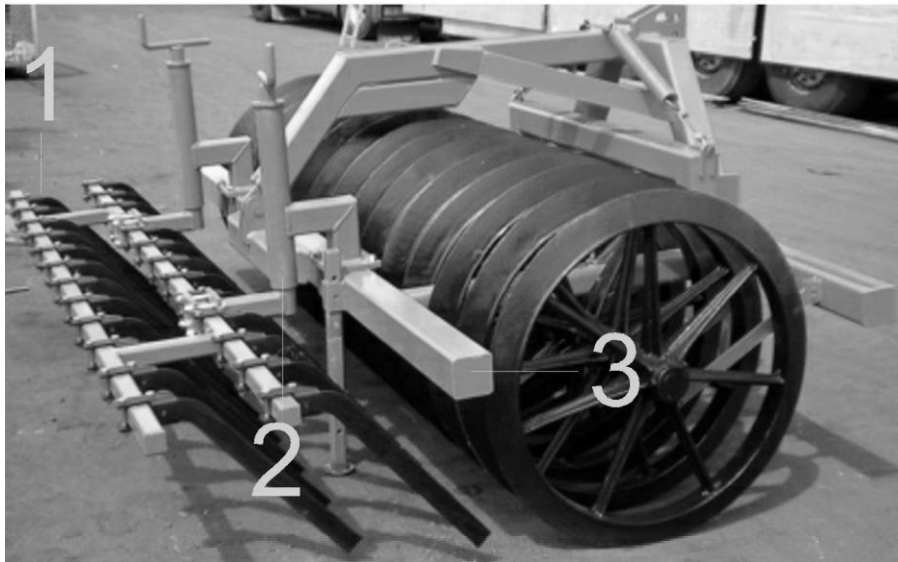


Fig. 2 Location of the smoothing harrow on the MWW roller: 1 - smoothing harrow, 2 - depth adjustment crank, 3 - frame

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. While attaching the roller to the tractor, the roller must be placed on hard and even ground.



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

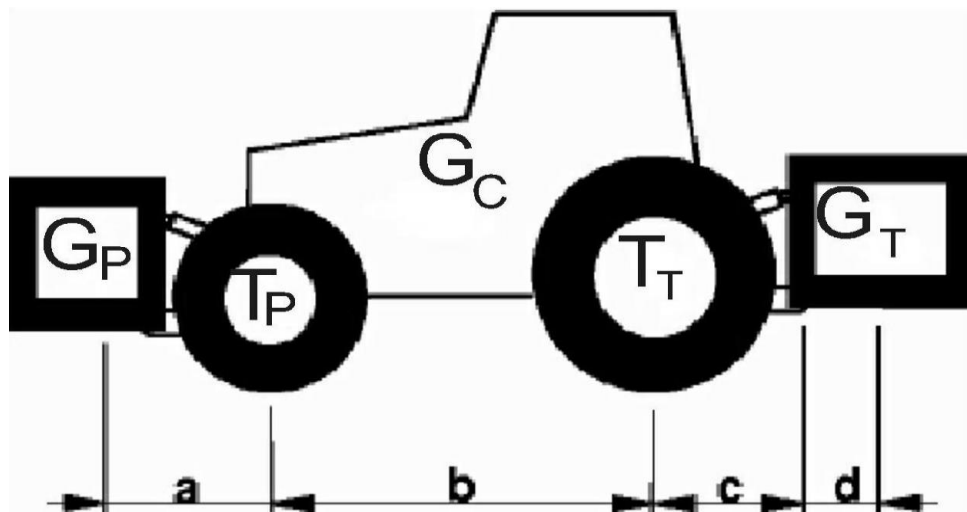


Fig. 3 Diagram of the markings of tractor loads.

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 centre of gravity from the hitch bolts (roller without smoothing harrow – 0.8 m, roller with smoothing harrow),

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:

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

Minimum load at the back if this is a front-mounted machine:

$$G_{Tmin} = \frac{G_P \cdot a - T_T \cdot b + x \cdot G_c \cdot b}{a + b + d}$$

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 smoothing harrow 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 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 roller lifting, lowering and the hydraulic system.



CAUTION! Before using the roller, check all bolted joints and retighten them if necessary.



CAUTION! Before folding and unfolding of the side wings, pull the string to release the roller locks

4.2. Adjustments

The roller operates by gravity and requires no adjustments of its operation. The smoothing harrow can be optionally adjusted in terms of working depth. For this purpose, the crank mounted on the harrow arm in front of the roller in working position is used (Fig. 1).

4.3. Operating the roller

Start working with the roller by making the first trial passage. During this task, check roller adjustment and manner of operation. If necessary, adjust the length of the tractor fastener so that the roller frame is position horizontally. Travelling speed while working with the roller should be up to 10 km/h.



CAUTION! Act with due caution while attaching the roller to the tractor and maintain the minimum speed of the tractor.

A properly attached and adjusted roller should travel behind or in front of the tractor along a straight line and compact soil at the entire working width.



CAUTION! Do not operate the roller soil which is too wet because the roller will be covered with soil.



CAUTION! Do not operate the roller on rocky soil because the working elements on the roller may become cracked.

4.4. Troubleshooting

Due to its simple design and the applied materials, the roller encounters malfunctions at an exceptionally low rate. Due to the application of GG20 cast iron of higher strength for rim casts, rim durability is improved. Remember that following all guidelines presented in this manual with regard to operation, adjustment, lubrication, transport and storage considerably contributes to longer trouble-free lifetime.

4.5. Roller 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.

- Working elements of the smoothing harrow can be used until they are almost entirely worn or their performance is inefficient.
- 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.



CAUTION! During any maintenance work, the roller must rest on the ground. The tractor engine must be stopped.

Hydraulic system maintenance

Maintenance of the hydraulic system (Fig.4) 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).

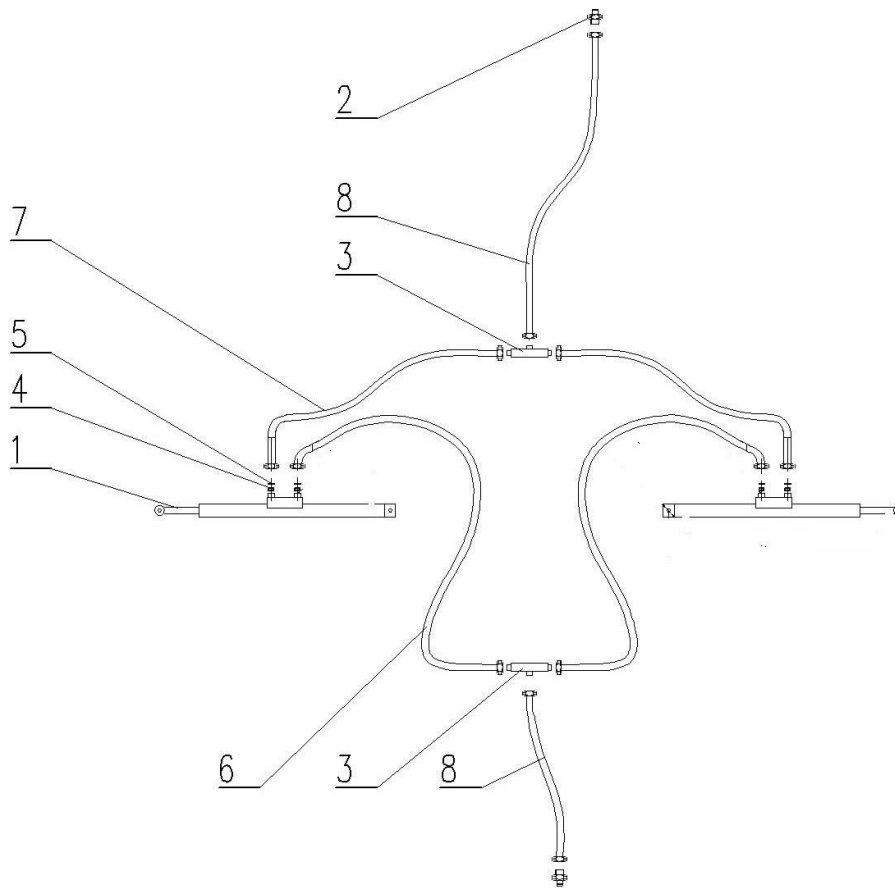


Fig. 4 Diagram of the hydraulic system of the MWC/MWW roller: 1- cylinder, 2- quick-connector, 3-T-connector, 4- flange, 5- copper washer, 6- hydraulic line 1.2 m, 7- hydraulic line 1.0 m, 8- hydraulic line 2.2 m

5. Storage of the roller

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 roller. If possible, store the roller under a roof, protected against any access of unauthorised persons and animals.



CAUTION! While in storage, the roller frame must be resting on the support feet. The roller should be set only on hardened surface with a slope up to 8.5°. Put wedges under the roller.

6. Transporting the roller

For transporting the roller, a three-point linkage on the tractor (front or rear-mounted) is used.



CAUTION! Travelling on public road with a roller 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 roller 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 roller is transported on the rear-mounted three-point linkage, before entering any public road, place an identification emblem for slow-driving vehicles in the roller holder and position holders of reflective lights so that white reflective elements face the travelling direction of the tractor. The roller attached to the front three-point linkage should feature side-marker and reflective lights. If the tractor's headlights are not visible, their equivalents should be installed on the machine. While being transported, the roller must be positioned sufficiently high to ensure that the clearance beneath the roller is at least 30 cm.

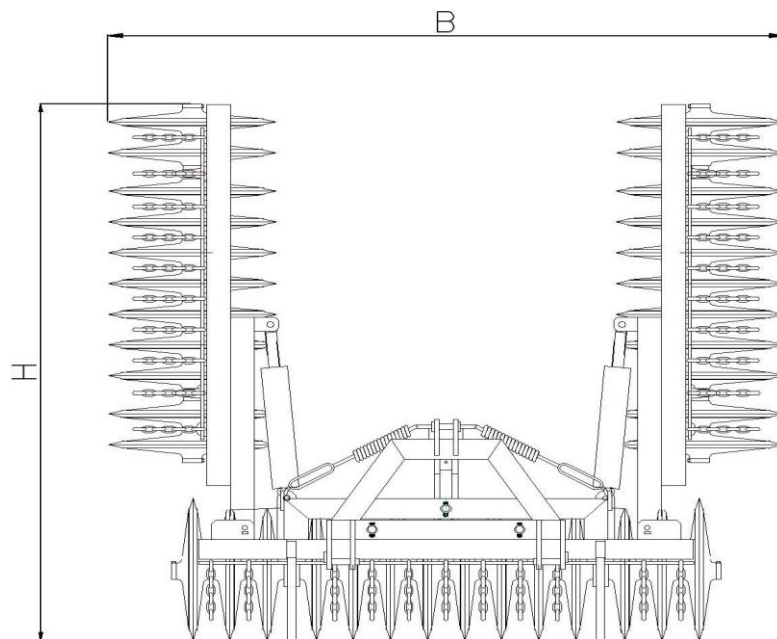


Fig. 5 Position of the MWC/MWW roller during transportation.

Table 3 Transportation dimensions of the MWC/MWW rollers

Type	Wheel diameter [mm]	H [m]	B [m]
MWC/MWW 1.5	700	1.2	1.65
	800	1.25	1.65
	900	1.3	1.65
MWC/MWW 2.5	700	1.2	2.6
	800	1.25	2.6
	900	1.3	2.6
MWC/MWW 3.0	700	1.2	3.0
	800	1.25	3.0
	900	1.3	3.0
MWC/MWW 4.0 H	700	1.9	2.6
	800	1.95	2.7
	900	2.0	2.8
MWC/MWW 6.0 H	700	2.7	2.8
	800	2.75	2.9
	900	2.8	3.0

While travelling, tractor must be driven as close to the right side of the road as possible. Act with due caution when overtaking or passing other participants of road traffic.



CAUTION Travelling on public roads without warning marks and lights required by law may result in an accident!

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 disassembled and withdrawn from use roller does not pose any particular threat to the natural environment. The roller consists of elements made of steel and cast iron. Start disassembling the roller by dismounting small parts (bolts, rings, etc.). Then, proceed with bigger parts.

Next, separate cast iron elements of wheel rims from other steel elements. Once disassembled, the roller must be handed over to scrap metal yard, which accepts steel and cast iron, for recycling. Wires and used oil should be disposed of at a waste management company.

8. Technical description

Table 3 Technical data of the MWC roller

Type	Working width [m]	Number of wheels [pcs]	Wheel diameter [mm]	Wheel edge angle [°]	Min. power demand [HP]	Weight [kg]
MWC 1.5	1.5	8	700	30	60	750
		8	800		60	850
		8	900		60	1000
MWC 2.5	2.5	13	700	30	60	817
		13	800		70	1200
		13	900		70	1350
MWC 3.0	3.0	15	700	30	60	935
		15	800		70	1182
		15	900		70	1450
MWC 4.0H	4.0	24	700	30	80	1390
		24	800		90	1800
		21	900		85	2562
MWC 6.0H	6.0	36	700	30	120	2210
		36	800		130	2780
		31	900		140	3220

Table 4 Technical data of the MWW roller

Type	Working width [m]	Number of wheels [pcs]	Wheel diameter [mm]	Wheel edge angle [°]	Number of teeth [pcs]	Min. power demand [HP]	Weight [kg]
MWC 1.5	1.5	8	700	30	13	60	862
		8	800			60	962
		8	900			60	1112
MWC 2.5	2.5	13	700	30	21	60	947
		13	800			70	1330
		13	900			70	1480
MWC 3.0	3.0	15	700	30	25	60	1075
		15	800			70	1360
		15	900			70	1590
MWC 4.0H	4.0	24	700	30	33	80	1630
		24	800			90	2040
		21	900			85	2802
MWC 6.0H	6.0	36	700	30	51	120	2540
		36	800			130	3110
		31	900			140	3550

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,
- 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.



P.P.H. MANDAM Sp. z o.o.
ul. Toruńska 2 44-100 Gliwice, Poland
e-mail mandam@mandam.com.pl
Tel.: 032 232 26 60 Fax: 032 232 58 85
NIP (VAT no.): 648 000 16 74 REGON (Registration no.): P – 008173131

WARRANTY CARD
OF THE CAMPBELL ROLLER with a hitch for front-mounting

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.