



OWNER'S MANUAL
WARRANTY CARD
SPARE PARTS CATALOGUE

1-BEAM PLOUGH mounted

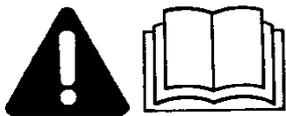
Libra

U 031 - 3-furrow plough

U 031/1 - 4-furrow plough (3+1)

U 031/2 - 4-furrow plough

U 031/3 - 5-furrow plough (4+1)



PRIOR TO STARTING WORK, PLEASE READ
THIS OPERATING INSTRUCTIONS



BOMET®

Spółka z ograniczoną odpowiedzialnością
Spółka Komandytowa
07-100 Węgrów, ul. B. Joselewicza 2
tel. (0 prefix 25) 691 78 06





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DECLARATION OF CONFORMITY for a machine



According to the Ordinance of Minister of Economy of 21 October 2008 (Journal of Laws ["Dziennik Ustaw"] No 199, item 1228) and European Union Directive 2006/42/WE of 17 May 2006 (Journal of Laws [Dz. U.] UE L157 p. 24-86)

we declare with full responsibility that the machine:

Machine:	1-BEAM PLOUGH MOUNTED
Type/model:	U 031
Year of production:	201
Function:	Cultivation of soil, ploughing, reverse and crushing soil

to which this declaration relates, is in conformity with:

*the **Ordinance** of Minister of Economy of 21 October 2008 on essential requirements for machines (Journal of Laws ["Dziennik Ustaw"] No 199, item 1228) and European Union **Directive** 2006/42/WE of 17 May 2006*

Person responsible for technical documentation of the machine: Andrzej Sińczuk, ul. B. Joselewicza 2, 07-100 Węgrów

Following harmonized standards have been applied:

PN-EN ISO 12100:2012
PN-EN ISO 4254-1:2016E

This Declaration of Conformity WE loses its validity if the product is misused or modified without proper authorization.

THE MANUAL CONSTITUTES MACHINE BASIC EQUIPMENT!

Węgrów,
Place and date of issue

BOMET
Spółka z ograniczoną odpowiedzialnością
Spółka Komandytowa
07-100 Węgrów, ul. Berka Joselewicza 2
tel. +48 25 792 38 88
NIP 8241801763
.....
Name and function of the signatory



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NIP 8241801763
.....
Name and function of the signatory

WARRANTY CARD

1-beam plough mounted type U031

Serial number

Date of production**201**

Inspector signature

Date of sale

Seller signature

BOMET
Spółka z ograniczoną odpowiedzialnością
Spółka Komandytowa
07-100 Węgrów, ul. Berka Joselewicza 2
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.....
Seller stamp

CAUTION: It is seller's obligation to fill in the warranty card and complaint forms carefully (legibly). Lack of e.g. date of sale or stamp of sales point will put the user at risk of not acknowledging possible complaints. Warranty card with any written corrections or filled in illegibly – is invalid.

Warranty proceedings rules

1. A user is understood as a natural or legal person purchasing an agricultural equipment and a seller – as a corporate unit providing equipment to the user and a manufacturer - as a producer of agricultural equipment.
2. Manufacturer ensures good quality and efficient operation of the plough, to which the warranty card is attached.
3. Any defects or damage of the plough shall be fixed free of charge at the place of the purchaser in the period of **12 months** from the sales date.
4. Any revealed defects or damages shall be reported in person, by post mail or by phone.
5. If during warranty period, a necessity of performing 3 warranty repairs occurs, and the product will still reveal defects disabling its usage according to its intended use, the purchaser is entitled to have the product exchanged into a new, flawless one or refund.
6. If the manufacturer, a seller and a user will not establish another deadline for considering the complaint, exchanging the product or refund, it should be made within 14 days from the date of reporting it by the user.
7. Warranty repairs do not cover repairs caused by:
 - using the plough inconsistently with the manual and intended use,
 - acts of God or others for which the manufacturer does not take responsibility.These repairs can be made only at the expense of the user, purchaser.
8. The manufacturer can cancel warranty on the product in case of stating:
 - introducing structural changes,
 - occurring any damages caused by acts of God,
 - lack of necessary records or made by one's own any records in the warranty card,
 - using the plough inconsistently with intended use or manual.



CAUTION!

Complaint about the reversible plough will not be recognised if the plough is aggregated to a tractor with too much power. The maximum allowable power for individual ploughs:

3-furrow plough - 82 hp, 4-furrow plough - 105 hp and 5-furrow plough - 126 hp

Complaint form no 1

1-beam plough mounted U 031 /

Serial number

Date of sale

.....

.....
Seller's signature and stamp

Complaint protocol number

Complaint form no 2

1-beam plough mounted U 031 /

Serial number

Date of sale

.....

.....
Seller's signature and stamp

Complaint protocol number

Complaint form no 3

1-beam plough mounted U 031 /

Serial number

Date of sale

.....

.....
Seller's signature and stamp

Complaint protocol number

After repair I received technically efficient machine
on

.....
user's signature

Notices:

.....
.....
.....

After repair I received technically efficient machine
on

.....
User's signature

Notices:

.....
.....
.....

After repair I received technically efficient machine
on

.....
user's signature

Notices:

.....
.....
.....

IDENTIFICATION

1-BEAM PLOUGH MOUNTED

1-beam plough mounted of U031 series has a rating plate, fitted in the front part of the plough frame. Basic data which serves for identification of the machine: manufacturer's name, machine symbol, serial number, year of production, is put there.

Data placed on the rating plate serves for identification of the plough and ought to correspond to the following data, filled in during the sales.

Symbol	U031 /
Year of production	201
Serial number

IT IS ADVISED THAT THE SUPPLIER OF MACHINES, BOTH NEW AND USED ONES, KEEP THE SIGNED BY THE PURCHASER CONFIRMATION OF RECEIPT OF MANUAL ALONG WITH THE MACHINE.



**THE MANUAL CONSTITUTES MACHINE BASIC EQUIPMENT
KEEP THIS INSTRUCTION FOR FUTURE REFERENCE**



CAUTION!

When lending the machine to another person, the manual shall be attached to the machine.

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1. INTRODUCTION

This manual aim is to make a user acquainted with a proper operation, usage and adjustment of the mounted plough. Its aim is also warning about existing or possible threats. The manual also contains information on preparation of the plough for operation and for transportation on public roads.

Strict compliance with recommendations included in the content of the manual will ensure long-term and non-failure operation and contribute to reduction of operating costs of the machine.

Each section of the instruction (according to the contents) presents proper issues in detail. If there is any unclear information for the user, they can obtain exhaustive explanation by writing to the manufacturer's address (the address is on the cover) – you are asked to give: exact address of the purchaser of the machine, machine symbol, serial number, year of production, year and number of issuing the manual.

Terms used in the manual: left side, right side, back and front – refer to the settings of an observer with his face turned according to the direction of the machine drive.

Warranty proceedings regulations and rights resulting from them, are given in the warranty card, attached to each plough.

2. INTENDED USE OF THE PLOUGH

1-beam mounted ploughs of U031 series with a width step adjustment are intended to operate exclusively in the agriculture. Using it for other purposes shall be understood as using it against the intended use. Ploughs are designed to perform ploughing of flat fields, on all soil types - from light to heavy but not on stony soils. Ploughs of U031 series are equipped with shear fuse securing the body against damage on stony soils. Meeting requirements referring to operation of the machine, its maintenance and repairs according to recommendations of the manufacturer and strictly complying with them state the condition of using it according to the intended use.

The machine shall be employed, operated and repaired only by people acquainted with its detailed characteristics and with procedures in the field of safety.

Regulations concerning accident prevention and all the basic regulations in the field of occupational health and safety and also traffic regulations should be always abided by.

Unauthorized structural modifications introduced to the tool without the manufacturer's consent may absolve the manufacturer from liability for any resulting damages and harms.

1-beam mounted ploughs are intended for performing middle-deep ploughing of all soils with moisture enabling proper operation. The ploughs should be aggregated only with tractor classes recommended by the manufacturer (see technical characteristics) equipped with suspension category II and standard ballasts of the front axle to keep the required controllability factor ($s \geq 0.2$).

3. SAFETY PRECAUTIONS AND WARNINGS

3.1. Symbols: meaning and application

In the present manual symbols are used in order to draw the reader's attention and stress certain particularly important aspects requiring discussion.

**DANGER**

This indicates danger, with a possible serious accident risk. Not obeying recommendations marked with this sign may cause a situation of a serious risk of sustaining an injury by the operator and/or people nearby! Obey strictly these recommendations!

**CAUTION**

The symbol indicates possibility of damaging the machine or other object and demands to be cautious. It is the advice which should be paid special attention!

**REMEMBER**

The symbol indicates advice or notice regarding key functions or useful information concerning proper functioning of the machine.

3.2. Expected use

1-beam mounted ploughs of U031 series have been designed, built and adjusted for operation in agricultural production for farming - ploughing on flat fields, on all types of soil with moisture enabling proper operation. As a standard, ploughs of U031 series are equipped with shear bolt securing the body against damage on stony soils. Operation with a plough can be performed on slopes up to 8.5°. Ploughs should be aggregated only with tractors classes recommended by the manufacturer, see technical characteristics.

**REMEMBER**

Regulations concerning the intended use and configurations, provided for this machine are the only ones, which are exclusively allowed. The machine shall not be employed for other purposes than those, which have been provided for it. The regulations given in this manual do not substitute obligation towards present regulations with force of a statute, referring to standards concerning safety and prevention from misadventure, but they summarize them.

3.3. Description of residual risk

Residual risk results from wrong or incorrect behaviour of the plough operator. The greatest danger can occur in performing following activities:

- operation of the plough by minors and also people not acquainted with the manual or not having qualifications for driving an agricultural tractor,
- operation of the plough by people with a disease, in a state indicating for using alcohol or narcotic drugs,
- transportation and operation without proper safety measures,
- aggregation of the plough with a tractor if the operator is between the machine and the tractor at the engine working,
- operation when people or animals stay within the range of operation of the assembly tractor + machine,
- maintenance and adjustment at the plough when the tractor engine is working and the plough is not protected against falling down.

When describing residual risk of the plough, the plough is treated as a machine, which since the moment of starting the production, has been designed and manufactured according to the present technique condition.

3.4. Estimation of residual risk

During operation of the plough, threat and residual risk can be limited to the minimum when such recommendations are abided by:

- careful reading the manual,
- prohibition of people staying on the plough during operation and transport,
- prohibition of people staying between the tractor and the plough when the tractor engine is working,
- all adjustment, maintenance and lubrication of the plough shall be performed only at the tractor engine stopped,
- repairs of the plough performed only by people trained in this field,
- operation of the machine by people who have qualifications to drive agricultural tractors and are familiar with the manual of the machine
- protection of the plough against children access.

Although **BOMET**[®] company takes responsibility for pattern-designing and construction in order to eliminate danger, certain risk elements during mounted plough operation are unavoidable.

⚠ 1) Danger of being caught or hurt by the frame edges or sharp edges of the ploughshare or mouldboard wing during aggregation or changing transportation-operation position and inversely.

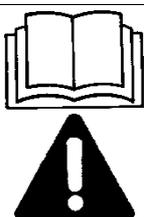
⚠ 2) Danger of being hurt or caught by a support wheel or a tillage tool. No part of the body should be situated between the support wheel with a tillage roller and the frame or near the plough during operation. Unauthorized persons should not be near the working plough.

⚠ 3) Danger of wound or abrasion by sharp working elements of the machine during performing maintenance or adjustment resulting from improper position of the operator during these activities.

⚠ 4) Danger of being crushed or hit by the hitch for tillage tools as a result of the operator's improper position during maintenance and adjustment.

⚠ 5) Danger of turning over the machine during storage or transportation. When stored to keep stability, the plough should be set on the flat ground leaning on the copying wheel and plough bodies. The plough shall be aggregated only with tractor classes recommended by the manufacturer.

3.5 Regulations for occupational health and safety



CAUTION

In order to avoid threats, before starting operation of the plough, please read the present manual and follow these rules concerning threats and safety measures:

General regulations

- Apart from this manual, one shall also follow traffic regulations and occupational safety and health regulations.
- Warnings (pictograms) placed on the plough give advice concerning safety of the user and other people, and avoiding accidents.
- When driving on public roads, it is obligatory to follow regulations included in Highway Code.
- It is recommended to cooperate with a tractor equipped with a cabin or a protective frame.
- Before each using the machine, it is necessary to check if all elements of the plough are in a good condition. Damage incurred shall be fixed without delay and possible deficiencies filled up.
- Avoid staying within the range of the working plough.
- Before leaving the tractor cabin and before each activity made at the plough, stop the tractor engine, remove the key from the ignition switch.
- The plough shall be stored in a dry room, on the tough and flat ground. During lowering the plough onto the ground, keep particular caution. Danger of injury!!!

Aggregation

- Keep particular caution during connecting the plough with a tractor and during its disconnection.
- It is forbidden to stay between the plough and a tractor during any activities performed with a hydraulic system lever.
- While aggregating the plough with a tractor, it is forbidden to stay between the tool and the tractor at the tractor engine working.
- During performing any maintenance at the plough, it is necessary to stop the engine, remove the key from the ignition switch and pull the handbrake.
- Pivots of the plough suspension system shall be secured only with the use of typical protection in the form of cotter pins.
- The plough shall be aggregated only with recommended tractor classes equipped with front axle ballasts.
- The plough can be operated by a person with qualifications allowing for using agricultural tractors.
- During aggregation, keep the minimum load of the tractor front.



CAUTION

Operation with a tractor of another class than recommended by the manufacturer may cause threat of stability loss in operation or in stoppage.

Tractor front axle load cannot be less than 0.2 of the tractor's weight.

Maintenance

- A plough can be operated by a person with qualifications allowing for using agricultural tractors and acquainted with the manual of the plough.
- All maintenance (lubrication, repairs, cleaning etc.) shall be performed with the plough lowered onto the ground, the tractor engine stopped, key taken out from the ignition switch and handbrake pulled.
- It is not allowed for other people not acquainted with the manual to operate the plough.
- It is not allowed for children and people after drinking alcohol to operate the plough.
- The plough shall be raised onto the tractor suspension system easily, without jerks or vibrations.
- Raise the plough upwards each time when turning and making returns.
- Work with a plough on slopes with gradient exceeding 8° is not allowed.

- At each getting off the tractor by the operator, leave the plough in the lowered position.
- Removing clogs can be performed after lowering the tool onto the ground and turning off the tractor engine.
- It is not allowed to use tractor reverse gear during work, when the tool is in the working position.
- People operating agricultural equipment should be equipped with working clothes and footwear, and personal protection measures appropriate for existing threats e.g. gloves.

Transportation

- Transportation of a plough by means of transport from the manufacturer to a sales person or a client is described in the section 'Transportation on public roads' in detail. One shall remember safety rules during the loading and proper fixing of the plough on a car trailer. Hooks for ropes or chains are marked with pictograms.
- The plough transported on public roads must be equipped with portable light and warning devices and a triangular sign for low-speed vehicles, fixed in special handles on the plough frame, see details in section 'Transportation on public roads'.
- It is forbidden to transport any people or items on the plough frame.
- Due to the length of the plough and a fixed connection with the tractor, keep caution especially at returns during operation and turnings during transportation on public roads with regard to overlapping of the tool.
- Keep extreme caution while making a turn of a tractor with a mounted plough, both during transportation and also while making returns in the field, especially when there are any people or items nearby.
- Driving speed of the tractor with the plough during transportation cannot exceed:
 - driving on hardened roads with flat surface – 15 km/h,
 - on field ways – 10 km/h.

Storage

- Disconnecting the plough from the tractor can take place only after the tractor engine stopped, key driving removed and the handbrake pulled.
- The plough shall be stored in a dry room, on the tough and flat ground. During lowering the plough onto the ground, keep particular caution - danger of being injured!!!
- During storage the plough should be leant firmly on the bodies and the wheel. The plough should be stored in places where there is no possibility of accidental injury on the flat ground, preferably under a roof.
- The plough shall be stored in a clean condition.



Threat!

Pay attention to sharp endings of ploughshares, mouldboard wings and disc coulter – danger of being hurt, keep caution during operations and maintenance of the plough.

Others

- It is not allowed to use the plough for other purposes than given in the manual.



CAUTION

Not following these rules may cause threat to the operator and other people and also may cause damage to the plough. Any damage resulting from not following these rules is the only responsibility of the user.

3.6. Standard conformity

The machine has been designed and made in accordance with standards concerning safety in the machine industry, valid on the day of marketing the mounted plough. Particularly, following legal acts and harmonized standards have been taken into account:

- 2006/42/WE - Directive on machinery safety introduced by the Ordinance of Minister of Economy on 21 October 2008 (Journal of Laws ["Dziennik Ustaw"] No 199, item 1228).
- PN-EN ISO 12100:2012P - Machinery. Safety. General principles for design. Risk assessment and risk reduction.
- PN-EN ISO 4254-1:2016E –Agricultural machinery. Safety. Part 1: General requirements (orig).
- PN-ISO 730-1+AC1:1996P – Wheeled agricultural tractors. Rear three-point suspension system. Categories 1, 2, 3 and 4.
- PN-ISO 2332:1998P – Tractors and agricultural machinery. Mounting machinery on a three-point suspension system. Free space zone.
- PN-ISO 3600:1998P – Tractors, agricultural and forest machinery, mototools. Manual. Contents and form.
- PN-ISO 11684:1998P – Tractors, agricultural and forest machinery, mototools. Safety and warning signs. General principles.

3.7. Manufacturer's responsibility and guarantee

In relation to described in this manual machine types, **BOMET**[®] company does not acknowledge any civil responsibility towards:

- improper or inconsistent with the manufacturer's recommendations using the machine,
- using the machine in a way breaking domestic law concerning safety and preventing from unfortunate accidents,
- non-compliance or improper following regulations cited in this manual,
- making unauthorized changes in the machine,
- using the machine by unqualified staff,
- using spare parts that are not original.

As long as the purchaser wants to make use of warranty, he should strictly follow recommendations and regulations given in the manual. In particular:

- he should work only in the given ranges of the machine operation,
- he should always perform unchangeable and thorough maintenance,
- only operators with proper abilities and qualifications shall be allowed to use the machine,
- he should use only original spare parts recommended by the manufacturer.

3.8. Noise and vibrations

During the operation of a plough for the operator there is no threat caused by noise contributing to the loss of hearing because the plough is an inactive tool and the workplace of the operator is in the tractor cabin. The tractor and not the machine is the source of noise.

There is no threat caused by vibrations when working with a plough because it is an inactive tool and the operator's workplace is located in the tractor cabin where the seat is amortized and properly ergonomically shaped.

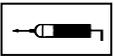
3.9 Safety signs and captions

1-beam mounted ploughs of U031 series of **BOMET**[®] company are equipped with all devices that ensure safe work. Where it is not possible to secure dangerous places

entirely due to the proper operation of the plough, there are warning signs – pictograms which indicate for possibility of danger and present manners of avoiding it.

In table 1 pictograms placed on the machine and their meaning have been specified. Safety pictograms should be protected against being lost and against loss of legibility. Lost or illegible signs and captions should be replaced with new ones. It is required that new assemblies employed during repair were marked with all safety signs predicted by the manufacturer. If you want to buy pictograms, write to the manufacturer's address and give the sign number (according to the table 1), version and year of issuing this manual.

Table 1. Safety signs and captions

No	Pictogram	Significance	Location
1	2	3	4
1.	(Rating plate)	Rating plate	At the front of the frame
2.		Prior to starting work, please read this operating instructions	On the plough frame
3.		Caution. Before operation turn off the engine and remove the key from the ignition switch	On the plough frame
4.		Do not stay near the lift rods, while controlling the lift	On the plough frame
5.		Danger of crushing hands. Do not reach crushing area if the elements can be in motion	On the roller movable arms
6.		Danger of hurting a leg. Keep the safe distance from ploughshare, disc sharp endings	On the plough frame
7.		Marking places of loading hooks	On the plough frame
8.		Marking lubrication points	On the plough frame
9.		Company logo	On the plough frame

4. USAGE REGULATIONS

4.1. General information

1-beam mounted ploughs of U031 series are produced in series as 3-furrow and 4-furrow ploughs with the possibility of mounting an attachment with 1-furrow. They are adjusted to work on terrain slopes not exceeding 8.5° and cooperate with tractors equipped with suspension system category III (see technical characteristics – table 4) equipped with wheel standard ballasts. User with the tractor, enabling the use of force adjustment of the ploughing depth, should use this adjustment, which allows for saving about 10% of fuel.

4.2. Construction and operation of the plough

1-beam mounted ploughs of U031 series (figure 1) are tools mounted on the tractor three-point suspension system. Construction of the ploughs is modular, i.e. they have the same structural elements but only differ in the number of bodies and the size of the frame.

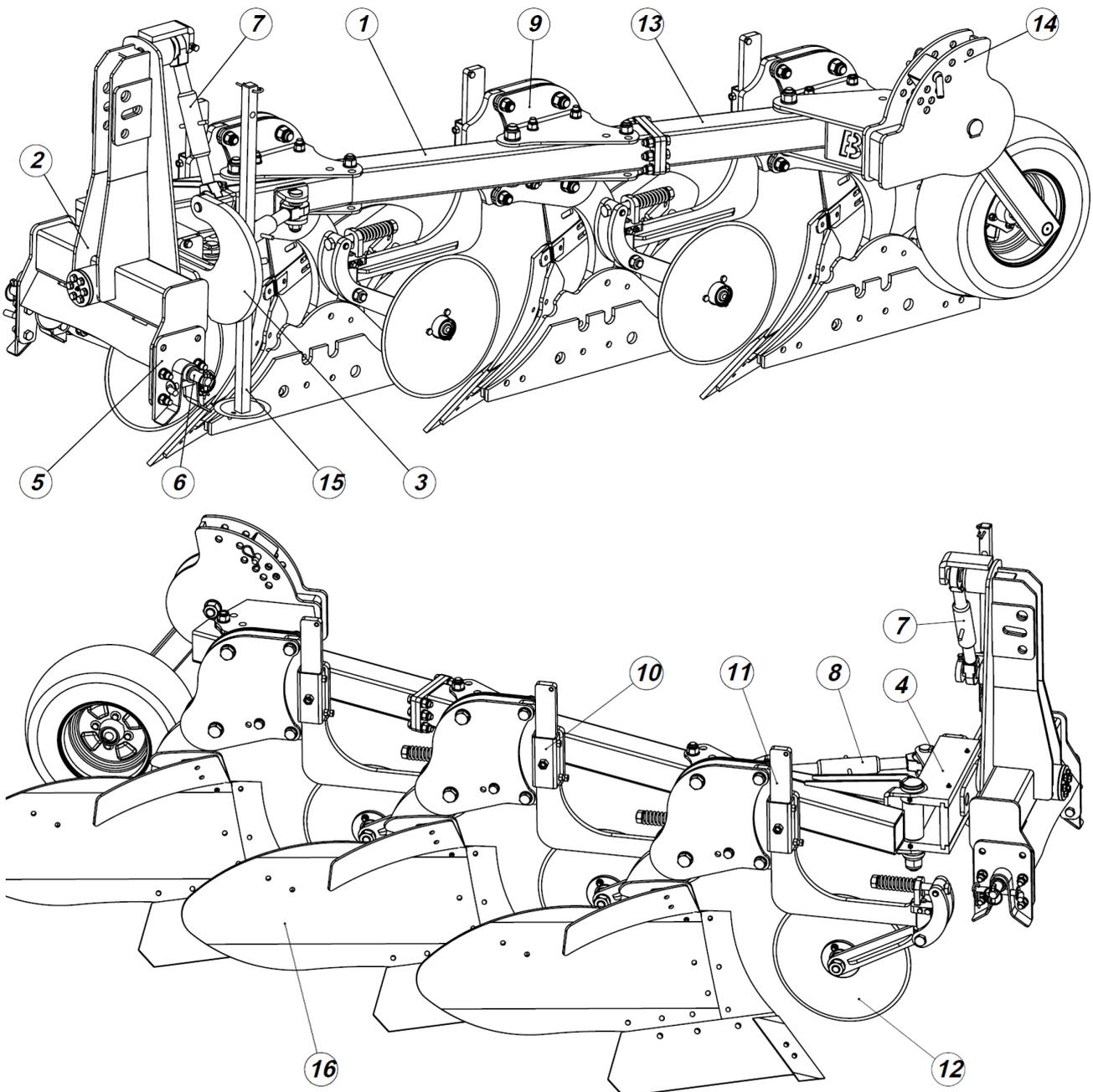


Figure 1. 1-beam plough - general construction: 1 - main frame 2 - three-point suspension system rack, 3 - ledger, 4 - slider, 5 - lower axle overlay 6 - quick hitch beam, 7 - transversal adjustment screw, 8 - longitudinal adjustment screw - alignment, 9 - body saddle, 10 - handle of the coulter or skimmer, 11 - coulter foot, 12 - coulter disc, 13 - frame +1, 14 - support wheel, 15 - support, 16 - body

1-beam ploughs of U031 series are connected to a tractor with the three-point suspension system. Suspension lower axle - quick hitch beam, is mounted in adjustable hitches of the coupler head. The plough coupler head with three-point suspension system rack comprises the rotary head of the plough, which is held in the proper position by a turnbuckle. Plough main beam is connected to a stud to a slider which slides on the ledger. The beam stud allows for rotation of the frame horizontally while width adjustment of the first furrow is possible by sliding the slider on the ledger. Plough bodies equipped

with divided mouldboards (breast and wing), ploughshare with screwed chisel, scraper bars mounted over the mouldboard and the skid are attached to the body core. Saddles of plough bodies are attached to the plough frame with screw connections. The leg of the plough body is connected to the saddle with screw connections, which protect the body against overload.

Saddles fixing plough bodies on the frame allow for a step change in adjustment of ploughing width between 30 cm - 38 cm - 45 cm. Plough is equipped with a disc coulter mounted on the last body, other bodies are also equipped with brackets allowing for mounting of coulters (optional equipment) or a skimmer.

1-beam plough is equipped with a support wheel fitted as standard on the last body. The wheel saddle is mounted on the body saddle and along with the change in the ploughing width there is also shifting of the wheel to the direction corresponding with the direction of ploughing. Ploughs of U031 series are equipped with handles, in which there are light devices and a triangular warning sign installed.

4.3. Equipment and fittings

The manufacturer delivers the plough for sale assembled. The manual with a spare parts catalogue and a warranty card are delivered along with the machine by the manufacturer.



REMEMBER

Manual with a spare parts catalogue comprise basic equipment of the plough.

1-beam plough **can be optionally equipped** with a skimmer or a disc coulter on each body. Basic equipment of the machine **does not involve** portable light and warning devices and a triangular sign for low-speed vehicles which are available at agricultural equipment storehouses.

Each user of a plough shall have light and warning signs, in working order, and a triangular sign for low-speed vehicles (sign description is available in the section 'Transportation'). Not having them during transportation may result in an accident. For damage incurred during an accident the user of the machine is responsible.

4.4. Preparing the tractor to work

Preparation of a tractor to cooperation with a plough consists in checking its general efficiency in accordance with the tractor manual (pay particular attention to the proper operation of the suspension system). It is mandatory to aggregate the plough with recommended tractor classes equipped with standard ballasts of front axle and rear wheels in accordance with data given in the technical characteristics of the tractor.

Hitch system

Hitch of the tractor three-point suspension system is a universal hitch adapted to connect all machines with a typical hitch system for a given category of the suspension. Hitch elements should be installed in such a way to enable easy adjustment. Before suspension of the machine, ball joints of lower rods of the tractor suspension system should be in lower position at the same height (distance between joints and the ground is minimum 200 mm). Rods set at the equal height from the ground facilitate mounting the plough on the tractor.

Wheel spacing - adjustment

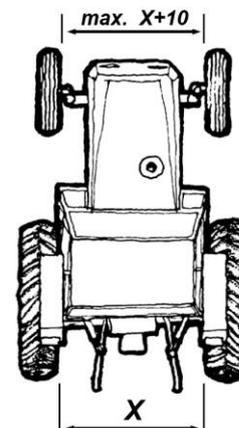
When ploughing the wheel spacing should always be measured inside the tires.

Internal distance between the front tires must be at least equal to the internal distance of the rear tires. It is permitted that the front wheels are wider by approx. 10 cm. The distance between the wheels must be symmetrical in relation to the longitudinal axle of the tractor.

The following spacing of wheels is recommended: 1200 - 1500 mm

Perfect wheel spacing = 3 x groove width + 100-150 mm

Example: groove width: 16" → 3 x 380 + 150 = 1290 mm



Tire pressure

The optimum driving properties as well as the proper and long-term use can be improved by applying the recommended tire pressure. Air pressure, particularly in rear tires of the tractor should be equal in both wheels and in accordance with the tractor's manual!



Figure 2. Position of the lower rods

Before suspension of the machine, lower rods of the tractor's suspension system shall be set in lower position at the same height (distance between joints and the ground is minimum 200 mm). Rods set at the equal height from the ground facilitate mounting the plough on the tractor.

Ballasts of the tractor front axle

The front of the tractor should be equipped with ballasts, in order to ensure optimal driving properties and longitudinal balance of the tractor. Controllability factor should equal $Ws \geq 20\%$ i.e. front axle should be ballasted with weight equalling or higher than 20% of the total weight of the tractor.

4.5. Preparing the plough to work

Preparation of a new 1-beam plough to operation and after storage period (e.g. after winter) consists in checking its technical condition and most of all durability of connections of working elements with the frame. In case of stating damage or worn elements it is necessary to exchange them into new or regenerated ones. Otherwise, it can lead to reduction of the tool work quality.



Caution

It is forbidden for the operator to stay between the tractor and the machine at the tractor engine running. The plough shall be raised easily, without jerks or vibrations.

In addition, it is necessary to:

- check screw connections, in case of backlash tighten the nuts,
- check if the copying wheel, adjustment screw and adjusting spindle move easily and without jamming, in case of stating jamming of the support wheel, it shall be uninstalled, cleaned and lubricated,
- lubricate the plough in accordance with recommendations (see section "Lubrication instruction").



CAUTION

All maintenance in the plough shall be performed before installing it on the tractor.

4.6. Aggregation of the plough with a tractor

When connecting the plough with a tractor, it is necessary to make sure that:

- tractor lower rods are below plough suspension studs,
- connecting points of the tractor and plough are in the same category,
- In the transportation and working positions, lower and upper connecting points of the plough with a tractor three-point suspension system are set in a vertical plane,
- during operation side stops of the lower rods allow for small clearance of the plough to the sides, but during transportation side clearance of rods must be eliminated noting that there is no collision between the tool and the surface of rear wheels and construction elements of the tractor.

When mounting the plough on the tractor, perform following activities:

- disassemble a tool latch bar from lower rods of the tractor three-point suspension system,
- drive to the machine frame close enough with the tractor,
- turn off the tractor engine, remove the key from the ignition switch and pull handbrake,
- uninstall the attaching beam (1) from the plough and install it on the lower rods of the tractor or on the tips of the latch bar, install ball joints and secure the beam with cotter pins,
- start the tractor and reverse to the distance allowing for connecting the attaching beam to the plough coupler head,
- secure the attaching beam (1) in the brackets of the plough with protecting pivots,
- link the upper connector of the tractor with the plough frame rack using a pivot and secure with a typical cotter pin in one of the three holes **A** or **B**.

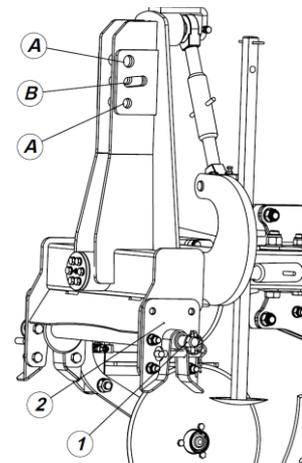


Figure 3. Plough suspension system rack



CAUTION

Holes **A** in the rack are holes for transporting the plough, the hole **B** is a hole for operation.
Attaching beam (1) can be lowered by shifting the overlay (2).

- tighten gently chains of lower rods of the tractor, keeping the symmetry between the plough suspension and the tractor,
- unlock the support of the plough, move it into the transportation position,
- check raising the plough and if the support wheel works properly,
- install portable light and warning signs and a triangular sign for low-speed vehicles.



CAUTION

It is forbidden to connect the machine to a tractor when the tractor engine is running. It is forbidden to use other elements to secure the tool suspension system than recommended by the manufacturer.

4.7. Safety instructions

The field should be properly prepared for ploughing. Headlands should be wide enough so that the plough can be completely taken out from the ground before the tractor returns. Depending on the size of the tractor and the plough, as well as the method of returns, the width of the headland equals from 10 m to 20 m. The headland width must be a multiple of the plough working width. The plough should be lowered and raised on the marked headland. Headlands should be marked by working to the inside of the field with the rear body at the front part of the plough raised.

In order to avoid clogging of the working bodies of the plough before starting

ploughing, the field should be cleaned of excessively long, loose (post-harvest) plant remnants. Permissible stubble height equals 20 cm. In the event of occurring working resistance beyond the towing capacity of the tractor, the last plough body can be uninstalled or a tractor with higher power should be used.

When starting ploughing from the field edge, the first furrow must be put to the inside of the field. The proper ploughing starts from the second passing, during which one returns along the first groove. This way, the whole ground will be ploughed. The first passage with the plough is performed at about $\frac{1}{3}$ of the working depth, the second at the $\frac{3}{4}$ of the depth. By the third passing the tractor goes in the furrow of the proper depth and then the final settings of the plough should be made.

Basic settings of the plough can be performed when the desired depth of ploughing is reached and the wheels of the tractor are in the furrow at the same depth.

4.7.1. Initial adjustment

Before starting ploughing, it is necessary to uninstall the warning marking for transportation on public roads and adjust chains limiting lower rods of the tractor so that the tractor can tilt to the sides easily. Performing the initial adjustment – longitudinal and transversal levelling of the plough is the condition of gaining properly performed ploughing. **Transversal levelling** shall be performed by proper shortening or lengthening the right hanger of the tractor suspension system so that the plough frame, from the back view, was set horizontally after gaining the full depth of operation and the leg was set perpendicularly to the ground (figure 4).

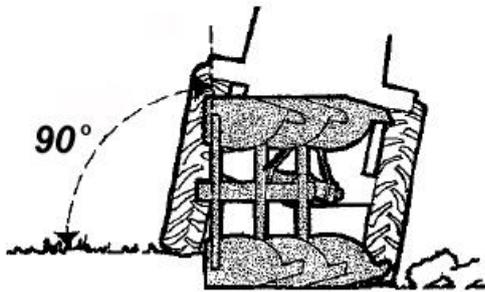


Figure 4. Correct position of the beam

In addition to perform transversal adjustment of the plough, adjustment screw of the ledger is used **A** (see Fig. 5), which is behind the three-point suspension system rack. In order to perform the adjustment raise the plough, adjust the adjustment screw, lower the plough and continue ploughing.

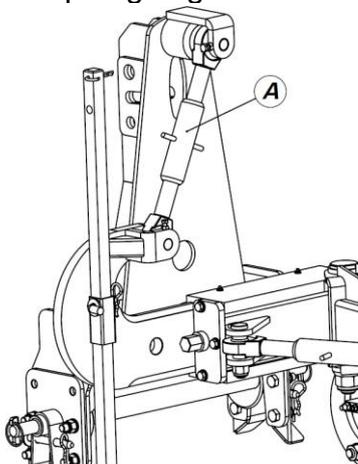


Figure 5. Screw for transversal levelling

Longitudinal levelling of the plough shall be performed by proper lengthening or shortening the upper connector (**A** Fig. 6) so that the tool frame, from the side view, was set horizontally to the ground after gaining the full depth that is the front and back of the

frame was at the same height H . The upper connector can be installed on the plough in three positions, see Figure 3.

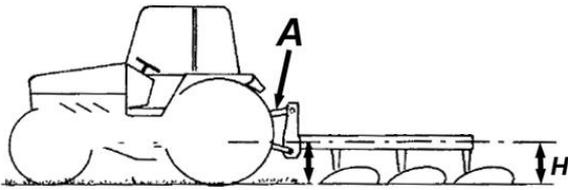


Figure 6. Plough longitudinal levelling

Properly leveled plough should have the frame set in parallel to the field surface and three-point suspension system rack should be set vertically. In such an adjusted plough, all plough bodies should work at the equal depth. After performing ploughing with such a leveled plough there should not be visible differences between the height of furrows put aside by individual bodies of the plough in the field.



DANGER!

All maintenance shall be performed at the plough lowered onto the ground and the tractor engine stopped. It is forbidden for the operator to stay between the tractor and the plough at the tractor engine running.

After each setting of the coulter, loosened screws and locknuts must be well tightened. Do never reverse with the plough when the body is still in the ground.

4.7.2. Operation with the mounted plough

To avoid clogging of the working elements of the plough, before ploughing the field should be cleaned of overly long, loose (post-harvest) plant remnants. Permissible stubble height equals 20 cm.

In order to make the plough move smoothly behind the tractor and the furrows have equal width and operate at equal depth during ploughing it is necessary to keep following rules:

- check initial levelling of the plough in the longitudinal direction, alternatively adjust the upper connector (1) and set the width of the first body (b) with the use of the transversal levelling screw,

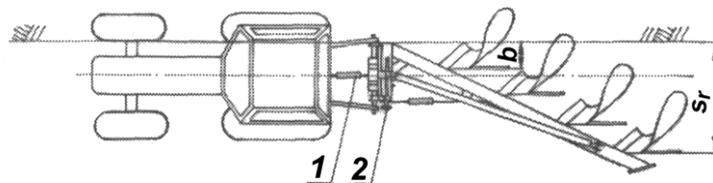


Figure 7. Initial adjustment of the plough

- always adjust the width of ploughing to its depth. Max ploughing depth should not exceed $2/3$ of the furrow width. This ensures forming furrows of the proper size and proper performance of the application,
- it is necessary to remember the tool reaches the full depth of the operation only after crossing even several metres. At the same time, the copying wheel can submerge in the superficial layer of soil in the field, increasing the value of the setting,

a)



b)

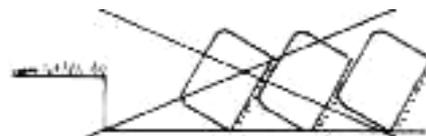


Figure 8. Arrangement of furrows during ploughing at: a - proper, b –improper proportions of the furrow width to the ploughing depth

- the speed of ploughing shall be adjusted to the field conditions,
- returns shall be performed after previous raising the tool to the transportation position.

- during operation, the plough should move in rectilinear motion with the constant speed adjusted to conditions of the performed ploughing. Operation with too low speed impairs the operation quality of the bodies, worsens soil crumbling and also quality of mixing and covering fertilizers and plant remnants,
- turning and returning with the tool lowered may lead to serious damage both to the plough and the tractor,
- during returns made with the tool opening the soil, it is necessary to increase the headland strip in order not to cause the collision between the plough and the tool,
- **in case of clogging of working elements** (stone, plant remnants, other foreign matters in the field) the plough shall be stopped, raised over the field surface and lowered. If it does not cause automatic cleaning of working units, the activity shall be repeated several times or after lowering the tool to the resting position, turn off the tractor engine, pull the handbrake and remove the cause of clogging,
- It is inadmissible to leave the plough on the slope or other terrain slope without securing it against automatic rolling down.

	<p>Caution</p> <p>During operation with a plough it is necessary to avoid sudden jerks. It is not allowed to reverse or return with a tractor with bodies submerged in the ground. It is necessary to keep extreme caution if there are people or items in the range of the plough operation.</p>
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	<p>WARNING</p> <p>All clogging made during the plough work requiring interference in the operation shall be removed after stopping the tractor, lowering the plough onto the ground, turning off the tractor engine and pulling the handbrake.</p>
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4.7.3. Plough adjustment

Proper operation of ploughs of U031 series requires performing two adjustments: transversal (change of width of the first furrow) and longitudinal that is setting the angle of plough main frame in relation to the suspension bracket (alignment), moreover it is necessary to adjust the depth of ploughing. In addition, it is necessary to adjust the depth of ploughing and perform adjustment of the system preventing from the damage to the body and adjust the position of skimmers and coulter if they are installed.

Adjustment of the first furrow

Perform the ploughing on a short distance and check the effect of ploughing. The rotation axis of the plough should be in the longitudinal axis of the tractor and the first body should plough to the full width of the ploughshare b_1 according to Figure 9. It is important that the first furrow is set at the same width as other bodies. The operation width of the first body can be also specified as follows:

$$0.5 L - C = b_1$$

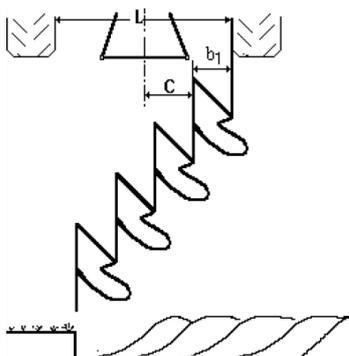


Figure 9. Adjustment of the first furrow width

If the first body does not cut furrows of the desired width, perform adjustment of the first furrow. This adjustment is performed with the screw **A** (Fig. 10). By moving the slider of the frame along the ledger to the left (to the undisturbed soil) the width is increased, to the right the width of the first furrow is reduced.

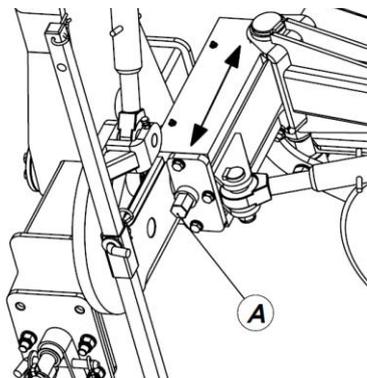


Figure 10. Adjustment of the first furrow screw

Ploughing width adjustment

In 1-beam ploughs of U031 series, the change of furrow width is obtained by changing the working width of individual plough bodies. This adjustment is made with the adjustment screw 1 (Fig. 11) on the saddle of each body in the holes A, B, C, after prior loosening the rotation screw 2. After setting the adjustment screw in the holes, the following working widths are obtained:

A - 30 cm / B - 38 cm / C - 45 cm

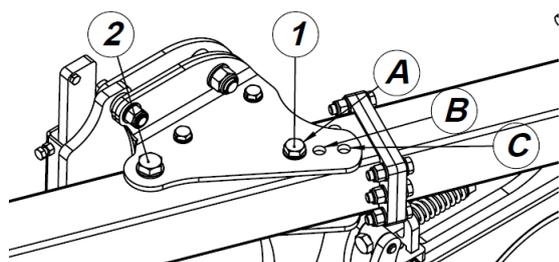


Figure 11. Ploughing width adjustment



IMPORTANT!

Please note that the same working width should be set on all bodies.

Frame plough alignment

After changing the working width of the bodies, the position of the plough frame must be changed that is alignment of the frame must be performed. Alignment, that is the change of setting the frame is performed with a turnbuckle A (see Fig.12). Alignment is performed by screwing or unscrewing the turnbuckle, causing the proper setting of the main frame, different for every working width.

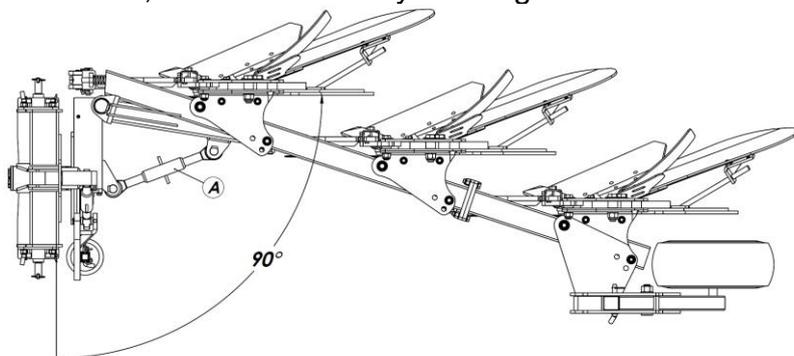


Figure 12. Setting the plough frame after alignment

At properly performed alignment of the main frame of the plough, skids of plough bodies should be set up in parallel to the driving direction (see Fig. 12) and should be

perpendicular to the latching axle of the suspension system.

It should be noted so that after submerging the plough, the tractor lower rods are at the same distance from the tractor axis of symmetry, and the upper connector runs along the axis of the tractor. If the front of the plough moves to the left or right off the tractor axle, adjust its position with the use of longitudinal adjustment.

Longitudinal adjustment should ensure stable operation of the tractor with a plough, the tractor drives straight with its wheels at the edge of the groove even without interfering by the tractor driver. The skid of the last body should leave a slight mark on the groove wall.



REMEMBER

Performing adjustment of the plough with the use of adjustment screws may require considerable power when the plough is in the working position. It is necessary to raise the plough to the transportation position then and lower it easily onto the ground and continue the adjustment.

Ploughing depth adjustment

Adjustment of the ploughing depth is performed with a copying wheel (copying adjustment) or with the use of a hydraulic actuator in the tractor (automatic adjustment). The position of the copying wheel of the plough is set with the use of the pivot **A** (Fig. 13). Changing the locking hole causes a change in the height in relation to the plough bodies. Plough depth should be always adjusted to the ploughing width. Max ploughing depth should not exceed 2/3 of the furrow width. This ensures the formation of furrows of the right size and proper execution of the procedure.

The use of a copying wheel limits the possibility of submerging the plough into the ground. The copying adjustment is currently the most common – although it is less favourable with regard to ploughing efficiency and consumption of fuel by the tractor.

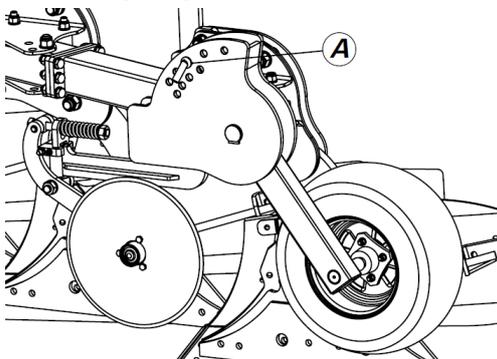


Figure 13. Ploughing depth adjustment

The proper operation effect, i.e. crushing and reversing depends on the ratio of the width to the depth of ploughing b / a . It should be noted that to obtain good crushing of the furrow, the depth should be close to the width ($a = b$). If we want to have a well reversed furrow, the ratio a/b - should equal 1:2, and to obtain ridge ploughing e.g. at winter ploughing ratio a/b should equal 1:1.5.

Table 2. The ratio of width to the depth of ploughing for various types of ploughing

Ploughing type	Ploughing depth	Ploughing width	Ratio
	a [cm]	b [cm]	b / a
Very deep	32 - 35	35 - 50	0.9 - 1.4
Deep	25 - 30	30 - 40	1.1 - 1.5
Medium	16 - 22	25 - 35	1.3 - 1.8
Stubble	6 - 12	24	2.0 - 5.0
Meadow ploughing	15 - 25	30 - 50	1.8 - 2.5

Adjustment of the shear fuse

1-beam ploughs of U031 series are equipped with a shear fuse of the bodies in the form of a screw M16x90-5.8. In the body saddle there are two holes in which fuses are mounted. As a standard, the fuse is mounted in the hole **A** (see Fig. 14), if field conditions are harder, the fuse should be shifted into the hole **B** which will cause that more force will be required to release the fuse.

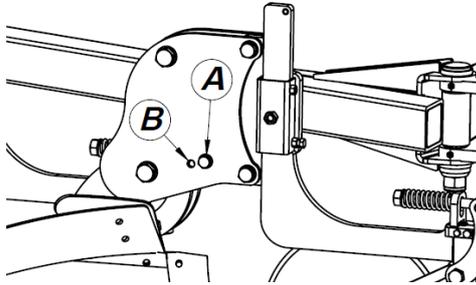


Figure 14. Adjusting the fuse

Please note that when using **the shear fuse** it is essential that in case of the exchange, only identical screws of the same hardness class can be used. When exchanging the shear fuse, stop the tractor, raise the plough and install the new lock screw.

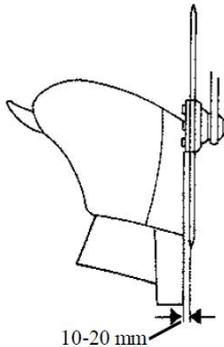
IMPORTANT!



As the working parts of the plough (skid, ploughshare) are subject to wear, the adjustment of the plough must be performed with the use of longitudinal adjustment. This regulation should ensure stable operation of the tractor with the plough, i.e. the tractor goes straight with the wheels at the edge of the groove, even without the interference of the tractor driver. At the proper setting of the plough, lower rods of the tractor are in the equal distance from the tractor axis of symmetry (or tires) and the upper connector goes along the tractor axle.

Adjustment of disc coulters

As a standard, in 1-beam ploughs, there are disc coulters mounted on the last plough bodies. Other plough bodies are equipped with brackets for mounting the coulters that can be delivered to the customer as an additional equipment.



In order to achieve a smooth groove wall, the coulters should be set 10-20 mm from the body skid towards the undisturbed soil (Figure 15).

Figure 15. Setting the coulters against the body

The change of the coulters working depth is performed by lowering or raising the coulters arm **1** in the guide **2** (Figure 16). Changing the depth is performed after loosening the screws **A** and **B**, setting the coulters at the proper depth and another locking the screws.

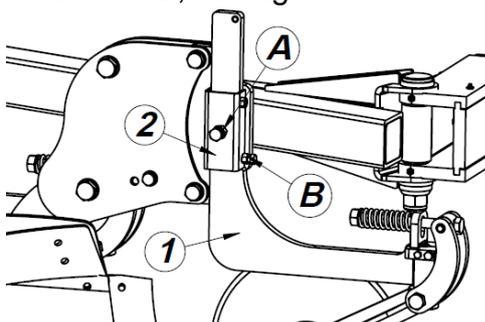


Figure 16. Adjustment of the coulters working depth

Adjustment of the skimmer

The primary function of skimmers is cutting off and reversing the top layer of soil, so that all remnants of sowings and weeds are covered. At the properly adjusted skimmer, the cut off soil layer is thrown onto the bottom of the groove and covered with the furrow. Properly used skimmers are the best way for mechanical elimination of weeds.

The position of mounting the skimmer bracket on the body beam is dependent on the setting of the skimmer ploughshare in relation to the body ploughshare. The maximum working depth of the skimmer should not exceed approx. 50 mm. In a situation when disc coulters are not used, skimmers should be set at approx. 12-20 mm outside the furrow. If the disc coulters are mounted, skimmers should be mounted next to the disc coulters in the distance of approx. 10 mm from the disc coulters.

After adjustment all the tips of skimmers should be in one straight line.

The adjustment is performed the same as in the case of the disc coulters.

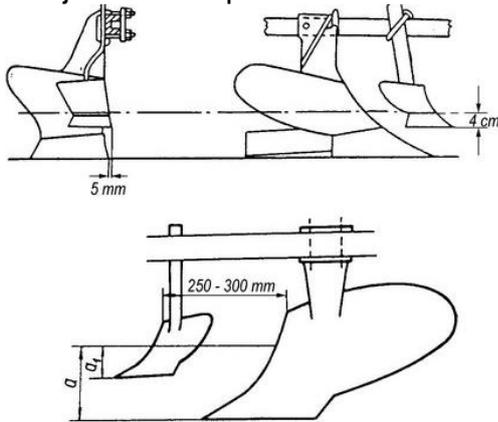


Figure 17. Setting the skimmer in relation to the body

(A - ploughing depth, a_1 - depth of cutting with a skimmer)

Source: Kanafojski 1967

Adjustment of the strip chipper

Strip chipper fulfills similar functions as the skimmer cutting the top layer of the cut off furrow and dropping it onto the bottom of the groove. The best effect of the chipper is achieved on lighter soils. Setting the chipper vertically is adjusted in patterned mounting holes.

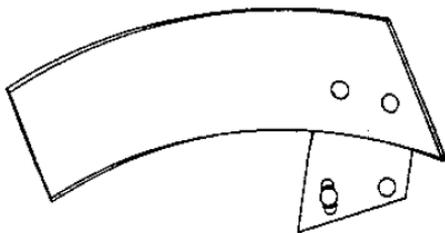


Figure 18. Strip chipper



IMPORTANT!

Be careful when making adjustments, especially when adjusting coulters and skimmers where there is danger of injury by sharp edges of the elements.



IMPORTANT!

As the working parts of the plough (skid, ploughshare) are subject to wear, the adjustment of the plough must be performed with the use of longitudinal adjustment. This regulation should ensure stable operation of the tractor with the plough, i.e. the tractor goes straight with the wheels at the edge of the groove, even without the interference of the tractor driver. At the proper setting of the plough, lower rods of the tractor are in the equal distance from the tractor axis of symmetry (or tires) and the upper connector goes along the tractor axle.

5. TECHNICAL OPERATION

To ensure a lasting and reliable operation of 1-beam plough, condition of screw connections should be checked and tightened in case of loosening. After work, the plough should be cleaned thoroughly. Worn or damaged working parts should be replaced following these recommendations:

- all worn elements of the plough shall be exchanged in the proper time,
- for exchange only original parts ensuring good quality shall be used, it comprises one of conditions of keeping warranty validity.

5.1. Instruction on maintenance of the plough

At the completion of the work the plough should be cleaned from the ground, and then connections of parts and units should be reviewed. Technical operation of the plough consists in reviewing the condition of ploughshares, mouldboards, copying wheels as well as screw and pivot connections. All loose screw connections shall be tightened. Pivots and studs of the plough suspension system should not be lubricated but kept in a clean and dry condition. Warning signs and a triangular sign for low-speed vehicles shall be kept clean.

5.2. After-seasonal maintenance

After season, the plough shall be cleaned thoroughly out of contamination. Worn or damaged working parts shall be exchanged and all loose screw connections tightened. Loss occurred in paint coat should be cleaned and filled by covering with a fresh layer of protective paint and then the plough shall be greased in accordance with the lubrication instruction.

5.3. Plough storage

Plough should be kept under a roof on the flat, solid ground. In case of lack of a roofed place, it is possible to keep the tool outside.



CAUTION

The plough should be kept in a place posing no threat to people and surrounding.

After disconnecting the plough from the tractor, the tool should be leant on plough bodies, supports and a copying wheel. During long-term storage of the tool outside, preservation of working elements shall be repeated in case of the preservative layer rinsed. **Light and warning signs and a triangular sign for low-speed vehicles should be uninstalled from the plough and placed in a dry room, to be protected from being damaged.**

5.4. Working parts exchange

In the plough there can be a ploughshare, a chisel, a skid, a heel and one of the elements of the mouldboard – a wing or a breast exchanged. In order to exchange a working element, raise the plough mounted on the tractor to the transportation position and secure against falling by placing a robust support preventing from the possibility of its overturning e.g. a block of wood with a height of about 25 cm under one of the plough bodies, in which there is no exchange. Then, lower the plough onto the support and turn off the tractor engine, remove the key from the ignition and pull the parking brake and secure one of the tractor rear wheels with wedges against moving. Before exchange of the working elements, stability of the assembly: tractor – plough shall be checked.

**CAUTION**

All activities connected with uninstalling and installing of worn parts of the plough shall be performed on the tough and flat ground, after lowering the plough onto the ground or supports.

Exchange of the ploughshare

Work surfaces of plough bodies should be equal, without bends in the contact places of a ploughshare, a breast and a wing of the mouldboard. In the case of larger faults between these elements, use cardboard pads inserted under individual elements to align the surface of the whole unit.

To exchange the ploughshare it is necessary to do as follows:

- unscrew four cone screws fastening the ploughshare to the leg,
- check the matching of a new ploughshare to the mouldboard,
- if there is a need, cardboard pads are put under the ploughshare to align the contact surfaces of the ploughshare with the mouldboard,
- tighten the ploughshare with fastening screws, when exchanging the ploughshare, fastening screws must also be exchanged,

Exchange of the chisel

The ploughshare is ended with a double-sided chisel. When the chisel is worn on one side, turn the chisel by 180°. When exchanging the chisel into a new one, also exchange fastening cone screws so that the connection with the ploughshare is reliable and precise.

Exchange of the breast or mouldboard breast

In order to exchange a wing or a breast of the mouldboard it is necessary to:

- untwist the screws fastening the wing or the breast to the leg,
- inspect matching of a new element to the ploughshare when there is a need to use pads,
- tighten fastening screws, when exchanging a wing or a breast, fastening screws must be also exchanged,

Exchange of a skid or a heel

In order to exchange a skid or a heel it is necessary to:

- untwist the screws fastening the skid to the leg or the heel to the skid,
- if there is a need, cardboard pads are put under the skid to align the contact surfaces with the ploughshare,
- tighten fastening screws, when exchanging a skid or a heel, fastening screws must be also exchanged,

**CAUTION**

During exchange of working elements, it is necessary to use proper tools and protective gloves. During exchange of working elements it is necessary to use a spare parts catalogue where assembly of plough parts is presented in the scheme.

5.5. Lubrication instruction

Basic maintenance activities are keeping lubrication periods and using proper types of grease. Before lubrication all the points of lubrication shall be cleaned out of contamination. Lubrication shall be performed according to the table 3.

**REMEMBER!**

Used oils and lubricants should be passed to a chain of points collecting them, where they are processed in order to be re-used.

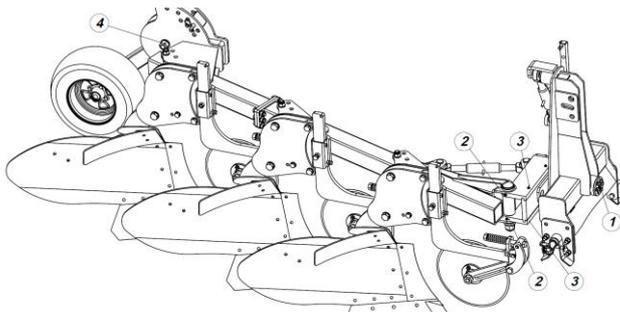


Fig. 19. Lubrication points

Table 3. Lubrication points

Lubrication place		Frequency of lubrication	Grease type
1	Rotation stud of the plough	10 h	ŁT 42 grease
2	Main stud of the plough frame	10 h	ŁT 42 grease
3	Guide of the slider and ledger	10 h	ŁT 42 grease
4	Stud of the wheel rotation mechanism	25 h	ŁT 42 grease
5	Body work surfaces	after finished season	grease "Antykor"

5.5. Detection and removal of failure

During ploughing, following failure can occur, which can affect unfavourably the plough operation quality, raise the application cost and also lead to damage both of the plough and the tractor.

Table 4. Table of inefficiency reasons and methods of removal

Symptoms	Reason	Method of removal
Tractor front tends to rise upwards	Too little load on the front. IMPORTANT: Tractor front axle load cannot be less than 20% of the tractor's weight	Check if the tractor class is consistent with the manual recommendations. If not – change the tractor. If the tractor is of the appropriate class – check and if need be add the proper number of front axle ballasts.
	Upper rod of three-suspension system too untwisted	Shorten the upper rod
Plough will not submerge	Improper longitudinal or transversal levelling	Level the plough
	Worn ploughshares or chisels	Exchange the ploughshares or chisels
	Improperly adjusted side rod pullers	Check and perform adjustment
The tractor is led with a tendency to turn into one side	Improperly adjusted plough	Improve the adjustment of individual elements of the plough (see "Operation of the plough")
	Upper rod is not parallel to the direction of ploughing	Check the adjustment of the first furrow width
	Improper width of the first furrow	Adjustment of the first furrow width
Uneven grooves	Improper depth of front grooves	Level the plough
	Improper setting of ploughshare beaks, various working depth	Adjust the bodies with the use of a screw in the bracket of the body
	Improper setting of the skimmer	Adjust the skimmer
	Unequal pressure in the rear tires of the tractor	Check and complete the tire pressure in according to the recommendations of the tractor manufacturer
	Upper rod is not parallel to the direction of ploughing	Check the adjustment of the first furrow width
Furrows are unequal within the same passage	Mouldboards are not set parallelly	Check and if need be perform adjustment
	Improper setting of the disc coultter (optional)	Adjust the width of the groove and setting of the coultter
	Improper width of the first furrow	Adjust the first furrow width
	Improper depth of front grooves	Level the plough
Furrows remain in the standing position or they are not fully inverted	The width of the groove is too small in relation to the depth	Check and if need be perform adjustment of the working width
	The plough tilted excessively towards the unploughed side	Check and correct plumbing of the plough.
	Skimmers set too low	Correct the skimmer setting

**REMEMBER!**

Inefficiencies and damages noticed shall be removed without delay.

6. TRANSPORTATION ON PUBLIC ROADS

6.1. Plough transportation by means of transport

Mounted ploughs can be transported from the manufacturer to the sales person or client by trailers of means of transport. Ploughs are transported assembled and ready for operation. Ploughs are loaded onto car trailers with lifting devices after installing lines or chains in places marked with pictograms by the manufacturer. The ploughs should be secured still on means of transport, the transporting person is responsible for proper securing.

**CAUTION**

When loading the plough on means of transport, lines or chains shall be installed in places marked by the manufacturer with pictograms.

6.2. Transportation of the plough on the tractor

During transportation the plough shall be set to the transportation position i.e. the smallest overall width and the proper transportation clearance min. 250 cm. When turning, pay attention to “overlapping” of the machine. In case when the plough sticks out beyond the tractor side outline, this part should be marked with alternate white and red stripes. If during transportation, the plough covers the tractor lights, the plough should be equipped with portable light and warning devices having at the back: side red light installed in the bracket. At the same time on the tractor cooperating with a tractor there must be a triangular sign for low-speed vehicles installed. Portable light devices are connected to the tractor wiring with the use of a connecting cable ended with 7-pole plugs. Please note that the width of the assembly tractor + machine must be less than 3.0 m so that it can move on public roads and if the length of the vehicle tractor + machine exceeds 6 m there must be side reflective yellow lights on the machine.

Standard equipment of the mounted 4-furrow plough consists of side reflective yellow lights. Moreover, the tractor, on which the plough is mounted, should fulfill conditions of admitting it to motion on public roads in accordance with Highway Code.

**WARNING !**

It is forbidden to move on public roads without the proper marking (Ordinance of Minister of Transport and the Maritime Economy Journal of Laws No 32/2003 item 262, as amended).

The plough transported on public roads on the tractor suspension system must be obligatory equipped with a portable light and warning device installed in a special bracket at the back of the plough and a triangular sign for low-speed vehicles mounted on the tractor.

7. DISASSEMBLY

Disassembly of the machine should be performed by people, equipped with protective gloves and previously acquainted with its construction, after disconnecting it from the tractor and setting the machine on the flat and tough ground. Due to a number of plough parts exceeding 20 kg (frame, leg), during disassembly use lifting devices. Disassembly of working parts should be performed according to the tables included in the spare parts catalogue. All fixings are made of normalized elements adjusted to metric

keys. In case of worn parts, follow 'Totaling' point.

	<p>CAUTION Lifting devices used during disassembly can be operated only by a person properly authorized and qualified.</p>
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8. TOTALING

Totaling of the plough should be performed after its previous complete disassembly and inspection of the machine parts. During disassembly, parts should be grouped according to the material type. Used metal parts should be grouped and passed to points purchasing these metals.

9. TECHNICAL CHARACTERISTICS

Technical data of 1-beam ploughs of U031 series is listed in table below.

Table. 4. Technical characteristics

Parameter	Unit of measure	Manufacturer data			
		U031	U031/1	U031/2	U031/3
Symbol		U031	U031/1	U031/2	U031/3
Number of bodies	pcs	3	3+1	4	4+1
Width of the furrow	m	0.30 - 0.38 - 0.45			
Ploughing width	m	0.90 - 1.35	1.20 - 1.80	1.20 - 1.80	1.50 - 2.25
Ploughing depth	cm	up to 35			
Overall dimensions of the plough					
- width	mm	1550 - 1660	1810 - 2295	1810 - 2295	2360 - 26850
- length	mm	3535 - 3575	4260 - 4340	4260 - 4340	4980 - 5110
- height	mm	1505	1505	1505	1505
Plough weight with shear fuse	kg	690	830	830	970
Body scale in the frame	mm	900			
Clearance under the frame	mm	780			
Mouldboard type	-	semi-helical			
Overload protection	-	shear bolt			
Support wheel	-	20x8.00-10 6PR			
Max. tyre pressure	kPa	230			
Power demand					
- suspension system	-	III category			
- min. tractor power	kW	37 - 55	48 - 70	48 - 70	55 - 85
	hp	50 - 75	65 - 95	65 - 95	75 - 115
Ploughing speed	km/h	up to 10			
Efficiency at the speed of 8km/h	ha/h	0.80 - 1.20	1.00 - 1.30	1.00 - 1.30	1.10 - 1.50

Measurements of geometric dimensions and weights are given in the technical characteristic to an accuracy of 1%.

SPARE PARTS CATALOGUE

How to use the catalogue.

Spare parts catalogue includes other assemblies of the plough, marked with proper numbers of tables.

The catalogue should be used as follows:

- determine the proper assembly the exchanged part belongs to according to the tables,
- find the needed part on the assembly table following the reference number from the assembly drawing.

Spare parts can be purchased at the tool manufacturer, by writing to his address or by calling; then you are supposed to specify:

- the exact address of the orderer,
- plough symbol
- serial number of the plough,
- year of production,
- manual issue number,
- the exact name of parts or assembly,
- Catalogue symbol (KTM), spare part number or standard,
- number of pieces,
- payment terms.

All standard parts can be purchased in the public sale.

Table 1. Frame and suspension system rack of the 1-beam plough

Position Fig.	Part name	KTM symbol or standard number	Number of pieces in the plough			
			U031	U031/1	U031/2	U031/3
1.	Head set	1031-01-001	1	1	1	1
2.	Ledger set	1031-02-001	1	1	1	1
3.	Slider set	1031-03-001	1	1	1	1
4.	The main frame Po3	1031-04-001	1	1	-	-
	The main frame Po4	1031-04-002	-	-	1	1
5.	The main frame +1	1031-04-003	-	1	-	1
6.	Levelling screw	1031-02-002	1	1	1	1
7.	Alignment screw	1031-04-005	1	1	1	1
8.	Quick hitch overlay	1031-01-002	2	2	2	2
9.	Quick hitch set	1031-01-003	1	1	1	1
10.	Top saddle plate	1031-05-001	3	4	4	5
11.	Bottom saddle plate	1031-05-002	3	4	4	5
12.	Inside saddle plate	1031-05-003	3	4	4	5
13.	Outside saddle plate	1031-05-004	3	4	4	5
14.	Beam	1031-05-005	3	4	4	5
15.	Bracket of the coulter or skimmer	1031-05-006	3	4	4	5
16.*	Coulter arm	1031-06-001	3	4	4	5
17.*	Disc coulter set	1031-06-002	3	4	4	5
18.	Copying wheel seat	1031-07-001	1	1	1	1
19.	Wheel with a hub	1031-07-002	1	1	1	1
20.	Support set	1031-02-003	1	1	1	1
21.	Body set	1031-08-000	3	4	4	5
	Saddle rotation screw	M24x160	3	4	4	5
	Saddle set screw	M20x150	3	4	4	5

* - in the plough there may be 1 coulter or at each body

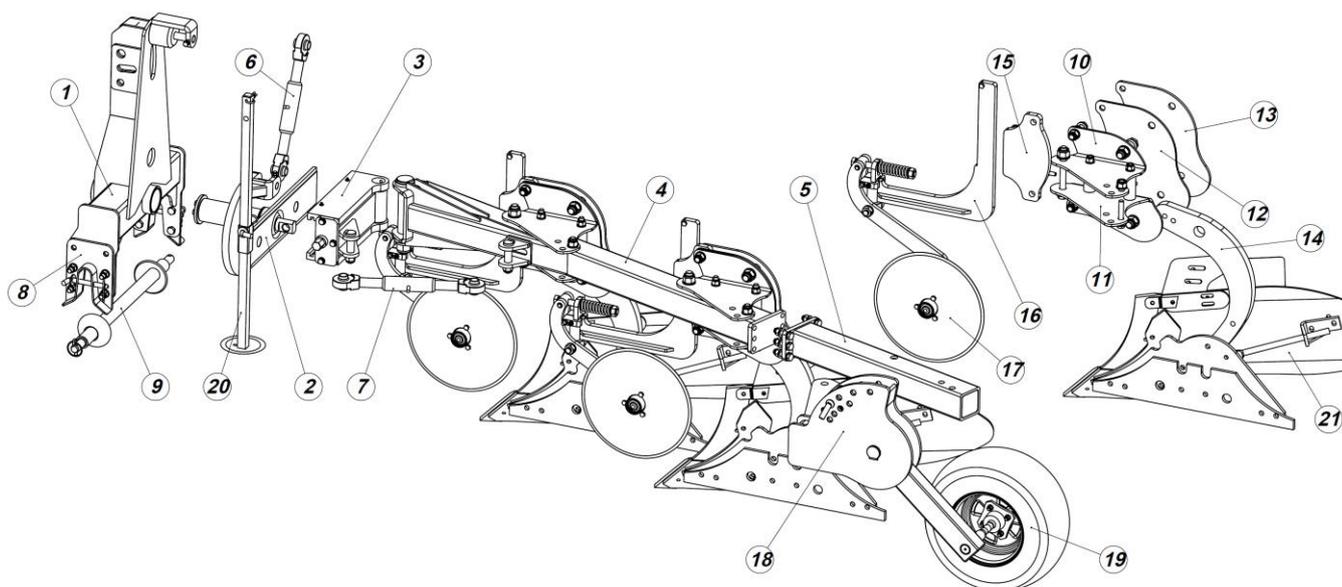


Table 2. Plough body

Position Fig.	Part name	KTM symbol or standard number	Number of pieces in the plough			
			U031	U031/1	U031/2	U031/3
1	Core	1031-05-001	3	4	4	5
2	Skid	1031-05-002	3	4	4	5
3	Ploughshare 16"	1031-05-003	3	4	4	5
4	Ploughshare chisel	1031-05-004	3	4	4	5
5	Breast	1031-05-005	3	4	4	5
6	Mouldboard wing	1031-05-006	3	4	4	5
7	Stiffening bracket	1031-05-007	3	4	4	5
8	Bracket fixing	1031-05-008	3	4	4	5
9	Strip chipper	1031-05-009	3	4	4	5
10	Chipper bracket	1031-05-010	3	4	4	5
11	Chipper overlay	1031-05-011	3	4	4	5
	Cone screw for chisels M12x34					
	Cone screw for ploughshares M14x34					
	Plough 2 fin neck bolt M12x35					
	Plough 2 fin neck bolt M12x45					

