



OWNER'S MANUAL  
WARRANTY CARD  
SPARE PARTS CATALOGUE

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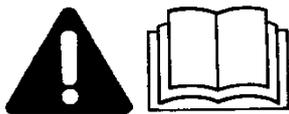
# AUTOMATIC CONVEYOR VEGETABLE PLANTERS

## *Gemma*

**S290 - 3-ROW PLANTER**

**S290/1 - 4-ROW PLANTER**

**S290/2 - 5-ROW PLANTER**



**PRIOR TO STARTING WORK, PLEASE READ THIS  
OPERATING INSTRUCTIONS**



**BOMET®**

Spółka z ograniczoną odpowiedzialnością  
Spółka Komandytowa  
07-100 Węgrów, ul. B. Joselewicza 2  
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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/EC of 17 May 2006 (Journal of Laws UE L157 p.24-86)*

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**we declare with full responsibility that the machine:**

Machine: **VEGETABLE PLANTER**  
Type/model: **S290**  
Serial number: .....  
Year of production: **201** .....

Function: Planting of tuberous vegetables

**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/EC of 17 May 2006

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

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**Following harmonized standards have been applied:**

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

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This EC Declaration of Conformity 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  
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07-100 Węgrów, ul. Berka Joselewicza 2  
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NIP 8241801763

.....  
Name and function of the signatory

# WARRANTY CARD

Automatic vegetable planter type **S290**

Serial number .....

Date of production..... **201** .....

Inspector signature .....

Date of sale .....

Seller signature .....

.....  
*Seller stamp*

**BOMET**  
Spółka z ograniczoną odpowiedzialnością  
Spółka Komandytowa  
07-100 Węgrów, ul. Berka Joselewicza 2  
tel. +48 25 792 38 88  
NIP 8241801763  
.....  
*Manufacturer 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 manufacturer of agricultural equipment.
2. Manufacturer ensures good quality and efficient operation of the planter, to which the warranty card is attached.
3. Any defects or damage of the planter 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 on a complaint form 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 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 planter 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 any records made by one's own in the warranty card,
  - using the planter inconsistently with intended use or manual.

---

**Complaint form No. 1**

Automatic vegetable planter **S290**

Serial number ..... Date of sale .....

.....  
*seller's signature and stamp*

Complaint protocol number .....

---

**Complaint form No. 2**

Automatic vegetable planter **S290**

Serial number ..... Date of sale .....

.....  
*seller's signature and stamp*

Complaint protocol number .....

---

**Complaint form No. 3**

Automatic vegetable planter **S290**

Serial number ..... Date of sale .....

.....  
*seller's signature and stamp*

Complaint protocol number .....

---

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After repair I received technically efficient machine  
on .....

.....  
*user's signature*

Notes:

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

---

After repair I received technically efficient machine  
on .....

.....  
*user's signature*

Notes:

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

---

After repair I received technically efficient machine  
on .....

.....  
*user's signature*

Notes:

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

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## IDENTIFICATION

# AUTOMATIC VEGETABLE PLANTER

The S290 automatic conveyor vegetable planter is a 3-row, 4-row or 5-row machine with a rating plate, fitted in the front part of the planter 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 planter and ought to correspond to the following data, filled in during the sales.

Symbol **U290** .....

Year of production **201** ....

Serial number .....

<b>BOMET® Sp. z o.o. Sp. K.</b> 	
07-100 Węgrów, ul. Joselewicza 2 Tel. /25/ 792 38 88	
<b>Sadzarka do warzyw</b>	
<input type="radio"/>	<input type="radio"/>
Symbol <input type="text" value="S290/"/>	Data <input type="text"/>
Numer <input type="text"/>	Masa <input type="text"/> kg

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



**CAUTION! REMEMBER!**

During transport, it is absolutely forbidden to stay on the planter.



**CAUTION!**

*During operation, it is necessary to pay particular attention to backlash of screw connections. Therefore, it is necessary to check and tighten screw connections after stopping the tractor and turning off the engine.*

## TABLE OF CONTENTS

WARRANTY CARD.....	2
1. INTRODUCTION.....	7
2. INTENDED USE OF THE PLANTER.....	7
3. SAFETY PRECAUTIONS AND WARNINGS.....	8
3.1. <i>Symbols: meaning and application</i> .....	8
3.2. <i>Expected use</i> .....	8
3.3. <i>Description of residual risk</i> .....	8
3.4. <i>Assessment of residual risk</i> .....	9
3.5. <i>Regulations for occupational health and safety</i> .....	9
3.6. <i>Standard conformity</i> .....	11
3.7. <i>Manufacturer's responsibility and guarantee</i> .....	12
3.8. <i>Noise and vibrations</i> .....	12
3.9. <i>Safety signs and captions</i> .....	12
4. USAGE REGULATIONS.....	13
4.1. <i>General information</i> .....	13
4.2. <i>Construction and operation of the machine</i> .....	14
4.3. <i>Equipment and fittings</i> .....	15
4.4. <i>Preparing the tractor for operation</i> .....	15
4.5. <i>Preparing the planter for operation</i> .....	16
4.6. <i>Mounting the planter on the tractor</i> .....	16
4.7. <i>Adjustment and setting of the planter</i> .....	17
4.8. <i>Operation with the planter</i> .....	19
5. TECHNICAL OPERATION.....	20
5.1. <i>Instructions on maintenance of the planter</i> .....	20
5.2. <i>After-seasonal maintenance of the planter</i> .....	20
5.3. <i>Storage of the planter</i> .....	20
5.4. <i>Replacement of the working elements</i> .....	21
5.5. <i>Lubrication instruction</i> .....	21
5.6. <i>Detection and removal of inefficiencies</i> .....	22
6. TRANSPORTATION ON PUBLIC ROADS.....	22
6.1. <i>Planter transportation by means of transport</i> .....	22
6.2. <i>Transportation of the planter on the tractor</i> .....	22
7. DISASSEMBLY.....	23
8. TOTALING.....	23
9. TECHNICAL CHARACTERISTICS.....	24
SPARE PARTS CATALOGUE.....	25

## 1. INTRODUCTION

**Dear customer,**

Congratulations on the choice of the product of **Bomet**<sup>®</sup> company.

The aim of this manual attached to each machine is to make a user acquainted with a construction, operation and adjustment of the automatic conveyor planters. Its aim is also warning about existing or possible threats. The manual also contains information on preparation of the planter for operation and for transportation on public roads.

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

Each section of the manual (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 issue number of 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 planter.

## 2. INTENDED USE OF THE PLANTER

Automatic conveyor 3-row, 4-row and 5-row planters are intended to operate exclusively in the agriculture. Using them for other purposes shall be understood as using them against the intended use. 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 and operated only by people acquainted with its detailed characteristics and 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.

Automatic vegetable planters of S290 series are multi-row planters mounted on the tractor three-point suspension system. Planters should be aggregated only with 2N and 2 tractors classes with suspension category II, equipped with standard ballasts of the front axle to keep the required controllability factor ( $s \geq 0.2$ ).

The machines are designed for planting vegetables such as garlic, broad beans or spring onions in well-cultivated soil on plain terrain and on slopes up to 8.5°. An automatic planter can be used for planting garlic, broad beans and spring onions, after mounting appropriate cups on the transport chain and setting the appropriate spacing of the planted seeds.

In one work cycle the planter performs all the work associated with planting cloves or vegetable seeds, i.e. plows furrows, automatically plants cloves and covers them with soil. The planter allows to plant seeds in a minimum inter-row spacing of 12cm. The maximum spacing possible to be obtained for a 3-row planter is 48cm, for a 4-row planter 32cm, and for a 5-row planter, 24cm. By replacing the gear wheel in the chain transmission and changing the ratio, it is possible to adjust the spacing by planting seeds in a row in the range of 9.5 cm to 21.5 cm.

### 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 important 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

Automatic vegetable planter of S290 series has been designed, built and adjusted for planting garlic, broad beans or spring onions in two, three or five rows on flat and wavy fields, on all types of soil kept in good culture, stoneless, of humidity enabling proper operation.

Planter should be aggregated with tractors class 2N and 2 or higher, equipped with suspension system category II and front axle standard ballasts to keep the required controllability factor. Operation with a planter can be performed on slopes up to 8.5°.



#### **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 behavior of the planter operator. The greatest danger can occur in performing following activities:

- operation of the planter by minors and also people not acquainted with the manual or not having qualifications for driving an agricultural tractor,
- operation of the planter 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 planter with a tractor if the operator is between the machine and the tractor with the engine working,
- operation when people or animals stay within the range of operation of the assembly tractor + machine,
- maintenance and adjustment near the planter when the tractor engine is working and the machine is not protected against falling down.

When describing residual risk of the vegetable planter, the planter 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. Assessment of residual risk

During operation of the vegetable planter, 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 planter during transportation,
- prohibition of people staying between the tractor and the planter when the tractor engine is working,
- all adjustment, maintenance and lubrication of the planter shall be performed only with the tractor engine stopped,
- repairs of the planter 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 planter against children access.

Although **BOMET**<sup>®</sup> company takes responsibility for pattern-designing and construction in order to eliminate danger, certain risk elements during automatic planter operation are unavoidable.

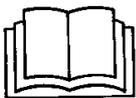
**⚠ 1) Danger of being caught or hurt** by the frame edges or marker sharp endings and adjustment elements of the planter press wheels during aggregation or changing transportation-operation position and inversely.

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

**⚠ 3) Danger of being crushed** by the moving elements of the transport chain with cups or the drive chain transmission as a result of the operator's improper position during maintenance and adjustment.

**⚠ 4) Danger of turning over the machine** during storage or transportation. When stored to keep stability, the planter should be set on the flat ground leaning on road wheels and markers. The planter 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 with the planter, 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 as well as occupational health and safety regulations.
- Warnings (pictograms) placed on the planter 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.
- Before each using the machine, it is necessary to check if all elements of the planter are in a good condition. Damage incurred shall be fixed without delay and possible deficiencies filled up.
- It is recommended to cooperate with a tractor equipped with a cabin or a protective frame.
- Avoid staying within the range of the working planter, outside the designated platform.
- Before leaving the tractor cabin and before each activity made at the planter, stop the tractor engine and remove the key from the ignition switch.

- The planter shall be stored in a dry room, on the tough and flat ground. When lowering the planter onto the ground, keep particular caution. Danger of injury!!!

### Aggregation

- Keep particular caution when connecting the planter with a tractor and during disconnection.
- It is forbidden to stay between the planter and a tractor during any activities performed with a hydraulic system lever.
- While aggregating the planter with a tractor, it is forbidden to stay between the tool and the tractor at the tractor engine working.
- When performing any maintenance at the planter, it is necessary to stop the engine, remove the key from the ignition switch and pull the handbrake.
- Pivots of the planter suspension system shall be secured only with the use of typical protection in the form of cotter pins.
- The planter shall be aggregated only with recommended tractor classes equipped with front axle ballasts.
- The planter 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. Front axle load cannot be less than 20% of the tractor's weight.

### Operation

- The planter can be operated by a person with qualifications allowing for using agricultural tractors and acquainted with the planter manual.
- It is not allowed for other people not acquainted with the manual to operate the planter.
- It is not allowed for children and people after drinking alcohol to operate the planter.
- The planter shall be raised onto the tractor suspension system easily, without jerks or vibrations.
- Raise the planter upwards each time when turning and making returns.
- Work with a planter on slopes with gradient exceeding 8.5° is not allowed.
- At each getting off the tractor by the operator, leave the planter in the lowered position.
- Removal of clogging on the markers can be performed after stopping the tractor with the machine lowered onto the ground and the tractor engine stopped.
- It is not allowed to use tractor reverse gear during work, when the machine is in the working position.
- All maintenance (lubrication, repairs, cleaning etc.) shall be performed with the planter lowered onto the ground, the tractor engine stopped, key taken out from the ignition switch and handbrake pulled.
- Take special care when checking the planting, especially filling the cups in the tank. Use protective gloves or other personal protective equipment.
- People operating agricultural equipment should be equipped with working clothes and footwear, and personal protection measures appropriate for existing threats, eg. gloves, glasses.



#### **!!! CAUTION!!!**



***Absolute prohibition of working with open or removed shields.  
It is forbidden to remove the shields when the planter is in operation.***

## Transportation

- Transportation of a planter 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 planter on a car trailer. Hooks for ropes or chains are marked with pictograms.
- The planter 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 planter frame, see details in section 'Transportation on public roads'.
- ***It is forbidden to transport any people or items on the frame (grain sacks), or to conduct transport journeys with a full tank.***
- With regard to overlapping of the machine due to considerable width of the planter and a fixed connection with the tractor, keep caution especially at returns during operation and turnings during transportation on public roads.
- Keep extreme caution while making a turn of a tractor with a mounted planter, 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 planter during transportation cannot exceed:
  - when driving on hardened roads with flat surface – 15 km/h,
  - when driving on field ways – 10 km/h.

## Storage

- Disconnecting the planter from the tractor can take place only after the tractor engine is stopped, key removed and the handbrake pulled.
- The planter shall be stored in a dry room, on the tough and flat ground. When lowering the planter onto the ground, keep particular caution - danger of being injured or crushed!!!
- During storage, the planter should be set firmly on working elements, i.e. markers and road wheels.
- The planter should be stored in places where there is no possibility of accidental injury of people or animals, on the flat ground, preferably under a roof.
- The automatic conveyor planter shall be stored in a clean condition.



### **Threat!**

Pay attention to sharp frame endings, markers, leveling roller - danger of being hurt, keep caution during operations near the planter.

## Others

- It is not allowed to use the planter 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 planter. 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 planter. Particularly, the following legal acts and standards have been taken into account:

- 2006/42/EC - 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 4254-1:2016P – Agricultural machinery. Safety. Part 1: General requirements.

- PN-ISO 730-1:2018E – Wheeled agricultural tractors. Rear three-point suspension system. Categories N1, 1, N2, 2, N3, 3, N4 and 4. (orig.)
- 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 signs and hazard pictograms. General provisions.

### **3.7. Manufacturer's responsibility and guarantee**

In relation to the machine described in this manual, **Bomet**<sup>®</sup> company does not acknowledge any civil responsibility towards:

- using the machine improperly or inconsistently with the manufacturer's recommendations,
- 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 the S290 automatic conveyor planter for the operator there is no threat caused by noise contributing to the loss of hearing because the planter is an inactive machine and the workplace of the operator is in the tractor cabin.

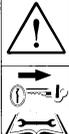
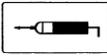
There is no threat caused by vibrations when working with a planter because the operator's workplace is located in the tractor cabin where the seat is amortized and properly ergonomically shaped.

### **3.9 Safety signs and captions**

Automatic conveyor planter of S290 series is equipped with all devices that ensure safe operation. Where it is not possible to secure dangerous places entirely due to the proper operation of the planter, 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 exchanged 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 or send information to the e-mail 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	Meaning	Location
1.	(Rating plate)	Rating plate	At the front of the frame
2.		Before operating the machine, read the manual.	At the front of the three-point suspension system
3.		Caution. Before operation turn off the engine and remove the key from the ignition switch.	At the front of the three-point suspension system
4.		Do not stay near the lift rods, while controlling the lift.	At the front of the three-point suspension system
5.		Caution. Risk of being caught by the chain transmission. Do not put hands into the planter tank during operation.	On the planter shield
6.		Caution. Do not reach crushing area if the elements can be in motion	On the planter frame
7.		Danger of hurting a leg. Keep the safe distance from the working roller	On the planter frame
8.		Prohibition of work without shields	On shields
9.		Marking places of loading hooks	On the planter frame
10.		Marking lubrication points	On the planter frame
11.		Symbol of permissible transport speed	At the back of the planter tank
12.		Company logo	On the planter tank

## 4. USAGE REGULATIONS

### 4.1. General information

The S290 automatic conveyor planter is a machine suspended on the tractor three-point suspension system. The planter is available as a 3-row, 4-row or 5-row machine. The planter is suitable for operation on slopes not exceeding 8.5° and cooperate with tractor classes 2N and 2 (see table 4) equipped with suspension system cat. 2 and standard wheel ballasts.

## 4.2. Construction and operation of the machine

The S290 automatic conveyor planter (Figure 1) is a machine mounted on the tractor three-point suspension system. Planters have a modular construction, they have the same elements, they only differ in the number of rows. The planter is available as a 3-row, 4-row or 5-row machine. The construction of the 4-row planter is described below.

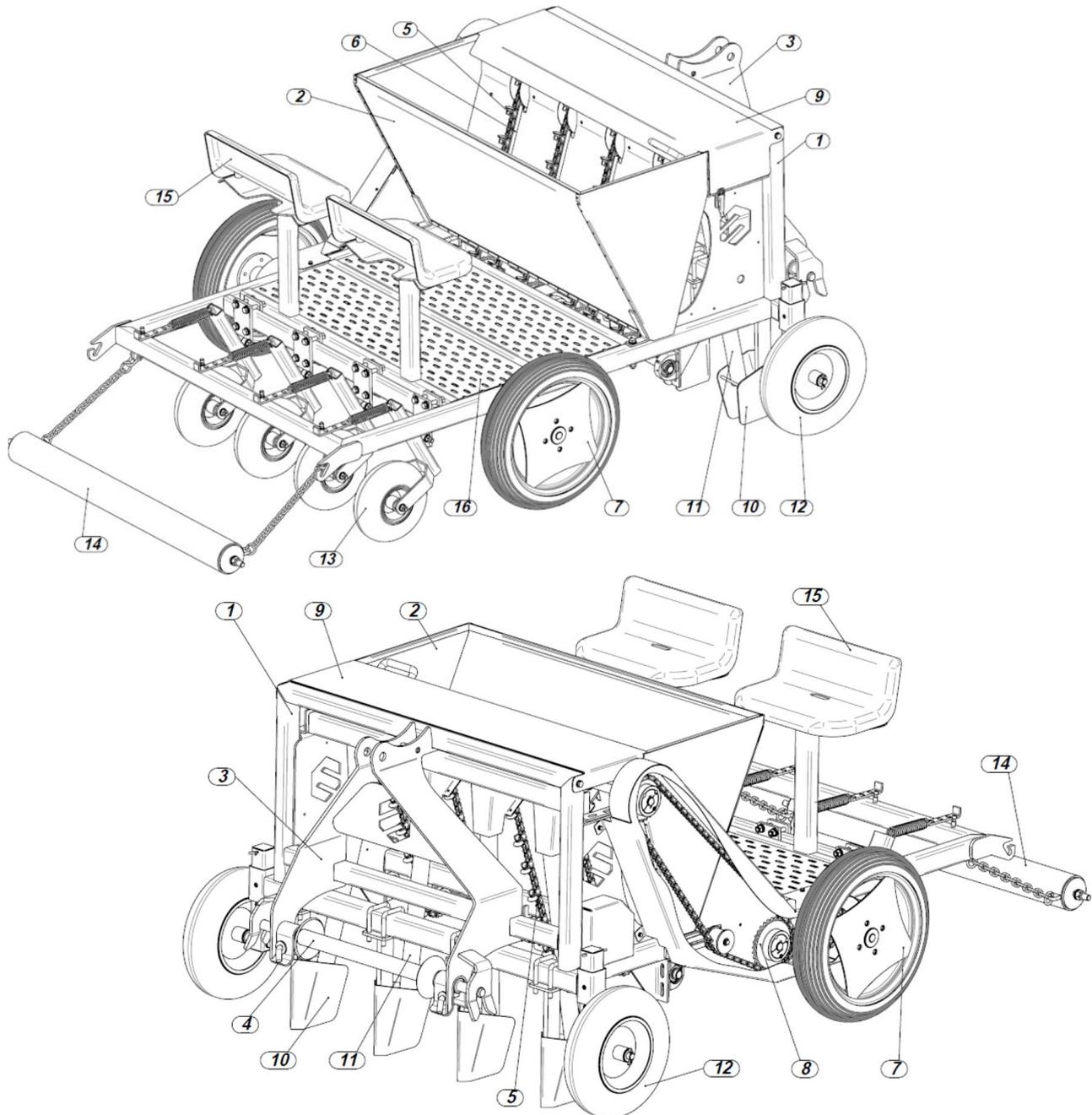


Figure 1. Automatic conveyor 4-row planter: 1 - frame, 2 - tank, 3 - tractor three-point suspension system, 4 - hitching beam, 5 - transport chain conveyor, 6 - chain keeper, 7 - road wheels, 8 - drive sprockets, 9 - drive chain transmission, 10 - markers, 11 - chute pipe, 12 - support wheels, 13 - press wheels, 14 - leveling roller, 15 - seats, 16 - platform

The basic component of the planter is a welded frame (1) on which a metal tank (2) is installed. At the front of the frame there is a three-point suspension system (3) with a hitching beam (4). In the tank there are transport chain conveyors with cups (5), leaning against the guides (6). The transport chain receives the drive from the road wheels (7) of the planter through the drive chain transmissions (8). The upper roller of the transport conveyor and the charging funnel are covered from the top by a cover (9). At the front of the planter frame there are markers (10) attached that plough the furrows. In the markers there are chute pipes

(11) which supply furrows with seeds. The planting depth is adjusted in strokes with front support wheels (12). At the back of the planter there are press wheels (13) and a leveling roller (14). The roller covers the seeds and levels the ridges. The planter is equipped with seats (15) and a platform (16) facilitating the control of filling the cups with seeds. **The platform and seats can only be used while working.**



### **!!! CAUTION!!!**



***It is absolutely forbidden to use the platform and seats during transportation.  
The platform and seats can only be used while working.***

The automatic conveyor planter is a machine intended for planting garlic, broad beans or spring onions, after proper adjustment of the size of the transport chain cups, and adjustment of the planting spacing in the row and adjustment of the inter-row spacing. The operation of the conveyor planter is based on collecting of individual garlic cloves or broad bean seeds and onions by the transport chain cups directly from the tank, and transporting them to the charging funnel. Seeds drop freely through charging funnels and chute pipes into the markers and into the furrow made by this marker. The leveling roller behind the planter covers the planted seeds with soil and levels the ridges.

### **4.3. Equipment and fittings**

The manufacturer delivers the planter for sale assembled. The manual with a spare parts catalog and a warranty card as well as two gear wheels with Taper Lock sleeves to adjust the planting spacing to the crop, are delivered along with the machine by the manufacturer. 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.



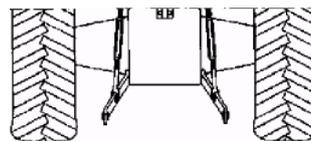
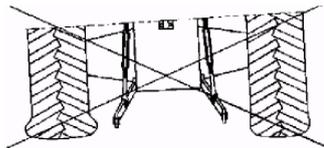
#### **REMEMBER**

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

Each user of the planter 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 for operation**

Preparation of a tractor to cooperation with a planter consists in checking its general efficiency in accordance with the tractor manual (pay particular attention to the proper operation of the suspension system). In addition, it is necessary to uninstall from the tractor elements disabling mounting the machine or disabling its operation. It is mandatory to aggregate the planter 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. Air pressure, particularly in rear tires of the tractor should be equal in both wheels and in accordance with the tractor's manual!



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 planter on the tractor.

#### 4.5. Preparing the planter for operation

Preparation of a new planter 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 machine work quality.



##### CAUTION

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

In addition, it is necessary to:

- check screw connections, in case of backlash tighten the nuts,
- determine and set the correct inter-row spacing for a given crop,
- determine and set the correct marker operation depth, by adjusting the front wheels,
- determine and install the correct cups in the transport chain for a given crop,
- check and if need be perform adjustment of the chain transmissions tension,
- lubricate the planter in accordance with recommendations (see section "Lubrication instruction").
- check the pressure in the planter tires.



##### CAUTION

The planter tank should be filled at a stoppage directly before sowing in the field, after lowering the planter onto the ground and turning off the tractor engine and the key removed from the ignition switch.



##### CAUTION

Loading of seeds into the tank should be made from the ground (sacks up to 25kg), the height of the tank's edge allows for safe loading from the ground.



##### CAUTION

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

#### 4.6. Mounting the planter on the tractor

When mounting the planter on the tractor, perform following activities, while disconnecting should be performed in reverse order:

- disassemble a tool latch bar from lower rods of the tractor three-point suspension system,
- disassemble the hitching beam of the planter and install it in the place of the hitching beam (lower rods of the three-point suspension system) on the tractor, securing it with typical cotter pins,
- drive to the machine with the tractor so that the hitching beam is mounted in the yoke brackets of the planter suspension system,
- **turn off the tractor engine, remove the key from the ignition switch and pull handbrake,**
- install locking pivots, securing them with typical cotter pins,
- using a pivot, link the upper connector of the tractor with the planter frame rack and secure with a typical cotter pin,
- tighten gently chains of lower rods of the tractor, keeping the symmetry between the planter suspension and the tractor,
- 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.



##### CAUTION

Pay particular attention when aggregating the planter, do not keep place between the planter and the tractor.

Disconnecting the planter from the tractor is performed in reverse order, it is necessary to leave the machine on the flat and even ground and secure it against moving.

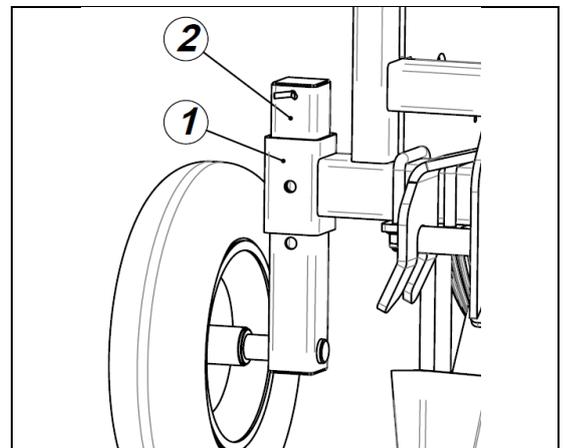
#### 4.7. Adjustment and setting of the planter

The correct and good quality of the planter's work depends on the proper leveling of the planter and then depending on the crop, the appropriate setting of the planting depth, setting of the inter-row width and the planting spacing in a row.

**Transversal leveling** ensures determining equal operation depth of right and left sections of the planter and is performed with the right hanger of the tractor suspension system. After performing adjustment the tank of the planter, visible from the back, after gaining full operation depth should be set horizontally.

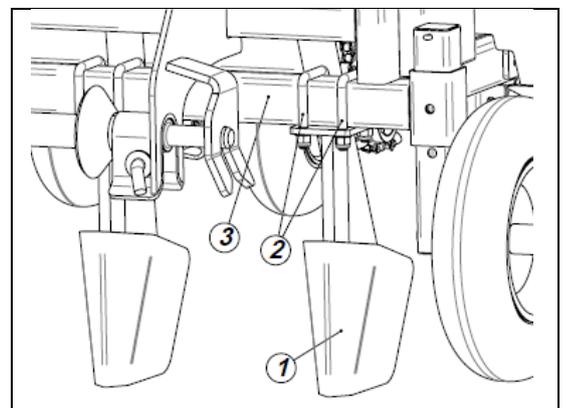
**Longitudinal leveling** ensures determining the equal operation depth of the working elements at the front and rear of the planter. Longitudinal leveling is performed by shortening or lengthening the upper connector of the tractor suspension system. Properly leveled planter should have the frame and the tank set in parallel to the field surface.

**Adjustment of the planting depth** is performed with the front support wheels. The change of the seed planting depth is performed by changing the position of the support wheel arms (2) and determining its position in the appropriate guide hole (1). The planter construction allows for a step change in the planting depth in the following ranges of **3cm, 5cm, 7cm and 9cm**. Such planting depths concern recommended agrotechnical planting depths for garlic, broad beans and spring onions.



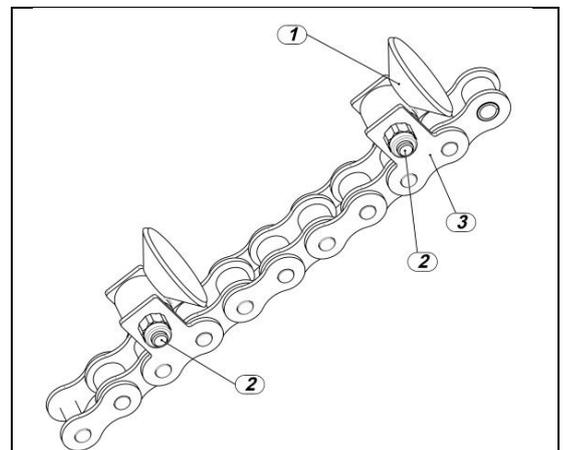
**Adjustment of inter-rows**, minimum inter-row spacing in the planter is 12cm, and the maximum spacing varies depending on the number of rows planted. For a 3-row planter, the maximum inter-row spacing is **48cm**, for a 4-row it is **32cm** and for a 5-row it is **24cm**.

In order to change the marker spacing (1), loosen the bolts fixing the U-bolts (2) on the planter frame (3), then set the markers to the appropriate spacing and tighten the fixing bolts.



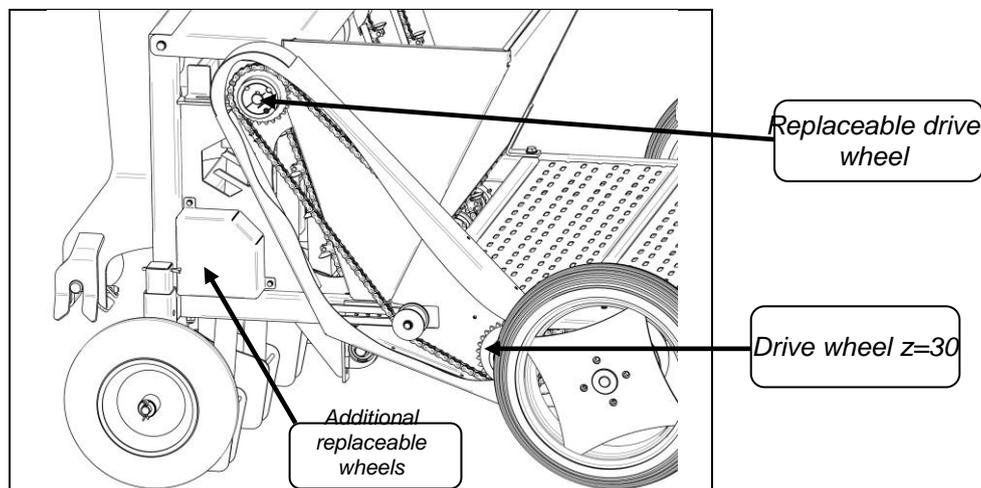
**Replacement of cups.** There are two planting cup dimensions of **ø28mm** and **ø36mm** to adjust to the planted crops and their seeds size.

In order to change a cup (1) in the transport chain, unscrew the M5x25 (2) bolt that tightens the cup in the connecting link (3), remove the cup and install another one.



**Changes in planting spacing in a row** are made by changing the upper drive wheel in the drive gear. Depending on the crop, the seed sowing should be set properly in the row. By changing the gear wheel, the rotational speed of the drive shaft of the transport chain conveyor is changed. The replaceable wheel is mounted on the upper roller with a Taper Lock sleeve. The standard equipment of the planter includes gear wheels  $z = 13$  with Taper Lock 1008,  $z = 16$  with Taper Lock 1610 and  $z = 25$  with Taper Lock 2012.

As a standard the planter is prepared for planting with 18cm spacing with the transport chain with 16 cups and a replaceable wheel  $z = 25$ .



Before starting work, if there is a need to change the planting spacing, select the appropriate replaceable gear wheel together with the Taper Lock sleeve and replace the upper gear wheel. The table below presents the achievable seed planting spacing with appropriate replaceable gear wheels together with the specified types of Taper Lock sleeves.

Table 2. Planting spacing for the transport chain with 16 cups

No.	Number of tines of the replaceable wheel	Taper Lock sleeve	Planting spacing
1.	$z = 13^*$	<b>1008</b>	<b>9.5 cm</b>
2.	$z = 14$	1108	10.0 cm
3.	$z = 15$	1210	10.5 cm
4.	$z = 16^*$	<b>1610</b>	<b>11.5 cm</b>
5.	$z = 17z$	1610	12.0 cm
6.	$z = 18$	1610	13.0 cm
7.	$z = 19$	1610	13.5 cm
8.	$z = 20$	1610	14.0 cm
9.	$z = 21$	1610	15.0 cm
10.	$z = 22$	1610	16.0 cm
11.	$z = 23$	1610	16.5 cm
12.	$z = 24$	2012	17.0 cm
13.	$z = 25^*$	<b>2012</b>	<b>18.0 cm</b>
14.	$z = 26$	2012	18.5 cm
15.	$z = 27$	2012	19.0 cm
16.	$z = 28$	2012	19.5 cm
17.	$z = 30$	2012	21.5 cm

\* wheels and sleeves which are standard equipment of the planter, there is also the possibility of ordering other wheels

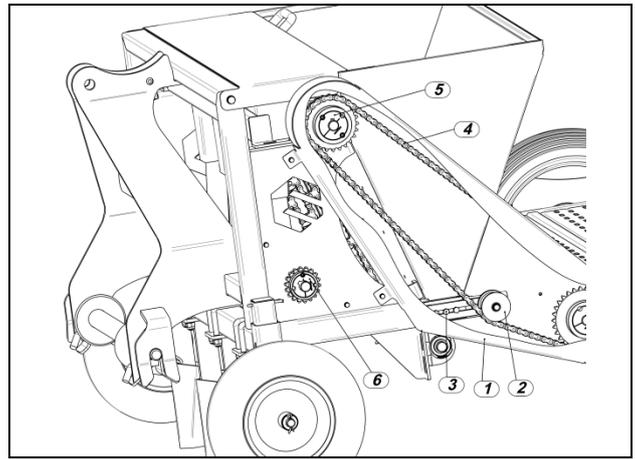


**WARNING**

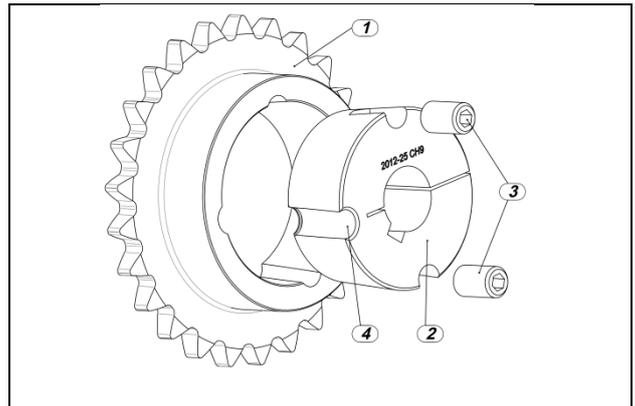
It is forbidden to perform adjustment of the planter with the tractor engine working.  
It is forbidden for the operator to stay between the tractor and the planter with the tractor engine running.

The change of planting spacing begins with the removal of the side shield (1) and loosening three M8x20 bolts (3) fastening the roller tensioner (2), which will allow to remove the drive chain (4) from the upper gear wheel (5). Then the replaceable gear wheel can be freely removed from the upper drive roller.

Additional replaceable gear wheels (6) are mounted on a special pin under a small side shield.



In order to uninstall the gear wheel (1) with the Taper Lock sleeve (2) from the upper roller, unscrew the clamping screws (3) from the sleeve. Then one of the screws (3) is screwed into the hole intended for uninstallation of the sleeve (4) from the gear wheel. When the screw is screwed into the hole (4), the sleeve will expand and it will be possible to slide the gear wheel down from the Taper Lock sleeve. First, the sleeve is uninstalled from the roller and then the gear wheel is removed.



The wheel installation sequence is opposite to uninstallation, i.e. first the gear wheel is put onto the roller, then the appropriate Taper Lock sleeve is installed and the sleeve with the gear wheel is screwed with the use of clamping screws. After that the chain is installed paying special attention that the upper and lower gear wheels are in the same plane, then the chain should be tensioned by adjusting the tensioner and tightening the set screws. After tensioning the chain with the tensioner, it is absolutely necessary to install the side shield of the drive gear.

	<p><b>WARNING</b></p> <p>After performing maintenance and adjustment, the shields must be <b>UNCONDITIONALLY</b> installed. Operation without the shields is <b>ABSOLUTELY</b> prohibited.</p>
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#### 4.8. Operation with the planter

The field intended for planting vegetables should be prepared according to agrotechnical requirements, after plowing the furrows should be leveled. The surface of the field should be even and free of weeds, because the remains of plant remnants clog the markers and the leveling roller. It is important that the soil moisture is optimal for seed emergence, i.e. approx. 15%. During operation the properly mounted and adjusted conveyor planter should be moving evenly behind the tractor and keep equal operation depth along the whole operation width. While planting, maintain a constant speed.

Planting in the first ridges should be performed as carefully as possible, since the accuracy of performing further ridges and the ease of conducting further care treatments and mechanical harvesting depend on them. When the markers or the ridging roller are clogged, stop the tractor and then raise and lower the planter on the tractor hydraulic lift.

	<p><b>CAUTION</b></p> <p>It is inadmissible to leave the planter on the slope or other terrain slope without securing it against automatic rolling down.</p>
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**CAUTION**

Returns shall be performed gently with the planter raised to the transport position, with no use of the tractor independent brake. It is necessary to keep extreme caution if there are people or items in the range of the planter operation.

**CAUTION**

It is not allowed to use tractor reverse gear during work, when the machine is in the working position. The planter shall be raised easily, without jerks or vibrations.

**WARNING.**

All clogging made during the planter work requiring interference in the operation shall be removed after stopping the tractor, lowering the planter, turning off the tractor engine and pulling the handbrake.

## 5. TECHNICAL OPERATION

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

- all worn elements of the planter shall be exchanged in the proper time,
- use gloves if necessary during maintenance,
- for exchange only original parts ensuring good quality shall be used, it comprises one of conditions of keeping warranty validity.

### 5.1. Instructions on maintenance of the planter

Each time, after work, clean the planter thoroughly out of soil and inspect connections of parts and units. Technical operation of the planter consists in reviewing the condition of markers, chain conveyor with cups, drive chains wheel as well as screw and pivot connections. All loose screw connections shall be tightened and the planter should be lubricated in accordance with the lubrication instructions.

Warning signs and a triangular sign for low-speed vehicles shall be kept clean.

**CAUTION**

All maintenance shall be performed at the planter lowered onto the ground and the tractor engine stopped.

### 5.2. After-seasonal maintenance of the planter

After season, the planter shall be cleaned thoroughly out of contamination and washed. 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 planter shall be greased in accordance with the lubrication instruction.

### 5.3. Storage of the planter

Planter 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 machine outside. After disconnecting the planter from the tractor, the machine should be leant on markers and road wheels.

**CAUTION**

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

During long-term storage of the machine 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 planter and placed in a dry room, to be protected from being damaged.

#### 5.4. Replacement of the working parts

In the planter there may be the need to replace wearing parts, i.e. markers or cups of the chain conveyor. In order to change a marker, the planter mounted on the tractor shall be raised to the transportation position. The machine shall be secured against falling by putting a strong enough support excluding its falling over under the frame. After setting the support, lower the planter until it is leant on it, stop the tractor engine, remove the key from the ignition switch, pull the handbrake, and secure one of the rear wheels of the tractor with wedges against moving. Before exchange of the working elements, stability of the assembly: tractor – planter shall be checked.

	<p><b>CAUTION</b> All activities connected with uninstalling and installing of worn parts of the planter shall be performed on the tough and flat ground, after lowering the planter onto the ground or supports.</p>
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#### Marker replacement (see p.17)

- the planter frame should be at the top on the support,
- unscrew the nuts fastening the marker U-bolts to the frame,
- remove the worn marker and install a new one,
- insert a new marker, put the U-bolts on the frame,
- tighten the U-bolt fastening nuts.

#### Replacement of the chain cup (see p.17)

- replacement of the cup can be performed on the chain mounted in the tank,
- set the chain in the position to unscrew the M5x25 bolt fixing the cup easily,
- after taking out the fixing bolt, remove the damaged cup and put on a new one,
- after placing the new cup, install the M5x25 fixing bolt and tighten the nut,

	<p><b>REMEMBER</b> During exchange of working elements it is necessary to use a spare parts catalogue where assembly of planter parts is presented in the scheme.</p>
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	<p><b>CAUTION</b> During exchange of working elements, it is necessary to use proper tools and protective gloves.</p>
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#### 5.5. Lubrication instruction

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

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

Table 3. Planter lubrication points

No. of the lubrication point	Lubrication point	Frequency of lubrication	Grease type
1	Bearing housing for the planter drive axles	twice a season	ŁT-43 grease
2	Tension wheel hub	twice a season	ŁT-43 grease
3	Bucket conveyor chain	twice a season	graphite grease
4	Washing working surfaces	after the season	"Antykor" kerosene
5	Maintenance of working surfaces	after the season	"Antykor" grease

## 5.6. Detection and removal of inefficiencies

During operation, following failure may occur, which can affect unfavorably the planter operation quality, raise the application cost and also lead to damage both to the planter and the tractor.

	<p><b>REMEMBER!</b> Work with an inefficient, improperly adjusted machine may lead to serious threats to the operator and other people. Inefficiencies and damages noticed shall be removed without delay.</p>
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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. <b>IMPORTANT:</b> Tractor front axle load cannot be less than 0.2 of the tractor's weight.	Check if the tractor class is consistent with the manual recommendations. If not – change the tractor. If so – check and if need be add the proper number of front axle ballasts.
Planter will not submerge	Support wheels set too low	Check and adjust the operation depth
	Improper longitudinal leveling	Check and level the planter
Uneven depth of work	Improper longitudinal or transversal leveling	Check and perform proper adjustment
	Support wheels at various heights	Check and adjust the wheels
	Operation of the support wheels is not equal	Check the pressure in tires
Cloves or seeds are not planted	Transport conveyor chain broken	Replace the broken chain link
	Groove of the drive wheel on the planter axle cut	Replace the cut groove
Several cloves or seeds are planted at the same time	Cup selected improperly to the size of seeds	Check and replace the cups, if necessary
Transversal rocking of the planter	Improperly adjusted side rod pullers	Check and perform adjustment

## 6. TRANSPORTATION ON PUBLIC ROADS

### 6.1. Planter transportation by means of transport

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

	<p><b>CAUTION</b> When loading the planter on means of transport, ropes or belts shall be installed in places marked by the manufacturer with pictograms.</p>
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	<p><b>DANGER</b> When loading, unloading and transporting, there is a risk of injury by falling objects, so keep extreme caution during these activities.</p>
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### 6.2. Transportation of the planter on the tractor

The planter is adjusted for transportation on public roads on the tractor three-point suspension system. During transportation it shall be raised onto the tractor three-point suspension system so that the transportation clearance equals minimum 30 cm. Then the support wheels and the leveling roller shall be checked if they are secured during transportation.

The planter transported on public roads on the tractor should be equipped with portable light and warning devices and a triangular sign for low-speed vehicles.

If the machine, when lifted to the transportation position, covers the tractor lights, it is necessary to use the complete rear marking, i.e.:

- **two portable warning signs** installed in the brackets at the back of the frame, the signs should be equipped with combination lamps and reflective red lights visible at the back as well as white side lights visible at the front,
- **sign for low speed vehicles** installed in the bracket at the back in the center,

Warning signs shall be installed firmly in the brackets and the plug shall be connected with the socket of the tractor electrical installation so that the lighting system of the sign is integrated with the tractor lighting. Before starting transportation, functioning of the lights shall be checked. Permissible transportation speed of the tractor with the machine equals 15 km/h. On roads with worse surface it shall be decreased to 10 km/h and on field roads down to 5 km/h. When passing or overtaking other vehicles, avoiding obstacles and driving on large inequalities in the field or on field roads keep extreme caution.

Moreover, the tractor, on which the planter is mounted, should fulfill conditions of admitting it to motion on public roads in accordance with Highway Code.



**CAUTION!**

It is forbidden to move on public roads without the proper marking (Ordinance of Minister of Infrastructure and Construction of 15 December 2016 Journal of Laws item 2022).

The planter transported on public roads on the tractor suspension system must be equipped with portable light and warning devices and a triangular sign for low-speed vehicles, fixed in special handles mounted on the machine.

It is forbidden to transport any people or items on the machine frame or in the planter tank.



**CAUTION!**

When turning, pay attention to "overlapping" of the machine.

## 7. DISASSEMBLY



**CAUTION**

Before starting the disassembly, the planter shall be disconnected from the tractor.

Disassembly of the machine should be performed by people, equipped with protective gloves and previously acquainted with its construction. These activities shall be performed after setting the machine on the flat and tough ground. Disassembly and replacement of working parts should be performed according to the tables included in the spare parts catalogue. In case of worn parts, follow 'Totaling' point.

Due to a number of planter parts exceeding 20 kg (frame, tank) during disassembly use lifting devices.



**CAUTION**

Lifting devices used during disassembly can be operated only by a person properly authorized and qualified.

All fixings are made of normalized elements adjusted to metric keys. For key movement there are free spaces ensuring unconstrained untwisting and tightening up nuts and screws predicted. In case of screws of yoke fastening the working sections to the frame, use bent box spanners.

## 8. TOTALING

Totaling of the planter 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 - ferrous metals. Used parts made from ferrous metals should be grouped and passed to points purchasing these metals.

## 9. TECHNICAL CHARACTERISTICS

Technical data of the mounted automatic conveyor vegetable planter of the S290 series is listed in table 5.

Table. 5. Technical characteristics of the S290 planter

No.	Specification	Unit of measure	Manufacturer data		
			S290	S290/1	S290/2
1.	Symbol	-	S290	S290/1	S290/2
2.	Type	-	mounted		
3.	Number of rows	pc/ pcs	3	4	5
4.	<b>Overall dimensions of the planter</b>				
	- width	mm	1580		
	- length	mm	2100		
	- length with a working roller	mm	2450		
	- height	mm	1030		
5.	Inter-row spacing	mm	120 - 480	120 - 320	120 - 240
6.	Seed spacing in a row* for gear wheels	cm	9.5 - z=13 11.5 - z = 16 18.0 - z = 25		
7.	Step adjustment of the planting depth	mm	30 / 50 / 70 / 90		
8.	<b>Leveling roller</b>				
	- diameter	mm	100		
	- roller width	mm	1050		
9.	Tank capacity	dm <sup>3</sup>	210		
10.	<b>Support wheels</b>				
	- wheel designation	-	4.00-8		
	- diameter of the support wheel	mm	380		
	- width of the support wheel	mm	100		
	- maximum tire pressure	bar	2.75		
11.	<b>Drive wheels</b>				
	- wheel designation	-	T105-70 R14		
	- diameter of the drive wheel	mm	500		
	- width of the drive wheel	mm	95		
	- maximum tire pressure	bar	4.2		
12.	<b>Press wheels</b>				
	- wheel designation	-	4.10-3.50		
	- diameter of the press wheel	mm	260		
	- width of the press wheel	mm	85		
	- maximum tire pressure	bar	3.5		
13.	Machine weight	kg	330	365	385
14.	Number of seats	pc/ pcs	2	2	2
15.	<b>Aggregation with the tractor</b>				
	- suspension system	-	II cat.		
	- power demand min.	kW	28	32	15
16.	Operation	persons	1		

\* - the planter can optionally be equipped with other replaceable gear wheels, giving a different seed spacing in a row

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 automatic conveyor planter, marked with proper numbers of tables.

The catalogue should be used as follows:

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

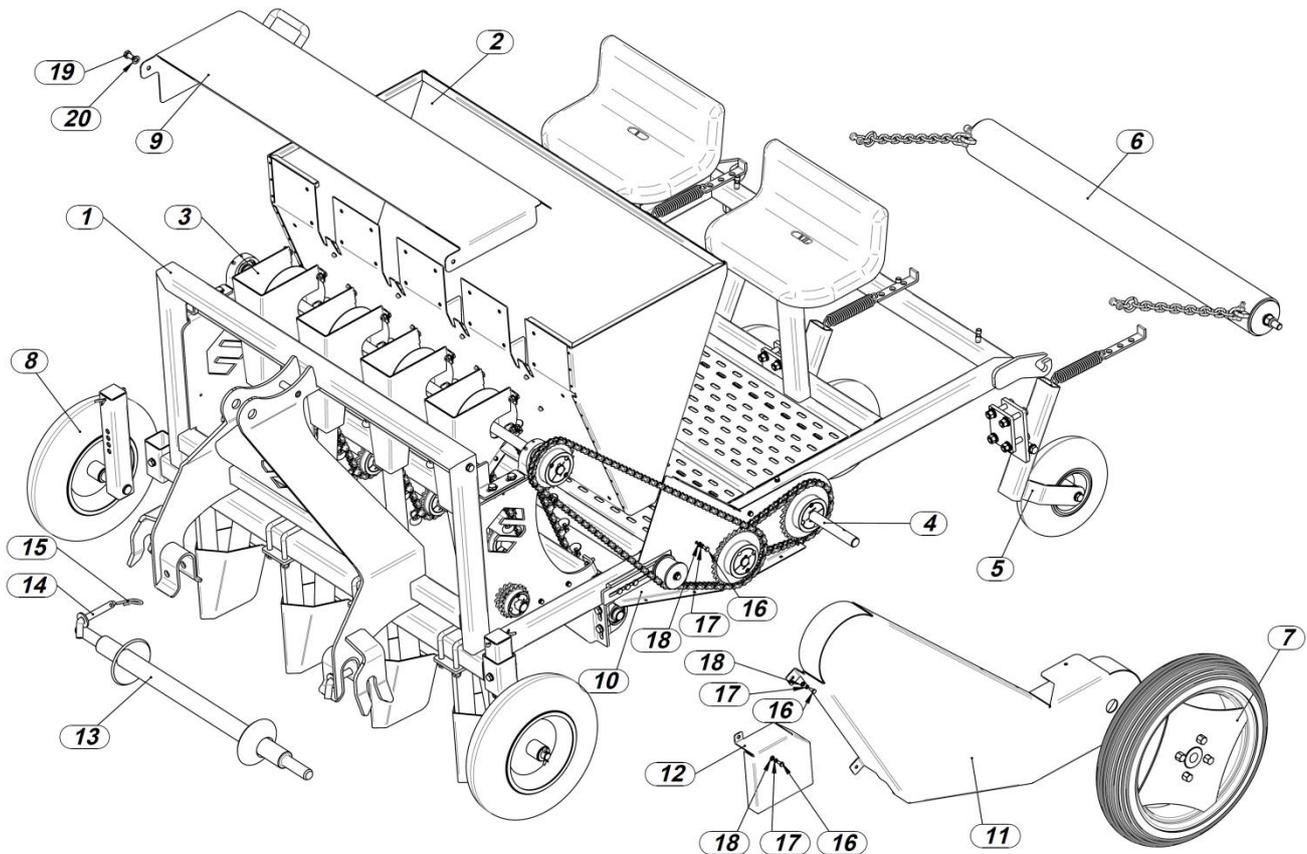
In order to purchase spare parts, contact the tool manufacturer by mail or phone; then you are supposed to specify:

- the exact address of the orderer,
- symbol of the planter
- serial number of the planter,
- 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.

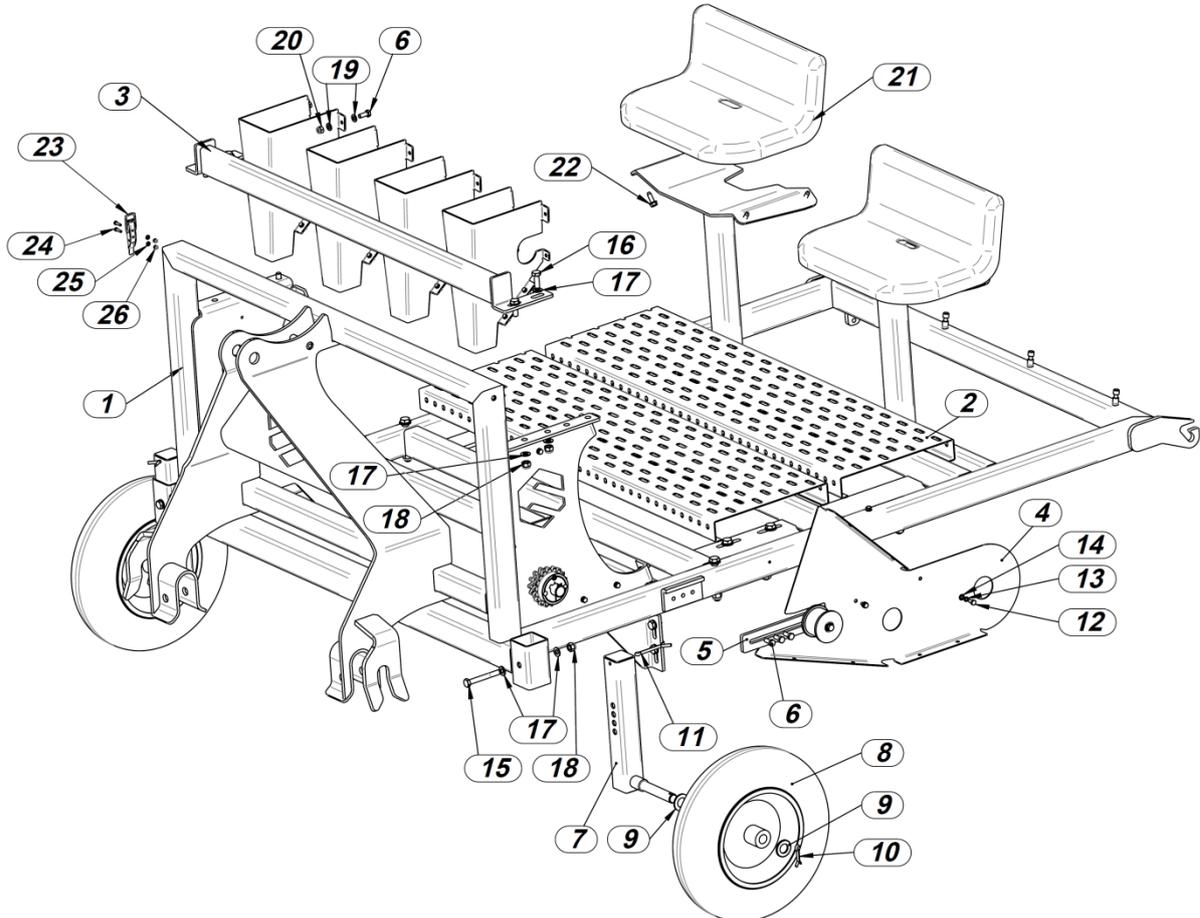
**Table 1. Vegetable planter**

Pos. in the picture	Part name	KTM symbol or standard number	Number of pieces		
			S290 3-row	S290/1 4-row	S290/2 5-row
1.	Planter frame set	290-001-000	1	1	1
2.	Planter tank set	290-002-000	1	-	-
		290-102-000	-	1	-
		290-202-000	-	-	1
3.	Planter chute assembly set	290-003-000	1	1	1
4.	Planter drive set	290-004-000	1	1	1
5.	Press wheel set	290-005-000	3	4	5
6.	Leveling roller set	290-006-000	1	1	1
7.	Road wheel T105-70 set	290-007-000	2	2	2
8.	Front support wheel 4.00-8 set	290-008-000	2	2	2
9.	Top shield set	290-009-000	1	1	1
10.	Side shield base	290-010-000	1	1	1
11.	Side shield welded	290-011-000	1	1	1
12.	Side shield small welded	290-012-000	1	1	1
13.	Hitching beam cat.2	290-013-000	1	1	1
14.	Pivot cotter pin Ø16x145	290-014-000	2	2	2
15.	Spring pin Ø6 (DIN11024)	290-000-015	2	2	2
16.	M6x12 bolt (DIN 933)	290-000-016	7	7	7
17.	Spring washer for M6 (DIN127)	290-000-017	7	7	7
18.	Washer 6.4 (DIN125)	290-000-018	7	7	7
19.	M10x20 bolt (DIN 933)	290-000-019	2	2	2
20.	Washer 10.5 (DIN125)	290-000-020	2	2	2



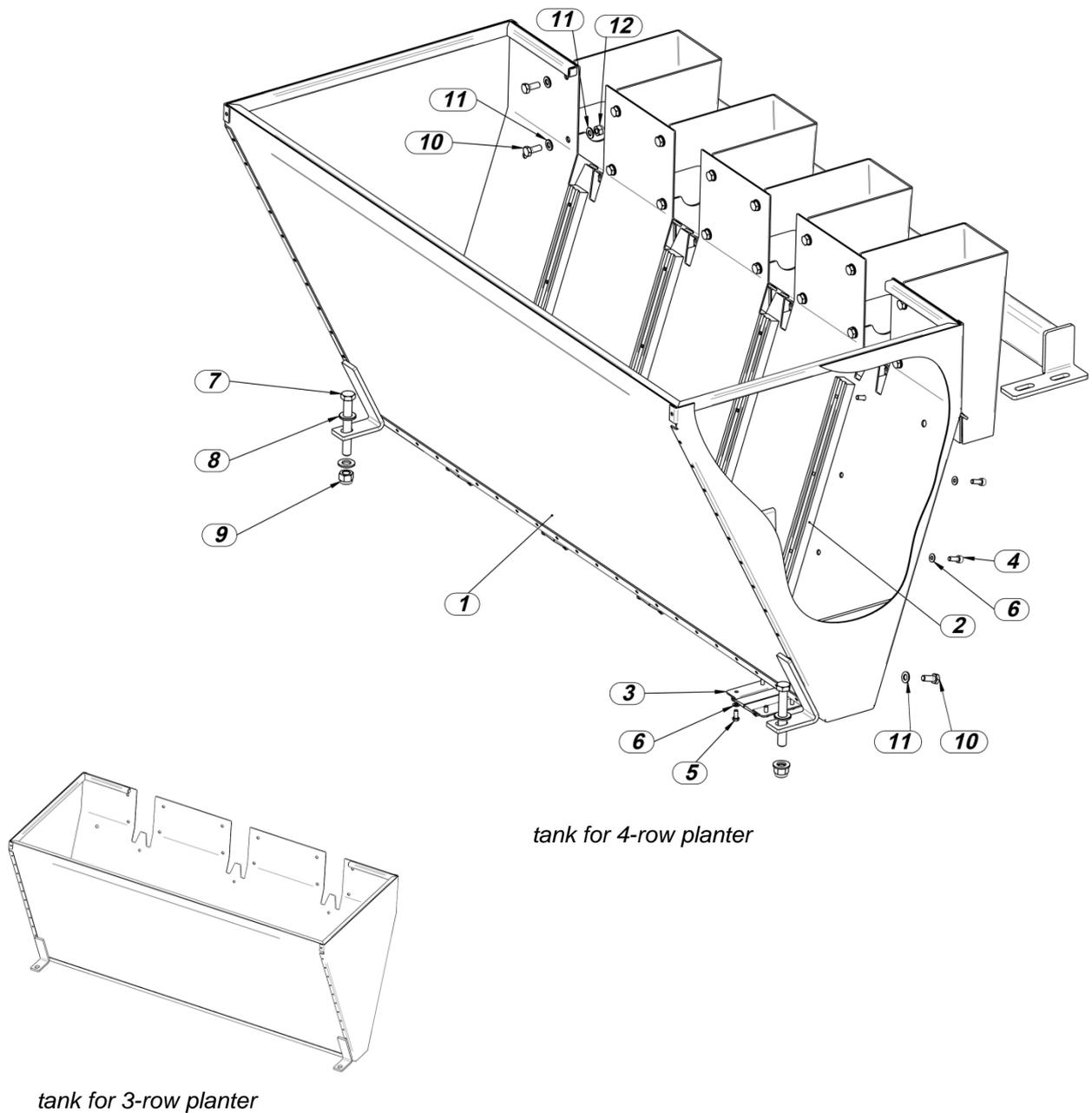
**Table 2. Planter frame**

Pos. in the picture	Part name	KTM symbol or standard number	Number of pieces		
			S290 3-row	S290/1 4-row	S290/2 5-row
1.	Planter frame welded	290-001-001	1	1	1
2.	Openwork platforms	290-001-002	2	2	2
3.	Top beam of the chute assembly welded	290-003-001	1	-	-
		290-103-001	-	1	-
		290-203-001	-	-	1
4.	Side shield base	290-010-000	1	1	1
5.	Drive chain tensioner set	290-001-005	1	1	1
6.	M8x20 bolt (DIN 933)	290-001-006	15	19	23
7.	Support wheel arm welded	290-001-007	2	2	2
8.	Tire and rim 4.00-8 set	290-001-008	2	2	2
9.	Washer 21 (DIN125)	290-001-009	4	4	4
10.	Split pin 6.3x32 (DIN94)	290-001-010	2	2	2
11.	Split pin 6.3x71 (DIN94)	290-001-011	2	2	2
12.	M6x12 bolt (DIN 933)	290-001-012	2	2	2
13.	Spring washer for M6 (DIN127)	290-001-013	2	2	2
14.	Washer 6.4 (DIN125)	290-001-014	2	2	2
15.	M10x80 bolt (DIN 931)	290-001-015	2	2	2
16.	M10x30 bolt (DIN 933)	290-001-016	4	4	4
17.	Washer 10.5 (DIN125)	290-001-017	12	12	12
18.	M10 self-locking nut (DIN985)	290-001-018	6	6	6
19.	Washer 8.4 (DIN125)	290-001-019	12	16	20
20.	M8 self-locking nut (DIN985)	290-001-020	12	16	20
21.	Plastic seat	290-001-021	2	2	2
22.	Sheet metal screw with washer M8x25 (DIN7504)	290-001-022	8	8	8
23.	Top shield lock	290-001-023	1	1	1
24.	M4x16 bolt (DIN 933)	290-001-024	2	2	2
25.	Washer 4.3 (DIN125)	290-001-025	2	2	2
26.	M4 self-locking nut (DIN985)	290-001-026	2	2	2



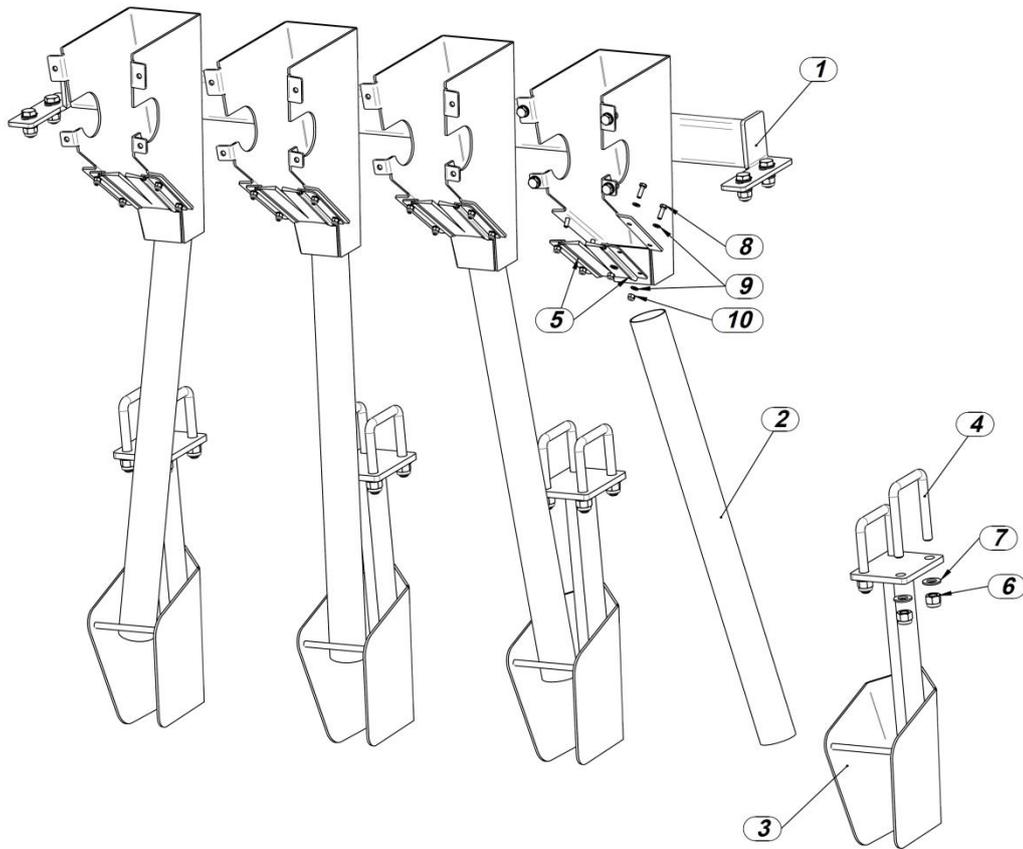
**Table 3. Planter tank**

Pos. in the picture	Part name	KTM symbol or standard number	Number of pieces		
			S290 3-row	S290/1 4-row	S290/2 5-row
1.	Planter tank welded	290-002-001	1	-	-
		290-102-001	-	1	-
		290-202-001	-	-	1
2.	Plastic chain keeper	290-002-002	3	4	5
3.	Brush seal h5 25mm L=70	290-002-003	6	8	10
4.	M6x16 bolt (DIN 933)	290-002-004	12	16	20
5.	M6x12 bolt (DIN 933)	290-002-005	12	16	20
6.	Washer 6.4 (DIN125)	290-002-006	12	16	20
7.	M12x90 bolt (DIN 931)	290-002-007	2	2	2
8.	Washer 13 (DIN125)	290-002-008	4	4	4
9.	M12 self-locking nut (DIN985)	290-002-009	2	2	2
10.	M8x20 bolt (DIN 933)	290-002-010	12	16	20
11.	Washer 8.4 (DIN125)	290-002-011	24	32	40
12.	M8 self-locking nut (DIN985)	290-002-012	12	16	20



**Table 4. Chute assembly set**

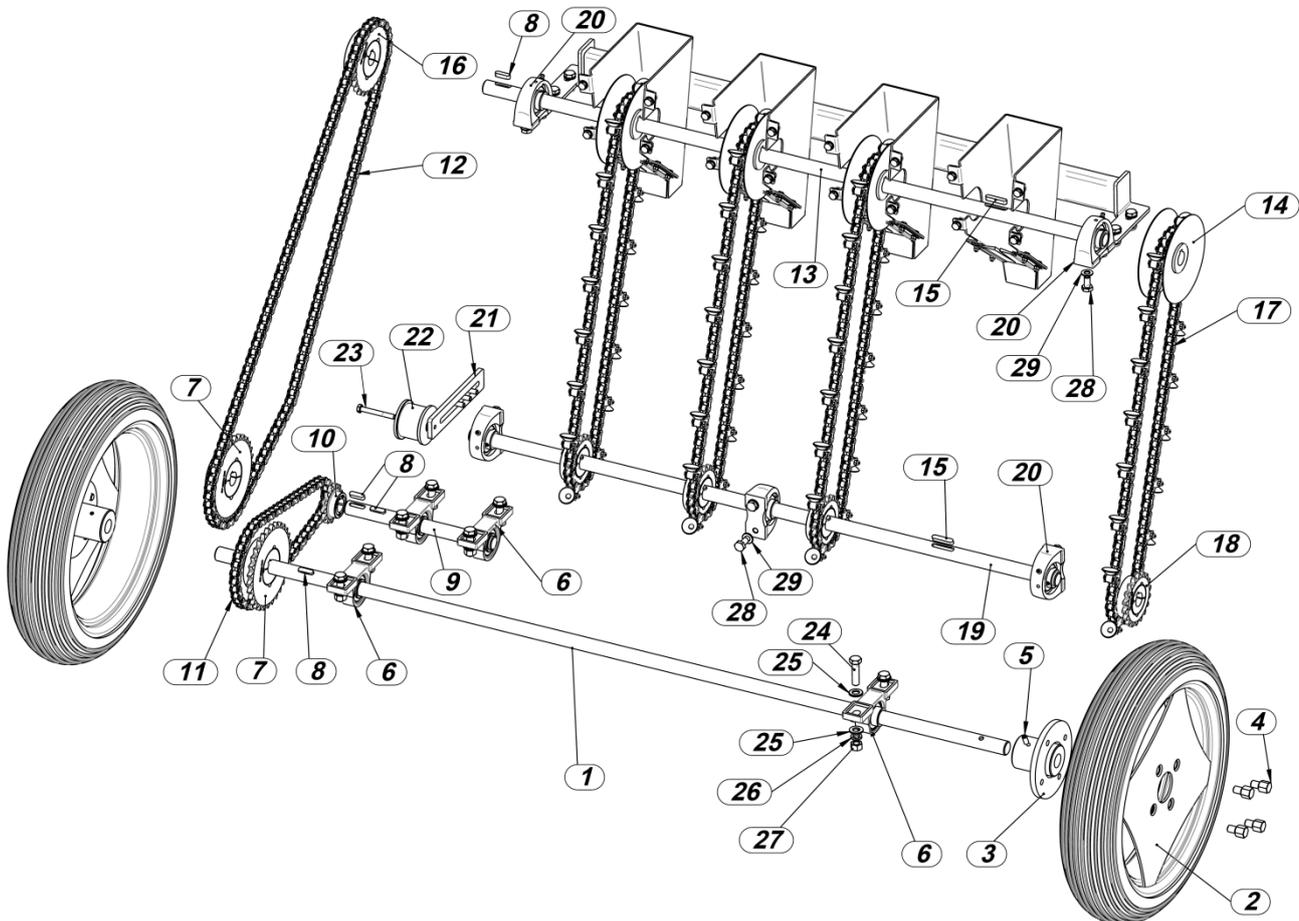
Pos. in the picture	Part name	KTM symbol or standard number	Number of pieces		
			S290 3-row	S290/1 4-row	S290/2 5-row
1.	Top beam of the chute assembly welded	290-003-001	1	-	-
		290-103-001	-	1	-
		290-203-001	-	-	1
2.	Chute pipe	290-003-002	3	4	5
3.	Marker welded	290-003-003	3	4	5
4.	M12 U-bolt for fitting 60x60	290-003-004	6	8	10
5.	Brush seal h5 25mm L=105	290-003-005	6	8	10
6.	M12 self-locking nut (DIN985)	290-003-006	12	16	20
7.	Washer 13 (DIN125)	290-003-007	12	16	20
8.	M5x16 bolt (DIN 933)	290-003-008	12	16	20
9.	Washer 5.3 (DIN125)	290-003-009	24	32	40
10.	M5 self-locking nut (DIN985)	290-003-010	12	16	20



**Table 5. Vegetable planter drive**

Pos. in the picture	Part name	KTM symbol or standard number	Number of pieces		
			S290 3-row	S290/1 4-row	S290/2 5-row
1.	Drive axle Ø25x1535	290-004-001	1	1	1
2.	Rubber wheel T105-70 R14 set	290-004-002	2	2	2
3.	Road wheel hub T105-70 welded	290-004-003	2	2	2
4.	Pins fastening the M12 road wheel hub	290-004-004	8	8	8
5.	Threaded pin M8x20 (DIN 915)	290-004-005	2	2	2
6.	Bearing bracket UCP205	290-004-006	4	4	4
7.	Gear wheel z=30 with Taper Lock 2012 sleeve	290-004-007	2	2	2
8.	Parallel key 8x7x28 (DIN 6885)	290-004-008	4	4	4
9.	Intermediate drive shaft Ø25x285	290-004-009	1	1	1
10.	Gear wheel z=13 with Taper Lock 1008 sleeve	290-004-010	1	1	1
11.	Drive chain L1 set	290-004-011	1	1	1
12.	Drive chain L2 set	290-004-012	1	1	1
13.	Top roller Ø25x1205	290-004-013	1	1	1
14.	Gear wheel z=18 with shields welded	290-004-014	3	4	5
15.	Parallel key 8x7x40 (DIN 6885)	290-004-015	6	8	10
16.	Gear wheel z=25 with Taper Lock 2012 sleeve*	290-004-016	1	1	1
17.	Transport chain with cups L3 set	290-004-017	1	1	1
18.	Gear wheel z=18 with Taper Lock 1610 sleeve	290-004-018	3	4	5
19.	Lower roller Ø25x1140	290-004-019	1	1	1
20.	Bearing bracket UCPA205	290-004-020	5	5	5
21.	Tensioner arm	290-004-021	1	1	1
22.	Tensioner roller	290-004-022	1	1	1
23.	Tensioner axle - M8x65 bolt (DIN 931)	290-004-023	1	1	1
24.	M12x45 bolt (DIN 933)	290-004-024	8	8	8
25.	Washer 13 (DIN125)	290-004-025	16	16	16
26.	Spring washer for M12 (DIN127)	290-004-026	8	8	8
27.	M12 self-locking nut (DIN 985)	290-004-027	8	8	8
28.	M10x20 bolt (DIN 933)	290-004-028	10	10	10
29.	Washer 10.5 (DIN125)	290-004-029	10	10	10

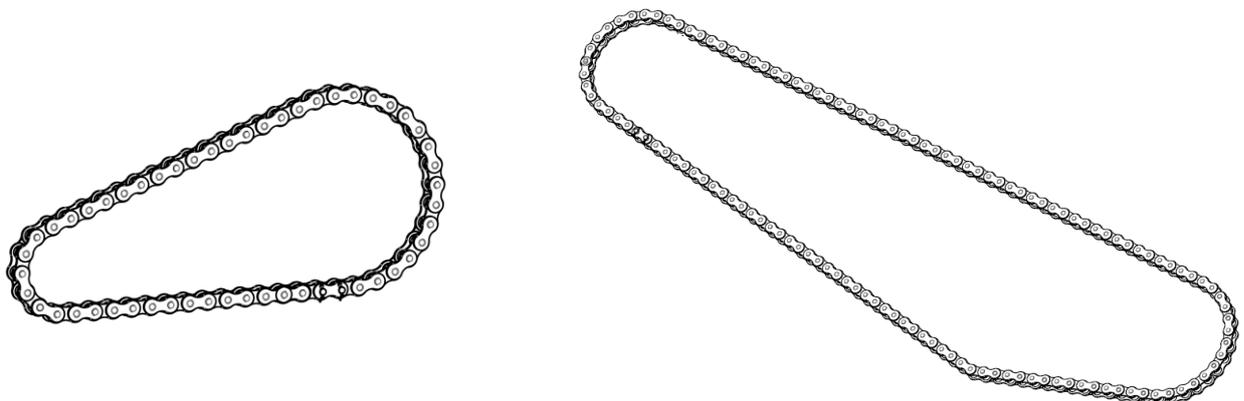
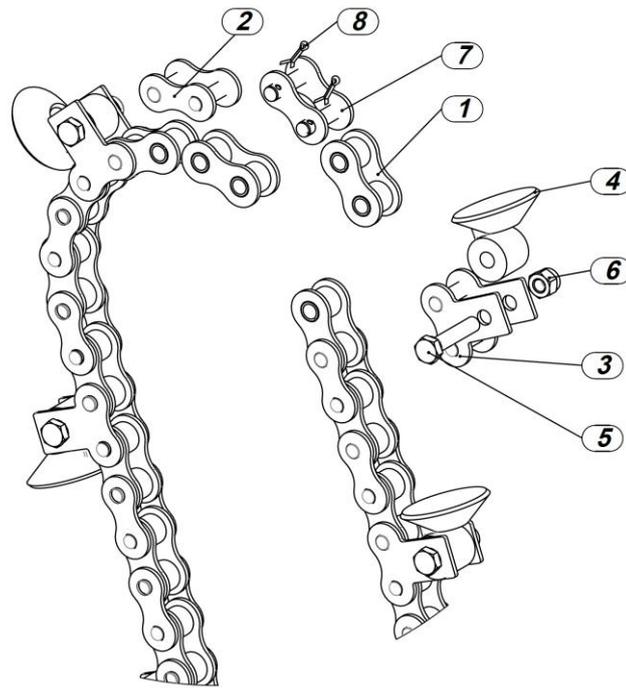
\* - replaceable wheel when changing the seed planting spacing in a row



**Table 6. Chain conveyor 5/8' (10B-1) with cups**

Pos. in the picture	Part name	KTM symbol or standard number	Number of pieces		
			S290 3-row	S290/1 4-row	S290/2 5-row
1.	Inner link	290-004-171	48	48	48
2.	Outer link	290-004-172	31	31	31
3.	Link with connection	290-004-173	16	16	16
4.	Transfer cup Ø28 welded*	290-004-174	16	16	16
5.	M5x20 bolt (DIN 933)	290-004-175	16	16	16
6.	M5 self-locking nut (DIN 985)	290-004-176	16	16	16
7.	Final link - clasp	290-004-177	1	1	1
8.	Split pin 1.5x8 (DIN 94)	290-004-178	2	2	2

\* - the cup is a removable item, depending on the planted seeds, Ø28mm or Ø35mm cup can be installed



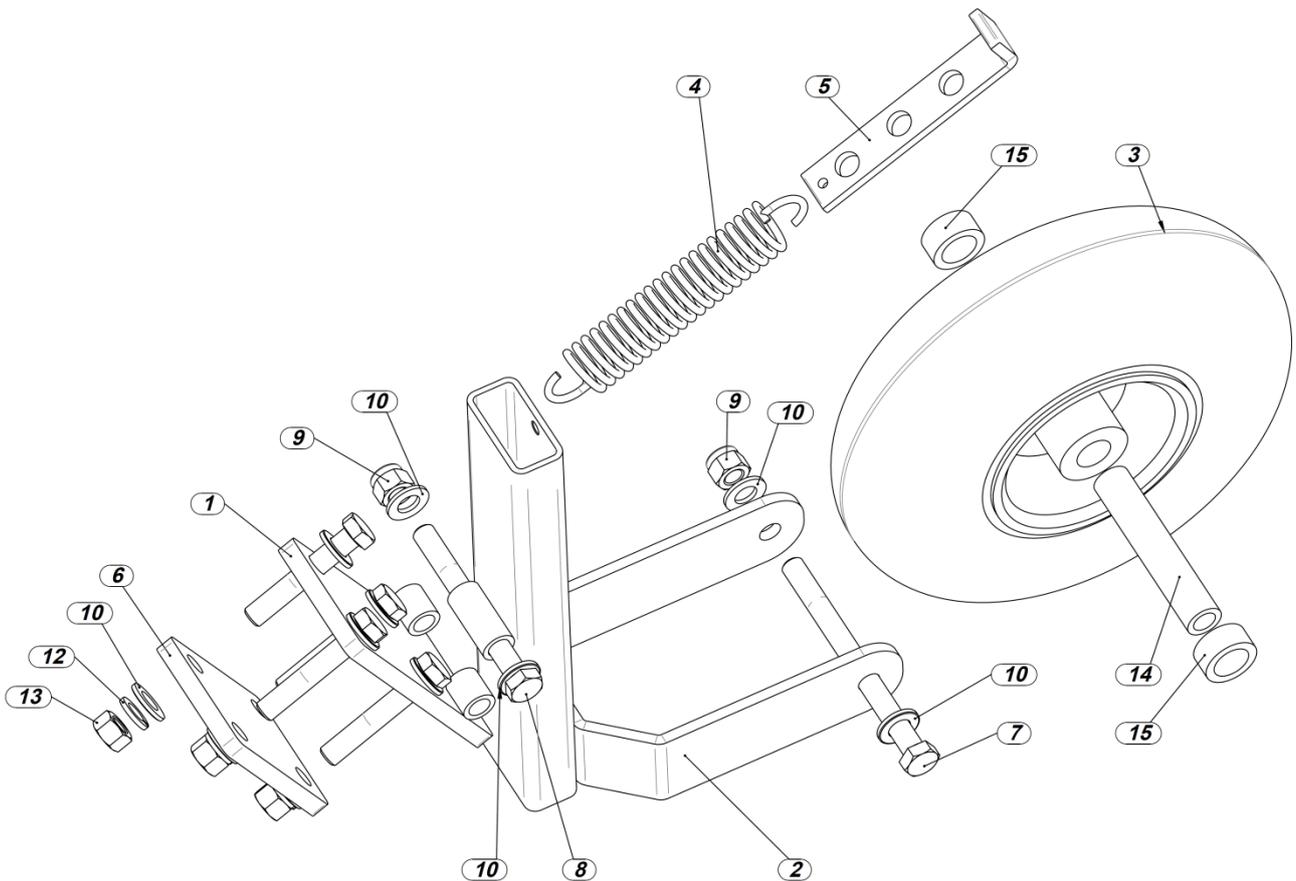
*Drive chain L1  
inner link 27, outer link 26 + clasp*

*Drive chain L2  
inner link 65, outer link 64 + clasp*

**Table 7. Press wheel set**

Pos. in the picture	Part name	KTM symbol or standard number	Number of pieces		
			S290 3-row	S290/1 4-row	S290/2 5-row
	Press wheel set	290-005-000	3	4	5
1.	Connection with sleeves welded	290-005-001	1	1	1
2.	Support bracket for press wheel welded	290-005-002	1	1	1
3.	Rubber wheel 4.10-3.50 set	290-005-003	1	1	1
4.	Wheel tension spring	290-005-004	1	1	1
5.	Spring tensioner	290-005-005	1	1	1
6.	Mounting of the connection	290-005-006	1	1	1
7.	M12x140 bolt (DIN 931)	290-005-007	1	1	1
8.	M12x110 bolt (DIN 931)	290-005-008	1	1	1
9.	M12 nut (DIN 934)	290-005-009	2	2	2
10.	Washer 12 (DIN126)	290-005-010	12	12	12
11.	M12x70 bolt (DIN 931)	290-005-011	4	4	4
12.	Spring washer L12 (DIN127)	290-005-012	4	4	4
13.	M12 nut (DIN 934)	290-005-013	4	4	4
14.	Wheel sleeve Ø13x20-105	290-005-014	1	1	1
15.	Wheel spacer Ø120.5x30-15	290-005-015	2	2	2

**Note:** the quantities given in the table refer to one set of wheels. **Depending on the number of rows, the number of wheels is changed**



**Table 8. Leveling roller**

Pos. in the picture	Part name	KTM symbol or standard number	Number of pieces		
			S290 3-row	S290/1 4-row	S290/2 5-row
1.	Leveling roller welded	290-006-001	1	1	1
2.	Chain	290-006-002	2	2	2
3.	M8 shackle	290-006-003	4	4	4
4.	M16 nut (DIN 934)	290-006-004	2	2	2
5.	Washer 16 (DIN126)	290-006-005	2	2	2

