



OWNER'S MANUAL

AUTOMATIC CONVEYOR POTATO PLANTER
Gemini

S239 - 2-ROW PLANTER (62,5 / 67,5cm)
S239/1 - 2-ROW PLANTER (70,0 / 75,0cm)
S239/2 - 1-ROW PLANTER



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



BOMET®

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1. INTRODUCTION

This manual is attached to each machine to make a user acquainted with construction, operation and adjustment of the automatic conveyor planter. 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 instruction will ensure long-term and non-failure operation and contribute to reduction of operating costs of the machine.

Each chapter 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 planter.

2. INTENDED USE OF THE PLANTER

Automatic conveyor planter is intended to operate exclusively in the agriculture. Using it for other purposes shall be understood as using it against the intended use. Meeting requirements referring to operation of the machine, its maintenance and repairs according to recommendations of the manufacturer and strict complying to 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 with procedures in the field of safety. Regulations concerning accident prevention and occupational health and safety and also traffic regulations should be always abided by.

Automatic potato planter S239 is a 2-row planter mounted on three-point suspension system of the tractor. The planter should operate with tractor classes of 0.6 and higher, equipped with suspension system category II and front axle standard ballasts for keeping the required controllability factor ($s \geq 0.2$). Single-row planter is designed to work with tractors class 1N having linkage category I. The machine is intended for planting potatoes in the well cultivated soil on plain terrain and slopes up to $8,5^\circ$.

The planter performs all the operation connected with potato planting that is makes furrows, plants potatoes automatically and pours it with soil forming ridges. Potatoes may be planted in rows of 62.5 cm or 67.5 cm and 70 cm or 75 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 potato planter S239 has been designed, built and adjusted for planting potatoes in two rows on flat and wavy fields, on all types of soil kept in good culture, stoneless, of humidity enabling proper operation. The operation of the planter can be performed on slopes up to 8.5°. 2-row planter should be aggregated with tractors of 0.6 class and higher equipped with standard ballasts of the front axle to keep the required controllability factor.



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 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,
- Transport and operation without proper safety measures,
- Aggregation of the planter 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 planter when the tractor engine is working and the machine is not protected against falling down.

When describing residual risk, 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. Estimation of residual risk

During operation of the 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 operation and transport,
- 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 at 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®** 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 sharp edges of the furrow openers, ridgers or lugs of road wheels of the planter during aggregation or changing transportation-operation position and inversely.

 **2) 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.

 **3) Danger of being squeezed** by movable elements of the chain conveyor or chain drive as a result of improper position of the operator during performing 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 on the road wheels and the ridger ploughshares. The planter shall be aggregated only with recommended tractor classes.

3.5. Regulations for occupational health and safety



CAUTION

In order to avoid threats, before starting operation of 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 and occupational safety and health 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.
- 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 planter are in a good condition. Damage incurred shall be fixed without delay and possible deficiencies filled up.

- Avoid staying within the range of the operating planter.
- 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. During lowering the planter onto the ground, keep particular caution. Danger of injury!!!

Aggregation

- Keep particular caution during 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.
- During 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 standard 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. The load of the tractor's front axle cannot be lower than 20% of its weight.

Maintenance

- A planter can be operated by a person with qualifications allowing for using agricultural tractors and acquainted with the manual of the planter.
- 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.
- Removing clogs can be performed after lowering the machine 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.
- 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.
- People operating agricultural equipment should be equipped with working clothes and footwear, and personal protection measures appropriate for existing threats.

Transportation

- Transportation of a planter by means of transport from the manufacturer to a sales person or a client is described in the chapter '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.

- A 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 chapter 'Transportation on public roads'.
- It is forbidden to transport any people or items on the frame or in the tank of the planter.
- Due to the 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 with regard to overlapping of the tool.
- 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 a planter during transportation cannot exceed:
 - driving on hardened roads with flat surface – 15 km/h,
 - driving on field ways – 10 km/h.

Storage

- Disconnecting the planter from the tractor can take place only after the tractor engine stopped, key taken out 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 extreme caution – danger of being injured or squeezed!!!
- During storage the planter should be leant firmly on the working elements that is furrow openers and ridgers.
- 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 endings of furrow openers, ridgers, road wheel lugs– possibility of injury, keep caution during any activities performed near the planter.

Others

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



CAUTION

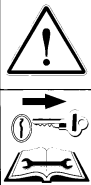
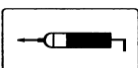
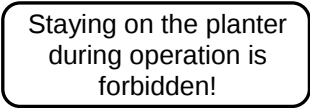
Not following these rules may cause threat to the operator and other people and also may cause damage to a planter. Any damage resulting from not following these rules is the only responsibility of the user.

3.6 Safety signs and captions

Automatic conveyor planter S2239 is 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 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 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 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	2	3	4
1.	(Rating plate)	Rating plate	On the side of the planter tank
2.		Before operating the machine, read the manual.	On the planter tank
3.		Caution. Before operation turn off the engine and remove the key from the ignition switch.	On the planter tank
4.		Do not stay near the lift rods, while controlling the lift.	On the planter tank
5.		Caution. Do not ride on the machine	On the planter tank
6.		Caution. Danger of being caught by the chain drive. Do not insert hands into the planter tank during operation.	On the planter tank
7.		Marking places of loading hooks.	On the planter frame
8.		Marking lubrication points	On the planter frame
9.		Symbol of permissible transport speed.	At the back of the planter tank
10.		Information	At the back of the planter tank
11.		Company logo	On the planter tank

3.7. 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 planter. 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 4254-1:2016P – Agricultural machinery. Safety. Part 1: General requirements.
- PN-ISO 730-1:2018E – Wheeled agricultural tractors. Rear three-point suspension system. Categories 1, 2, 3 and 4. (org.)
- 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.

3.8. Manufacturer's responsibility and guarantee

In relation to described in this manual machine, **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.

3.9. Noise and vibrations

During the operation of an automatic conveyor planter S239 for the operator there is no threat caused by noise contributing to the loss of hearing because the planter is an inactive tool 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.

4. USAGE REGULATIONS

4.1. General information

Automatic conveyor planter S239 is manufactured as a 2-row machine mounted on the tractor three-point suspension system in series of types of two ranges with planting width of 62.5 cm and 67 cm or 70 cm and 75 cm. The 2-row planter is adjusted for operation on terrain slopes not exceeding 8.5° and they cooperate with tractor classes of 0.6 (see table 4) equipped with wheel standard ballasts.

4.2. Construction and operation of the machine

The S239 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 width of planting or the number of rows planted. Planter is available as a 2-row or 1-row machine. The construction of the 2-row planter is described

below. 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). In the tank there are two chain conveyors (4) with buckets (5), leaning against the guides (6). The chain receives the drive from the road wheels (7) of the planter through the sprocket (8). The chain conveyor outside the tank is shielded from the top with a head (9) and a chute pipe (10) at the front of the tank. Adjustment of the chain conveyor tension is made by the tensioner (11). To the frame of the planter there is an attached unit plowing a furrow and forming a ridge. The unit consists of two markers at the front of the planter (12) and three ridging coulter (13) at the back installed on levers (14) with shock absorbers (15). For convenient operation, the planter is equipped with two platforms (16) which can only be used in stoppage.

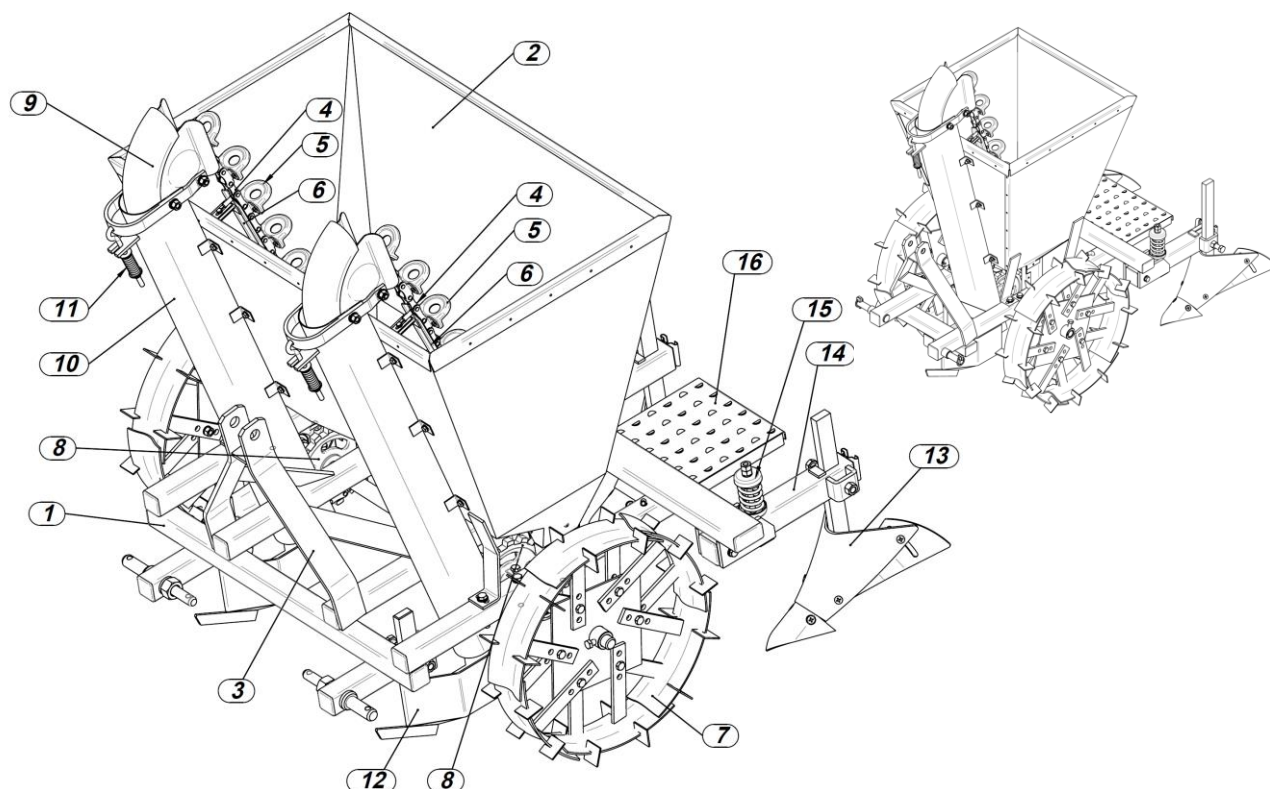


Figure 1. Basic units of S239 automatic conveyor planter: 1 - frame, 2 - tank, 3 - three-point suspension system, 4 - chain conveyor, 5 - bucket, 6 - chain guide, 7 - road wheel with spurs, 8 - drive sprockets, 9 - head of the chute pipe, 10 - chute pipe, 11 - chain tensioner, 12 - marker, 13 - ridging coulter, 14 - ridger lever, 15 - platform

4.3. Equipment and fittings

The manufacturer delivers the planter for sale assembled. The manual with a spare parts catalogue and a warranty card 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

The manual with the spare parts catalogue comprise basic equipment of the planter.

At a client's request, the planter can be equipped with pneumatic wheels.

Each user of a 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 to work

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). It is also necessary to uninstall from the tractor elements disabling suspension of the machine or 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 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 to work

Preparation of a 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 tool 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.

Furthermore, it is necessary to:

- check screw connections, in case of backlash tighten the nuts,
- set the proper distance between the rows,
- set the proper operation depth of furrow openers and ridgers,
- check and adjust the tension of chain conveyors if need be,
- lubricate the planter in accordance with recommendations (see section 'Lubrication instruction'),
- fill the tank with planted potatoes directly from means of transport.



CAUTION

Planter tank shall be filled at the stoppage, after lowering the planter onto the ground, turning off the tractor engine and removing the key from the ignitron switch.



CAUTION

Loading of potatoes to the tank shall be performed from means of transport (eg. trailers).



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:

- disassemble a tool drawbar 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,
- install tractor lower rods onto the planter studs and secure 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 sing for low-speed vehicles.



CAUTION

It is forbidden to connect the machine with 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

Keep extreme caution at connecting the planter, do not stay between the planter and the tractor.

4.7. Adjustment and setting of the planter

Planter proper operation of good quality is dependent on proper levelling of the planter and setting the planting depth, height of covering planted potatoes and the distances between planted potatoes in a row.

Transversal levelling ensures determining equal depth of operation of right and left units of the planter and is performed with the right hanger of the tractor suspension system. After performing the adjustment, the planter tank, from the back view, is set horizontally after gaining the full depth of operation.

Longitudinal levelling ensures determining equal depth of operation of working elements at the front and back of the planter. Longitudinal levelling is performed by shortening or lengthening the upper connector of the tractor suspension system. Properly levelled planter should have the frame and the tank set in parallel to the field surface while furrow openers and ridgers should operate at equal depth.

Adjustment of planting depth is performed by setting the proper height of front furrow openers (at the same level) and setting their position with fastening bolts.

Adjustment of covering height is performed by setting the proper height of ridgers in lever sockets and setting their position with bolts. All three ridgers should be on the same level. Spreading movable wings of ridgers is performed by deflecting them and after setting at the proper width they are locked with screw connections.

Adjustment of shaking device is performed by proper spreading shock finger and locking it with screw connections so that after crossing of the finger there is only one planted potato in the bucket.

Adjustment of spring strut of soil resistance is performed by the proper tension of the spring so that the distance between neighbouring spring coils equals maximum 3 mm.

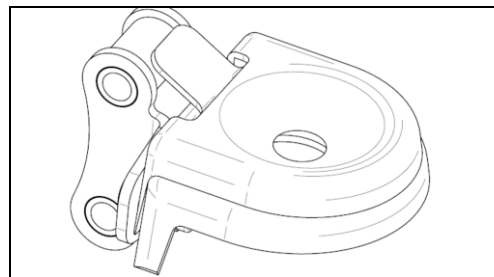
Setting the distance between seed potatoes in a row is made by changing the diameter of the road wheels, *this applies only to metal wheels*. In order to do this units of the clamp shall be attached with screws in one of three openings in brackets of the road wheel hub disc (in all units equally). As a result of this adjustment, road wheels can gain diameter of Ø470mm, Ø520mm, Ø570mm and various distances of planted potatoes in a row of 29, 32 and 35 cm are gained respectively. **For rubber wheels there is a constant planting distance in a row and equals 32 cm.**



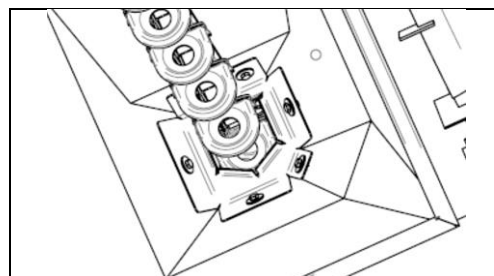
WARNING

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

Planting small potatoes, to facilitate planting small diameter potatoes, a bucket cap must be mounted, see p.36 table 8 additional equipment.



Planting small potatoes, when planting small diameter potatoes, additional rubbers sealing the bottom of the tank must be also installed, see p.36 table 8 additional equipment.



4.8. Work with a planter



CAUTION - WARNING!

ABSOLUTE PROHIBITION OF STAYING ON THE PLANTER DURING OPERATION.

The field intended for planting potatoes should be prepared in accordance with agronomic requirements, furrows after ploughing should be levelled. The field surface should be equal and deprived of weeds as plant remnants clog raking and ridging tools.

Properly mounted and adjusted automatic conveyor planter should move equally after the tractor during operation and keep equal depth at the whole working width. Working speed of the planter should equal maximum 4 km/h.

Planting, after performing adjustment of row spacing and operation depth, can be started with an optional field edge. If the operation is performed on a slope, activities shall be started each time from the above so that the extreme row could be copied during the return crossing. First rows shall be performed as carefully as possible since precision of performance of further rows, simplicity of performance of later cultivation treatment and mechanical harvesting of potatoes depend on it.

At clogging of furrow openers or ridgers it is necessary to stop the tractor, raise and lower the planter on the tractor hydraulic elevator.



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.



CAUTION

Returns shall be performed easily with the planter raised to the transportation position, without the use of an independent tractor brake. It is necessary to keep extreme caution if there are people or items in the range of the planter operation.



WARNING.

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



CAUTION

It is inadmissible to leave the planter on the slope or other terrain slope without securing it against automatic rolling down.

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 replaced following these recommendations:

- all worn elements of the planter shall be exchanged in the proper time,
- during maintenance it is necessary to use gloves,
- 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 a planter

Each time, after work, clean the planter out of soil, and inspect connections of parts and assemblies. Technical maintenance of the planter consists in checking the condition of furrow openers, ridgers, condition of chain conveyor with buckets and also it is necessary to check the condition of screw and pivot connections. All loose screw connections shall be tightened.

Pivots and studs of the planter 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.



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. Planter storage

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 tool outside. After disconnecting the tractor, the machine should be leant on furrow openers, ridger bodies 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. Working parts exchange

In the planter there can happen necessity of exchange of furrow opener, ploughshare or wing of the ridger, chain conveyor bucket. In order to exchange working elements, the planter mounted on the tractor shall be raised to the transportation position. The machine shall be secured against falling down by putting a strong support excluding possibility of its falling over under the frame. After putting the support, lower the planter until it is leant against the support, 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.



CAUTION

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.

Exchange of a furrow opener

- planter frame should be set above on the support,
- untwist the screw fastening the handle of the furrow opener in the rail,
- remove the handle of the worn furrow opener from the rail,
- insert the handle of a new furrow opener into the rail,
- tighten the screw fastening the handle.

Exchange of a ploughshare

- uninstall the ridger body out of the rail,
- install the ridger in the workshop vise,
- untwist the screw (pos.9 - table 7, part catalogue) fastening the ploughshare to the body,
- install a new ploughshare and install a new screw.

Exchange of a ridger wing

- uninstall the ridger body out of the rail,
- install a ridger in the workshop vise,
- knock out the rivet fastening the wing to the body (pos.14 - table 7, part catalogue),
- untwist the screw (pos.12 - table 7, part catalogue) fastening the wing to the body,
- install a new wing, a new screw and a rivet.



REMEMBER

During exchange of working elements it is necessary to use spare parts catalogue where assembly of planter parts is presented in the scheme.



CAUTION

During exchange of working elements, it is necessary to use proper tools and protective gloves.

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 of the planter shall be performed according to the table 2.

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

Table 2. Lubrication points of the planter

Nr of lubrication place	Lubrication place	Lubrication frequency	Grease type
1	Housing of planter axle bearing	Twice a season	ŁT-43 grease
2	Idler hub	Twice a season	ŁT-43 grease
3	Bucket conveyor chain	Twice a season	graphite grease
4	Washing working surfaces	After season	„Antykor” kerosene
5	Maintenance of working surfaces	After season	„Antykor” grease

5.6. Detection and removal of failure

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



REMEMBER!

Work with an inefficient tool, improperly adjusted machine may lead to serious threats to the operator and other people. Inefficiencies and damages noticed shall be removed without delay.

Table 3. Table of inefficiency reasons and methods of removal

Symptoms	Reasons	Method of removal
Tractor front tends to rise upwards	Too little load on the front. IMPORTANT: 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	Damaged or worn furrow openers or ploughshares of the ridger	Check and exchange
	Furrow openers or ploughshares of the ridger set too high	Check and adjust the operation depth
	Improper longitudinal levelling	Check and level the planter
Uneven working depth	Improper longitudinal or transversal levelling	Check and perform proper adjustment
Planted potatoes are not planted	Broken chain of the chain conveyor	Exchange broken link of the chain
	Sheared inlet of the drive wheel on the planter axle	Exchange sheared inlet
Several planted potatoes are planted at the same time	Improperly adjusted spring shock absorber	Check and perform adjustment
Transverse swinging of the planter	Improperly adjusted side rods turnbuckles	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 client by trailers or means of transport. Planters are transported assembled and ready for operation. Planters are loaded onto trailers with lifting devices after installing lines or chains 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 the planter.



CAUTION

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

6.2. Transportation of a planter on the tractor

Planter is adjusted for transportation on public roads on the tractor three-point suspension system. During transportation it shall be raised with the use of the tractor three-point suspension system so that the clearance equals minimum 25 cm. Then check the protection of furrow openers and ridgers against falling out.

The planter transported on public roads on a tractor should be equipped with portable light and warning devices having at the back: combination lamps with lights: side, brake, direction indicator and red reflective one. On the machine there must be a triangular sign for low speed vehicles placed. Portable light devices are connected with the tractor wiring with the use of a connecting cable ended with 7-pole plugs.

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 of 31 December 2002 Journal of Laws ("Dziennik Ustaw") No 32/2003 item 262 with later amendments.

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

It is forbidden to transport people or cargo on the frame of the planter.

**CAUTION !**

When turning, pay attention to “overlapping” of the machine.

7. DISASSEMBLY

**CAUTION**

Before starting to disassembly, disconnect the planter from the tractor.

Disassembly of the machine should be performed by people, equipped with protective gloves and previously acquainted with its construction. These activities should be done after setting the machine on the flat and solid ground. Disassembly and changing the working parts should be performed according to the tables included in the spare parts catalogue. In case of worn parts, follow ‘Totalling’ 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 unscrewing and tightening up nuts and screws predicted. In case of screws of yoke fastening working sections to the frame, use bent box spanners.

8. TOTALLING

Totalling of the planter shall 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. Worn parts made from ferrous metals shall be grouped and passed to points purchasing these metals.

9. TECHNICAL CHARACTERISTICS

Technical data of a mounted automatic conveyor 2-row and 1-row potato planter S2329 is listed in table 4.

Table. 4. Technical characteristics of the planter

No	Specification	Unit of measure	Manufacturer data		
1.	Symbol	-	S239	S239/1	S239/2
2.	Type	-	zawieszana		
3.	Planting depth	mm	60 – 100		
4.	Row spacing	mm	625 / 675	700 / 750	-
5.	Spacing of ridging bodies	mm	625 / 665	690 / 730	620 / 700
6.	Covering depth	mm	80 - 120		
7.	Distance between potatoes in a row for set Ø of road wheels *	mm	290 ⇒ Ø 470 320 ⇒ Ø 520 350 ⇒ Ø 570		
8.	Maximum load of the tank	kg	180	300	90
9.	Overall dimensions in working position and transportation position				
	- length,	mm	1450	1450	1350
	- width,	mm	1470	1510	1100
	- height.	mm	1500	1500	1500
10.	Machine weight	kg	210	220	130
11.	Transportation clearance	m	0,30		
12.	Cooperation with a tractor				
	- suspension system	-	II kat.		I kat.
	- power demand	kW	28	32	15
13.	Speed				
	- working	km/h	4 - 6		
	- transportation	km/h	15		
14.	Operation	osób	1		

* - *optionally the planter can be equipped with pneumatic wheels (4.00-12)*

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