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Established – 1984

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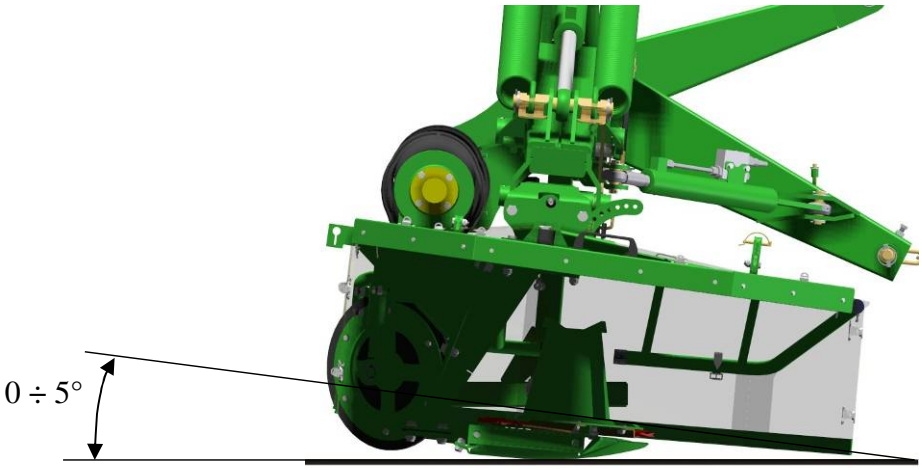
OPERATOR'S MANUAL

DOUBLE-SIDED DISC MOWER WITH CENTRAL SUSPENSION

KDD 861 (H)	**- 8,60 m / 28'3"**
KDD 911 (H)	**- 9,10 m / 29'10"**
KDD 912 (H)	**- 9,10 m / 29'10"**
KDD 941 (H)	**- 9,40 m / 30'10"**
KDD 861 S/SL/W (H)	**- 8,60 m / 28'3"**
KDD 941 S/SL/W (H)	**- 9,40 m / 30'10"**
KDD 861 S/SL/W T (H)	**- 8,60 m / 28'3"**
KDD 941 S/SL/W T (H)	**- 9,40 m / 30'10"**

Serial number:

IN272USA008
2019.04.09
EDITION No 8



Optimum inclination towards the ground is 0 ÷ 5° to the mowing direction. It is allowed to work in horizontal position. Different inclination may damage the mower.

DO NOT

TURN THE DRIVE ON IF THE MOWER IS NOT IN WORKING POSITION.

DO NOT

LIFT THE MOWER BEFORE THE MOWING DISCS HAVE COME TO COMPLETE STANDSTILL.

DO NOT

OPERATE WHEN ANY PERSON REMAINS IN THE DANGER AREA OF 50 m (170').

NOTICE:

Keep this manual for future use.

Well-proven design with thousands of machines in regular use in many countries and quality materials ensure high durability and reliability of SaMASZ mowers.

We congratulate you on the purchase of your new SaMASZ mower and wish you much pleasure and the very best work results through the years to come.

Contents **page**

1. IDENTIFYING THE MACHINE

Data plate is mounted to the mower's main frame in the place shown in **Fig. 1**.

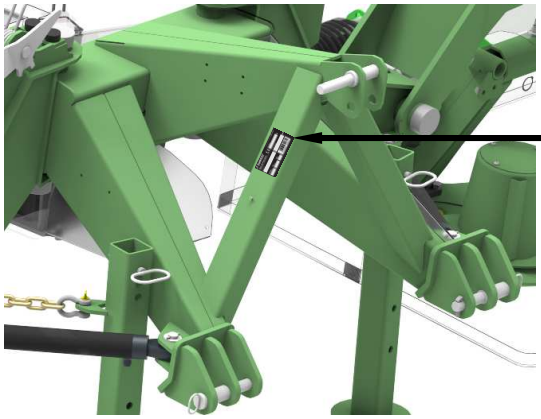


Fig. 1. Data plate location

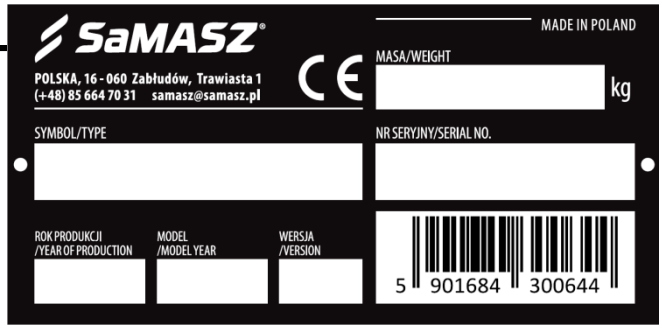


Fig. 2. Data plate

Data plate includes:

- name and adress of the manufacturer,
- CE marking means, that the produce conforms to 2006/42/EC Directive and harmonized standards,
- machine symbol,
- date of manufacture,
- model year,
- version number,
- machine weight,
- id number,
- barcode.

WARNING!

In case the operator's manual is unclear or illegible all necessary information can be obtained from manufacturer or the dealer.

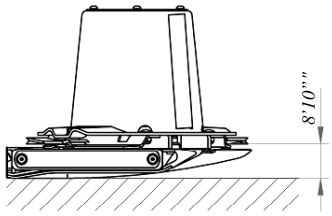
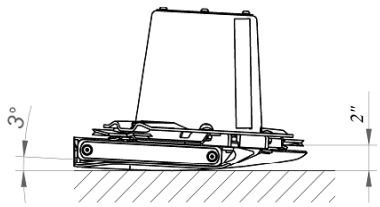
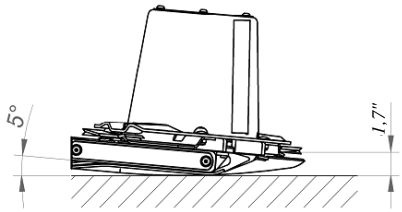
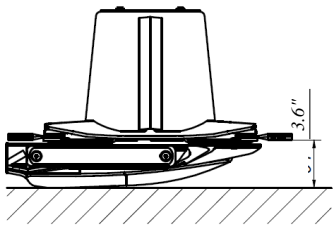
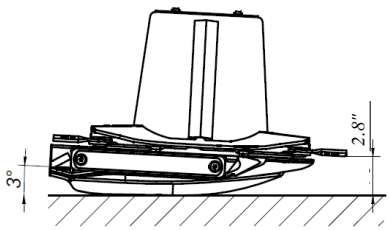
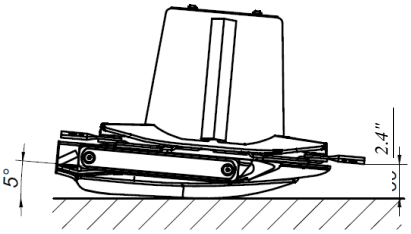
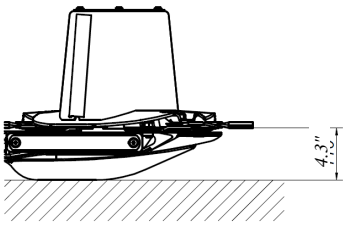
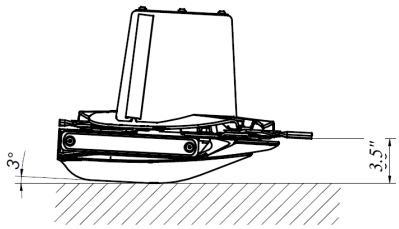
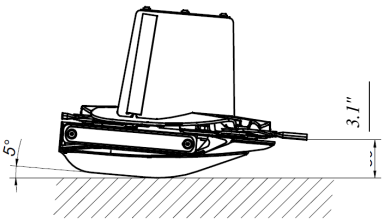
2. INTRODUCTION

- This operator's manual is essential for safe and proper use of this mower and should be read before anyone operates this mower. It should be kept near the mower for future use. If the mower is used by another operator, it should be in working condition and include this operator's manual and all other basic equipment.
- Operator's manual is attached to every machine in order that the operator can familiarize himself with design, working principles, service and adjustment of the mower. The operator should be familiar with common safety rules and procedures.
- The mower is manufactured according to international safety rules.
- Compliance with the safety precautions in this operator's manual will help to enable safe operation.
- Please contact your dealer if you have any queries relating to the operation and service of the mower.
- This operator's manual is an indispensable part of any machine and is intended to familiarize future user with principles of proper operation and use of the machine as well as the risks involved.

3. PROPER AND INTENDED USE

Double-sided disc mower is equipped with **Perfect Cut** cutterbar. The mowing height differences, depending on the inclination angle of the cutterbar are shown in **Tab. 1**.

Tab. 1. Mowing height depending on cutterbar's inclination angle.

„Perfect Cut" cutting bar		
No tilt	3° tilt	5° tilt
Standard mowing height		
		
Optional heights when using high mowing topping		
		
Optional heights when using high mowing double topping		
		

Note: Grass, which has not grown much should be mowed with zero angle inclination.

- The rear mounted disc mower is intended to mow green fodder such as grass and alfalfa on permanent grassland (pastures), on crop fields without rocks, and to form loose rows of cut fodder. The pasture or field being mown should be even and best if prepared by rolling. In the event there is a majority of tall grass, the first and second mowing should be done at a height of 2.4" - 2.8", while with a majority of short grass, at a height of 2". The last mowing should be done a little higher - at 2.8" - 3.1" from the ground.
- The rear mounted disc mower with tine/roller conditioner is intended to mow green fodder such as grass and alfalfa on permanent grassland (pastures), on crop fields without rocks, and to form loose rows of cut forage. As a result of the passing of the layers of the green fodder through the flails or rollers, the grass stems are broken and a layer of wax is removed. This facilitates and speeds up the drying process of the fodder by approximately 30 to 40%. The use of rollers is especially recommended when mowing legumes such as alfalfa. Rollers are particularly recommended for mowing grass legume such as alfalfa. The pasture or field being mown should be even and best if prepared by rolling. This is especially true of mowers with rollers as they tolerate rocks with a diameter of a few inches. If a larger stone is picked up, stop and remove it as it could cause damage of the discs. With a majority of tall grass, the first and second mowing should be done at a height of 2.4" - 2.8", while with a majority of short grass it should be cut at a height of 2". The last cut should be done a little higher - at 2.8" - 3.1"from the ground.

WARNING!

Use of the mower for purposes other than described above is forbidden. Improper use can be dangerous and may lead to voiding of the warranty. Mower should be operated and repaired only by people familiar with its detailed specifications and with all applicable safety rules and regulations and with the relative dangers. Unauthorized modifications to the mower will lead to voiding the warranty.

3.1. Technical data

Tab. 2a. Specification of the mower

Model:	**KDD 861 (H)**	**KDD 911 (H)**	**KDD 912 (H)**	**KDD 941 (H)**
Working width[1]	8.60 m (28' 3")	9,10 m (29'10")		9.40 m (30'10")
Number of knives [pcs]	14 / 28	16 / 32		16 / 32
Tractor PTO rpm	1000 rpm			
Tractor power required	110 kW (150 HP)	115 kW (155 HP)		117 kW (160 HP)
3-point linkage category	II - III			
Working capacity[2]	~ 10.0 ha/h	~ 10.5 ha/h		~ 11.0 ha/h
Transport length	3,0 m (9' 10")			
Swath width	about 2 x 1.9-2.3m (2x6' 3"-7' 7")	about 2 x 1.9-2,3 m (2x6' 3"-7' 7")		about 2 x 2.3-2.7m (2x7' 7"-8' 10")
Weight[3]	2125 kg-4684 lbs. (2100 kg-4629 lbs.)	2320 kg-5114 lbs. (2290 kg-5048 lbs.)		2290 kg-5048 lbs. (2190 kg-4828 lbs.)
PTO shaft with overrunning clutch	1100 Nm			
Cutting speed of the knife	88 m/s			
Disc rpm	3167 rpm			
Emitted noise[4]	up to 115 dB			

Tab. 2b. Specification of the mower

Model:	**KDD 861 S/SL (H)**	**KDD 941 S/SL (H)**	**KDD 861 W (H)**	**KDD 941 W (H)**
Working width[1]	8.60 m (28' 3")	8.60 m (28' 3")	8.60 m (28' 3")	8.60 m (28' 3")
Number of knives [pcs]	14 / 28	16 / 32	14 / 28	16 / 32
Tractor PTO rpm	1000 rpm			
Tractor power required	147 kW (200 HP)	161 kW (220 HP)	147 kW (200 HP)	161 kW (220 HP)
3-point linkage category	III			
Working capacity[2]	~ 10,0 ha/h	~ 11,0 ha/h	~ 10,0 ha/h	~ 11,0 ha/h
Transport length	3.0 m (9' 10")			
Swath width	about 2x1.6 - 2.1 m (2x5' 3"- 6' 11")	about 2x2.0 - 2.5 m (2x6' 7"- 8' 2")	about 2x1.4-2.0 m (2x4' 7"- 6' 7")	about 2x 1.8- 2.3 m (2x 5' 11"- 7' 7")
Weight[3]	2990/2650 kg - 6591/5842 lbs. (2790/2550 kg) - (6150/5621 lbs.)	3120 / 2930 kg - 6879/ 6460 lbs. (3020/2830 kg) - (6657/6239 lbs.)	3080 kg - 6790 lbs. (2970 kg- 6547 lbs.)	3300 kg - 7275 lbs. (3200 kg- 7054 lbs.)
PTO shaft with overrunning clutch	1100 Nm			
Cutting speed of the knife	88 m/s			
Disc rpm	3167 rpm			
Emitted noise[4]	up to 115 dB			

S/SL – mower with swath conditioner / with light weight swath conditioner
W – mower with swath rollers

[1] This cutting width can be obtained when aggregating with a front mower KDF.
[2] Productivity depends on tractor's real working speed (max. working speed is not specified by SaMASZ company). Applies to operation at V=12 km/h.
[3] Machine's weight may change due to optional equipment.
[4] Noise measured by noise meter from 1 m (3ft. 3in.) distance from the machine in motion in final test area.

Tab. 2c. Specification of the mower

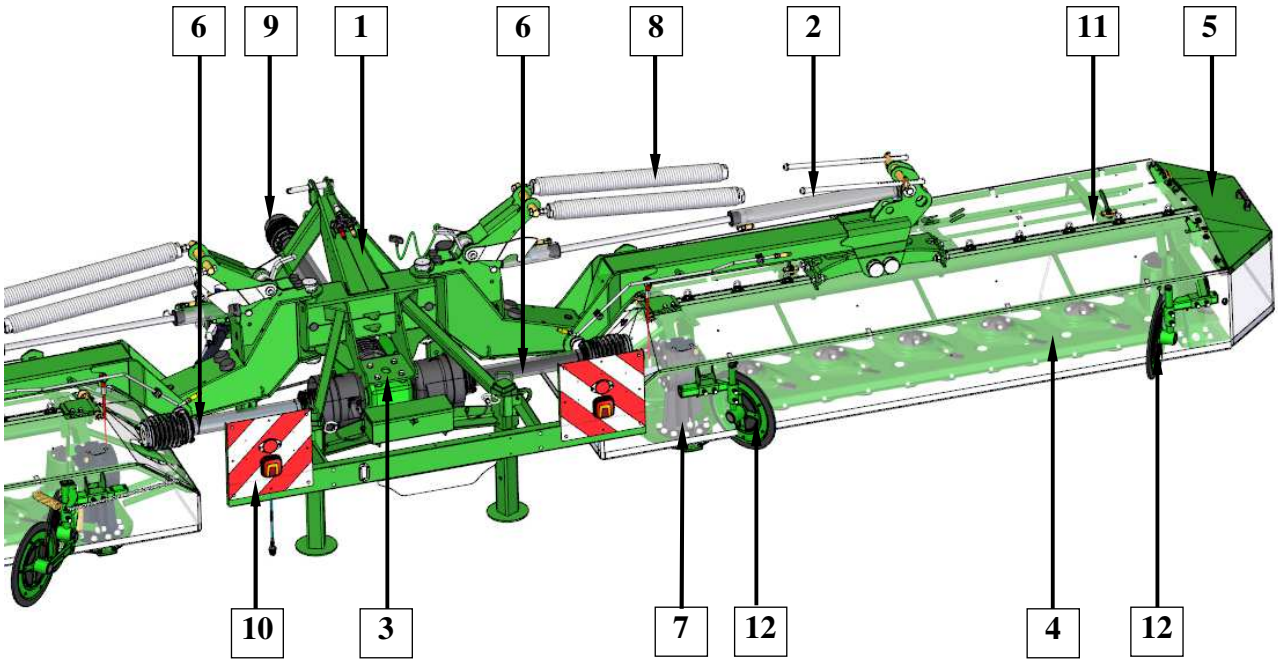
Model:	**KDD 861 S/SL T**	**KDD 941 S/SL T**	**KDD 861 W T**	**KDD 941 W T**
Working width[1]	8.60 m (28' 3")	9.40 m (30'10")	8.60 m (28' 3")	9.40 m (30'10")
Number of knives [pcs]	14 / 28	16 / 32	14 / 28	16 / 32
Tractor PTO rpm	1000 rpm			
Tractor power required	147 kW (200 CV)	161 kW (220 KM)	147 kW (200KM)	161 kW (220 KM)
3-point linkage category	III			
Working capacity[2]	~ 10,0 ha/h	~ 11,0 ha/h	~ 10,0 ha/h	~ 11,0 ha/h
Transport length	3,0 m		3,0 m	
Swath width	about 2x1,9-2,3m (2x6' 3"-7' 7")	about 2x 2,3-2,7m (2x7' 7"-8' 10")	about 2x1,4-2,0m (2x4' 7"- 6' 7")	about 2x 1,8-2,3m (2x 5' 11"- 7' 7")
Weight[3]	3920/3500 kg - 8642/7716 lbs.	4250/3780 kg – 9369/8333 lbs.	4160 kg – 9171 lbs.	4450 kg – 9811 lbs.
PTO shaft with overrunning clutch	1100 Nm			
Cutting speed of the knife	88 m/s			
Disc rpm	3167 rpm			
Emitted noise[4]	up to 115 dB			

S/SL – mower with swath conditioner / with light weight swath conditioner
W – mower with swath rollers
T – mower with swath conveyor (belt width 1.0m / 3ft. 3in.)

[1] This cutting width can be obtained when aggregating with a front mower KDF.
[2] Productivity depends on tractor's real working speed (max. working speed is not specified by SaMASZ company). Applies to operation at V=12 km/h.
[3] Machine's weight may change due to optional equipment.
[4] Noise measured by noise meter from 1 m (3ft. 3in.) distance from the machine in motion in final test area.

3.2. Design and working principle

3.2.1. Double-sided disc mowers without swath conditioner/rollers



Tab. 3a. Parts of SaMASZ double-sided mower (KDD 861/911/912/941)

3-point linkage frame (**1**) enables attachment of the mower to tractor's 3-point linkage. Drive from tractor's rpm is transmitted through PTO shaft (**9**) an intersecting axis gear I (**3**) onto drive shafts (**6**), which, through intersecting axis gears II (**7**), power the cutterbars (**4**). On cutterbars, have discs with two knives each. Hydraulic lifting cylinders (**2**) fed from the tractor external hydraulics are used for adjusting the mower to working position. Main frame (**11**), on which cutterbars unloaded with springs (**8**) are installed. On main frame, safety guard (**5**) and two swath guides (**12**) are mounted. The mower is equipped with warning and signal plates (**10**) as standard. On main frame, safety guards (**5**) are mounted.

3.2.2. Double-sided disc mowers with tine conditioner

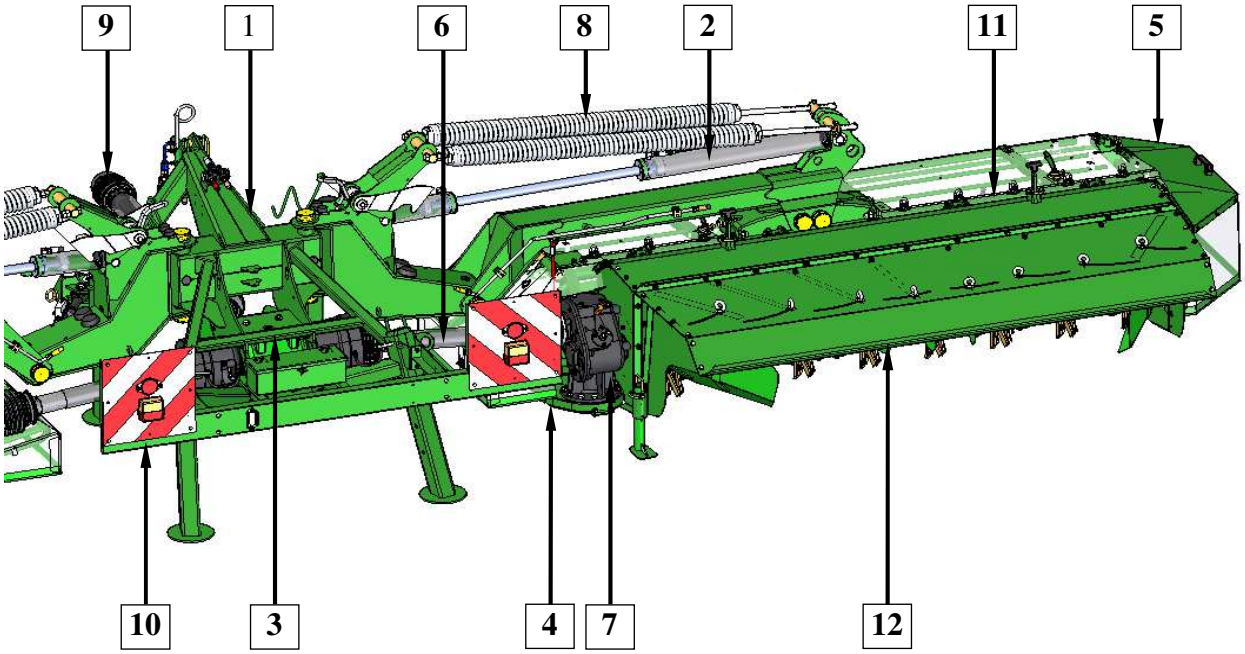


Fig. 3b. Parts of SaMASZ double-sided mower with tine conditioner (KDD S/SL)

3-point linkage frame (**1**) enables attachment of the mower to tractor's 3-point linkage. Drive from tractor's rpm is transmitted through PTO shaft (**9**) an intersecting axis gear I (**3**) onto drive shafts (**6**), which, through intersecting axis gears II (**7**), power the cutterbars (**4**). On cutterbars, have discs with two knives each. Moreover, drive from tractor's rpm is transmitted through intersecting axis gear I (**3**), PTO shafts (**6**), intersecting axis gears II (**7**) directly transmitted onto swath conditioners (**12**). Hydraulic lifting cylinders (**2**) fed from the tractor external hydraulics are used for adjusting the mower to working position. Main frame (**11**), on which cutterbars (**4**) are installed, is unloaded with springs (**8**). On main frame, safety guards (**5**) are mounted. The mower is equipped with warning and signal plates (**10**) as standard.

3.2.3. Double-sided disc mowers with roller conditioner.

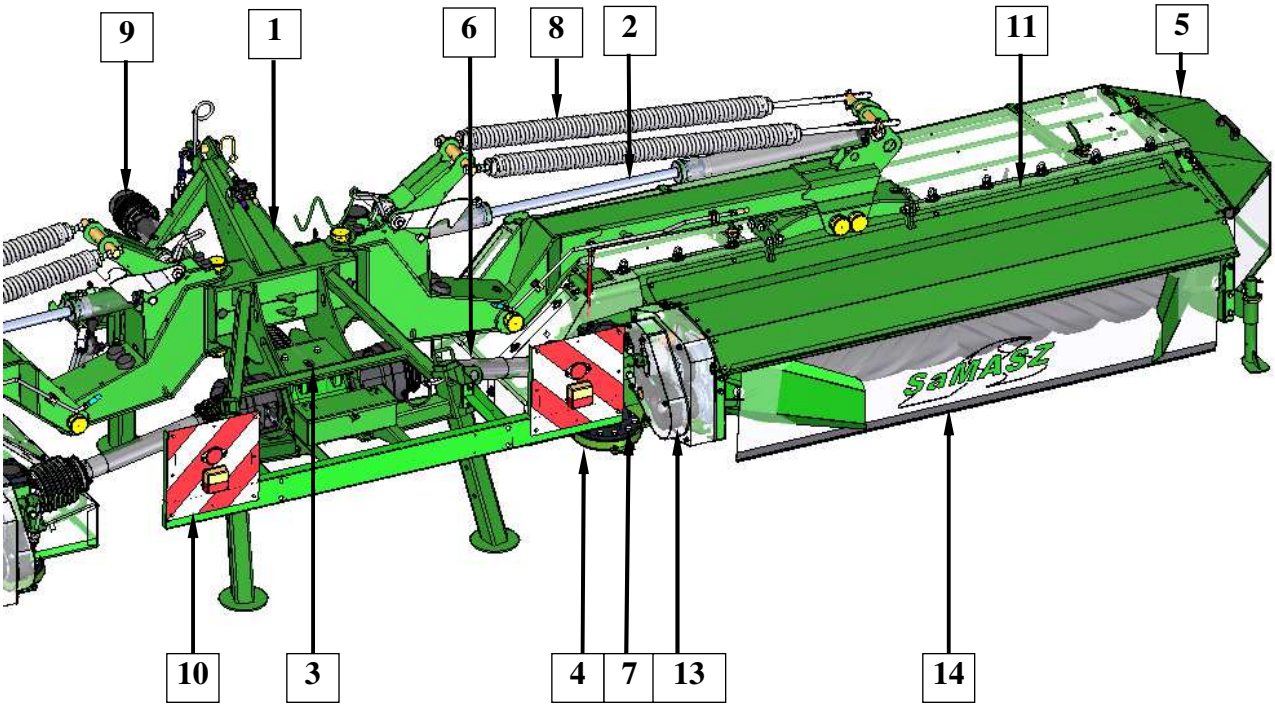


Fig. 3c. Parts of SaMASZ double-sided mower with roller conditioner (KDD W)

3-point linkage frame (**1**) enables attachment of the mower to tractor's 3-point linkage. Drive from tractor rpm is transmitted through PTO (**9**) and intersecting axis gear (**3**) onto drive shafts (**6**), which, through intersecting axis gears (**7**) power the cutterbars (**4**). The cutterbars have discs with two knives each. Moreover drive from the tractor rpm, through intersecting axis gear (**3**), PTO shafts (**6**), intersecting axis gears (**7**) and belt transmission (**13A**) or chain transmission (**13B**) is transmitted onto swath rollers (**14**). Hydraulic lifting cylinders (**2**) fed from the tractor external hydraulics are used for adjusting the mower to working position. Main frame (**11**), on which cutterbars (**4**) are installed, is unloaded with springs (**8**). On main frame, safety guards (**5**) are mounted. The mower is equipped with warning and signal plates (**10**) as standard.

3.2.4. Double-sided disk mowers with swath conditioner and conveyors

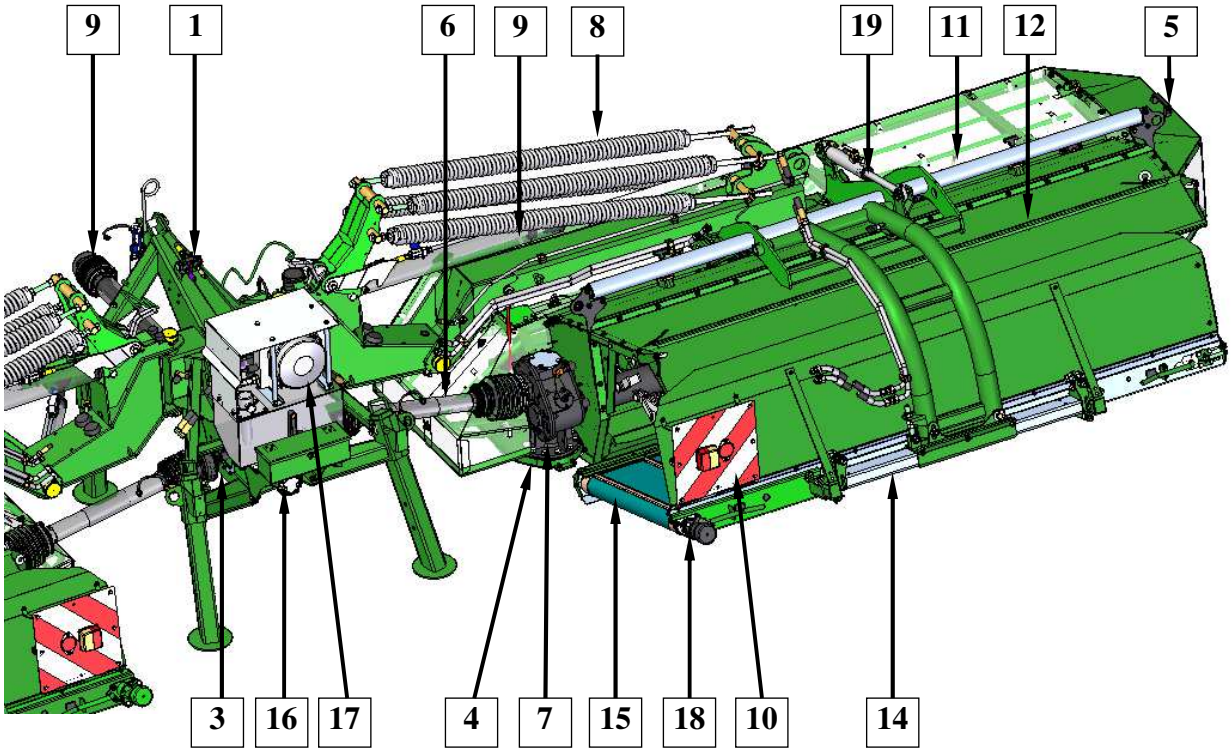


Fig. 3d. Parts of SaMASZ double-sided mower with swath conditioner and conveyors (KDD S/ST)

3-point linkage frame (**1**) enables attachment of the mower to tractor's 3-point linkage. Drive from tractor rpm is transmitted through PTO (**9**) and intersecting axis gear I (**3**) onto drive shafts (**6**), which, through intersecting axis gears II (**7**) power the cutterbars (**4**). The cutterbars (**4**) have discs with two knives each. Moreover, drive from tractor's rpm is transmitted through intersecting axis gear I (**3**), drive shaft (**6**), intersecting axis gears II (**7**) directly transmitted onto swath conditioners (**12**). Hydraulic lifting cylinders (**2**) fed from the tractor external hydraulics are used for adjusting the mower to working position. Main frame (**11**), on which cutterbars (**4**) are installed, is unloaded with springs (**8**). On main frame, safety guards (**5**) are mounted. The mower is equipped with warning and signal plates (**10**) fixed on the conveyors, as standard.

In two-sided mowers with conveyors (**14**), conveyor belts (**15**) are powered by the hydraulic system. The system comprises hydraulic pump (**16**) connected to intersecting axis gear I (**3**). Each conveyor is equipped with hydraulic cylinder (**18**) to move conveyor belts with energy transferred by hydraulic oil. While conveyors are being powered, the oil temperature increases. Hydraulic oil temperature is kept at an adequate level by cooler (**17**) with thermostat. During operation a conveyor can be lifted by means of cylinders (**19**). Turning conveyors (independently) on and off is possible through electric console provided in the tractor operator's cabin.

3.2.5. Double-sided disk mowers with swath rollers and conveyors

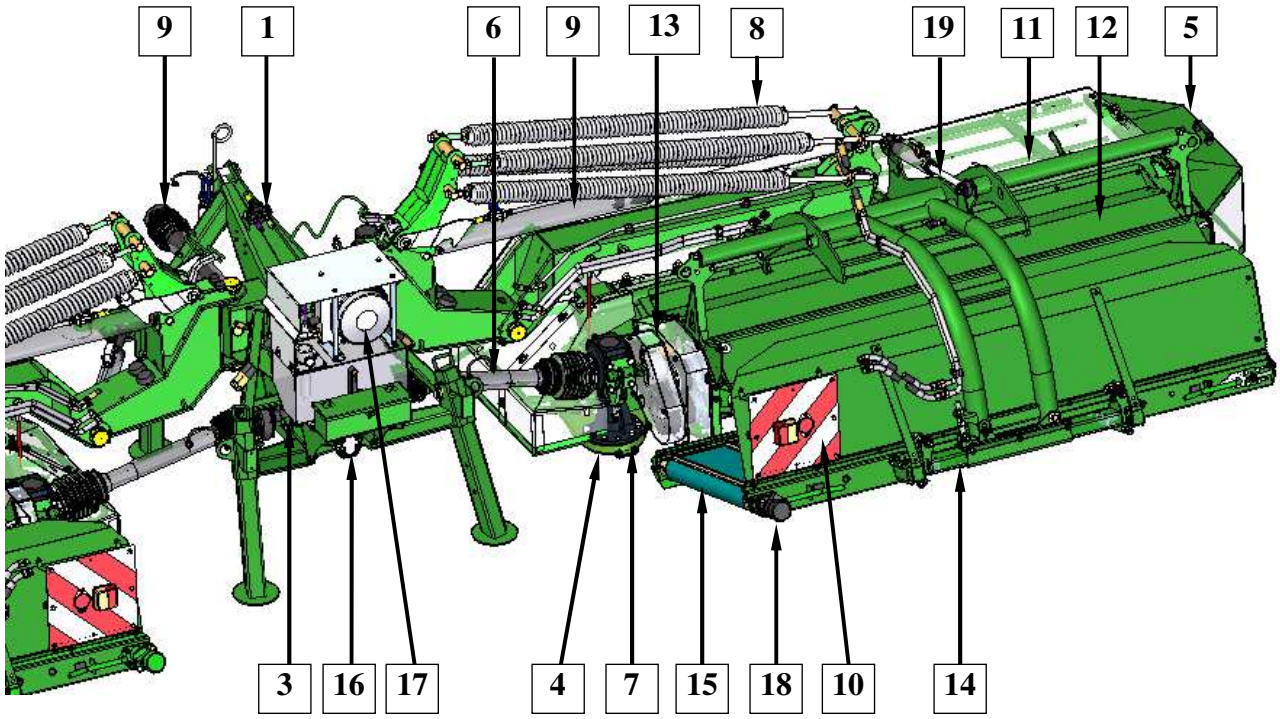


Fig. 3e. Parts of SaMASZ double-sided mower with swath rollers and conveyors (KDD WT)

3-point linkage frame (**1**) enables attachment of the mower to tractor's 3-point linkage. Drive from tractor rpm is transmitted through PTO (**9**) and intersecting axis gear (**3**) onto drive shafts (**6**), which, through intersecting axis gears (**7**) power the cutterbars (**4**). The cutterbars have discs with two knives each. Moreover drive from the tractor rpm, through intersecting axis gear (**3**), drive shafts (**6**), intersecting axis gears (**7**) and belt transmission (**13A**) is transmitted onto swath rollers (**14**). Hydraulic lifting cylinders (**2**) fed from the tractor external hydraulics are used for adjusting the mower to working position. Main frame (**11**), on which cutterbars (**4**) are installed, is unloaded with springs (**8**). On main frame, safety guards (**5**) are mounted. The mower is equipped with warning and signal plates (**10**) fixed on the conveyors, as standard.

In two-sided mowers with conveyors (**14**), conveyor belts (**15**) are powered by the hydraulic system. The system comprises hydraulic pump (**16**) connected to intersecting axis gear (**3**). Each conveyor is equipped with hydraulic cylinder (**18**) to move conveyor belts with energy transferred by hydraulic oil. While conveyors are being powered, the oil temperature increases. Hydraulic oil temperature is kept at an adequate level by cooler (**17**) with thermostat. During operation a conveyor can be lifted by means of cylinders (**19**). Turning conveyors (independently) on and off is possible through electric console provided in the tractor operator's cabin.

3.2.6. Double-sided disk mowers with hydro-pneumatic support

All KDD disk mowers are also offered with hydro-pneumatic support (**Fig. 4**).

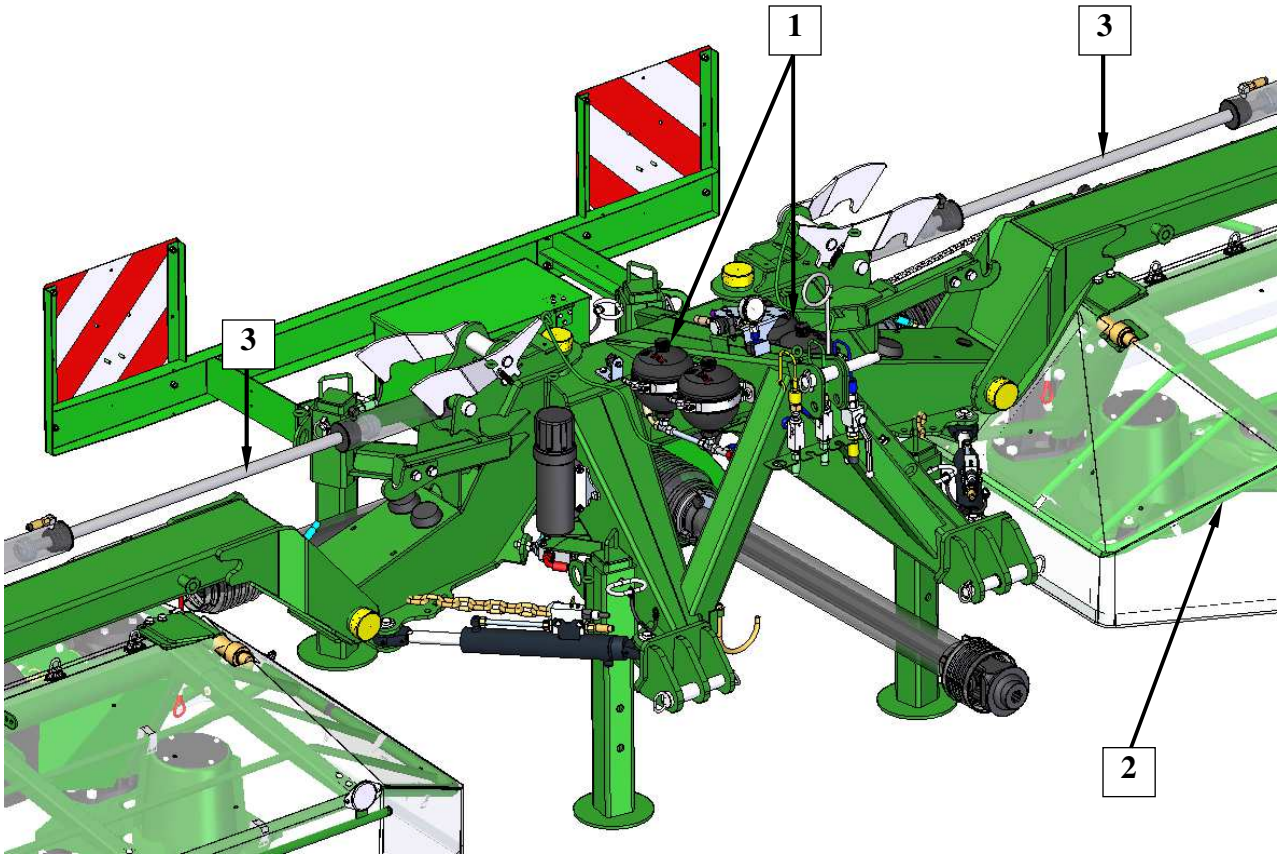


Fig. 4. Overview of rear disk mower with hydro-pneumatic support

- Hydraulic lifting cylinder (**3**) and hydro-pneumatic suspension driven from the tractor external hydraulics and hydraulic accumulators (**1**) are used to adjust the mower to working position.
- 3-point linkage frame, onto which cutterbar is set, features hydro-pneumatic support (**2**). The abovementioned suspension enables the mower's impact to the ground to be controlled by modification of the pressure in hydraulics.

3.3. Standard equipment and spare parts

The mowers are sold with the following standard equipment:

- warranty card,
- operator's manual with catalogue of spare parts and declaration of conformity,
- PTO shaft,
- cutting disk with drum (2 pcs.),
- spray paint (150 ml / 5.1 us fl oz),
- reflective plates with lights,,
- frame mounting key,
- cutting disk (2 pcs.),
- disk module (2 sets),
- slide (2 pcs.),
- slide cap (2 pcs.),
- knife base (46 pcs.),
- skew knife L=105mm/ 4.1" (180 pcs.),
- knife holder (2 pcs.),
- inter - skid insert (3pcs.).

Moreover, mowers with conveyers (KDD S/SL T (H)) are provided with convey belt – 1 pc.

Optional extra equipment:

- warning triangle,
- hydro-pneumatic suspension.
- control panel (assembled at SaMASZ),
- high mowing toppings / double toppings,
- cutting disc (set).

NOTICE:

Optional extra equipment should be ordered separately.

The mower is equipped with such elements as holders and brackets used to mount warning lights and plates. Combined lights and reflectors are mounted on warning plates.

Tab. 3. Recommended PTO shafts for KDD mowers

Model	Power KM	Length	Torque Nm	Symbol	Manufacturer
KDD 861 (H) KDD 911 (H) KDD 912 (H) KDD 941 (H)	100	47.6" – 67.3"	956	CS8N121U2R08R07LAX	Bondioli-Pavesi
KDD 861 S T (H), KDD 861 SL T (H) KDD 941 S T (H), KDD 941 SL T (H) KDD 861 W T (H), KDD 941 W T (H)	100	47.6" – 67.3"	956	CH8N121U2R08R09LAX	Bondioli-Pavesi

NOTICE:

Lubricate the PTO shaft with high quality multi-purpose grease every 50 shaft operating hours (**Fig. 5**). If access holes are accessible, lubricate fittings through access holes.

PTO shaft's end without clutch – To be mounted on the tractor's side.

PTO shaft's end with overrunning clutch – To be mounted on mower's side

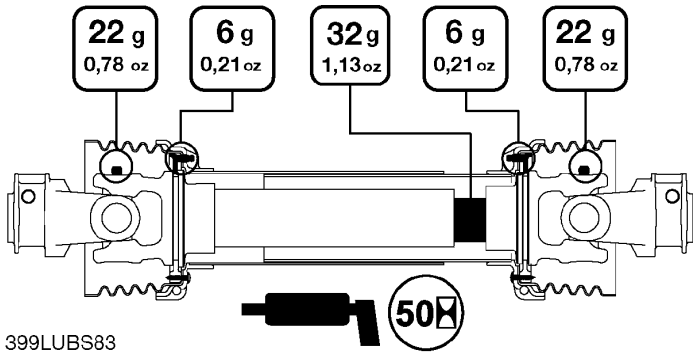


Fig. 5. PTO shaft lubrication points. Mounting directions

PTO shafts of other brands with equivalent parameters could be used after first obtaining SaMASZ permission.

4. SAFETY PRECAUTIONS

WARNING The following precautions are for your safety. They must be read carefully and followed by every person who operates or maintains the machine. Failure to follow these safety precautions could result in serious injury or death to the operator, maintenance person or bystanders and property damage to the machine and surrounding property.

Safety Signal Words

This manual and the safety labels attached to this equipment utilize signal words that signify safety hazards with different levels of severity. Below are the words used and the definitions for these words:

- **DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury
- **WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury
- **CAUTION** indicates a hazardous situation which, if not avoided, could result in minor or moderate injury
- **NOTICE** is used to address practices not related to physical injury

4.1. General safety rules and regulations

The following descriptions are for your safety:

They must therefore be read carefully and applied every time you use the machine.

- The machine has been designed for use by one single operator.
- When using, servicing, repairing, moving or storing the machine, the operator must wear safety
- footwear, safety gloves plus ear protection and dusk mask if necessary.
- During use, the machine may give rise to dust, especially if the soil is dry. You are advised to
- use a tractor with a cab fitted with filters in the ventilation system. Failing this, wear a dust
- mask with filter to protect your respiratory tract
- Front axis of the tractor should be weighted to keep the balance. If need be, use front wheel weights.
- In order to keep steering conditions, impact on front axis should be at least 20% of the complete tractor.
- Be extremely careful whenever using hydraulic lift lever or buttons. Any operation with hydraulic lift lever should be done from operator's seat; DO NOT move the lever from outside of a tractor.
- In case of tractors equipped with EHR, operating with hydraulic lift is done by the buttons mounted outside the tractor's cabin. When operating be extremely careful.
- When switching from mowing to transport position, remove the entire PTO shaft or at least one end of the shaft from the tractor's PTO so it cannot turn.
- When attaching the mower to a tractor, the operator should wear protective gloves.
- DO NOT operate the mower unless all safety guards are in place and operational. In addition, any damaged protective aprons should be replaced with a new one.
- DO NOT exceed 1050 PTO rpm.

- No person (except operator) should stand within danger area which is a minimum of 170' from any operating part, especially when operating near roads and in areas with stones and other debris. Be certain that children and animals are at a safe distance away from the machine.
- **IMPORTANT:** Maintenance and adjustment should ONLY be done after the following has occurred:
    - tractor's engine has been stopped and ignition key has been taken out,
    - all rotating parts have come to complete standstill (NOTE: cutting knives will rotate for several minutes after engine is turned off),
    - the cutterbar is on the ground, and
- Never tamper with or remove safety devices on the machine or make them inoperable.
- Before starting work and periodically thereafter, replace any damaged, missing and/or worn knives and knife holders.
- When driving on public roads always comply with local traffic regulations, especially those concerning warning lights.
- When the mower is lifted for repair on 3-point linkage, it should be secured against falling by mechanical support or by chain.
- The bolts and other fasteners have to be periodically checked and, if necessary, tightened or replaced. DO NOT work with damaged or worn fasteners.
- Never lift the mower on tractor linkage when the drive is operating and the cutting discs are rotating.
- When operating the mower, the tractor should always be equipped with operator protection that is required by laws and regulations.
- Never start the mower when the mower blades are off the ground.
- Before you start the tractor make sure that all drives are turned off and the levers that turn the hydraulics are in neutral position.
- Never leave tractor's engine running without supervision. Before you leave the tractor, turn off the engine and remove the key from tractor's ignition.
- DO NOT operate the mower when driving the tractor backwards.
- Permissible inclination of the mower on a slope when working and during transport is 8°. Exceeding this incline can result in mower tipover.
- Never stand between tractor and mower unless tractor and mower are secured against moving by the tractor's brake.
- If any maintenance must be done under an elevated mower, it must be blocked or otherwise secured against falling.
- When the parts of the mower need replacement, use only original spare parts as described in the spare parts list. Pay particular attention to PTO shaft's guards and mower's and tractor's spline shaft guards.
- Hydraulic hoses are potentially very dangerous. Do the following to minimize any hazards:
    - Hydraulic hoses should be periodically checked and if any damage to the hoses have occurred or if they have been used more than 5 years, replace with new ones.
    - Never use scotch tape to repair hydraulic hoses.
    - When connecting hydraulic hoses to tractor's hydraulic connectors, make sure that the tractor's or mower's hydraulic system is not under pressure.
- The mower should be stored under a roof and in a way as to not be hazardous bot people or animals.

- Before any maintenance works set the machine on a stable ground and secure it against unintentional moving.
- When cleaning the machine, for health protection use personal protective equipment.
- Do not leave farming machinery on slopes or other descents without having provided sufficient protection against its free runaway.
- No person (except operator) should stand within danger area from any operating part, especially when operating near roads and in areas with stones and other debris. Keep the safe distance.
- In the event of any break in the equipment operation, turn the drive off. Shut down the tractor's engine, take the ignition key off, leave the cabin and make sure there are no unauthorized persons in the cabin and close the door.
- In the event of an accident involving this mower in a field or on a road, follow all applicable first aid procedures and contact SaMASZ technical service.
- Mower should be kept clean, so as to avoid danger of fire.

4.2. Qualifications of operator

To provide safe machine operation each person being the machine operator must meet the following requirements:

- Operator should hold driving license, have ability to drive vehicles safely and know road traffic rules.
- Operator must be in proper physical condition to be able to operate the machine.
- Operator must not be under the influence of alcohol, drugs and medicines, which all have influence on vehicle driving and machine operation.
- Operator should be familiarized with this manual and follow its provisions.
- Operator should be familiar with working principles of both the tractor and the machine, and be able to recognize and avoid hazards resulting from operation of the aggregate.

4.3. Conditions of mounting mower on tractor

- Prior to the mounting operation, be sure that the tractor and mower hitches are compatible and that the tractor's hitch load is adequate for the machine which is to be mounted or attached.
- Prior to mounting the machine, examine the technical condition of the mower's hitch assembly and tractor's 3-point linkage.
- Use only genuine cotter pins to mount the mower on a tractor.

4.4. Transport

The lifting, handling and transporting operations can be very dangerous unless they are carried out with the utmost caution. Have all persons not involved in the actual work move away from the area and limit the zone where the operations are to be carried out. Also make sure that the area in which the operations take place is clear and that there is a sufficient escape route, i.e. a free, safe zone to which the operators can quickly move if the load should fall.

The safety hooks and ropes used to lift the machine must be of an adequate carrying capacity.

To minimize the risk of serious injury or death, do the following:

- When the machine is converted from the transport position to the work position and vice versa, you could be pinched or crushed by some of its parts. Take extra care when carrying out these maneuvers and have all persons keep well clear of the danger zone.

- Do not change position of the mower until there are no people or animals around (pay particular attention to children).
- While transporting the mower, put a warning plate with combined lights and reflectors and warning triangle on the mower.
- During transport, always put the mower in its proper and safe transport position. See section 5.3.
- Before putting the mower in transport position, make sure that the tractor's PTO is turned off and all rotating parts have come to a complete stop.
- Do not drive over 25 km/h (15 mph). Drive slower if road conditions are poor, especially on irregular surfaces or steep slopes.
- The behavior of the tractor on the road, such as its turning and braking capacities, are affected by the implements mounted.
- When driving on the road after work, check to make sure that the tires and soil working tools are clean to prevent the road surface from becoming dirty.
- Make sure that the machine is not damaged during transport.
- No person and no objects must remain on the mower when driving or transporting.
- When taking turns pay particular attention and consider the machine's weight and dimensions.
- Bear in mind that when transporting the machine in areas where high voltage lines are present, exercise special caution as touching the lines with the aggregate is likely.

4.4.1. Putting the mower onto another vehicle for transport

The driver and the carrier are responsible for the mower's transport safety. Equipment and parts must be secured during transport. To put the mower onto another vehicle in a safe way, please obey the following rules.

- Transport should be done by qualified and specifically trained personnel,
- Grab the mower by any lifting devices only in places indicated by hook sign (**Fig. 6**),

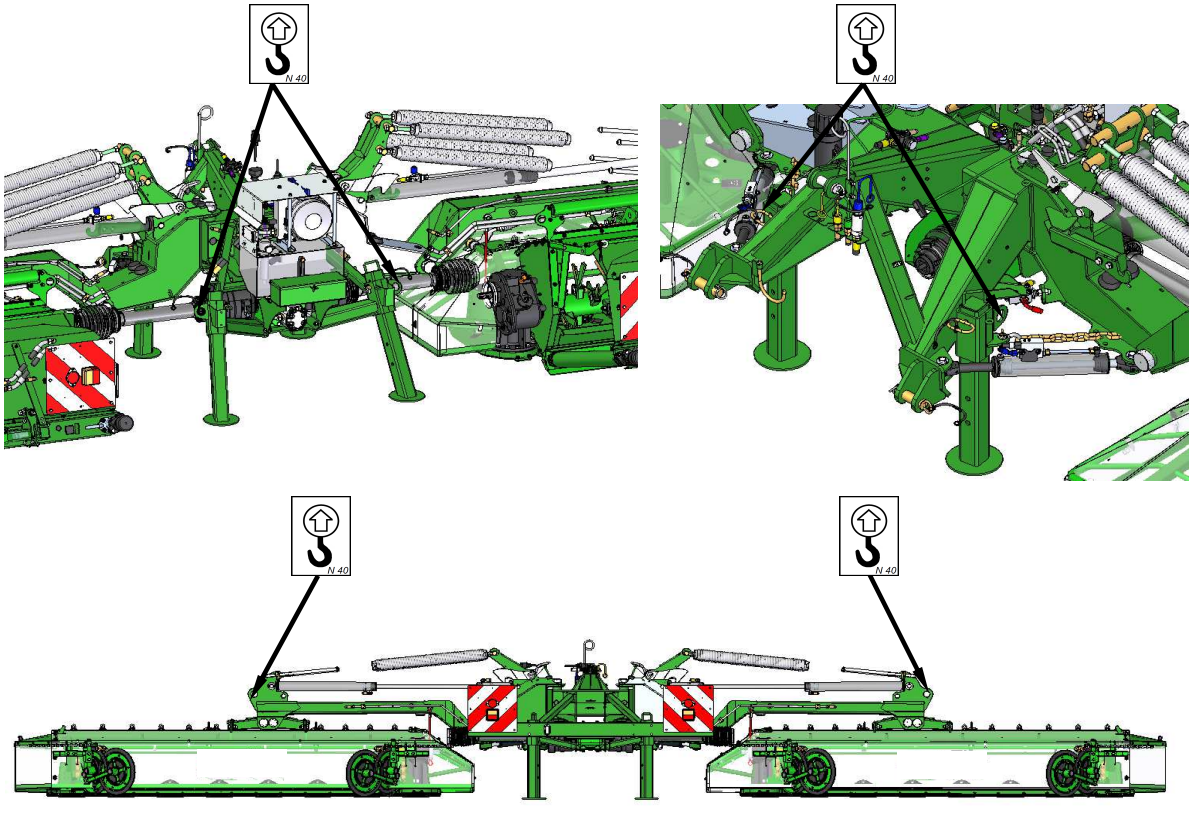


Fig. 6. Points for fixing of transport equipment

- For mower lifting, use only lifting devices with hoisting capacity larger than mower's weight shown in data plate. This also applies to ropes and chains used for lifting,
- Do not lift if transport belts, belt suspensions, ropes are damaged. Whenever damage to these parts occurs, replace with new ones,
- When mounting slings, chains, handles etc., always set the machine's center of gravity properly,
- To safely support the machine, use ropes of adequate length so that the angle between them is no greater than 120°, and the angle between the strand and the vertical is no greater than 60°,
- Lift the machine with the utmost caution and move it slowly,
- No one should be within the range of action of the lifting equipment when any transporting operations are being carried out.
- Collapsible parts should be blocked in transport position,
- When the mower is on the vehicle's trailer, the machine should be secured against moving.

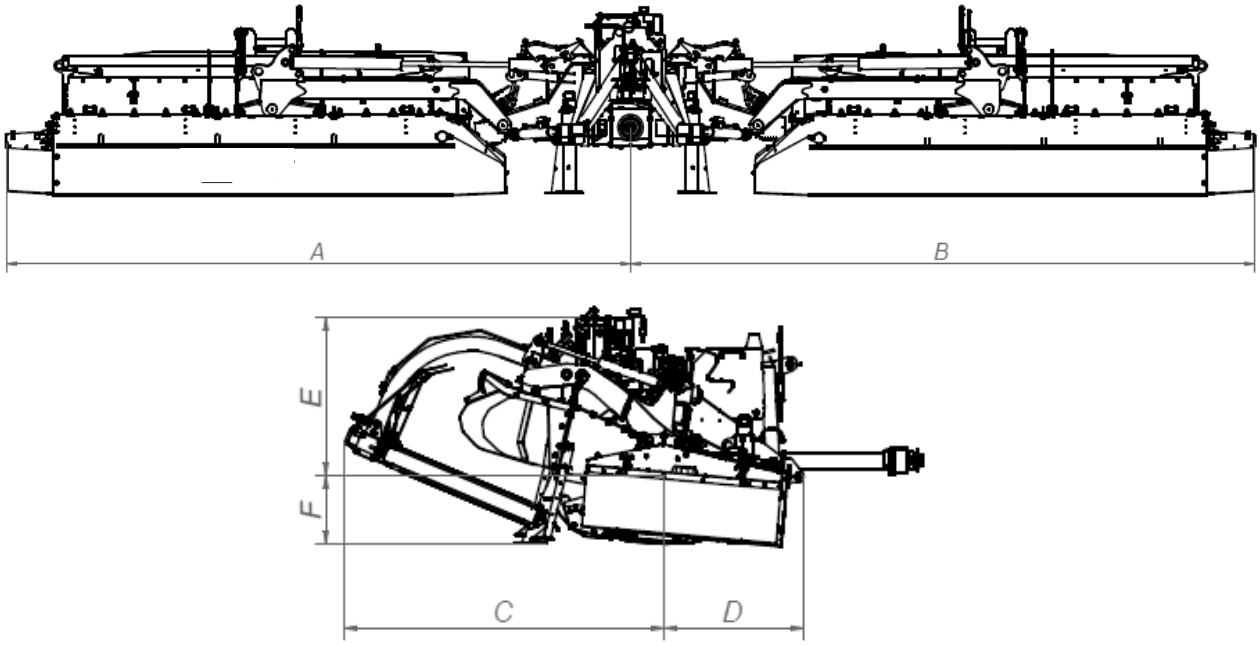


Fig. 7. Location of center of gravity on mowers KDD

Tab. 4. Location of center of gravity

Dimension [mm]	Model						
	KDD 861 (H)	**KDD 861 S (H)**	**KDD 861 SL (H)**	**KDD 861 W (H)**	**KDD 861 ST (H)**	**KDD 861 SLT (H)**	**KDD 861 WT (H)**
A	4480/14' 8"	4480/14' 8"	4480/14' 8"	4480/14' 8"	4480/14' 8"	4480/14' 8"	4480/14' 8"
B	4480/14' 8"	4480/14' 8"	4480/14' 8"	4480/14' 8"	4480/14' 8"	4480/14' 8"	4480/14' 8"
C	1110/3' 7"	1210/3' 12 "	1480/4' 10"	1035/3' 5"	1630/5' 4"	1480/4' 10"	1660/5' 5"
D	860/3'	990/3' 3"	960/3' 2"	960/3' 2""	1200/3' 11"	1350/4' 5"	1200/3' 11"
E	890/2' 11"	890/2' 11"	950/3' 1"	910/2' 12"	800/2' 8"	950/3' 1"	835/2' 9"
F	490/1' 7"	490/1' 7"	550/2'	450/1' 6"	565/1' 10"	550/1' 9"	470/1' 7"

Dimension [mm]	Model										
	KDD 911 (H)	**KDD 912 (H)**	**KDD 911 S (H)**	**KDD 911 SL (H)**	**KDD 941 (H)**	**KDD 941 S (H)**	**KDD 941 SL (H)**	**KDD 941 W (H)**	**KDD 941 ST (H)**	**KDD 941 SLT(H)**	**KDD 941 WT(H)**
A	4750/ 15' 7"	4750/ 15' 7"	4750/ 15' 7"	4750/ 15' 7"	4900/ 16' 1"	4900/ 16' 1"	4910/ 16'	4900/ 16' 1"	4900/ 16' 1"	4900/ 16' 1"	4900/ 16' 1"
B	4750/ 15' 7"	4750/ 15' 7"	4750/ 15' 7"	4750/ 15' 7"	4900/ 16' 1"	4900/ 16' 1"	4910/ 16'	4900/ 16' 1"	4900/ 16' 1"	4900/ 16' 1"	4900/ 16' 1"
C	1130/ 3' 9"	1130/ 3' 9"	1190/ 3' 11"	1190/ 3' 11"	1110/ 3' 8"	1210/ 3' 12"	1480/ 4' 10"	1030/ 3' 5"	1630/ 5' 4"	1480/ 4' 10"	1660/ 5' 5"
D	860/3'	860/3'	990/ 3' 3"	990/ 3' 3"	860/3'	990/ 3' 3"	960/ 3' 2"	960/ 3' 2"	1200/ 3' 11"	1350/ 4' 5"	1210/ 3' 11"
E	890/ 2' 11"	890/ 2' 11"	890/ 2' 11"	890/ 2' 11"	890/ 2' 11"	890/ 2' 11"	960/ 3' 2"	870/ 2' 10"	800/ 2' 7"	960/ 3' 2"	860/3'
F	470/ 1' 6"	470/ 1' 6"	470/ 1' 6"	470/ 1' 6"	490 /1' 7"	490 /1' 7"	540/ 1' 9"	490/1' 7"	565/1' 10"	540/ 1' 9"	460/ 1' 6"

4.5. Working parts

- Before operating the mower, check knife's, knife mounting's and knife holder's condition.
- Worn or damaged knives, knife holders or knife mounting should be immediately replaced with new ones.

WARNING!

During replacement of working parts, it should be used personal protective gloves.

4.6. PTO shaft

- Before operating, read bar manufacturer's manual placed on the bar. Follow all safety precautions in that manual.
- Use only PTO shafts recommended by mower's manufacturer with guards in good condition.
- In order to operate safely, use only undamaged PTO shafts and shields. Damaged PTO shafts and shields must be repaired or replaced with new ones before use.

4.7. Hydraulic assembly

- Hydraulic assembly is under high pressure. Hydraulic oil under pressure may penetrate skin and cause serious injury or death. Skin and eyes should be protected when working around this assembly.
- In case of injury caused by a liquid under pressure, call a doctor immediately.
- Hydraulic hoses can be connected to the tractor's hydraulics provided that both the tractor's and the mower's hydraulic assemblies are not under pressure. To remove the pressure from the hoses, start the tractor's hydraulic valves several times with the tractor off.

- When looking for oil leaks, do so safely. Use a cardboard card. Do not touch any potential leaks until the entire hydraulic assembly has been relieved of pressure.
- It is recommended that the hydraulic oil used should not exceed 10 oil purity class in accordance with NAS 1638**.**

When using hydraulic hoses:

- Avoid stretching the hoses when operating.
- Do not allow hydraulic hoses to get deflected.
- Do not expose hydraulic hoses to contact with any sharp edges.
- If damaged or worn, replace the hoses with new ones.
- Useful life for hydraulic hoses is 5 years from their production date.

4.8. Safety curtains

SaMASZ mowers feature standard safety curtains (**1**) for self-mounting. In order to mount the guard properly, put it on a mower and secure with catches (**2**) and front guard (**3**) **Fig. 8.** Examine condition of guards and its mounting on a regular basis. Front guard (**3**) should be fixed so that it holds the safety curtain (**1**).

Fix immediately if damaged and replace if missing. Do not operate mower without safety curtains.

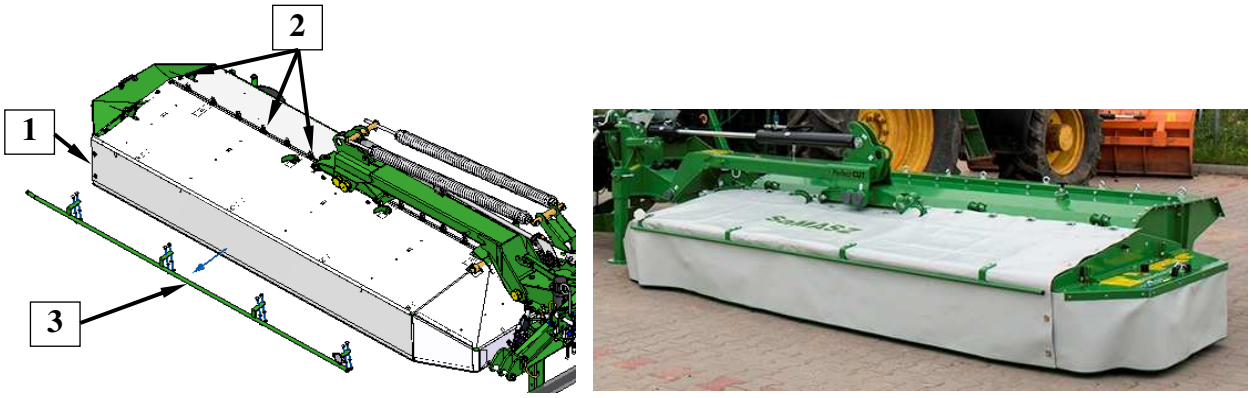


Fig. 8. Mounting safety curtain guard on the mower

4.9. Residual risk

Despite the fact that SaMASZ, the manufacturer of the mower, has taken great care in the design and manufacturing of the mower, certain risks during mower operation and maintenance are unavoidable. A major source of risk that could result in serious injury or death can occur during the performance of these operations.

Major source of risk follows performance of these operations:

- operation of mower by minors,
- operation by individuals who have not read the operator's manual and safety labels,
- operation of mower by persons under influence of alcohol or other substances,
- not being cautious during transportation and moving mower during operation,
- transport of persons who are on the machine,
- presence of persons and animals within the mower operation range,
- performing servicing and machine adjustments with the engine on.

4.9.1. Danger of machine entanglement

This risk occurs when (1) changing position of a mower, (2) operating near rotating parts, and (3) working without safety guards. During operation, maintenance and adjustment, always wear protective gloves, shoes and clothes without loose parts, belts and so on. Always comply with safety labels placed on the mower.

4.9.2. Danger of cutting injury, abrasion and damage of skin

Present when replacing working parts with sharp edges, cleaning the machine and removal of any clogging and seizure. During any maintenance work always use safety gloves.

4.9.3. Danger of injury from liquid ejection out of hydraulic system

During connection of hydraulic hoses to hydraulic connectors, be sure that tractor's or mower's hydraulic system is not under pressure. Regularly check hydraulic hoses for leaks.

WARNING!
Residual risk always results from incorrect behaviour of mower's operator.

4.9.4. Forbidden actions

During mower's operation, do not do the following:

- never unblock the mower, make any regulations or repairs of the mower while it is in motion,
- never change order of operation and maintenance activities described in operator's manual,
- never operate the mower when it is not in working order or has damaged safety guards,
- never get your hands and legs close to rotating parts of the mower,
- during repair and maintenance of the mower, always comply with descriptions included in operator's manual. Always do these activities when the tractor's drive is off,
- never operate the mower under influence of alcohol, drugs, or strong medicine that impair your attention,
- do not wear clothes or jewelry that are too loose or too tight. Too loose clothing or jewelry may be pulled in by the rotating parts of the mower,
- the mower should not be operated by children or by handicapped people,

When describing residual risk, the mower complies with the state of the art in technology on the date it was manufactured.

NOTICE:
Despite following the specified instructions and prohibitions, residual risk is still present.

4.9.5. Residual risk assessment

Residual risk occurs from not complying with the instructions and safety precautions. Such risk can be minimized by doing the following:

- thorough familiarizing yourself with operator's manual,
- allow no persons on the machine when operating,
- allow no persons within the mower operation range,
- adjust, maintain and lubricate the machine with the engine off,
- only skilled persons should perform repairs of the machine,
- children and strangers must keep away when the machine is operating.

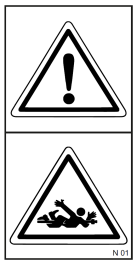
When the risk of exposure to noise cannot be avoided or eliminated by any protective means or organization of work, the employer (farmer) must: 1) provide the operator with individual means of noise protection if the noise level in work place exceeds 80 dB.

2) provide the operator with individual means of noise protection and supervise the correctness of its usage, if the noise level in work place reaches or exceeds 85 dB.

4.10. Safety labels and their meaning

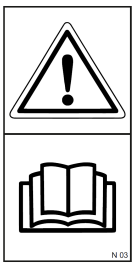
Safety labels are critical to safe use of this mower. They must be read, understood and followed. Also, be sure that:

- All warning decals are clean and legible
- All lost or damaged decals are replaced by ordering new decals from your dealer or supplier
- All persons using this mower have read the section of this manual explaining the meanings of these labels
- All spare part used for repair of the mower should have all safety labels provided by the manufacturer.

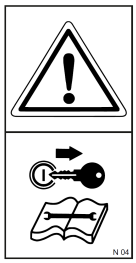


N-01
Be extremely careful when PTO shaft is rotating

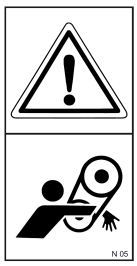
N-02
Warning: cutting knives. Approach during operation is forbidden



N-03
Read the operator's manual before putting the mower into operation



N-04
While making repairs the machine must be stopped

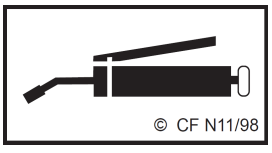


N-05
Warning: belt transmission, be extremely careful

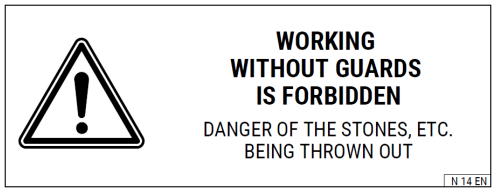
N-06
Caution: pulling-in parts

N-07
Operating is forbidden when any person is within the danger area of 170 ft

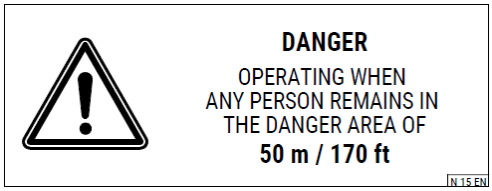
N-09
Warning: rotor



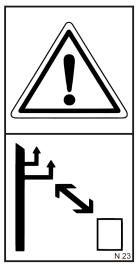
N-11
Lubrication point



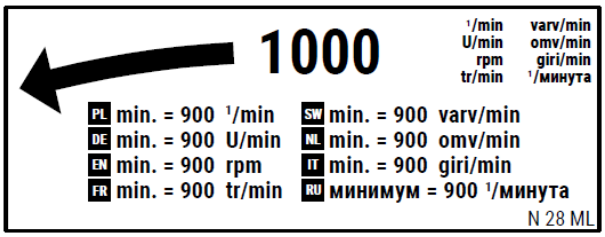
N-14



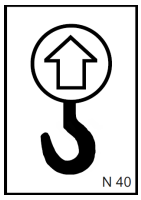
N-15



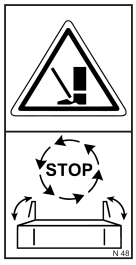
N-23
Watch out: power lines



N-28



N-40
Signs indicating transport holders

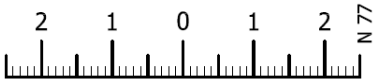


N-48
Stay away from mower's inclination area

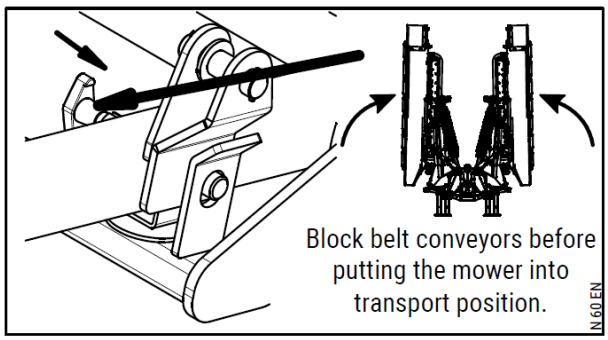
N-49
Never stand near tractor's 3-point linkage while steering tractor's lift

N-50
Do not stay in the swinging area of mower's parts

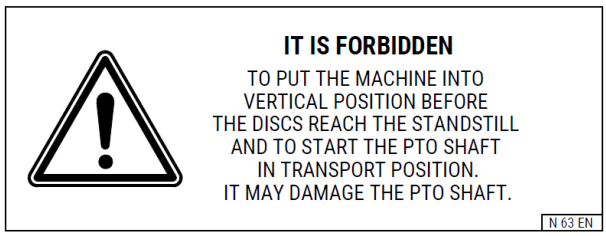
N-55



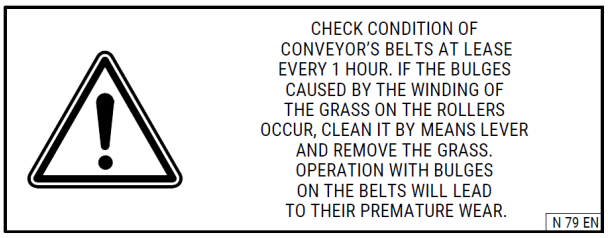
N-77
Tension of conveyor's belt



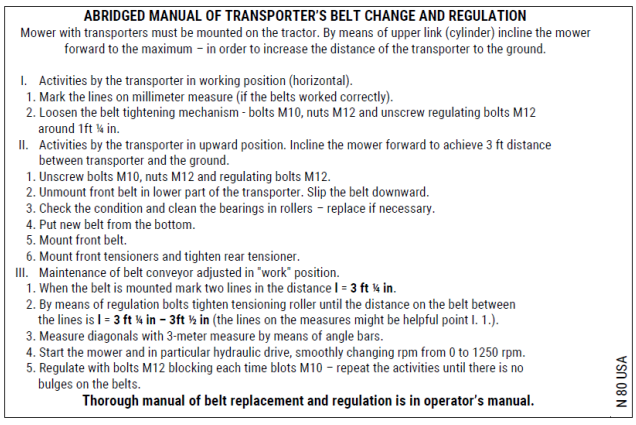
N-60

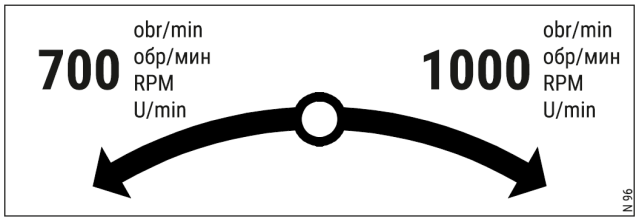


N-63

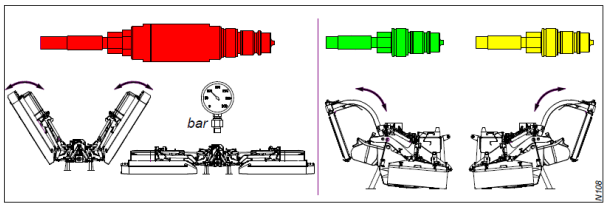


N-79



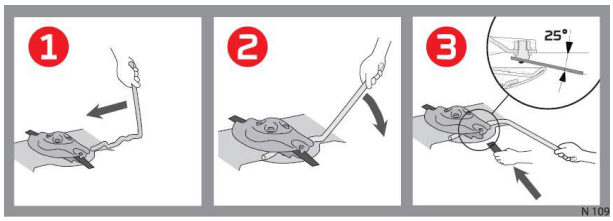


N-80
Regulation and change the conveyor's belt



N-108

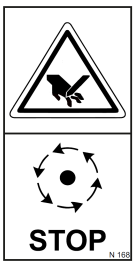
N-96



N-109

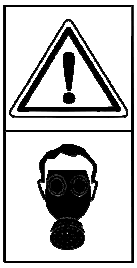
N-117
Avoid fluid escaping under pressure. Consult technical manual for service procedures

N-167
Do not remain on the machine while driving



N-168
Do not touch the machine before the rotating parts have not come to a complete standstill

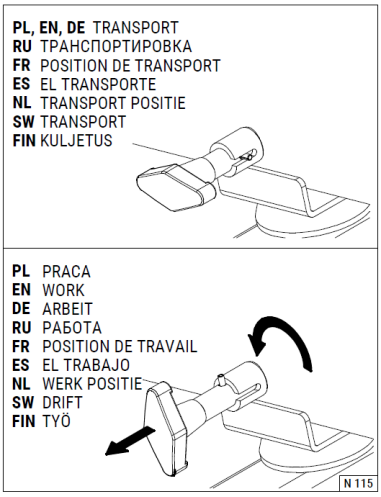
N-201
Permissible transport speed



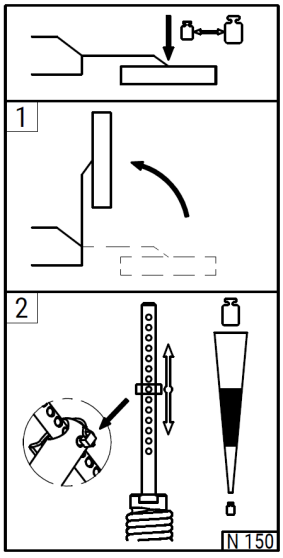
N-204

N-205

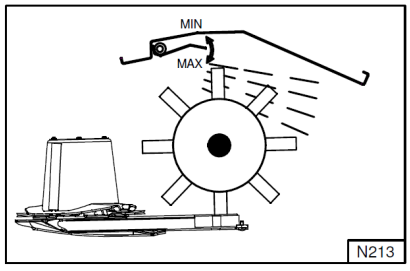
Use the required Personal Protective Equipment



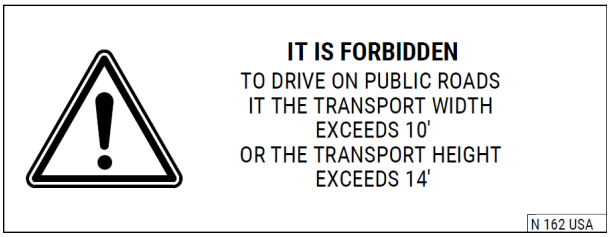
N-115
Locking conveyors



N-150
Regulation of support springs



N-213
(for: KDD S/SL)



N-162

N-224
Do not open and remove safety guards with motor operating

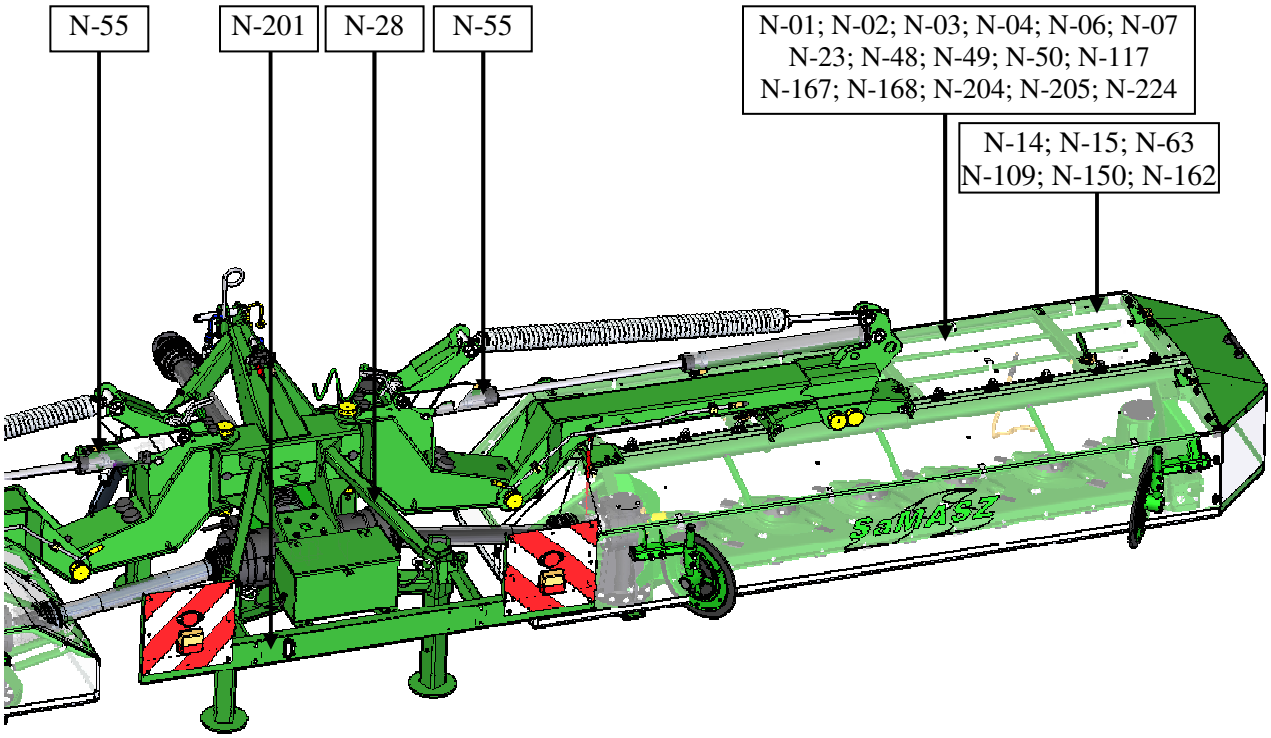


Fig. 9a. Warning decals placed on the mower without conditioner

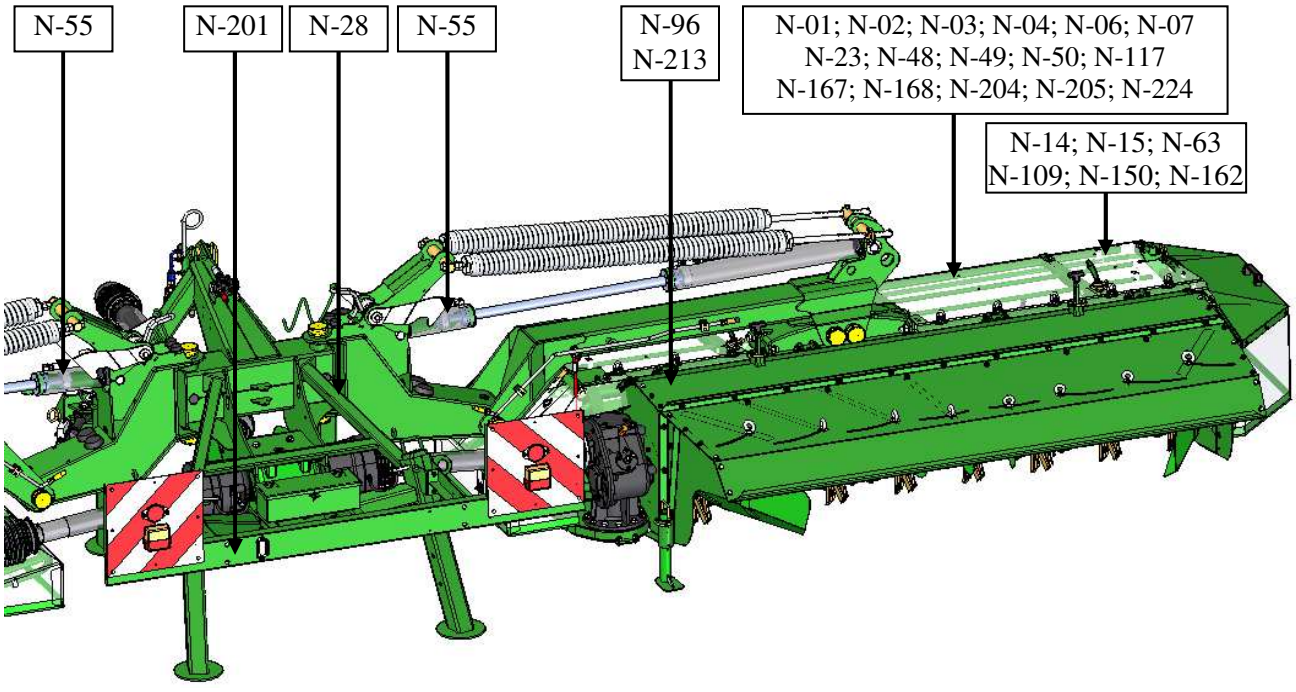


Fig. 9b. Warning decals placed on the mower with conditioner

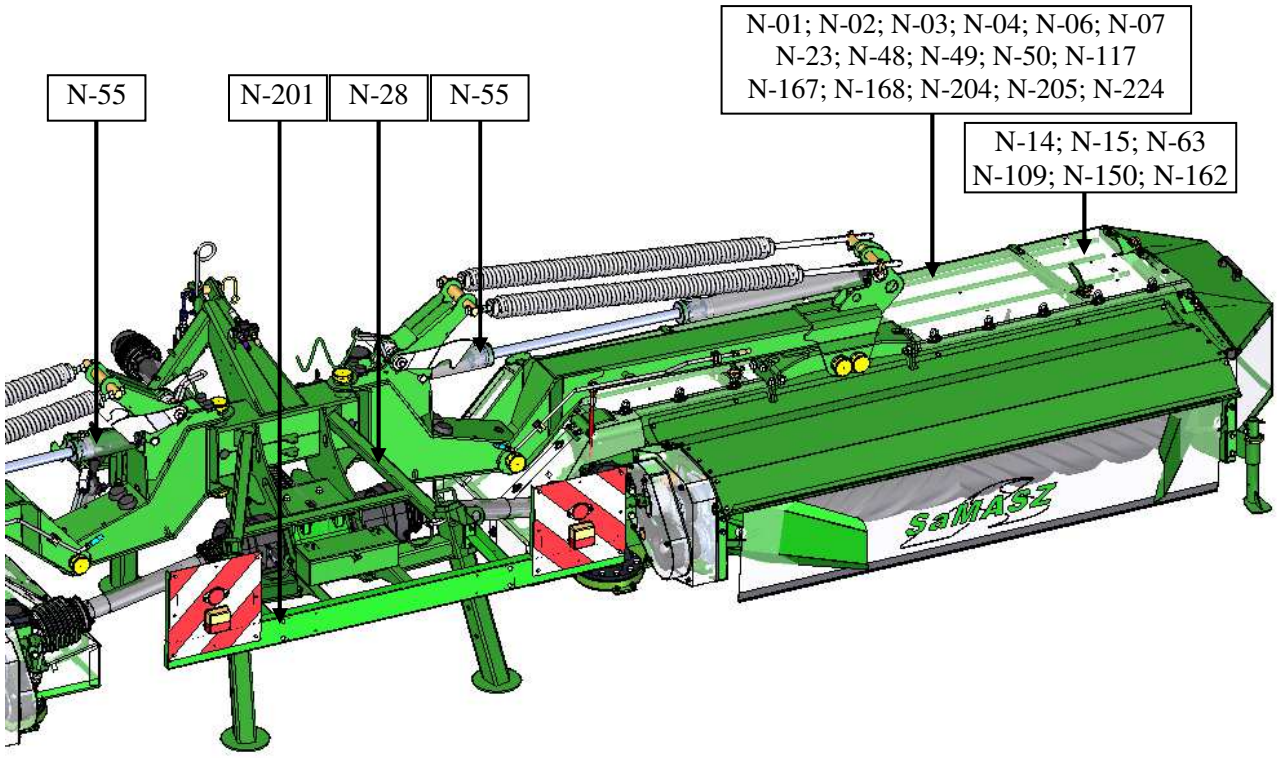


Fig. 9c. Warning decals placed on the mower with roller conditioner

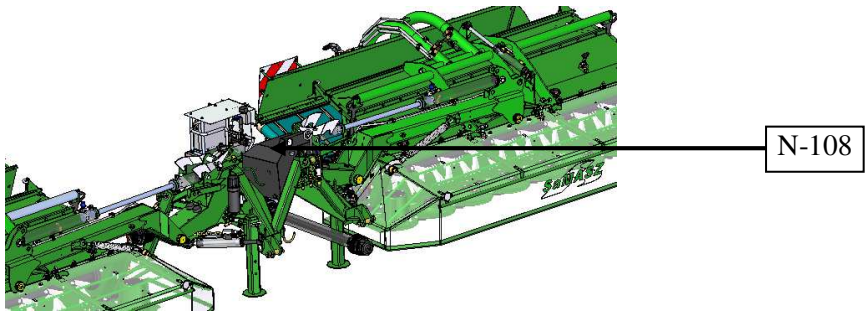


Fig. 9d. Warning decals placed on the mower with hydro-pneumatic support

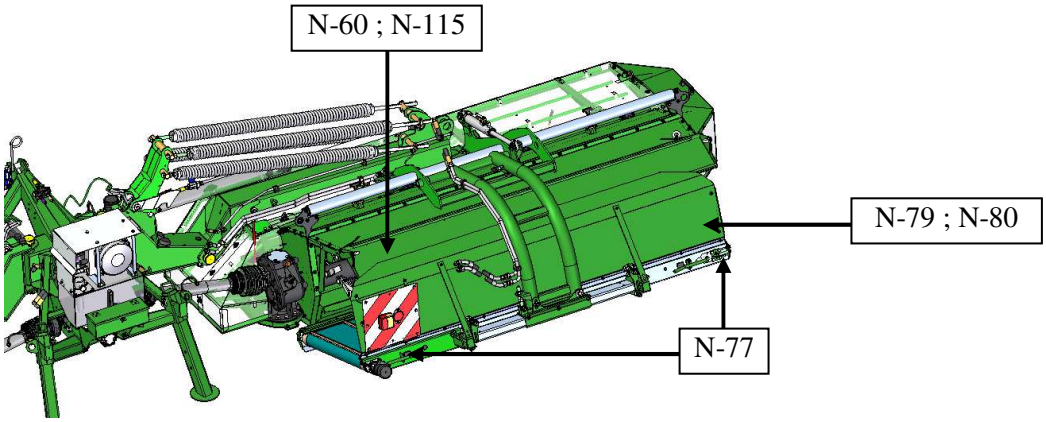


Fig. 9e. Warning decals placed on the mower with swath conveyor

NOTICE:

Any spare part used for repair of the mower should have all warning decals provided by the manufacturer.

4.11. Design and operation of safety breakaway device

Hydraulic safety breakaway device protects mower against hitting small obstacles. In the event the mower hits an immovable obstacle, the cutterbar folds back about 30 degrees and at the same time rises about 2' 4". After that, the cutterbar automatically comes back to its working position. Hydraulic safety breakaway device is used for tilting to the back and lifting of the cutting unit.

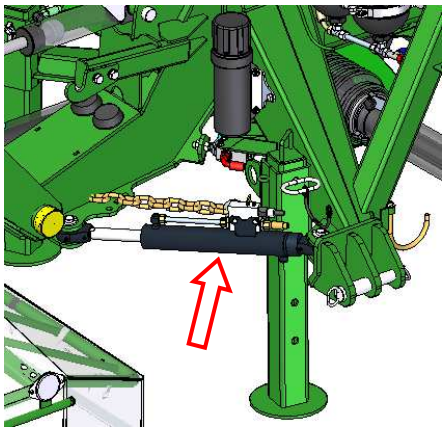


Fig. 10. Hydraulic safety breakaway device

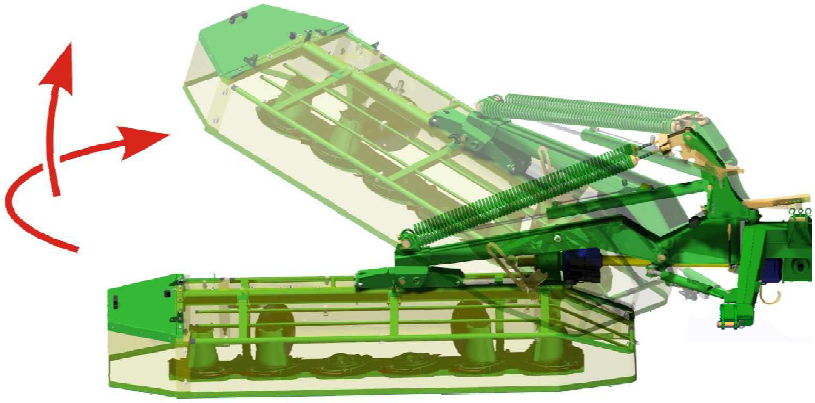


Fig. 11. Simultaneous holding back of the mower up and backwards when safety breakaway advice is used

NOTICE:

Hydraulic safety breakaway device works only if the valve's pressure is adjusted to the factory setting of 1102 lbs.

5. OPERATION

WARNING!

Before beginning to use this machine, do the following:
- Read manual, especially safety precautions in section 4.
- Make sure you are familiar with all controls and functions.
- Make sure all safety devices are in place and working. Fix or replace if not working or damaged.
- Replace protective cover if damaged.

5.1. Attaching the mower to the tractor

WARNING!
- Only hitch and unhitch machine on a flat surface with compact dirt.
- Keep everyone away from area between mower and tractor.
- Be careful near link road zone of tractor's rear power lift. Contains sharp parts.

Mowers KDD are suitable for mounting on tractors with three-point linkage cat. II and III.

To mount the mower on tractor:

- drive the tractor near the hitch of the mower,
- install pins (**S**) of the mower in hangers (**W**) of tractor's lower links (**Fig. 12**),
- adjust position of the mower by means of upper link (**C**) and hangers (**W**),
- once the mower is mounted, lift support feet and secure them with cotters,
- connect the mower's hydraulics to hydraulic connectors on the tractor (see 5.1.1.),
- mount PTO shaft (**B**) (**Fig. 12**). If needed, shorten the shaft as in 5.1.2,
- connect control panel using RS cable to control box on the mower – for models equipped with control. Place the connected panel in the tractor.

After the mower has been attached to tractor, check balance and steerability of tractor-mower set. To do this, calculate to formulas given in the appendix or weigh the set, and then drive on the scales only with front axis of the tractor (the mower must be in transport position – lifted upwards). If the pressure on the front axis is at least 20 % of the whole set's pressure, it means the set is stable. If not, front axis should be balanced.

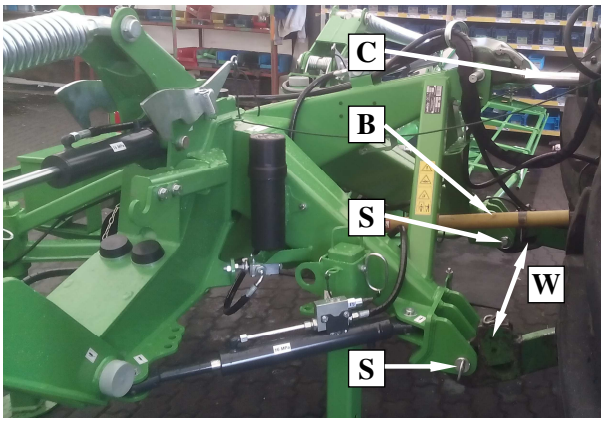


Fig. 12. Connecting mower to the tractor

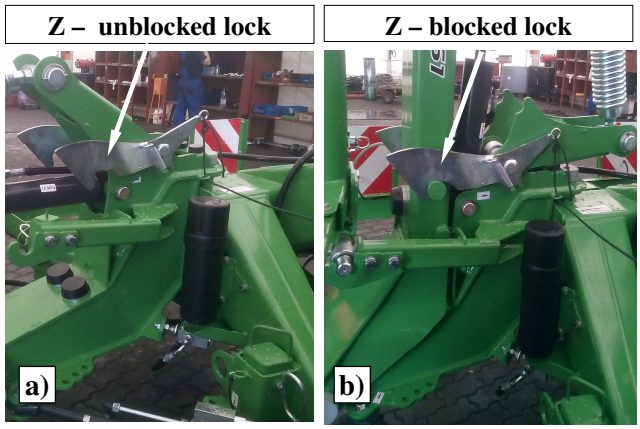


Fig. 13. Position of the lock

5.1.1. Connecting hydraulic hoses

The circuit is under high pressure.

WARNING!

Before beginning any maintenance work on the hydraulic system, turn off the engine (if it is on), apply the hand brake, remove the ignition keys from the dashboard and lower the machine to the ground.

5.1.1.1. Double-sided disk mowers without swath conditioner/rollers and conveyors

In all mower models with own hydraulic assembly, to connect the mower to the tractor use three hydraulic hoses: red – **A,** green – **B** and yellow – **C** (see label N-108 **Fig. 14a**). Hose **A** with red connector is used for lifting of cutting units on headlands, for transport and unloading and for setting pressure in support assembly. Hoses with green **B** and yellow **C** are used for lifting of conveyors – right and left.

Connect each hose to a separate section of the tractor's external hydraulics (**Fig. 14b**). It would be best, if the section would have a free oil flow. The tractor should have three pairs of hydraulic connectors.

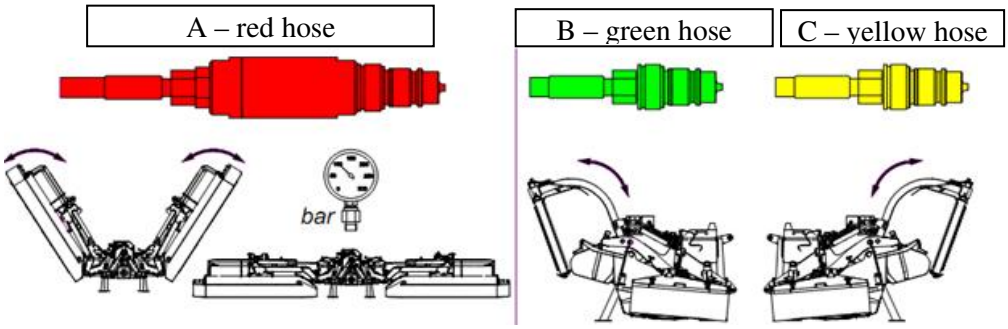


Fig. 14a. Hydraulic hoses mower with conditioners/rollers – tractor

Make sure that the hydraulic hoses have been inserted properly and that the colours of the hoses match. Make sure that there are no leaks in the hydraulic system and that the connections have been correctly made.

WARNING!

Leaking fluid (hydraulic oil) at the high pressure can penetrate under the skin and cause serious injury or death. If leaking fluid penetrates skin, immediately seek medical assistance in order to prevent the risk of serious infection.

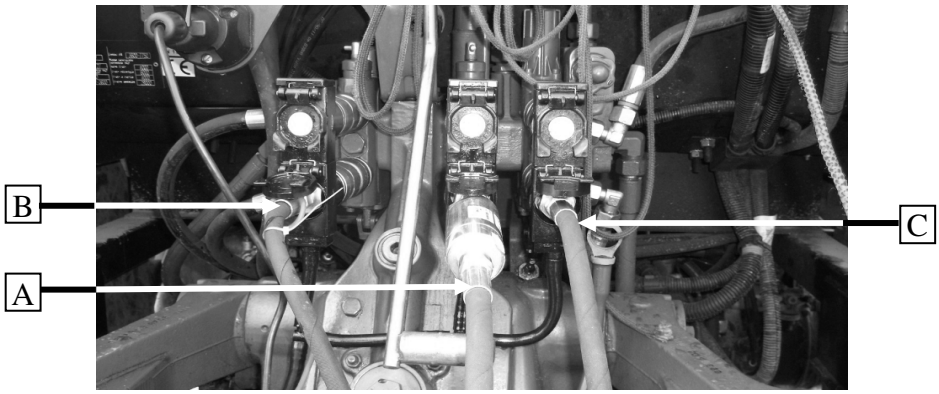


Fig. 14b. Attaching hydraulic cords tractor – mower

5.1.1.2. Mowers fitted with controller

In all models of mowers fitted with controller, one hydraulic hose is used for connecting the mower to the tractor. The hose has filter (**Fig. 14b** hose **A**). In such mowers it is enough if the tractor has one floating hydraulic section available.

5.1.1.3. Mowers without controller

In all models of mowers without controller, three hydraulic hoses are used for connecting the mower to the tractor (**Fig. 14c**). Hose **A** (**red**) with ball valve is used for lifting of cutting units to transport position and for setting pressure in support assembly. It should be connected to the floating section of the tractor. Hose **B** (**green**) with choke valve is used for lifting of left cutting unit on headlands, and hose **C** (**yellow**) also with choke valve is used for lifting of right cutting unit on headlands. In such mowers it is enough if the tractor has three pairs of hydraulic outputs (one with free oil flow).

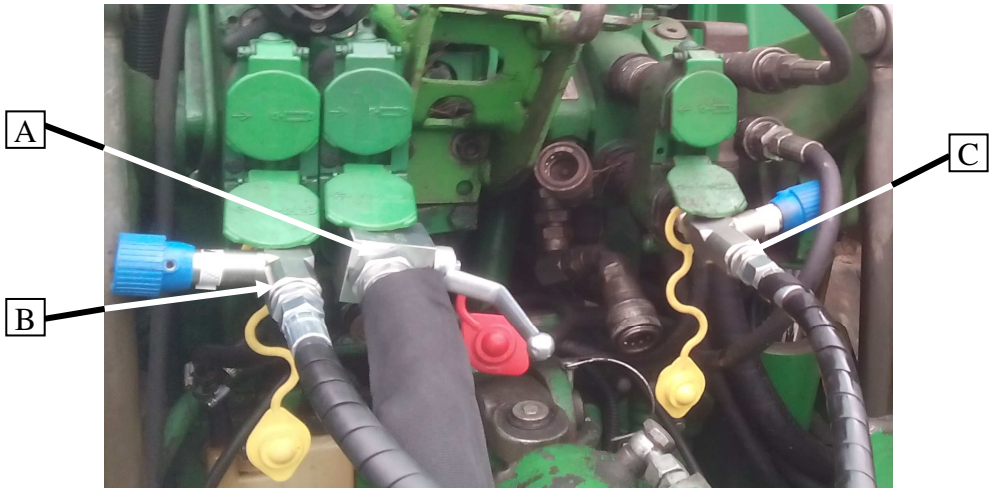


Fig. 14c. Connecting hydraulic hoses to tractor from mower with conditioners/rollers in version without controller

5.1.2. Mounting PTO shaft

PTO shaft's end with overrunning clutch should be mounted on mower's side.

When connecting PTO shaft between tractor and mower make sure that external guard tube of the shaft is on the tractor's side. The PTO shaft plastic guards have to be secured by fastening their small chains to immovable parts of tractor and mower. The PTO shaft must operate at the lowest possible angle. This will ensure that both shaft and the machine last as long as possible.

NOTICE:

If need be, shorten the PTO haft according to its operator's manual given by the shaft's manufacturer (**Fig. 15**).

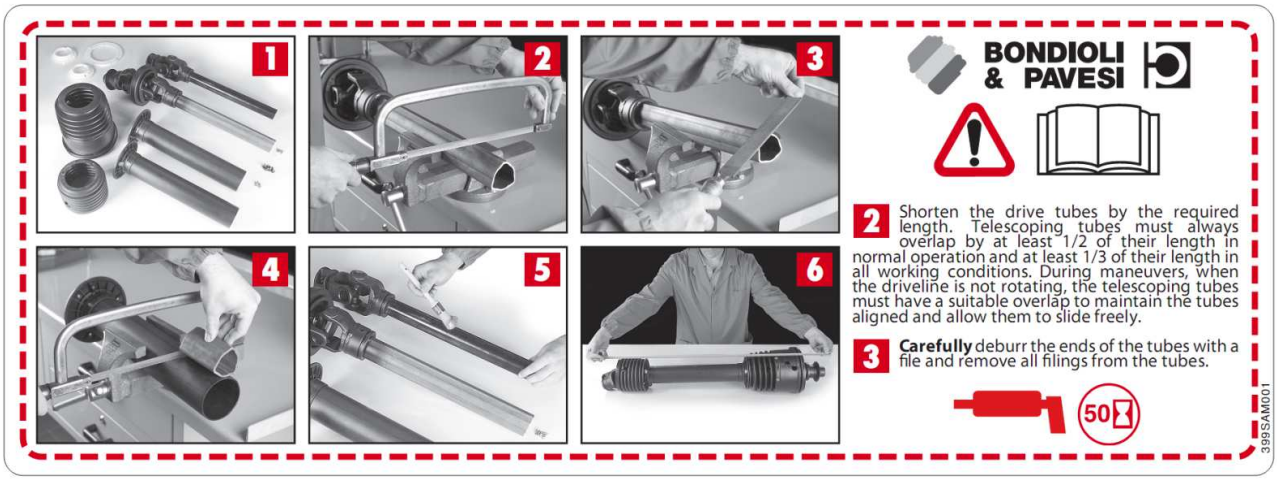


Fig. 15. Instruction of PTO shaft shortening

WARNING!

Handle all parts with utmost care. Never place your hands or fingers between one part and the other. Wear safety clothes such as gloves, protective footwear and goggles. The operation of shortening must be carried out with the utmost care as the PTO shaft will have to be replaced if the telescopic shafts are shortened to an excessive extent.

WARNING!

The PTO shaft should be mounted only during operation time and disconnected from tractor PTO for transport and service.

NOTICE:

The manufacturer declines all liability for damage caused by an incorrectly fitted or used PTO shaft.

WARNING!

Use the machines with PTO shafts designed to drive them. Before the work begins, check the safety guards (in tractor, mower and PTO shaft), if they are placed correctly and are not damaged. Damaged or lost parts must be replaced with genuine ones. Make sure the PTO shaft is properly mounted. It is forbidden to approach the rotating parts, because it may lead to serious injuries or even death. All service and repair operations must be done only after the tractor engine has been stopped and ignition key off, all rotating parts have come to the complete standstill and the cutterbar is on the ground. Before the operation begins, read operator's manuals of both the machine and PTO shaft.

5.2. Control panel

Controlling the mower is performed with use of one of the tractor's hydraulic sections and control panel located in the tractor's cabin. The action to be performed is chosen by the operator with buttons on the panel which controls the tractor's hydraulics. Push the button (**1**)  (**Fig. 16**) in order to enable controlling. Pushing the button is signaled with a diode located over the button.

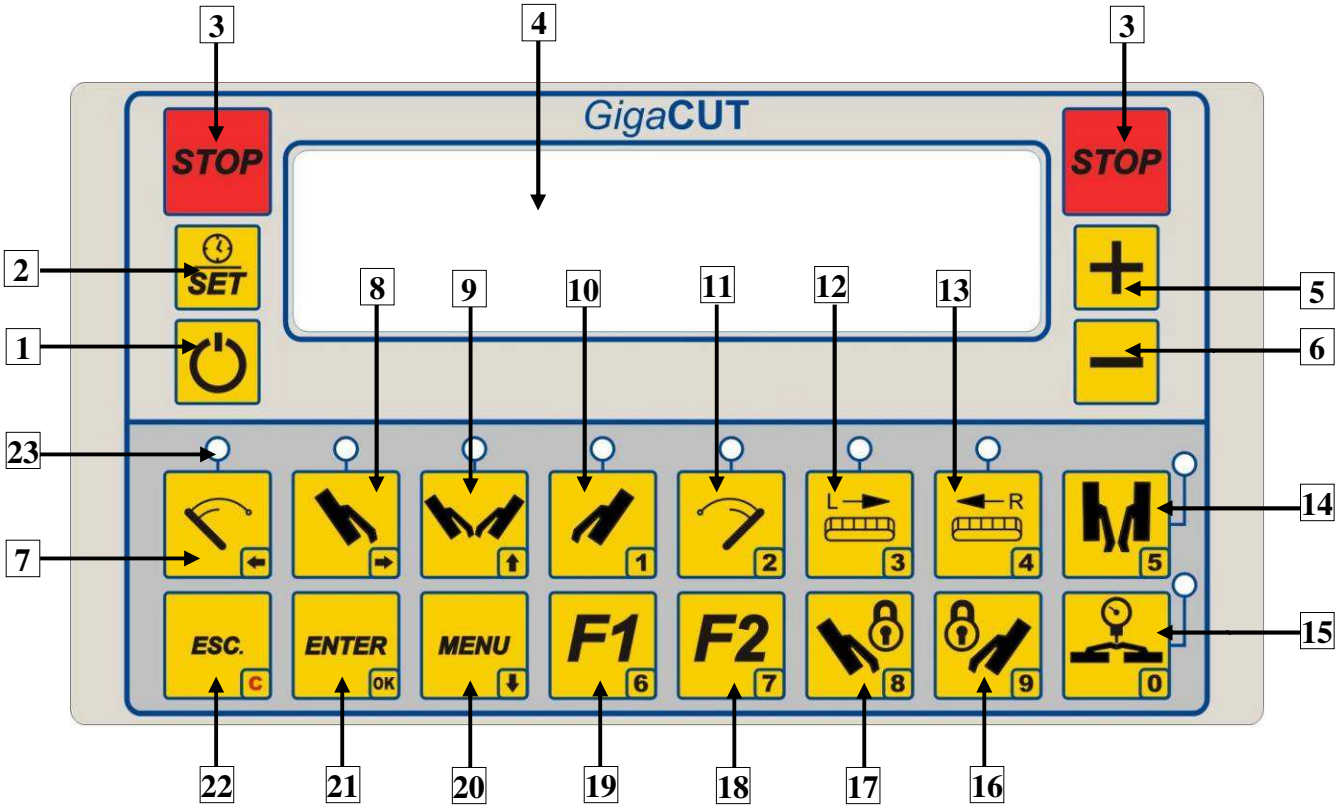


Fig. 16. Control panel – functions

1. Control on/ off switch
2. Time display
3. Control emergency stop – restart of the control will follow after F1 (**19**) and F2 (**18**) buttons are pressed at the same time
4. Information screen
5. Increasing rotary speed of conveyors
6. Decreasing rotary speed of conveyors
7. *Disabled button*
8. Lifting to headlands of left cutting unit
9. Working position for driving on headlands
10. Lifting to headlands of right cutting unit
11. *Disabled button*
12. Left conveyor starting
13. Right conveyor starting
14. Transport position
15. Pressure modification in unloading system
16. Right cutterbar locking
17. Left cutterbar locking
18. Function button F2 to cancel emergency mode
19. Function button F1 to cancel emergency mode
20. The menu
21. Menu navigation button
22. Menu navigation button
23. Information diode

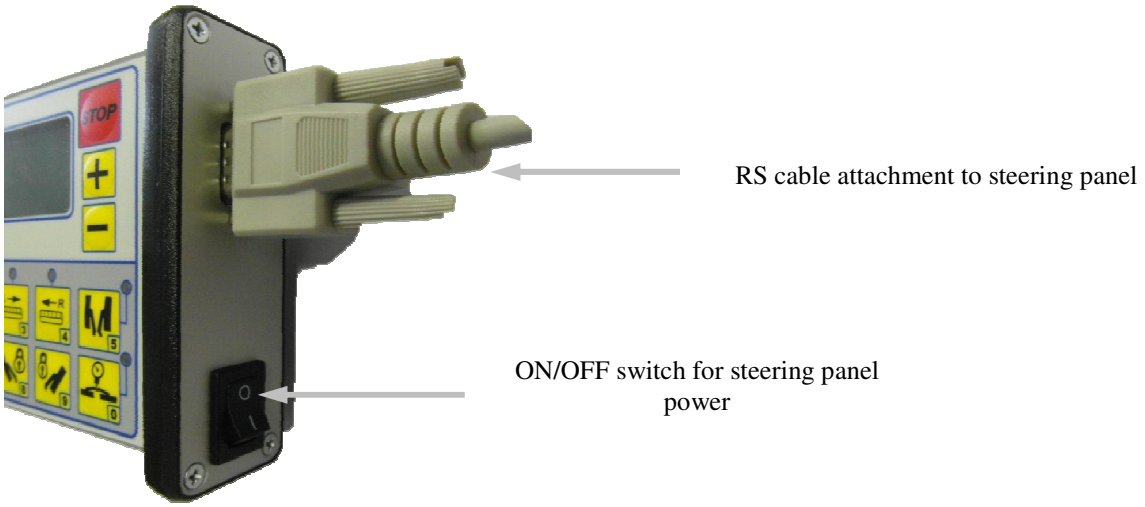


Fig. 17a. Steering box

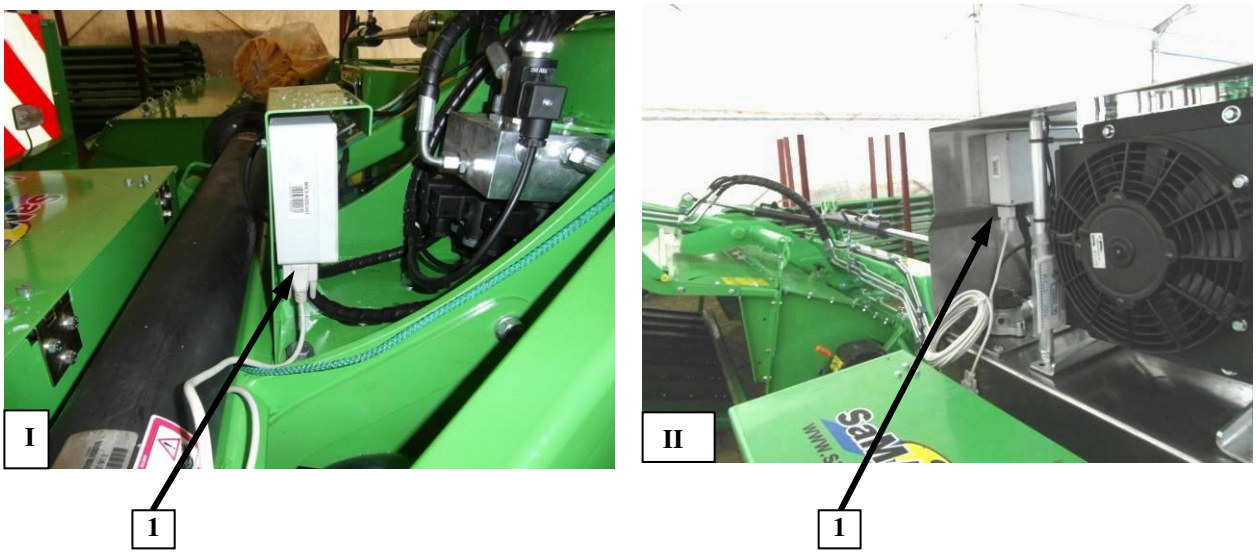


Fig. 17b. Placement of steering box and cable attachment socket RS (**1**) on KDD mowers, I – mowers without belt conveyors, II – mowers with belt conveyors

5.2.1. Setting mower in transport position on headlands

In order to set the mower in transport position on headlands push button (**1**) and (**9**) on control panel **(Fig. 16)**.

In order to use one of the cutting units, e.g. right one, lift both of them to transport position on headlands using button (**9**) , while using the lever to control the tractor's external hydraulics and lock the left one against falling with button (**8**) . Right cutterbar is protected against falling with button (**10**) .

Protection of the chosen cutterbar is signalled with a red diode located over the button which corresponds to the cutterbar. In order to unlock particular cutterbar push either of buttons (**8**) or (**10**) again – unlocking cutterbar protection is then signalled by dimming of the red diode.

5.2.2. Setting mower in vertical transport position

In order to set mower in vertical transport position (**Fig. 17**) push button (**14**) , while using the lever to control the tractor's external hydraulics. If near the end of lifting phase the cutterbars are stopped and mechanical protection devices are not locked then increase pressure in unloading system. To perform this push button (**14**) again (disabling is then signalled by dimming of the green diode), push button (**15**) and continue setting the mower in transport position until mechanical protection is locked. Next disable control with button (**1**) .

To lift only one cutterbar, e.g. the right one for any height just push button (**16**) and to lift the left one only push button (**17**) . The lifted units can be locked in their current positions by pressing the buttons for lifting twice.

5.2.3. Starting the conveyer's belt

To turn rears of conveyor's belt and start left conveyor (**L**) press button (**12**)  until the diode lights up. Analogically, when button (**13**)  is pressed, the corresponding diode is lit up, which starts the right conveyor (**R**). Turning conveyors off is possible owing to pressing again the buttons responsible for turning conveyors in **Fig. 16**. Rotations of conveyors' belts are adjusted with button (**5**)  - causing increase in speed of belt rotation or button (**6**)  - causing reduction in swath conveyors' rotation speed.

5.2.4. Changing language version of control panel

On the control panel, it is possible to change language version for descriptions of the displayed options. In order to change, press button **MENU** (**20**)  . . Navigation through the option list is performed by means of buttons (**9**)  and (**20**)  . To confirm your choice, use button (**21**)  . Press button (**22**)  to leave the options menu.

5.2.5. Service mode

When service mode is selected from the control panel, it is possible to check the mower's serial number and work time, i.e. machine's man-hour time. To run service mode, turn off the panel, and press buttons (**1**)  and (**2**)  at the same time until information is displayed on the information screen (**4**). To exit the service mode, turn off the panel and on again with power switch (**Fig. 17a**).

5.3. Simplified control panel

The control system comprises controller, controls (sensors, solenoid valves, etc.) installed on the machine and control panel (**Fig. 18**).

On the upper wall the panel has **ON/OFF** switch (allowing for its switching on/off), display and 7 buttons.

During normal operation with two cutterbars (no selected function on the controller), the operator handles only the section of distributor to which the main hydraulic system of the machine (section with floating function) is connected. After the distributor lever is switched oil is fed to the machine control system which results in lifting of its cutterbars to headland position. After the distributor lever is switched back to the floating position, the cutterbars are lowered to to working position. To using functions, select a corresponding function on the controller and then switch the distributor lever on the tractor, select a corresponding function on the controller and then switch the distributor lever on the tractor..

If the machine is equipped with hydro unloading system to adjust it use the lever of the other distributor on the tractor to which the unloading system was connected.

After enabling the control panel with **ON/OFF** switch, on the display red decimal point will flash in the last position indicating that power supply is fed and the controller is ready for operation.

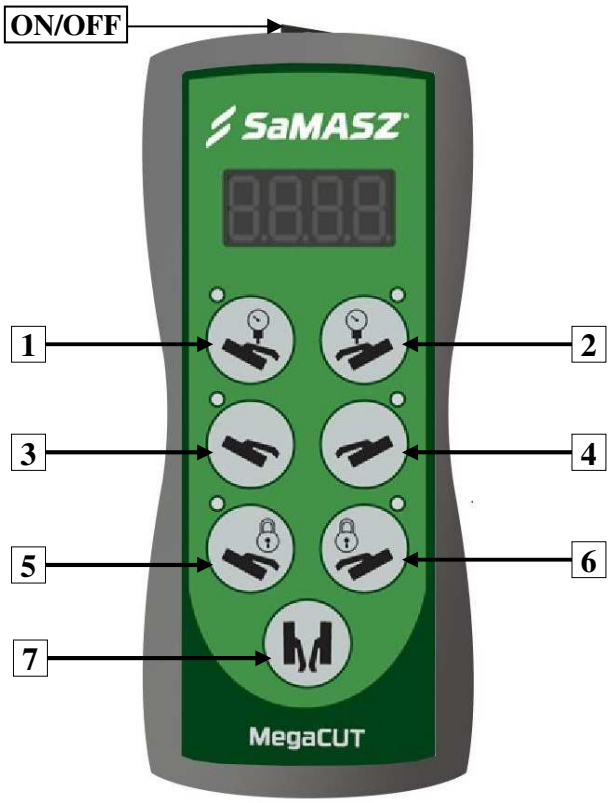


Fig. 18. Simplified control panel – description of functions

Function 1. Setting pressure in unloading system of left cutterbar
Function 2. Setting pressure in unloading system of right cutterbar
Function 3. Lifting to headlands of left cutterbar
Function 4. Lifting to headlands of right cutterbar
Function 5. Left cutterbar locking
Function 6. Right cutterbar locking
Function 7. Lifting cutterbars to transport position

NOTICE:
The correct control of the machine depends on a properly operating electricity in the tractor.

I. OPERATING MODE

5.3.1. Setting pressure in unloading system

Automatic loading of pressure in loading system of cutterbars to a setpoint is carried out after pressing button (**1**) (for **left cutterbar**) or button (**2**) (for **right cutterbar**) which is indicated by corresponding diode flashing red. To set any unloading pressure value, press and hold button (**1**) (for **left cutterbar**) or button (**2**) (for **right cutterbar**) which is indicated by corresponding diode turning red.

NOTICE:

Function 1 or 2 can be enabled only if cutterbar lock is not enabled (diodes at button **(5)** or **(6)** should be off).

When filling accumulators the display shows current pressure value, e.g. **"**P120**"** (120 bar). After reaching a default value loading will stop automatically. After button (**1**) or (**2**) is pressed again, function 1 or function 2 is disabled.

NOTICE:
If the pressure reduction in automatic mode is not possible, perform this operation in manual mode.

5.3.2. Lifting of cutterbars to headlands

After button (**3**) or (**4**) (diode will light up green) is pressed only **left cutterbar** or **right cutterbar** can be operated (lifting to maximum to headland position), e.g. to pass an obstacle. After button (**3**) or (**4**) is pressed again (diode will turn off) the controller will return to its previous condition (possibility of operating two cutterbars).

NOTICE:
Function 3 can be enabled on condition the **left cutterbar** is not locked (diode at button **(5)** is off).
Function 4 can be enabled on condition the **right cutterbar** is not locked (diode at button **(6)** is off).

When function 3 is being enabled, function 4 is disabled, and when function 4 is being enabled, function 4 is disabled (if enabled).

5.3.3. Locking cutterbars in lifted position

After button **(5)** (is pressed (diode blinks red) **left cutterbar can be locked** in lifted position during operation with only **right cutterbar**.

After button **(6)** is pressed (diode blinks red) **right cutterbar can be locked** in lifted position during operation with only **left cutterbar**.

After button (diode will turn off) is pressed again the lock will be released and the controller will return to its previous condition (possibility of operating two cutterbars).

When **left cutterbar lock** is enabled (function 5) function 1 is disabled (unloading should be adjusted only when cutterbar is in working position) and function 3. Function 5. (**left cutterbar lock**) has a priority higher than function 3 and thus it is not possible to select function 3 when the lock is enabled.

When **right cutterbar lock** is enabled (function 6) function 2 is disabled. (unloading should be adjusted only when cutterbar is in working position) and function 4. Function 6. (**right cutterbar locks**) has a priority higher than function 4 and thus it is not possible to select function 4 when the lock is enabled.

5.3.4. Lifting cutterbars to transport position

After button **(7)** is pressed, arm position sensors are disabled which allows for folding of the machine to transport position. When function 7 is enabled other functions (if enabled) are disabled and locked, and the display alternately shows the following symbols:  and  .

Lifting of cutterbars to transport position is possible only when PTO shaft rpm is zero (protection against machine damage).

When button **(7)** is pressed again the sensors (cutterbars can be lifted only to headland position) are activated, and thus machine folding to transport position is disabled.

5.3.5. Description of errors

Errors are displayed as "**Errx"** (**x** is error no.) alternately with parameter value. If multiple errors occur at the same time, they are displayed sequentially, e.g. for errors 1, 3 and 5: **Err1 -> 750 -> Err3 -> 650 -> Err5 -> P30** etc.

Tab. 5. Possible displayed errors

Error:	Cause:
Err1*	improper speed of main PTO shaft
Err2*	speed of left PTO shaft below speed of main PTO shaft
Err3*	speed of right PTO shaft below speed of main PTO shaft
Err4	too low pressure in unloading system of left cutterbar
Err5	too low pressure in unloading system of right cutterbar

* Errors concerning PTO speed (**Err1, Err2, Err3**) are registered and displayed only if speed of main PTO shaft is greater than 600 rpm.

II. PARAMETER PREVIEW MODE

5.3.6. Work parameter overview

To enable work parameter preview turn on the controller with **ON/OFF** switch, and then hold button (**2**)  The displayed parameter can be changed by pressing button (**2**)  .

Tab. 6. Work parameters

Parameter:	Opis:
	Current PTO rpm at gearbox input. (90 rpm)
	Current PTO rpm of left cutterbar. (90 rpm)
	Current PTO rpm of right cutterbar. (90 rpm)
	Current pressure in unloading system of left cutterbar. (120 bar)
	Current pressure in unloading system of right cutterbar. (120 bar)
	Changeable working pressure in left unloading system. (120 bar) Values can be changed using button (**3**)  to decrease and button (**4**)  to increase. After button (**1**)  is pressed the set value is confirmed which is indicated by message **"SAFE".**
	Changeable working pressure in right unloading system. (120 bar) Values can be changed using button (**3**)  to decrease and button (**4**)  to increase. After button (**1**)  is pressed the set value is confirmed which is indicated by message **"SAFE".**

To exit work parameter overview function press button (**1**)  .

III. TEST MODE

5.3.7. Controls testing

To test individual controls turn on the controlled with **ON/OFF** switch, and then hold buttons (**3**)  and (**4**)  simultaneously. The display will show message "**tESt**".

a) Solenoid valves test

Pressing and holding the button will enable the solenoid valve as described below:

- button **(1)**  will enable solenoid valve **EZ_1**;
- button **(2)**  will enable solenoid valve **EZ_2**;
- button **(3)**  will enable solenoid valve **EZ_3**;
- button **(4)**  will enable solenoid valve **EZ_4**;
- button **(5)**  will enable solenoid valve **EZ_5**;
- button **(6)**  will enable solenoid valve **EZ_6**;
- button **(7)**  will enable solenoid valve **EZ_7**.

b) Sensors test

After a given sensor is enabled LED at the button will light up as described below:

- button **(1)**  - main PTO sensor is enabled;
- button **(3)**  - left PTO sensor is enabled;
- button **(4)**  - right PTO sensor is enabled;
- button **(5)**  - left arm pressure sensor is enabled;
- button **(6)**  - right arm pressure sensor is enabled.

NOTICE:
Arm position sensors will be enabled after a magnet is approached to a given sensor, and PTO sensors will be enabled after a metal part is approached.

NOTICE:
Pressure sensor testing is possible only when filling hydraulic accumulators. The displayed active value should be compared to pressure gauge indication.

To exit controls testing function turn off the control panel with **ON/OFF** switch.

5.4. Preparing the mower for transport – version without controller

To prepare the mower for transport and to meet safety precautions, please do the following:

- when swath conveyors are not lowered, lower them and lock with cotter – for mowers fitted with swath conveyor (label N-115, N-60),
- lift the mower with a hydraulic lift, so that the tractor's lower links are about 30 cm from the ground (**Fig. 21**),
- lift support feet **S** and secure them with cotter (**Fig. 19**),
- fold side safety curtain to reduce the total transport height,
- by means of hydraulic cylinders lift the cutting unit to a vertical position until pawl **Z** is locked (**Fig. 13**),
- lower the transport height on the tractor links, so it does not exceed 4 m (**Fig. 21**),
- the mower is equipped with service-free transport lock (**Fig. 20**). Failure to secure the lock may cause damage to PTO shafts.

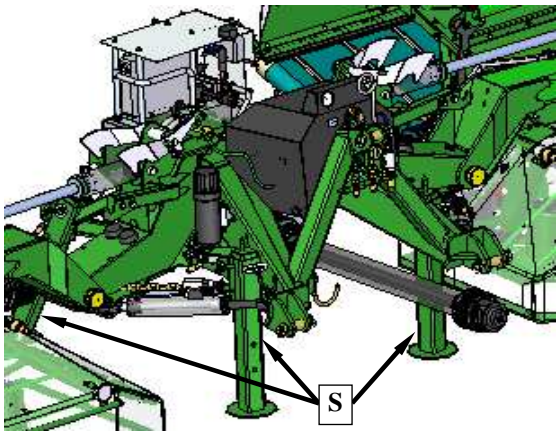


Fig. 19. Support legs

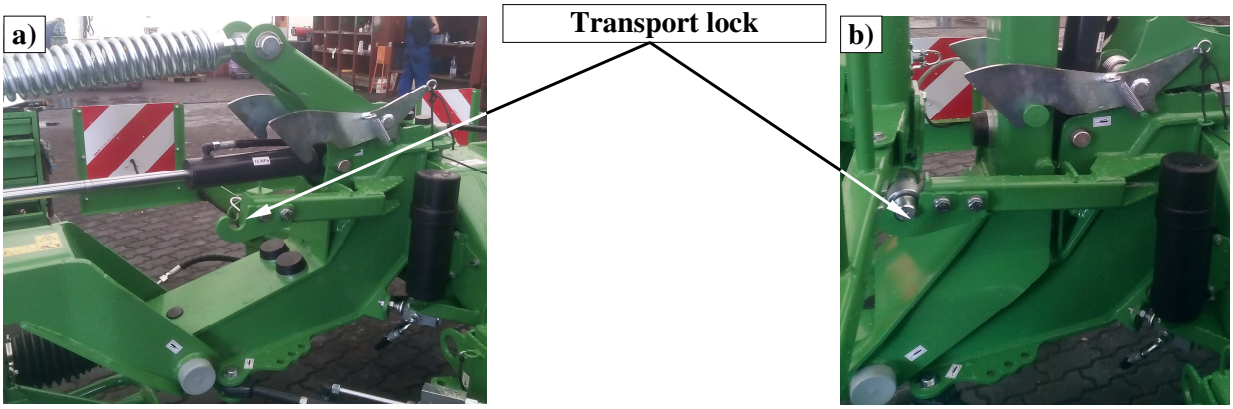


Fig. 20. Transport lock: a) Operating position (mowing), b) Transport position with lifted mower

Before transporting your mower in upward position, side safety guard must be lifted.

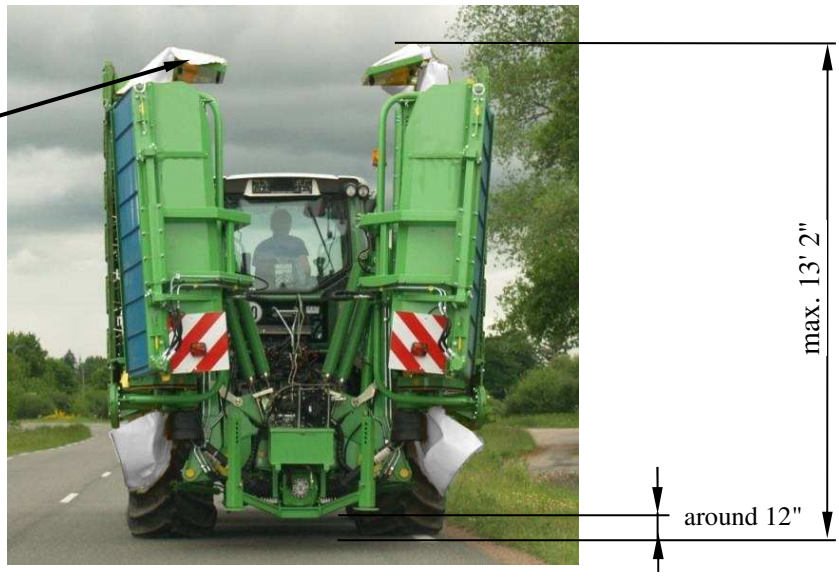


Fig. 21. SaMASZ double-sided mower in its transport position

WARNING!

Once the machine is lifted to transport position, check whether mechanical locking pawls are properly locked on pins.

5.5. Preparing the mower for transport on public roads

WARNING!

Legal requirements for transport on public roads may differ from state to state. Check your location's requirements and comply.

To comply with safety precautions concerning transport on the public roads the mower should be equipped with the following devices:

- warning light plates fixed on the mower's or conveyors' frame. The panel consists of warning plate with combined lamp mounted (parking, stop lights and driving direction) and with red reflectors facing the rear and white light on the front,
- warning triangle which can be put into holder on top mower guard.

WARNING!

Do not drive on public roads if the machine's transport height is more than 13' 2" (when transported, transport height should be lowered on the tractor links – **Fig. 21**).

Also check whether the machine does not exceed maximum permissible values (weight, axle load, towing device load, etc.) according to valid regulations.

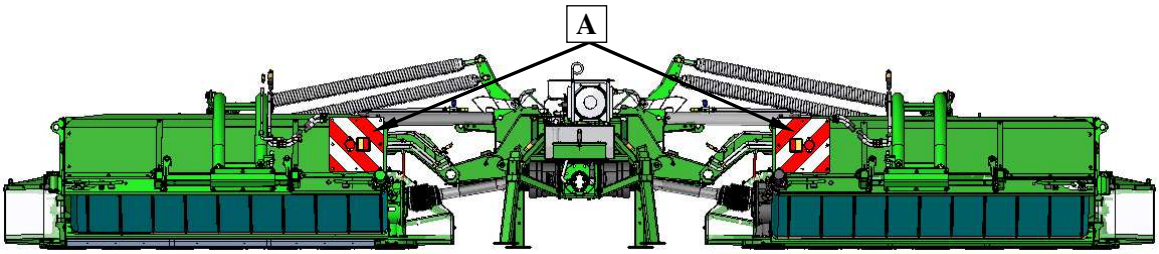


Fig. 22. Portable warning light plates

5.6. Moving from transport to operating position

WARNING!

Moving the mower to and from operating position from the transport position should only take place on even and stable ground. Prior to making the moves make sure whether there are no unauthorized persons exposed to any hazardous moving parts.

To safely move to the operating position, do the following:

- open the shut-off valve on the hydraulic cylinder,
- lower the mower until the cutterbar is at least 1' 8" above the ground,
- make sure there is nobody in the place where you are going to lower the mower,
- tighten the cord until the lock **Z** is released (**Fig. 13**) and using the hydraulic cylinder put the mower into a horizontal position,
- using the tractor's lever, slowly lower the cutterbar to the horizontal position,
- unblock the lock and lower the mower until the cutterbar touches the ground,
- fold side safety curtain,
- by means of link **C** (**Fig. 12**), adjust the cutting height. Extending the link **S** increases the cutting height and shortening the link reduces it.

5.7. Preparing mower for operation – mower with hydro-pneumatic support

NOTICE:

Before sale SaMASZ protects the cylinders with special grease against weather which may cause premature wear. Before operating the mower, remove the excess grease from the cylinders.

Increasing pressure – lower impact on the ground.

Reducing pressure – bigger impact on the ground.

IMPORTANT: If the pressure supporting the assembly of the cutterbars is too high, the cutterbars will not be able to lowered.

IMPORTANT: Too low a pressure in suspension disables the machine to be set in transport position. If locking pawl is not caught when mower is being switched to transport position, then increase pressure in suspension.

NOTICE:

Improperly relieved cutting unit of the mower will cause increase of cutterbar pressure on the ground which will lead to faster wear of sliding skids, overload of cutterbar, higher fuel consumption, damage to the stubble and contamination of the fodder.

5.7.1. Mower version with controller

Engaging mower's drive should be performed once cutterbar is placed on the ground. The following should be performed in workplace and as mower is in operating position:

- hang the machine on the 3-point linkage. Connect hydraulic hoses, control panel power cord and signal cable RS 232,
- lower cutterbar so it touches the ground,
- connect PTO shaft extension of the tractor rpm (unless only one extension was taken out or connect the complete PTO shaft),
- optimal angle of cutterbar in relation to the ground should be between 0° and 5°. This angle is result of tightening or extending the link. The same principle applies to mowers equipped with conditioner or rollers,
- slowly engage the mower drive until cutting disks reach their nominal PTO rotating speed of 950 ÷ 1000 rpm. Rears should be considerably lower, so that tractor's fuel consumption can be reduced.
- engage proper tractor gear and start mowing. Even meadows can be mowed at any driving speed, however as unevenness occurs the speed should be reduced.

Engaging mower's drive should be performed as cutterbar is on the ground, so that oil fills the cutterbar. In workplace and as mower is in operating position, it should be set pressure in unloading system.

In the case of a mower equipped with the control panel in **Fig. 16**, perform the following actions:

- start control panel,
- lift mower on tractor's 3-point linkage up in order to eject cylinder rod to maximum out the cylinder,
- then press button (**15**)  on control panel to set pressure in hydro-pneumatic assembly,
- using tractor's hydraulic valve lever set the pressure until mower's cutterbar is slightly chattered,
- turn off button (**15**)  on control panel,
- set mower in working position.

In the case of a mower equipped with a simplified control panel (**Fig. 18**), proceed in accordance with point **5.3.1**.

5.7.2. Mower version with controller

The following should be performed in workplace and as mower is in operating position:

- hang the machine on the 3-point linkage,
- lower cutterbar so it touches the ground using three hydraulic outlets of the tractor (see p. 5.1.1.3),
- optimal angle of cutterbar in relation to the ground should be between 0° and 5°. This angle is result of tightening or extending the link. The same principle applies to mowers equipped with conditioner or rollers,
- slowly engage the mower drive until cutting disks reach their nominal PTO rotating speed of 950 ÷ 1000 rpm. Rears should be considerably lower, so that tractor's fuel consumption can be reduced,
- engage proper tractor gear and start mowing. Even meadows can be mowed at any driving speed, however as unevenness occurs the speed should be reduced.
- lift mower on tractor's 3-point linkage up in order to eject cylinder rod to maximum out the cylinder and the cutterbar should touch the ground,
- using tractor's hydraulic valve lever (connected with red hose **A** (**Fig. 14c**), set the pressure until mower's cutterbar is slightly chattered,
- lift the mower on the three-point linkage of the tractor up about 30 cm above the ground.

5.8. Preparing the mower for work – mower with support springs

Put the mower into operation when the cutterbar is on the ground so that oil can fill the whole cutterbar. When the mower is in working position, please do the following:

- be sure cutterbar is on the ground,
- connect PTO shaft between tractor and mower by means of the tractor's external hydraulics,
- by means of upper regulating bar of the mower, adjust the cutterbar's height and inclination towards the ground. Proper inclination of the cutterbar is between 0° and 5°. It is regulated by extending or shortening the bar,
- you can operate either with or without belt conveyors. If an operator is willing to work without belt conveyors, they must be lifted by means of the tractor's hydraulic system. Before lifting, the cotter pin must be unblocked,
- slowly engage PTO clutch and wait until the cutting unit reaches its rated speed. DO NOT exceed 950 - 1000 rpm. Tractor's engine rpm should be considerably lower, so that the fuel consumption could be reduced,

- engage tractor gear and drive slowly into grass field. Flat meadows can be mowed with any speed. If the meadow is uneven, reduce speed.

WARNING!

Do not operate the conveyor when it is in vertical position (**Fig. 23b**).

Fig. 23. Operating either with (a) or without belt conveyors (b).

NOTICE:

DO NOT pull the cutterbar towards the tractor, because it will lead to cutterbar's premature wear or even its damage.

5.8.1. Regulation of cutterbar's pressure on the ground by means of support springs

Pressure on the ground is regulated by changing the tension of support springs.

Decreasing the pressure of the cutterbar on the ground is done by increasing the tension of the support springs from moving the lock in the next hole on the rod towards the springs (**Fig. 24**). Increasing the cutterbar's pressure on the ground is done by decreasing the tension of support springs from moving the lock towards the rod's end.

Regulation may only be performed when the machine is in vertical position (**Fig. 27**).

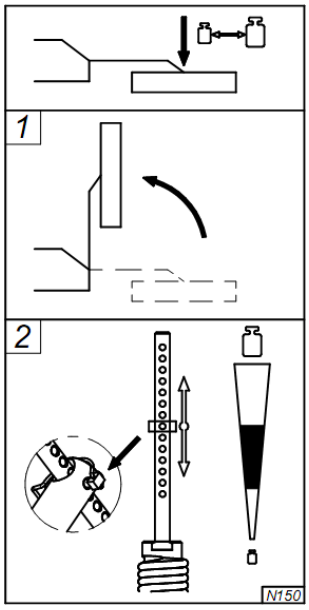


Fig. 24. Regulation of support springs

5.9. Operation (mowing)

WARNING!
The operator must be seated in the tractor's driver's seat when the machine is operating since only from that position is he able safely and properly operate the mower. Before he leaves the driver's seat, the operator must stop the engine, apply the parking brake and turn off the tractor engine.

Always use appropriate protective equipment (safety footwear, gloves, ear protection and dust mask).

Before using the machine, make sure that all the safety devices are in their correct positions and in a good condition. These safety devices must be immediately replaced if they are faulty or damaged.

In particular, the protective cover must be checked regularly. It must be immediately replaced if it is missing or damaged in any way.

IMPORTANT: If a disc mower is your first experience (you have mowed with 2-drum mower), you need a piece of essential information:

1. Main advantage of disc mowers is their small power demand – 20% less tractor power, small moment of inertia and possibility to manufacture mowers with large working width.
2. There is however a certain disadvantage - creased stubble, especially when it comes to lying grass. Straight grass may be mowed with horizontal adjustment of the mower and then the stubble will be even, but it will not look as attractive as with 2-drum or 4-drum mowers, because the knives work horizontally to the ground and inclined grass bends because of wind blasts. After the grass is mowed, it stands up, which makes an impression of inaccurate mowing.

   Every mower may leave stripes of uncut grass when it comes to the knives which cut the grass towards the grass direction.

   It is a normal phenomenon. Practically, it is not possible to achieve such attractive stubble as in

   2-drum mowers, because the knives work horizontally or at an angle of up to 8° to the ground, and when it comes to 2-drum and 4-drum mowers, slantwise through the ground (even 23°).

   Despite these 'disadvantages', disc mowers are 'winning farmers' trust' and modern technologies give an opportunity to manufacture very durable mowers.
3. The most even stubble with very low grasses is obtained with disc mowers when half of the discs rotate to the right and half to the left. A disadvantage of this system is a narrow and thick windrow which needs to be spread out.

5.9.1. Essential information concerning mowing

Optimum work parameters

1. Inclination towards the front 0-5 degrees which equates to 5'11" - 2.8" of mowing height.
2. Operation speed around 10 km/h or more, if the conditions allow.
3. PTO rpm = 950-1000 rpm. PTO rpm less than 1000 may cause stripes of uncut grass between the disc.

High and inclined grass

1. Heighten the cutterbar's inclination to H = about 5'11"".
2. If there is no inclination the grass will be wedged on the forming drums.
3. Speed can be more than 12 km/h (the faster – the better)
4. Do not turn in the mowed grass.

- Optimum inclination of the cutterbar towards the ground is between 0° to 5°. If the inclination exceeds 5°, there might be a slight unevenness of mowed grass. It impairs slightly the quality of mowing and has an influence on the mower's operation. When the cutterbar is pulled in the other direction, it significantly impairs the quality of mowing and in some cases the mower stops mowing. Besides, it may lead to premature wear or even damage of the slides and cutterbar.
- When high grass prevails, first and second cut should be mowed at height level 2.4" - 2.8", but when the grass grows low it should be mowed at 2". The last cut should be mowed a little bit higher, 2.8" - 3" above the ground.
- Too high a PTO rpm whirls the air, which may cause inclination of the grass in front of discs, which impairs the quality of mowing.
- Too low a PTO rpm impairs the quality of mowing and in some cases the mower stops mowing (too low linear velocity of the knife).
- In contrast with 2-drum mowers, straight mounting of the mower and full speed are not always possible. Adjust inclination of the mower, PTO rpm, speed and correctness of knife-mounting to get the best results.
- In case of mowing soft meadows, the pressure of the cutterbar on the ground should be reduced by adjusting support springs.
- Always check to make sure that the ground speed suits the conditions or work and that it does not create a potential source of danger
- Do not take sharp turns anytime and do not operate in reverse.

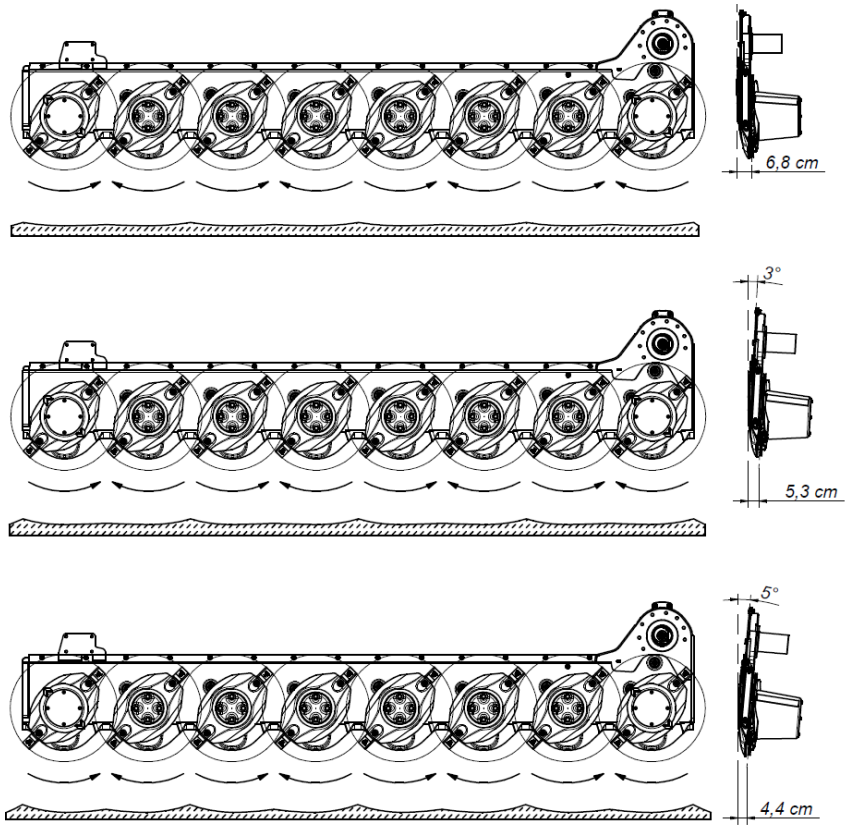


Fig. 25. Shape of the stubble with cutterbar's inclination 0°, 3° and 5°

5.9.2. Removing clogging and jams

When operating the mower pay attention to variable conditions on field, which may influence the mower clogging and jams, such as: terrain unevenness, height and density of grass as well as other objects in the grass (stones, branches, piles of soil). In order to avoid clogging and jams, operating speed should be adjusted to the mentioned conditions.

WARNING!

Removing clogs and jams while the machine is in operation can lead to the accident!

In case of machine blockage caused by wrapped material, set the machine on a flat surface, remove excess material using sharp tool. After clearing the machine check if nothing has been damaged.

To remove any clogging it is obligatory to disconnect the drive and the motor, take out the ignition key. When eliminating any clogging on the machine, use also safety means for operator, so protective gloves and tight wear.

5.9.3. Taking turns on headlands

Lift the mower with hydraulic cylinder (Pos. 2 **Fig. 3**) before turning. The mower does not need to be additionally lifted by tractor's 3-point linkage (**Fig. 26**).

Fig. 26. Mower KDD when taking turns

5.10. Detaching the mower from the tractor

WARNING!

While detaching, make sure there is no person in between the mower and the tractor.

To detach the mower from the tractor do the following:

- Turn off the cutterbar drive, tractor's ignition and take the tractor's ignition key out,
- reduce pressure in unloading system,
- lift the machine so it is possible to insert support feet and secure them with cotters,
- lower the mower by means of the tractor's hydraulic assembly and place it on a firm and level ground,
- secure the tractor against free runaway,
- dismount PTO shaft and place it on PTO shaft holder,
- disconnect the machine's hydraulics and wiring system from the tractor,
- disconnect the upper link,
- disengage the machine from hangers of the tractor's lower links by lifting the three-point linkage,
- carefully drive the tractor away.

5.11. Storing

Mower should be stored in paved, dry places, protected against precipitation. In order to minimize the space necessary for storage the mower may be stored in a vertical position (**Fig. 27**) but always on paved surface. Storing the mower on an unpaved surface may cause the mower to lose stability and turnover.

NOTICE:

When stored for long time (e.g. in winter season), the machine should be in an upright position on paved surface (**Fig. 27**) (with closed cylinders). Storing the mower in a horizontal position may cause faster wearing (rusting) of the cylinder from the inside (through vent valve) by being penetrated by moisture from the air.

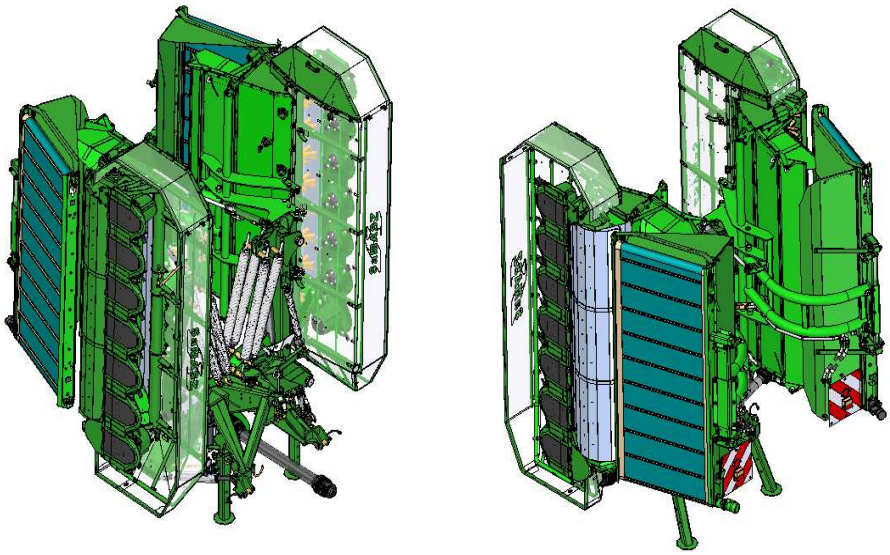


Fig. 27. Double-sided disc mower in its storing position

6. MOUNTING AND ADJUSTMENTS

6.1. Assembling / disassembling main frames

When assembling and disassembling main frames from the mower's linkage, in order to unscrew nuts M20 use a special key (**Fig. 28**) delivered with the mower.

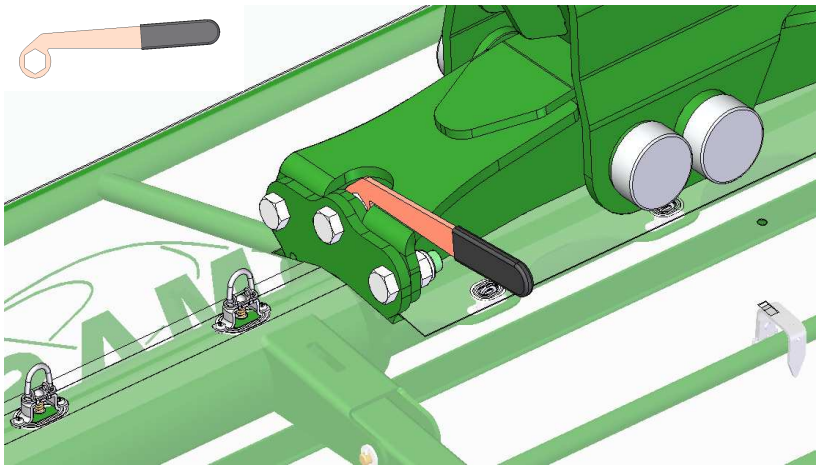


Fig. 28. Key for assembling / disassembling main frames

6.2. Mounting of the knives

The knives should be mounted as shown in **Fig. 29**. Mount the knives so that cutting edges are directed towards the ground, so that a knife lifts the grass after cutting.

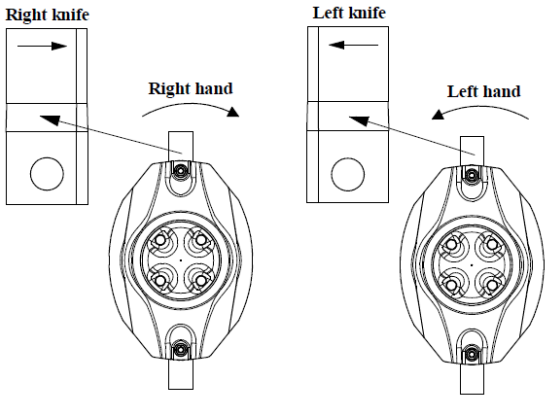


Fig. 29. Mounting of the knives on mowing discs

WARNING!

- Use only SaMASZ-provided cutting knives.
- Condition of knifes should be inspected before any operation.
- Do not use damaged or worn elements due to the risk of throwing objects.
- Damaged or worn elements are dangerous.

6.3. Checking the knives and knife mountings

All knives should have the same lengths and weights. Replace them, if necessary, only in sets. Make sure all knives in a set are of the same length and weight.

Knife mounting cannot be worn more than provided in **Fig. 30**. If knife mounting is worn too much, it should be replaced.

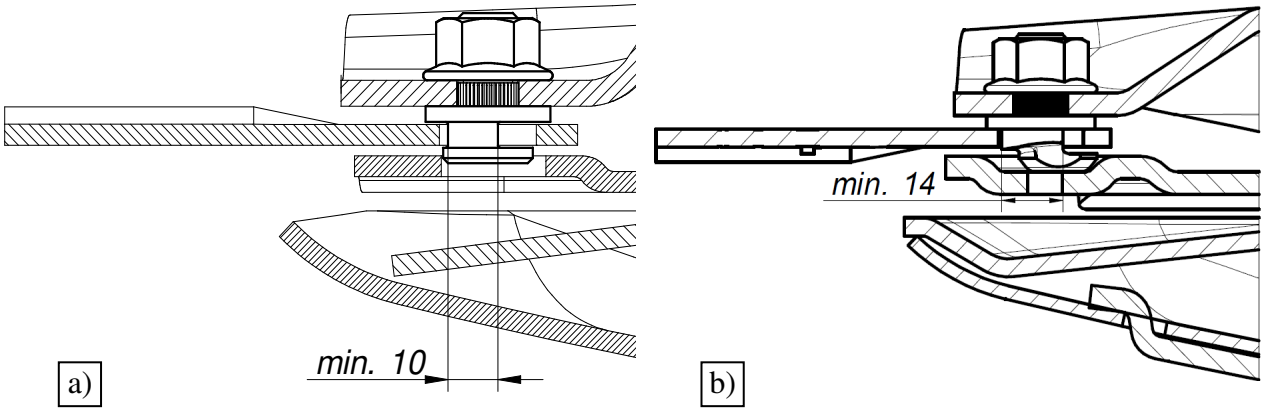


Fig. 30. Permissible wear of knife holder pin on disk a) knife base M12 b) knife base M12 with claw

WARNING!

- Use only SaMASZ-provided knife mountings.
- Condition of knife mountings should be inspected before any operation.
- Do not use damaged or worn elements due to the risk of throwing objects.
- Damaged or worn elements are dangerous.

6.4. Replacing the knives and knife mountings

Worn and/or damaged knives should be immediately replaced (**Fig. 31**). Replace knives, if necessary, only in sets. When replacing, carefully inspect a knife mounting. If knife mounting (**Fig. 30**), is worn, immediately replace two mountings.

NOTICE:

When operating pay attention whether there are no excessive vibrations of the mower which may indicate that the disc(s) operate with 1 cutting knife attached only. Long-term cutting with insufficient amount of knives will cause permanent damage to the cutterbar, not eligible for a repair under the warranty. When operating check knives for completeness.

WARNING!

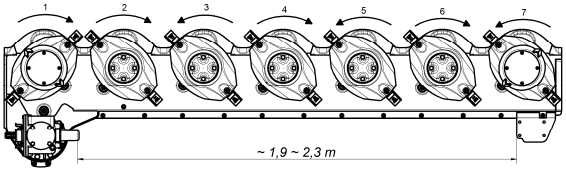
When replacing knives, the engine must be stopped and the cutterbar must lie on the ground. PTO shaft must be disconnected. Discs should be perpendicular to cutterbar.

Fig. 31. Quick replacing of the knives with mounting lever

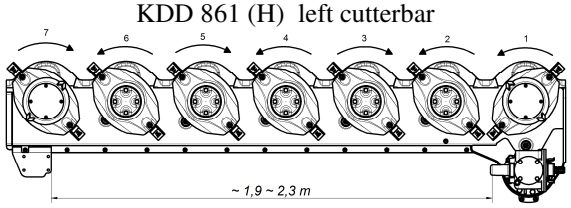
WARNING!

- Due to various windrow widths in the mowers (and therefore various rotation directions of the discs), before mounting the knives check rotation directions of each disc (**Fig. 32**).
- Improper mounting of knives will cause mower's choking. When mounting pay particular attention to knife's free rotation on knife mounting.

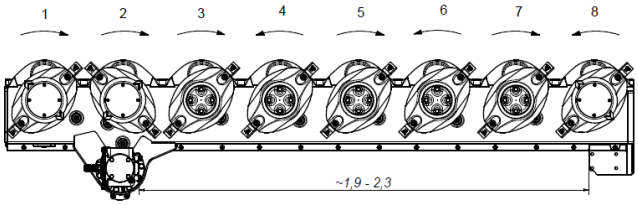
KDD 861(H) right cutterbar



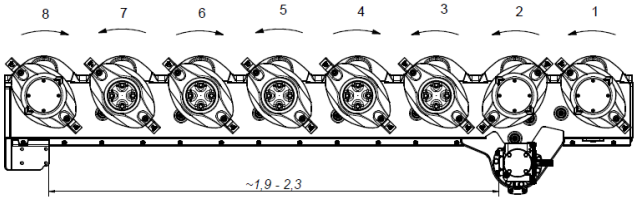
KDD 861 (H) left cutterbar



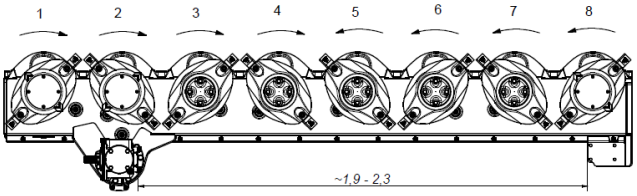
KDD 911 (H) right cutterbar



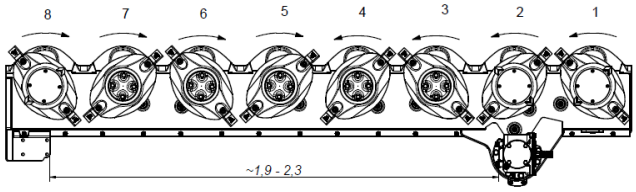
KDD 911 (H) left cutterbar



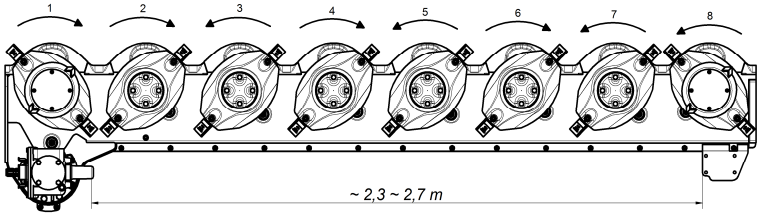
KDD 912 (H) right cutterbar



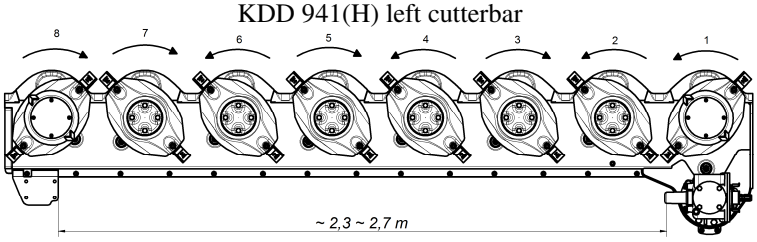
KDD 912 (H) left cutterbar



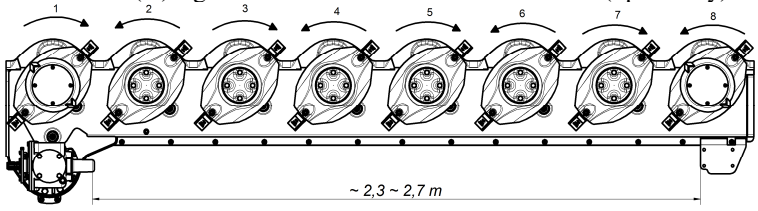
KDD 941(H) right cutterbar



KDD 941(H) left cutterbar



KDD 941(H) right cutterbar – alternate disc rotations (optionally)



KDD 941(H) left cutterbar – alternate disc rotations (optionally)

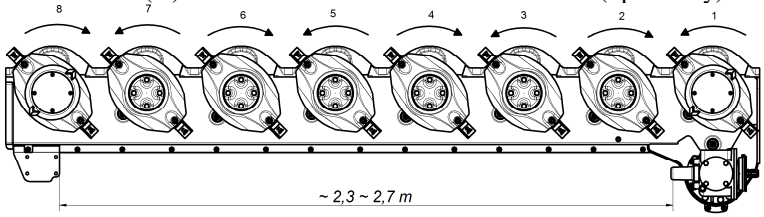


Fig. 32. Rotating direction of disks in each type of mowers

6.5. Adjusting the cutterbar

Swath width is adjusted with swath guides (**1**) mounted on the 3-point linkage frame of the cutterbar (**Fig. 33**).

In order to adjust the guide, the following should be performed (for: KDD 861 (H), KDD 911 (H), KDD 912 (H), KDD 941 (H)):

- loosen locknuts (**2**) and screws (**3**),
- shift the guide arm (**6**),
- tighten screws (**3**) and locknuts (**2**),
- loosen locknuts (**4**) and screws (**5**),
- then adjust shield height and angle (**7**),
- tighten screws (**5**) and locknuts (**4**).

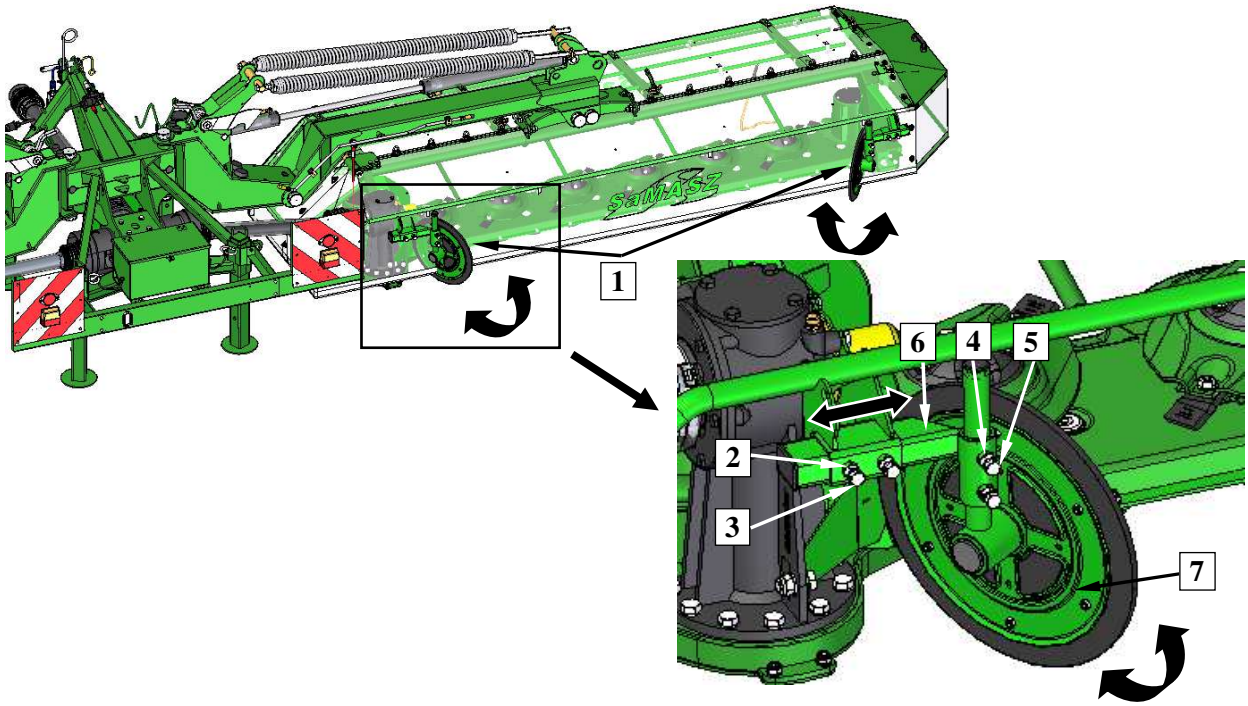


Fig. 33. Adjustment of swath guides: 1 - swath guide, 2 - locknuts, 3- arm adjustment screws, 4 - locknuts, 5- shield adjustment screws, 6- guide arm, 7- shield

In order to set swath width, adjustment of swath guides (**1**) should be performed (**Fig. 34**) (for: KDD S/ST/SL/SLT (H)):

- loosen eye screw (**2**) of the swath guide,
- set the swath guide (**1**) as needed,
- tighten screw (**2**),
- even spreading of swath might be adjusted with wheels (**3**) the same as it is performed with guides.

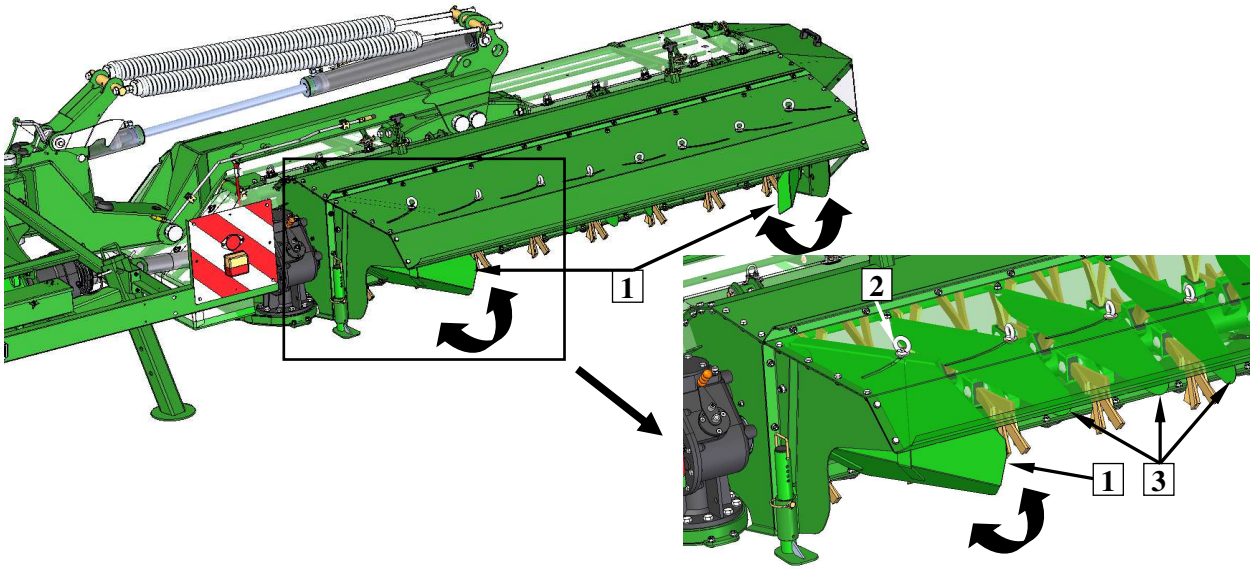


Fig. 34. Adjustment of swath guides: 1- swath guide, 2 - adjustment screw, 3 - swath wheel

In order to set swath width, adjustment of swath guides (1) should be performed (**Fig. 35**) (for: KDD W/WT (H)):

- loosen eye screw (**2**) of the swath guide,
- set the swath guide (**1**) as needed,
- tighten screw (**2**).

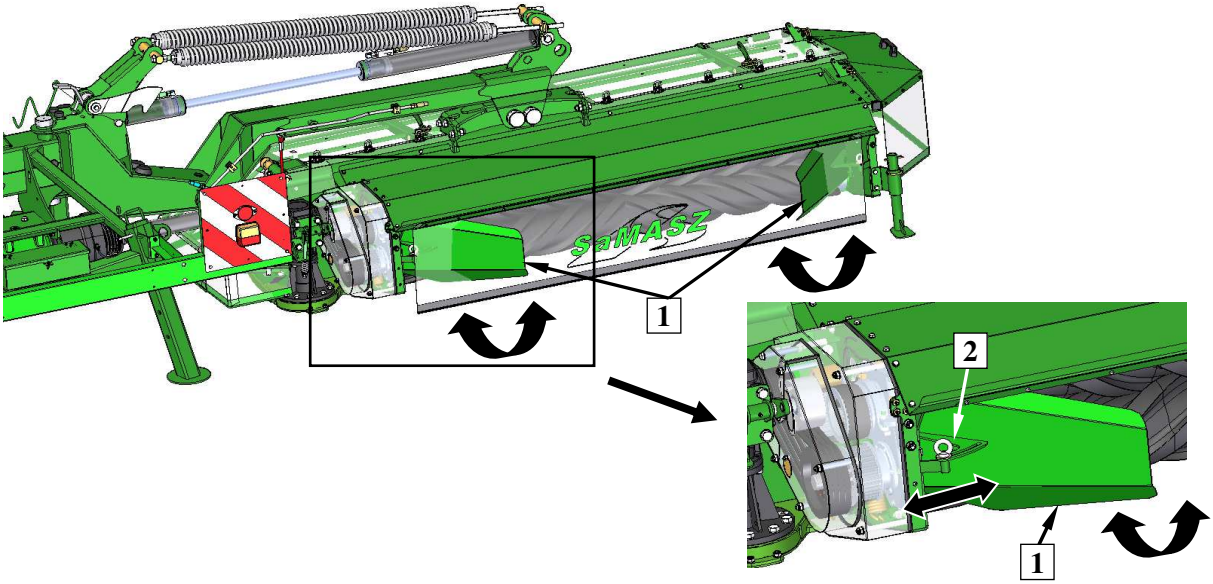


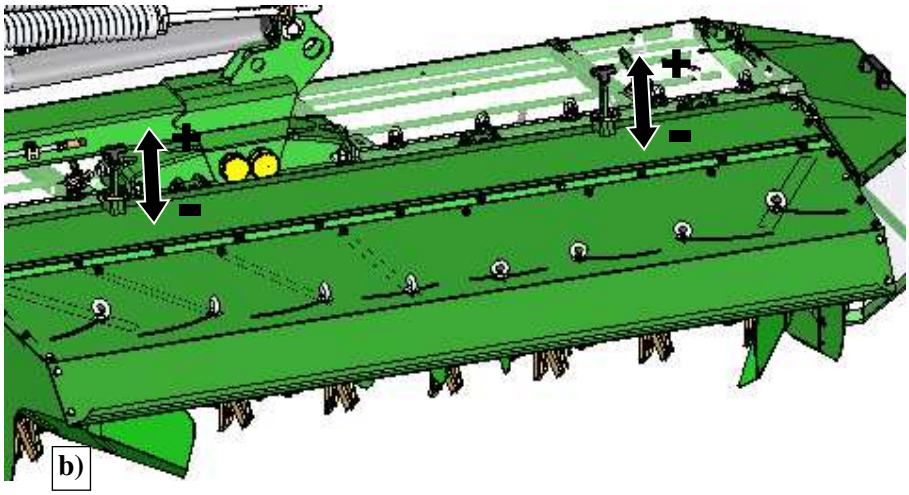
Fig. 35. Adjustment of swath guides: 1- swath guide, 2 - adjustment screw

6.6. Adjusting swath conditioner

6.6.1. Adjusting space between tine conditioner's mask and its shaft

(Models: KDD S/ST/SL/SLT (H))

Depending on size and thickness of the mowing grass, it may be necessary to adjust the conditioner's mask. The higher and thicker the grass, the bigger the space between the conditioner's mask and its shaft should be. A proper setting should be done experimentally so that there is no jamming in the flow of the mowed material and overload clutch of the PTO shaft is not engaged. The mask is regulated as shown in **Fig. 36**.



„+" - increasing plate - conditioner clearance width
„-" - reducing plate – conditioner clearance width

Fig. 36. Adjustment of the tine conditioner's guard

6.6.2. Adjusting conditioner's shaft rpm

Depending on the required intensity of grass conditioning, adjust the conditioner's shaft rotary rate Speed of the conditioner roller can be adjusted between 700 and 1000 rpm using lever A (**Fig. 37**). To increase the shaft's rotary rate, switch lever (**A**) (**Fig. 37**) from **I** to **III**. Set the lever in middle position – **II** – to stop the shaft.

WARNING!

Adjustment should be performed with PTO shaft's drive off.

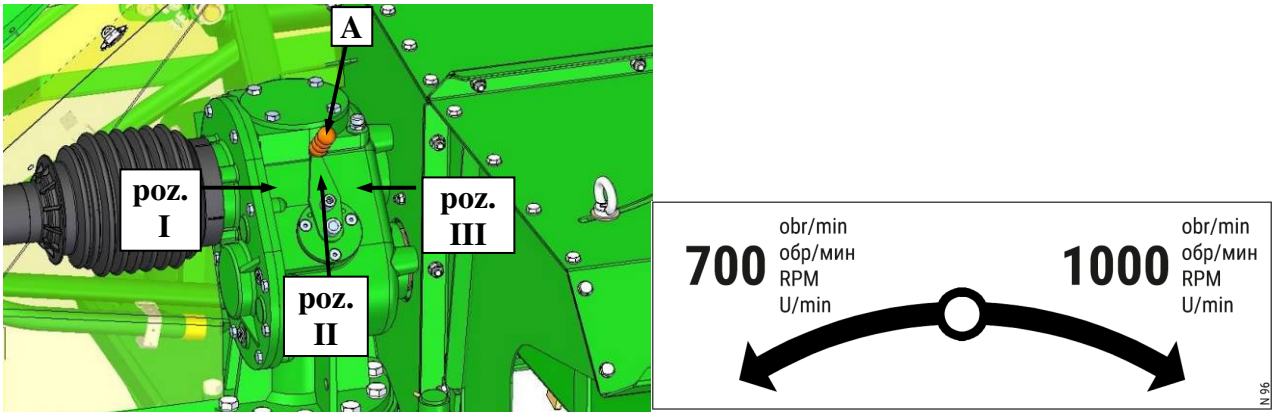


Fig. 37. Lever for adjusting conditioner's shaft rpm

6.7. Replacing conditioner's tines

(Models: KDD S/ST/SL/SLT (H))

Prior to commencing any operation, on each occasion check condition of bolts, on which flails are set, as well as condition of flails themselves. When inspecting also take notice of condition of rubbers where flails are mounted (applicable to shafts with rubber flail mounts). If flails or bolts or rubbers are worn or damaged, replace them. **Bear in mind, that flails should be replaced in pairs (opposite) featuring the same weight in order to keep shaft well balanced.** Not keeping the shaft well balanced may lead to premature wearing of bearings as well as the shaft itself.

In order to remove the flail release the nut with a wrench, remove bolt, and the flail – in case of mowers equipped with a light-weight conditioner remove the flail rubber pad (**Fig. 38b**). Installation of a new flail is performed in the reverse order, when tightening the nut apply an adequate torque (**Tab. 7**).

1. Conditioner's shaft
2. Self-locking nut kl. 8 oc.
3. Tine
4. Bolt M12x55 cl. 8.8

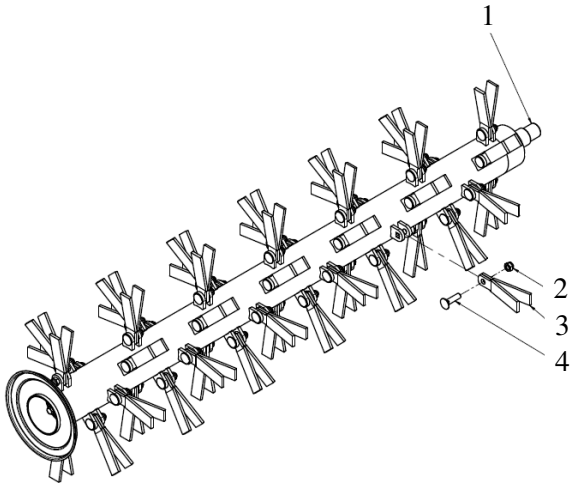


Fig. 38a. Parts of tine conditioner

1. Conditioner's shaft
2. Self-locking nut M12 cl. 8
3. Washer ∅12
4. Tine
5. Bolt M12x55 cl. 8.8
6. Tine insert

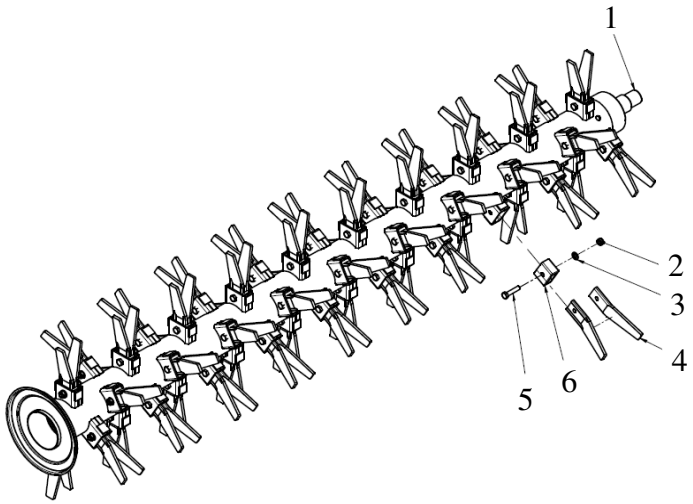
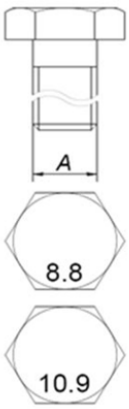


Fig. 38b. Parts of tine conditioner (light-weight swath conditioner)

Tab. 7. Torque values for bolts

A	6.8		8.8		10.9		12.9	
	Maximum torque							
	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm	lb-ft	Nm
M4	1.5	2.2	2	3.0	3	4.4	4	5.1
M5	3.5	4.5	4.5	5.9	6.5	8.7	7.5	10
M6	5.5	7.6	7.5	10	11	15	13	18
M8	13	18	18	25	26	36	33	43
M10	27	37	37	49	55	72	63	84
M12	47	64	63	85	97	125	111	145
M14	74	100	103	135	151	200	177	235
M16	118	160	159	210	232	310	273	365
M18	162	220	225	300	321	430	376	500
M20	229	310	321	425	457	610	535	710
M22	314	425	435	580	620	820	726	960
M24	395	535	553	730	789	1050	926	1220



In the absence of specific torque values, the following chart can be used as a guide to the maximum safe torque for a particular size and grade of fastener. There is no torque difference for fine or coarse threads. Torque values are based on clean, dry threads. Reduce value by 10% if threads are oiled before assembly.

6.8. Adjusting force of the pressure of roller conditioner

With factory set rollers, a ridge on one roller should enter a groove on the other. Clearance between a ridge and a groove on rollers should be within 2-5mm.

If need be, the force of roller conditioner's pressure can be regulated by changing the tension of springs **S** (**Fig. 39** and **Fig. 40**) by means of nut **N**. In **Fig. 40** to access nut for spring tensioning, bend cover marked with an arrow. Adjustment should be done on both sides of the conditioner.

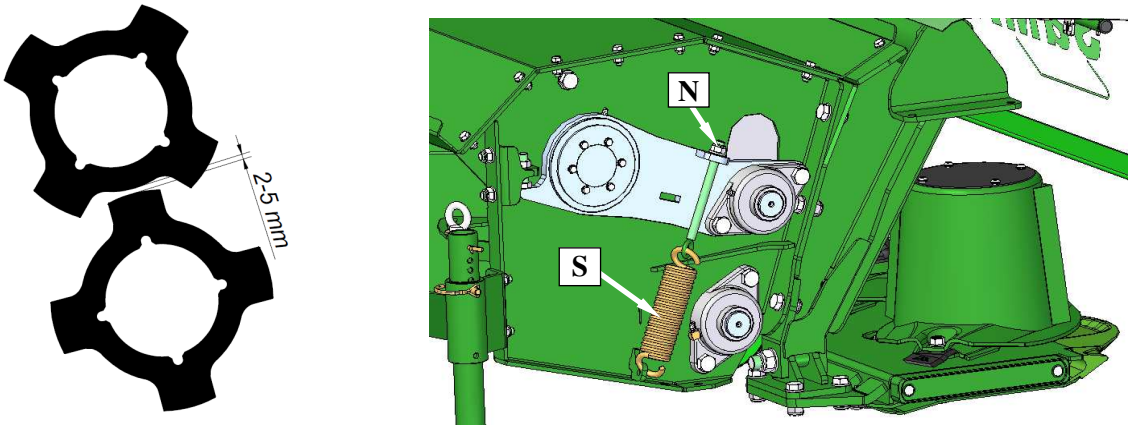


Fig. 39. Adjusting force of the pressure of roller conditioner

6.9. Maintenance and service

6.9.1. Checking the tension of belt on belt gear for conditioner rollers

Power from transmission shafts is transferred with V-belts and toothed belts onto rollers axle. Constant chain tension is provided by tensioner, adjusted with tensioning screw **N** (**Fig. 40**). Properly tensioned V-belt, once pressed with a finger on tensioner arm **K** should deflect by about 5 mm. Tensioning of toothed belts is factory-set and should be enough.

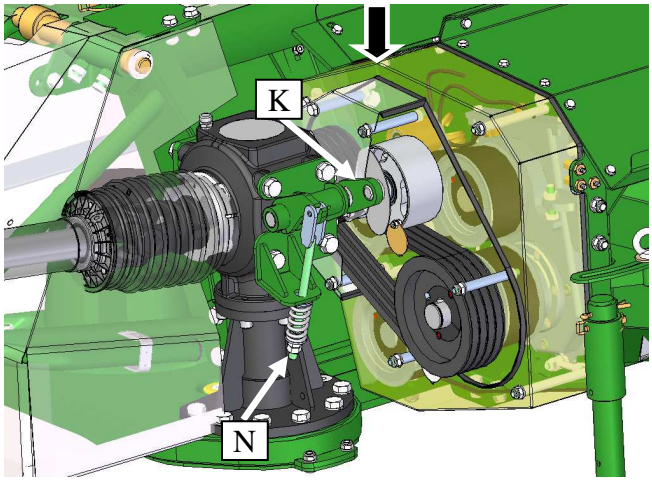


Fig. 40. Adjusting tensioning of belt on belt gear (view without part of the guard) – swath rollers

6.9.2. Daily maintenance

When you finish each day of operation carry out the following maintenance:

- check all visible parts and components and their connections; tighten all loose bolts and nuts and replace all damaged and/or worn parts with new genuine ones,
- clean the mower, especially between discs and cutterbar, because grass with mud may damage bearings in disc module,
- remove grass and mud,
- check the cutterbar,
- grease PTO shaft tubes with STP grease,

- if necessary, lubricate the parts and components according to lubrication instructions (chapter 7).

Parts, which may cause risk to operator's health and safety are as follows: damaged disks, tarpaulin covers, worn or damaged hydraulic hoses, PTO shaft guides, worn knives and knife holders.

WARNING!

When performing maintenance or adjustment works underneath the mower, use adequate locks for lifted parts of the machine preventing their falling and risk of crushing.

6.9.3. After-season maintenance and storing of machine

Upon completion of operation the following shall be performed:

- lower the mower's cutterbar onto the ground,
- take the PTO shaft extension out of the tractor rpm or dismount the complete PTO shaft and install it into corresponding holder at the 3-point linkage frame,
- detach hydraulic and electrical hoses out of the tractor and hang them onto corresponding holders on the 3-point linkage frame,
- detach the mower from the tractor (reverse procedure as in case of attaching the mower to the tractor item 5.1), and then drive the tractor away.

Detached mower should be stored in standstill position, so it is supported onto supporting leg and the cutterbar (**Fig. 27**). It is recommended to store the set on paved ground, preferably in roofed places, inaccessible to unauthorized personnel or animals.

After storing for adequate period prior to the machine operation, its technical condition should be examined and special attention should be paid to the hydraulics and the drive. Paintwork should be complemented, hydraulic hoses checked and lubricated.

Additionally:

- touch up any chips in the paint,
- check the oil level in the angle drives and the cutterbar (Section 7). If leaks are discovered they should be repaired immediately and lost oil replaced. If water in oil is discovered immediately change the oil as it could cause corrosion of internal mechanisms such as gear wheels, bearings, or shafts, and in effect be the cause of breakdowns,
- periodically inspect the mower and lubricate moving parts in order to protect them from corrosion which effects proper operation of the mower,
- check hydraulic hoses regularly. Replace any damaged or old hoses. The period of hydraulic hose utilization should not exceed 5 years from the date of their manufacture printed on the hose.

After storage period, before the machine is used:

- check the mower's technical condition, and the transmission in particular,
- supplement the paint where missing,
- make sure that all nuts and screws are tightened properly,
- make sure that all guards are in place,
- protect all moving parts with grease in order to prevent their baking and creating any sources of corrosion, which significantly influences mower's proper operation,
- check oil level in axis gears and cutterbar. If leaks are found remove them immediately and refill the oil. If water in oil is found, immediately change the oil as it could cause corrosion of internal mechanisms such as gear wheels, bearings, or shafts, and cause breakdowns.

6.10. Conveyor control and adjustment

(For: KDD ST/SLT/WT (H))

6.10.1. Cleaning belts and rollers

WARNING!

Check the condition and the conveyor belts condition after each hour of operation. If you find bulges caused by rolling the grass onto rollers, clean them by using the lever and remove the grass. Using conveyors with bulged belts may lead to their premature wearing.

NOTICE:

Conveyor belts are not covered by warranty.

1. In order to clean roller switch lever **D,** rotate belt to **1** and hold until bulges disappear (**Fig. 41**). This should also be performed from the other side of conveyor if necessary.

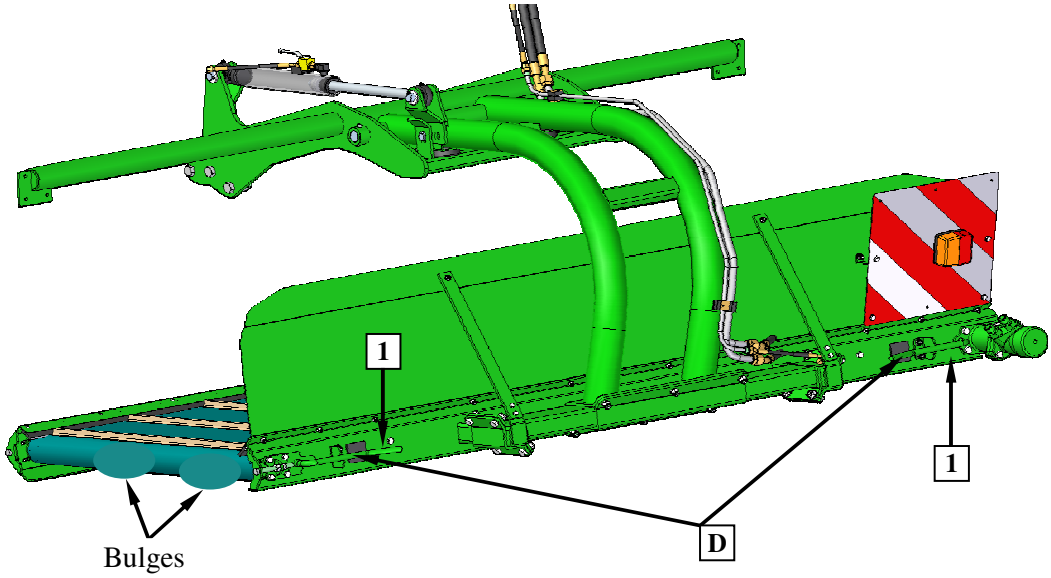


Fig. 41. Cleaning of conveyor rollers

2. Impurities inside belt can be removed once conveyor is in vertical position. Belt is deflected by hand and then impurities can be removed with a hook wire.

Fig. 42. Removal of impurities inside the conveyor

6.10.2. Conveyor belt replacement and adjustment instruction

Mower KDD with conveyors must be suspended onto tractor. Lean the mower with use of upper connector (cylinder) as far as you can to the front – in order to increase the distance between conveyor and the ground.

I. The adjustment of the belt conveyor should be done only when the conveyor is in its working position (horizontal).

1. Using a marker, mark lines on millimeter measures – decal 77 (if belts worked well).
2. Loosen tightening roller mechanism – screws M10 - **S1**, nuts M12 – **N2**, and loosen adjustment screw M12 – **S2** by approx. 3'11" (**Fig. 43**).

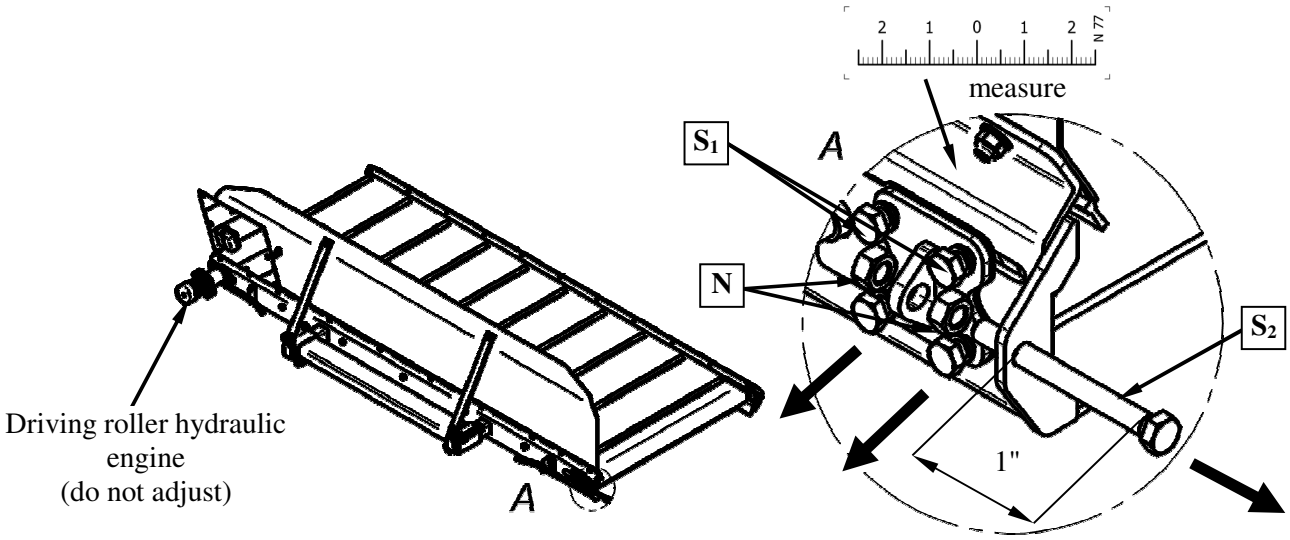


Fig. 43.

II. Steps to be taken when transporting in vertical position. Mower shall be leaned to the front so the distance between conveyor and the ground is approx. 3' 3".

1. Loosen screws M10 – **S1**, nuts M12 – **N2**, adjustment screws M12 – **S2** of front tensioners (**Fig. 44**).

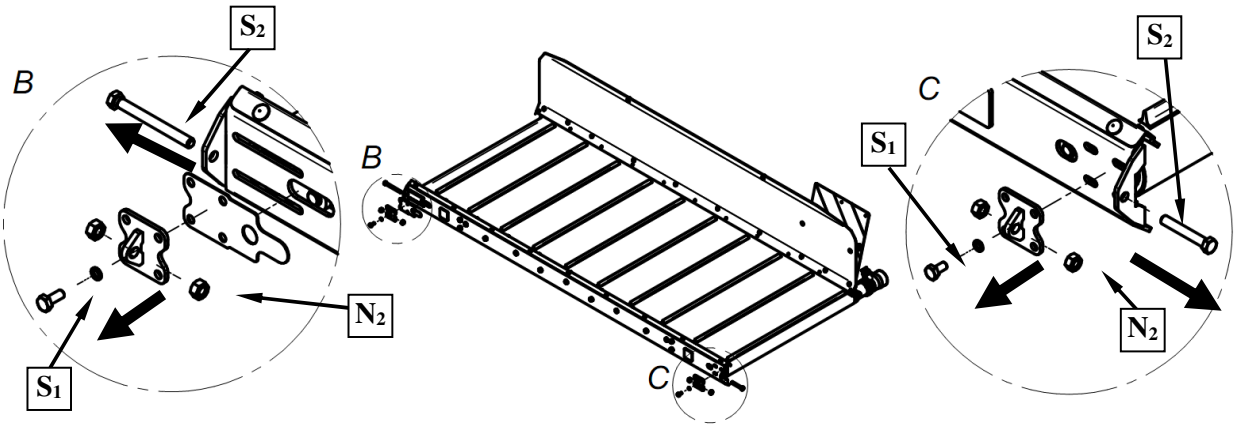


Fig. 44.

2. Dismount front belt in lower part of the conveyor **P** (**Fig. 45**). Slide belt **T** down (**Fig. 46**).

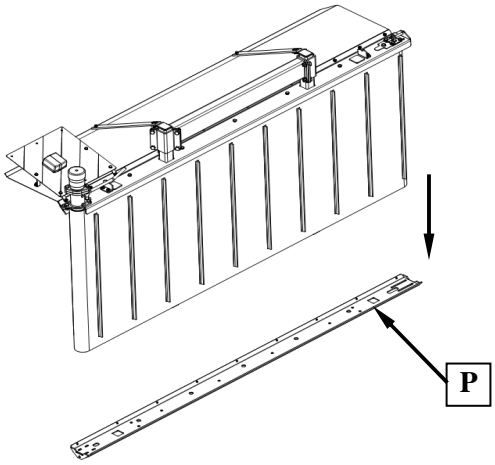


Fig. 45

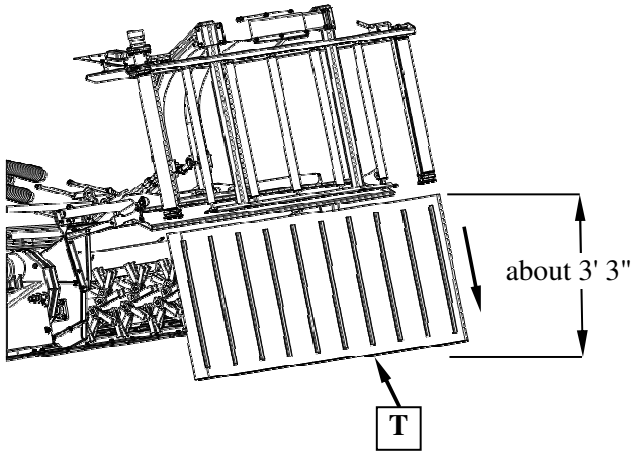


Fig. 46

3. Clean and check condition of bearings in rollers – worn ones must be replaced.
4. Mount the new belt upwards.
5. Mount front belt **P.**
6. Mount front tensioners and tighten rear tensioner.

III. Maintenance of belt conveyor adjusted in "work" position - inclination towards the ground should be 23°.

1. Mark two lines on newly mounted belt in intervals of l **= 3' 3"** (**Fig. 47**).
2. With adjustment screws **S2** tighten the roller so the distance on belt between marked lines is l **= 3' 4" - 3' 4.2"** (lines on measures from item I. 1 may prove to be helpful). The distance between the lines may differ on both edges of conveyor's belt.

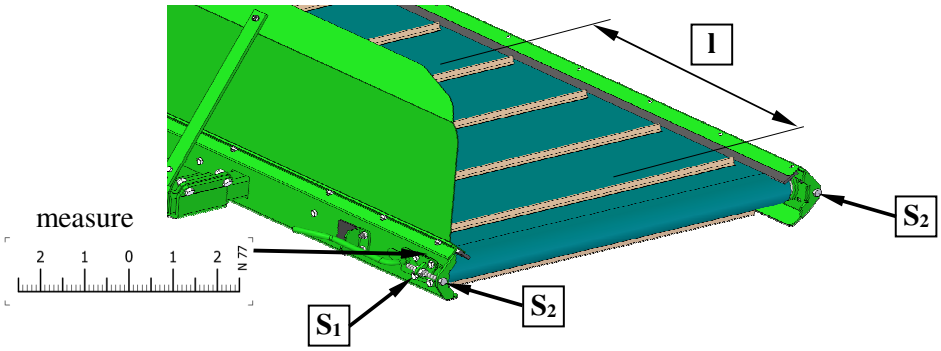


Fig. 47.

3. Measure diagonals with use of 9' 10" measure using angle bars.
4. Start the mower and in particular hydraulic drive, gradually increasing rpm from 0 to 1250 rpm.
5. Adjust with screws **S2**, locking screws **S1** each time **–** to be repeated until fine tuned, so there are no bulges on the belt.

NOTICE:

Precision is recommended, so belts and their edges work symmetrically on rollers. Well-adjusted belts cannot bulge in places where v-belt is guided inside the roller channel.

7. LUBRICATION

7.1. Risks present when lubricating

- To avoid being splashed with pressurized liquid wear protective eyewear with side guards.
- When lubricating protect skin against contact with the substance. Therefore use adequate long-sleeved protective clothing and protective shoes. Use protective gloves, too. In case of a contact with skin, immediately wash the infected area with plenty of soap water.
- Do not allow the product to contaminate water outlets, water courses and soils.
- In case of an unintentional release to the environment plug the leak, limit the spillage, and then collect the oil with non-flammable absorbent material (e.g. sand).
- The product is flammable. In case of fire, use adequate fire-extinguishing means (e.g. foam, water mist, extinguishing powders). Do not use water jets.
- Disposal of the used product must be made according to local regulations. Improper disposal of the used oil poses danger to the environment.

7.2. Cutterbar

Refilling oil in the cutterbar is done through the inlet **A** (**Fig. 48**). Proper oil level is 0.2" - 0.3" from the cutterbar bottom. In order to drain oil from the cutterbar dismount the cutterbar enclosure by releasing bolts (**B**). Oil capacities are in **Tab. 8.**

Tab. 8. Oil capacities

Model	Oil capacity [US gal lqd]	Oil type	Lubrication frequency
KDD 861 (S/SL/W (H) (T)) - 8,60 m	2 x 1.6	80W90	Once every 3 seasons (if working intyensively, more frequently)
KDD 911 (S/SL (H)) - 9,10 m KDD 912 (H) - 9,10 m KDD 941 (S/SL/W (H) (T)) - 9,40 m	2 x 1.7		

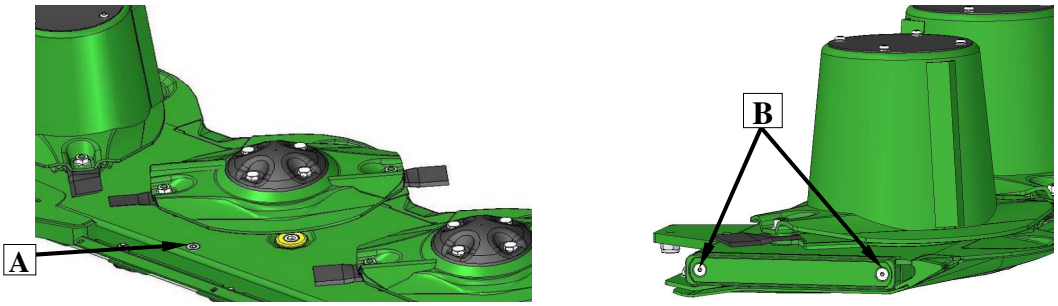


Fig. 48. Cutterbar oil inlet **A**

7.3. Intersecting axis gears

Every day before starting work please check the oil level and, if needed, please refill after having removed the vent **A** on the top of the gear (**Fig. 49**). The oil level can be checked through check opening **B** on the side of the gear. Please refill the oil until it is visible in the check opening **B**. Check oil level when the cutterbar is on the ground. Removing the worked oil from the gearbox is done through the outlet **C**.

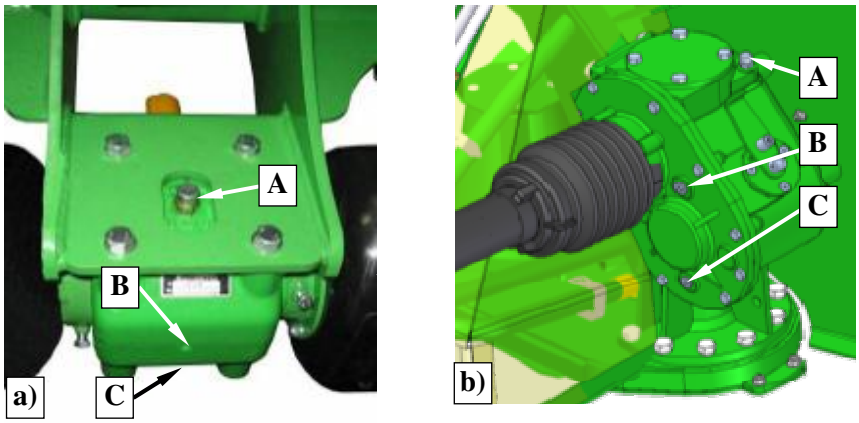


Fig. 49. Intersecting axis gears oil

To replace oil in gears:

- Prepare an adequate tank for waste oil to be disposed of at a specialized plant,
- Open refill vent **A** and drain vent **C** (**Fig. 49**),
- Drain oils from the gear,
- Close drain vent **C**,
- Refill the oil level until it is visible in the check opening **B**,
- Close refill vent **A.**

Tab. 9. Oil capacities in intersecting axis gears

Model	Gears	Oil capacity [US gal lqd]	Oil type	Lubrication frequency
KDD 861 (H) KDD 911 (H) KDD 912 (H) KDD 941 (H)	054-02.10CB.R	0.3	SAE 80W/90, API GL-4	Once every 3 seasons (if working intensively more frequently)
	055-02-10CB.R			
	118-03.111.LS	0.7		
KDD 861 S/SL (H) KDD 941 S/SL (H) KDD 861 W (H) KDD 941 W (H)	130-01.113.LS	1.6		
	052-02.0100AB.L	0.65		
	095-07.1FL.RS	0.3		
KDD 861 S/SL T (H) KDD 941 S/SL T (H) KDD 861 WT (H) KDD 941 WT (H)	138-03.1D13.LS	1.6		
	052-02.0100AB.L	0.65		
	053-02.0100AB.L			
	095-07.1FL.RS	0.3		

WARNING!
The above instructions should be strictly followed. If the discs in the cutterbar rotate loosely, do not worry about high intersecting axis gear temperature; after long working time, it may reach as much as 100°C.

7.4. Swath rollers cog gear

Before checking the oil level in swath rollers cog gear unscrew bolts holding protective housing. Please check the oil level and, if needed, please refill after having removed the vent **A** on the top of the gearbox (**Fig. 50**) The oil level can be checked through the check opening **B** on the side of the gear. Please refill the oil until it is visible in the check opening **B**. The oil level: about 0.5 l. Check oil level when the cutterbar is on the ground. Removing the worked oil from the gearbox is done through the outlet **C**.

Tab. 10. Oil capacities in swath rollers cog gear

Model	Oil capacity [US gal lqd]	Oil type – for gearboxes	Lubrication frequency
Oil type	0.13	80W90	Once every 3 seasons (if working intensively)

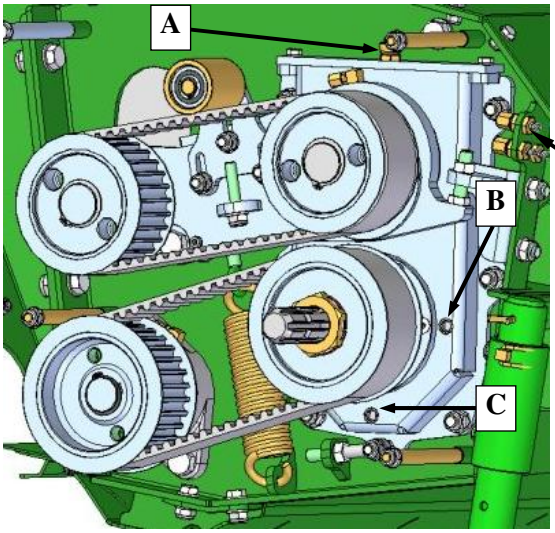


Fig. 50. Points of check and oil replacement in swath rollers cog gears

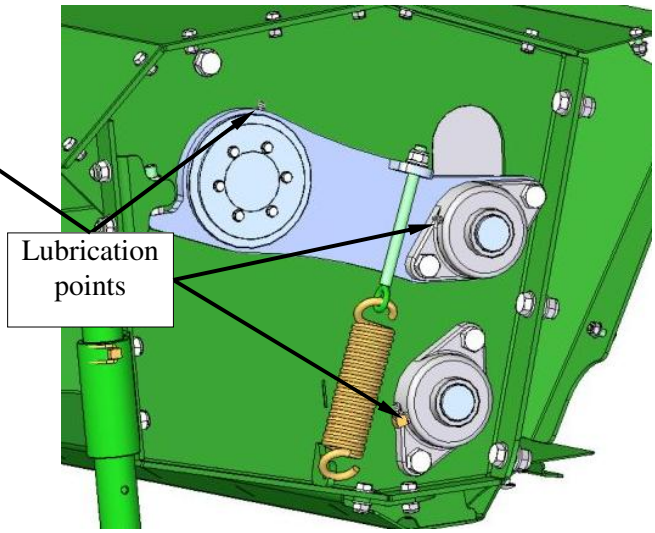


Fig. 51. Point of lubrication with ŁT43 grease for non-locating bearing

7.5. Conveyor integrated drive system

(For: **KDD S/SL/W T (H)**)

Oil level to be controlled on the external oil level and temperature gauge **A**. Remove oil filter **B** and top up the oil if needed. Use HYDROL PREMIUM L-HV 46 or other HLP hydraulic oil with similar characteristic. To drain oil tank remove drain plug **C**, located at the bottom of oil tank. Oil capacity is of about 8.7 Us Gal lqd.

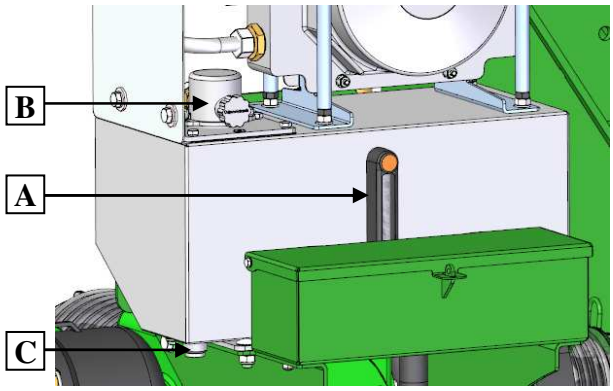


Fig. 52. Location of oil level control and refilling points, on the oil tank of the conveyor drive system

7.6. Lubrication points

Every 50 mower working hours, lubricate tine/roller conditioner's bearings (**Fig. 53, Fig. 54**) with **LT43** grease (or other designed to lubricate rolling and slide bearings, that work in -30 to +130ºC) and main joints of the mower with **STP** grease and all connections in cylinders (**Fig. 55**) with **STP** lubricant.

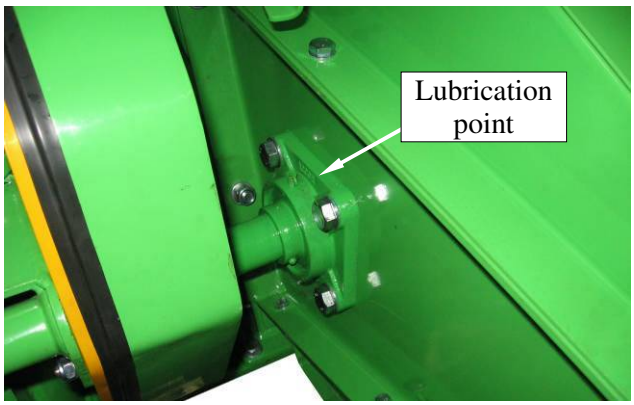


Fig. 53. Bearing lubrication point withLT43 grease

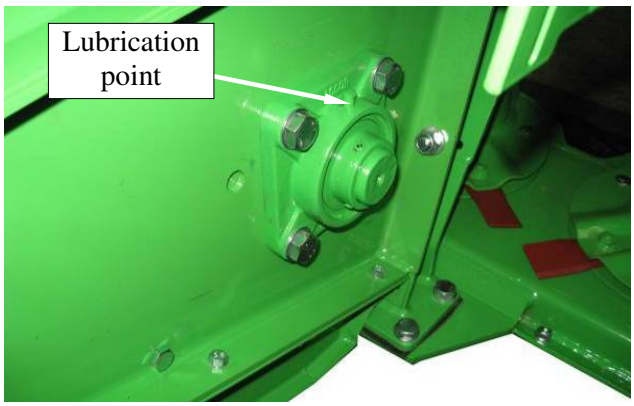
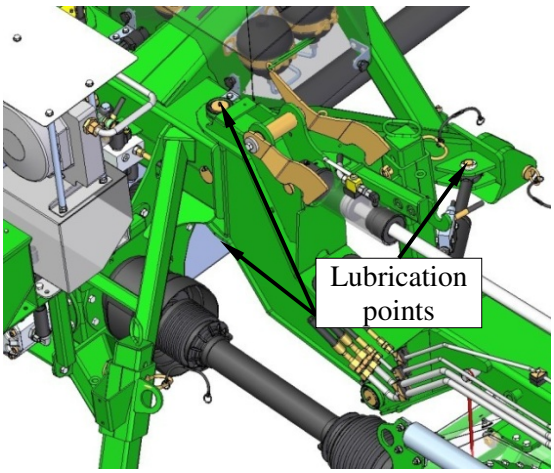


Fig. 54. Bearing lubrication point with LT43 grease



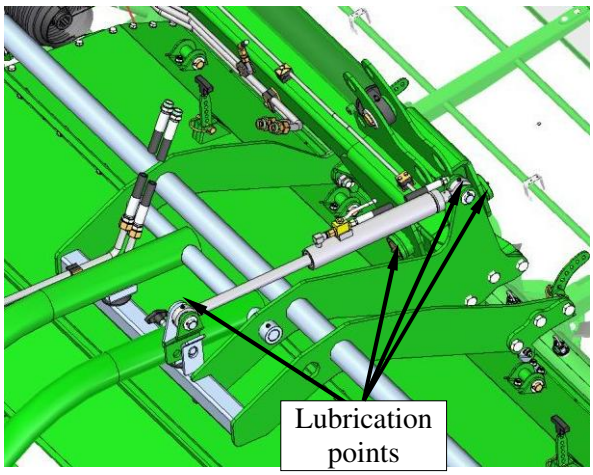


Fig. 55. Lubrication point of the suspension with STP grease

8. MALFUNCTION AND THEIR REPAIRS

Tab. 11. Defects and their repairs

Defect	Reason		Repair
Mower stops working (partly)– leaves stripes of uncut grass between the discs	1	Lack of knives	Put on knives
	2	Worn knives	Replace knives
	3	Improperly mounted knives (left – right)	Put on knives strictly according to instructions
	4	Improper front inclination	Adjust inclination strictly according to instructions
	5	Too high PTO rpm (The most frequent mistake)	Reduce PTO rpm
	6	Too low work speed	Speed up to V 10 km/hor more
	7	Damaged tractor's PTO	Repair
	8	Lying grass	The inclination - the angle zero
	Mower with either tine or roller conditioner may mow improperly in case of very short grass or after rain		
The grass is wound on the forming drums	Mowing lying grass without inclination towards the front		Always mow low and fast – inclination towards the front – 4 cm
Grass blocks the mower – lack of grass flow or the flow is uneven	Too low work speed		Speed up to 10 km/h or more
Safety device is working often without clear reason	Worn elements of safety device or improper adjustment		This repair must be done by SaMASZ service
Mower does not work, even though the drive is transmitted from the tractor	Damaged intersecting axis gear		Replace intersecting axis gear
Mower is blocked	Damaged gears in the cutterbar. Damaged bearings in the disc hub		This repair must be done by SaMASZ service
Mower's hydraulics do not work	Damaged or dirty hydraulic cylinder and check valve		Replace or clean hydraulic connector and check valve
	Tractor's hydraulic system is damaged.		Check tractor's hydraulic system
Conveyor is being blocked by grass	Too low speed		Increase – adjust to the grass weight
Leaking cylinder	Contaminated oil in the tractor hydraulics		Replace oil in the tractor hydraulics. Provide brand new cylinder repair kit and replace worn gaskets
Excessive vibration during work	Damaged PTO shaft		Check the condition of PTO shaft and if necessary replace
Oil leak in gear	Not tight assembly		Examine tightness and check oil level.

9. DISASSEMBLY AND WITHDRAWAL FROM USE

9.1. Disassembly

WARNING!

Before disassembly the mower should be disconnected from the tractor.

Before starting any repair or service the mower should be cleaned and any grass or dirt removed.

Carefully check nuts and bolts for adequate torque and the pins for wear. Replace screws, v-belts, pins, bushings, discs, knives, holders, mountings, etc. if necessary.

Once the machine is repaired perform the following:

- Make sure that all elements are installed properly,
- Install the removed guards,
- Check that all screws and nuts are tightened,
- Check for proper clearance on pins and gears,
- Once all the guards are installed, perform a warm-up start to make sure the repaired machine operates properly.

9.2. Scrapping

If the mower cannot be repaired anymore, it should be withdrawn from use.

For this purpose oil from intersecting axis gear and cutterbar should be drained and delivered to a proper waste treatment company. Clean the mower parts, dismantle and dispose properly of all plastic parts. After that, the mower could be sold to breaker's yard.

WARNING!

When disassembling the machine pay particular attention to additional dangers as crushing, cutting, wounding, concussion. Use proper tools and personal protective equipment: protective gloves, clothing and shoes, goggles, etc. Pay attention so that the machine works efficiently, and therefore it is required to secure the machine with supports.

10. WARRANTY CARD

REAR DOUBLE-SIDED MOWER WITH CENTRAL SUSPENSION

	Serial number Date of manufacture Manufacturer's stamp QC signature
	Date of purchase Dealer's stamp Dealer's signature

The product quality has been checked and meets the required standards and regulations and is permitted for use.

NOTICE:

A warranty card without the required information or with corrected or illegible information **– is invalid.**

11. WARRANTY TERMS

11.1. Warranty claims procedures

1. The manufacturer guarantees its products against faults in materials or production.
2. Warranty period is for two years from the date of sale to the purchaser, stated above.
3. Any repair which is subject to warranty should be carried out by an authorised SaMASZ dealer. Upon completion of the repair, the dealer must submit a warranty claim within 14 days.
4. Warranty claims regarding replacing of the product are considered if received within 14 days after it is completed by the manufacturer.
5. The following parts and situations are not covered by warranty:
   a) **wearing parts: cutting plates, sliding skids, intersecting axis gears and parts inside the gearboxes, bushings and sliding elements, clutchech, joints, knife holder, knife mountings, cutting knives, V-belts, sprockets, drive chain, conditioner's tines and rollers, roller conditioner's rubbers, bearings, rubber-metal fenders, safety curtains, conveyor's belts, swath guides rubbers, connective elements, etc. These repairs may be done only at purchaserer's cost.**
   b) **use for any other purpose than those described in the operator's manual,**
   c) **operation on stoney fields and results such as: damage of tine conditioner's shaft, discs, bending of cutterbar (stone with its diameter of 5.5" will not move between the discs and conditioner's shaft,**
   d) **running into any obstacle,**
   e) **too fast lowering of the cutterbar to the ground,**
   f) **transport and accidental damage,**
   g) **breaking, damage of tine conditioner's shaft, conveyor's belt.**
6. The Purchaser bears the costs of technical evaluation - when the manufacturer finds that a claimed product is free of defects and a technical report confirms that.
7. The manufacturer has the right to cancel a warranty in the following cases:
   a) **interference of the interior of the mower, changes of its mechanical design or intentional damages, bending parts of the mower and so on,**
   b) **operating with only 1 knife on the disc or without disc cover plates,**
   c) **damage caused by accidents, running into obstacles or other events, for which the warrantor is not responsible,**
   d) **using of knives, knife holders and mountings other than originally delivered by SaMASZ,**
   e) **negligent maintenance,**
   f) **use of non-genuine spare or replacement parts that are not specifically designed for the model in question,**
   g) **lack of needed records in the warranty card or filling in the warranty card independently,**
   h) **use of the mower not in accordance with operator's manual or for incorrect purpose, or use of the machine by untrained persons.**
8. Manufacturer can break the service agreement with immediate effect when the user does not pay the invoice according to that agreement in a timely manner and the delay in payment is longer than 30 days from maturity date. Breaking the service agreement caused by the user also invalidates the warranty.

NOTICE:

Please ask your dealer to complete and return the warranty card, otherwise you may lose your warranty rights.

NOTICE:

The warranty card is valid only when it contains the following information: address, date and place of purchase, mower type and invoice number.

NOTICE:

When the warranty expires, repairs can be done for a payment by the entitled repair shops pointed by the dealer. The dealer is obliged to indicate them.

NOTICE:

The Manufacturer have right to introduce design modifications.

NOTICE:

The SaMASZ company constantly works on development of all of ist machines types and models. Therefore, there is always a possibility in change of form, equipment and technology of the delivered machines. No claims can arise from data, drawings and descriptions included herein as well as in the spare part list.

The SaMASZ is not responsible for printing errors.

11.2. Warranty repairs record

Repairs description and changed spare parts:

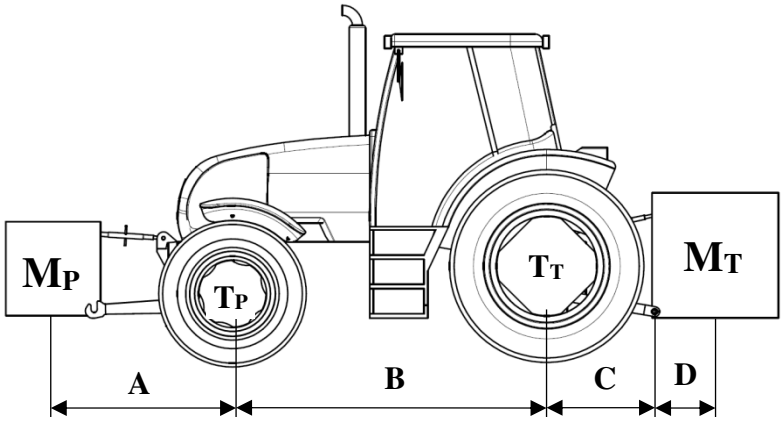
Date, stamp and signature of repair shop.

Date, stamp and signature of repair shop.

Date, stamp and signature of repair shop.

APPENDIX
Defining the total weight, axis load, tyre load capacity and minimum load

NOTICE:
When mounting the machine on a tractor using front and/or rear 3-point linkage, a maximum value of permissible load cannot be exceeded – tractor's front axis load must be 20% of the tractor's overall weight.
Before using the tractor-machine assembly, check whether these conditions are met, while calculating and weighing the assembly.



For calculations the following data is necessary:

T	[lbs.]	Tractor's overall weight	(1) (3)
T_P	[lbs.]	Front axis load on unloaded tractor	(1) (3)
T_T	[lbs.]	Rear axis load on unloaded tractor	(1) (3)
M_P	[lbs.]	Total weight of machine mounted on front 3-point linkage or weight of front ballast	(2) (3)
M_T	[lbs.]	Total weight of machine mounted on rear 3-point linkage or weight of rear ballast	(2) (3)
A	[ft.]	Distance between tractor's front axis centre and centre of gravity of machine mounted on front 3-point linkage / front ballast	(2) (3)
B	[ft.]	Distance between tractor's axes	(1) (3)
C	[ft.]	Distance between tractor's rear axis centre and centres of ball joints on tractor's lower links	(1) (3)
D	[ft.]	Distance between centres of ball joints on tractor's lower links and centre of gravity of machine mounted on rear 3-point linkage / rear ballast	(2)

(1) Refer to tractor's operation manual

(2) Refer to technical data for machine in operation manual or price list

(3) Dimensions / measurement

- Calculating minimum weight of front balast **$M_{P\ min.}$** – machine mounted at tractor's rear:

$$M_{Pmin.} = \frac{M_T \times (C + D) - T_p \times B + 0{,}2 \times T \times B}{A + B}$$

- Calculating real axis load at tractor's front axis **$T_{P\ rzecz.}$**:

$$T_{P\ rzecz.} = \frac{M_p \times (A + D) + T_p \times D - M_T \times (C + D)}{B}$$

If the value of front axis load* **($T_{P\ rzecz}$) *is less than 20 % of tractor's overall weight* **(T)**, *apply additional load on the front axis.*

- Calculating total weight of tractor-machine assembly **M_C**:

$$M_C = M_p + T + M_T$$

- Calculating real axis load at tractor's rear axis **$T_{T\ rzecz.}$**:

$$T_{T\ rzecz.} = M_C - T_{P\ rzecz.}$$

- Tyre load capacity – apply double the load indicated by the tyres' manufacturer.

Enter the above calculation data and technical data provided by the manufacturer in the below table.

	Real value from calculations		Value to technical specification		Double value of tyre capacity load
Minimum weight of front ballast **M_{Pmin}**					
Total weight **M_C**		≤			
Front axis load **$T_{P\ rzecz.}$**		≤		≤	
Rear axis load **$T_{T\ rzecz.}$**		≤		≤	

Minimum ballast must be reached by mounting the machine or additional weights provided on the tractor.
Values resulting from calculations should be lower than or even to values given in technical specification.