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Established – 1984

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OPERATOR'S MANUAL

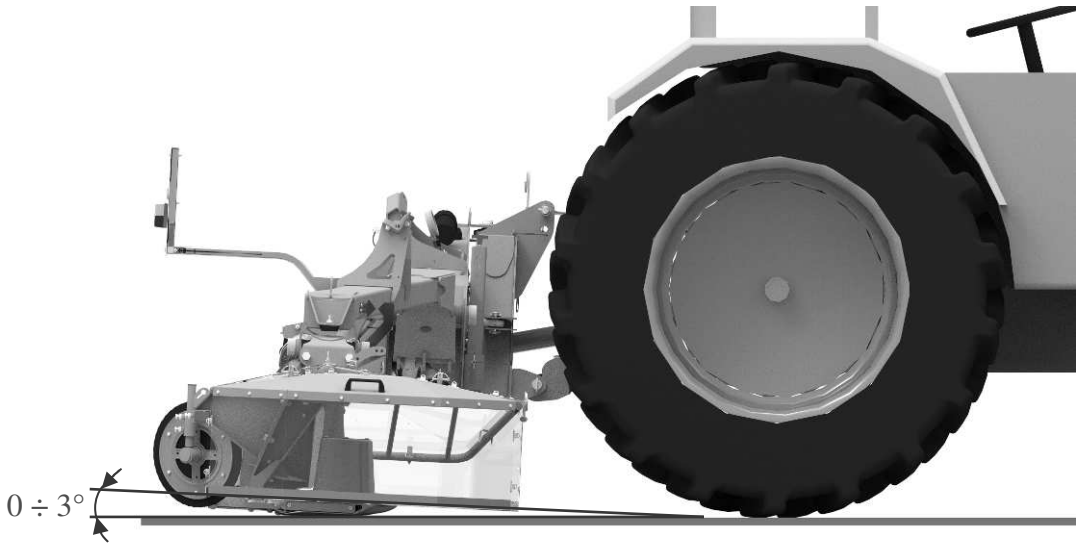
REAR DISC MOWER WITH CENTRAL SUSPENSION

XT 390 - 3,90 m / 12′ 9″

Serial no.:

IN2250USA000
2017.05.31
EDITION NO. 0

Translation of the original manual



Recommended cutterbar inclination is approx. 0 ÷ 3° towards mowing direction. Other position will cause serious damage of the cutterbar.

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

DO NOT
LIFT THE MOWER
IF THE MOWING
DISCS ARE NOT
STOPPED COMPLETELY

DO NOT
OPERATE WITH ANY PERSON
REMAINING WITHIN THE DANGER
AREA OF 170 ft. (50m)

IMPORTANT:
Keep this manual for future reference.

Well-proven design with thousands of machines in regular use in many countries and quality materials used 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.

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1. IDENTIFYING THE MACHINE

Data plate (**Fig. 2**) is attached on the mower's main frame as shown below in **Fig. 1**.

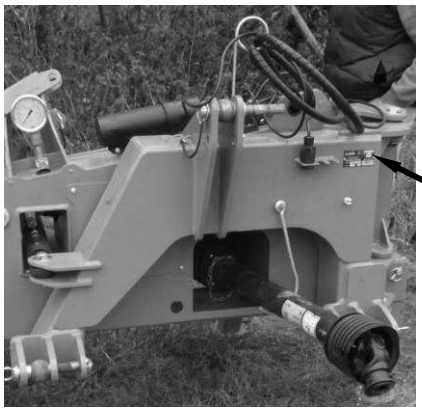


Fig. 1. Data plate location

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.

NOTE:
Should the contents of the herein manual be unclear, ask the manufacturer or your dealer for more detailed information on the machine.

2. INTRODUCTION

- This operator's manual should be considered the mower's basic equipment and should be kept for further reference. If the mower is handed over to another user, it should be serviceable, and include this operator's manual, CE declaration of conformity and its required basic equipment.
- Before operating the mower its user must familiarize himself with this manual as well as current work safety rules.
- The mower is manufactured according to international safety rules.
- Respecting recommendations herein shall ensure use safety.
- Should you have any questions relating to the operation and service of the mower, please contact the manufacturer.
- 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.

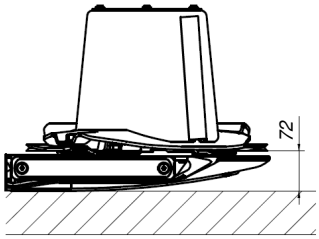
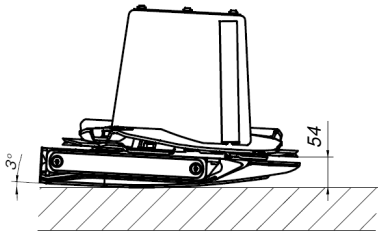
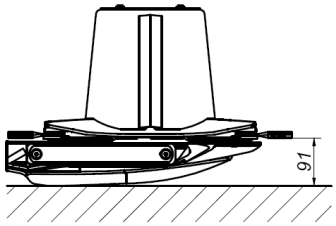
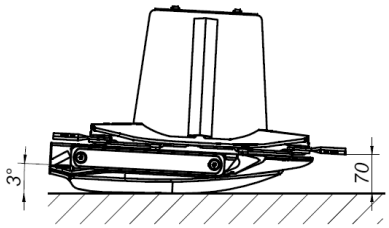
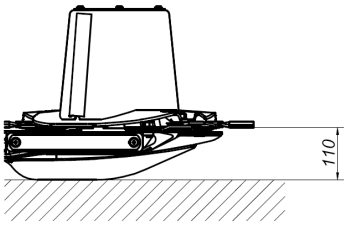
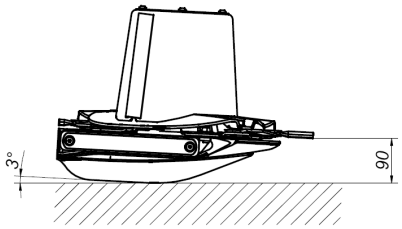
GENERAL PRECAUTION
When operating the machine always respect warnings and safety rules marked with this sign.

WARNING!
Operating the mower without reading the contents of the manual, and by unauthorized personnel, children in particular, is strictly forbidden.

3. INTENDED USE

A mower XT is equipped with the **„Perfect Cut"** cutterbar. **Tab. 1** shows the mowing height differences, depending on the tilt angle of the cutterbar.

Tab. 1. Mowing height depending on the cutterbar type and its tilt angle

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

NOTE:
It is recommended to mow very rare grass with zero angle inclination.

- The rear mounted disc mower is intended to mow green fodder: grass, alfalfa, etc. on permanent grassland (pastures), crop fields without rocks, and to form loose rows of cut fodder. The pasture or field being mown should be even, best if prepared by rolling. For the majority of tall grass the first and second mowing should be done at height of 2.36″-2.75″ (6-7cm), while for a majority of short grasses at a height of 1.97″ (5cm). The last mowing should be done a little higher - at 2.75″-3.15″ (7-8cm) from the ground.

WARNING!
Do not use the mower for purposes other than those listed in this manual. Otherwise it will be classified as misuse and could release the manufacturer from responsibility for any damages. The mower should be used, serviced and repaired only by personnel familiar with its characteristics and with safety regulations. Tampering with the mower may release the manufacturer from responsibility for any resulting malfunctions or damages.

3.1. Technical data

Tab. 2. General specification

Mower type		**XT 390**
Mowing width [ft in / m]		12′ 9″ / 3.90
Number of blades [pcs]		18 (9x2)
Minimal cooperating tractor power		74 kW (100 HP)
Operating capacity at V = 12km/h		~ 4.5
Swath width [ft in / m]		~ 7′ 10″-8′ 8″ / 2.40 – 2.65
Transport width [ft in / m]		~ 8′ 6″ / 2.60
Working assembly width [ft in / m]		~ 20′ / 6.10
Transport length [ft in / m]		~ 5′ 1″ / 1.55
Machine height [ft in / m]		~ 12′ 4″ / 3.77
Weight [lbs / kg]		2866 / 1300
Tractor 3-point linkage category		II/III
Tractor PTO speed [rpm]		1000
Line cutting speed [m/s]		88.4
Disc rotational speed [rpm]		3156
Emitted noise level [dB]	L_{pA}	103 ± 1
	L_{Amax}	109 ± 1
	L_{Cpeak}	112 ± 1

L_{pA} – noise level related to 8 hour working time. Averaged in time acoustic pressure level corrected by frequency characteristic A.
L_{Amax} – maximum value corrected by frequency characteristic A of acoustic pressure level.
L_{Cpeak} – peak level of acoustic pressure corrected by frequency characteristic C.

3.2. Design and working principle

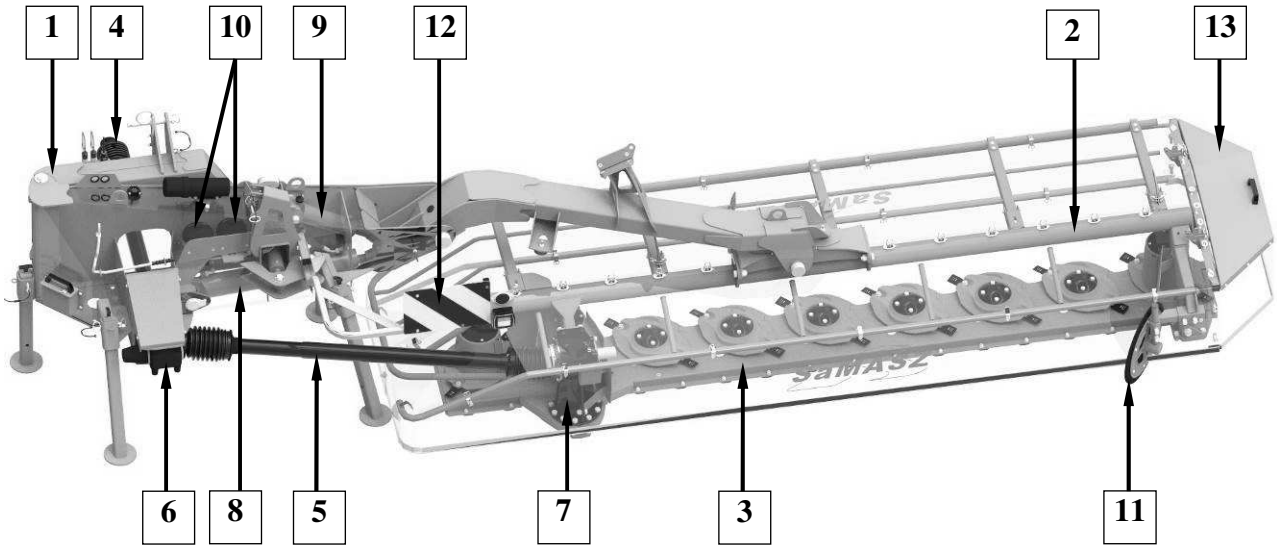


Fig. 3. Overview of rear disk mower

1 – Suspension frame
2 – Main frame
3 – Cutterbar
4 – PTO shaft I
5 – PTO shaft II
6 – Gearbox I
7 – Gearbox II
8 – Hydraulic cylinder I
9 – Hydraulic cylinder II
10 – Hydraulic accumulators
11 – Swath guide
12 – Warning plates and lights
13 – Safety guard

The suspension frame (**1**) allows the mower to be connected to the three-point hitch of the tractor. Drive from tractor rpm is transmitted through PTO shaft I (**4**) and gearbox I (**6**) onto PTO shaft II (**5**), which drives the cutterbar (**3**) through gearbox II (**7**). On the cutterbar (**3**) there are discs with two cutting blades each. Extreme most discs are fitted with additionally mounted swath guiding drums.

Hydraulic lifting cylinder I (**8**) and hydro-pneumatic suspension, fed from the tractor external hydraulics and hydraulic accumulators (**10**) are used to adjust the mower to working position. Main linkage frame (**2**), onto which cutterbar (**3**) is set features hydro-pneumatic cylinder II (**9**). The abovementioned suspension enables the mower's impact to the ground to be controlled oil pressure adjustment in hydraulic cylinders.

The swath guide (**11**) and safety guard (**13**) are also installed on the main frame (**2**). A standard equipment of the mower includes warning plate with combined lights and reflectors (**12**).

3.3. Equipment and spare parts

Mowers are sold with the following standard equipment:

- warranty card,
- operator's manual with spare part list and declaration of conformity,
- cutting knives L=105 mm (4.13″): 2 sets (24 pcs.),
- PTO shafts,
- spray paint (0.5 fl oz / 150ml),
- warning plates and lights.

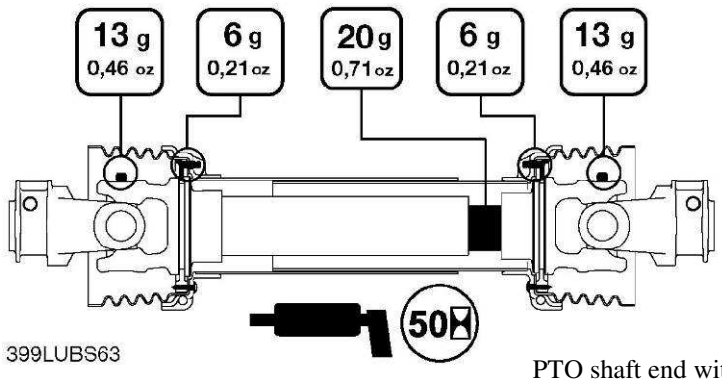
Optional extra equipment:

- warning triangle,
- high mowing toppings / double toppings,
- working disc with instep.

Tab. 3. Recommended PTO shaft for connecting the mower to the tractor

Mower	Power	Length	Torque	Symbol	Coupling	Manufacturer
	HP	ft in / mm	Nm			
XT 390	74	3′ 4″-4′ 7″ / 1010-1417	520	7G5N101CE0071A1A	Unidirectional right clutch + friction	Bondioli-Pavesi

PTO shafts of other brands with equivalent technical parameters may be used on the SaMASZ permission.



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

PTO shaft end with unidirectional right clutch + friction – To be mounted on the mower side

Fig. 4. PTO shaft lubrication and direction of connection

IMPORTANT:
Make sure to follow the PTO shaft lubrication frequency. Lubrication points marked in **Fig. 4** should be lubricated every 50 hours. Always lubricate the PTO shaft before and after a period of longer idleness.

NOTE:
Optional extra equipment should be ordered separately.

4. SAFETY PRECAUTIONS

4.1. General safety rules and regulations

- Front axis of the tractor should be balanced to enable its steering. If necessary, use front wheel weights.
- In order to keep steering conditions, make sure that impact on the front axis is at least 20% of the complete impact on the tractor.
- Any operation with the hydraulic lift lever should be done from the operator's seat; never operate the lever from outside of the tractor.
- For tractors equipped with EHR, control with hydraulic lift is done with a button located outside the tractor's cabin. When operating, please exercise particular caution.
- When mounting the mower on a tractor, risk of wounding is likely. It is recommended that operator wears protective gloves.
- Do not operate without safety guards. Neither operation with damaged nor raised guard is allowed (risk of stones, etc. being thrown out). Damaged safety curtain should be replaced.
- Make sure to check condition of the guards and their mounting regularly.
- Start mowing only when the tractor's PTO shaft reaches its nominal 1000 rpm.
- Do not exceed 1050 rpm on the shaft.
- Please make sure that no unauthorized personnel remains within the danger area of at least 170 ft (50m). Keep particular caution when operating near roads and in stony areas.
- Perform any maintenance and adjustment work only when the drive is disconnected and discs have stopped completely.
- Make sure to check condition of knife holders regularly. Replace any damaged or worn parts.
- When driving on public roads always comply with local traffic regulations, especially on the warning lights.

WARNING!
Make sure to perform any service and repair operations with the tractor drive shut off and the cutterbar on the ground and after all rotating parts have stopped completely.

WARNING!
Keep children away from the mower when operating and idle.

- When the mower is lifted for repair on the 3-point linkage, it should be secured against falling by a mechanical support or by chain.
- Check bolts and other fasteners regularly. Do not operate with damaged or worn fasteners.
- Do not leave a running tractor without supervision. Before leaving the tractor turn off the engine and remove the ignition key.
- If any break in the machine operation occurs, turn off the drive.
- Tractor cooperating with the mower should be equipped with a driver's cabin.
- Mower should not be operated when the tractor-mower aggregate is not well balanced.
- Never start the mower in the lifted position.
- Never start the mower if any people or animals are around the mower

- Never lift the safety guard before rotating parts have come to a complete stop. Stop the tractor's engine. **Warning: Cutting knives keep rotating for several seconds after the engine has been stopped.**
- Always follow safety decals describing hazards, and warning signs placed on the machine.
- Before starting the tractor make sure that each drive is disconnected and control levers for hydraulics are in neutral position.
- Do not drive the mower backwards when operating.
- Never get onto the mower.
- Never lift the mower on tractor's lift when the drive is on and discs are rotating.
- For operation and transport do not drive slopes greater than 8°.
- Never stand between the tractor and the mower, unless tractor-mower aggregate is protected against moving with the tractor's parking brake.
- Any inspections and adjustments may be conducted only when the mower is disconnected from the tractor and on the ground.
- For repairs or adjustments to be done under the mower make sure to secure it against falling using a proper support.
- If any part of the mower needs to be replaced, use only genuine spare parts according to spare part list.
- Pay particular attention to PTO shaft guards and mower and tractor spline shaft guards. Never operate with damaged guards.
- Inspect hydraulic hoses on regular basis and if any damage is found or their service life expires, replace them. Service life for a hydraulic hose should be no longer than 5 years.
- Never repair damaged hydraulic hoses using a tape.
- When connecting hydraulic hoses to tractor's hydraulic connectors make sure, that either tractor or mower hydraulics are pressure free.
- When servicing hydraulic unit, always wear protective gloves and eyewear. Hydraulic oil leaking under pressure (16MPa) may permeate through the skin and cause its infection thereafter. If this is the case, immediately visit a doctor.
- The mower should be stored under a roof and in such way so as to effectively prevent animals and people from being injured.
- Before starting the mower, make sure there are no animals underneath the guard.
- Before operating the machine, make sure all safety devices are in place and working. If not working or damaged replace them.
- Before any maintenance, assembly, disassembly works and when parking position the machine on a solid ground and secure it against accidental movements.
- When cleaning the machine, use personal protective equipment for health protection.
- Do not leave agricultural machinery on slopes or other descents without providing protection against free runaway.
- When operating on a stony field or nearby roads there is a risk of throwing out stones or other objects which may pose a danger for passing-by vehicles on the road or for passers-by. Therefore keep the safe distance.
- If any break in the equipment operation occurs, turn off the drive. Before leaving the tractor turn off the engine and remove the ignition key, leave the cabin and make sure there are no unauthorized personnel in the cabin and close the door.
- The operator is not allowed to leave the tractor while driving.
- In case of a major failure, stop the machine's drive, turn off the tractor's engine and remove the ignition key. Next, please contact technical service, and if accident (i.e.: road accident) occurs, respect first aid rules and call appropriate authorities.
- Keep the mower clean, so as to avoid a risk 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

- Before the mounting operation, check whether the tractor's and the mower's hitch categories are compatible and make sure that tractor's hitch load is adequate for the machine aggregated.
- Before mounting the machine, inspect technical condition of the mower's hitch assembly and tractor's 3-point linkage.
- Use only genuine pins and cotters to mount the mower on a tractor.

4.4. Transport

- Front axis of the tractor should be well balanced to allow for its steering. If necessary, use front wheel weights.
- Any modifications in the mower's position are possible only if no unauthorized personnel is around (children in particular).
- For transport make sure that the mower has portable light board and the triangular safety sign identifying a slow moving vehicle mounted.
- When transporting the mower make sure it is always placed in the transporting position.
- Before moving the mower to transport position make sure, that the tractor’s PTO is turned off and all rotating parts have come to a complete stop.
- Always adjust driving speed to current road conditions and local traffic code.
- Do not exceed a permissible speed of 15mph (25km/h).
- Do not transport any people or objects on the machine.
- When taking turns pay particular attention and keep in mind the machine's weight and dimensions.
- Bear in mind that when operating and transporting the machine in areas where high voltage lines are present, exercise special caution as it is likely for the aggregate to touch the lines.
- It is forbidden for the operator to leave the vehicles when driving.
- Reckless driving and speeding may cause a traffic accident or collision.

4.4.1. Putting the mower onto another vehicle for transport

The driver and the carrier are responsible for mower’s transport safety. Equipment and parts must be secured during transport.

To put the mower onto another vehicle in a safe way, please follow the procedure below:

- Grab the machine by any lifting devices only in places indicated by hook sign (**Fig. 5**),

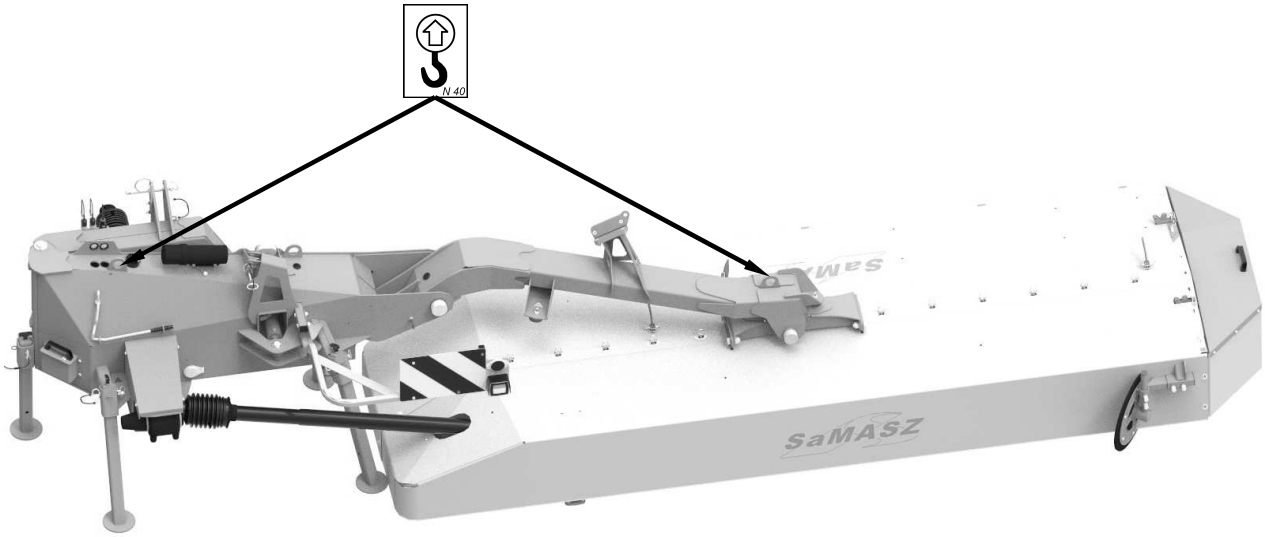


Fig. 5. Transport holders

- For hoisting do use hoists with capacity bigger than the machine weight as indicated on its data plate. It also applies to the necessary cables and chains,
- Transport belts, belt suspensions, ropes cannot be damaged. Whenever damages to these parts are found, replace them,
- When mounting slings, chains, clamps, etc. always keep in mind the center of gravity of the machine (**Tab. 4**),
- For seizing the machines pick lines of adequate length, so that the angle between them was no greater than 120°, and the angle of inclination between the cable and the vertical was no greater than 60°,
- Collapsible parts should be blocked in transport position,
- When relocating the mower onto another vehicle, there should be no unauthorized personnel permitted to remain within the danger area,
- The mower should be protected against moving on the vehicle's trailer.

WARNING!
Securing the maneuver area and providing safety for operation performed is the responsibility of the person in charge of the plow moving.

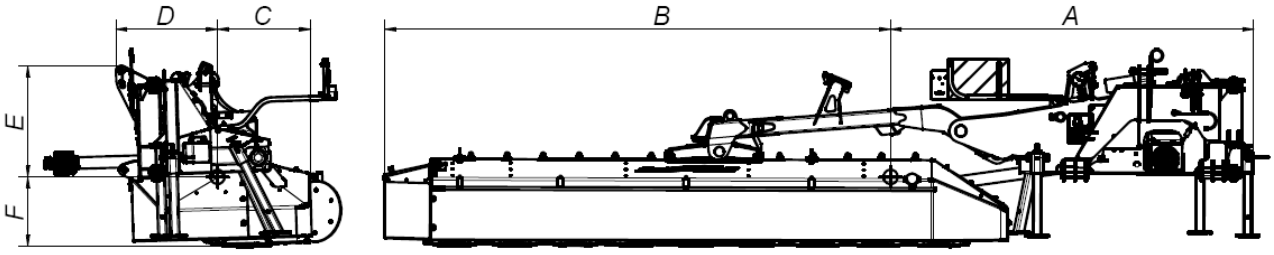


Fig. 6. Location of center of gravity

Tab. 4. Location of center of gravity

Dimension [ft in / mm]	Mower type
	XT 390
A	8′ 3″ / 2520
B	11′ 6″ / 3500
C	2′ 1½″ / 650
D	2′ 3½″ / 700
E	2′ 7½″ / 800
F	1′ 7″ / 480

4.5. Working parts

- Before operating the mower check condition of the knife, knife mountings and the knife holders.
- Immediately Replace any worn or damaged knives, knife mountings or knife holders.

WARNING!
When replacing working parts, always use protective gloves.

4.6. PTO shaft

- Before operating learn provisions found in the shaft manufacturer's manual placed on the shaft.
- Use only the mower's manufacturer recommended PTO shafts with guards in good technical condition.
- In order to operate safely use only fully serviceable, undamaged PTO shafts. Repair o replace a damaged PTO shaft.
- Before any operation make sure if direction of PTO rotation is correct.

4.7. Hydraulic assembly

- WARNING! Hydraulic assembly is under pressure! Hydraulic oil under pressure may permeate through skin and cause serious injury, therefore protect skin and eyes. In case of injuries caused by a liquid under pressure, call doctor immediately.
- Hydraulic hoses can be connected to tractor's hydraulics, only if both the tractor's and the mower's hydraulic assemblies are not under pressure. To remove the pressure from hoses just simply restart the tractor's hydraulic valves several times, after the tractor's drive is turned off.
- When dismounting the machine from the tractor, set the equipment aside, deflate the pressure from hydraulics and turn off the tractor's engine.
- When inspecting for hydraulic assembly's malfunction and looking for oil leaks, do not touch any potential leaks until the entire assembly is under pressure.
- **WARNING! It is recommended to use hydraulic oil of oil purity class 9 - 10 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.
- Service life for hydraulic hoses is 5 years from their production date.

4.8. Safety curtains

For storage, the SaMASZ manufactured mowers have standard safety curtains (**1**) to be mounted on user's own. In order to mount the curtain properly put it on mower and secure using catches (**2**) and with front guard (**3**) (**Fig. 7**). Front guard (**3**) should be fixed so that it holds the safety curtain (**1**). Examine condition of guards and its mounting on regular basis.

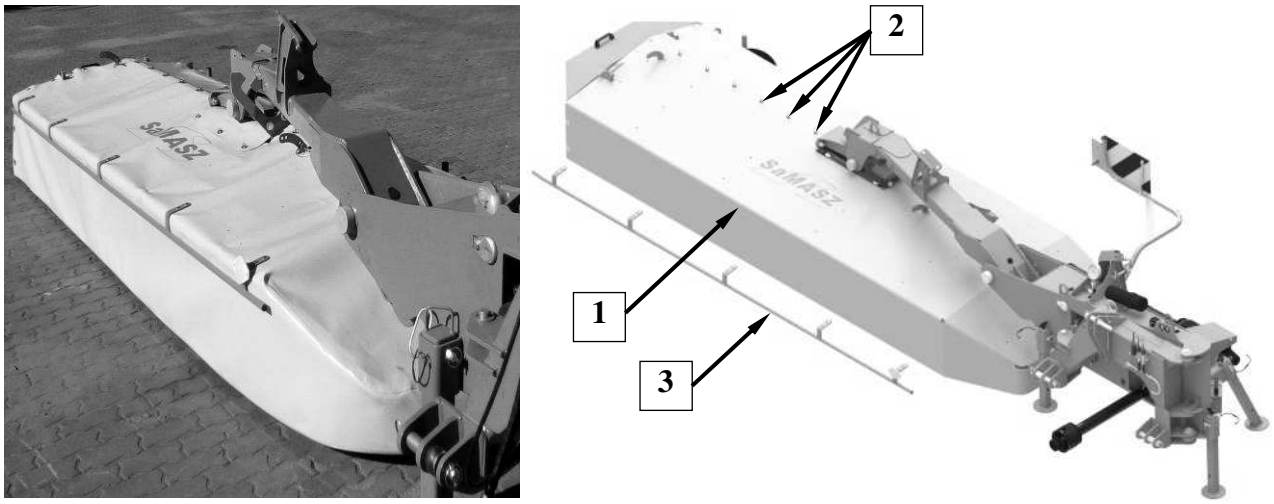


Fig. 7. Mounting safety curtain on mower

4.9. Residual risk

Despite the fact, that SaMASZ Sp. z o.o. Białystok company − the manufacturer of the mower takes the responsibility for the mower design and manufacturing, in order to eliminate hazard, certain risk when operating the mower is unavoidable.

Major source of risk results from the following operations:

- operation of mower by minors and operators not being familiarized with operator's manual,
- operation of mower by personnel under influence of alcohol or other abusive substances,
- failure to keep caution while transporting and moving the mower during operation,
- transport of personnel on the machine,
- presence of persons and animals within the mower operating range,
- service and adjustment operations with engine running.

4.9.1. Risk of being caught or pulled in

This risk occurs when repositioning of the mower, or working on the mower while the rotating elements are in motion and with guards removed.

During operation, maintenance or adjustment works on the mower always use protective gloves, covered footwear, protective clothing without loose elements, such as belts etc. Always observe the warnings placed on the mower.

4.9.2. Risk of injury, abrasion and damage of skin

This risk occurs when replacing working parts with sharp edges, cleaning the machine and removal of any clogging and jams. For any repair and maintenance works always wear safety gloves.

4.9.3. Risk of liquid ejection out of hydraulics

When connecting and disconnecting hydraulic hoses to and from the tractor's hydraulic connectors make sure, that both tractor or mower hydraulics are pressure free.

When servicing hydraulic unit, always wear protective gloves and eyewear. Inspect hydraulic hoses regularly.

NOTE: Present residual risk results mainly from erroneous actions of the mower's operator and failure to follow the instruction manual.

4.9.4. Prohibited actions

Bear in mind the following prohibited actions when operating the mower:

- Do not unblock the mower, make any adjustments or repairs when the mower is operating,
- Never change the sequence of operation and maintenance works specified in the operator's manual,
- Never operate the mower when its working condition is poor or its safety guards are damaged,
- Never get your limbs close to mower's rotating parts,
- During repair and maintenance works on the mower always comply with the descriptions included in the operator's manual, while making sure the tractor's drive is turned off,
- Before any works, focus your attention solely on the tasks to do,
- Never operate the mower being under influence of alcohol, drugs, or strong medicines,
- Wear clothing that is not too loose, or too tight. Too loose clothing elements may be pulled in by the mower's rotating parts,
- Make sure the mower is not operated by children no handicapped people.

When describing residual risk, the mower shall be considered a machine, which until the moment of production launching had been designed and manufactured in accordance with the state of the art at the day of the manufacture.

WARNING!
Residual risk may occur if specified instructions and forbidden actions are not respected.

4.9.5. Residual risk assessment

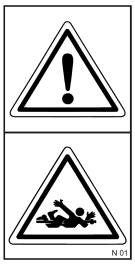
- read operator's manual thoroughly,
- make sure no person remains on the machine when operating and driving,
- make sure no person remains within the mower's operating range,
- before any adjustment, maintenance and lubrication works on the machine, make sure its engine is turned off,
- repair works on the machine can be done by properly qualified and skilled personnel only,
- before operating the machine, carefully read the operator's manual,
- make sure that no children and unauthorized personnel stays around the machine.

When the risk of being exposed to noise cannot be avoided or eliminated by any group protective equipment or through organization of work, employer (operator) must:
1) provide the operator with individual noise protection equipment, if noise level in work place exceeds 80 dB.
2) provide the operator with individual noise protection equipment and supervise its proper use, if noise level in work place reaches or exceeds 85 dB.

4.10. Safety labels and their meaning

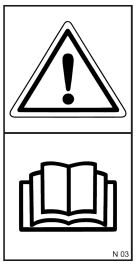
IMPORTANT

a) All warning labels should be clean and legible,
b) Lost or damaged labels must be replaced,
c) New labels can be ordered at the Manufacturer.

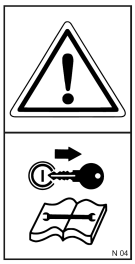


N-01
Be extremely careful when PTO shaft is rotating

N-02
Warning: cutting knives! Do not get near to the operating mower



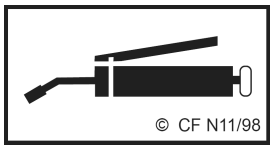
N-03
Prior to operation commencement read the operator's manual carefully



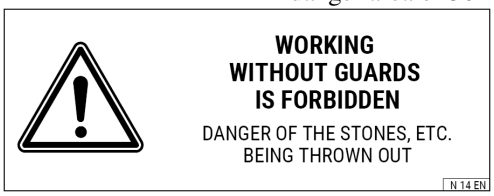
N-04
Prior to approaching any maintenance or repair works, turn the machine off

N-06
Warning: pulling-in parts

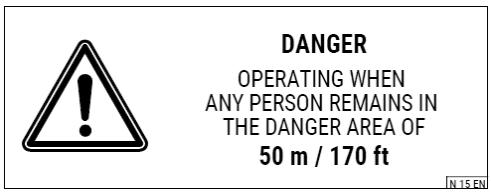
N-07
Operating the mower is forbidden with presence of any unauthorized personnel within the danger area of 50 m



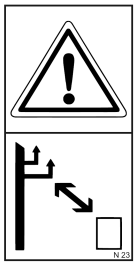
N-11
Lubrication point



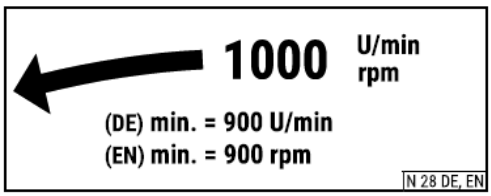
N-14



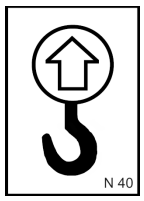
N-15



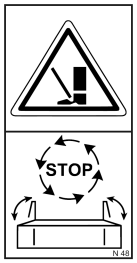
N-23
Warning: power lines



N-28



N-40
Transport holder for moving the mower

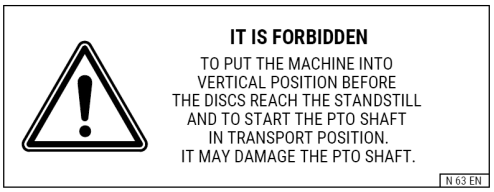


N-48
Stay away from mower's inclination area

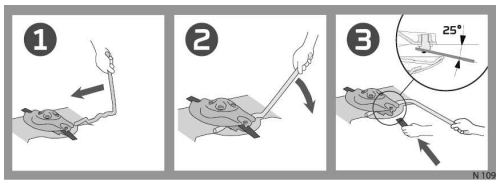
N-49
Do not get too close to the hoist of the tractor during operation of the hoist

N-50
Do not remain in the mower swinging area

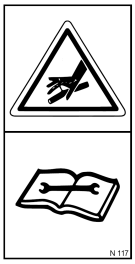
N-55



N-63

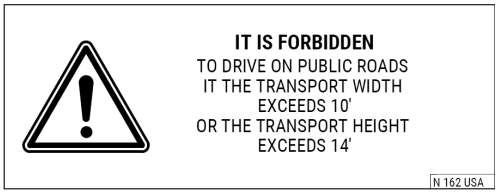


N-109

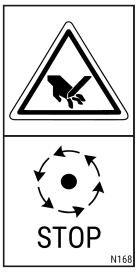


N-117
Avoid contact with liquid coming out under pressure

N-167
Do not remain on the machine while driving



N-162



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

N-204
Use the required Personal Protective

N-205
Use the required Personal Protective

N-206
Use the required Personal Protective

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

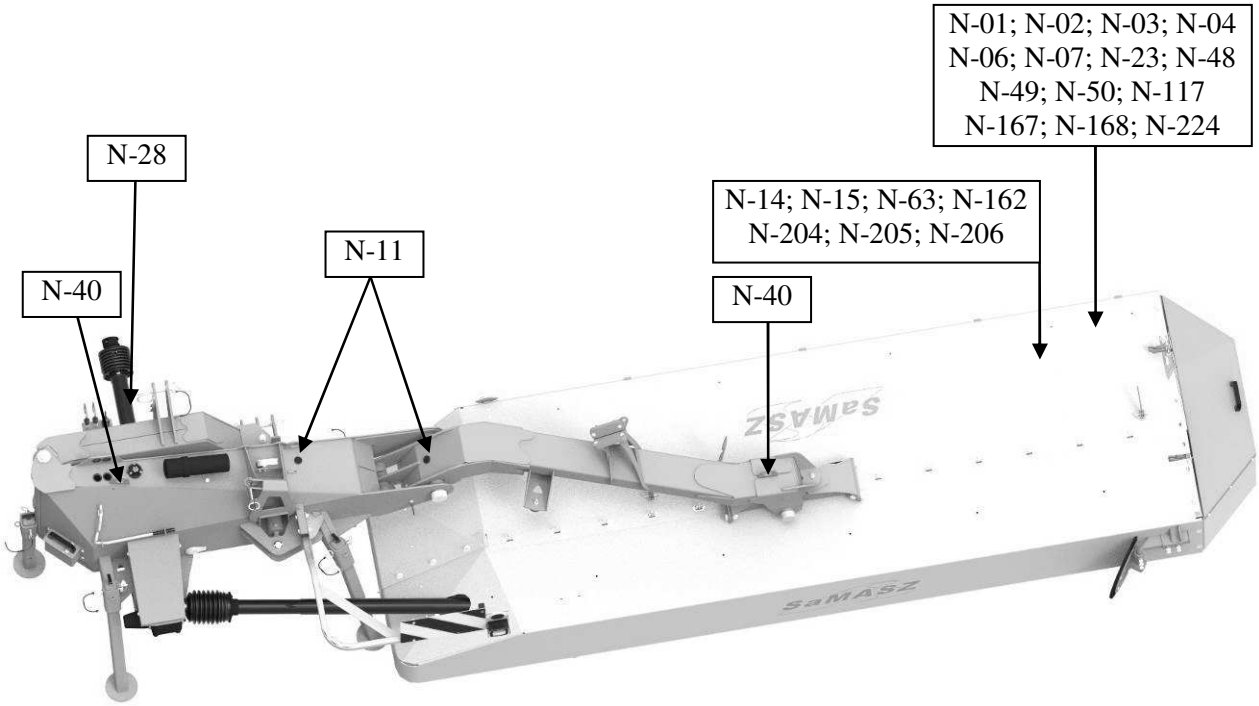


Fig. 8. Safety labels placed on the mower

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

4.11. Design and operations of hydraulic safety breakaway device

Hydraulic safety breakaway device (**Fig. 9**) protects mower from hitting small obstacles. When an obstacle is hit, the cutting unit retracts by 15° enabling retraction of the first disc by more than 1′ 8″ (0.5m) back, while lifting the first disk by more than 1′ 1″ (0.3m) up. After that, the cutterbar automatically comes back to its working position.

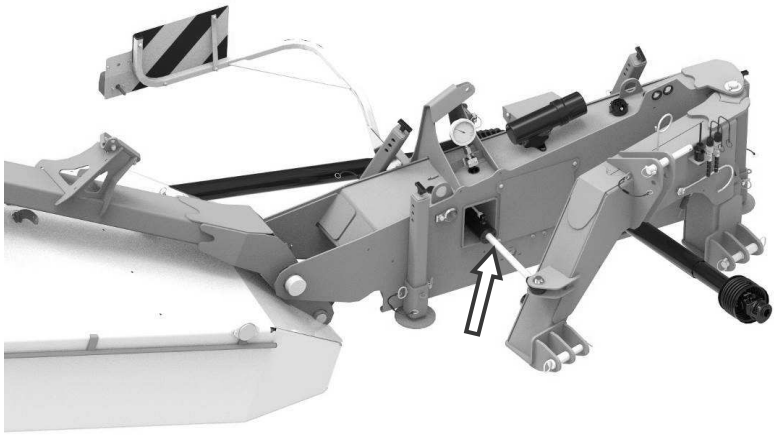


Fig. 9. Hydraulic safety breakaway device

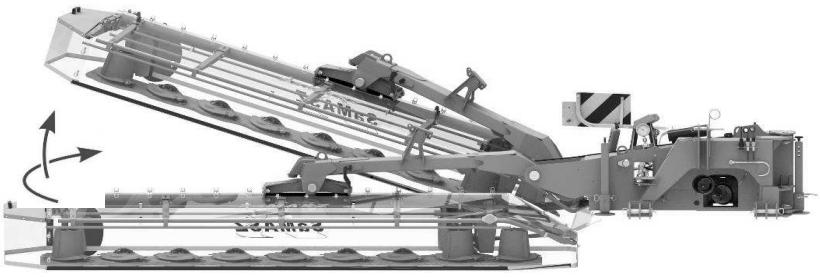


Fig. 10. Mower held back up and backwards after safety breakaway advice is used

WARNING!
Proper operation of hydraulic safety breakaway device is ensured only if factory-set value (1102 lbs / 500 kg) is maintained. Any change in safety breakaway device adjustments will render warranty null and void.

5. USE OF MOWER

5.1. Mounting mower on tractor

WARNING!
Exercise particular caution when mounting mower on vehicle. During mounting make sure there are no people between the mower and the tractor.

NOTE:
Mount the machine on a level ground.

The mower is suitable for mounting on tractors with three-point linkage cat. II and III (**Fig. 11**).

After the mower has been mounted, adjust (on a level ground) the mower's position by means of top (**C**) and lower links (**W**). The cutterbar should lean (~3°) towards the driving direction. Lower links (**W**) should be connected to 3-point linkage frame pins (**S**).

Then connect:

- hydraulic hose to tractor's floating section,
- PTO shaft (**B**) to tractor (p. 5.1.1),
- the machine's lighting cables (**A**) to the tractor' electric socket,
- control panel (**Fig. 16**) using hermetic connector (place the panel in the tractor).

After the mower has been mounted on the tractor, check the balance and whether the tractor-mower aggregate is steerable. To do this, calculate to formulas given in the appendix or weigh the aggregate, 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 aggregate's weight, it means the aggregate is stable. Otherwise the front axis should be balanced.

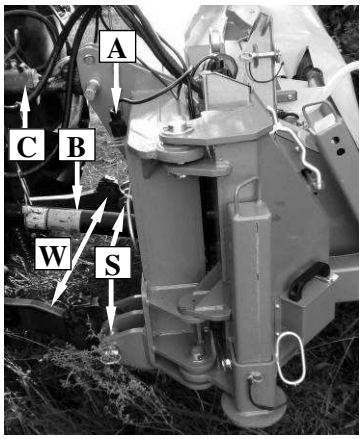


Fig. 11. Mounting mower on tractor

5.1.1. Mounting PTO shaft

Before operation, check and adjust length of PTO shaft, which is designed for mounting the machine on a tractor. In some cases it is possible, that the shaft is too long and therefore needs to be shortened, so that there is adequate tolerance for the shortest possible distance between tractor's shaft (**A**) and machine's shaft (**B**).

The cover should be secured so that it does not spin by securing the holding chains to a permanent part of the body of the tractor and the loop on the guard of the splined shaft of the mower drive shaft. Shaft's length should be adjusted individually for the tractor, on which the machine is mounted.

In order to determine minimal shaft length:

- set aggregated mower in working position,
- take measurement of distance between two shafts as provided in **Fig. 12 - Fig. 13**,
- additionally distract 3.15″ (80mm) from the resulting measurement (**Lz**) in order to keep tolerance and shorten the shaft for this particular length (**Fig. 14**). Information on proper shortening of shafts is provided on label N-149 (**Fig. 15**) placed on the machine and also in shaft's manual delivered by its manufacturer.

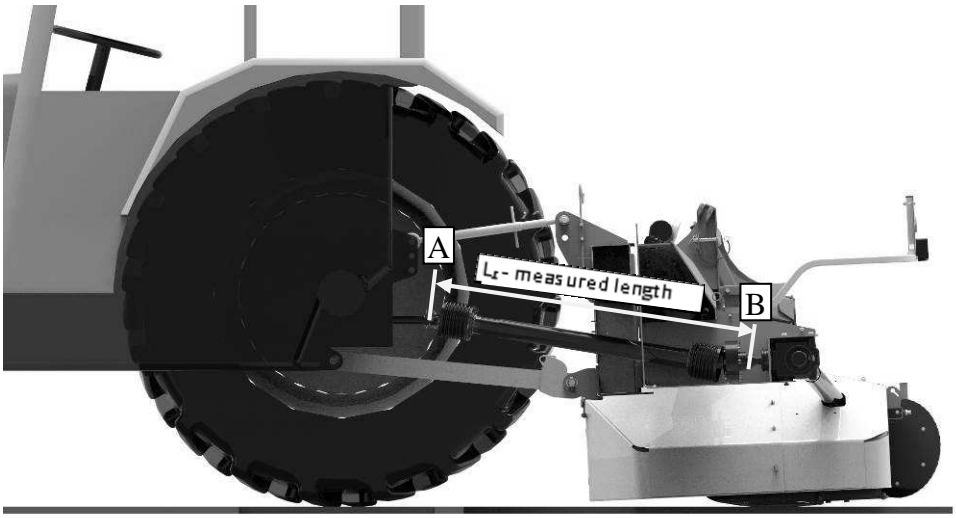


Fig. 12. Distance between tractor's PTO shaft and machine's drive shaft

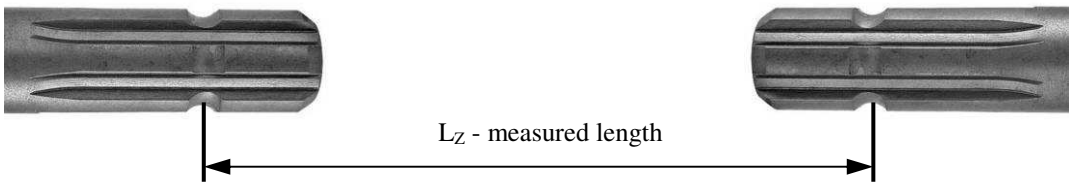


Fig. 13. Properly measured length

As a result, length of PTO shaft is obtained, and then the shaft can be used safely to mount the machine on the tractor.

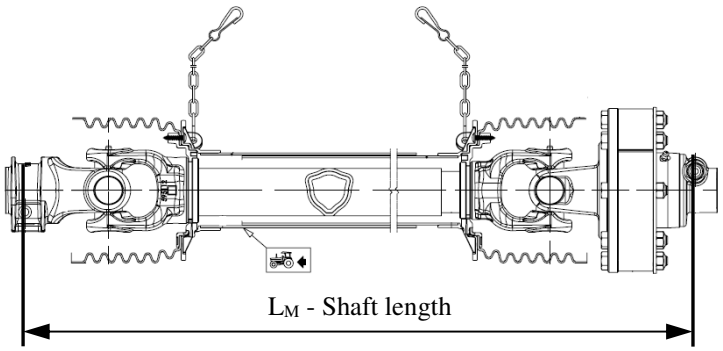


Fig. 14. Properly measured shaft length
$L_M = L_Z$ – .26″ (80mm)

NOTE: If necessary, shorten the PTO shaft according to its operator's manual given by the shaft's manufacturer (**Fig. 15**).

WARNING!
When changing the tractor, with which the machine operates, check the length of PTO shaft again, as otherwise the machine can be damaged.

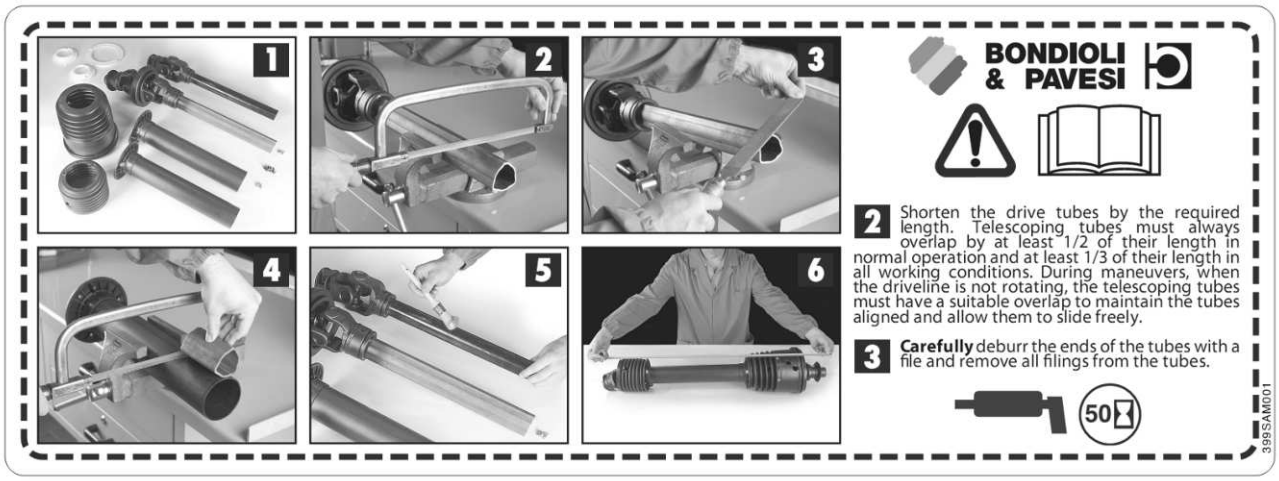


Fig. 15. PTO shaft shortening instructions

WARNING!
The articulated telescopic shaft should remain connected only during mower operation. During transport or any servicing operations the shaft should be disconnected from the PTO of the tractor.

WARNING!
Use machines with correspondingly designed driving PTO shafts. Before work, safety guards should be inspected whether they (in the tractor, the mower and the PTO shaft) are placed correctly and are not damaged. Damaged or missing parts must be replaced. Make sure that the PTO shaft is mounted properly. Approaching the rotating parts is strictly forbidden, as it may cause serious injuries or even death. For any service and repair works on the shaft and the mower, makes sure that the tractor's engine and its drive is turned off. Before operation, read the operator's manuals of both the machine and the PTO shaft.

NOTE:
PTO shaft's end with friction clutch should be mounted at the mower's side.

5.2. Control panel

Mower is controlled with use of one of tractor's hydraulic sections and control panel located in tractor's cabin. A required action is chosen by operator with buttons on the panel and then performed with use of tractor's hydraulics.

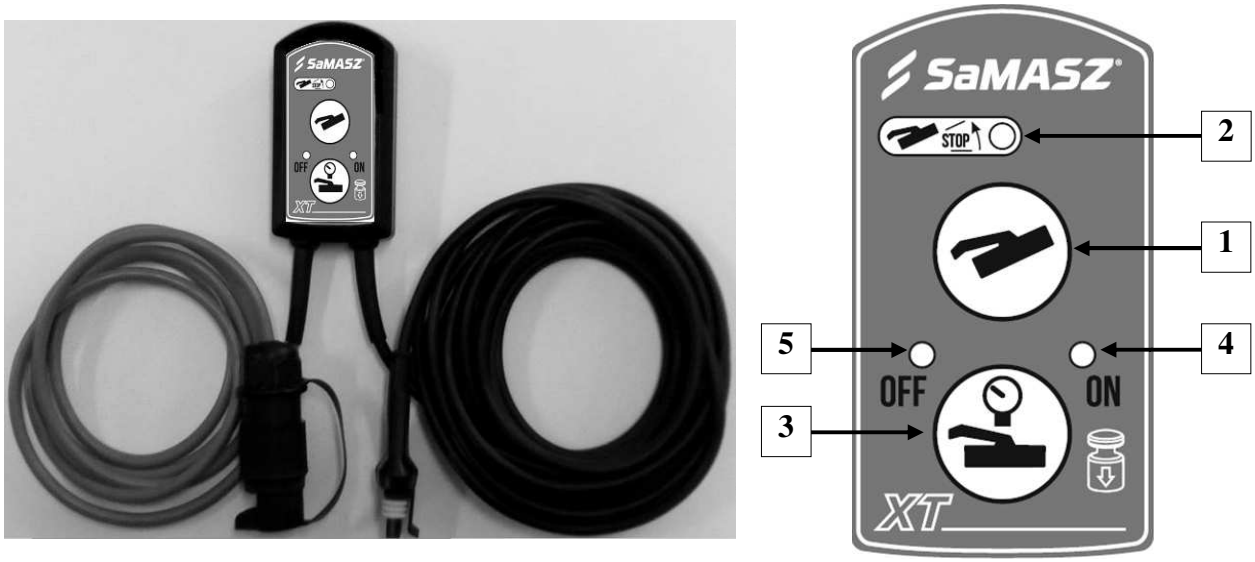


Fig. 16. Control panel – functions

1 - Switch ON/OFF for position of driving on headlands

2 - LED for switch ON or OFF of the headlands position

3 - Switch ON/OFF for position of pressure setting

4 - LED for switch ON of position of pressure setting

5 - LED for switch OFF of position of pressure setting

5.2.1. Setting hydro-pneumatic unloading of the mower

In order to set pressure in working system, first press button (**3**) on control panel (**Fig. 16**), then use lever to control the tractor's external hydraulics (making oil flow from tractor to working system will cause increase of pressure in the system). **Warning! Set the pressure in the working system before starting the mower, as otherwise unloading cylinder may be damaged.**

Activation of button (**3**) is indicated by switching of LED above the button from the left (**5**) OFF position to the right (**4**) ON position. To return from pressure setting position to working position, press the button (**3**) again. **NOTE: Automatic override to working position will follow after 1 minute - even without the need of the operator's action**. Return to working position is indicated by switching of LED above the button from the right (**4**) - ON position to the left (**5**) - OFF position.

Gas pressure in the accumulator and in the entire system should be set, depending on the mower model (see **Tab. 6**).

WARNING!
Set the pressure in the working system before starting the mower, as otherwise unloading cylinder may be damaged.

NOTE:

After switching button (3) to ON (4) position the automatic override to OFF (5) position will follow after 1 minute - even without the need of the operator's action.

WARNING!
Making the oil flow from the tractor to working system will cause increase of pressure in the system.

NOTE:
Increasing pressure – lower impact on the ground.
Reducing pressure – bigger impact on the ground.

5.2.2. Setting mower in position for driving on headlands and transport position

To set the mower in position for driving on headlands (**Fig. 17**) and transport position (**Fig. 20**) use button (**1**) on control panel (**Fig. 16**) and lever to control the tractor's external hydraulics. Activation/deactivation of a given button is indicated by activated/deactivated LED (**2**) above the button (STOP position).

To set the cutting unit lifting lock for driving on headlands, press button (**1**) so that LED (**2**) - STOP position above the button is activated. To unlock the cutting unit press button (**1**) again so that LED (**2**) STOP position above the button is deactivated.

NOTE:

Activated LED (**2**) - STOP position above the button (**1**) means that the cutting unit lifting is locked.

Deactivated LED (**2**) - STOP position above the button (**1**) means that the cutting unit can be lifted / lowered freely.

Fig. 17. Taking turns over swaths

5.3. Preparing the mower for transport

To prepare the front-rear disc mower mounted on the tractor for transport - movement on public roads - please follow the procedure:

- lift the mower with tractor hydraulic lift onto the tractor links until pins of the mower 3-point linkage are min. 1′ 8″ (500mm) (**dimension Y**) above the ground (**Fig. 20**),
- lift the support legs **W** (**Fig. 18**) and secure them with cotter,
- fold side safety curtain to reduce the total transport height (**Fig. 20**),

- using hydraulic cylinders lift the cutting unit to vertical position until mower arm connector lies on the body connector (**Fig. 19 - Fig. 20**),
- the mower is equipped with transport lock as pin **S** (**Fig. 19**). Secure the cutting unit against falling by pushing the pin through and securing it with cotter,
- lower the transport height on tractor's links individually depending on the mower and tractor model to **Tab. 5** so it is no greater than 13′ 1″ (4.0m) (**Fig. 20**).
- when setting min./max. height on tractor's lower links pay particular attention to drive shaft **B** (**Fig. 11**) connecting the mower to the tractor's PTO. If the mower is lowered or lifted too much, the PTO shaft may be damaged.

Fig. 18. Support legs

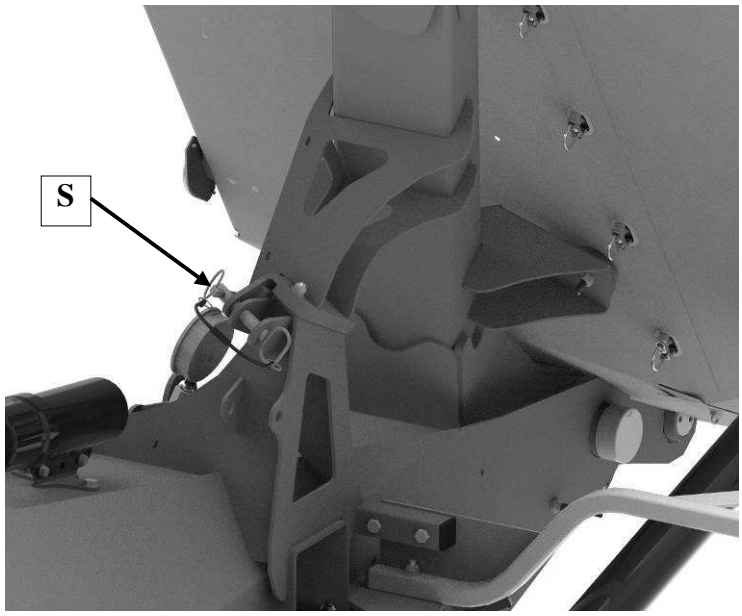


Fig. 19. Transport lock

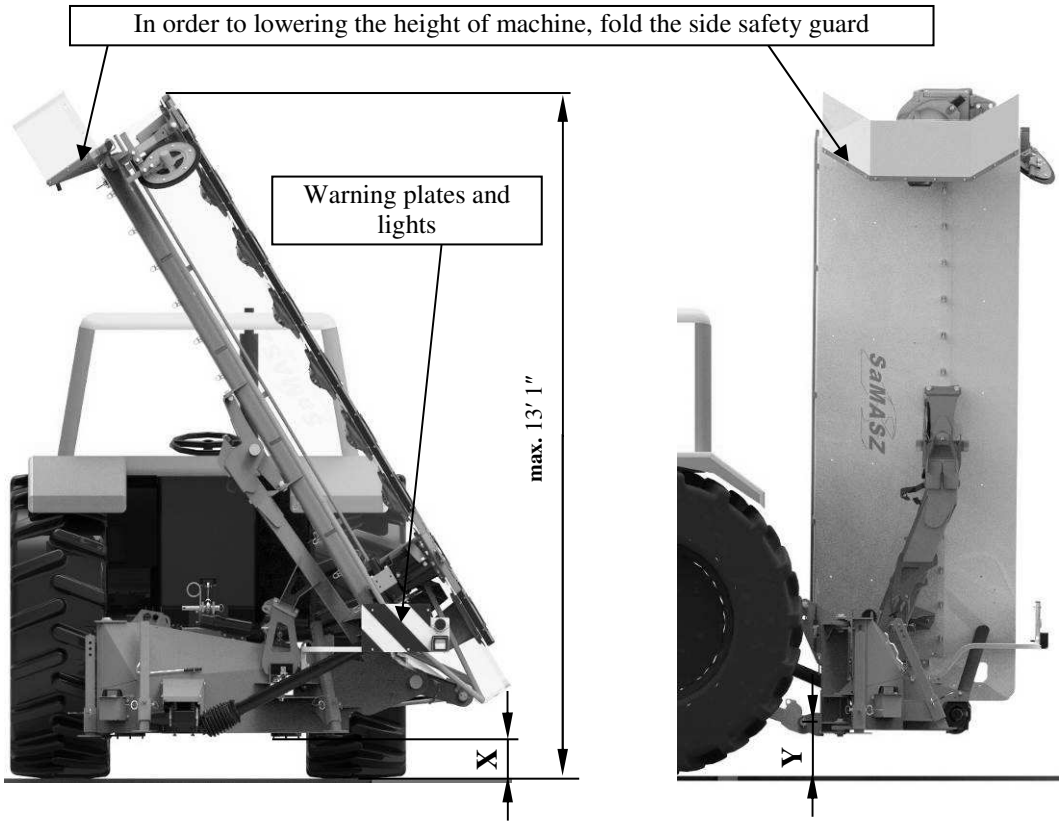


Fig. 20. Transport position

Tab. 5. Recommended height of the tractor's links when driving at max. transport height is 13′ 1″ (4.0m)

Mower type	Dimension Y (height of links)	Dimension X (the ground clearance under the machine)
XT 390	~ 1′ 1″ (340mm)	~ 9″ (230)mm

WARNING!

During transport the transport lock pin **S** (**Fig. 19**) should be secured with cotter. It prevents an accidental unfolding on a sudden movement of the tractor and mower – in extreme case this might lead to breaking of the hydraulic hose and cause an accident.

WARNING!

When setting min./max. height on tractor's lower links pay particular attention to drive shaft **B** (**Fig. 11**) connecting the mower to the tractor's PTO. If the mower is lowered or lifted too much, the PTO shaft may be damaged.

5.4. Preparing the mower for transport on public roads

To meet safety precautions concerning transport on the public roads and valid regulations the mower should be equipped with the following portable warning light plates (**Fig. 20**) consisting 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. Also make sure that tractor is equipped with additional plate for slow-moving vehicles.

WARNING!

Do not drive on public roads if the machine's transport height is more than 13′ 1″ (4.0m) (when transported, transport height should be lowered on the tractor links – **Fig. 20**).

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

WARNING!

Pay attention to efficiency and tightness of the hydraulic system of the machine during the mower transport.

5.5. Changing the mower position from transport to operating position

- unlock the cutting unit by removing the transport lock pin **S** (**Fig. 19**),
- lower the mower on the TPH of the tractor so that the pins of the suspension frame are at a minimum of 1′ 8″ (500mm) above the ground (**Fig. 20**),
- make sure that the space where the mower will be opened is unobstructed and free of people or animals,
- engaging the external hydraulic valve on the tractor and the hydraulic hoist of the tractor, position the cutting unit into a horizontal position,
- using the lever of the external hydraulic system of the tractor lower the cutting unit so that as it gets closer to the ground it slows down, next lower cutterbar freely until cutterbar touches the ground,
- fold side safety curtain,
- using the upper regulated tie **C** (**Fig. 11**) adjust to the required cutting height. Extending the tie **C** increases cutting height and shortening it decreases it. The best recommended tilt angle of the cutterbar to the ground is from 0° to 3° (see Figure on the front page),

- set height of the tractor's 3-point linkage lower links until red arrows attached on the cutting unit and the mower's arm are equal (hitch lower pin ~ 1′ 8″- 1′ 10″ (520-570 mm) above the ground).

WARNING!
Switching the mower from operating position to transport position and other way round could only take place on a level and solid ground. Before works remove the transport lock pin **S** (**Fig. 19**) and make sure whether there are no unauthorized persons exposed to risk of crushing.

5.6. Preparing the mower for work

WARNING!
During storage of the machines in at SaMASZ the cylinders are protected by special grease against weather conditions which may cause their premature wear. Before starting the operation remove excess grease from the cylinders.

Put the mower in motion 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:

- connect the articulated telescopic shaft end onto the PTO of the tractor (if one end was disconnected) or connect both ends of the shaft,
- push the button (**3**) on the control panel (**Fig. 16**) for setting pressure in hydro-pneumatic system,
- using tractor's hydraulic valve lever set the pressure until mower's cutterbar is slightly chattered. Gas pressure in the accumulator and in the entire system should be set, depending on the mower model (**Tab. 6**),
- turn off the button (**3**) on the control panel (**Warning! Otherwise automatic override to working position will follow after 1 minute**),
- slowly turn on the power to the mower bringing the cutting discs to the nominal rotational speed of the PTO of 950 - 1000 rpm. The rpm's should be as low as possible to decrease tractor fuel consumption,
- engage tractor gear and drive slowly into the grass-field. Flat meadows can be mowed at any driving speed, while in uneven terrain the speed should be adjusted to working conditions to minimize the likeliness of risk.

NOTE:
Too great pressure in support unit of cutterbars disables lowering of cutterbars from transport to working position.

NOTE:
Increasing pressure – lower impact on the ground.
Reducing pressure – bigger impact on the ground.

WARNING!
Improper unloading of the mower's cutterbar will result in increased pressure of the bar onto the ground which may result in: faster wearing of sliding skids, overloading the cutterbar, increasing fuel consumption, damaging the turf and causing contamination to forage.

NOTE:

After switching button (**3**) to ON (**4**) position the automatic override to OFF (**5**) position will follow after 1 minute - even without the need of the operator's action.

WARNING!
Making the oil flow from the tractor to working system will cause increase of pressure in the system.

WARNING!
Tilting the mower back is forbidden as it will cause faster wear or even damage of the cutterbar.

5.7. Gas pressure in the accumulator and in the entire system

In the table below are shown the optimal values of pressure in the gas accumulators and in the entire system, depending on the mower model. The system pressure can be read on the manometer. Value for gas in accumulator is factory-set.

Tab. 6. Gas pressure in the accumulator and in the entire system should be set, depending on the mower model

Mower type	Gas pressure in the accumulator [psi / bar]	Recommended pressure in the system pressure (manometer reading) [psi / bar]
XT 390	580 / 40	725-942 / 50-65

6. OPERATING THE MOWER

Dear User,

If this is your first experience with a disc mower (previously you used a 2-drum mower) then you may need some obvious information:

1. The greatest asset of disc mowers is their lower, about 20 %, power requirements, shorter time of inertia, and the possibility of constructing mowers of greater width.
2. A certain disadvantage is the not as pretty, wavy stubble (after gathering) especially when mowing fallen grasses. Straight grasses can be mowed with the mower in the horizontal position and then the stubble will be even but it will not be as attractive as with the 2-drum or 4-drum mower, because the cutting blades cut in a horizontal position which creates an air gust which bends the blades which stand up after passing and create the impression of inaccurate mowing.
   Each mower should be given tolerance for leaving some slight piece of uncut grass at knives which cut grass forward. Such occurrence is normal. For disc mowers it is both theoretically and physically impossible to achieve such attractive looking stubble as for double drum mowers for knives work either horizontally or under small angle of up to 3° in relation to the ground, and in double and quadruple drum mowers angled over the ground (even 23°).
   Despite these "disadvantages" farmers all around the world are more and more convinced by disc mowers while modern technologies allow manufacturing very solid mowers (even up to 1000%).
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.

Essential information concerning mowing

Optimum work parameters

1. Inclination towards the front 0÷3 degrees which stands for 1.97″-2.75″ (5-7cm) of mowing height.
2. Working speed ≥ 6mph (10 km/h).
3. PTO rpm = 950÷1000 rpm. PTO rpm > 1000 may cause stripes of uncut grass between the disc.

High and inclined grass

1. Heighten the cutterbar's inclination to – H = about 1.97″ (5cm).
2. Operation without cutterbar's inclination may cause winding of grass on the forming drums.
3. Speed up to V ≥ 7mph (12 km/ h) (the faster – the better)
4. Do not take turns in the mowed grass.

- Optimum inclination of the cutterbar towards the ground is between 0° and 3°.
  If the inclination exceeds 5°, there might be a slight unevenness of the mowed grass. It impairs slightly the quality of mowing and has an influence on mower's operation. When the cutterbar is pulled in other way, 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 the high grass prevails, the first and the second cut should be mowed at the height level 2 ½″ 6 - 7 cm, but when the grass grows low – at the height level - 1.97″ (5cm). The last cut should be mowed a little bit higher – 2.75″-3″ (7-7.5cm) above the ground.
- Too high PTO rpm whirl the air, which may cause the inclination of the grass in front of the discs. It impairs the quality of mowing.
- Too low PTO rpm impair 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 is not always possible. Adjust experimentally the inclination of the mower, PTO rpm, speed and correctness of knife-mounting.
- On reclaimed meadows for first mowing or after heavy and long rainfall, reduce the pressure of the bar on the ground by adjusting pressure in the working unit.

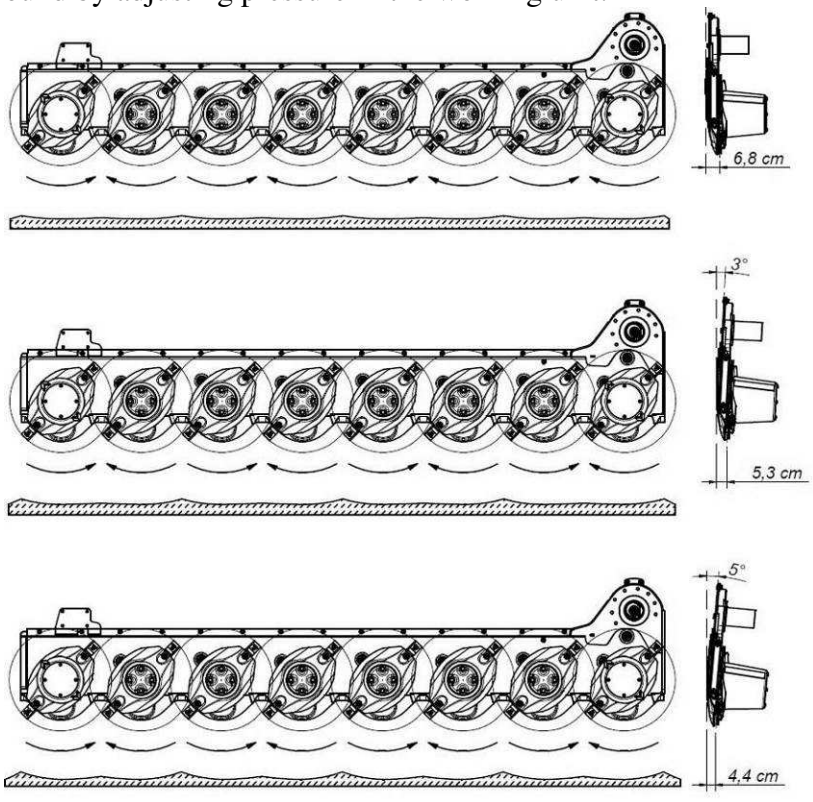


Fig. 21. Shape of the stubble with cutterbar's inclination 0°, 3° and 5°

6.1. Taking turns over swaths

Lift the mower with hydraulic cylinder (**Fig. 17**) and take the turn. The mower does not need to be additionally lifted by tractor's 3-point linkage.

6.2. 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!
When removing clogs and jams while the machine is in operation an accident may occur!

In order to remove the machine clogging, lower the cutterbar onto the ground, disconnect the drive and the motor, take out the ignition key and pay particular attention. Remove excess material using sharp tool. After clearing the machine check if nothing has been damaged. When eliminating any clogging on the machine, use also safety means for operator, so protective gloves and tight wear.

6.3. Dismounting machine from the tractor

WARNING!
When dismounting, make sure there is no person in between the machine and the tractor.

To dismount the machine from the tractor:

- deactivate cutterbar drive, ignition of tractor and removing the key of the tractor's ignition lock,
- reduce the pressure in the working system by press the button (**3**) on the control panel (**Fig. 16**), at the same time it is reducing the pressure in the tractor's hydraulics,
- 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,
- protect the tractor against free runaway,
- dismount tractor's rpm and place it on a PTO shaft holder, that is standard-delivered with the mower,
- disconnect hydraulic hose and electrical installation from the tractor,
- disconnect the upper link **C** (**Fig. 11**),
- disengage the machine from hangers of the tractor's lower links **W** (**Fig. 11**) by lifting the three-point linkage,
- carefully drive the tractor away.

6.4. Storing machine

The mower should be stored on a hard, flat and level surface, under dry, roofed place to protect it from atmospheric precipitation. In order to save storing area e.g. under shed, houses, etc. the mower may be stored in vertical position (**Fig. 22**) but always on paved surface. Storing the mower on an unpaved surface is inadmissible, for it may cause the mower to lose stability and in consequence lead to falling for what the manufacturer shall not bear any responsibility.

IMPORTANT:
When stored for longer period (e.g. in winter season), the machine should be erected in standstill position on paved surface (**Fig. 22**).

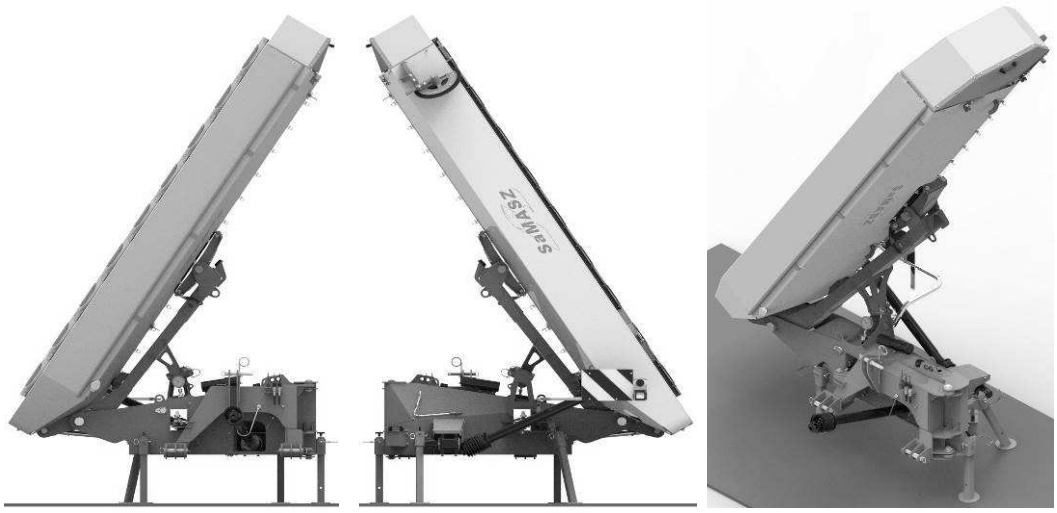


Fig. 22. Mower in vertical standstill position

7. MOUNTING AND ADJUSTMENTS

7.1. 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. 23**) delivered with the mower.

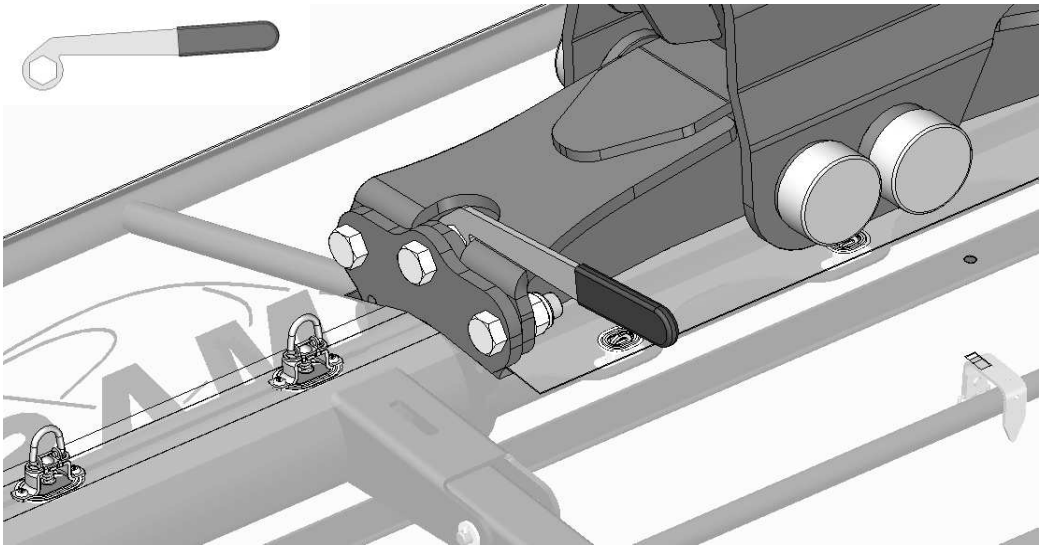


Fig. 23. Key for assembling / disassembling main frames

7.2. Mounting knives

Knives should be mounted in accordance with scheme provide in **Fig. 24** and **Fig. 26**. The blades recommended by the manufacturer have the dimensions 105x49x4 and meet relevant requirements. Cutting knives should be mounted with principle, that the knife upon grass cutting should lift it up (cutting edge should be lower).

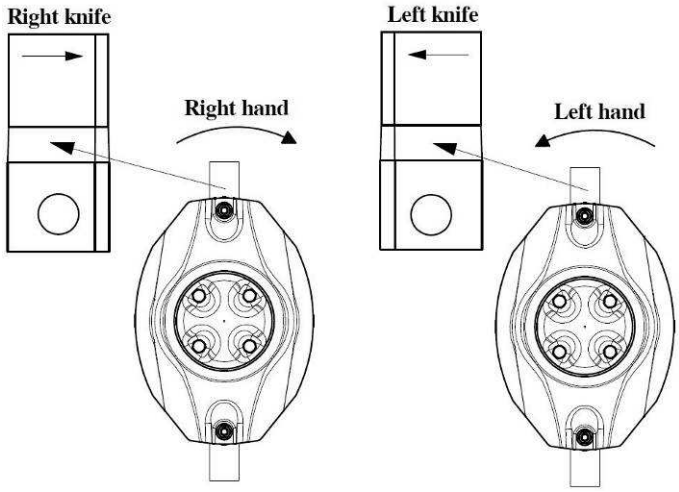


Fig. 24. Mounting cutting knives

NOTE:
Use only SaMASZ original cutting knives.

WARNING!
Condition of knives should be checked each time before any operation. Damaged or worn elements pose danger of throwing and are as well health and life threatening.

7.3. Checking condition of knives and holder pins

All knives should be of the same length and weight. Replace them, if necessary, only in sets of the same length and weight.

Knife holder pin cannot be worn more than provided in **Fig. 25**. Too big a pin wearing is enough for a knife holder to be replaced.

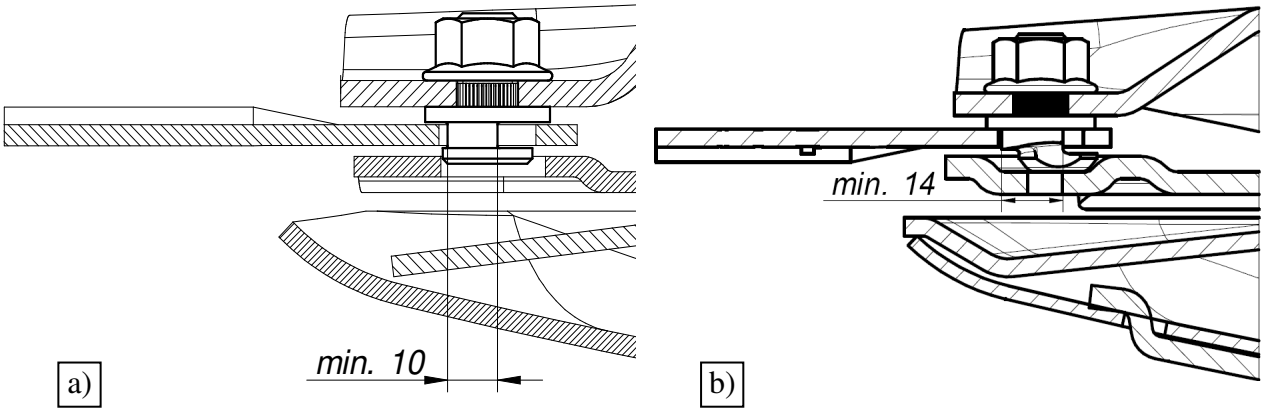


Fig. 25. Permissible wear of knife holder pin on disk a) knife base M12 b) knife base M12 with claw

NOTE:
Use only SaMASZ original holder pins.

WARNING!
Condition of holder pins should be checked each time before any operation. Damaged or worn elements pose danger of throwing and are as well health and life threatening.

7.4. Replacing knives and holder pins

Worn and/or damaged knives must be replaced immediately as shown in **Fig. 26**. Knives should be replaced in pairs so proper disk balance is kept. On replacing knives pin of knife's holder shall be examined carefully. If holder's pin is worn (**Fig. 25**), both holders or the pins must be replaced with new ones.

WARNING!
Pay attention, whether the mower is not vibrating when operating as this means that disc (discs) operates only with 1 knife. Long-term operation will lead to serious damage of the cutterbar. This is not covered by warranty. Have breaks while operating and check whether the knife set is complete.

WARNING!
When replacing knives make sure the engine is be turned off and the cutterbar lies on the ground. Also, turn off the PTO shaft connecting the mower to the tractor.
Discs should be perpendicular to the cutterbar .

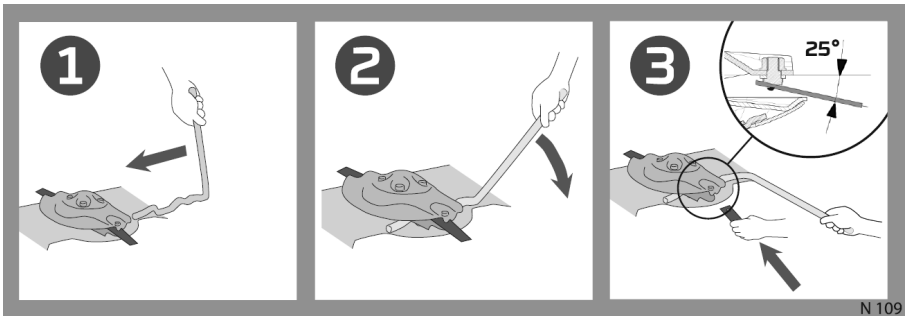


Fig. 26. Cutting knife quick replacement

WARNING!
Due to various windrow widths in offered mowers (and therefore various rotation directions of discs), before mounting knives check rotation directions of each disc (**Fig. 27**).

WARNING!
Improper mounting of knives will lead the mower to choke. When mounting pay particular attention to knife rotating freely on the holder's pin.

XT 390

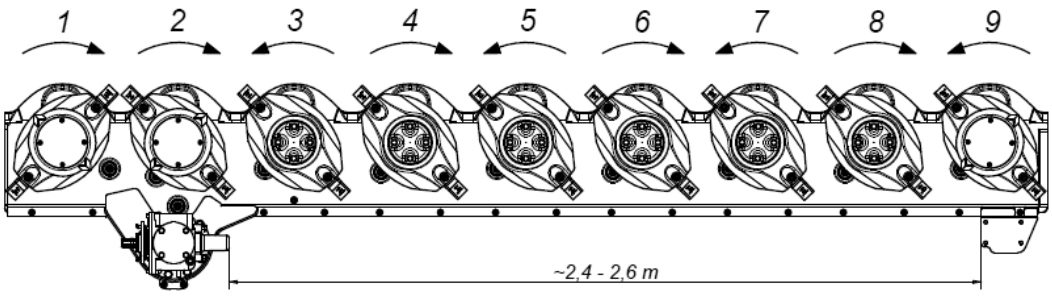


Fig. 27. Disc rotation directions

7.5. Swath width adjustment

Swath width is adjusted with swath guides (**1**) mounted on the 3-point linkage frame of the cutterbar (**Fig. 28**).

In order to adjust the guide, the following should be performed:

- 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 height and shield angle (**7**),
- tighten screws (**5**) and locknuts (**4**).

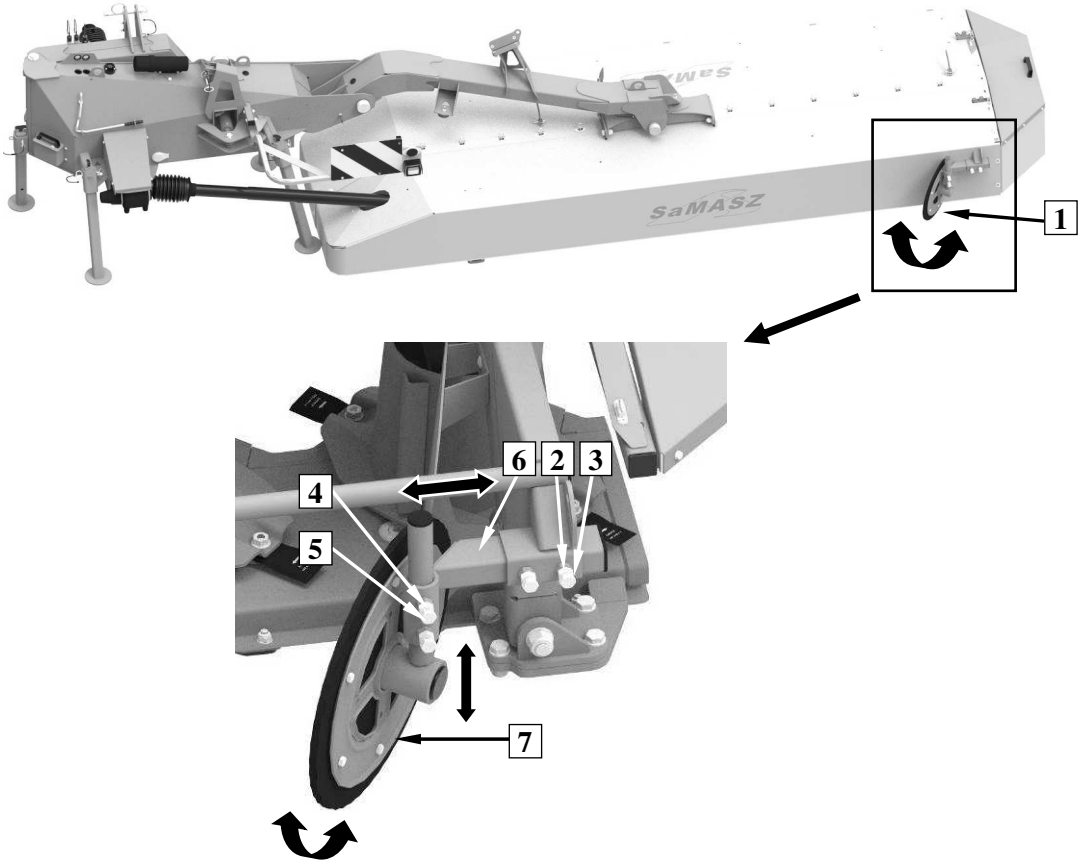
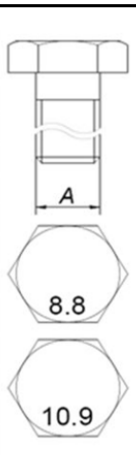


Fig. 28. Adjustment of swath guides: **1**- swath guide, **2** - locknuts, **3** - arm adjustment screws, **4** – locknuts, **5** - shield adjustment screws, **6** - guide arm, **7** – shield

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.

7.6. Maintenance

7.6.1. Daily maintenance

Upon daily completion of operation the following should be performed:

- check all visible parts and components and their connections, tighten all loosened nuts or screws and replace all worn or damaged parts,
- wash the mower with water under pressure after every use, especially between the cutterbar and discs, because dried mud with grass can cause premature wearing out of the bearings in the disc assembly or block proper rotation of the assembly,
- clean any remaining plant matter, dirt or mud,
- check the condition of the cutting unit,
- lubricate the telescoping shafts of the articulated telescoping shaft with STP grease,
- if needed lubricate according to lubricating instructions (**Section 8**).

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 holder pins.

7.6.2. After -season maintenance and storing

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 or as shown in **Fig. 22**. It is recommended to store the set on paved ground, preferably in roofed places, inaccessible to unauthorized personnel or animals. Machine should be stored in dry place, in the event if it is exposed to precipitations, apply lubrication regularly.

At the end of the season the mower should be cleaned, washed and dried. Carefully grease unpainted surfaces and 3-point linkage pins.

Moreover:

- perform any necessary paintwork repair,
- examine oil level in axis gears and cutterbar (**Section 8**). If leaks are found remove them immediately and refill the oil. If water is found in the oil, it must be replaced; otherwise the gears, bearings and shafts could be exposed to corrosion what in result could lead to further failures,
- perform periodic check-ups of the mower and protect all operating parts with grease in order to prevent their baking and creating any sources of corrosion, which significantly influences mower's proper operation,
- 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.

8. LUBRICATION

8.1. Risks present when lubricating

- If risk of splashing is present, make sure to wear protective eyewear with side guards.
- When lubricating protect eyes and skin against contact with the substance. Therefore use adequate protective wear with long sleeves and protective footwear. Also use protective gloves. In case of a contact with skin, immediately wash the infected area with plenty of water with soap.
- 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 official regulations. Improper disposal of the used oil poses danger to the environment.

8.2. The cutterbar

The opening with a plug **A** is used to fill cutterbar oil (**Fig. 29a**). The correct oil level when the cutterbar is levelled should reach from .2″-.27″ (5-7mm) from the bottom. In order to drain oil from the cutterbar dismount the cutterbar enclosure by releasing bolts **B** (**Fig. 29b**). The best time to drain the oil is immediately after the operation, if still warm. The necessary amount of oil is shown in the following **Tab. 8**.

Tab. 8. Amount of oil in the cutterbar

Mower type	Amount of oil [US Gal lqd]	Oil type	Frequency of oil changes
XT 390 - 12′ 9″ (3,90 m)	1.85	80W90	once every 3 seasons (as necessary with intensive use)

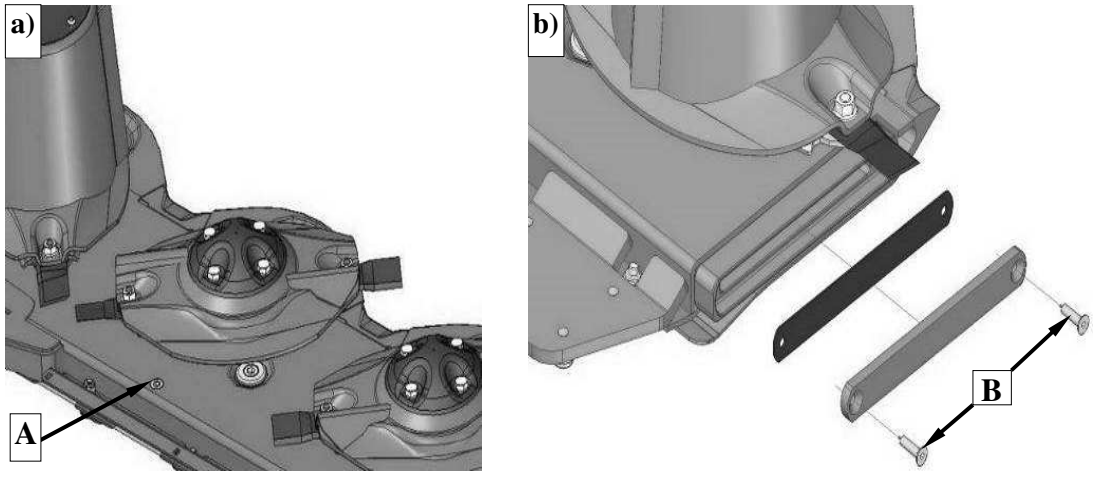


Fig. 29. Control and oil changing points of the cutterbar

8.3. Gear boxes

Before daily work check the oil level and, if needed, refill after having removed the vent **A** (**Fig. 30a, b**) on the top of the gear. The oil level can be checked by opening check opening **B** on the side of the gear. If oil level is too low, refill oil until it is visible in the check opening **B**. The oil capacity in the 110-01.111.L (**Fig. 30a**), 054-02.10CB.R (**Fig. 30b**) gears is about 0.26 US Gal lqd. Check the oil level with the cutterbar set horizontally on the ground. Vent **C** is used for draining of oil.

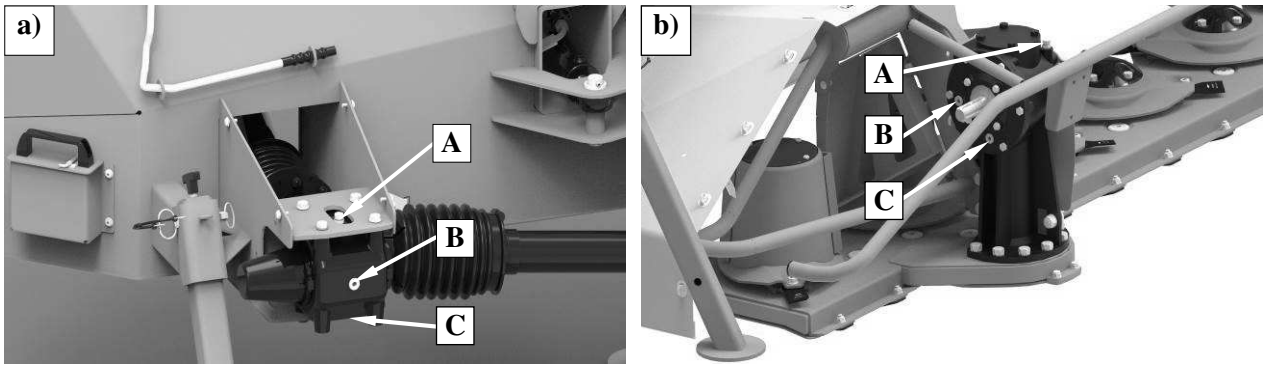


Fig. 30. Control and oil changing points of the gear box

To replace oil in gears:

- Prepare an adequate tank for the used oil to be disposed,
- Open fuel cap **A** (**Fig. 30**),
- Drain oil from the gear by opening drain vent **C**,
- Close drain plug **C**,
- Refill the oil level until it is visible in the check opening **B**,
- Close fuel cap **A.**

Tab. 9. Amount of oil in the gear box

Mower type	Amount of oil [US Gal lqd]	Oil type	Frequency of oil changes
XT 390	0.26	SAE 80W/90, API GL-4	once every 3 seasons (with intensive use)

NOTE:

Make sure to follow the above guidelines. If discs on the cutterbar can spin freely then the high temperature of the gear should not be a concern since after long periods of work it can reach temperatures of up to 100°C.

8.4. Lubrication points

Every 50 hours of the mower's operation, lubricate main joints of the mower and all connections is cylinders with **STP** grease**.**

9. DEFECTS AND THEIR REPAIR

Tab. 10. Possible defects and their repairs

Defect type	Reason		Recommendations
Mower fails to mow or leaves strip of uncut grass between discs	1	Some of knives are missing	Mount knives
	2	Worn knives	Replace knives with new ones
	3	Improperly mounted knives (left – right)	Mount knives strictly keeping provisions found in manual
	4	Improper forward tilt	Set tilt according to operating manual
	5	Too high tractor's engine rpm (the most frequent mistake)	Reduce rpm
	6	Too low operating speed	Increase driving speed above V ≥ 6mph (10km/h)
	7	Damaged tractor's PTO shaft, drive not transmitted	Remove defect
	8	Laid grass	Inclination - zero angle
	It is tolerable for a mower with conditioner or rollers to mow improperly in case of very low grass or during a rainfall		
Grass winds on drums	Mowing lying grasses without tilting the mower forward.		Always mow low and fast – tilt forward to 1.57″ (4cm)
The mower jams up with grass - windfall is blocked or uneven	Mowing speed too low		Increase mowing speed to 6mph (10km/h) or more
	Swath guides are set too narrow		Widen swath guides to the maximum
Hydraulic safety activates too often with no apparent cause	Improperly adjusted or damaged hydraulic valve		Adjust or have the valve repaired by an authorized service provider
The mower does not cut even though tractor power is transferred to the mower	Broken shaft in the gearbox		Replace gear shaft
	Relay shafts - incorrect rotation direction of the unidirectional clutch		Check rotation direction
The mower seizes up	Damaged gear in the cutterbar or gearbox		Repair through an authorized service provider
The mower will not fold up	Damaged or dirty hydraulic connections		Replace or clean hydraulic connections
	Damaged tractor hydraulic system		Check the functioning of the tractor hydraulic system
Conveyor is clogged with grass	Too low conveyor speed		Increase – adjust so as corresponds to grass weight
Leaking cylinder	Dirty oil in hydraulic unit of the tractor		Replace oil in hydraulic unit of the tractor (recommended class of cleanliness of oil according to NAS 1638 is minimum 9-10). Purchase repair kit of the cylinder and replace damaged sealings
Excessive vibration during work	Damaged PTO shaft		Check the condition of PTO shaft and if need be replace
Oil leak in gear	Not tight assembly		Examine tightness and check oil level

10.REPAIR AND WITHDRAWAL FROM USE

10.1. Repair

IMPORTANT:
Before repair works make sure the mower is disconnected from the tractor.

Before repairing or assessing whether the mower is still serviceable, the machine should be carefully cleaned of dirt, mud and plant remains.

After checking nuts and bolts, proper slack in joints and gears we can assess if the machine is still serviceable. Worn out bolts, pegs, pins, discs, holders, knives etc. should be replaced.

Once the machine is repaired perform the following:

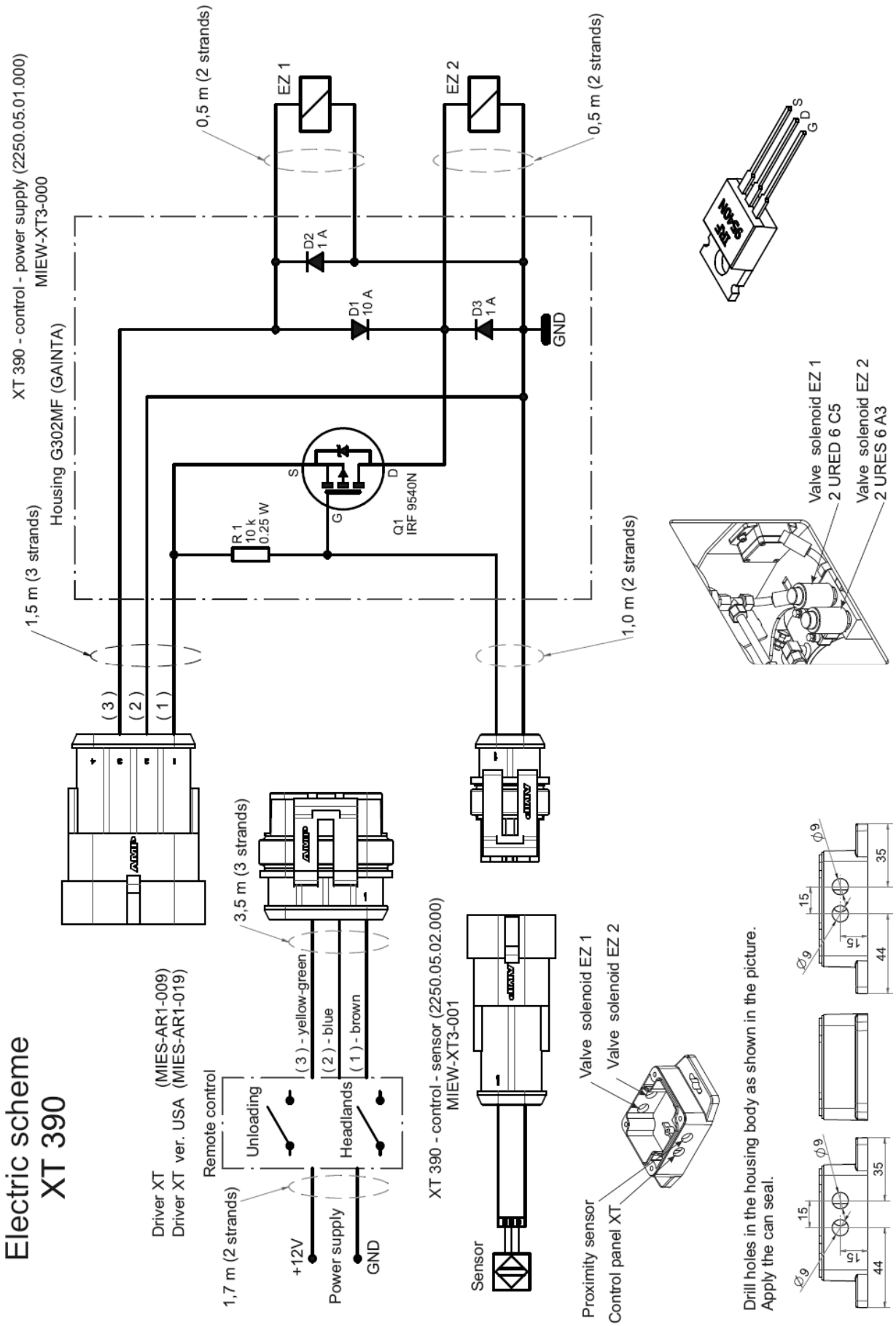
- make sure that all elements are installed properly,
- install the removed guards,
- check whether screws and nuts are tightened,
- check proper slack in joints and in gears,
- once all the guards are installed, perform a warm-up start to make sure the repaired machine operates properly.

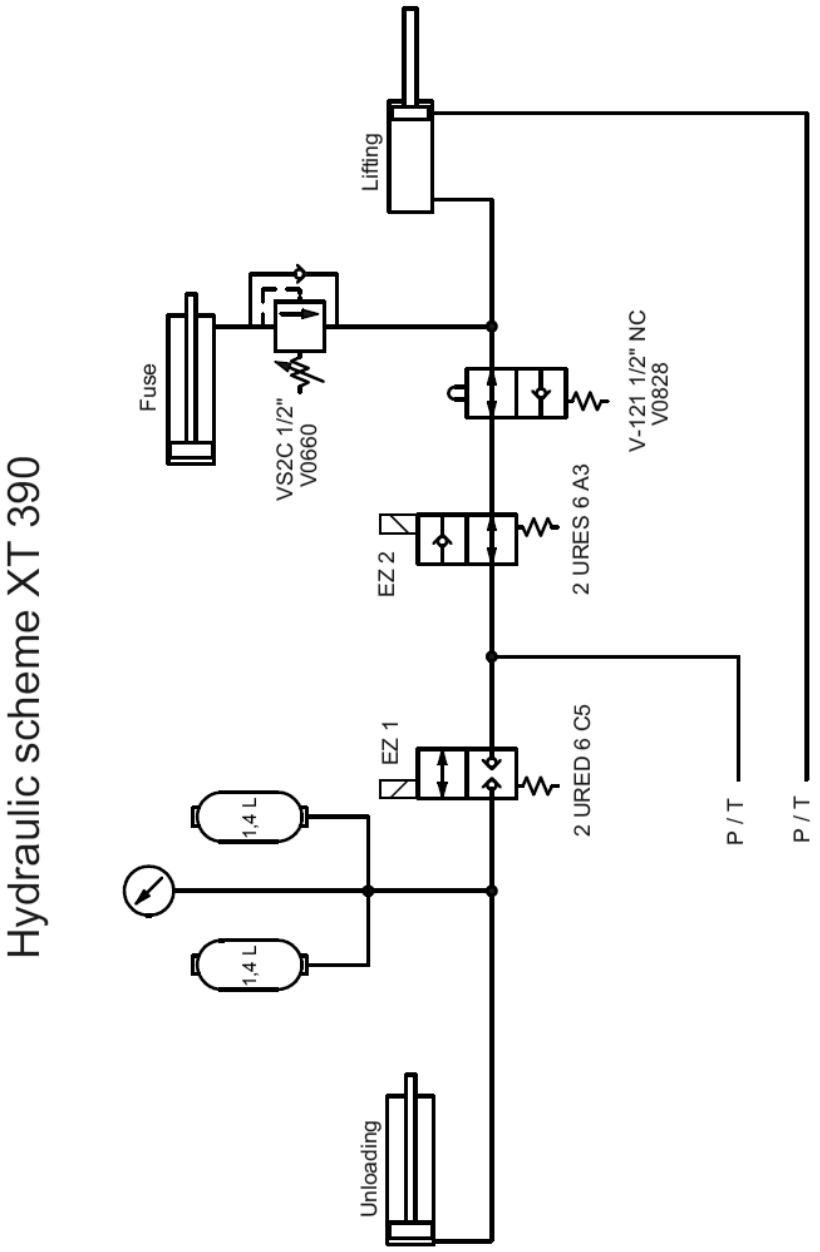
10.2. Disassembly and withdrawal from use

If the mower cannot be repaired anymore, it should be withdrawn from use. For this purpose oil from the frame gearbox should be drained and thoroughly clean any excess oil with cleaning agent, take parts made of plastic off. These should be used further on or delivered to a proper waste treatment company. Upon completing the required activities machine should be sold to breaker's yard.

IMPORTANT:
When dismounting the machine pay particular attention to and additional dangers, as crushing, cutting, wounding, concussion and abrasion. Use proper tools and personal protective equipment: protective gloves, clothing and footwear, eye wear, etc. Pay attention so that the machine works efficiently, and thus it is required to secure the machine with supports.

11.ELECTRIC AND HYDRAULIC SCHEMES




Hydraulic scheme XT 390
Lifting
Fuse
VS2C 1/2"
V0660
V-121 1/2" NC
V0828
EZ 2
2 URES 6 A3
EZ 1
2 URED 6 C5
1,4 L
1,4 L
P / T
P / T
Unloading

12.WARRANTY CARD

REAR DISC MOWER WITH CENTRAL SUSPENSION XT

	Serial number Manufacture date Guarantor seal Controller signature
	Date of sale Seller seal Seller signature

This product has been checked and deemed fully serviceable and cleared for use.

NOTE:
Warranty card – if not filled in, corrected or illegible – **is not valid.**

13.WARRANTY TERMS

13.1. Warranty claims procedures

1. The manufacturer warrants good quality and defect-free operation of the mower under this warranty if mower is operated in accordance with the operator's manual.
2. Faults or damages to the machine found within 24-month period from the date of purchase shall be removed free of charge at the purchaser's or the manufacturer's.
3. Faults or damages should be submitted personally, in writing or by telephone. Repairs shall be carried out within 14 days. Any repairs under the warranty should be carried out by authorized SaMASZ service facilities.
4. Warranty claims regarding the product replacement or repayment are considered within 14 days by the manufacturer.
5. The following parts and situations are not covered by warranty:
   a) wear and tear of parts such as: mowing discs, slides, intersecting axis gears and parts within, bushings and sliding bushes, joints, knife holders, cutting knives, V-belts, conditioner's tines and rollers, roller conditioner's rubbers, bearings, rubber - metal fenders, safety curtains, conveyor's belts, connective elements, etc. These repairs may be carried out only at the purchaser cost.
   b) use of the mower for any purpose other than described in the operator's manual,
   c) operation on stony area resulting in e.g. damaging conditioner roller, discs, bending cutterbar (stone with diameter greater than 5.51″ (140mm) is not able to pass through discs and the roller),
   d) running into any obstacle,
   e) lowering the cutterbar to the ground too fast,
   f) random events or other occurrences, for which the Manufacturer cannot be held responsible,
   g) damaging, breaking conditioner roller, conveyor belts.
6. The Purchaser bears the costs of technical evaluation – if the Manufacturer finds that a claimed product is free of defects and this is confirmed by technical report.

7. The Manufacturer has the right to cancel the warranty in the following cases:

a) hampering with the mower, modifications to its mechanical design or intentional damages,
b) operating mower with a single knife on a disc,
c) vast damage caused by fortuitous events or others, for which the Manufacturer does not bear any responsibility,
d) use of knives, knife holders and mountings other than originally delivered by SaMASZ,
e) lack of required records in the warranty card or filling in the warranty card independently,
f) use of the mower for any purpose other than described in the operator's manual.

8. The 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 by the Contractor due to causes dependent on the user shall lead to termination of the warranty given for the particular machine.

9. The Manufacturer shall not bear any compensation responsibility for the loss caused by the machine breakdown during its operation.

NOTE:
Please ask your dealer to complete and return the warranty card with date and place of purchase, and dealer's stamp and signature. Otherwise you may lose your warranty rights.

NOTE:
The Manufacturer reserves the right to introduce design changes.

NOTE:
The SaMASZ company is constantly working on the development of all of its machine types and models. Therefore, any modifications of our machinery due to their form, equipment and technology are likely. No claims can arise from data, drawings and descriptions included herein as well as the spare parts list.
SaMASZ is not responsible for printing errors.

13.2. Warranty repairs record

Repairs scope and spare parts replaced:

Date, stamp and signature of repair shop.

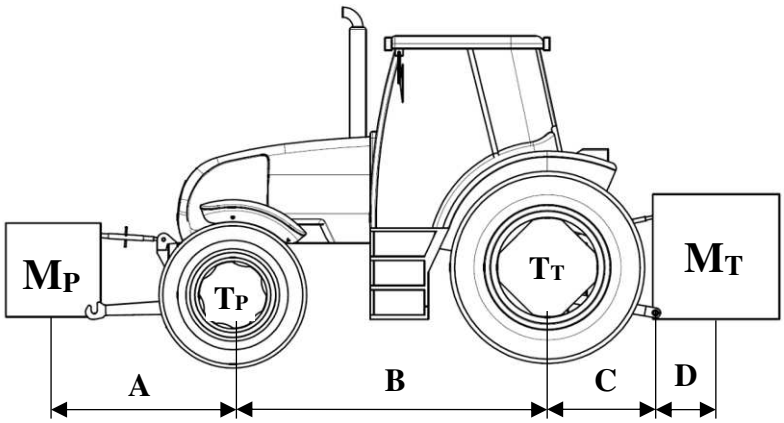
Date, stamp and signature of repair shop.

Date, stamp and signature of repair shop.

APPENDIX
CALCULATING AXIS LOAD

WARNING!
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.

1. Defining the total weight, axis load, tire load capacity and minimum load.



For calculations the following data is necessary:

T	[kg]	Tractor's overall weight	(1) (3)
T_P	[kg]	Front axis load on unloaded tractor	(1) (3)
T_T	[kg]	Rear axis load on unloaded tractor	(1) (3)
M_P	[kg]	Total weight of machine mounted on front 3-point linkage or weight of front ballast	(2) (3)
M_T	[kg]	Total weight of machine mounted on rear 3-point linkage or weight of rear ballast	(2) (3)
A	[m]	Distance between center of gravity of machine mounted on front 3-point linkage / front ballast and tractor's front axis center	(2) (3)
B	[m]	Distance between tractor's axes	(1) (3)
C	[m]	Distance between tractor's rear axis center and centers of ball joints on tractor's lower links	(1) (3)
D	[m]	Distance between centers of ball joints on tractor's lower links and center 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 ballast **$M_{P\ min.}$** – machine mounted at tractor's rear or at rear and front:

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

- Calculating minimum weight of rear ballast **$M_{T\ min.}$** – machine mounted at tractor's front:

$$M_{T\,min.} = \frac{M_P \times A - T_P \times B + 0{,}45 \times T \times B}{B + C + D}$$

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

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

** If machine is mounted on tractor's front 3-point linkage (M_P) it is lighter than minimum required load at the front, so increase the weight of this machine to the required minimum load*

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

$$M_C = M_P + T + M_T$$

** If machine is mounted on tractor's rear 3-point linkage (M_T) it is lighter than minimum required load at the rear, so increase the weight of this machine to the required minimum load*

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

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

- Tire load capacity – apply double the load indicated by the tires' 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 tire capacity load**
Minimum weight of front or rear ballast **$M_{Pmin.}$ or $M_{Tmin.}$**					
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.