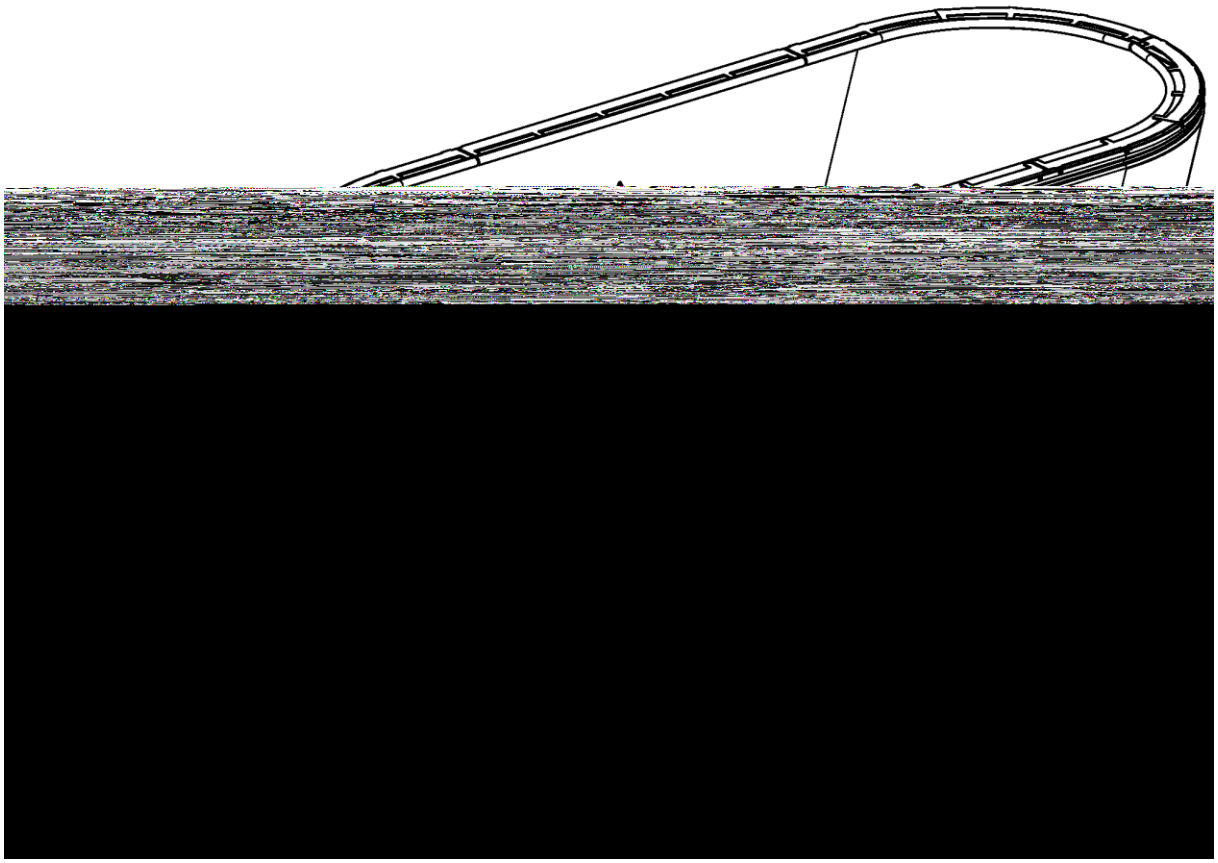
Original instructions

Fodder mixing wagon

Verti-Mix 951-1651,
Verti-Mix 951-L, 1251-L,
Verti-Mix 1501 D-3101 D



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Type		Verti-Mix Double			
	Unit	1501 D	1801 D	2401 D	3101 D
P.t.o. speed	min^{-1}	540			
Sound pressure level	dB(A)	≤85			

* Actually usable mixing capacity, mixing augers having been deducted from the capacity

Tab. 9

Figures, technical data and weights may change due to technical development and are not binding for delivery.

The sound pressure level mainly depends on the tractor used.

2.6.3.1 Dimensions of wagon

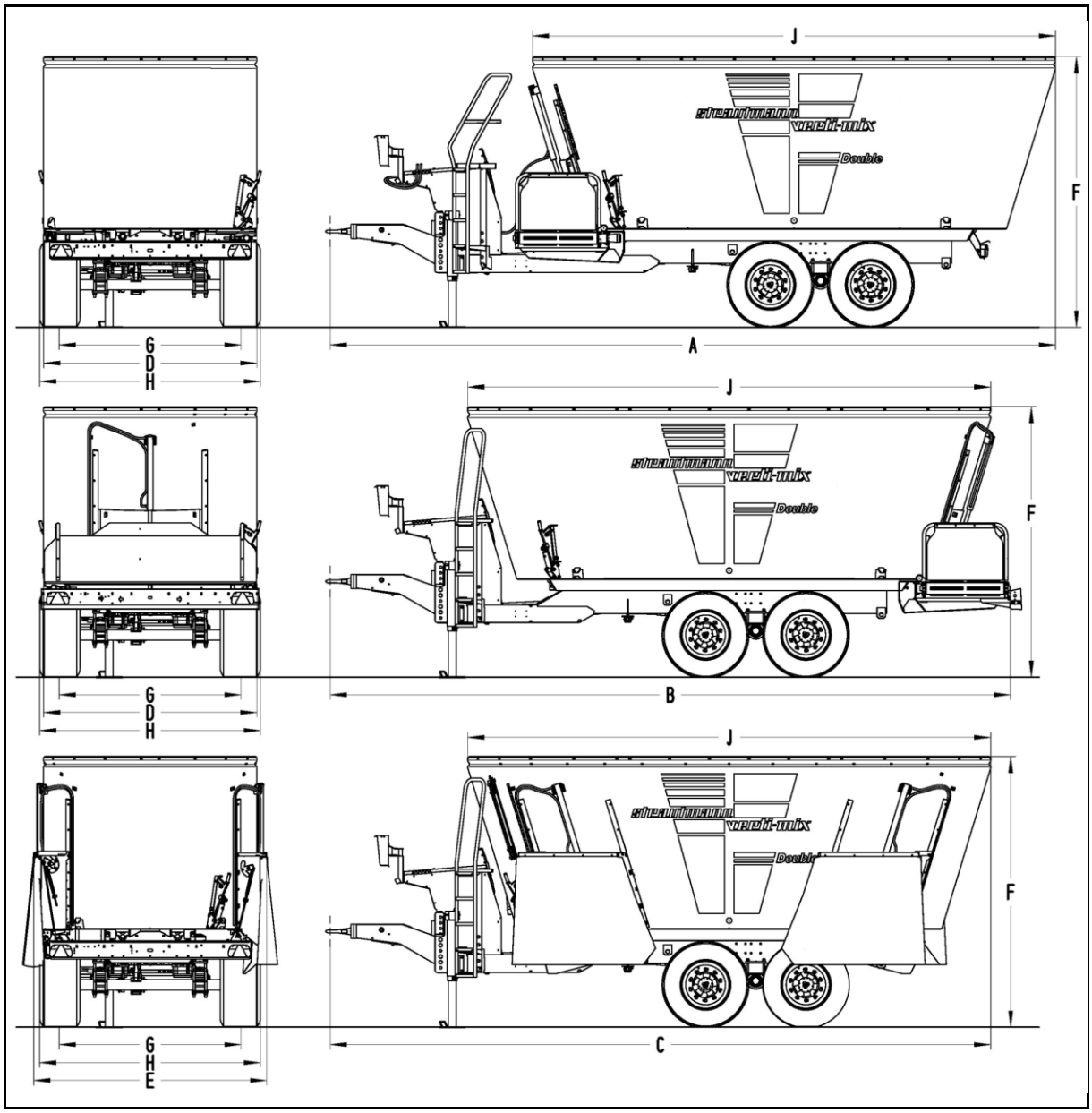


Fig. 11

Type		**Verti-Mix Double**											
	Unit	**1501 D**			**1801 D**			**2401 D**			**3101 D**		
Extension height	**m**	**-**	**0.18**	**0.36**	**-**	**0.18**	**0.36**	**-**	**0.18**	**0.36**	**-**	**0.18**	**0.36**
Length:													
• A = with front crossover conveyor	m	7.01			7.40			7.76			8.13		
• B = with rear crossover conveyor*	m	6.61			6.98			7.27			7.55		
• C = without crossover conveyor	m	6.34			6.71			7.06			7.44		
Width:													
• D = with crossover conveyor	m	1.96			2.16			2.28			2.42		
• E = with right-hand or left-hand side discharge	m	2.06			2.26			2.38			2.52		
• E = with side discharge on both sides	m	2.16			2.36			2.48			2.62		
Height incl. tyres (single axle):													
• F = with 8.15- 15 (14 PR) double Middle axle position	m m	2.30 2.28	2.48 2.46	2.66 2.64	2.34 --	2.52 --	2.70 --	2.62 --	2.80 --	2.98 --	-- --		
• F = with 215/75-17.5 double Middle axle position	m m	2.36 2.35	2.54 2.53	2.72 2.71	2.37 --	2.55 --	2.73 --	2.66 --	2.84 --	3.02 --	-- --		
• F = with 235/75R17.5 double	m	--			--			2.66	2.84	3.02	--		
• F = with 455/45R22.5	m	--			--			2.85	3.03	3.21			
• F = with 435/50R19.5 Middle axle position	m m	2.51 2.49	2.69 2.67	2.87 2.85	2.52 --	2.70 --	2.88 --	2.80	2.98 --	3.16 --			
Reduction of load capacity:	kg	--			--			12100					
• F = with 400/60-15.5 Middle axle position	m m	2.43 2.38	2.61 2.56	2.79 2.74	--			--					
Reduction of load capacity:	kg												
Height incl. tyres (Tandem axle):													

Type		Verti-Mix Double											
	Unit	1501 D			1801 D			2401 D			3101 D		
Extension height	**m**	**-**	**0.18**	**0.36**	**-**	**0.18**	**0.36**	**-**	**0.18**	**0.36**	**-**	**0.18**	**0.36**
• F = with 10.0/75-15.3	m				2.38	2.56	2.74						
• F = with 400/60-15.5	m				2.51	2.69	2.87	2.8	2.98	3.16			
Increase of load capacity:	kg				12800			17800			--		
• F = with 435/50R19.5, track 1930	m	--			--			2.87	3.05	3.23	3.21	3.39	3.57
Increase of load capacity:	kg	--			--			17800			--		
•F = with 435/50R19.5, track 1720	m	--			2.56	2.74	2.92	2.84	3.02	3.20	3.21	3.39	3.57
Increase of load capacity:	kg	--			12800			17800			--		
G = Track	m	1.52			1.52			1.74			1.94		
H = Outside wheel width incl. standard tyres:	m	2.03			2.03			2.03					
J = Container length	m	4.84			5.17			5.59			6.07		
Discharge height with crossover conveyor	m	0.79			0.81			0.81			1.03		
* + 0.13 m with lighting													

Tab. 10

Figures, technical data and weights may change due to technical development and are not binding for delivery.

2.6.3.2 Tyre pressure

Type		Verti-Mix Double			
Tyres	**Unit**	**1501 D**	**1801 D**	**2401 D**	**3101 D**
Single axle					
8.15-15 (14 PR) double	bar	9.0	9.0	9.0	--
215/75R17.5 (133) double	bar	9.5	9.5	9.5	--
235/75R17.5 double	bar	--	--	9.5	--
435/50 R 19.5	bar	9.0	--	--	--
400/60-15.5 (18 PR)	bar	6.0	--	--	--
455/45R22.5	bar	--	--	9.0	--
Tandem axle					
10.0/75-15.3 (18 PR)	bar	--	7.0	--	--
400/60-15.5 (18 PR)	bar	--	6.0	6.0	--
435/50 R 19.5	bar	--	--	9.0	9.0

Tab. 11

2.7 Required tractor equipment

The employed tractor must meet the following requirements, in order to ensure correct use of the machine:

Tractor engine output

For the necessary power required, please refer to chapter "Technical data", page 24.

Electrical system

Battery voltage:	• 12 V (volt)
Socket for lighting:	• 7-pole
Socket for work lights, camera system and control set:	• 3-pole (DIN 9680). The feed line of the 3-pole socket should have a minimum cable cross section of 4 mm².

Hydraulics

- Check the compatibility of the hydraulic oils before connecting the machine to the hydraulic system of your tractor. For details about checking the compatibility of the hydraulic oils, contact your agricultural machinery dealer if necessary.
- Do not mix mineral oils with bio oils.

Maximum operating pressure:	• 210 bar
Delivery rate of hydraulic pump	• min. 25 l/min and max. 45 l/min at 180 bar
Hydraulic oil of machine:	• ATF Hydraulic oil

Depending on their function, the hydraulic components can be connected to:

- a double-acting control device,
- a single-acting control device and a depressurised return line leading directly into the hydraulic oil tank of the tractor.

Given a free choice, we recommend a single-acting control device and a depressurised return line. The hydraulic oil flows back into the hydraulic oil tank of the tractor through the free return line with a low back pressure. Thus, a free return line reduces heating-up of the hydraulic oil.

Operation via direct tractor connection

Hydraulic component:	Required control devices on the tractor:
• Discharge door:	• 1 double-acting control device
• Hydraulic supporting leg:	• 1 double-acting control device
• Hydraulic counter-cutters:	• 1 double-acting control device
• Hydraulic motor for crossover conveyor:	Optional: • 1 double-acting control device or • 1 single-acting control device and 1 pressure-less return line (max. back pressure in return line 5 bar)
• Side discharge conveyor:	• 1 double-acting control device (extend and retract)
• Hydraulic motor for side discharge conveyor:	Optional: • 1 double-acting control device or • 1 single-acting control device and 1 pressure-less return line (max. back pressure in return line 5 bar)
• Conveyor extension:	• 1 double-acting control device (extend and retract)

Tab. 12

Operation via Bowden cable or electro-hydraulic E-control

Optional extra

Required control devices on the tractor:	Optional: • 1 double-acting control device or • 1 single-acting control device and 1 pressure-less return line (max. back pressure in return line 5 bar)

Tab. 13

Brake system

Hydraulic service brake up to 6 km/h (not licensed for public road traffic):	• 1 single-acting control device
Dual-line service brake system:	Dual-line compressed-air brake system including: • 1 hose coupling (red) for the feed line • 1 hose coupling (yellow) for the brake line
Hydraulic service brake (only available for export):	• 1 hydraulic clutch according to ISO 5676 (100 bar)

Tab. 14

Mirrors

The used tractor must be equipped with mirrors such that the hazardous areas on both sides of the machine are clearly visible from the tractor's seat.

2.8 Drawbar

The machine is equipped with a vertically adjustable drawbar for:

- Top linkage with flanged drawbar lug 40 mm according to DIN 74054-1/2 / ISO 8755,
- Top linkage with drawbar lug 40 mm according to DIN 74054-1/2 / ISO 8755 with automatic reverse system (25 km/h) (only Verti-Mix 951, 1251),
- Top linkage with flanged and cranked drawbar lug 40 mm
- Top linkage with coupling head type 80
- Bottom linkage with coupling head type 80
- Bottom linkage with flanged drawbar lug type 3394 and fixed supporting leg,
- Bottom linkage with flanged drawbar lug 50 mm according to DIN 74053-1 / ISO 1102.

The drawbar (1) can be screwed on within the adjusting range of the positioning holes (2) at different levels compared to the chassis (3) (Fig. 12).

This allows optimum adjustment of the drawbar lug (4) to the respective height of the coupling device of the different tractors.

The drawbar lug (4) is coupled by means of an appropriate bolt-type coupling.

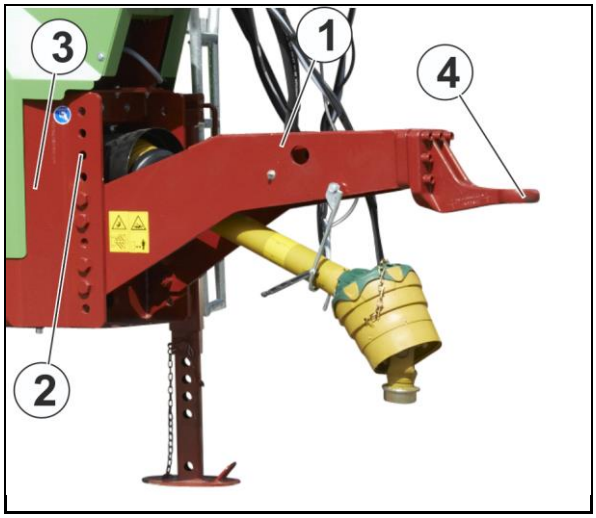


Fig. 12

3 Safety instructions

This chapter contains important information for the user and the operator on how to operate the machine in a safety-conscious and trouble-free way.

Observe all safety instructions included in these operating instructions!

Most accidents are caused by non-observance of simplest safety rules.

By observing all safety instructions included in these operating instructions, you help to prevent accidents.

3.1 Correct use

The fodder mixing wagons of the Verti-Mix series are designed for chopping, homogeneous mixing, transport and discharge of all types of silage and normal fodders used in keeping livestock,

Prerequisites:

- In conventional TMR mixtures*, the dry substance content of the total mixture must be more than 30 % at any time of the mixing process.
- Use a protective cover if the dry substance content is less than 30 % at any time, e.g. in compact TMRs.

* TMR = Total Mixed Ration

The fodder mixing wagons must not be charged otherwise than by means of:

- a tractor equipped with a front loader,
- a yard or wheeled loader,
- a telescopic loader,
- the provided feeding aids such as mineral feed funnel, etc.
- direct filling from the pipe or conveying device for concentrated feed, mineral feed etc.

The following is also part of the correct use:

- the observance of all instructions contained herein,
- the observance of the specified service and maintenance work on the machine,
- the exclusive use of original spare parts.

Any use beyond this is prohibited and will be regarded as incorrect.

For any damage resulting from incorrect use:

- the user will be solely responsible,
- the manufacturer will not assume any liability.

3.2 Safety-conscious working

The machine complies with the safety-related requirements and state of the art. When using the machine, risks and impairments might yet arise:

- for life and limb of the operator or third parties,
- for the machine itself,
- to other material assets.

For the safety-conscious operation of the machine, please observe:

- these operating instructions, in particular:
  - the basic safety instructions, the activity-related safety instructions and the instructions what to do,
  - the instructions regarding correct use.
- the warning signs on the machine,
- the general national occupational safety, accident prevention and environmental protection rules,
- the national road traffic regulations when carrying out transport journeys.

Only operate the machine in perfect safety-related condition.

WARNING	**Risk of being crushed, cut, becoming entangled, being drawn in or risk of impact if the tractor and the machine are not in adequate roadworthy and reliable condition!** Check tractor and machine for their road and operational safety before each startup.

3.3 Organisational measures

The operating instructions:

- must always be kept at the machine's place of operation,
- must always be easily accessible for operating and maintenance staff.

3.3.1 User’s obligation

The user is obliged:

- to observe the general national occupational safety, accident prevention and environmental protection rules,
- to exclusively have staff operating the machine who:
  - know the basic occupational safety and accident prevention regulations,
  - have been instructed how to operate the machine,
  - have read and understood these operating instructions.
- to keep all warning signs attached to the machine in legible condition,
- to replace any damaged warning signs,
- to provide the necessary personal protective equipment such as protective goggles, work gloves according to DIN EN 388, safety footwear, protective clothing, skin protectant, etc.

3.3.2 Operator’s obligation

Any members of staff charged to operate the machine are obliged:

- to acquaint themselves with the machine before starting operation,
- to acquaint themselves with the following regulations and to observe them during work:
  - the general national occupational safety, accident prevention and environmental protection rules,
  - the chapter "Basic safety instructions“, page 48,
  - the chapter „Warning and instruction signs“, page 59, and the warning signs when operating the machine,
  - the chapters of these operating instructions which are important for the tasks assigned to them.

If the operator notices that a device is not in a sound safety-related condition, the operator shall be obliged to immediately eliminate this defect. If this is not part of the operator’s scope of tasks or he/she lacks adequate expert knowledge, the operator shall be obliged to report this defect to his/her superior or to the user.

3.3.3 Qualification of operator

Only trained and instructed staff is allowed to operate the machine. The user must clearly define the responsibilities of the members of staff for operation, service and maintenance.

A person to be trained must be supervised when operating the machine.

The operator is only allowed to carry out such work as specified in these operating instructions which is not marked as "Shop work".

Only authorised workshops are allowed to carry out work on the machine which requires special expert knowledge. Authorised workshops have qualified staff and adequate means (tools, lifting and supporting equipment) at their disposal to carry out this work properly.

This applies to any work:

- which is not mentioned in these operating instructions,
- which is marked as "Shop work" in these operating instructions.

3.4 Product safety

3.5 Hazardous areas and dangerous spots

The hazardous area is the area within and/or in the vicinity of a machine, in which the safety or health of people might be impaired.

People are not allowed in the hazardous area:

- if the tractor engine is running with the propeller shaft coupled/ the hydraulic/electronic system connected,
- if tractor and machine are not secured against accidental starting and rolling.

Only if no people are within the hazardous area of the machine, is the operator allowed to:

- move the machine,
- set movable machine parts from transport to working position and from working to transport position,
- power working tools.

Within the hazardous area, risks occur at dangerous spots, which cannot be completely eliminated due to the operational safety of the machine. The risks exist permanently or may occur unexpectedly.

Dangerous spots are marked by warning signs attached to the machine, which warn about existing residual risks.

In these operating instructions, activity-related safety instructions mark the existing residual risks.

Risks may arise:

- due to work-related movements of the machine and its working tools,
- due to substances or foreign objects flung out of the machine,
- due to accidental lowering of the lifted machine/of lifted machine parts,
- due to accidental starting and rolling of the machine.

Dangerous spots exist:

- within the drawbar area between tractor and machine,
- within the area of the powered propeller shaft,
- within the area of the discharge openings,
- within the area of the powered discharge conveyor, crossover conveyor or conveyor extension,
- in the mixing container with the machine powered or not powered,
- around the discharge pipe and in ejection direction in case of machines equipped with straw blower.

3.5.1 Safety-conscious operation of machine

The machine is only allowed to be operated from the driver's seat of the tractor, provided that no people are within the machine's hazardous area. Observe the information in the chapter "Hazardous areas and dangerous spots", page 45.

3.5.2 Safety and protective devices

- Only operate the machine when all safety and protective devices are properly fixed and in fully operable condition.

  Defective or removed safety and protective devices might cause dangerous situations.
- Check all safety and protective devices for visible damage and functional ability before starting the machine.

3.5.3 Structural alterations

- Vehicles provided with an official operating license or vehicle-linked devices and equipment provided with an official operating license or a road traffic license according to the road traffic regulations must be in the condition specified by that license.
- You are only allowed to carry out structural alterations, extensions or modifications on the machine with the prior written consent of the manufacturer.
- In case of non-authorized structural alterations, extensions or modifications:
  - the declaration of conformity and the CE symbol of the machine will become invalid,
  - the operating license according to national and international regulations will become invalid.
- Exclusively use original parts or modification and accessory parts approved by the manufacturer such that:
  - the declaration of conformity and the CE symbol of the machine will remain unaffected,
  - the operating license according to national and international regulations will remain unaffected,
  - perfect functioning of the machine will be ensured.
- The manufacturer will not assume any liability for damage resulting from:
  - unauthorized alterations of the machine,
  - non-approved modification and accessory parts,
  - welding and drilling work on load-bearing parts of the machine.

3.5.4 Spare and wearing parts, auxiliary materials

Immediately replace machine parts which are not in perfect condition.

Exclusively use original parts of the manufacturer or parts approved by the manufacturer such that the operating license according to national and international regulations will remain unaffected. If spare and wearing parts produced by third-party manufacturers are used, their stress-related and safety-conscious design and production will not be ensured.

The manufacturer will not assume any liability for damage resulting from the use of non-approved spare and wearing parts or auxiliary materials.

3.5.5 Warranty and liability

As a basic principle, our "General Sales Terms and Delivery Conditions" shall apply. They have been handed over to the user upon conclusion of contract at the latest.

Any warranty and liability claims in case of personal injury and material damage will be excluded if they are due to one or several of the following reasons:

- improper use of the machine,
- improper assembly, commissioning, operation and maintenance of the machine,
- operation of the machine, the safety devices being defective or the safety and protective devices having not been properly installed or being not serviceable,
- non-observance of the instructions included in the operating instructions referring to commissioning, operation and maintenance,
- unauthorized structural alterations on the machine,
- insufficient inspection of machine parts which are subject to wear,
- improperly effected repairs,
- disasters due to foreign objects and force majeure.

3.6 Basic safety instructions

Basic safety instructions:

- shall, as a basic principle, apply to the safe operation of the machine,
- are summarized in the subsections below.

3.6.1 General safety and accident prevention instructions

- Observe the general national safety and accident prevention regulations in addition to the safety instructions included in this chapter!
- Observe the warning and instruction signs attached to the machine. They provide important information for the safe and trouble-free operation of the machine!
- Observe the activity-related safety instructions included in the other chapters in addition to the basic safety instructions included in this chapter!
- Wear your personal protective equipment when carrying out work on the machine!
- Make sure that people leave the immediate vicinity of the machine before moving or starting the machine! Particularly be aware of children!
- Never carry passengers, animals or objects on the machine! Carrying passengers and transport of animals or objects are not allowed on the machine!
- Adapt your driving such that you have always safe control over the tractor with the attached/hitched machine!

  Consider your personal abilities as well as the road, traffic, visibility and weather conditions, the driving characteristics of the tractor and the influences exerted by the attached/hitched machine.
- The following measures are imperative before carrying out any work on the machine such as adjusting work or trouble-shooting:
  - secure the machine against rolling with the machine not hitched to the tractor,
  - turn the tractor engine off and secure tractor and machine against accidental starting and rolling with the machine hitched to the tractor,
  - secure lifted machine parts/the lifted machine against accidental lowering.

Hitching and unhitching of machine

- Only use appropriate tractors to hitch and transport the machine!
- Properly hitch the machine to the specified devices!
- Be sure not to exceed the following values when hitching the machine to the front and/or rear of a tractor:
  - the gross vehicle weight rating of the tractor,
  - the admissible axle loads of the tractor,
  - the admissible tongue load at the tractor's coupling spot,
  - the admissible towing capacity of the coupling device,
  - the admissible load capacities of the tractor tyres,
  - the tractor's front axle load must never fall below 20 % of the tractor's empty weight!

    The tractor must reach the deceleration specified by the tractor's manufacturer even with the machine attached / hitched up.
- Secure tractor and machine against rolling before hitching or unhitching the machine!
- People are not allowed between tractor and machine, while the tractor is approaching the machine!

  Present helpers are only allowed to act as a guide next to the vehicles and to enter the space between the vehicles after the vehicles have completely stopped.
- Put the support device into support position when hitching and unhitching the machine (stability)!
- Risk of crushing and shearing when actuating support devices!
- Hitching and unhitching the machine to or from the tractor requires particular care! Crushing and shearing zones exist within the area of the coupling spots between tractor and machine!
- Check the connected supply lines. Connected supply lines:
  - must easily give way to any movements during cornering without any stress, buckling or chafing,
  - must not chafe against external components!
- Always park the unhitched machine in a stable position! Pay attention to the ground condition. Beware of soft surfaces.

Use of machine

- Acquaint yourself with all mechanisms and operating elements of the machine and their functions before starting work! During operation it will be too late.
- Wear close-fitting clothing! Loose-fitting clothing increases the risk of becoming entangled in or wound up at drive shafts!
- Start the machine only if all protective devices have been installed and are in protective position!
- Observe the maximum load capacity of the attached/hitched machine and the admissible axle and tongue loads of the tractor! Run the machine with the cargo space being only partly filled if necessary.
- People are not allowed:
  - within the operating/hazardous area of the machine,
  - within the discharge area of the machine,
  - within the turning and swivelling range of movable machine parts,
  - beneath lifted and unsecured movable machine parts!
- You are only allowed to operate powered machine parts if there are no people within the machine's hazardous area!
- Secure the tractor against accidental starting and rolling before leaving it!
- Safely support folded-up covers before standing underneath them!

Transport of machine

- Observe the respective national road traffic regulations when carrying out transport journeys on public roads!
- Before carrying out transport journeys, check:
  - the supply lines for proper connection,
  - the lighting system for damage, proper functioning and cleanliness,
  - the brake and hydraulic system for visible defects,
  - whether the parking brake has been completely released,
  - the brake system for proper functioning,
  - whether the required transport equipment, such as lighting, warning and protective devices, has been properly mounted on the machine!
- Always ensure sufficient steerability and braking ability of the tractor!

  Machines attached/hitched to a tractor and front or tail weights influence the driving characteristics as well as the steerability and the braking ability of the tractor.
- Use front weights if necessary!

  The tractor's front axle load must never fall below 20 % of the tractor's empty weight, in order to ensure sufficient steerability.
- Always properly fix front weights to the fixing points provided for this purpose!
- Observe the maximum loading capacity of the attached/hitched machine and the admissible axle and tongue loads of the tractor!
- Check the braking effect before starting the journey! The tractor must produce the required deceleration for the combination of tractor and attached/hitched machine!
- Observe the broad overhang and the flywheel mass of the machine when cornering with attached/hitched machine!
- Avoid sudden changes of direction, in particular when travelling uphill and downhill and when traversing hills!
- Set all movable machine parts to transport position and secure them before carrying out transport journeys! Use the transport locks provided for this purpose!
- Before transport journeys, check whether the required transport equipment, such as lighting, warning and protective devices, has been properly mounted on the machine!
- Adapt your travelling speed to the conditions prevailing at the time!
- Shift down to a lower gear before travelling uphill!
- Switch the single-wheel brake system off (lock pedals) before carrying out transport journeys!

3.6.2 Hydraulic system

- Only an authorised workshop is allowed to carry out work on the hydraulic system!
- Make sure that the hydraulic system on the tractor and on the machine has been depressurized when connecting the hydraulic hose pipes!
- Ensure to properly connect the hydraulic hose pipes!
- Do not block any operating elements, which serve to directly initiate hydraulic or electrical movements of components, e.g. folding, swivelling and sliding operations!

  The respective movement must automatically stop as soon as the respective operating element is released.

  This shall not apply to:

  - continuous movements of devices,
  - automatically controlled movements of devices,
  - movements of devices which, for functional reasons, require an open-centre or pressing position.
- Before carrying out any work on the hydraulic system:
  - secure lifted movable machine parts against accidental lowering,
  - depressurize the hydraulic system,
  - turn the tractor engine off,
  - pull the ignition key out,
  - apply the parking brake.
- Have hydraulic hose pipes checked for their operational safety by an expert at least once a year!
- Hydraulic hose pipes must be replaced in case of visible defects, damage and ageing! Only use original hydraulic hose pipes!
- The period of use of the hydraulic hose pipes should not exceed six years (including a maximum possible shelf life of two years).
- Never try to block leaking hydraulic hose pipes with your hand or fingers! Immediately contact an authorized workshop if a leak is suspected.

  Hydraulic oil squirting out under high pressure may enter the skin and the body and cause serious injuries.

  If injuries caused by hydraulic oil occur, immediately contact the medical services. Risk of infection!
- Never try to detect leakage points with your bare hands. Risk of serious infection! Use appropriate means when trying to locate leakage points (cleaning sprays, special leak detector spray)!

3.6.3 Electrical system

- Before carrying out any work on the electrical system, disconnect the minus pole of the battery!
- Always cover the plus pole of the battery as required. Risk of explosion in case of accidental ground!
- Only use the specified fuses. When using bigger fuses, the electrical system may be destroyed. Risk of fire!
- Ensure correct order when connecting and disconnecting the battery:
  - connection: first connect the plus pole, then the minus pole,
  - disconnection: first disconnect the minus pole, then the plus pole!
- Avoid sparking and open fire in the vicinity of the battery! Risk of explosion!
- The machine can be equipped with electronic components and parts, the functioning of which may be affected by electromagnetic emissions of other devices. Such interferences may be a risk to people if the following safety instructions are not observed:
  - In case of a retrofitting of electrical devices or components into the machine and their connection to the on-board electrical system, the user must check on his own responsibility whether the retrofitted parts interfere with the vehicle electronics or other components.
  - Ensure that the retrofitted electrical and electronic components comply with the EMC directive as amended from time to time and bear the CE symbol!
- Never fit the machine with additional work lights without authorisation! The manufacturer will not assume any liability or warranty for subsequent damage on the electrical system.

3.6.4 Propeller shaft operation

- The included operating instructions of the propeller shaft manufacturer shall apply!
- Only use the propeller shafts specified by the manufacturer and equipped with the proper protective devices!
- Always transport the propeller shaft in horizontal position, in order to avoid injuries due to the propeller shaft halves falling apart!
- Check the propeller shaft:
  - protective tube and protective cone of the propeller shaft must be undamaged,
  - a protective cover must be mounted to the tractor's and to the machine's p.t.o. shaft! The protective covers must be in proper condition!
- Working with the protective devices being damaged is not allowed!
- Mounting and dismounting of the propeller shaft is only allowed:
  - with the p.t.o. shaft switched off,
  - with the tractor engine turned off,
  - with the ignition key pulled out,
  - with the parking brake applied!
- Always ensure proper mounting and securing of the propeller shaft!
- Secure the propeller shaft guard against rotation by installing the chain/s!
- Always mount the wide-angle joint at the pivot point between tractor and machine when using a wide-angle propeller shaft!
- In case of propeller shafts equipped with overload or overrunning clutch, this clutch must always be mounted at the machine!
- Before switching the propeller shaft on, check whether the selected speed and the sense of rotation of the tractor's p.t.o. shaft have been adjusted to the admissible drive speed and the sense of rotation of the machine!
- Make sure that people leave the hazardous area of the machine before switching the p.t.o. shaft on!
- Do not use the coupled propeller shaft as a step!
- Never switch the propeller shaft on with the tractor engine turned off!
- Observe the admissible angular misalignment and the travel of the propeller shaft when cornering!
- Observe the transport and working position of the specified tubular covers of the propeller shafts!
- People are not allowed within the range of the rotating propeller shaft when work with the propeller shaft is being carried out!
- Always switch the propeller shaft off if the angular misalignments occurring are too large or when it is not required!
- Risk of injury due to the flywheel mass of the machine parts continuing to rotate for a short time after the propeller shaft has been switched off!

  Do not approach the machine too closely during that time! Do not carry out any work on the machine until all machine parts have completely stopped.
- Secure tractor and machine against accidental starting and rolling before carrying out any maintenance, cleaning, lubrication or setup work on machines powered by propeller shafts or before hitching/unhitching them!

- Place the uncoupled propeller shaft on the respective holder!
  - Put the protective cover onto the p.t.o. shaft stub after the propeller shaft has been uncoupled!

3.6.5 Hitched machines

- Only couple admissible combinations of tractor and hitched machine!
- Observe the maximum admissible tongue load of the tractor at the coupling device in case of single-axle machines!
- Always ensure sufficient steerability and braking ability of the tractor!

  Machines attached/hitched to a tractor influence the driving characteristics as well as the steerability and the braking ability of the tractor, in particular single-axle machines with the tongue load being exerted on the tractor.
- Only an authorized workshop is allowed to adjust the height of the drawbar for drawbars with tongue load!
- Ensure sufficient tongue load at the support device when unhitching and parking a single-axle machine!

  Risk of tipping, particularly in case of unevenly charged machine (stability).

3.6.6 Brake system

- The brake system of the tractor must be compatible with the brake system of the machine!
- Immediately stop the tractor in case of a malfunction of the brake system. Have the malfunction promptly remedied by an authorized workshop!
- Only authorized workshops or qualified personnel are allowed to carry out adjustment and repair work on the brake system!
- Have the brake system regularly and thoroughly checked!

  In order to maintain the operational safety, the wheel brakes must always be properly adjusted.
- Before carrying out any work in the brake system:
  - safely park the machine and secure it against accidental rolling (chocks),
  - secure the lifted machine/machine parts against accidental lowering!
- Especially beware when carrying out welding and drilling work and work involving open fire in the vicinity of brake lines!
- As a basic principle, test the brakes after any adjusting and maintenance work on the brake system!

Compressed-air brake system

- The compressed-air brake systems of the tractor and of the machine must be compatible!
- Clean the sealing rings at the hose couplings of the feed and brake lines from possible soiling before hitching the machine!
- You are only allowed to start the tractor with the hitched machine moving when the pressure gauge on the tractor indicates 5.0 bar!
- Drain the air reservoir every day!
- Cover the tractor's hose couplings before carrying out journeys without machine!
- Hang the couplings of the feed and brake line on the provided blank connections with the machine unhitched!

- Do not modify the specified settings at the brake valves!
- Replace the air reservoir if:
  - the air reservoir can be moved in the tensioning straps,
  - the air reservoir is damaged,
  - the type plate at the air reservoir is getting rusty, is loose or is missing!

Hydraulic brake system

- Hydraulic brake systems are not licensed for road traffic in Germany!
- Only use the specified hydraulic oils when topping up or changing oils. Observe the relevant regulations when changing hydraulic oils!

3.6.7 Axles

As a basic principle, never overload the axles. Overloading of axles reduces the service life of the axle bearings and causes damage to the axles.

Therefore avoid:

- overloading of the machine,
- bumping into curbs,
- exceeding the speed limit,
- mounting wheels of wrong inserting depth,
- mounting wheels and tyres of wrong dimensions.

3.6.8 Tyres

- Only qualified personnel equipped with appropriate fitting tools is allowed to carry out repair work on tyres and wheels! Mounting of wheels and tyres requires sufficient know-how and appropriate tools.
- Safely park the machine and secure it against accidental lowering and rolling (parking brake, chocks) before carrying out any work on the tyres!
- Place the lifting device at the marked application points.
- Use lifting equipment suitable and approved for the machine's weight with sufficient lifting power.
- Deflate the tyre before removing it!
- Regularly check the tyre pressure!
- Observe the maximum admissible tyre pressure. Risk of explosion in case of excessive pressure!
- Keep to the side of the wheel when refilling the tyres! An inflation hose with an approximate length of 1.5 m makes work easier.
- Retighten all fastening screws and nuts according to the manufacturer’s specifications!

3.6.9 Fodder mixing wagon

- The fodder mixing wagon is only allowed to be operated by one person!
- Before operating the machine, make sure that third persons / animals leave the machine's hazardous area!
- Fill the fodder mixing wagon only by means of a tractor equipped with a front loader or by means of a wheeled loader!
- People are not allowed:
  - above the fodder mixing wagon, e.g. to fill the mixing container manually from a silo or a hayloft! People who are standing above the fodder mixing wagon risk to fall into the mixing container,
  - to climb onto the top edge of the mixing container,
  - to enter or reach into the mixing container,
  - to travel as passengers on the machine!
- Dose pourable fodder additives (e.g. mineral feed) or other bulk material through the feed funnel (optional extra) or by means of the loading tool into the mixing container!
- Equip your tractor with mirrors, in order to ensure indirect visibility of the work area to the right and to the left of the fodder mixing wagon!
- Risk of crushing when opening and closing the discharge doors. Before opening or closing the discharge door(s), make sure that people and animals leave the hazardous area!
- Never reach into the mixing container through a discharge opening::
  - as long as the engine is running,
  - as long as the discharge door has not been secured against accidental lowering!
- Risk of injuries caused by the sharp-edged cutting knives of the mixing auger(s). Wear your personal protective equipment (protective gloves, safety footwear), when carrying out maintenance work on the cutting knives of the mixing auger(s)!
- Only enter the mixing container:
  - with the propeller shaft uncoupled,
  - through a discharge opening with the discharge door completely open,
  - when wearing your personal protective equipment,
  - with greatest possible care. Beware of the cutting knives' position at the mixing auger!
- When using electrical tools, the connecting cables must not be moved over sharp-edged cutting knives!

3.6.10 Service and maintenance of machine

- Carry out the required service and maintenance work on the machine in due time!
- Observe the maintenance intervals for wearing parts!
- Secure the tractor against accidental starting and rolling before carrying out any service or maintenance work on the machine or climbing onto the machine!
- Existing mechanical, hydraulic, pneumatic and electrical or electronic residual energies may cause accidental machine movements!

  Beware of existing residual energies in the machine when carrying out maintenance work. Warning signs mark the components with residual energies.
- Fix larger assemblies carefully to lifting equipment and secure them before replacing larger assemblies!
- Secure the lifted machine or lifted machine parts against accidental lowering before carrying out service or maintenance work on the machine!
- Regularly check screws and nuts for tightness! Retighten loosened screws and nuts!
- Check unscrewed joints for tightness. After finishing maintenance work, check the safety and protective devices for proper functioning!
- Use appropriate equipment and gloves when replacing working tools with blades!
- Disconnect the generator and battery cable on the tractor before carrying out electrical welding work on the tractor and/or on the attached/hitched machine!
- Dispose of oils, greases and filters properly!
- Properly handle and dispose of substances and materials used for cleaning the machine, especially:
  - when working on lubrication systems and devices,
  - when carrying out cleaning work with solvents!
- Spare parts must at least comply with the specified technical standards of the manufacturer! This is guaranteed when using original parts!

3.7 Warning and instruction signs

The following warning and instruction signs are attached to the machine:

- Warning signs: They mark dangerous spots on the machine and warn about residual risks, which cannot be completely eliminated due to the machine's operational safety.
- Instruction signs: They include information referring to proper use of the machine.

Keep these signs always in a clean and clearly legible condition! Replace illegible signs. Order the warning and instruction signs according to their order number:

- from the dealer,
- directly via the Strautmann spare parts warehouse, phone: + 49 (0) 5424 802-30.

3.7.1 Warning signs

A warning sign consists of 2 pictographs:

(1) Pictograph for description of risk

The pictograph shows the pictographic description of the risk, surrounded by a triangular hazard symbol.

(2) Pictograph how to avoid the risk

The pictograph shows the pictographic instruction how to avoid the risk.

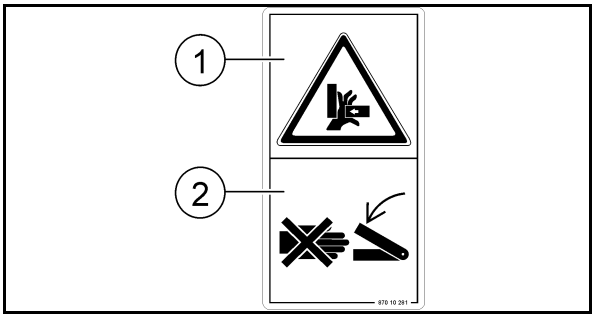


Fig. 13

Explanation of warning signs

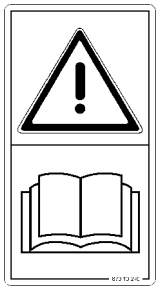
The following list includes:

- in the right-hand column all warning signs attached to the machine,
- in the left-hand column the following details referring to the warning sign on the right-hand side:
  - the order number.
  - the description of risk, e. g. "Risk of crushing fingers or hand due to accessible movable machine parts!"
  - the consequences in case of non-observance of the instruction(s) how to avoid the risk, e. g. "This risk may cause most serious injuries involving loss of limbs."
  - the instruction(s) how to avoid the risk, e. g. "Never reach into the dangerous spot as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected. Make sure that people leave the hazardous area of the machine before moving machine parts."

Order number and explanation	Warning signs

87010270

Please read and observe the operating and safety instructions before commissioning!

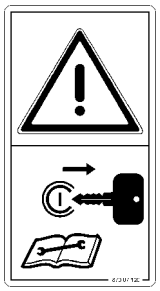


87007120

Risks when carrying out work on the machine such as mounting, adjusting, trouble-shooting and maintenance, due to accidental starting or rolling of tractor and machine!

This risk may cause most serious injuries or even death.

- Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine.
- Read and observe the instructions in the respective chapters in the operating instructions depending on the work to be carried out.

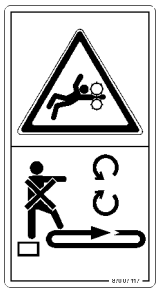


87007117

Risk to any part of the body of being drawn in or becoming entangled due to powered working tools!

This risk may cause most serious injuries or even death.

Never enter the cargo space as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.



87007123

Risk due to hydraulic oil squirting out under high pressure, caused by leaking hydraulic hose pipes!

This risk may cause most serious injuries or even death if hydraulic oil squirting out under high pressure enters the skin and the body.

- Never try to block hydraulic hose pipe leaks with your hands or fingers.
- Read and observe the information included in the operating instructions before carrying out service and maintenance work on hydraulic hose pipes.

87007126

Risk to any part of the body of being rolled over by the machine due to accidental rolling of the machine parked in unsecured condition!

This risk may cause most serious injuries or even death.

Secure the machine against accidental rolling before unhitching the machine from the tractor or before parking the machine. Use the parking brake and/or the chock(s) for this purpose.

87007121

Risk of falling for passengers on treads or platforms!

This risk may cause most serious injuries or even death.

- It is not allowed:
  - to transport people as passengers on the machine,
  - to transport objects on the machine,
  - to climb onto travelling machines.
- Ensure that there are no passengers on the machine.

87010276

Risk to any part of the body of being drawn in or becoming entangled due to powered working tools!

This risk may cause most serious injuries or even death.

- Keep sufficient safe distance to powered working tools.
- Ensure that people keep sufficient safe distance to powered working tools.

87010278

Risk of becoming entangled and wound up due to the powered propeller shaft!

This risk may cause most serious injuries or even death.

- Keep sufficient safe distance to the propeller shaft as long as the tractor engine is running with the propeller shaft coupled/the hydraulic system connected.
- Ensure that people keep sufficient safe distance to the powered propeller shaft.

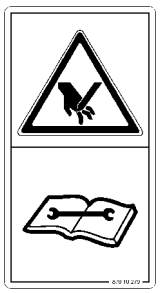
87007130

Risk to any part of the body of being crushed if people stand within the swivelling range of the drawbar between the tractor and the hitched machine!

This risk may cause most serious injuries or even death.

- People are not allowed within the hazardous area between tractor and machine as long as the tractor engine is running and the tractor has not been secured against accidental rolling.
- Make sure that people leave the hazardous area between tractor and machine as long as the tractor engine is running and the tractor has not been secured against accidental rolling.

87010279



Risk of cuts for fingers and hands due to work on sharp / sharp-edged working tools!

This risk may cause most serious injuries including loss of limbs.

Observe the information in the operating instructions before carrying out work on sharp working tools.

87010281

Risk to fingers or hands of being crushed due to accessible movable machine parts!

This risk may cause most serious injuries including loss of limbs.

Never reach into the hazardous area as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.

87010283

Risk due to substances or foreign objects blown away from or out of the machine to people standing within the hazardous area of the machine!

This risk may cause most serious injuries to any part of the body.

- Keep sufficient safe distance to the hazardous area of the machine.
- Ensure that people keep sufficient safe distance to the hazardous area of the machine as long as the tractor engine is running.

87010287

Dangerous situations may occur if load-bearing parts break due to mechanical work on frame elements!

This risk may cause most serious injuries or even death.

As a basic principle, the following work is not allowed:

- mechanical processing of the chassis,
- drilling at the chassis,
- boring up of existing holes at the chassis frame or at load-bearing parts,
- welding on load-bearing parts.

87012568

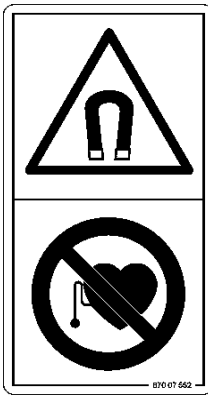
Risk of becoming entangled, wound up, being drawn in and risk of slipping, stumbling or falling if people fall from the top edge of the mixing container!

This risk may cause most serious injuries or even death.

Therefore, it is not allowed

- to stay above the mixing container.
- to bend over the mixing container.
- to enter the mixing container over the top edge of the container.

870 07 552



Risk for people with pacemakers and implanted defibrillators due to magnetic fields!

The magnetic fields of the powerful permanent magnets may interfere with the functioning of active electronic implants such as pacemakers and defibrillators and cause harm to the health or even death of their wearers.

- Keep sufficient distance to the magnets if you wear a pacemaker or implanted defibrillator.
- Warn people with a pacemaker or implanted defibrillator to stay away from the magnets.

87007557

Risk to any part of the body of being drawn in or becoming entangled due to powered working tools!

This risk may cause most serious injuries or even death.

Never enter the cargo space as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.

87010271

Risk to any part of the body of being crushed and/or risk of impact if people stand within the hazardous area of the machine!

This risk may cause most serious injuries or even death.

People are not allowed to stand within the hazardous area between tractor and machine as long as the tractor engine is running.

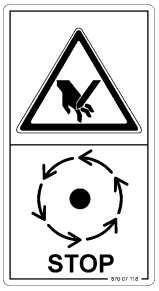
87010280

Risk to hands or arms of being drawn in or becoming entangled in moving power transmission parts!

This risk may cause most serious injuries including loss of limbs.

Never open nor remove protective devices as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.

87007118



Risk of cutting fingers and hands due to sharp/sharp-edged powered working tools!

This risk may cause most serious injuries including loss of limbs.

- Do not touch working tools until they have completely stopped.
- Keep sufficient safe distance to powered working tools.
- Ensure that people keep sufficient safe distance to powered working tools.
- Never open nor remove protective devices as long as the tractor engine / the diesel engine is running.

87007113

Risk to any part of the body of being drawn in and becoming entangled due to powered working tools!

This risk may cause most serious injuries or even death.

- Keep an adequate safety distance from powered working tools.
- Ensure that people keep an adequate safety distance from powered working tools.
- Never open nor remove protective devices as long as the tractor engine is running with the propeller shaft coupled/the hydraulic/electronic system connected.

3.7.2 Instruction signs

An instruction sign consists of a pictograph:

(1) Pictograph including information about proper use of the machine.

The pictograph includes visual or descriptive information or information summarised in a table.

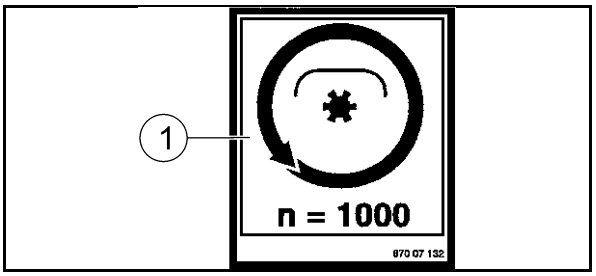
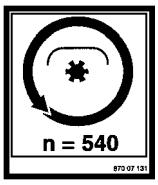
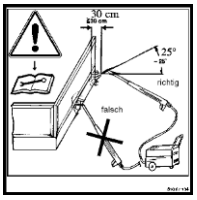
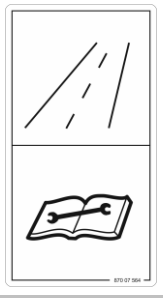


Fig. 14

Order number and explanation	Instruction signs
87007131 **The required drive speed of the machine is 540 min^{-1}.** Before switching the propeller shaft on, check whether the selected speed and sense of rotation of the tractor's p.t.o. shaft have been adjusted to the admissible speed and sense of rotation of the machine.	
87007134 **Risk due to improper cleaning of the machine.** Absolutely observe the information in the chapter "Cleaning of machine", page 175 when using a pressure washer/steam blaster for cleaning the machine.	
87010288 This pictograph illustrates fixing points for lifting equipment (jack).	
877 06 091 The pictograph marks anchorage points for fixing slings for transport of the machine.	
87007564 Read and observe the chapter Transport Journeys in the operating instructions before travelling on public roads!	

3.7.3 Placing of warning and instruction signs

The following figure illustrates the position of the warning and instruction signs on the machine.

Depending on the machine's equipment, more or less warning and instructions signs than shown here may be available.

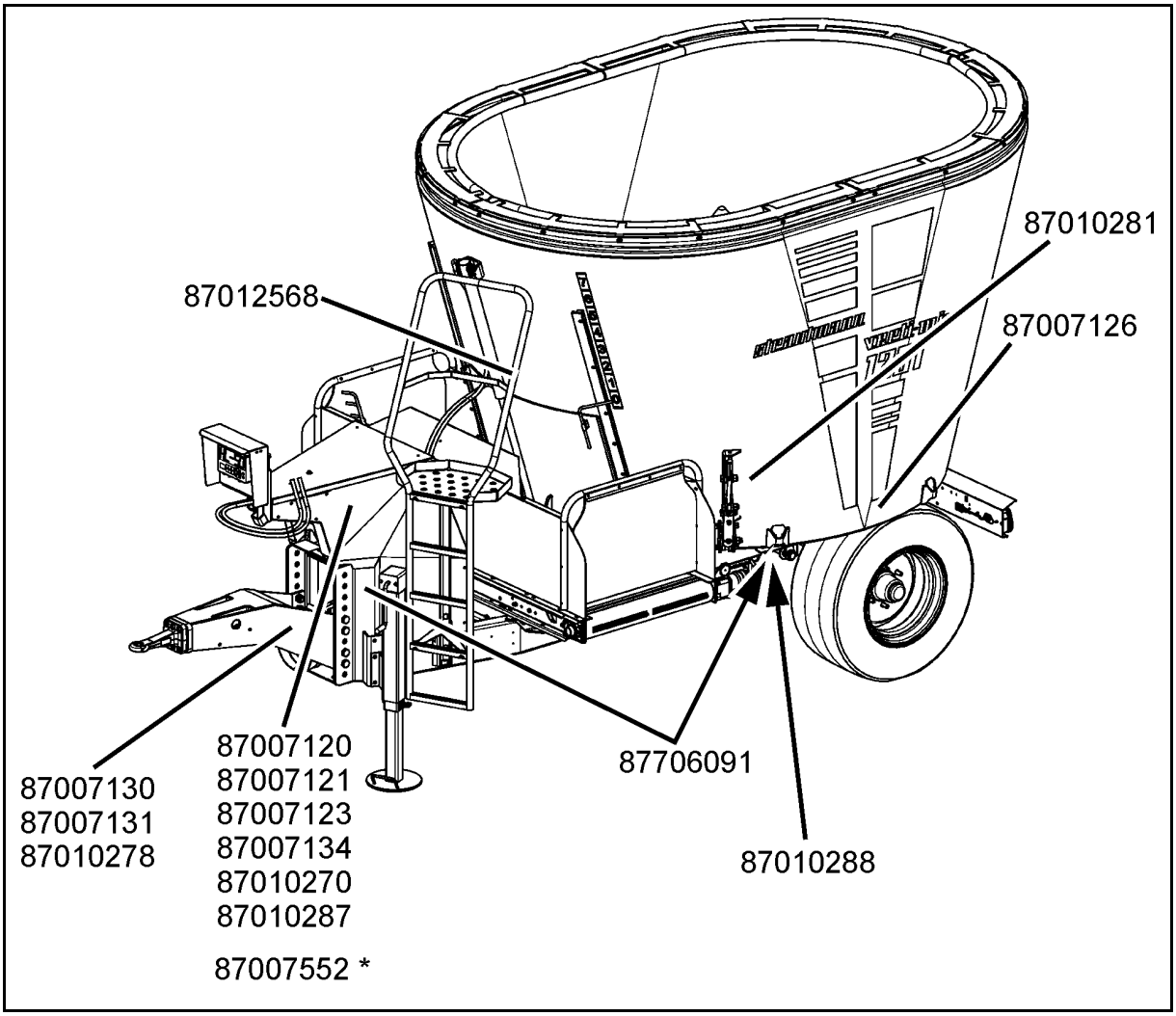


Fig. 15 * With magnetic system.

Placing of warning signs at the discharge outlets

Side discharge

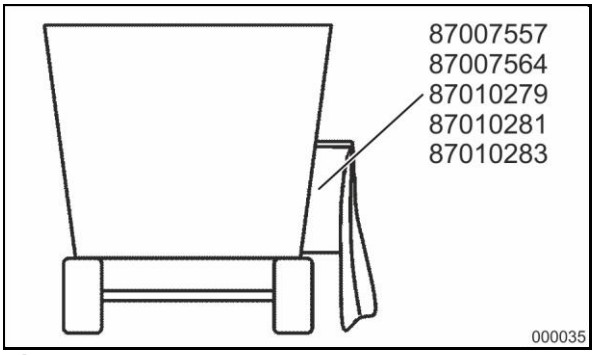


Fig. 16

Rear side discharge

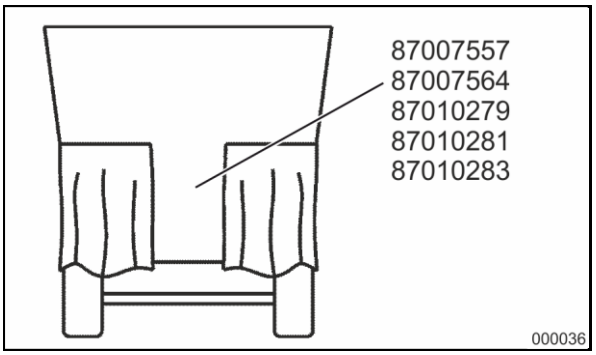


Fig. 17

Rear centre discharge

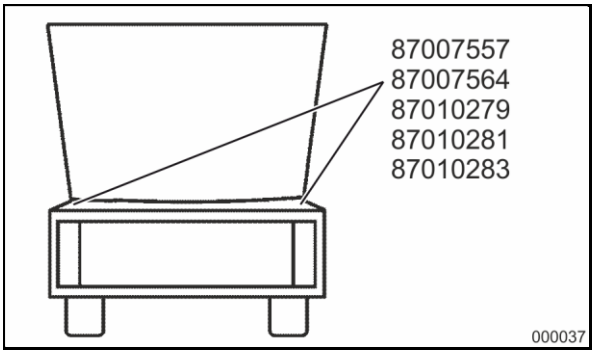


Fig. 18

Mechanical straw blower

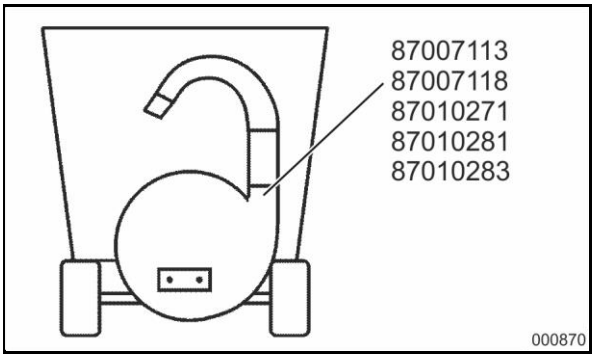


Fig. 19

Side discharge with side discharge conveyor

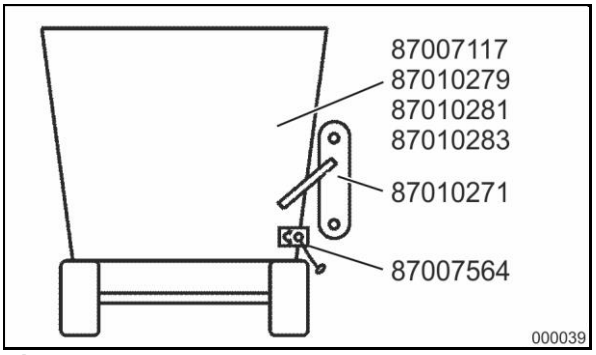


Fig. 20

Crossover conveyor with conveyor extension

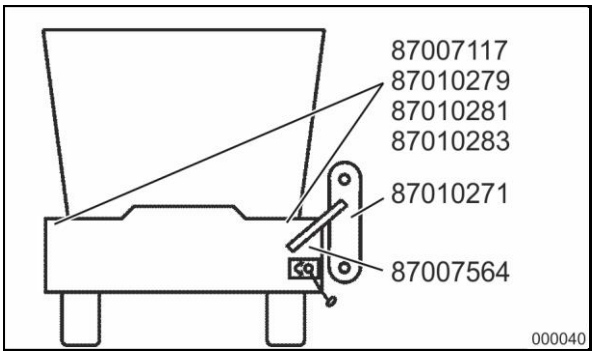


Fig. 21

Crossover conveyor

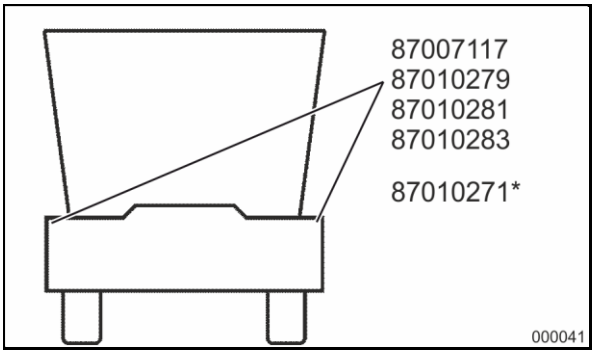


Fig. 22 * With movable crossover conveyor

Crossover conveyor with fast bedding roller

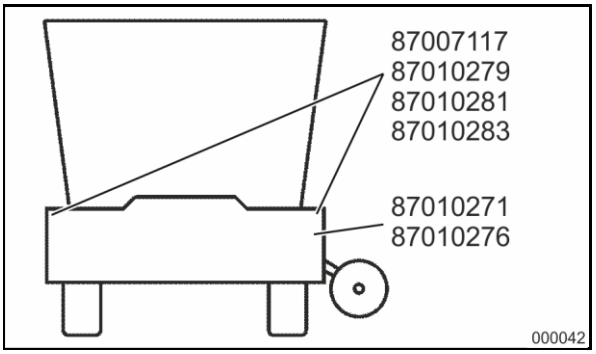


Fig. 23

C-conveyor

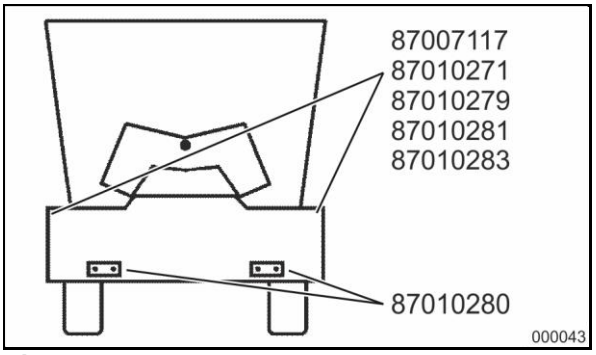


Fig. 24

3.8 Risks in case of non-observance of safety instructions and warning signs

Non-observance of the safety instructions and warning signs may:

- cause risk to people, environment and machine such as:
  - risk to people due to non-secured work areas,
  - failure of essential machine functions,
  - failure of specified methods for the use, service and maintenance of the machine,
  - risk to people due to mechanical and chemical effects,
  - threat to the environment due to leaking operating media.
- lead to invalidation of any claims for damages.

4 Loading of machine

Only the haulage contractor is authorised to carry out this work!

This work requires special know-how and/or specific technical equipment.

Otherwise, this work will impair your safety and the functional ability of the machine during and after its execution.

Lashing points on the machine for fixing lashing equipment are identified by the pictograph (Fig. 25).

Fig. 25

Loading and unloading by means of tractor

WARNING

Risk to people due to uncontrolled movements of the tractor and the machine if insufficient stability and insufficient steerability and braking ability of the tractor occur!

- Properly hitch the machine to the tractor before loading or unloading the machine onto or from a transport vehicle.
- When hitching and transporting the machine for loading and unloading, only use a tractor which meets the performance requirements and can safely slow down the machine..

  If the machine is equipped with a compressed-air brake system, you are only allowed to start moving the machine when the pressure gauge on the tractor indicates 5.0 bar.

Loading and unloading by means of lifting equipment (for lifting into containers)

DANGER

Risk of fatal crushing and/or impact to people if the lifted machine accidentally comes down!

- Never stand within the lifting zone beneath the lifted machine.
- Only use authorised, sufficiently dimensioned slings free of damage which are able to safely carry the machine's weight.
- Check the slings before each loading and unloading of the machine for possible damage and replace them if necessary.
- It is imperative to use the marked fixing points when fixing slings for loading and unloading of the machine by means of a lifting device.
- Use an appropriate crane system, a suitable lifting equipment and have the loading and unloading procedure carried out by qualified staff.

4.1.1.1 Verti-Mix

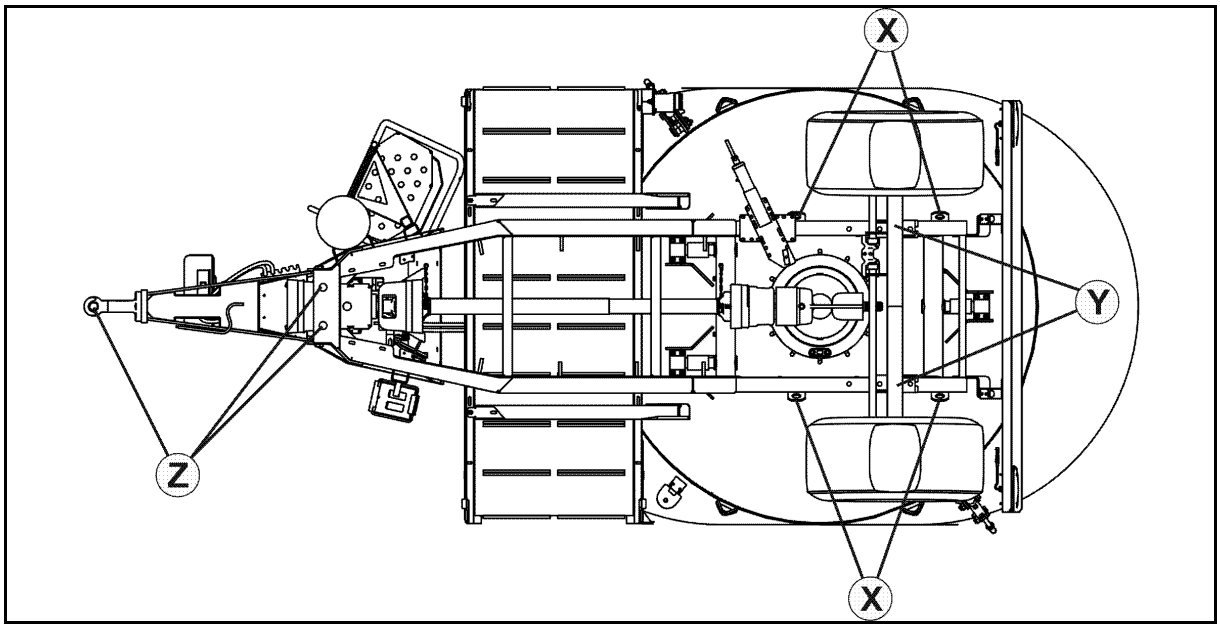


Fig. 26

(X), (Z) Lashing and anchorage points

(Y) Application points for lifting device (jack)

4.1.1.2 Verti-Mix L

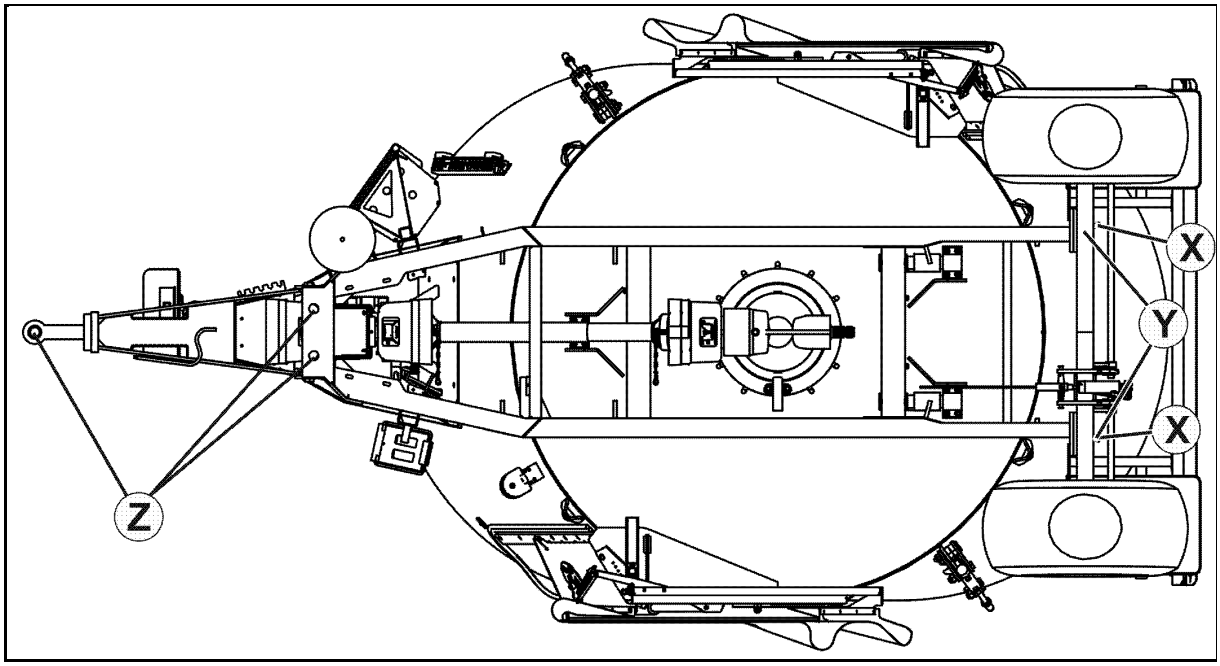


Fig. 27

(X), (Z) Lashing and anchorage points

(Y) Application points for lifting device (jack)

4.1.1.3 Verti-Mix Double

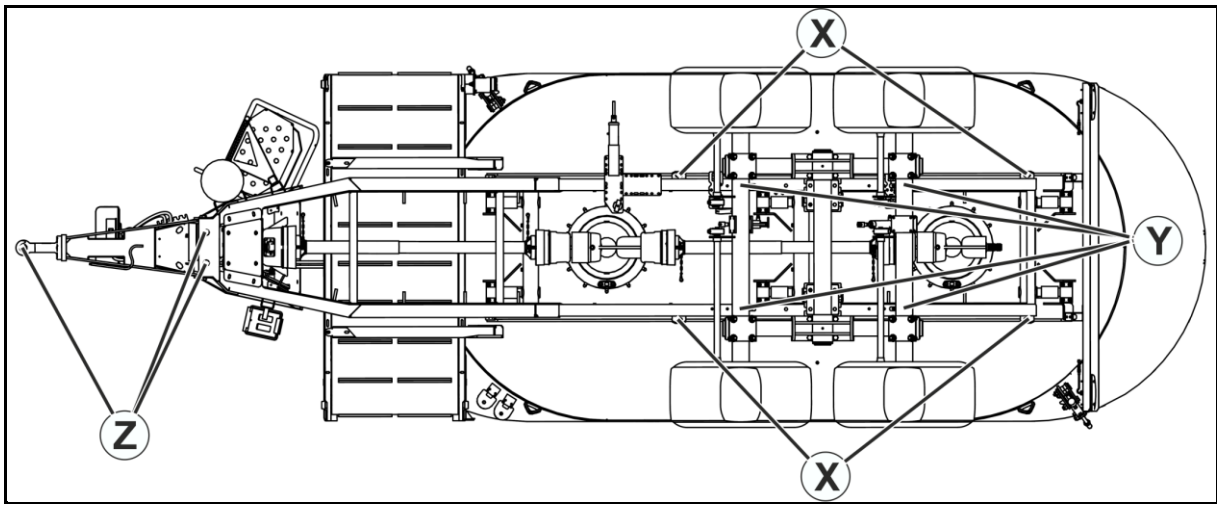


Fig. 28

(X), (Z) Lashing and anchorage points

(Y) Application points for lifting device (jack)

5 Commissioning

This chapter will provide information:

- on how to proceed when commissioning your machine,
- on how to check whether the machine is licensed for being attached/hitched to your tractor.

- Before commissioning, the operator must:
  - have read and understood these operating instructions.
  - lubricate all lubrication points.
- When commissioning the machine, additionally observe the information included in the chapters:
  - "Operator's obligation", page 43,
  - "Qualification of operator", page 44,
  - "Basic safety instructions", page 48,
  - "Warning and instruction signs", page 59,
  - "Service and maintenance of machine", page 170.

  Observance of these chapters serves your safety.
- Before each startup, the operator must check the tractor and the machine for their road and operational safety.
- Only use appropriate tractors to hitch and transport the machine.
- Check the following adjustments when changing the tractor:
  - Length of propeller shaft. Observe the information in the chapter "Adjust length of propeller shaft to tractor", page 92,
  - Setting of pressure regulator (load-sensing screw).

  Readjust if necessary.
- Tractor and machine must comply with the national road traffic regulations.

  Owner (user) and driver (operator) of the vehicle are responsible for observing the national road traffic regulations.

WARNING

Dangerous situations for people may occur if the hazardous areas of the machine are not clearly visible from the tractor!

Equip the tractor with mirrors such that the hazardous areas on both sides of the machine are clearly visible from the tractor.

WARNING

Risk of crushing, shearing, cuts, becoming entangled and being drawn in to people if operating elements used to actuate movable components carrying out dangerous movements are blocked!

Do not block any operating elements which serve to initiate movable components to carry out dangerous movements, e. g. folding, swivelling or sliding operations of components.

The movement must automatically stop as soon as the operating element is released.

This shall not apply to movements of devices:

- in continuous action for constant loads,
- with automatic control,
- which, for functional reasons, require an open-centre or pressing position.

5.1 Road traffic regulations

Observe the national road traffic regulations.
Owner (user) and driver (operator) of the vehicle are responsible for observing the national road traffic regulations.
Ensure that a warning triangle, a first aid kit, a signal lamp and a safety vest are always placed within reach in the driver's cabin.

5.1.1 Road traffic regulations in Germany

The standard machine model does not have a certificate issued by a recognised expert for motor vehicle traffic.

The maximum admissible speed is 6 km/h!

- In terms of the StVZO (note of transl.: German Road Traffic Licensing Code) the machine is a hitched farming or forestry machine.
- Farming or forestry equipment:
  - with a gross vehicle weight rating of more than 3 t requires an operating licence for travelling on public roads,
  - with a gross vehicle weight rating of more than 3 t does not require an operating licence for travelling on public roads if the maximum admissible speed is 6 km/h,
  - is not subject to licence (no licence plate, no technical supervision) if:
    - exclusively used in farming and forestry establishments,
    - exclusively used for farming or forestry purposes.
  - must be equipped with the second licence plate of one of the farm's tractors if it is not subject to licence,
  - is subject to licence for commercial use, e. g. by contractors (licence plate, technical supervision),
  - must be equipped with a proper lighting and identification system when travelling on public roads.

Apply for operating license or registration

An existing certificate issued by an officially recognised expert for motor vehicle traffic may not be considered as a permit to travel on public roads. An officially approved operating license or registration is always required.

Apply for the operating license or registration at your local registration office and attach the certificate issued by an officially recognised expert for motor vehicle traffic to your application.

5.2 Check tractor’s compatibility

WARNING

Risk due to incorrect use of the tractor if this causes failure of components, insufficient stability and insufficient steerability and braking ability of the tractor!

- Check your tractor for compatibility before attaching/hitching the machine to the tractor.

  Only attach/hitch the machine to appropriate tractors.

- Carry out a brake test to check whether the tractor reaches the required deceleration with the machine attached / hitched up.

The following features are crucial prerequisites for the compatibility of the tractor:

- the gross vehicle weight rating of the tractor,
- the admissible axle loads of the tractor,
- the admissible tongue load/towing capacity at the coupling device of the tractor,

  These details are registered on the type plate, in the vehicle registration certificate and in the operating instructions of the tractor.

- the load-bearing capacities of the tyres mounted on the tractor.

The tractor's front axle load must never fall below 20 % of the tractor's empty weight.

The tractor must reach the deceleration specified by the tractor's manufacturer even with the machine attached/hitched up.

5.2.1 Calculate actual values

The gross vehicle weight rating of the tractor, which is specified in the operating instructions/in the tractor's vehicle registration certificate, must exceed the sum of:

- the tractor's empty weight,
- the ballasting mass,
- the tongue load of the hitched machine.

5.2.2 Preconditions for the operation of tractors with rigid drawbar trailers

WARNING

Risk due to failure of components caused by incorrect use of the tractor!

Ensure:

- that the coupling device at the tractor has a sufficient admissible tongue load rating for the actually existing tongue load.
- that the coupling device at the tractor and the drawgear at the rigid drawbar trailer are able to take up the towed load of the rigid drawbar trailer (towed load = axle load). Calculate the tractor's admissible towing capacity if necessary.
- that the tractor's axle loads and weights influenced by the tongue load are within the admissible limits. Check the weight in case of doubt.
- that the static, actual rear-axle load of the tractor will not exceed the admissible rear-axle load rating.
- that the gross vehicle weight rating of the tractor will not be exceeded.
- that the admissible load-bearing capacities of the tyres mounted on the tractor are not exceeded.

5.2.2.1 Combination options of coupling devices and drawgears

The following table shows admissible combination options of the tractor's coupling device and the machine's drawgear depending on the maximum admissible tongue load.

The maximum admissible tongue load for your tractor is directly indicated on the type plate of the coupling device/in the operating instructions/in the vehicle registration certificate of your tractor.

Maximum admissible tongue load	Tractor's coupling device	Machine's drawgear
2500 kg - ≤ 25 km/h 2000 kg - ≤ 40 km/h	Bolt-type coupling DIN 11028 / ISO 6489-2	• Drawbar lug 40 reinforced DIN 11026 / ISO 5692-2 • Drawbar lug 40 for folding drawbar DIN 11043 • Drawbar lug 40 DIN 74054-1/2 / ISO 8755
	Non-automatic bolt-type coupling DIN 11025	• Drawbar lug 40 for folding drawbar DIN 11043 • Drawbar lug 40 DIN 74054-1/2 / ISO 8755
	Automatic bolt-type coupling 40 DIN 74051-1 / ISO 3584	• Drawbar lug 40 DIN 74054-1/2 / ISO 8755
	Automatic bolt-type coupling 50 DIN 74052-1 / ISO 3584	• Drawbar lug 50 DIN 74053-1 / ISO 1102
4000 kg - ≤ 40 km/h 2000 kg - > 40 km/h	Tow hook (hitch hook) ISO 6489-1	• Drawbar lug (hitch ring) ISO 20019 • Drawbar lug (hitch ring) ISO 5692-1
	Draw pin (Piton-Fix) ISO 6489-4	• Drawbar lug (hitch ring) ISO 5692-1
4000 kg - ≤ 40 km/h 2000 kg - > 40 km/h	Ball-type coupling 80	• Shell 80

Tab. 15

5.2.2.2 Calculate actual D_C value for combination to be coupled

WARNING

Risk to people due to failure of components caused by breaking coupling devices between tractor and machine in case of incorrect use of the tractor!

- Only combine compatible coupling devices and drawgears.
- Calculate the actual D_C value of your combination consisting of tractor and rigid drawbar trailer to check the coupling device of your tractor for the required D_C value. The actual calculated D_C value for the combination must be less than or equal to (≤) the specified D_C value of the coupling device of your tractor and the drawgear of the rigid drawbar trailer. If this is not the case, the admissible towing capacity for your tractor must be calculated. In each case, the lowest D_C value shall be relevant.
- Calculate the admissible towing capacity of your tractor if the calculated D_C value for the combination is higher than the specified D_C value of the coupling device of your tractor or of the drawgear of the rigid drawbar trailer. This calculated towing capacity must not be exceeded when charging your rigid drawbar trailer.

The actual D_C value of a combination to be coupled is calculated as follows:

$$D_C = g \times \frac{T \times C}{T + C}$$

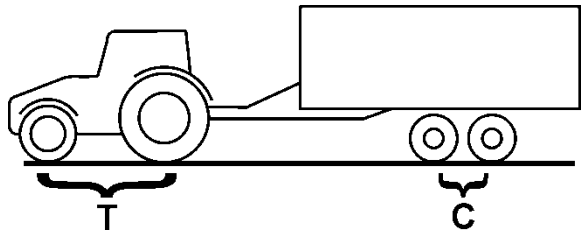


Fig. 29 D_C value of combination

T: Gross vehicle weight rating of your tractor in [t]

(see operating instructions/vehicle registration certificate of tractor)

C: Axle load/sum of axle loads of the machine charged with the admissible mass (loading capacity) in [t] without tongue load

g: Gravitational acceleration (9.81 m/s²)

Actual calculated D_C value for the combination		**Specified D_C values of the tractor's coupling device and the machine's drawgear**
kN	≤	kN

The D_C value:

- for the coupling device is directly indicated on the type plate of the coupling device/in the operating instructions/in the vehicle registration certificate of your tractor.

  In case of differing values on the type plates of the trailer bracket and the coupling device, the lower value shall be relevant.

- for the drawgear is directly indicated on the type plate of the drawgear.

Example

Gross vehicle weight rating of the tractor:	14 t
Admissible axle load(s) of the rigid drawbar trailer:	18 t

$$D_C = 9.81\ m/s^2 \times \frac{14\ t \times 18\ t}{14\ t + 18\ t} = 77.2\ kN$$

5.2.2.3 Calculate tractor's admissible towing capacity

The lowest D_C value of your tractor's coupling device or of the drawgear of your rigid drawbar trailer determines the admissible towing capacity C of your tractor. In case of rigid drawbar trailers, the tractor's towing capacity is equal to the axle load(s) of the rigid drawbar trailer.

The admissible towing capacity of your tractor determines the admissible load capacity of your rigid drawbar trailer. This calculated towed load/axle load must not be exceeded when charging your rigid drawbar trailer.

$$C = \frac{T \times D_C}{g \times T - D_C}$$

T: Gross vehicle weight rating of your tractor in [t]

(see operating instructions/vehicle registration certificate of tractor)

D_C: Lowest D_C value of your tractor's coupling device/of your machine's drawgear/of the combination

g: Gravitational acceleration (9.81 m/s²)

Example

Gross vehicle weight rating of the tractor:	14 t
D_C value of tractor's coupling device	70 t
D_C value of machine's drawgear:	77.5 t
D_C value for the combination to be coupled:	77.2 t

$$\mathbf{C = \frac{14\ t \times 70\ kN}{9.81\ m/s^2 \times 14\ t - 70\ kN} = 14.5\ t}$$

Due to the D_C value of the tractor's coupling device, the admissible axle load is 14.5 t. This calculated axle load must not be exceeded when charging your rigid drawbar trailer.

5.3 Secure tractor and machine against accidental starting and rolling

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people during work on the machine:

- **if the unsecured machine not hitched to the tractor accidentally rolls,**
- **if powered working tools are not switched off,**
- **if hydraulic functions are accidentally carried out, working tools or machine parts are unintentionally powered with the machine hitched to the tractor and the tractor engine running,**
- **if the tractor engine is accidentally started,**
- **if tractor and machine accidentally roll,**
- **if lifted machine parts accidentally come down.**

Risk due to accidental contact with powered, unsecured working tools and lifted, unsecured machine parts when carrying out work on the machine.

Therefore, the following measures are imperative before carrying out any work on the machine such as adjusting work or trouble-shooting:

- Secure the machine against rolling with the machine not hitched to the tractor,
- turn the tractor engine off and secure tractor and machine against accidental starting and rolling with the machine hitched to the tractor,
- make sure that third persons (children) leave the tractor,
- secure lifted machine parts against accidental lowering.

Secure tractor and machine against accidental starting and rolling

1. Lower lifted, unsecured machine parts to a secure stop position.

→ This will prevent accidental lowering.

2. Apply the parking brake of the tractor.
3. Turn the tractor engine off.
4. Pull the ignition key out.
5. Make sure that third persons (children) leave the tractor.
6. Lock the tractor cabin.
7. Secure the machine against rolling:
   - o On even ground by means of the parking brake or the chocks,
   - o on extremely uneven ground or downhill gradients by means of the parking brake and the chocks.

5.4 Drawbar

5.4.1 Adjust mounting height of drawbar

Shop work

You must have the mounting height of the drawbar adjusted to the respective tractor model if the fodder mixing wagon hitched to the tractor is not horizontally aligned on even ground.

The mixing auger only works at its optimum in horizontally aligned position. When horizontally aligning the fodder mixing wagon, use the top edge of the mixing container for guidance.

WARNING

Risk of crushing, entanglement, being drawn in and of impact for people if the hitched machine accidentally loosens from the tractor!

Only an authorised workshop is allowed to screw the drawbar to the chassis within the adjusting range of the positioning holes for adapting the mounting height.

WARNING

Risk of crushing, entanglement, being drawn in and of impact for people if the machine starts rolling when adjusting the mounting height of the drawbar!

Secure the machine against rolling before adjusting the mounting height of the drawbar.

WARNING

Risk of crushing and impact for people if the chassis accidentally lowers during screwing work on the drawbar!

Ensure sufficient ground stability when lifting the chassis by means of the supporting leg. Additionally use solid, load-distributing supports if necessary.

1. Park the fodder mixing wagon on even, firm ground:
   1.1 Secure the fodder mixing wagon against rolling by means of the parking brake and / or chocks.
   1.2 Unhitch the machine from the tractor.
   1.3 Move the tractor forward until the coupling device of the tractor uncovers the drawgear of the drawbar.
2. Align the fodder mixing wagon horizontally by means of the supporting leg such that the top edge of the mixing container runs parallel to the ground.
3. Align the coupling device on the tractor such that the coupling device can take up the drawgear of the drawbar.
4. Have the mounting height of the drawbar adjusted if the adjusting range for the coupling device on the tractor is not sufficient to hitch the fodder mixing wagon in horizontal position.

Only an authorised workshop is allowed to carry out this work!

This work requires special know-how and/or specific technical equipment.

Otherwise, this work will impair your safety and the functional ability of the machine during and after its execution!

5. Ensure that there is enough free space around the propeller shaft in any operating state. Insufficient free space will lead to damage on the propeller shaft.

5.4.2 Couple drawbar

WARNING

Risk of being crushed, drawn in, becoming entangled and risk of impact to people if the machine accidentally loosens from the tractor!

- Check whether the coupling device on your tractor is licensed for taking up the machine's drawgear.

  Absolutely observe the information in the chapter "Preconditions for the operation of tractors with rigid drawbar trailers"", page 78.
- Properly hitch the machine to the tractor and secure it.
- Never use damaged or deformed trailer systems.

WARNING

Risk of being crushed and of impact to people standing between tractor and machine while the machine is being hitched!

Make sure that people leave the hazardous area between tractor and machine before approaching the machine.

Present helpers are only allowed to act as a guide next to the tractor and the machine and to enter the space between the tractor and the machine after the vehicles have completely stopped.

5.4.2.1 Bolt-type coupling

1. Secure the machine against rolling.
2. Prepare hitching up:
   - Remove the coupling bolt (non-automatic bolt-type coupling).
   - Open the hitch, i.e. it should be in a pre-coupling position (automatic bolt-type coupling).
3. Make sure that people leave the hazardous area between tractor and machine before approaching the machine.
4. Reverse tractor:
   - such that tractor and machine can be coupled by means of the coupling bolt (non-automatic bolt-type coupling).
   - until the bolt-type coupling engages in the drawbar lug (automatic bolt-type coupling).
5. Secure the tractor against accidental starting and rolling.
6. Check that the connection is secure after coupling:
   - Secure the inserted coupling bolt by positive locking (non-automatic bolt-type coupling).
   - Ensure that the automatic bolt-type coupling is locked (control pin, end position of operating lever etc.).
7. Connect the supply lines.
8. Lift the supporting leg to transport position.
9. Release the parking brake of the machine.

5.4.2.2 Tow-hook (hitch hook) and drawbar lug (hitch ring)

1. Secure the machine against rolling.
2. Make sure that people leave the hazardous area between tractor and machine before approaching the machine.
3. Lower the tow hook.
4. Approach the machine as closely as possible such that the lowered tow hook can take up the drawbar lug.
5. Lift the tow hook to catch the drawbar lug.

→ After automatic engaging, the drawbar lug is fixed between the tow hook and the locking mechanism (holding-down device).

6. Secure the tractor against accidental starting and rolling.
7. Ensure that the tow hook is properly locked.
8. Connect the supply lines.
9. Release the parking brake of the machine.
10. Lift the supporting leg to transport position.

5.4.2.3 Draw pin (Piton-Fix) and drawbar lug (hitch ring)

1. Secure the machine against rolling.
2. Make sure that people leave the hazardous area between tractor and machine before approaching the machine.
3. Reverse tractor and approach the machine.
4. Secure the tractor against accidental starting and rolling.
5. Remove the holding-down device (cross bolt) above the draw pin.
6. Connect the supply lines.
7. Approach the machine as closely as possible such that the draw pin can take up the drawbar lug.
8. Lower the drawbar by means of the supporting leg until the draw pin engages in the drawbar lug.
9. Secure the tractor against accidental starting and rolling.
10. Fix and secure the cross bolt above the draw pin.
11. Release the parking brake of the machine.
12. Lift the supporting leg to transport position.

5.4.2.4 Ball-type coupling and shell

WARNING

Risk of being crushed, drawn in, becoming entangled and risk of impact to people if the machine accidentally loosens from the tractor!

- Before travelling on extremely uneven ground/over bunker silos, ensure that there is enough free space at the holding down-device above the shell.
- Mount the shorter holding-down device at the tractor's ball-type coupling in case of insufficient free space.

Lubricate the coupling device every day to minimize wear on the ball head and the shell. Lubricate the area between the holding-down device and the surface of the shell as well.

(1) Shorter holding-down device for ball-type coupling

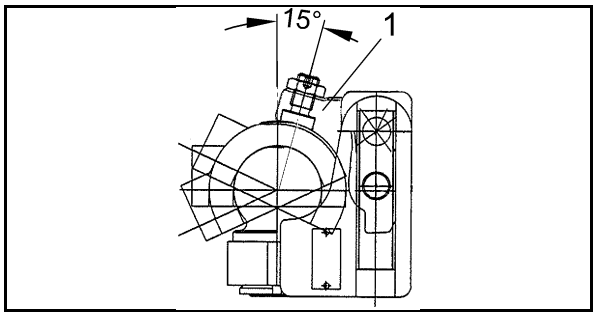


Fig. 30

1. Prepare for coupling:
   - 1.1 Remove grease and dirt from the ball head, the holding-down device and the shell.
   - 1.2 Lubricate the ball head and the surface of the shell with new grease.
   - 1.3 Unlock the holding-down device at the bearing block.
   - 1.4 Swivel the holding-down device to coupling position.
   - 1.5 Clean and grease the ball head.
2. Connect the supply lines.
3. Approach the machine as closely as possible such that the ball head can take up the shell.
4. Lower the drawbar by means of the supporting leg until the ball head engages in the shell.
5. Lock and secure the holding-down device at the bearing block.
6. Release the parking brake of the machine.
7. Lift the supporting leg to transport position.

5.4.3 Uncouple drawbar

WARNING

Risk of being crushed, cut, drawn in, becoming entangled and risk of impact to people due to insufficient stability of the unhitched machine!

- Park the empty machine on even, firm ground.
- Secure the machine against rolling.

5.4.3.1 Bolt-type coupling

1. Secure the tractor against accidental starting and rolling.
2. Secure the machine against rolling. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling".
3. Lower the supporting leg to support position such that the drawbar no longer transmits any tongue load to the tractor.
4. Disconnect the supply lines.
5. Place the supply lines onto the hose holder.
6. Prepare unhitching:
   - Remove the coupling bolt (non-automatic bolt-type coupling).
   - Open the trailer hitch (automatic bolt-type coupling).
7. Move the tractor forward.

5.4.3.2 Tow-hook (hitch hook) and drawbar lug (hitch ring)

1. Secure the tractor against accidental starting and rolling.
2. Secure the machine against rolling. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling".
3. Lower the supporting leg to support position.
4. Lower the tow hook.
5. Move the tractor forward (approx. 25 cm).
6. Lift the tow hook.
7. Secure the tractor against accidental starting and rolling.
8. Disconnect the supply lines.
9. Place the supply lines onto the hose holder.
10. Move the tractor forward.

5.4.3.3 Draw pin (Piton-Fix) and drawbar lug (hitch ring)

1. Secure the tractor against accidental starting and rolling.
2. Secure the machine against rolling. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling".
3. Remove the holding-down device (cross bolt) above the draw pin.
4. Lower the supporting leg to support position such that the drawbar lug disengages from the draw pin.
5. Move the tractor forward (approx. 25 cm).
6. Secure the tractor against accidental starting and rolling.
7. Fix and secure the holding-down device (cross bolt) above the draw pin.
8. Disconnect the supply lines.
9. Place the supply lines onto the hose holder.
10. Move the tractor forward.

5.4.3.4 Ball-type coupling and shell

1. Unlock the holding-down device at the bearing block.
2. Swivel the holding-down device to coupling position.
3. Lower the supporting leg to support position such that the shell disengages from the ball head.
4. Move the tractor forward (approx. 25 cm).
5. Secure tractor and machine against accidental starting and rolling.
6. Lock and secure the holding-down device at the bearing block.
7. Disconnect the supply lines.
8. Place the supply lines onto the hose holder.
9. Move the tractor forward.

5.5 Propeller shaft

The power transmission between tractor and machine is effected by means of the propeller shaft.

WARNING

Risk to people of becoming entangled and wound up due to an unsecured propeller shaft or damaged protective devices!

- Never use the propeller shaft without protective device or with a damaged protective device or without proper handling of the clip chain.
- Before starting operation, always check:
  - all protective devices of the propeller shaft for proper mounting and functioning,
  - whether there is sufficient free space around the propeller shaft in any operating state. Insufficient free space will lead to damage on the propeller shaft.
- Immediately have damaged or missing parts of the propeller shaft replaced by original parts from the propeller shaft manufacturer.

  Observe the fact that only an authorized workshop is allowed to repair a propeller shaft.

WARNING

Risk to people of becoming entangled and wound up due to unprotected propeller shaft parts within the power transmission area between the tractor and the powered machine!

Only carry out work with the drive unit between tractor and powered machine completely protected.

- The unprotected parts of the propeller shaft must always be protected by means of a protective cover mounted on the tractor and a protective sleeve mounted on the machine.
- Check whether the protective cover mounted on the tractor or the protective sleeve mounted on the machine and the safety and protective devices of the extended propeller shaft overlap by at least 50 mm. If not, the machine must not be powered via the propeller shaft.

- Proper use and maintenance of the propeller shaft prevent serious accidents.
- When coupling the propeller shaft, observe:
  - the admissible drive speed of the machine,
  - the correct driving direction of the propeller shaft,
  - the correct fitting length of the propeller shaft, see chapter "Adjust length of propeller shaft to tractor", page 92,
  - the correct fitting position of the propeller shaft. The tractor symbol on the protective tube of the propeller shaft indicates the propeller shaft connection at the tractor.
- Before switching the propeller shaft on, observe the safety instructions for propeller shaft operation.

5.6 Adjust length of propeller shaft to tractor

Shop work

WARNING

Risk to people of being drawn in and becoming entangled due to assembly work on the propeller shaft carried out improperly or due to unauthorized structural alterations!

Only an authorized workshop is allowed to carry out structural alterations on the propeller shaft. Observe the included operating instructions of the propeller shaft manufacturer.

Adjustment of the propeller shaft length is allowed if observing the required minimum transverse contact ratio.

Structural alterations to the propeller shaft which are not specified in the included operating instructions for the propeller shaft are not allowed.

WARNING

Risk to people due to blown out objects if the length of the propeller shaft has been improperly adjusted thus being compressed during cornering!

Have the length of the propeller shaft checked in all operating states by an authorized workshop and adjusted if necessary before coupling the propeller shaft to your tractor for the first time.

This will prevent propeller shaft compression or insufficient transverse contact ratio.

WARNING

Risk to people of being crushed due to the tractor and the hitched machine accidentally rolling!

Secure tractor and machine against accidental starting and rolling before entering the hazardous area between the tractor and the hitched machine for adjusting the propeller shaft.

- The propeller shaft reaches its shortest operating position during extreme cornering. The propeller shaft reaches its longest operating position during straight travelling.
- Also observe:
  - possible changes in inclination between tractor and machine, e. g. in case of ramp travels,
  - the specific differences between top and bottom linkage.
- The adjustment of the propeller shaft only applies to the current tractor model. Readjustment of the propeller shaft may be necessary if hitching the machine to another tractor.
- Absolutely observe the operating instructions provided by the propeller shaft manufacturer provided along with the propeller shaft when determining the length and shortening the propeller shaft!

Assembly instructions for authorized workshop:

1. Hitch the machine to the tractor (do not couple the propeller shaft).
2. Take the shortest operating position of the propeller shaft.
3. Secure the tractor against accidental starting and rolling before entering the hazardous area between tractor and machine.
4. Pull the propeller shaft apart.
5. Slip the fork of the propeller shaft half with the tractor symbol on the protective tube onto the p.t.o. shaft of the tractor until the locking mechanism noticeably engages.
6. Slip the fork of the other propeller shaft half onto the p.t.o. shaft of the machine until the locking mechanism noticeably engages.
7. Observe the included operating instructions for the propeller shaft when determining the length and when shortening the propeller shaft.
8. Reinsert the shortened propeller shaft halves into each other.
9. Lubricate the p.t.o shaft of the tractor and the machine's p.t.o. shaft before coupling the propeller shaft.

5.6.1 Couple propeller shaft to the tractor

1. Clean and lubricate the p.t.o. shaft stub on the tractor.
2. Start the tractor engine.
3. Hitch the machine to the tractor.
4. Secure the tractor against accidental starting and rolling.
5. Check whether the p.t.o. shaft has been switched off.
6. Release the p.t.o. shaft brake at the tractor if necessary.
7. Slip the propeller shaft fork onto the p.t.o. shaft stub of the tractor until the locking mechanism noticeably engages.

   Also observe the included operating instructions for the propeller shaft!
8. Secure the propeller shaft guard at the tractor and at the machine against rotating by means of the clip chains (1):
   - 8.1 Fix the clip chains at right angles to the propeller shaft if possible.
   - 8.2 Fix the clip chains such that a sufficient swivelling range of the propeller shaft is ensured in any operating state. Clip chains must not get entangled in tractor or machine components.
9. Ensure that there is sufficient free space around the propeller shaft in any operating state. Insufficient free space will lead to damage on the propeller shaft.

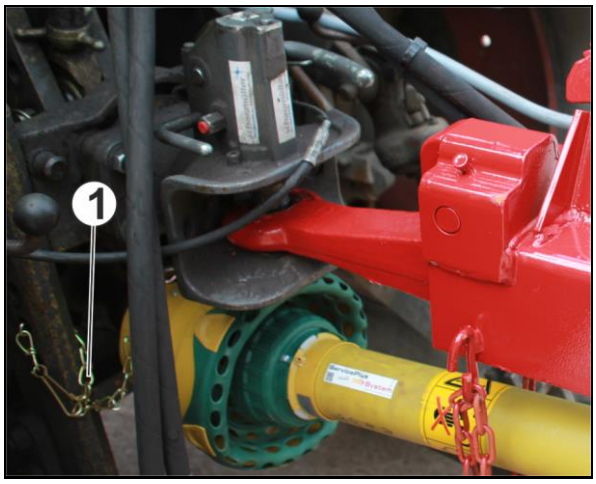


Fig. 31

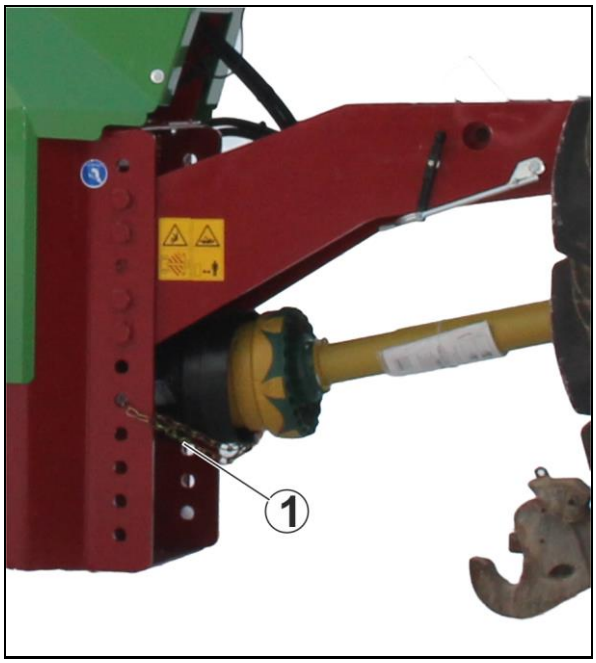


Fig. 32

5.6.2 Uncouple propeller shaft from tractor

CAUTION	**Risk of burns due to contact with hot propeller shaft components!** Do not touch considerably warmed-up propeller shaft components (particularly do not touch any couplings).

	Clean and lubricate the propeller shaft before longer downtimes.

1. Secure the machine against accidental starting and rolling.
2. Remove the clip chain from the tractor.
3. Unlock the locking mechanism and strip the fork of the propeller shaft off the p.t.o. shaft of the tractor.
4. Place the propeller shaft onto the respective holder (1).

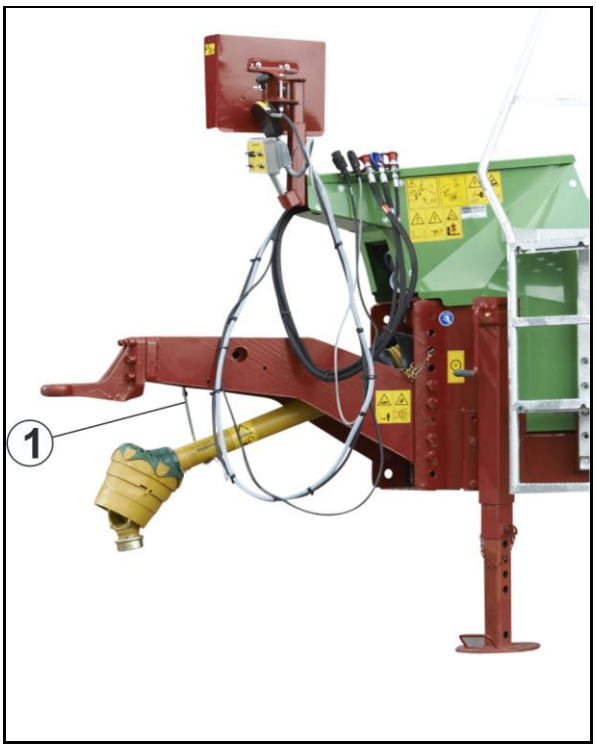


Fig. 33

5.7 Supporting leg

WARNING	**Risk to people of crushing fingers and hands when lifting the supporting leg to transport position!** When lifting the supporting leg, keep sufficient safe distance to the supporting leg as long as parts are moving.

WARNING	**Risk to people of crushing their feet beneath the lowering supporting leg!** When lowering the supporting leg, keep sufficient safe distance to the supporting leg as long as parts are moving.

The unhitched machine is supported by the supporting leg. Depending on the machine's equipment, it is fitted with:

- a mechanical supporting leg
- a hydraulic supporting leg
- Bottom hitch with fixed supporting leg

5.7.1 Mechanical supporting leg

The mechanical supporting leg with spindle adjustment and telescopic quick adjustment (3) is rotated via the crank handle (1).

Sense of rotation of crank handle	Supporting leg
clockwise	lift (transport position)
anticlockwise	lower (support position)

Fig. 34

5.7.1.1 Lift mechanical supporting leg to transport position

1. Hitch the machine to the tractor.
2. Relive the supporting leg via the crank handle (Fig. 34/1).
3. Use one hand to grip the handle (Fig. 34/2) of the telescopic quick adjustment (Fig. 34/3).
4. Use the other hand to unlock and remove the locking bolt (Fig. 34/4).
5. Lift the telescopic quick adjustment of the supporting leg as far as it will go.
6. Secure the supporting leg in the lifted transport position by means of the locking bolt.
7. Secure the locking bolt against accidental losing by means of the spring cotter (Fig. 34/5).

5.7.1.2 Lower mechanical supporting leg to support position

1. Use one hand to grip the handle (Fig. 34/2) of the telescopic quick adjustment (Fig. 34/3).
2. Use the other hand to unlock and remove the locking bolt (Fig. 34/4).
3. Lower the supporting leg.
4. Secure the supporting leg in the lowered position by means of the locking bolt.
5. Secure the locking bolt against accidental losing by means of the spring cotter (Fig. 34/5).
6. Use the crank handle (Fig. 34/1) to lower the supporting leg to support position.

5.7.2 Hydraulic supporting leg

Optional extra

Depending on the machine's equipment, the supporting leg (Fig. 35) is operated by remote control from the tractor:

- directly via a double-acting control device of the tractor (standard equipment),
- via Bowden cable operation (optional extra),
- via electro-hydraulic operation (control set) (optional extra).

Fig. 35

WARNING

Risk to people of crushing fingers, hands and feet when moving the supporting leg!

- Keep sufficient safe distance to the supporting leg as long as parts are moving.
- Make sure that people leave the hazardous area between tractor and machine before moving the hydraulic supporting leg.

5.7.2.1 Lift hydraulic supporting leg to transport position

1. Make sure that people leave the hazardous area between the tractor and the hitched machine before lifting the hydraulic supporting leg.
2. Open the stop-cock (1) to lift the supporting leg.
3. Keep hold of the respective operating element in “Lifting“ position until the supporting leg has been lifted from its support position to its transport position.
4. Close the stop-cock (1) to secure the supporting leg in its transport position.

5.7.2.2 Lower hydraulic supporting leg to support position

1. Make sure that people leave the hazardous area between tractor and machine before lowering the hydraulic supporting leg.
2. Open the stop-cock (1) to lower the supporting leg.
3. Keep hold of the respective operating element in “Lowering“ position until the supporting leg has been lowered from its transport position to its support position.

→ The drawbar no longer transmits any tongue load to the tractor.

4. Close the stop-cock (1) to prevent a lowering of the supporting leg.

5.7.3 Fixed supporting leg with bottom hitch

Optional extra

The machine is put down resting on a fixed supporting leg of the bottom hitch. Lifting and lowering is executed via the hitch hook of the tractor.

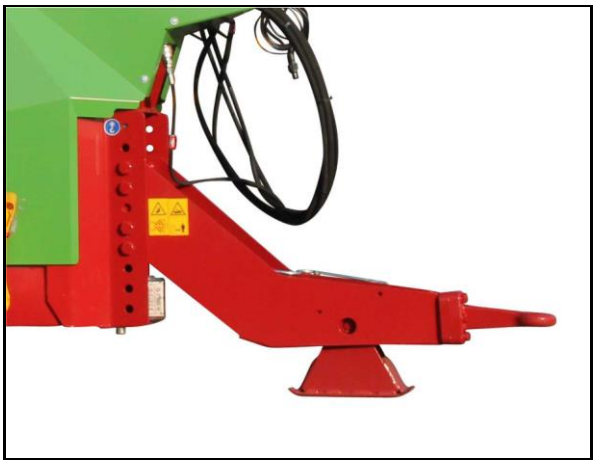


Fig. 36

5.8 Check machine for proper functioning

Check the machine for proper functioning before the first startup and each time before starting work.

1. Hitch the fodder mixing wagon to the tractor.
2. Completely lubricate the fodder mixing wagon and the propeller shaft. Observe the information in the chapter "**Lubrication of machine**", page **176**.
3. Check the oil level of the angular gear in the compensating reservoir for the gear lubricant oil. Observe the information in the chapter "Check oil level", page **180**.
4. Check all functions of the machine before filling the mixing container for the first time:
   - 4.1 Open and close discharge door.
   - 4.2 Lower hydraulic supporting leg (if available) to support position and lift it to transport position.
   - 4.3 Extend and retract hydraulic counter-cutters (if available) into and from the mixing container.
   - 4.4 Let crossover conveyor (if available) run in both driving directions.
   - 4.5 Let crossover conveyor (if available) run at different conveyor speeds.
   - 4.6 Lower conveyor extension (if available) to working position and lift it to transport position.
   - 4.7 Lower discharge conveyor for side discharge (if available) to working position and lift it to transport position.
   - 4.8 Let discharge conveyor for side discharge (if available) run in driving direction (in working position).
   - 4.9 Let discharge conveyor for side discharge (if available) run at different conveyor speeds (in working position).
   - 4.10 Check the weighing device (if available) for proper functioning.
   - 4.11 Check the lighting system (if available) for proper functioning.
   - 4.12 Check the brake system for proper functioning.

Machine with on-board hydraulic system

Ensure that the stop valve (5) is open before each start-up. Fig. 64 shows the open stop valve (5).

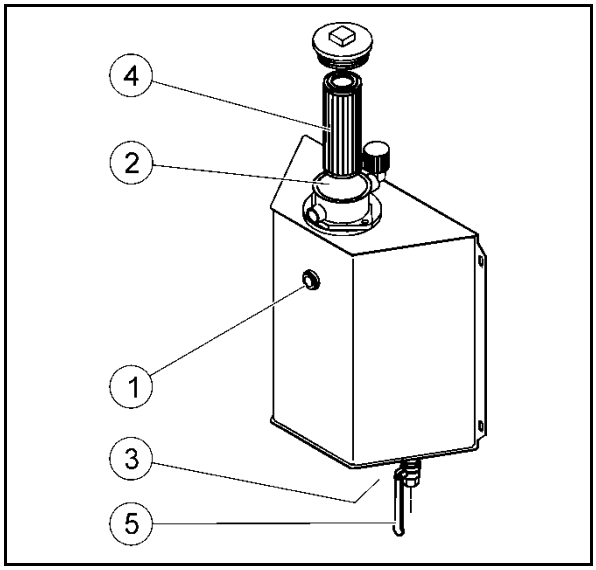


Fig. 37

5.8.1 Hydraulic hose pipes

WARNING

Risk of infection to people due to hydraulic oil squirting out under high pressure and entering the body!

Make sure that the hydraulic system on the tractor and on the machine has been depressurized when connecting and disconnecting the hydraulic hose pipes. Always swivel the operating element at the control device on the tractor to open-centre position.

5.8.1.1 Connect hydraulic hose pipes

WARNING

Risk of being crushed, cut, becoming entangled, being drawn in and risk of impact to people due to malfunctions caused by improperly connected hydraulic hose pipes!

- Check the assignment of the hydraulic hose pipes at the control block of the machine if the coloured markings (dust caps) are missing:
  - P = Pressure line
  - T (R;S) = Return line

- Check the compatibility of the hydraulic oils before connecting the machine to the hydraulic system of your tractor.
- Do not mix mineral oils with bio oils!
- Observe the maximum admissible operating pressure of the hydraulic oil.
- Only connect clean hydraulic plugs and hydraulic sleeves.
- Slip the hydraulic plug into the hydraulic sleeve until the hydraulic plug noticeably locks.
- Check the coupling spots of the hydraulic hose pipes for correct and tight seat.
- Connected hydraulic hose pipes:
  - must easily give way to any movements during cornering without any stress, buckling or chafing,
  - must not chafe against external components.

1. Swivel the respective operating element at the control device on the tractor to open-centre position.
2. Connect the hydraulic hose pipes to the control devices of the tractor:
   2.1 Pressure pipe to a single-acting or double-acting control device.
   2.2 Return pipe to a depressurized return port if possible.

5.8.1.2 Disconnect hydraulic hose pipes

CAUTION	**Risk of burns due to contact with hot hydraulic hose pipe components!** Do not touch considerably warmed-up components of the hydraulic hose pipes (particularly do not touch any hydraulic plugs and hydraulic sleeves).

1. Always swivel the respective operating element at the control device on the tractor to open-centre position.
2. Turn the tractor engine off.
3. Disconnect the hydraulic hose pipes.
4. Use the dust caps to protect the hydraulic plugs against soiling.
5. Put the hydraulic hose pipes down onto the hose holder.

5.9 Brake system

Depending on the machine's equipment, the brake system consists of:

- a hydraulic service brake with parking brake for an admissible maximum speed of 6 km/h,
- an automatic reverse overrun brake for machines with a gross vehicle weight rating of 8 t and an admissible maximum speed of 25 km/h,
- a dual-line service brake system (compressed-air brake system) with manually operated brake pressure regulator and parking brake for an admissible maximum speed of 25 km/h or 40 km/h,
- a hydraulic service brake system with parking brake for an admissible maximum speed of 25 km/h. The hydraulic service brake system has been designed for connection to a controlled hydraulic service brake system of a tractor.

- Observe the fact that the braking axle needs to run in during the first service hours – the brake lining is adjusting to the brake drum. Full braking power is only reached after this running-in period.
- Check the brake system for proper functioning before carrying out transport journeys.

5.9.1 Hydraulic service brake

The hydraulic service brake is connected to a single-acting control device or to a double-acting control device with open-centre position of the tractor. The operator must actuate the respective control device on the tractor in order to slow the machine down.

The machine equipped with a hydraulic service brake is a pure yard vehicle and not licensed for use on public roads. The maximum admissible speed is 6 km/h.

We explicitly point out to you the risk to lose insurance coverage if you cause an accident by exceeding the admissible maximum speed of 6 km/h.

When connecting the hydraulic service brake to the tractor, ensure that the full system pressure must always act on the brake connection, even when switching on other hydraulic functions.

(1) Hydraulic plug ISO 7241-A DIN 2353

Fig. 38

(2) Hydraulic cylinder of braking axle

Fig. 39

5.9.1.1 Connect hydraulic brake system

- Only couple clean hydraulic clutches.
- Clean hydraulic plug and hydraulic sleeve if necessary.
- Slip the hydraulic plug into the hydraulic sleeve until the hydraulic plug noticeably locks.
- Check the coupling spot of the hydraulic brake line for correct and tight seat.
- The connected hydraulic brake line:
  - must easily give way to any movements during cornering without any stress, buckling or chafing,
  - must not chafe against external components.
- Check the hydraulic brake system for proper functioning before carrying out transport journeys.

1. Swivel the operating element at the control device on the tractor to open-centre position (neutral position).
2. Remove the dust cap from the hydraulic plug (1).
3. Connect the hydraulic plug with the hydraulic sleeve to a single-acting control device or a double-acting control device with open-centre position of the tractor.
4. Release the parking brake.

Fig. 40

5.9.1.2 Disconnect hydraulic brake system

1. Apply the parking brake.
2. Relieve the brake hydraulics. Swivel operating element at the control device on the tractor to “Lowering“ position such that the hydraulic oil flows back to the tractor.
3. Disconnect the hydraulic plug.
4. Use the dust cap to protect the hydraulic plug against soiling.
5. Put the hydraulic brake line onto the hose holder.

5.9.2 Automatic reverse overrun brake system

Optional extra

The automatic reverse overrun brake:

- serves as service and as parking brake,
- is licensed for machines with a gross vehicle weight rating of 8 t and an admissible maximum speed of 25 km/h determined by its design.

- The automatic reverse function permits direct reversing of the machine, as there will be no braking effect with the wheels running backwards.
- Particularly beware when travelling on extreme uphill gradients. In case of tractors with insufficient power or spinning tractor wheels, the combination of tractor / machine risks to be pulled back down the hill by the charged machine. When reversing, the machines can only be slowed down by means of the hand brake lever.

(1) Hand brake lever
   - o serves as parking brake for the unhitched machine
   - o is used for slowing down the machine during reverse travel

(2) Pawl for locking the applied hand brake lever

(3) Push button for releasing the applied hand brake lever

(4) Pneumatic spring, automatically retightens the applied hand brake lever if the machine rolls backwards

(5) Contact breaking cable, serves to actuate the hand brake lever from the tractor

(6) Hand brake lever (1) is released

(7) Hand brake lever (1) is applied

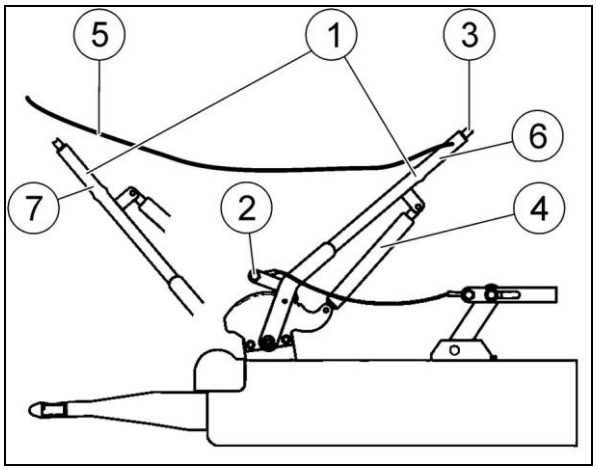


Fig. 41

5.9.2.1 Connect automatic reverse overrun brake system

WARNING

Risk of crushing, being drawn in, becoming entangled and risk of impact to people if the machine accidentally loosens from the tractor!

Absolutely fix the contact breaking cable (5) of the hand brake lever to the tractor when hitching the machine to the tractor.

The contact breaking cable (5) actuates the hand brake lever (1) thus slowing down the machine if the machine accidentally loosens from the tractor.

1. Fix the contact breaking cable (5) actuating the hand brake lever to the tractor within your reach.

   The contact breaking cable fixed to the tractor:

   - must easily give way to any movements during cornering without any stress, buckling or chafing,
   - must not chafe against external components.
2. Pull the contact breaking cable (5) from the tractor to unlock the pawl (2).
3. Release the contact breaking cable.

→ The hand brake lever (1) swivels backwards to position (6) and the parking brake is released.

→ If the machine accidentally loosens from the tractor, the hand brake lever is actuated via the contact breaking cable and the machine is slowed down.

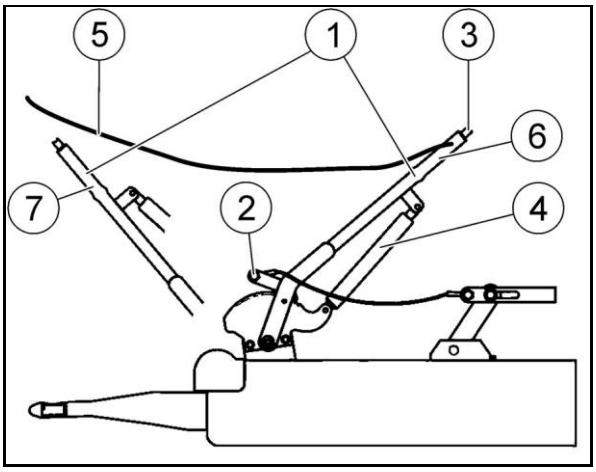


Fig. 42

5.9.2.2 Disconnect automatic reverse overrun brake system

1. Strongly pull the contact breaking cable (Fig. 42/5) from the tractor before leaving the tractor.

→ The hand brake lever (Fig. 42/1) swivels forward past the dead centre to position (Fig. 42/7) and the parking brake is applied.

5.9.3 Dual-line compressed-air brake system

The brake system consists of:

(1) Feed line with hose coupling (red)
(2) Brake line with hose coupling (yellow)
(3) In-line filter of feed line
(4) In-line filter of brake line
(5) Trailer brake valve with brake pressure regulator
(6) Piston-type brake cylinder
(7) Text connection, piston-type brake cylinder
(8) Compressed-air reservoir
(9) Drain valve
(10) Test connection, compressed-air reservoir

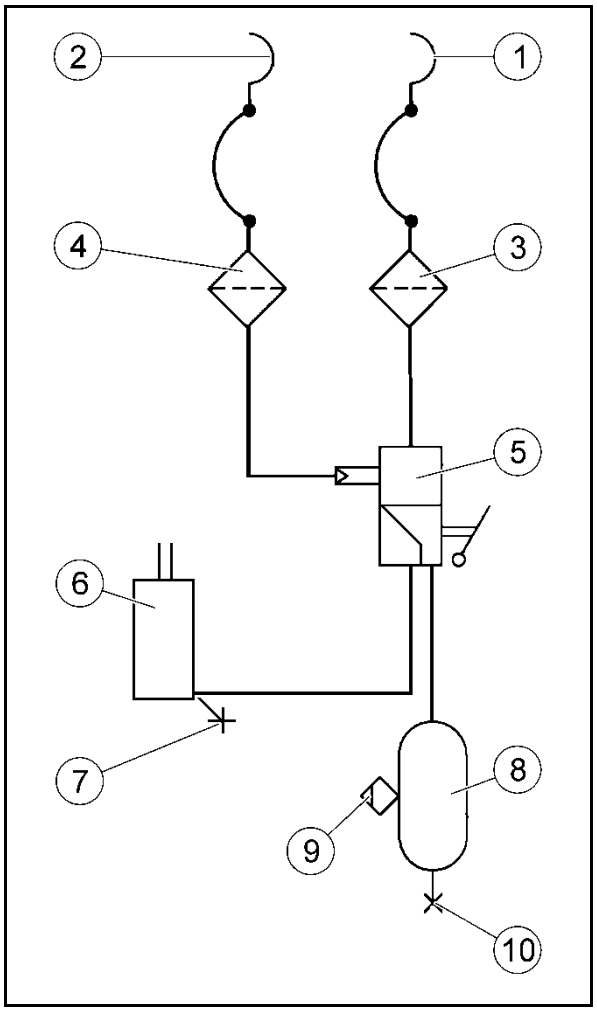


Fig. 43

Observance of the maintenance intervals is indispensable for proper functioning of the dual-line compressed-air brake system.

Brake pressure regulator

The brake pressure regulator can be used to manually adapt the braking effect (braking force) of the dual-line service brake system to the current loading condition of the machine. The following positions are possible:

- Full load = Machine filled
- Half load = Machine empty
- Release = Release service brake system

The "Release" position allows to manoeuvre the machine with the brake hoses not coupled to the manoeuvring vehicle.
Due to the vehicle weight, the brake pressure regulator must be set to half load when the machine is empty.

(1) Trailer brake valve
(2) Brake pressure regulator
(3) Feed line with hose coupling (red)
(4) Brake line with hose coupling (yellow)
(5) In-line filter of feed line
(6) In-line filter of brake line
(7) Hand lever for adapting the braking effect
(8) Reading point of the set braking effect

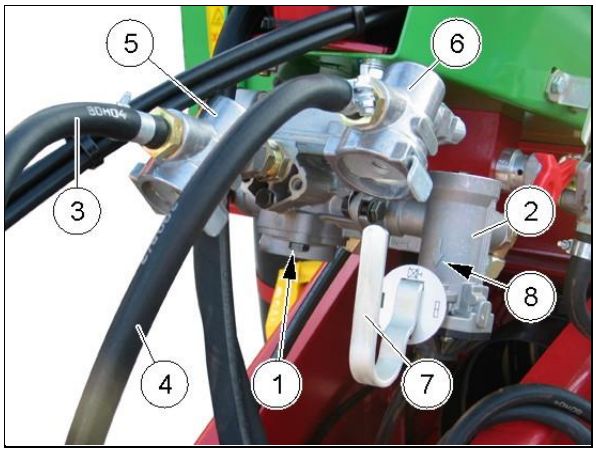
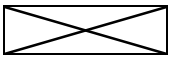


Fig. 44

"Full load"

"Half load"


"Release"

Example:

Machine filled = Turn hand lever (7) such that the "Full load" symbol is beneath the reading point (8).

It is absolutely imperative to adapt the braking effect of the dual-line service brake system via the brake pressure regulator to the current loading condition of the machine before carrying out transport journeys.

Only with the braking effect adapted:

- will the pressure released by the trailer brake valve be limited,
- will there be no run-on pushes,
- will it be possible to sensitively and gradually slow down the combination of tractor / machine,
- will the tractor / machine combination remain in straight position due to advanced braking.

5.9.3.1 Connect brake and feed line

WARNING

Risk of crushing, cuts, becoming entangled, being drawn in and risk of impact to people due to improper functioning of the service brake system!

- When connecting the brake and feed line, ensure that:
  - the sealing rings of the hose couplings are clean,
  - the sealing rings of the hose couplings seal tightly.
- Immediately replace damaged sealing rings.
- Drain the air reservoir every day before the first trip.
- Only start the tractor with the hitched machine moving when the pressure gauge of the compressed-air brake system on the tractor indicates 5.0 bar.
- Check the course of the connected brake lines! The brake lines must not chafe against external components.

WARNING

Risk of crushing, cuts, becoming entangled, being drawn in and risk of impact to people if the machine rolls due to the service brake system being released!

Always connect the hose coupling of the brake line (yellow) first and then the hose coupling of the feed line (red).

The machine's service brake system immediately comes off the brake position if the red hose coupling is connected.

1. Open the caps of the hose couplings on the tractor.
2. Remove the hose coupling of the brake line (yellow) from the blank connection.
3. Clean soiled sealing rings or replace damaged sealing rings.
4. Properly fix the hose coupling of the brake line (yellow) to the yellow marked coupling device at the tractor.
5. Remove the hose coupling of the feed line (red) from the blank connection.
6. Clean soiled sealing rings or replace damaged sealing rings.
7. Properly fix the hose coupling of the feed line (red) to the red marked coupling device at the tractor.
8. Use the brake pressure regulator to adapt the braking effect of the service brake system to the current loading condition of the machine.
9. Release the parking brake of the machine and / or remove the chocks.

5.9.3.2 Disconnect brake and feed line

WARNING

Risk of crushing, cuts, becoming entangled, being drawn in and risk of impact to people if the machine rolls due to the service brake system being released!

Always disconnect the hose coupling of the feed line (red) first and then the hose coupling of the brake line (yellow).

The machine's service brake system only moves to brake position if the red hose coupling is disconnected.

It is imperative to observe this order, as otherwise the service brake system will be released and the non-braked machine may start to move.

When the machine is unhitched or torn off, the feed line connected to the trailer brake valve bleeds. The trailer brake valve automatically switches over thus actuating the service brake according to the set braking effect.

1. Secure the machine against rolling. Observe the information in the chapter "**Secure tractor and machine against accidental starting** and rolling", page 83.
2. Release the hose coupling of the feed line (red).
3. Release the hose coupling of the brake line (yellow).
4. Fix the hose couplings to the blank connections.
5. Close the caps of the hose couplings at the tractor.

5.9.3.3 Manoeuvre unhitched machine by means of a manoeuvring vehicle

WARNING	**Risk of crushing, entanglement and impact for people if the machine accidentally rolls during manoeuvring work with the service brake released!** Tightly connect the machine with the braked manoeuvring vehicle before manually releasing the service brake. Now the machine must be exclusively slowed down by the manoeuvring vehicle.

1. Hitch the machine to the braked manoeuvring vehicle.
2. Release the parking brake of the machine.
3. Swivel the hand lever at the brake pressure regulator to "Release" position.

→ The service brake is released and the machine can be manoeuvred.

4. Manoeuvre the machine by means of the manoeuvring vehicle.
5. Apply the parking brake of the manoeuvring vehicle after manoeuvring.
6. Swivel the hand lever at the brake pressure regulator back to its initial position after manoeuvring.

→ The system pressure from the air reservoir slows the machine down.

7. Apply the parking brake of the machine.
8. Unhitch the machine from the manoeuvring vehicle.

5.9.4 Hydraulic service brake system

The controlled hydraulic service brake system is connected to the special brake valve of the tractor. When the brake pedal on the tractor is pressed down, the machine is slowed down.

(1) Hydraulic sleeve ISO 5676

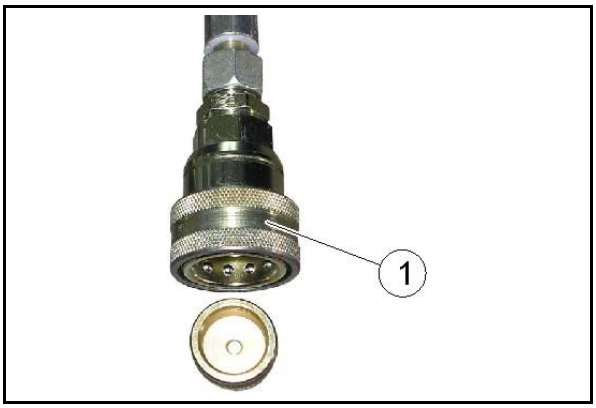


Fig. 45

(2) Hydraulic cylinder of braking axle

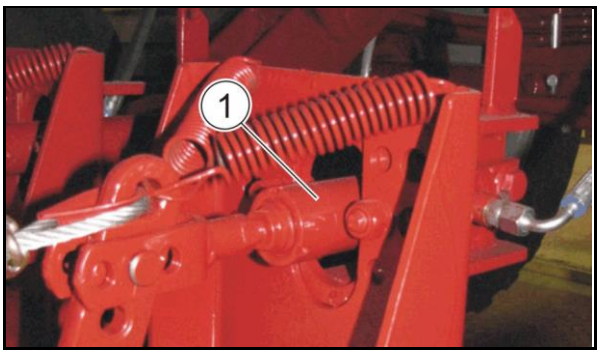


Fig. 46

5.9.4.1 Connect hydraulic brake system

- Only couple clean hydraulic clutches.
- Clean hydraulic plug and hydraulic sleeve if necessary.
- Slip the hydraulic plug into the hydraulic sleeve until the hydraulic plug noticeably locks.
- Check the coupling spot of the hydraulic brake line for correct and tight seat.
- The connected hydraulic brake line:
  - must easily give way to any movements during cornering without any stress, buckling or chafing,
  - must not chafe against external components.
- Check the hydraulic brake system for proper functioning before carrying out transport journeys.

1. Remove the hydraulic sleeve (1) from the machine's blanked-off connecting piece (2).
2. Couple the machine's hydraulic sleeve to the tractor's hydraulic plug of the hydraulic brake system.
3. Release the parking brake of the machine.

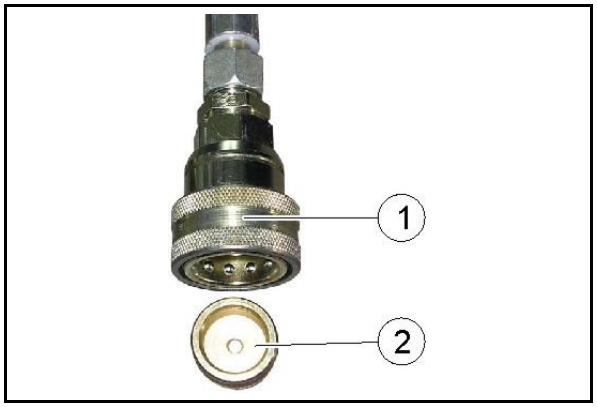


Fig. 47

5.9.4.2 Disconnect hydraulic brake system

1. Apply the parking brake of the machine.
2. Uncouple the hydraulic sleeve (Fig. 47/1).
3. Slip the hydraulic sleeve onto the machine's blanked-off connecting piece (Fig. 47/2).

5.9.5 Parking brake

The applied parking brake secures the unhitched machine against rolling. The parking brake is actuated via spindle and cable when turning the crank handle.

(1) Crank handle; in adjusting position (2)

(2) Adjusting position

(3) Resting position, swivelled by 180° compared to the adjusting position

(4) Spindle

(5) Cable

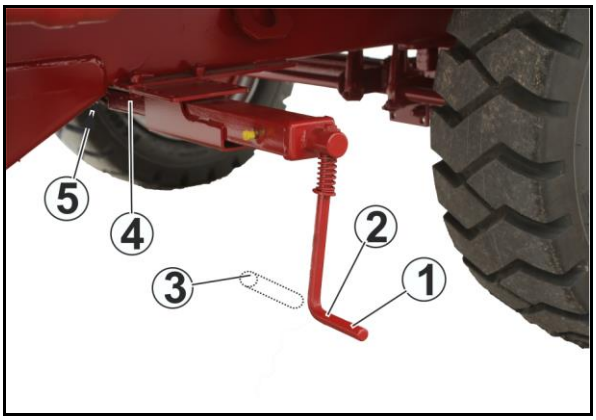


Fig. 48

Release parking brake

Ensure that the cable does not rest on or chafe against other vehicle components.

With the parking brake released, the cable shall slightly sag.

1. Swivel the crank handle (1) from resting position (3) by 180° to adjusting position (2).
2. Turn the crank handle anticlockwise until the cable (5) is relieved.

→ The parking brake is released.

3. Swivel the crank handle to resting position.

Apply parking brake

Correct the setting of the parking brake if the tension path of the spindle (4) is no longer sufficient.

1. Swivel the crank handle (1) from resting position (3) by 180° to adjusting position (2).
2. Turn the crank handle clockwise.

→ The parking brake is applied via the cable (2).

6 Hitch and unhitch machine

- Additionally observe the information in the chapter "Basic safety instructions", page 48, when hitching and unhitching the machine.
- Check the machine for visible defects during each hitching and unhitching procedure. Observe the information in the chapter "Operator's obligation", page 43.

WARNING

Risk to people of being crushed due to the tractor and the machine accidentally starting or rolling when hitching or unhitching the machine!

Only hitch or unhitch the machine after the tractor and the machine have been secured against accidental starting and rolling.

Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling", page 83.

6.1 Hitch machine

WARNING

Risk due to incorrect use of the tractor if the attached/ hitched machine causes insufficient stability or insufficient steerability and braking ability of the tractor!

Only attach/hitch the machine to appropriate tractors. Observe the information in the chapter "Check tractor's compatibility", page 77.

WARNING

Risk of being crushed and of impact to people standing between tractor and machine while the machine is being hitched!

Make sure that people leave the hazardous area between tractor and machine before approaching the machine.

Present helpers are only allowed to act as a guide next to the tractor and the machine and to enter the space between the tractor and the machine after the vehicles have completely stopped.

WARNING

Risk of crushing, cuts, being drawn in, becoming entangled and risk of impact if the machine accidentally loosens from the tractor!

- Observe the maximum admissible tongue loads, towing capacities and axle loads of the tractor.
- Properly use and secure the provided coupling devices of the tractor and the machine.

WARNING

Risk to people due to a failure of the power supply between tractor and machine, caused by defective supply lines!

Observe the course of the supply lines during hitching. The supply lines:

- must easily give way to any movements during cornering without any stress, buckling or chafing,
- must not chafe against external components.

1. Secure the machine against rolling. Observe the information in the chapter "**Secure tractor and machine against accidental starting** and rolling", page 83.
2. Always check the machine for visible defects during hitching. Observe the information in the chapter "**Operator's obligation**", page 43.
3. Couple the drawbar. Observe the information in the chapter "**Couple drawbar**", page 85.
4. Connect the hydraulic hose pipes. Observe the information in the chapter "**Connect hydraulic hose pipes**", page 101.
5. Connect the brake system. Observe the information in chapters:
   - Hydraulic service brake, from page 104,
   - Automatic reverse overrun brake system, from page 106,
   - **Dual-line compressed-air brake system**, from page **108**.
   - **Hydraulic service brake system**, from page **113**,
6. Couple the propeller shaft. Observe the information in the chapter "Couple propeller shaft", from page 94.
7. Insert the Bowden cable control set / the control unit into the holder of the tractor.
8. Connect the electrical supply lines / lighting system.
9. Lift the supporting leg to transport position. Observe the information in chapters:
   - "Lift mechanical supporting leg to transport position", page 97,
   - "Lift hydraulic supporting leg to transport position", page 98.
10. Release the parking brake of the machine. Observe the information in the chapter "Parking brake", page 115.

6.2 Unhitch machine

WARNING

Risk of being crushed, cut, drawn in, becoming entangled and risk of impact to people due to insufficient stability of the unhitched machine!

- Park the empty machine on even, firm ground.
- Secure the machine against rolling.

Ensure that there is always still enough free space in front of the machine when unhitching the machine such that the tractor can reapproach the machine in true alignment for hitching the machine again.

1. Lower the supporting leg to support position. Observe the information in chapters:
   - "Lift mechanical supporting leg to transport position", page 97,
   - "Lift hydraulic supporting leg to transport position", page 98.
2. Secure the machine against rolling. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling", page 83.
3. Always check the machine for visible defects during unhitching. Observe the information in the chapter "Operator's obligation", page 43.
4. Disconnect the electrical supply lines / lighting system.
5. Disconnect the hydraulic hose pipes. Observe the information in the chapter "Disconnect hydraulic hose pipes", page 102.
6. Disconnect the brake system. Observe the information in chapters:
   - Hydraulic service brake, from page 104,
   - Automatic reverse overrun brake system, from page 106,
   - Dual-line compressed-air brake system, from page 108.
   - Hydraulic service brake system, from page 113,
7. Uncouple the propeller shaft. Observe the information in the chapter "Uncouple propeller shaft from tractor", page 95.
8. Insert the Bowden cable control set / the control unit into the holder on the machine.
9. Uncouple the drawbar. Observe the information in the chapter "Uncouple drawbar", page 89.

6.2.1 Container attachment

Optional extra

The container attachment (1) increases the mixing capacity and additionally prevents the fodder from being thrown over the container edge. For this purpose, the container attachment is screwed on starting at the container edge (2). The overflow ring (3) is mounted at the top edge of the container attachment.

Fig. 49

- Only authorised and qualified staff is allowed to mount the container extension!
- The manufacturer will not assume any warranty and liability for material damage and personal injuries if the work is carried out by insufficiently qualified staff.
- Only use original Strautmann spare parts.

Risk of damage to the machine due to overload caused by filling too much mass into the mixing container due to a non-approved extension! Exclusively use approved extensions.

- The maximum extension height is 360 mm, only 180 mm on the Verti-Mix 1451!
- Combining different extensions is not allowed!
- Observe the fact that the container extension increases the vehicle height. Observe the information in the **chapter "Technical data", page 24**

6.2.2 Set conveyor speed

The conveyor speed for the crossover conveyor / C-conveyor / discharge conveyor for side discharge is infinitely adjustable.

The set conveyor speed determines the lateral delivery distance (throwing range) of the fodder next to the machine. An increasing conveyor speed results in a larger lateral delivery distance of the fodder.

The conveyor speed is infinitely adjusted at the current regulation valve:

- manually directly on the machine,
- by remote control via the control set from the tractor.

The set scale value is not an absolute value for the conveyor speed, but only a reference value. Depending on the tractor model, the set conveyor speed may differ even if the scale value is identical.

6.2.2.1 Manual setting of conveyor speed

Set the conveyor speed directly on the machine via the rotary knob (1) at the current regulation valve (2). Position (3) indicates the scale value for the set conveyor speed.

- Scale value 0 = lowest conveyor speed,
- Scale value 10 = highest conveyor speed.

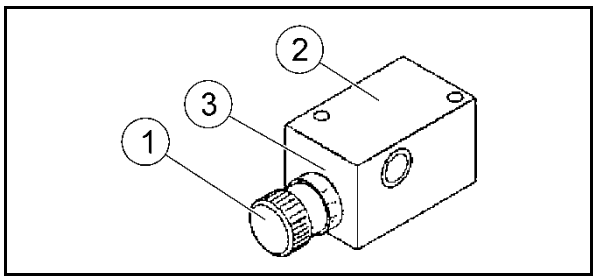


Fig. 50

6.2.2.2 Set conveyor speed via control set

Set the conveyor speed via the control dial (1) on the control set. Pointer (2) indicates the scale value for the set conveyor speed:

- Scale value 0 = lowest conveyor speed,
- Scale value 10 = highest conveyor speed.

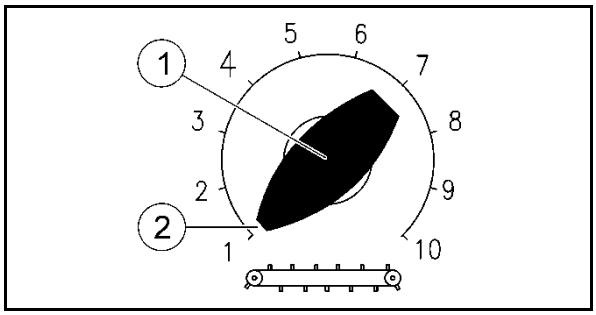


Fig. 51

6.2.3 Set control dial range of E-control set

The E-control set provides you with the option to adapt the control range of the control dial and thus the drive speed of the conveyor (crossover conveyor, side discharge conveyor, conveyor extension or C-conveyor) to your needs.

The control dial is factory-set such that in normal operating mode the conveyor slowly starts to run in position 2 and approximately reaches its maximum drive speed in position 10.

WARNING

Risk of becoming entangled, being drawn in and wound up by the running crossover conveyor, side discharge conveyor, conveyor extension or C-conveyor!

Make sure that people or animals leave the hazardous area of the conveyor before powering the conveyor.

Immediately switch the conveyor off if people or animals enter the hazardous area of the conveyor.

1. Hitch the machine to the tractor:
   - 1.1 Couple drawbar.
   - 1.2 Connect hydraulic flow line and return line.
   - 1.3 Connect control set of the E-control.
2. Secure tractor and machine against rolling.
3. Insert the blade of a screwdriver into the slit (1) on the right-hand side of the control set and force open the casing by pressing the screwdriver handle outwards.

Fig. 52

The casing of the control set can only be completely folded open on the right-hand side.

4. Start the machine and switch the conveyor on.
5. Set the control dial (2) to position 2 (minimum drive speed).

6. Turn the screw at the trimmer potentiometer P2 to change the minimum drive speed of the conveyor until it runs at the desired speed (current approx. 0.6-1.9 A).
7. Set the control dial (2) to position 10 (maximum drive speed).
8. Turn the screw at the trimmer potentiometer P3 to change the maximum drive speed of the conveyor until it runs at the desired speed (max. current 2.5 A).
9. Finally, turn the control dial and observe the conveyor to check the entire control range.

   Adjust the control range as described in steps 5-8 if necessary.

> With the control dial range being reduced, the other hydraulic functions are reduced as well as long as the conveyor is running.
>
> In case of a conveyor failure, the other hydraulic functions can still be operated.

10. Close the casing of the control set.

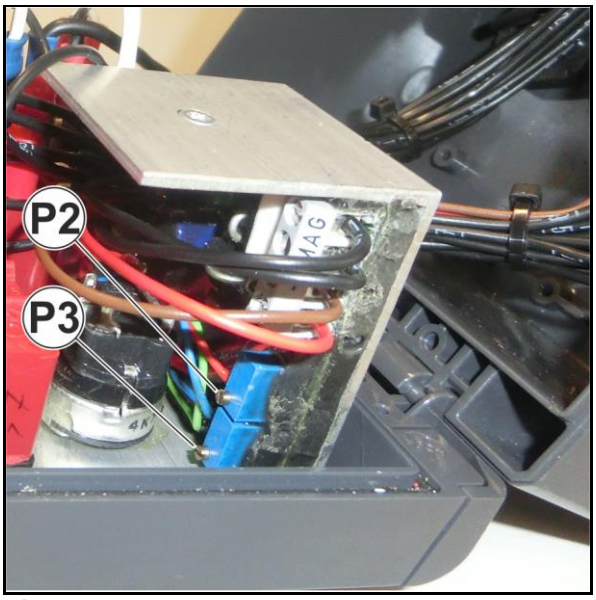


Fig. 53

6.3 Mount control set on the tractor

6.3.1 Mount holder with pocket for Bowden cable control set

1. Fix the holder (1) with the pocket (2) for the Bowden cable control set within view and easy reach at an appropriate spot in the tractor's cabin.
2. Insert the Bowden cable control set into the pocket (2).

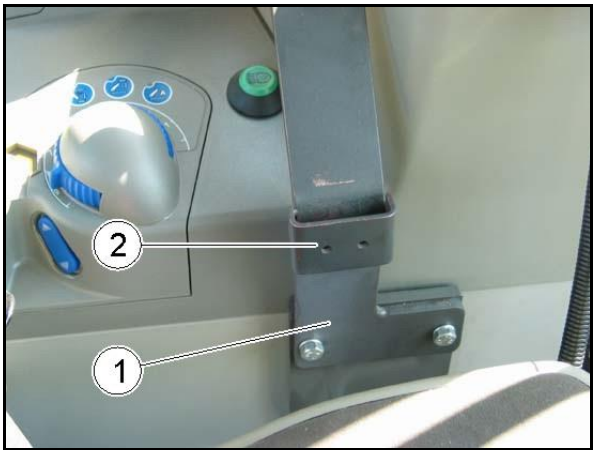


Fig. 54

6.3.2 Mount E-control set on the tractor

1. Mount the holder (1) with the mounting element (2) for the control set on the tractor within view and easy reach to the driver's right.
2. Insert the mounting element for the control set into the holder.
3. Plug the 3-pole plug (DIN 9680) of the power cable into the 3-pole socket of the tractor.
   (Pole 15/30 = Plus; Pole 31 = Minus)

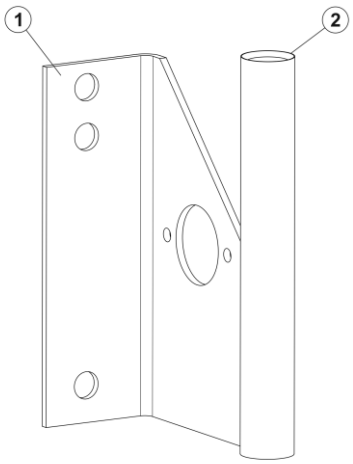


Fig. 55

- Do not draw the current from the light socket.
- Retrofit the 3-pole socket if your tractor is not equipped with a 3-pole socket. An appropriate retrofit kit is available.
- A constant power supply of 12 V is required. The 3-pole socket must be protected by a fuse of at least 25 A.
- The feed line of the 3-pole socket must have a minimum cable cross section of 4 mm^2.

6.4 Battery for weighing device

Optional extra

The battery of the weighing device enables the use of the weighing device when the machine is not connected with the tractor.

The signal lamp (1) displays the status of the system:

- flashes green: Battery is fully charged,
- flashes red/green: Battery is being charged,
- flashes red: The weighing device is supplied by the battery.

When the machine is not connected with the tractor by means of the three-pole plug, press the button (2) to activate the power supply via battery. The signal lamp flashes red and the weighing device is supplied with power for 45 minutes.

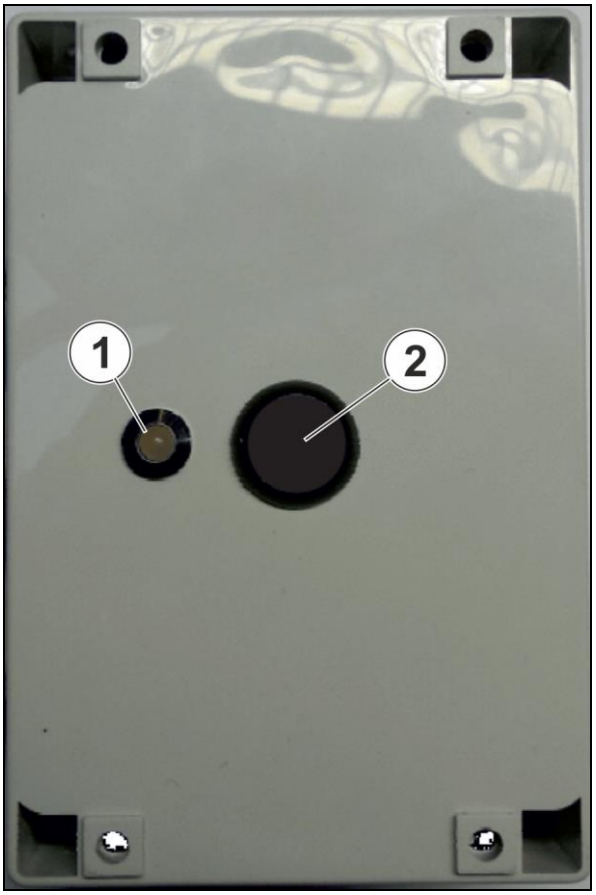


Fig. 56

Charge battery

If the voltage of the additional battery falls below 10.5 V, charging via the battery management is no longer possible!

In this case, a separate power supply unit with connecting cable is required.

The battery is charged if the three-pole plug of the E-control set is connected with the tractor. Precondition for the charging procedure is a socket in the tractor which is not switched via the ignition system. Otherwise, the battery is only charged with the ignition system switched on.

Approx. 11 hours are required to completely charge an empty battery. In order to ensure trouble-free operation, provide for a sufficient minimum charging time.

Operation of weighing device without connection to tractor	Minimum charging time of battery
15 min	0.5 h
30 min	1.0 h
45 min	1.5 h
60 min	2.0 h

If the required minimum charging time cannot be reached, an additional power supply unit will be required which enables charging of the battery independently of the tractor. The electronic system of the charging equipment prevents overloading. The power supply unit is connected with the three-pole plug of the E-control set by means of a charging cable.

6.5 Set deflector plate

WARNING	**Risk of injury due to movements of the machine or its working tools!**
	Secure the machine against accidental starting, rolling and actuation!

Mechanical deflector plate

1. Lower the dosage gate(s) completely.
2. Unscrew the nut (4).
3. Move the adjusting sheet (3)
   - up (1): the deflector plate (5) swivels out to its maximum extent when the dosage gate is lifted.
   - down (2): the deflector plate (5) swivels out to its minimum extent when the dosage gate is lifted.
4. Retighten the nut (4).

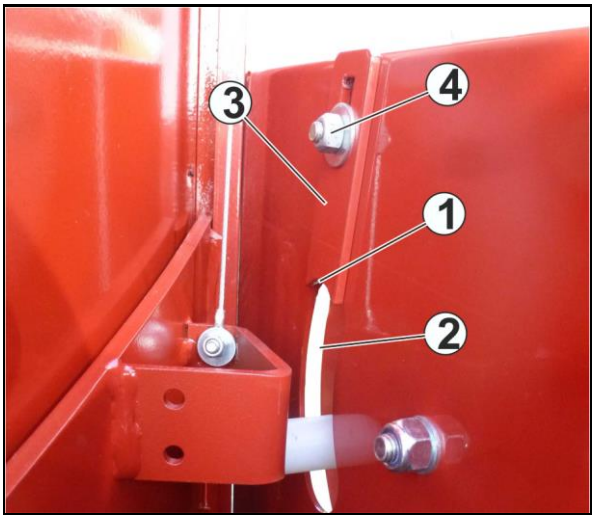


Fig. 57

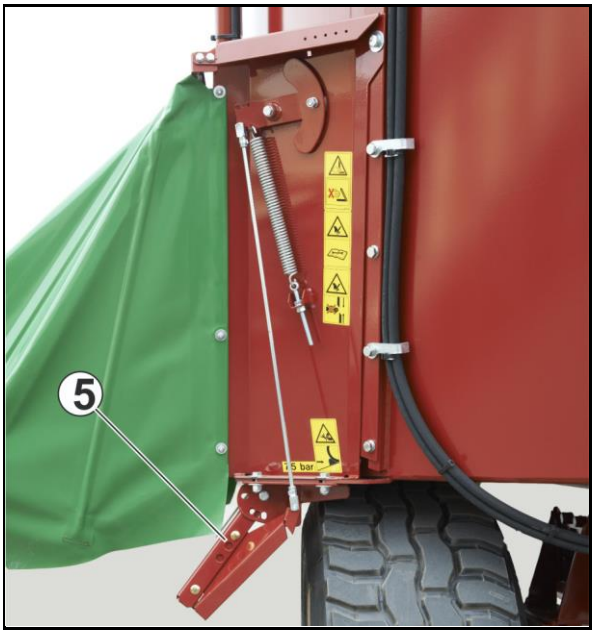


Fig. 58

Hydraulic deflector plate

Optional extra

Use the locking bolt (2) to set the throwing range of the deflector plate (1):

- Locking bolt (2) in drilled hole (3) = Maximum swivelling-out of deflector plate (1).
- Locking bolt (2) in drilled hole (4) = Minimum swivelling-out of deflector plate (1).

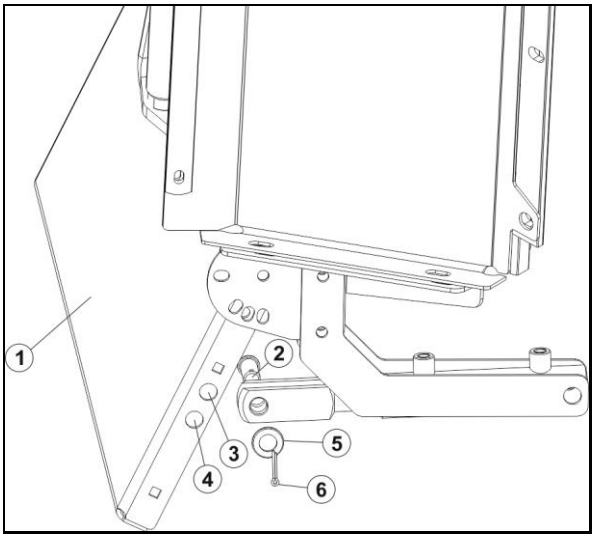


Fig. 59

1. Remove the split-pin (6) and the washer (5).
2. Remove the locking bolt (2) from the respective drilled hole.
3. Position the hydraulic cylinder above the desired drilled hole and insert the locking bolt (2).
4. Mount the washer (5).
5. Use a new split-pin to secure the washer.

7 Operation

Depending on the machine’s equipment, actuation of the machine’s hydraulic and electrical function(s) is effected via remote control from the tractor:

- via direct tractor connection (standard equipment)
- via Bowden cable operation (optional extra)
- via electro-hydraulic operation (E-control) (optional extra)

- The actuating speed of the hydraulic functions (hydraulic components) depends on the tractor's hydraulic system.

  Depending on the tractor model, a correction of the set actuating speeds at the tractor's control device / the machine's control block may be necessary.
- For information about the required control devices, please refer to the chapter "Required tractor equipment“ on page 39.

7.1 Direct tractor connection

The individual hydraulic components of the machine are directly connected to the hydraulic system of the tractor via appropriate hydraulic hose pipes for oil supply.

A double-acting control device is required on the tractor for each function (hydraulic component) of the machine.

Each individual function of the machine is then actuated from the tractor via the operating element on the appropriate control device.

7.2 Bowden cable control set

The individual hydraulic components of the machine are connected to a control block. To ensure the oil supply, the control block is connected to the hydraulic system of the tractor via a double-acting control device or a single-acting control device and a free return line.

If the machine is equipped with an on-board hydraulic system, it is not necessary to connect the machine to the hydraulic system of the tractor.

The Bowden cable control set serves to actuate the hydraulic functions of the machine from the tractor if the oil circulation between tractor and machine has been switched on via the control device on the tractor.
One operating element is required for each function of the machine.
The Bowden cable control set

- is mounted on the tractor within view and easy reach of the operator,
- is equipped with one or several operating element(s).

The operating elements are in touch-control or in latch-in design:

- In touch-control design for folding, swivelling or sliding movable machine parts, e. g. discharge door, hydraulic counter-cutters, supporting leg etc. The function is only carried out when the operating element is activated and kept hold of. As soon as the operating element is released, it returns to its neutral position and the action is stopped.
- In latch-in design for movements requiring continuous action for constant loads, e. g. hydraulic motor of discharge conveyor.

The operating elements can be set to a maximum of 3 positions:

- Function I,
- Neutral position,
- Function II.

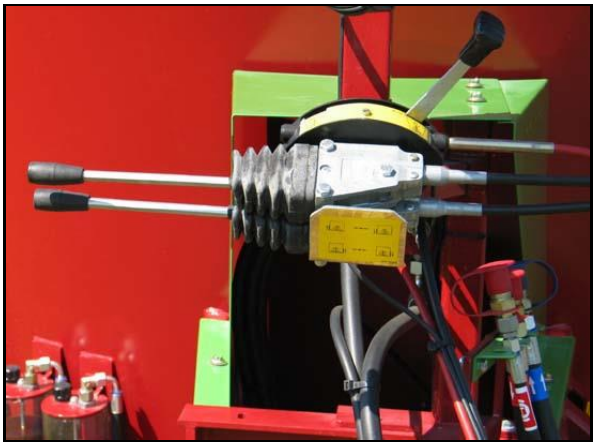
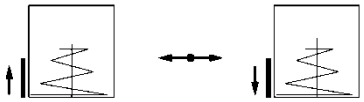
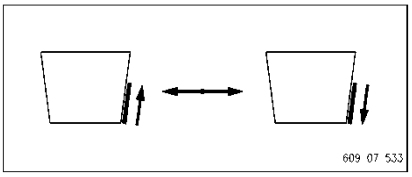


Fig. 60

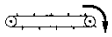
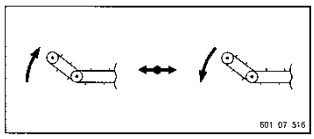
7.2.1 Possible symbols and their meaning

The following paragraphs show the possible symbols on the control set and their meaning.

Open / Close discharge door

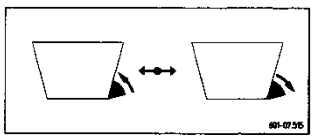
Symbol	Position of hand lever	Discharge door
	front (touch-control)	right open
	neutral position	no action
	rear (touch-control)	right close
	front (touch-control)	left open
	neutral position	no action
	rear (touch-control)	left close
	front (touch-control)	front / rear open
	neutral position	no action
	rear (touch-control)	front / rear close

Switch crossover conveyor / conveyor extension / discharge conveyor

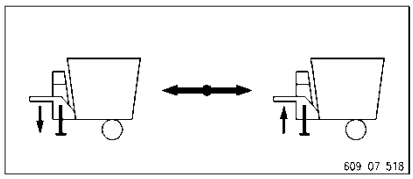
Symbol	Position of hand lever	Crossover conveyor / Conveyor extension / Discharge conveyor
	front (latch-in design)	crossover conveyor * ON to the left
	neutral position	crossover conveyor OFF
	rear (latch-in design)	crossover conveyor * ON to the right
	front (latch-in design)	discharge conveyor ON
	neutral position	discharge conveyor OFF
	Position of hand lever	**Conveyor extension / Discharge conveyor**
	front (touch-control)	swivel up to transport position
	neutral position	action stops
	rear (touch-control)	swivel down to working position

* At the same time, the conveyor extension is powered if a conveyor extension is mounted in the conveying direction of the crossover conveyor. If the material is conveyed away from the conveyor extension, the conveyor extension will stop.

Extend and retract counter-cutters

Symbol	Position of hand lever	Counter-cutters
	front (touch-control)	extend (in)
	neutral position	no action
	rear (touch-control)	retract (out)

Lift / Lower supporting leg

Symbol	Position of hand lever	Supporting leg
	front (touch-control)	lift to transport position
	neutral position	no action
	rear (touch-control)	lower to support position

Change mixing auger speed

Symbol	Position of hand lever	Speed
	front (latch-in design)	fast gear level I
	rear (latch-in design)	slow gear level II

For changing the gear level, swivel the Bowden cable lever (1) into the required position. Beware of the fact that the Bowden cable lever (1) engages in the selected position at the notch after changing gear.

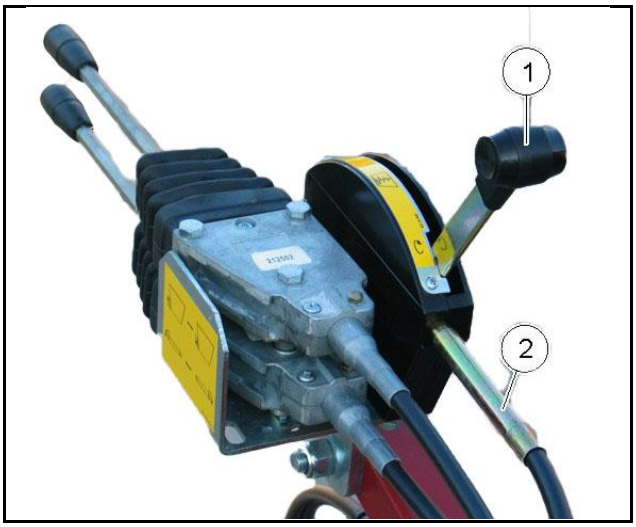
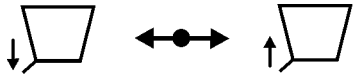
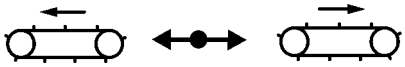


Fig. 61

Extend and retract deflector plate

Symbol	Position of hand lever	Deflector plate
	front (touch-control)	extend (in)
	neutral position	action stops
	rear (touch-control)	retract (out)

Displace C-conveyor

Symbol	Position of hand lever	C-conveyor
	front (touch-control)	retract
	neutral position	action stops
	rear (touch-control)	extend

7.3 E-control set

The individual hydraulic components of the machine are connected to a control block. To ensure the oil supply, the control block is connected to the hydraulic system of the tractor via a double-acting control device or a single-acting control device and a free return line.

If the machine is equipped with an on-board hydraulic system, it is not necessary to connect the machine to the hydraulic system of the tractor.

The E-control set serves to actuate the hydraulic functions of the machine from the tractor if the oil circulation between tractor and machine has been switched on via the control device on the tractor.

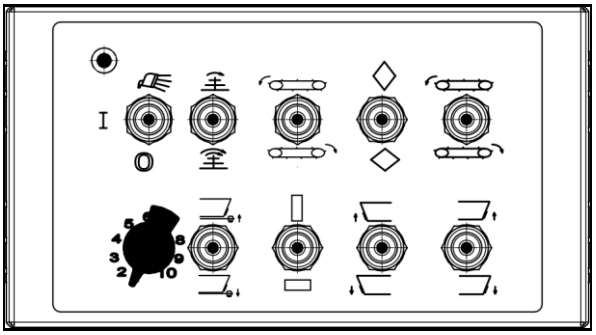


Fig. 62

One operating element is required for each function of the machine.

The control set:

- is differently designed depending on the machine's equipment,
- is mounted on the tractor within view and easy reach such that the operating elements are easily accessible,
- must be connected to the tractor's power supply (12 V) via the 3-pole plug (DIN 9680),
- is equipped with several operating elements such as key buttons, toggle switches and, where applicable, a control dial.

The operating elements are in touch-control design (key buttons), in latch-in design (toggle switches) or in control-dial design:

- In touch-control design for folding, swivelling or sliding movable machine parts, e. g. dosage gate, hydraulic counter-cutters, supporting leg, etc. The function is only carried out if the operating element is kept hold of. As soon as the operating element is released, it returns to its neutral position and the action is stopped.
- In latch-in design for movements requiring continuous action for constant loads e. g. hydraulic motors.
- Control dials for setting the actuating speed of the hydraulic functions in 10 steps (e.g. conveyor speed for crossover conveyor / discharge conveyor).

The operating elements in touch-control or in latch-in design can be set to a maximum of 3 positions:

- Function I
- Neutral position
- Function II

In case of longer downtimes of the machine, switch the control set off, in order to avoid a discharging of the tractor’s battery due to switched-on loads!

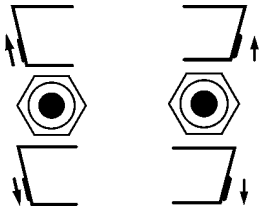
7.3.1 Functions and their symbols

The following paragraphs show the symbols of the operating elements of the control set and their functions.

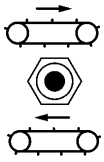
Switch control set on / off

Symbol	Position of toggle switch	Control set
	top (latch-in design)	Work lights ON
	I (On) Middle	ON (red control lamp lights up)
	0 (Off) (latch-in)	OFF (red control lamp does not light up)

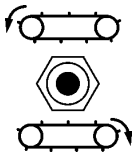
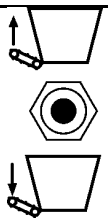
Open / Close discharge door

Symbol	Position of key button	Discharge door
	top (touch-control)	open
	neutral position	action stops
	bottom (touch-control)	close

Displace C-conveyor

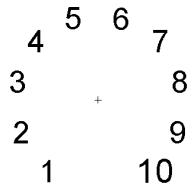
Symbol	Position of key button	C-conveyor
	top (touch-control)	retract
	neutral position	action stops
	bottom (touch-control)	extend

Switch crossover conveyor / conveyor extension / discharge conveyor

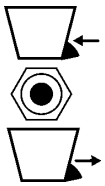
Symbol	Position of toggle switch	Crossover conveyor / Conveyor extension / Discharge conveyor
	top (latch-in design)	crossover conveyor * ON to the left
	neutral position	crossover conveyor OFF
	bottom (latch-in design)	crossover conveyor * ON to the right
	top (latch-in design)	discharge conveyor ON
	neutral position	discharge conveyor OFF
	Position of key button	**Conveyor extension / Discharge conveyor**
	top (touch-control)	swivel up to transport position
	neutral position	action stops
	bottom (touch-control)	swivel down to working position

* At the same time, the conveyor extension is powered if a conveyor extension is mounted in the conveying direction of the crossover conveyor. If the material is conveyed away from the conveyor extension, the conveyor extension will stop.

Set conveyor speed for crossover conveyor / discharge conveyor / C-conveyor

Symbol	Position of control dial	Conveyor speed and other hydraulic functions
	1	low
	10	high

Extend and retract counter-cutters

Symbol	Position of key button	Counter-cutters
	top (touch-control)	extend (in)
	neutral position	action stops
	bottom (touch-control)	retract (out)

Lift / Lower supporting leg

Symbol	Position of key button	Supporting leg
	top (touch-control)	lift to transport position
	neutral position	action stops
	bottom (touch-control)	lower to support position

Change mixing auger speed

Symbol	Position of key button	Speed
	top (touch-control) keep hold of for at least 10 s	fast gear level I
	neutral position	remains constant
	bottom (touch-control keep hold of for at least 10 s	slow gear level II

For changing the gear level, swivel the key button into the required position and keep hold of it there for at least 10 seconds.

The position of the indicator pipe (1) of the electrical remote control indicates the set gear level:

Position of indicator pipe	Driving speed of mixing auger
top	fast
bottom	slow

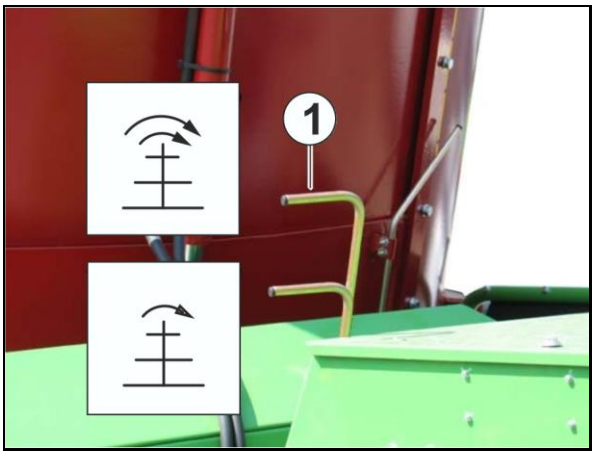


Fig. 63

Lock / Unlock follow-up steering

Symbol	Position of key button	Steering axle
	top (touch-control)	unlock
	neutral position	maintains setting
	bottom (touch-control)	lock

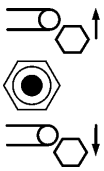
Extend and retract deflector plate

Symbol	Position of key button	Deflector plate
	top (touch-control)	extend (in)
	neutral position	action stops
	bottom (touch-control)	retract (out)

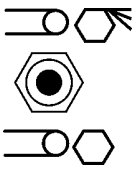
Switch work lights on/off

Symbol	Position of toggle switch	Work lights
	top (latch-in design)	ON
	bottom (latch-in design)	OFF

Extend and retract litter spreading drum

Symbol	Position of key button	Litter spreading drum
	top (touch-control)	retract (out)
	neutral position	action stops
	bottom (touch-control)	extend (in)

Switch litter spreading drum on and off

Symbol	Position of key button	Litter spreading drum
	top (touch-control)	ON
	neutral position	stops
	bottom (touch-control)	stops

Switch straw blower on / off

Symbol	Position of key button	Straw blower
	top (latch-in design)	ON
	neutral position	-
	bottom (latch-in design)	OFF

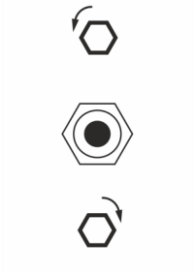
Straw blower - Turn blow-out pipe

Symbol	Position of key button	Blow-out pipe
	top (touch-control)	turn to the left
	neutral position	action stops
	bottom (touch-control)	turn to the right

Straw blower – Lift / Lower ejection hood

Symbol	Position of key button	Ejection hood
	top (touch-control)	lift (increase throwing range)
	neutral position	action stops
	bottom (touch-control)	lower (reduce throwing range)

Straw blower - Switch on / Switch off / Reverse feeding roll

Symbol	Position of key button	Ejection hood
	top (touch-control)	switch feeding roll on
	neutral position	action stops
	bottom (touch-control)	reverse feeding roll

8 Use of machine

When using the machine, additionally observe the information included in the following chapters:

- "Operator’s obligation", page 43,
- "Qualification of operator", page 44,
- "Basic safety instructions", page 48,
- "Warning and instruction signs", page 59.

Observance of these chapters serves your safety.

WARNING

Risk of becoming entangled, wound up and risk due to blown-away foreign objects to people within the hazardous area of the powered propeller shaft!

- Check the safety and protective devices of the propeller shaft for proper functioning and completeness before each startup of the machine.

  Have damaged safety and protective devices of the propeller shaft immediately replaced by an authorized workshop.
- Immediately turn the tractor engine off in case of emergency.

WARNING

Risk to people of being crushed, drawn in and becoming entangled due to unprotected powered driving elements during machine operation!

- Start the machine only with the protective devices completely mounted.
- It is not allowed to open protective devices:
  - when the machine is powered,
  - as long as the tractor engine is running with the propeller shaft coupled/the hydraulic system connected,
  - if the ignition key is in the tractor and the tractor engine can be accidentally started with the propeller shaft coupled/the hydraulic system connected,
  - if tractor and machine have not been secured against accidental rolling by means of their respective parking brake and/or the chocks.

  Close open protective devices before powering the machine.

WARNING

Risk to people due to failure of components if the machine is powered at inadmissible high drive speed!

Observe the admissible drive speed of the machine before switching the tractor's p.t.o. shaft on.

WARNING

Risk due to failure of components in case of actuation of the overload clutch!

Immediately switch the tractor's p.t.o. shaft off in case of actuation of the overload clutch.

WARNING

Risk of being crushed, drawn in or risk of impact to people if tractor and machine tip over due to insufficient stability!

Adapt your driving such that you have always safe control over the tractor and the attached/hitched machines:

- Consider your personal abilities as well as the road, cornering, traffic, visibility and weather conditions, the driving characteristics of the tractor as well as the influences exerted by the attached/hitched machine.
- Never take a tight curve at excessive travelling speed.
- Avoid sudden changes of direction when travelling uphill and downhill and when traversing hills (risk of tipping over!).

WARNING

Risk of crushing, cuts, becoming entangled and being drawn in if people get into accidental touch with the powered mixing auger!

- Never reach into the mixing container through an open discharge opening with the mixing auger powered.
- Never bend over the top edge of the mixing container with the mixing auger powered.
- Never enter the mixing container with the mixing auger powered or the engine running.

DANGER

Risk to third persons / animals / objects during reverse travel behind the machine due to insufficient visibility from the driver seat!

Before each startup of the machine, adjust the rear-view camera such that you have a complete view of the hazardous area behind the machine.

As a basic principle, check the hazardous area behind the machine before starting reverse travel. You will always be responsible.

Machine with on-board hydraulic system

Optional extra

Ensure that the stop valve (5) is open before each start-up. Fig. 64 shows the open stop valve (5).

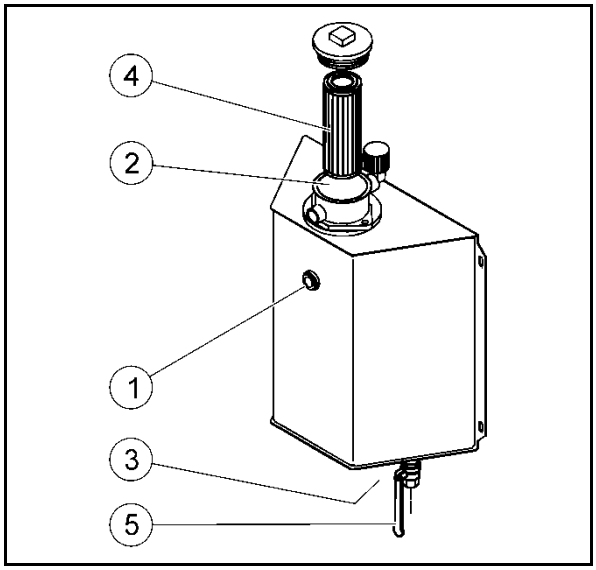


Fig. 64

If the machine is equipped with an on-board hydraulic system (optional extra), the hydraulic functions of the machine can be operated only with the propeller shaft powered.

8.1 Magnetic system

Optional extra

The magnetic system consists of two powerful magnetic blocks (1) at the mixing auger.

The permanent magnets keep the fodder mixture free from pointed and sharp-edged foreign objects. Iron particles (nails, loose wire fragments etc.) stick to the magnets and can be removed later.

Fig. 65

8.2 Scraper

Optional extra

The scraper (1) is mounted at the bottom of the first mixing auger turn.

The scraper serves to transport the fodder from the outside to the inside. Thus, better mixing of poorly structured fodder is achieved directly at the beginning of the mixing process.

Scrapers can be retrofitted and are simply screwed onto the mixing auger or the INNODUR wearing elements.

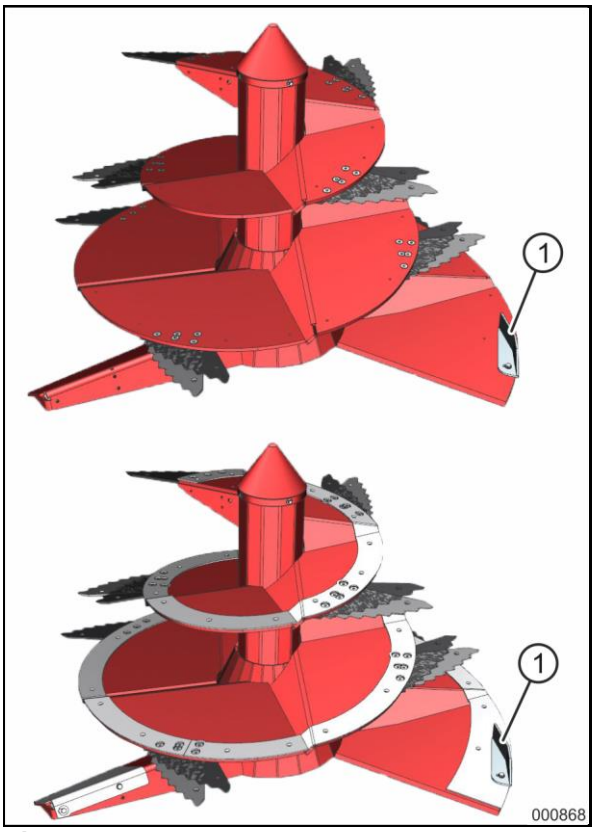


Fig. 66

8.3 Protective cover

Optional extra

The protective cover (1) is mounted beneath the mixing auger and serves to minimise deposits of fodder residues between coaxial gearbox and mixing auger.

The protective cover is in particular required when preparing compact TMR due to the poorly structured, pappy consistence.

* TMR = Total Mixed Ration

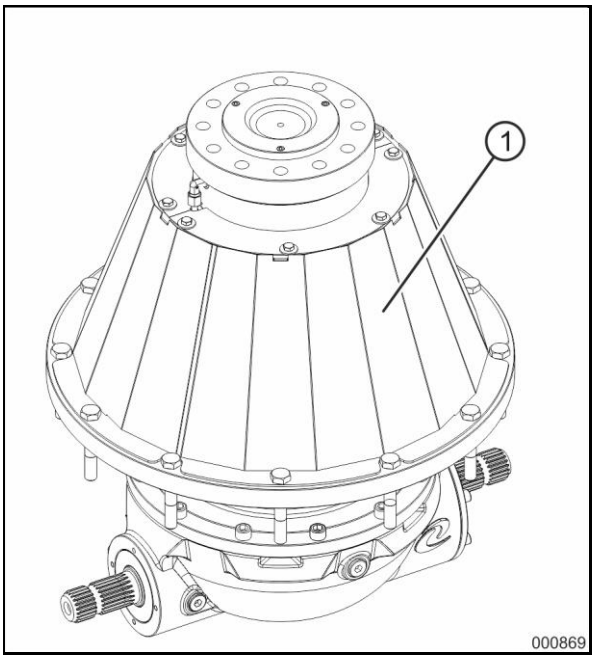


Fig. 67

8.4 Fill fodder mixing wagon

WARNING

Risk due to incorrect use of the tractor if this causes failure of components, insufficient stability and insufficient steerability and braking ability of the tractor!

Observe the maximum loading capacity of the attached / hitched machine and the admissible axle and tongue loads of the tractor. Run the machine only with partly-filled mixing container, if necessary.

CAUTION

Risk of failure of components due to overloading of the machine!

Observe the maximum load of the machine and the filling order of the individual fodder components.

The fodder components should freely move in the mixing container with the mixing auger(s) powered. Overload may occur:

- if fodder components become entangled in the counter-cutters and blockages pile up,
- when loosening round bales,
- due to blunt knives,
- when switching the mixing auger on or on again with the mixing container filled. This applies in particular to mixtures of high density (> 450 kg/m³), e.g. compact TMR.

Overload affects the machine's performance and service life. Damages due to overloading are excluded from warranty.

WARNING

Risk of crushing, cuts, becoming entangled or being drawn in if people get into accidental contact with the powered mixing auger due to improper filling of the mixing container!

- Only use appropriate equipment to fill the mixing container.

  Appropriate equipment may be:

  - Tractor equipped with front loader,
  - telescopic loader,
  - wheeled / yard loader.
  - conveyor system.

- People are only allowed to fill the mixing container manually if they cannot accidentally fall into the mixing container.

  People are not allowed on a level with or above the feed opening of the mixing container.

- As a basic principle, fill pourable fodder additives (e. g. mineral feed) into the mixing container by means of the loading tool (loading shovel), through the feed funnel (optional extra) or via a conveyor system.

- Fill liquid or sticky fodder additives into the mixing container by means of the loading tool (loading shovel):

  - Fill the loading shovel only partly.
  - Form a hollow in the grass or maize silage.
  - Fill the fodder additives into the hollow.

  Or add fodder additives via a conveyor system.

- Ensure that the dry substance content is more than 30 % at any time.
- In a compact TMR, the dry substance content may be less than 30 %, which requires the use of a protective cover.

* TMR = Total Mixed Ration

- Remove baler twines and nets on the ground before filling round or cuboid bales into the mixing container by means of the loading tool.
- When filling the mixing container, ensure that the tractor engine runs as equally as possible when powering the mixing auger, i. e. without variations in the tractor engine speed. Variations in the tractor engine speed indicate insufficient engine power of your tractor and cause additional load to all powered components.

  The required tractor power can be reduced by means of a two-level switchgear (optional extra) in the power train of the mixing auger.

- The total fodder quantity that can be mixed and chopped in one mixing container filling cycle depends on the following factors:
  - mixing container capacity,
  - total dry mass of the fodder components to be mixed,
  - structure (stalk length and quality) of the individual fodder components,
  - way and order of filling,
  - tractor power.
- Due to the different fodder components to be mixed, the filling quantity for one mixing container filling cycle may vary. Avoid overloading of the fodder mixing wagon when filling the mixing container. In case of overload:
  - the individual fodder components cannot be mixed homogeneously,
  - mechanical damage on the power train may occur,
  - cutting knives of the mixing auger may be bent.
- If only one tractor is available, the mixing container can also be filled when unhitched. The mixing process will, however, be accelerated if the mixing auger is powered during filling.

  If the mixing auger is switched on only after filling or transport journeys, more power will be required to set the fodder components to be mixed in motion.

1. Check the mixing container for foreign objects before starting the tractor engine. Remove foreign objects from the mixing container, if necessary.
2. Start the tractor engine.
3. Park the tractor with the hitched fodder mixing wagon on even ground. Align the tractor in a straight line in front of the fodder mixing wagon. Further angular misalignment of the propeller shaft causes increased wear.
4. Secure tractor and fodder mixing wagon against rolling.
5. Close possibly open discharge doors.
6. Swivel the weighing device (if available) from the tractor into filling direction.
7. Switch the weighing device on and start the programme (if available).

Fig. 68

8. Make sure that people leave the area where the fodder mixing wagon is filled.
9. Switch the tractor's p.t.o. shaft on.

→ The mixing auger starts.

10. Let the tractor engine run at appropriate speed to ensure that the tractor engine runs equally and does not stall when the mixing container is being filled.
11. Fill the mixing container by means of a tractor equipped with a front loader or by means of a wheeled / yard loader.

8.4.1 Recommended filling order

- For undoing round or cuboid bales, a higher power is required. The required power can be reduced by means of a two-level switchgear (gear level II).
- Recommended procedure for processing round or cuboid bales:
  1. Extend the counter-cutters into the mixing container.
  2. Fill round or cuboid bales in at slow mixing auger driving speed.
  3. Increase the driving speed of the mixing auger after the bale has been "undone".
  4. Now retract the counter-cutters from the mixing container.

1. Fill highly-structured fodder components (hay, straw etc.) in with the mixing auger powered.

   Have them possibly mixed for a short time before filling in the next component. Longer mixing ensures better chopping of the long stalks.
2. Fill in grass silage.
3. Fill in maize silage, grain silage.
4. Fill in concentrated feed, grain feed etc.
5. Fill in mineral feed by means of the loading tool (shovel), through the feed funnel (optional extra) or via a conveying system.
6. Fill in fodder components with a high proportion of water, e.g. draff, potato pulp or beet chips.
   – Add water to the mixture as evenly as possible, in order to minimise the mixing times.
7. Fill liquid components such as liquid yeast, molasses into the mixing container by means of the loading tool together with the last portion of maize silage.

8.5 Mix fodder components

- The type and the structure of the used fodder components and the desired cutting length of the fodder mixture determine the duration of the last mixing cycle.

  The mixing process will be extended for highly-structured fodder components which must be cut.
- Monitor the mixing process from the ladder.
- Stop the mixing process when the fodder components have been homogeneously mixed. In case of a too long mixing process, the mixture risks to lose its structure.
- Depending on the structure of the fodder components, the counter-cutters can be extended into the mixing container at different positions.

  The counter-cutters slow down the horizontal revolving of the fodder in the mixing container, e. g. during chopping and mixing of round or cuboid bales. The further the counter-cutters project into the mixing container, the larger the slowing-down effect.

  Extend the counter-cutters into the mixing container only as far as to ensure that the fodder will not get entangled by / pile up on the counter-cutters.

  Swivel the counter-cutters only with the mixing auger stopped.
- Reduce the driving speed of the mixing auger if light fodder components are thrown over the edge of the mixing container during mixing.
- Sharp cutting knives reduce the required mixing auger power. Regularly sharpen cutting knives. Observe the information in the chapter "Grind cutting knives“, page 196.

8.5.1 Counter-cutters

The use of the counter-cutters (1) allows finer chopping and faster mixing of highly-structured fodder components.

The counter-cutters:

- are e.g. used for chopping and mixing round or cuboid bales,
- can be extended into the mixing container by placing the bolt (2) in 4 possible positions,
- are working the more effectively, the further the counter-cutters are extended into the mixing container,
- are, as a standard feature, manually extended into the mixing container or retracted.

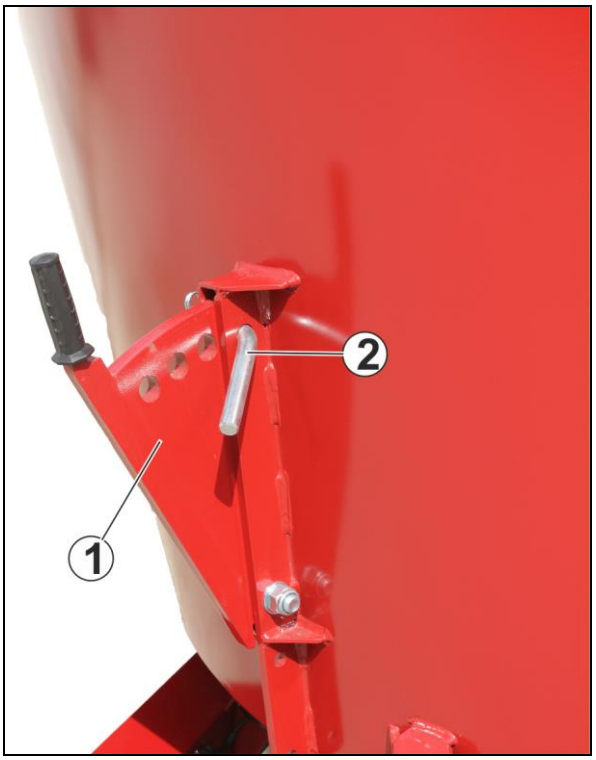


Fig. 69

Optional extra

The counter-cutters (1) may be equipped with a hydraulic cylinder (2).

The hydraulic cylinders:

- enable the remotely controlled extension and retraction of the counter-cutters,
- enable the extension of the counter-cutters into the mixing container in 4 possible positions by placing the bolt (3) respectively.

The counter-cutters are extended and retracted via remote control from the tractor. Depending on the machine's equipment:

- directly via a double-acting control device of the tractor,
- via the Bowden cable control set,
- via the E-control set.

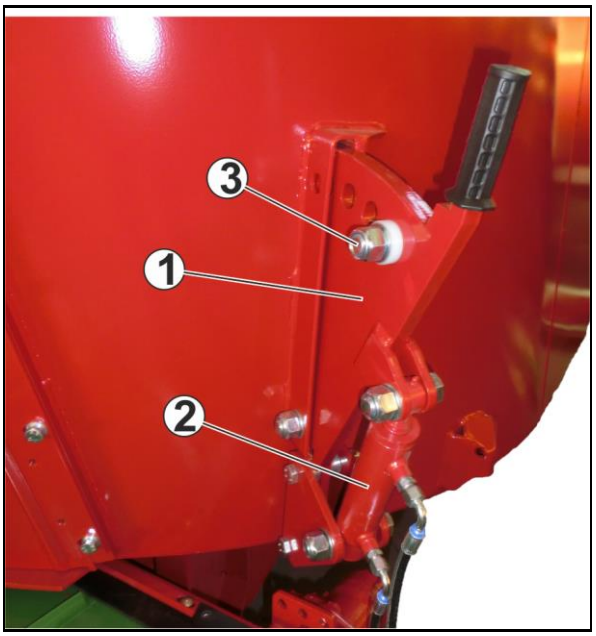


Fig. 70

8.6 Fodder discharge

- The discharge door must be completely opened when discharging very dry, long and highly-structured fodder.
- The discharge door must be opened according to the desired discharge quantity when discharging strongly pourable fodder.
- When discharging the fodder, the 750 p.t.o. shaft can be used (if available) and the tractor engine can be run at reduced speed.
- Increase the driving speed of the mixing auger (gear level I or p.t.o. shaft speed 1000 min^{-1}) for a short time towards the end of the discharging process to throw off any fodder residues from the mixing auger and to completely empty the mixing container.

The opening width of the dosage gate is indicated on the scale at the dosage gate.

- Scale value 0: Dosage gate is closed. No fodder discharge.
- Scale value 7: Dosage gate is completely open. Maximum fodder discharge.

Keep to the following order when discharging fodder (optional extras in parentheses):

Start discharge

1. (Set conveyor belt to working position if it can be swivelled/moved.)
2. Switch p.t.o. shaft on.
3. (Switch conveyor belt on.)
4. Switch mixing auger on.
5. Lift dosage gate.

Finish discharge

1. Lower dosage gate.
2. Switch mixing auger off.
3. (Switch conveyor belt off when the fodder discharge has been finished.)
4. Switch p.t.o. shaft off.
5. (Set conveyor belt to transport position if it can be swivelled/moved.)

WARNING	**Risk of impact to people and animals if objects are thrown out of the discharge opening or the crossover conveyor during fodder discharge!** Make sure that people leave the hazardous area of the discharge opening or the crossover conveyor before opening the discharge opening or switching the crossover conveyor on. Keep animals away from the hazardous area.

The fodder discharge can be started after the mixing process has been finished.

The fodder quantity discharged onto the feeding table is set via:

- the driving speed of the mixing auger,
- the opening width of the discharge door,
- the travelling speed of the tractor on the feeding table.

The higher the driving speed of the mixing auger, the wider the opening width of the discharge door and the slower the travelling speed of the tractor, the larger the fodder quantity discharged onto the feeding table.

8.6.1 Eliminate blockages

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people if:

- **lifted, unsecured machine parts accidentally come down or are unintentionally lowered , e.g. an open discharge door,**
- **the machine is unintentionally started or rolls accidentally.**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure the machine against accidental starting and rolling before eliminating any blockages on the machine.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

WARNING

Risk of cuts if people reach into sharp-edged cutting knives of the mixing auger(s) when eliminating blockages!

When eliminating blockages, beware that sharp-edged cutting knives of the mixing auger(s) may be within the discharge opening area.

CAUTION

Risk of damage to the machine if you change the sense of rotation of the tractor's p.t.o. shaft for eliminating blockages!

Never change the sense of rotation of the tractor's p.t.o. shaft.

1. Switch the p.t.o. shaft off.
2. Completely open the discharge door of the clogged discharge opening if necessary.
3. Secure tractor and machine against accidental starting and rolling, observe the information in the chapter "**Secure tractor and machine against accidental starting** and rolling", page 83.
4. Eliminate the blockage such that the discharge opening gets free and the mixed materials can be easily discharged again.
5. Start the tractor engine.
6. Close the discharge door.
7. Switch the p.t.o. shaft on.
8. Power the mixing auger at the desired driving speed.
9. Open the discharge door at the desired opening width and continue the fodder discharge.

8.7 Working with the straw blower

Optional extra

Bulk straw or straw bales are filled into the mixing container, chopped and blown into the stable by means of the straw blower (1). The straw blower is available with a discharge device on the right-hand side in the direction of motion (see Fig. 71) or with an adjustable discharge device (see Fig. 72), which can be hydraulically turned from a discharge position on the right-hand side in the direction of motion to a discharge position on the left-hand side. Furthermore, a hydraulically powered feeding roll can be installed (Fig. 72/2).

Fig. 71

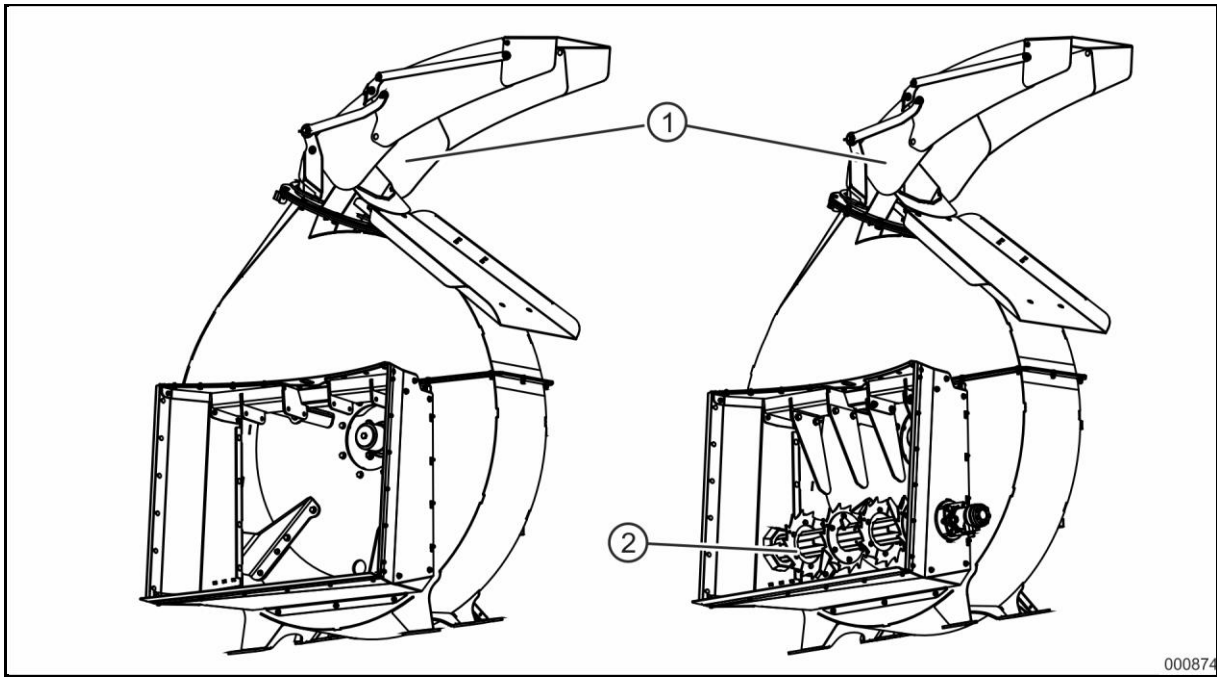


Fig. 72

(1) Discharge device with rotary tower adjustment

(2) Feeding roll

For chopping the straw, extend the counter-cutters a little further into the mixing container if necessary.

When spreading, keep to the following order:

1. Move blow-out pipe and ejection hood into the spreading position.
2. Switch the straw blower on.
3. Switch the feeding roll on (if available).
4. Open the dosage gate (completely for dry straw)

The volume flow discharged through the straw blower is adjusted by means of the opening width of the dosage gate. Too large opening widths might cause a blockage of the straw blower!

Adjust the spreading range by lifting or lowering the ejection hood: The higher the ejection hood position, the further the straw is ejected.

To omit individual areas during spreading, switch the feeding roll off briefly (when passing through the specific area)

Avoid blockage or clogging of the straw blower (if not equipped with a feeding roll):

- Discharge as dry straw as possible.
- Open the dosage gate less, the damper the straw.
- Regularly remove foreign objects and accumulated water.

If equipped with a feeding roll:

The feeding roll homogenises material or the supplied material quantity and ensures a more uniform volume flow even in case of damp or lumpy material. The use of the feeding roll reduces the tendency of blockages at the blower.

Elimination of malfunction: Check sense of rotation

Blockages of the feeding roll can be eliminated by a short reverse via the E-control set.

If equipped with rotary tower adjustment function:

If the straw blower is equipped with the rotary tower adjustment function, it cannot be switched on when the ejection hood is directed towards the tractor cabin.

If the ejection hood is turned in the direction of the tractor cabin with the straw blower switched on, the rotary motion is stopped at a certain point, in order to prevent the operator from being injured.

WARNING

Risk of injury due to material being flung out!

Keep people and animals away from a wide area around the running straw blower.

Keep the straw free from foreign objects, e.g. stones.

Keep strictly to the required operating speed of the straw blower, too low operating speed may cause blockages.

1. Make sure that people and animals leave the hazardous area of the machine / the straw blower.
2. Select gear level II at the switchgear (low driving speed of mixing auger); the switch level increases the mixing auger speed and thus also the volume flow of supplied material in addition to the gate opening width. The speed of the straw blower rotor is independent of the switchgear's switch level.
3. Rotate the blow-out pipe and the ejection hood into the desired ejection direction if the straw blower is equipped with rotary tower adjustment function.
4. Tighten the drive belt of the straw blower to switch the straw blower on.
5. Switch the tractor's p.t.o. shaft on.
6. Increase the speed of the straw blower up to operating speed.
   - P.t.o. shaft speed 540±100 min^{-1}
7. Open the dosage gate until the desired volume flow is reached.

   Ensure to reduce the opening width in case of damp or lumpy spreading material or a lower blower speed (risk of blockage).
8. Set the desired spreading range / throwing range by lifting or lowering the ejection hood.

8.7.1 Eliminate blockages

WARNING

Operator’s risk of being drawn in or becoming entangled if the straw blower starts to run during manual elimination of blockages / jams!

Secure tractor and machine against accidental starting and rolling before manually eliminating clogging / blockages.

WARNING

Risk due to the rotor continuing to run after being switched off!

Wait for the rotor to stop completely before removing the screws (Fig. 73/2) at the inspection door (Fig. 73/1).

1. Close the dosage gate.
2. Switch the p.t.o. shaft off.
3. Secure tractor and machine against accidental starting and rolling.
4. Wait for the rotor to stop completely.
5. Loosen the screws from the front inspection door (Fig. 73/2), such that the cover of the door can be removed and put aside.

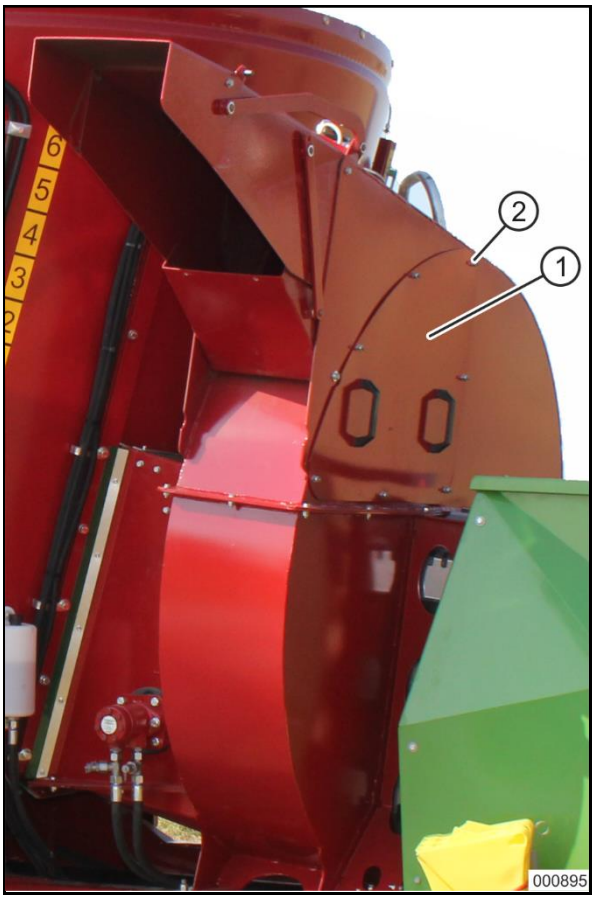


Fig. 73

6. Empty the blow-out pipe or the blower casing. Rotate the rotor by means of an appropriate tool (tyre lever, crowbar) to convey material piled up in the blower casing to the inspection door and remove it.

WARNING	**Risk of being drawn in/becoming entangled by the reversing rotor!** Risk of injury due to crushing, cuts and amputation caused by unintentional movements of the blower rotor. When rotating the rotor to eliminate blockages, use an appropriate, robust tool (tyre lever, crowbar) to block the blower rotor in case of unintentional reverse.

7. Use the screws to close and secure the inspection door before switching the blower on.

8.8 Working with the litter spreading drum

Optional extra

Mix the bedding substrates such as straw, peat, sawdust, horse manure and lime in the mixing container to obtain a homogeneous mixture.

Make sure that the mixture possesses sufficient density. Add some water if necessary. If the density is too low, the spreading range will be considerably reduced.

For chopping the straw, extend the counter-cutters a little further into the mixing container if necessary.

When spreading, keep to the following order:

1. Switch crossover conveyor on.
2. Switch fast bedding roller on.
3. Open discharge door.

Adjust

- the spreading range by means of the speed of the fast bedding roller,
- the spreading quantity by means of the opening width of the discharge door.

Swivel the fast bedding roller completely to its transport position before transport journeys!

WARNING

Risk of injury due to crushing and impact when swivelling the fast bedding roller!

Keep people and animals away from the extending and retracting fast bedding roller.

WARNING

Risk of becoming entangled, being drawn in and wound up due to the rotating fast bedding roller!

Keep people and animals away from the rotating fast bedding roller.

WARNING

Risk of injury due to material being slung out!

Keep people and animals away from a wide area around the rotating fast bedding roller.

Keep the bedding material free from foreign objects, e.g. stones.

Fast bedding roller retracted to transport position

Fig. 74

Fast bedding roller extended to working position

Fig. 75

1. Make sure that people and animals leave the hazardous area of the machine / the fast bedding roller.
2. Set the switchgear to gear level II (low driving speed of mixing auger) if the machine is equipped with a switchgear.
3. Swivel the fast bedding roller to its top position. Consider the local circumstances when swivelling.
4. Switch the tractor's p.t.o. shaft on.
5. Switch the crossover conveyor on.
6. Use the pushbutton to switch on the fast bedding roller and keep it pressed.
7. Open the dosage gate.
8. Set the desired spreading range / throwing range by setting the speed of the fast bedding roller. The spreading quantity can be adjusted via the dosage gate.
9. Finish working with the fast bedding roller:
   - 9.1 Close the dosage gate.
   - 9.2 Switch the p.t.o. shaft off.
   - 9.3 Only switch the crossover conveyor off when the discharge of bedding substrate has been finished.
   - 9.4 Switch the fast bedding roller off.
10. Swivel the fast bedding roller to transport position. The fast bedding roller is in transport position only when the hydraulic cylinder has been completely retracted.

8.9 Driving mechanism with switchgear

Optional extra

If the power train of the mixing augers is equipped with an additional two-gear switchgear, the mixing augers can be alternatively powered at gear level I or II providing different speeds.

The increased driving speed (gear level I) is used:

- for producing small mixtures,
- for evacuating residual quantities from the mixing container.

The reduced driving speed (gear level II) is used:

- for mixing with the mixing container completely filled,
- when using a tractor with low driving power,
- when starting a filled container to loosen up the contents,
- when using a straw blower.

8.9.1 Change gear level by means of switchgear

The switchgear is not synchronised. Changing gear level is only possible when the vehicle is stationary or when it is coasting or starting at low speed.

Different steps may therefore be necessary for changing gear level by means of the switchgear. The necessary steps depend on:

- the type of actuation of the tractor's p.t.o. shaft:
  - after the p.t.o. shaft has been switched off, the p.t.o. shaft drive of the tractor is slowed down during coasting and when stationary,
  - the p.t.o shaft coupling engages very fast when the p.t.o. shaft is switched on.
- the type of remote control of the switchgear:
  - mechanical remote control via Bowden cable,
  - electrical remote control via the control set.
- the amount of load of the mixing auger in the mixing container:
  - empty or slightly filled mixing container,
  - fully filled mixing container.

Hereinafter, two different procedures for changing gear level by means of the switchgear are described.

Empty or slightly filled mixing container – low amount of load of mixing auger

1. Switch the tractor's p.t.o. shaft off.
2. Use the switchgear to change the gear level via the mechanical / electrical remote control set.
3. Switch the p.t.o. shaft of the tractor on again.

→ During restarting, changing gear level is initiated in the switchgear.

Fully filled mixing container – high amount of load of mixing auger

1. Switch the tractor's p.t.o. shaft off.
2. Prepare changing of gear level:
   - Turn the tractor engine off if the p.t.o. shaft drive of your tractor is slowed down during coasting and when stationary, after the p.t.o. shaft has been switched off.

   → In this state, the p.t.o. shaft can move freely.
   - Select the function "Switched-off p.t.o. shaft freely movable with the tractor engine running" at your tractor if your tractor is equipped with this function.
3. Use the switchgear to change the gear level via the mechanical / electrical remote control set.
4. Switch the p.t.o. shaft of the tractor on again.

→ During restarting, changing gear level is initiated in the switchgear.

9 Transport journeys

A transport journey is a journey of the charged or empty machine to or from the place of operation.

- Additionally observe the chapter "Basic safety instructions", when carrying out transport journeys.
- Before carrying out transport journeys, check:
  - the lighting system for damage, proper functioning and cleanliness,
  - whether the parking brake has been completely released,
  - the brake system for proper functioning,
  - whether parts of the load risk to fall off the machine. When travelling on public roads and paths parts of the load falling off onto the road must be avoided.
- Set all moving machine parts to transport position before carrying out transport journeys. This shall in particular apply to parts protruding over the sides in operating position, e.g. when the machine is equipped with optional extras such as the fast bedding roller, the side discharge conveyor, the conveyor extension or the blow-out pipe of the straw blower.
- Engage the transport support before transport journeys to prevent damage to the machine.
- Switch the work lights off when travelling on roads.

WARNING

Risk of being crushed, drawn in or risk of impact to people if tractor and machine tip over due to insufficient stability!

Adapt your driving such that you have always safe control over the tractor and the attached/hitched machines:

- Consider your personal abilities as well as the road, cornering, traffic, visibility and weather conditions, the driving characteristics of the tractor as well as the influences exerted by the attached/hitched machine.
- Never take a tight curve at excessive travelling speed.
- Avoid sudden changes of direction when travelling uphill and downhill and when traversing hills (risk of tipping over!).

WARNING

Risk to people due to insufficient stability and tipping over of the machine if the steering axle (optional extra) is not properly used!

It is absolutely necessary to lock the steering axle:

- before carrying out road journeys,
- on uneven ground,
- when traversing hills,
- before carrying out reverse travels.

WARNING

Risk due to incorrect use of the tractor if this causes failure of components, insufficient stability and insufficient steerability and braking ability of the tractor!

Observe the maximum loading capacity of the attached / hitched machine and the admissible axle and tongue loads of the tractor. Run the machine only with partly-filled mixing container, if necessary.

WARNING

Risk to people due to accidental actuation of hydraulic functions during transport journeys!

Before carrying out transport journeys:

- switch the control set off,
- switch the oil circulation between tractor and machine off,
- always switch the propeller shaft off if an on-board hydraulic system is available.

WARNING

Risk of being drawn in, getting entangled or risk of impact for people if machine parts swivelled to transport position accidentally move off their transport position during transport journeys!

Before carrying out transport journeys:

- lock swivelling machine parts in transport position
- ensure that swivelling machine parts are locked in transport position.

WARNING	**Risk of falling off the machine for unauthorised passengers!** Passengers are not allowed on the machine.

	Switch the work lights off when travelling on roads.

9.1 Secure protective devices for transport journeys

Secure the protective devices (1) for side or rear discharge in transport position by means of the rubber strap (2) before starting the journey.

Fig. 76

9.2 Stop-cock at side discharge conveyor or conveyor extension

In order to secure the side discharge conveyor or conveyor extension against accidental folding-out during road journeys, it is equipped with a stop-cock.

Depending on the use of the machine, close or open the stop-cock.

Before road journeys

Close the stop-cock to secure the conveyor against lowering in transport position: Swivel the lever transversely to the cable direction (Fig. 77/1, Fig. 78/1).

Before fodder discharge

Open the stop-cock to swivel the conveyor down to its working position: Swivel the level in the direction of the cables (Fig. 77/2, Fig. 78/2).

Stop-cock with short conveyor (1 hydraulic cylinder)

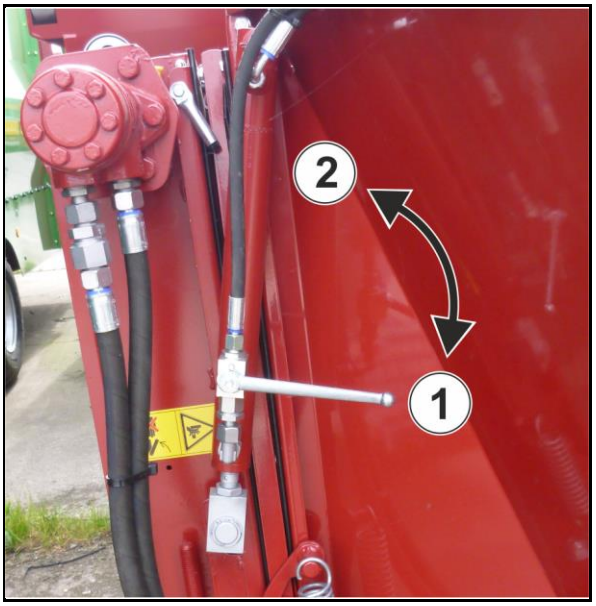


Fig. 77

Stop-cock with longer conveyor (2 hydraulic cylinders)

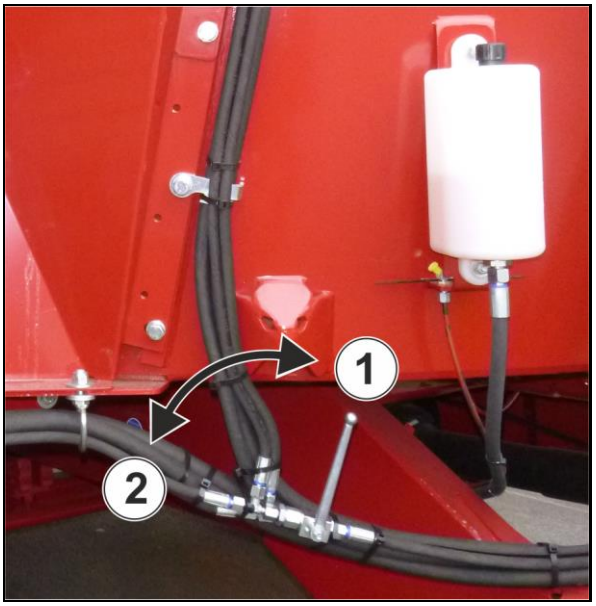


Fig. 78

(1) Stop-cock closed for transport position of conveyor during road journeys

(2) Stop-cock open for working position of conveyor during fodder discharge

The discharge conveyor is in transport position only when the hydraulic cylinder has been completely retracted.

10 Service and maintenance of machine

Regular and proper service and maintenance:

- will keep your machine ready for use for a long time and avoid early wear,
- will reduce downtimes and repairs,
- is a precondition for our warranty provisions.

- When carrying out service and maintenance work on the machine, additionally observe the information included in the following chapters:
  - "Operator's obligation", page 43,
  - "Qualification of operator", page 44,
  - "Basic safety instructions", page 48,
  - "Warning and instruction signs", page 59.

  Observance of these chapters serves your safety.
- Only use original spare parts.
- Observe environmental measures when carrying out service and maintenance work on the machine.
- Observe legal provisions when disposing of operating materials such as oils and greases. These legal provisions also apply to parts having come into contact with those operating materials.
- As a basic principle, disconnect all electrical / electronic plug connections before carrying out service and maintenance work on the machine. This shall particularly apply to welding work.
- It is necessary to take protective measures such as covering power supply lines, hydraulic hose pipes, brake and supply lines or removal of such lines at particularly critical spots:
  - when carrying out welding, drilling and grinding work,
  - when carrying out work by means of cutoff wheels in the vicinity of these pipes and lines.
- Check brake lines, air pipes and hydraulic hose pipes with special care for visible defects.

- Special know-how is required for carrying out testing and maintenance work. This know-how is not imparted by these operating instructions.
- The maintenance intervals depend on the frequency of use of your machine. The maintenance plan has been tailored to medium axle loads and stress exerted on the brakes.

  In case of higher loads and amount of stress, maintenance work must be carried out at respectively shorter intervals. This shall in particular apply to the brakes and chassis.
- Modifications to the maintenance instructions shall be reserved!

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people if:

- **lifted, unsecured machine parts accidentally come down or are unintentionally lowered,**
- **tractor and machine accidentally start and roll!**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure tractor and machine against accidental starting and rolling before carrying out any service or maintenance work on the machine.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

WARNING

Risk to people of being crushed, drawn in and becoming entangled due to unprotected powered driving elements during machine operation!

- Start the machine only with the protective devices completely mounted.
- It is not allowed to open protective devices:
  - when the machine is powered,
  - as long as the tractor engine is running with the propeller shaft coupled/the hydraulic system connected,
  - if the ignition key is in the tractor and the tractor engine can be accidentally started with the propeller shaft coupled/the hydraulic system connected,
  - if tractor and machine have not been secured against accidental rolling by means of their respective parking brake and/or the chocks.

  Close open protective devices before powering the machine.

WARNING

Dangerous situations may occur if load-bearing parts break due to mechanical work on frame elements!

As a basic principle, the following is not allowed:

- drilling at the frame or chassis,
- boring up of existing holes at the frame or chassis,
- welding on load-bearing parts.

10.1 Enter the mixing container

Shop work

You will have to enter the mixing container, e.g. to carry out maintenance work on the cutting knives of the mixing auger(s).

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people if:

- **lifted, unsecured machine parts accidentally come down or are unintentionally lowered , e.g. an open discharge door,**
- **the machine accidentally starts or rolls,**
- **the mixing auger(s) is (are) accidentally powered!**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure the machine against accidental starting and rolling before entering the mixing container:
  - Turn the diesel engine off.
  - Switch the parking brake on.
  - Pull the ignition key out.
  - Keep children away from the machine.

DANGER

Danger to life due to falling when climbing over the top edge of the mixing container without permission!

Only enter the mixing container through a discharge opening with the dosage gate completely lifted and secured against accidental lowering!

WARNING

Risk of cuts when entering the mixing container if the cutting knives of the mixing auger(s) are directed towards the discharge opening!

Rotate the mixing auger(s) such that the cutting knives are directed away from the discharge opening before entering the mixing container.

WARNING

Risk of injury due to slipping, stumbling or falling!

Only carry out work in an empty mixing container which is as clean and dry as possible!

Wear non-slip safety footwear!

Pay particular attention to the scraper(s) of the mixing auger(s) near the bottom!

DANGER

With magnetic system (optional extra): Danger to life to people with pacemakers and implanted defibrillators due to magnetic fields!

Keep sufficient distance to the magnets at the top and bottom at the mixing auger(s) if you wear a pacemaker or implanted defibrillator.

CAUTION

Risk of cutting and crushing fingers and hands and even of bone fractures if tools are attracted to the magnet!

Risk of cutting fingers and hands when removing sharp-edged or pointed foreign objects from the magnetic system!

Therefore observe the following in particular when cleaning the magnetic system:

- Always wear cut-resistant protective gloves.
- Exclusively use non-magnetic tools, e.g. made of wood or plastic.
- Do not put your free hand onto the magnet.

1. Completely open the discharge door through which you want to enter the mixing container.
2. Secure tractor and machine against accidental starting and rolling, for details please refer to the chapter "**Secure tractor and machine against accidental starting** and rolling", page 83.
3. Strip the propeller shaft off the tractor's p.t.o. shaft allowing you to manually rotate the mixing auger via the propeller shaft if necessary.
4. Rotate the mixing auger such that the cutting knives are directed away from the discharge opening.
5. Unscrew the screwed connections (1) between protective cover (2) and mixing container (3).
6. Remove the screwed connection (4) of the swivel pin and take off the protective cover (2).
7. Enter and leave the mixing container carefully through the discharge opening or the crossover conveyor and the discharge opening.
8. Carefully clean the mixing container from installation material or grinding residues before leaving the mixing container.
9. Ensure that all components, tools etc. are removed from the mixing container.
10. Properly fix the protective cover (2) again at the mixing container after finishing all necessary work in the mixing container.

Fig. 79

10.2 Cleaning of machine

- Regularly and thoroughly clean the machine! Dirt binds humidity thus causing rust formation.
- Observe the legal provisions for handling and disposal of cleaning agents.
- Never clean brake lines, air pipes and hydraulic hose pipes with benzine, benzol, paraffin or mineral oils.
- Lubricate the machine after cleaning, especially after cleaning by means of a pressure washer / steam blaster or fat-dissolving agents.

Cleaning by means of pressure washer / steam blaster

It is absolutely imperative to observe the following when using a pressure washer / steam blaster for cleaning.

- The maximum admissible injection pressure is 80 bar.
- The maximum admissible water temperature is 60°C.
- Do not clean electrical components such as control set, weighing rods, distributor boxes, weighing computer etc.
- Do not clean chromium-plated components.
- Never aim the cleaning nozzle jet of the pressure washer / steam blaster:
  - directly at lubrication points and bearings,
  - directly at hydraulic components.
  - directly at rubber gaskets.
- Always keep a minimum nozzle distance of 300 mm between the cleaning nozzle and the machine.
- Never aim the cleaning nozzle jet at the machine parts at right angles. The nozzle spray angle must at least be 25°.
- Do not use any chemical additives.
- Observe the safety instructions when handling pressure washers.

10.3 Lubrication of machine

Remove the dirt from the lubrication nipples before carrying out lubrication work.

Do not exceed the maximum lubrication pressure of 250 bar when using high-pressure grease guns! Damage to bearings, seals etc. may occur if the grease gun used is not equipped with a protective device.

Exclusively use lithium-saponified multi-purpose grease.

Use environmentally friendly, biodegradable oils and greases where lubricants may penetrate the fodder or the ground.

10.3.1 Lubrication plan

Observe the included sub-supplier documentation for lubrication of the propeller shaft(s)!

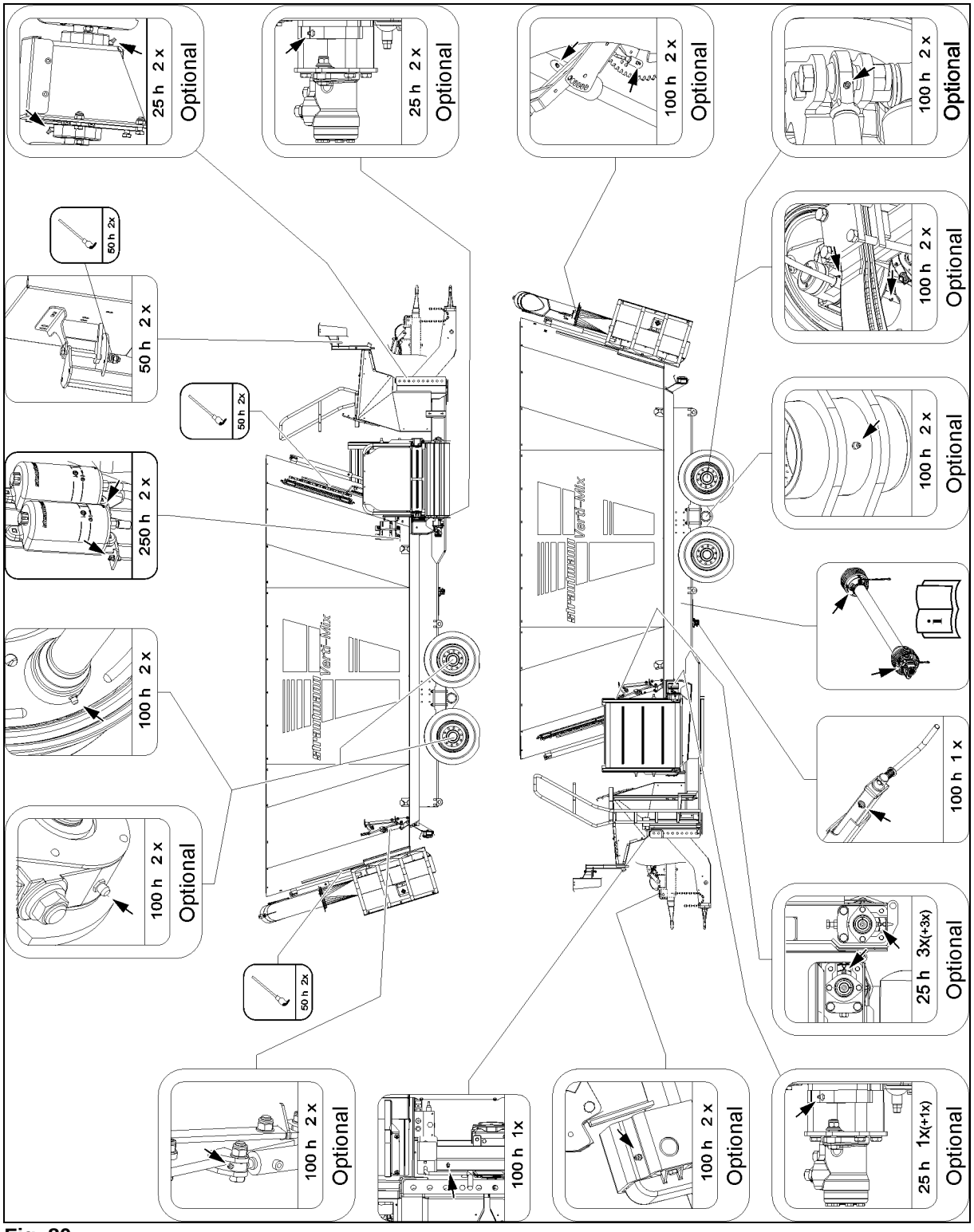


Fig. 80

10.4 Preservation/Longer downtimes

Preparing the machine for longer downtimes shall include:

- thorough cleaning of machine,
- lubrication and greasing of machine,
- touching up of paintwork.

10.5 Check/Top up/Change gear lubricant oil

The gearboxes require:

- regular check/topping-up of oil level,
- change of gear lubricant oil,
- the first oil change after 50 service hours.

CAUTION

Risk of damage to machine components when powering gearboxes without gear lubricant oil!

Always ensure a sufficient oil level in the gearboxes.

WARNING

Risk of slipping to people due to leaking oil during topping-up of oil / oil change!

Immediately remove fresh oil stains by means of binding agents.

- Change the oil when the gear lubricant oil has reached its operating temperature (30-40°C) if possible. The flowability of the gear lubricant oil is at its optimum at operating temperature.
- The optimum oil level is reached at an oil temperature of 0-20°C.

Dispose of used oil according to regulations. Contact your oil supplier in case of disposal problems!

10.5.1 Quantities when filled and change intervals

- Change the gear lubricant oil:
  - o for the first time after 1000 service hours,
  - o then every 2000 service hours,
- Dispose of used oil according to regulations. Contact your oil supplier in case of disposal problems!

Gearbox	Quantity when filled [litre]	Interval
Mixer gearbox VM 951(L);VM1251(L); VM 1201, VM 1451; VM 1501 D; VM 1801 D; VM 2401 D	20	after 1000 service hours, then every 2000 service hours
Mixer gearbox VM 1651; VM 3101 D	14	
Switchgear	9	
Gearbox, on-board hydraulic system without switchgear	0.75	

Tab. 16

10.5.2 Admissible gear lubricant oils

	Gear lubricant oil
Type of oil / Manufacturer	SAE 80W MIL-L-2105
AVIA	AVIA Gear Oil MZ 80W
ARAL	EP 80W
SHELL	Spirax S3 G 80W
TOTAL	Transmission Gear 7 80W

The mixer gearbox is initially filled with AVIA MZ 80 W.

10.5.3 Mixer gearbox

The gearbox(es) require(s):

- check of oil level and topping-up if necessary,
- change of gear lubricant oil.

10.5.3.1 Check oil level

Check the oil of the mixer gearbox:

- after commissioning during the first 10 service hours,
- after changing the gear lubricant oil,

and top up if necessary.

Check the oil level before starting the mixing process, as the oil heats up during the mixing process thus rising in the compensating reservoir.

1. Check the oil level in the mixer gearbox via the lateral compensating reservoir (Fig. 81/1).

   The oil level must be visible between the two fill level markings (Fig. 81/2) of the compensating reservoir.

2. Fill gear lubricant oil (see Quantities when filled and change intervals, p. 179) through the vent opening into the compensating reservoir after removal of the vent screw (Fig. 81/3) if necessary.

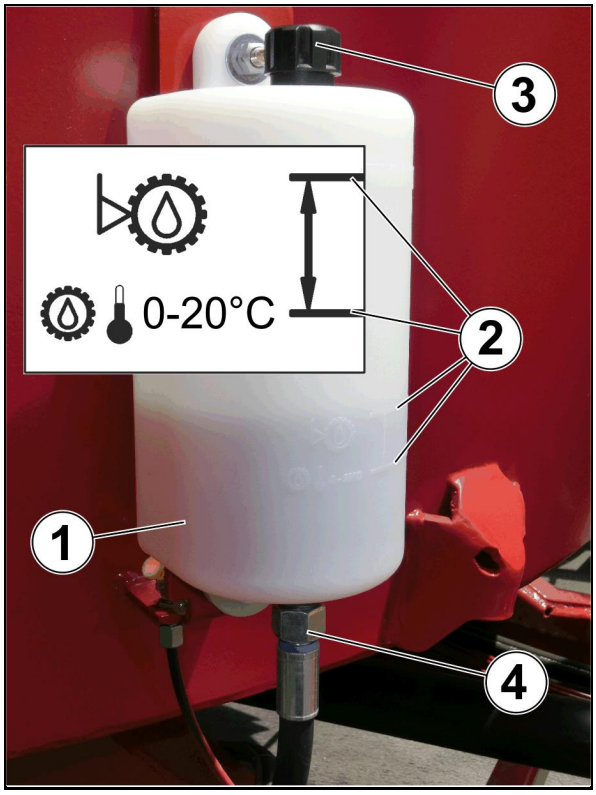


Fig. 81

10.5.3.2 Change oil

Shop work

1. Park the machine on even ground.
2. Turn the diesel engine off and secure the machine against rolling.
3. Place a drip tray (capacity approx. 30 litres) beneath the compensating reservoir (Fig. 81/1).
4. Remove the vent screw (Fig. 81/3).
5. Unscrew the hose pipe (Fig. 81/4) from the compensating reservoir.

→ The gear lubricant oil flows out of the compensating reservoir into the drip tray.

6. Refix the hose pipe (Fig. 81/4) to the compensating reservoir.
7. Place the drip tray beneath the drain valve (Fig. 82/5) of the mixer gearbox.
8. Hang the oil drain hose (Fig. 83/6) into the drip tray.
9. Remove the cap (Fig. 82/5, Fig. 83/5) from the drain valve.
10. Screw the end of the oil drain hose onto the drain valve by means of the union nut (Fig. 83/7).

→ The drain valve opens and the gear lubricant oil drains off into the drip tray.

11. Wait for the oil to stop draining off through the oil drain hose.
12. Connect a filling pump to the oil drain hose.
13. Fill gear lubricant oil (see Quantities when filled and change intervals, p. 179) through the filling pump into the mixer gearbox until the gear lubricant oil pours via the connector (**Fig. 81**/4) into the compensating reservoir (**Fig. 81**/1) and the oil level is visible between the two markings (Fig. 81/2) of the compensating reservoir.

Fill the gear lubricant oil slowly into the mixer gearbox, in order to avoid formation of bubbles. In case of bubbles forming, the mixer gearbox cannot be filled with the required quantity of gear lubricant oil.

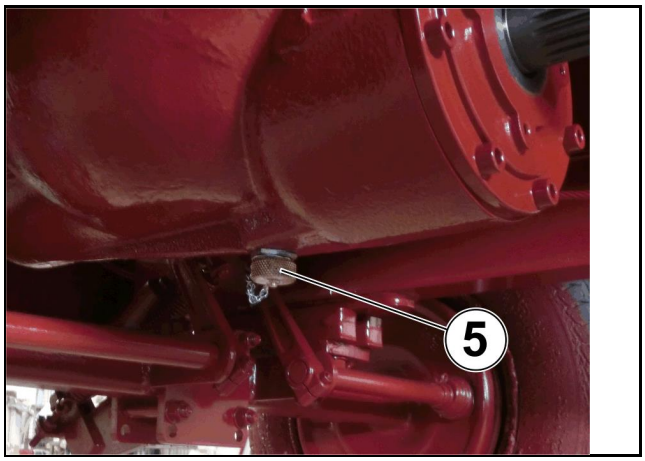


Fig. 82

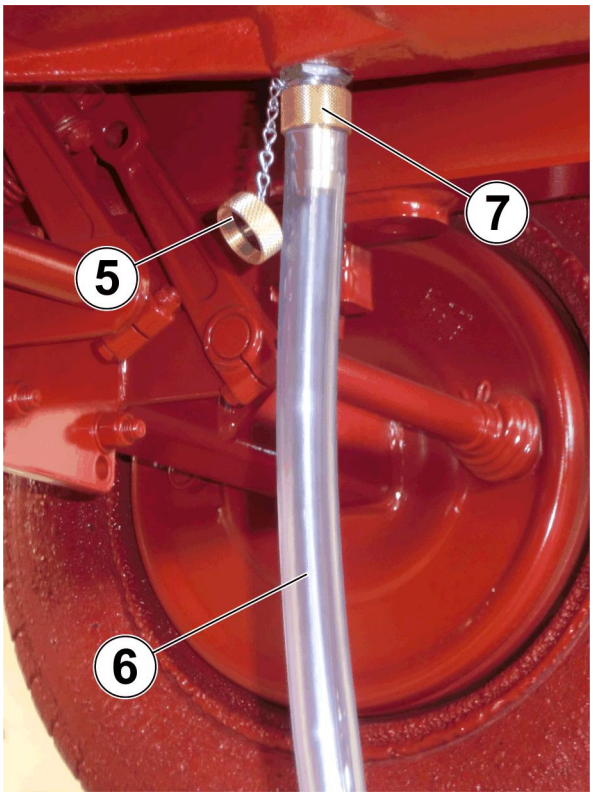


Fig. 83

14. Unscrew the oil drain hose from the oil drain plug.
15. Disconnect the filling pump from the oil drain hose.
16. Screw the cap (Fig. 82/5, Fig. 83/5) onto the drain valve.
17. Screw the vent screw (Fig. 81/3) again onto the vent opening of the compensating reservoir (Fig. 81/1).
18. Carry out a test run for several minutes.
19. Check the oil level in the compensating reservoir afterwards.
20. Fill gear lubricant oil through the vent opening (Fig. 81/3) into the compensating reservoir if necessary.

Check the oil level in the mixer gearbox several times during the first 10 service hours after changing the gear lubricant oil.

10.5.4 Switchgear

The gearbox(es) require(s):

- check of oil level and topping-up if necessary,
- change of gear lubricant oil.

10.5.4.1 Check oil level

WARNING	**Risk of injury due to movements of the machine or its working tools!**
	Secure the machine against accidental starting, rolling and actuation!

1. Remove the inspection plug (1) to check the oil level.

   The oil level must reach the tap hole.
2. Top up oil through the filler neck (2) if necessary.
3. Screw the inspection plug in again.

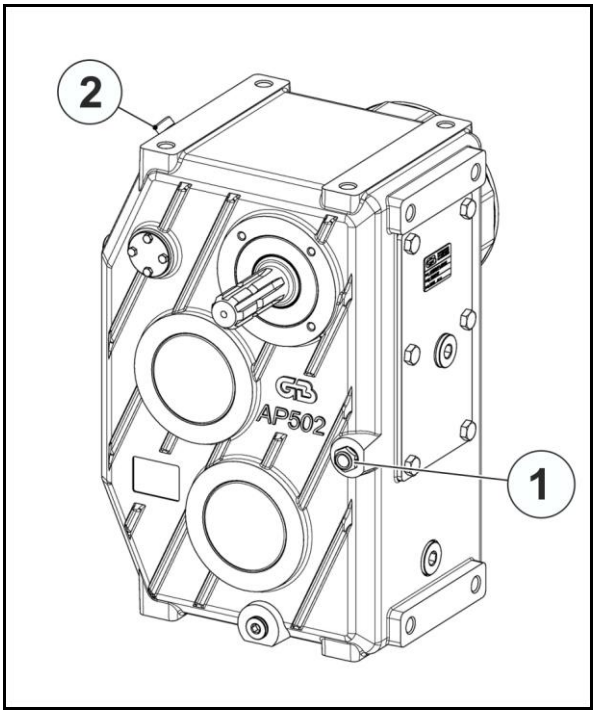


Fig. 84

10.5.4.2 Change oil

Shop work

1. Secure the machine against rolling.
2. Align the machine in horizontal position.
3. Place a drip tray beneath the gearbox (capacity approx. 15 litres).
4. Unscrew oil drain plug (1) and ventilation screw (2).
5. Wait for the oil to stop draining out of the oil drain opening.
6. Screw in again and tighten oil drain plug (1) (use sealant).
7. Remove the inspection plug (3).
8. Top up 13 litres of oil through the filler neck (4) until the oil level becomes visible at the tap hole.
9. Screw the inspection plug in again.
10. Clean and screw in the ventilation screw (2).
11. Check the oil level after 5 service hours.

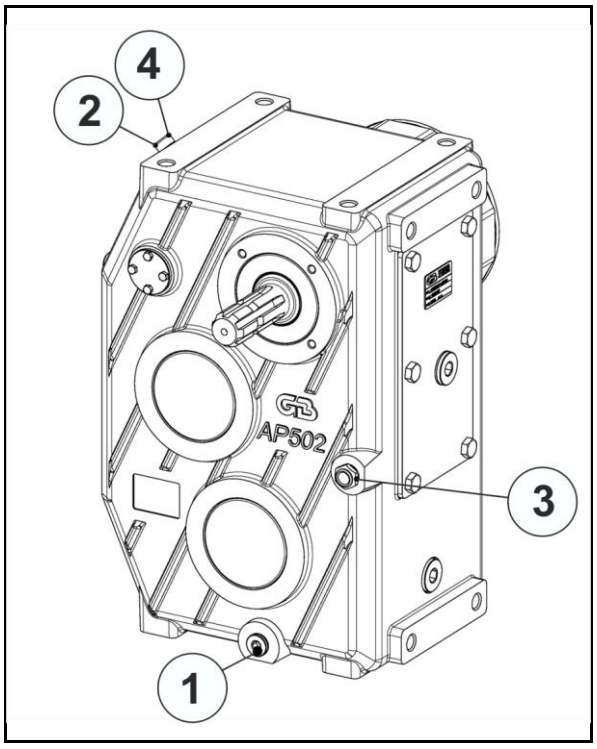


Fig. 85

10.5.5 Spur gear for driving mechanism with on-board hydraulic system without switchgear

The gearbox(es) require(s):

- check of oil level and topping-up if necessary,
- change of gear lubricant oil.

10.5.5.1 Check oil level

WARNING	**Risk of injury due to movements of the machine or its working tools!**
	Secure the machine against accidental starting, rolling and actuation!

1. The oil level must be visible at the inspection glass (1) of the spur gear (2).
2. Top up oil through the filler neck (3) if necessary.

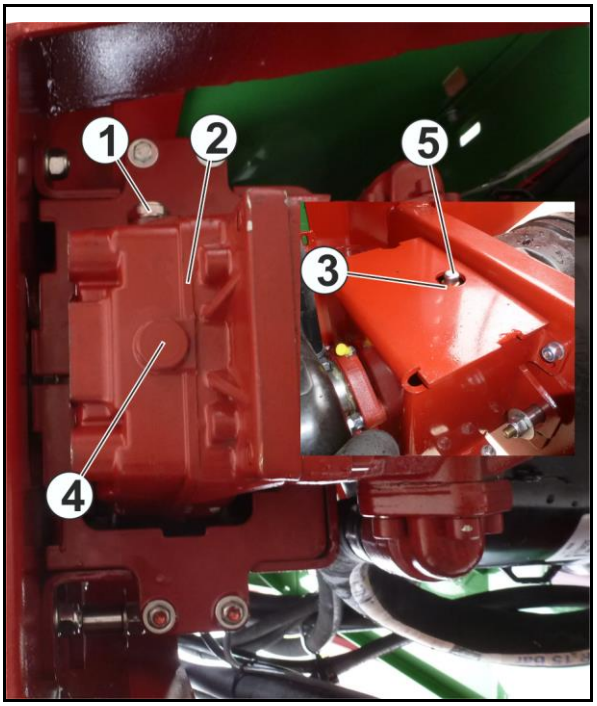


Fig. 86

10.5.5.2 Change oil

Shop work

1. Secure the machine against rolling.
2. Align the machine in horizontal position.
3. Place a drip tray beneath the gearbox (capacity approx. 2 litres).
4. Unscrew oil drain plug (4) and ventilation screw (5).
5. Wait for the oil to stop draining out of the oil drain opening.
6. Screw in again and tighten oil drain plug (4) (use sealant).
7. Top up 0.75 litres of oil through the filler neck (3) until the oil level becomes visible at the inspection glass (1).
8. Clean and screw in the ventilation screw (5).
9. Check the oil level after 5 service hours.

10.5.6 On-board hydraulic system

In case of the on-board hydraulic system:

- check oil level and top up hydraulic oil if necessary,
- change hydraulic oil / replace filter element.

- Change the hydraulic oil and replace the filter element:
  - for the first time after 250 service hours,
  - then every 2000 service hours,
  - but at least every 2 years (depending on which change interval occurs first).
- Required hydraulic oil quantity of on-board hydraulic system:
  - Machine without blower drive: approx. 21 litres
  - Machine with blower drive: approx. 52 litres
- Never mix different types of hydraulic oil.
- Dispose of used oil according to regulations. Contact your oil supplier in case of disposal problems!

10.5.6.1 Admissible hydraulic oils

	Hydraulic oil
Type of oil / Manufacturer	ATF according to GM DEXRON® II-D
ARAL	ATF 22
AVIA	FLUID RSL 46, ATF 86
BP	Autran DX II
Mobil	ATF 220
TOTAL	ATX 40

The on-board hydraulic system is initially filled with AVIA FLUID RSL 46 (type HLP).

10.5.6.2 Check oil level

1. Check the oil level at the inspection glass (1).

   The oil level must be visible at the inspection glass.

2. Top up hydraulic oil through the filler neck (2) into the hydraulic oil tank if necessary.

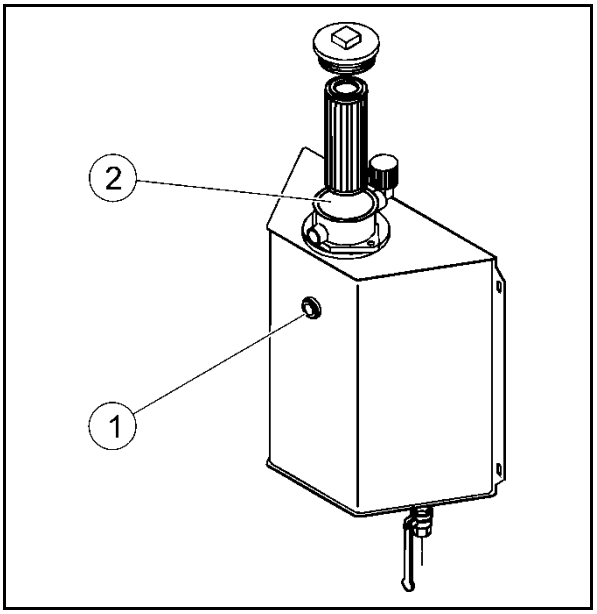


Fig. 87

10.5.6.3 Change oil

Shop work

1. Secure the machine against rolling.
2. Align the machine in horizontal position.
3. Place a drip tray beneath the hydraulic oil tank:
   - Capacity approx. 30 litres in case of on-board hydraulic system for hydraulic functions,
   - capacity approx. 60 litres in case of on-board hydraulic system for blower drive.
4. Unscrew oil drain plug (3) from the bottom of the hydraulic oil tank.
5. Wait for the oil to stop draining out of the oil drain opening.
6. Screw in again and tighten oil drain plug (3) (use sealant).
7. Replace the filter element (4) if necessary.
8. Fill the required hydraulic oil and the required oil quantity through the filler neck (2) into the hydraulic oil tank.

   The oil level must be visible at the inspection glass (1).

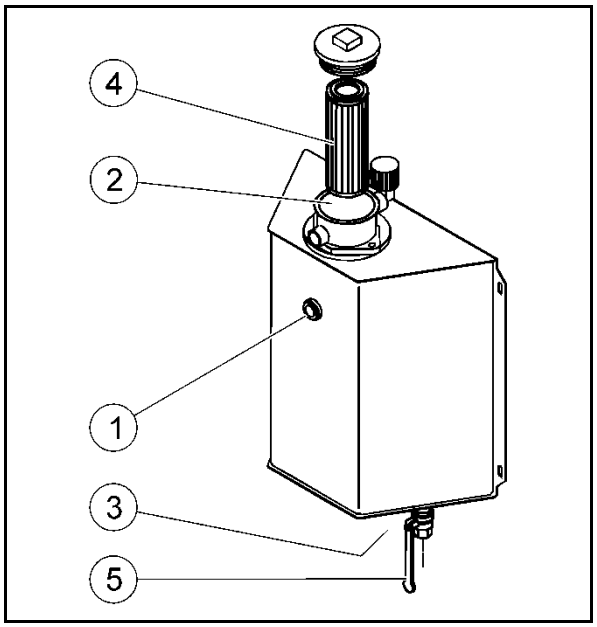


Fig. 88

10.6 Replace shear bolts of shear bolt coupling

1. Secure tractor and machine against accidental starting and rolling, see information on page 83.
2. Eliminate the cause for the overloading (e. g. foreign object in mixing container), see information on page 160.
3. Strip the propeller shaft (1) off the p.t.o. shaft of the tractor.
4. Open the fitting apertures on the protective device. Observe the included operating instructions for the propeller shaft.
5. Remove the residues of the shear bolt (2).
6. Rotate the power train such that the boreholes of the coupling halves (3) and (4) face each other.
7. Replace the shear bolts (2) by a bolt M10 x 50 8.8
8. Close the fitting aperture.
9. Couple the propeller shaft.

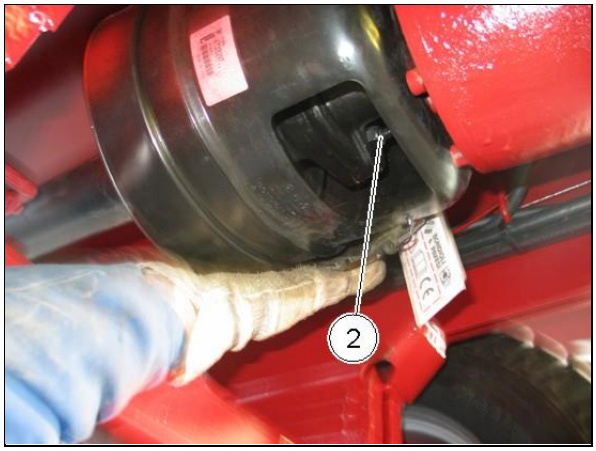


Fig. 89

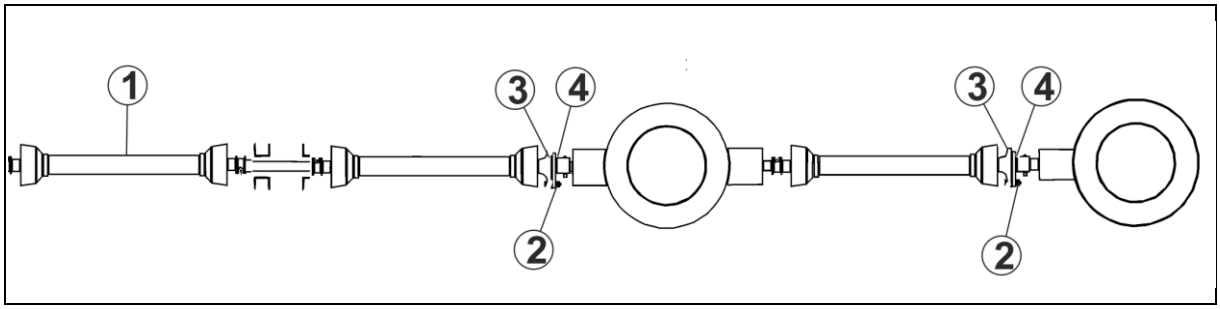


Fig. 90

10.7 Auger position, Verti-Mix Double

Ensure identical position of the mixing augers when mounting the mixing auger drive (shop work!).

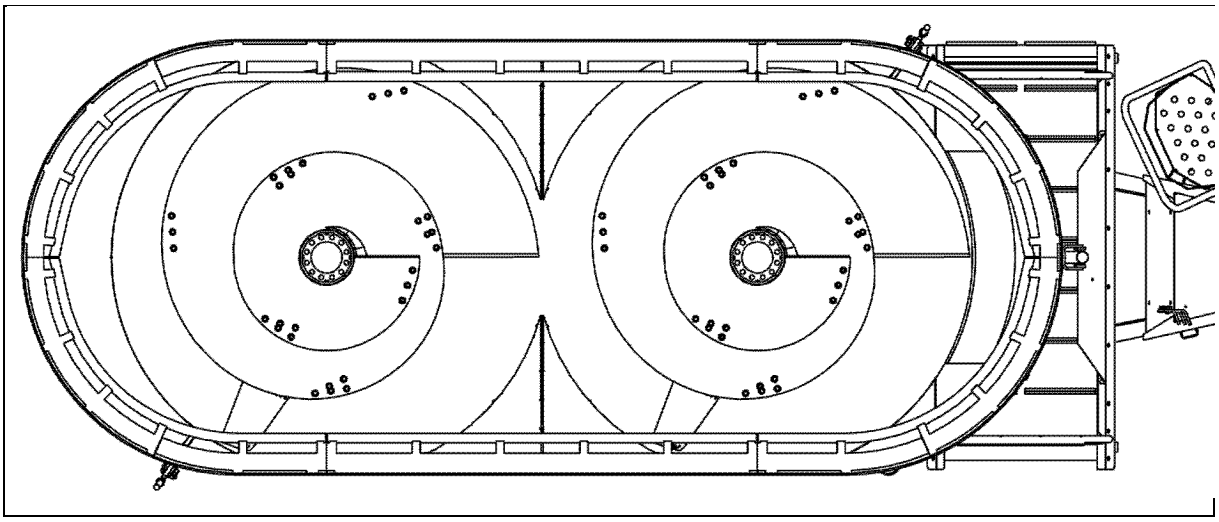


Fig. 91

10.8 Check / Adjust discharge door distance

1. Close the discharge door.
2. Secure the machine against accidental starting and rolling.
3. Measure the distance X between the discharge door and the mixing container. The distance must be approx. 5 mm.
4. Adjust the distance X if necessary:
   - 4.1 Unscrew the screws (1) at the L straps (2).
   - 4.2 Move the L straps (2) in the oblong holes such that the distance X is approx. 5 mm.
   - 4.3 Retighten the screws (1).

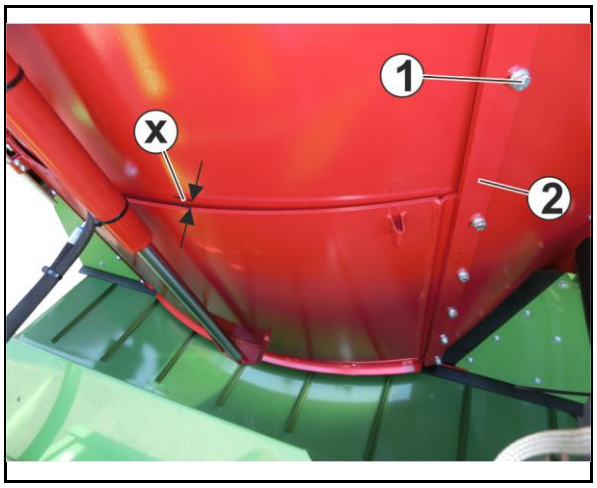


Fig. 92

10.9 Cutting knives of mixing auger(s)

- Only an authorised workshop is allowed to carry out work in the mixing container!
- Have the cutting knives of the mixing auger ground if necessary.

  Blunt cutting knives require a higher mixing auger power.
- Check the cutting knives from the service platform / the ladder for visible defects every day. Have damaged or worn cutting knives replaced in good time. Have broken-off cutting knife particles removed from the mixing container to avoid any damage resulting from conveyed cutting knife particles.

DANGER

Risk of most serious injuries or even death due to movements of the machine or its working tools!

Secure the machine against accidental starting, rolling and actuation!

DANGER

Danger to life due to falling when climbing over the top edge of the mixing container without permission!

Only enter the mixing container through a discharge opening with the dosage gate completely lifted and secured against accidental lowering!

DANGER

With magnetic system (optional extra): Danger to life to people with pacemakers and implanted defibrillators due to magnetic fields!

Keep sufficient distance to the magnets at the top and bottom at the mixing auger(s) if you wear a pacemaker or implanted defibrillator.

WARNING

Risk of injury due to sharp cutting knives!

Rotate the mixing auger(s) such that the cutting knives are not directly pointed at the discharge opening through which you intend to enter the mixing container!

Wear cut-resistant protective gloves!

Cover the cutting knives by means of an edge protector!

WARNING

Risk of injury due to slipping, stumbling or falling!

Only carry out work in an empty mixing container which is as clean and dry as possible!

Wear non-slip safety footwear!

Pay particular attention to the scraper(s) of the mixing auger(s) near the bottom!

10.9.1 Swivel / Replace cutting knives

Shop work

Some cutting knives can be mounted in 2 positions:

(1) **Retracted (factory setting):**

- Requires less driving power.
- Better undoing of bales.

(2) **Extended:**

- Requires higher driving power.
- Supports discharge of highly-structured mixtures at the discharge opening.
- An extended upper cutting knife can better pick up bale components and re-include them in the intensive mixing process.

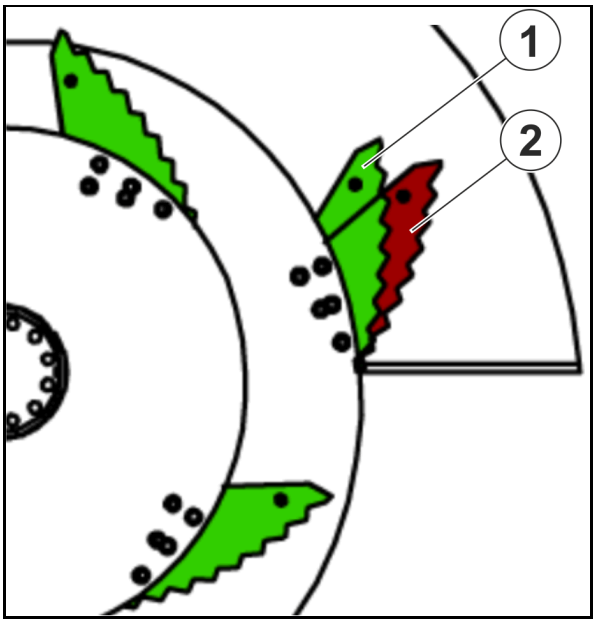


Fig. 93

1. Remove the screws (2).
2. Swivel the cutting knife (1) or replace it.

   For the positions of the individual cutting knives, please refer to "Positions of cutting knives", page 193!

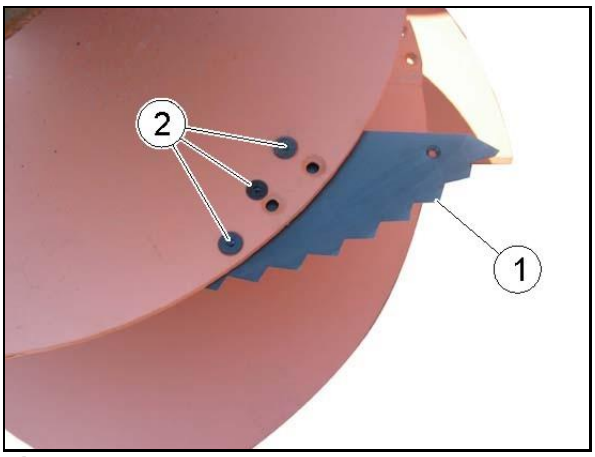


Fig. 94

Observe the fact that a knife supporting plate must be mounted beneath the top cutting knife of the mixing auger:

- a straight knife supporting plate (3) with the "Standard" and "Straw" set of knives.

Fig. 95

- an angular bale knife supporting plate (5) with the "Bales" set of knives.

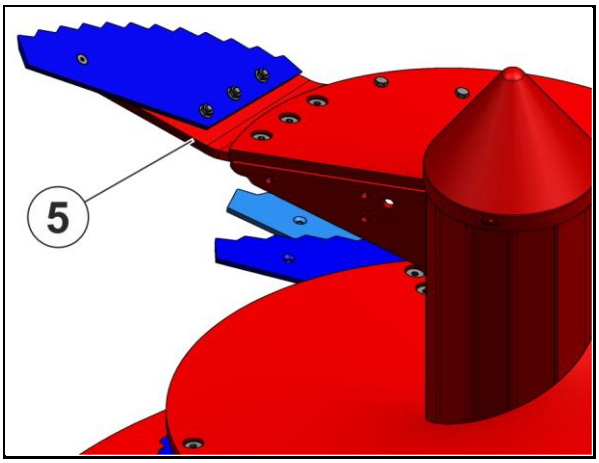


Fig. 96

3. Retighten the screws (2).
4. In addition to the cutting knives, a root crop knife (4) can be mounted onto the bottom end of the mixing auger.
5. Then remove all foreign objects (tools etc.) from the mixing container and thoroughly clean the container.

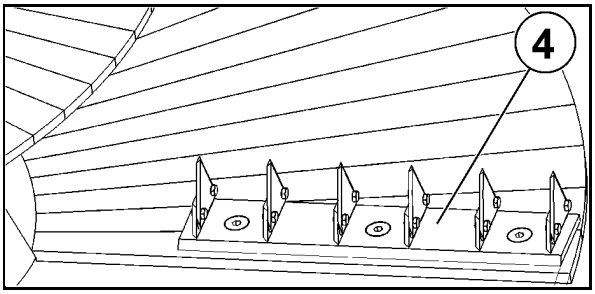


Fig. 97

Positions of cutting knives

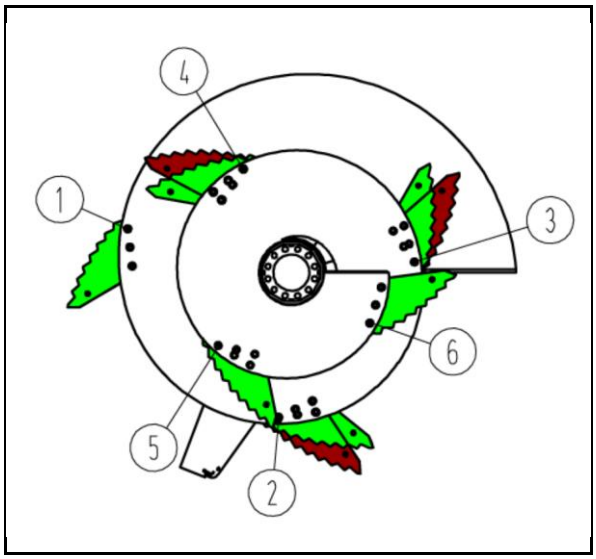


Fig. 98 VM 1501 D

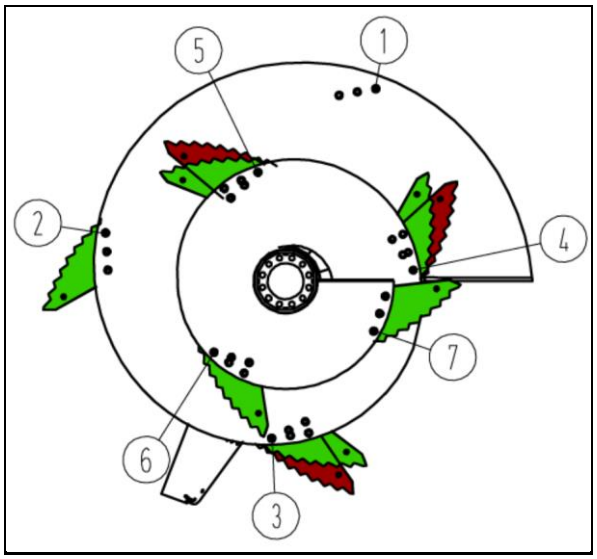


Fig. 99 VM 951 / VM 951-L / VM 1801 D

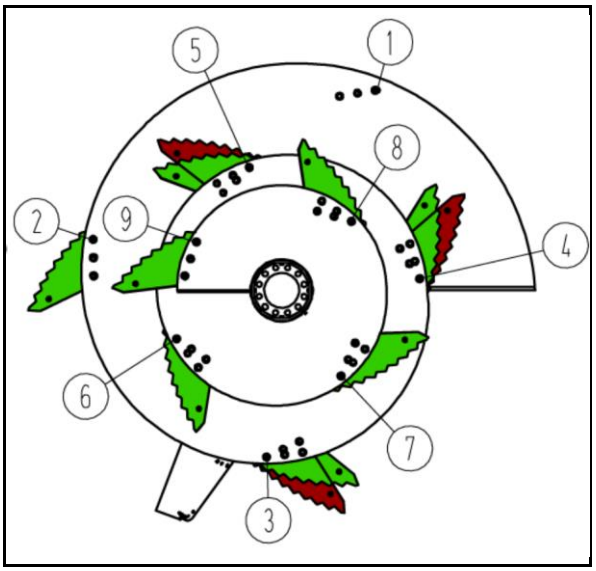


Fig. 100 VM 1251 / VM 1251-L / VM 1201 / VM 2401 D

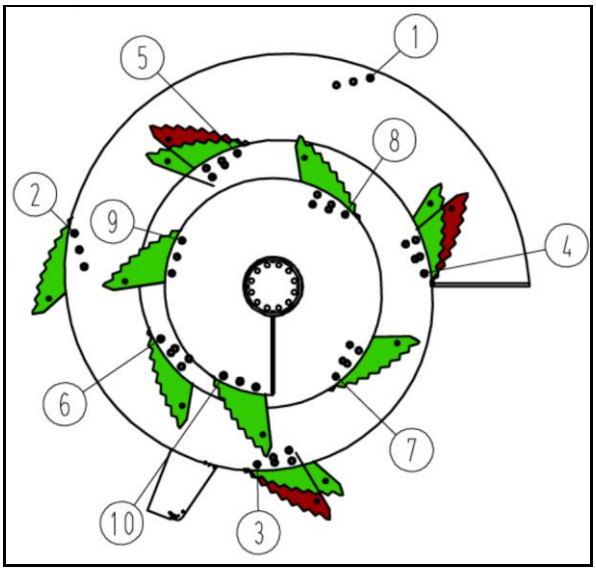


Fig. 101 VM 1451 / VM 1651 / VM 3101 D

	VM 1451 / VM 1651 / VM 3101 D									
	VM 1251 / VM 1251-L / VM 1201 / VM 2401 D									
Position / **Set of knives**	**(1)**	**(2)**	**(3) ***	**(4) ***	**(5) ***	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**
Standard	–									
Straw	–									
Bales	–									

	VM 1501 D					
Position / Set of knives	(1)	(2) *	(3) *	(4) *	(5)	(6)
Standard						
Straw						
Bales						

	VM 951 / VM 951-L / VM 1801 D						
Position / Set of knives	(1)	(2)	(3) *	(4) *	(5) *	(6)	(7)
Standard	–						
Straw	–						
Bales	–						

short knife

long knife

* In these positions, extending of cutting knives is most effective.

10.9.2 Grind cutting knives

Shop work

WARNING	**Risk of eye injury due to blown-away abrasive particles!** Wear protective goggles when carrying out grinding work! Observe the safety instructions of your grinding machine!

1. Insert a flap grinding wheel into a right-angle grinder.
2. Carefully grind the cutting knives on their smooth top side.

Never regrind cutting knives on their corrugated underside!

Avoid overheating (discolouration) of the cutting knives during regrinding work! Overheating will reduce the service life of the cutting knives.

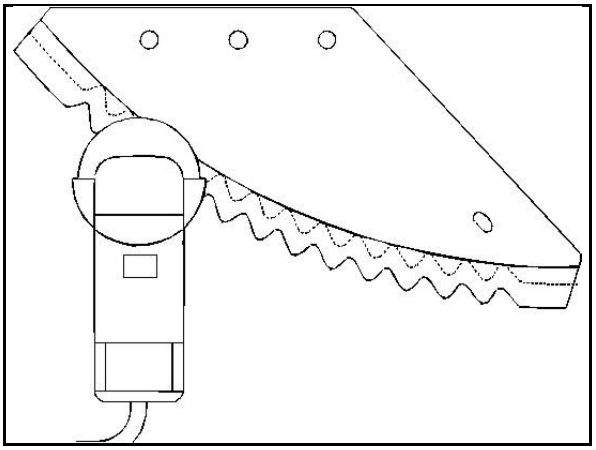


Fig. 102

3. Then remove all foreign objects (tools etc.) from the mixing container and thoroughly clean the container.

10.10 Crossover conveyor, discharge conveyor or conveyor extension

- Check the tension of the respective conveyor every day.

  A wrong tension may cause damage to the conveyor.

  A properly tightened conveyor sags by approx. 10 to 15 mm in its centre. Consider the ambient temperature. Low temperatures shorten the conveyor, high temperatures lengthen it.
- Straighten the conveyor by means of the clamping screws (Fig. 104/2) if the conveyor is not running straight or is rubbing along the frame.
- Clean the driving and carrying rollers and pulleys if fodder residues have piled up on the rollers.
- Lubricate the 4 flanged bearings of the conveyor at least every 50 service hours.

10.10.1 Check conveyor for visible defects

Check the conveyor (1) and the belt fastener (2) of the respective conveyor weekly for visible defects. Replace the conveyor in case of damage (fissures, raised corners).

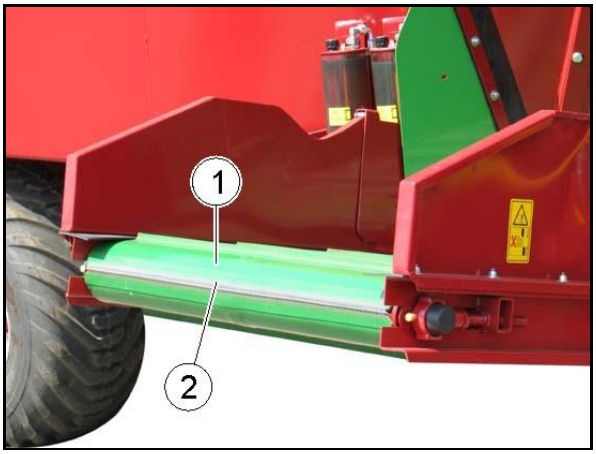


Fig. 103

10.10.2 Adjust /Tighten conveyor

1. Turn the diesel engine off.
2. Switch the parking brake on.
3. Pull the ignition key out.
4. Unscrew the counter nut (1) at the right-hand and left-hand radial insert ball bearing (2).
5. Equally turn the two clamping nuts (3):
   - such that the conveyor sags by approx. 10 to 15 mm in its centre,
   - such that the distance A between the square profiles (4) and the clamping housing (5) is equal on both sides of the conveyor.

     Only if the distance A is equal on both sides of the conveyor, does the conveyor run straight.
6. Carry out a test run to check whether the conveyor has an equal distance to the frame at the return rollers on both sides. If not, correct accordingly by turning the clamping nuts (3).
7. Retighten the counter nut (1) at the right-hand and left-hand radial insert ball bearing (2).

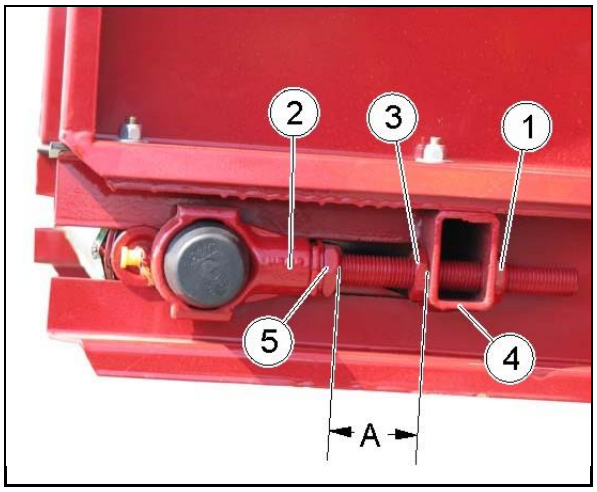


Fig. 104

10.10.3 Clean driving rollers, carrying rollers and pulleys

1. Secure tractor and machine against accidental starting and rolling.
2. Relieve the conveyor (1).
3. Rotate the relieved conveyor until the side of the belt fastener (2) is positioned on the pulley.
4. Pull the connecting wire out of the belt fastener.
5. Remove the conveyor.
6. Clean:
   - the driving and carrying rollers and the pulleys,
   - the frame,
   - the rubber seal strips.
7. Reinstall the conveyor.

   Ensure that the rubber seal strips rest on top of the conveyor.

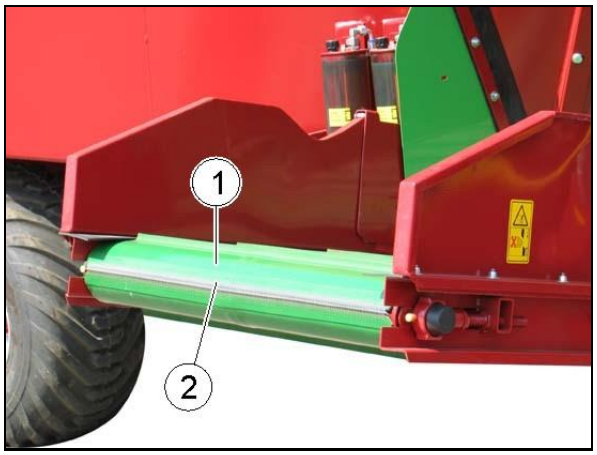


Fig. 105

8. Mount the connecting wire.
9. Tighten the conveyor.

10.11 C-conveyor

10.11.1 Check C-conveyor for visible defects

Check the C-conveyor (1) with its toothed belts (2) for visible defects every week. Replace the C-conveyor in case of damage (fissures etc.).

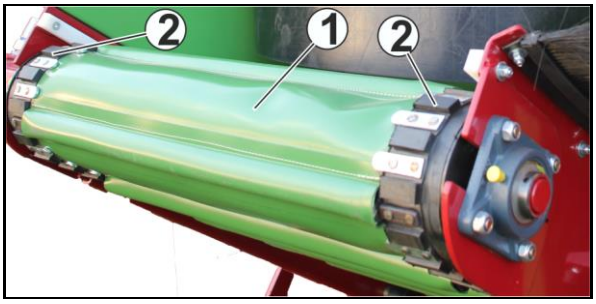


Fig. 106

10.11.2 Tighten / Adjust C-conveyor

Proper conveyor tension is vital for

- the correct running of the teeth in the driving wheels,
- maximum power transmission to the toothed belts.

If the toothed belts are too tight or too loose, they might override the teeth of the driving wheels, thus causing incorrect running.

1. Secure tractor and machine against accidental starting and rolling. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling", page 83
2. Unscrew the counter nut (1) at the right-hand and left-hand radial insert ball bearing.
3. Turn the nut (2) until the belt strap is relieved.
4. Measure the distance X across 10 cams at each toothed belt.

   Example: X = 400 mm
5. Turn the nuts (2) equally on both sides:
   - such that the conveyor tension is 0.5 – 0.75 % at each toothed belt (example X = 402 – 403 mm),
   - such that the distance A is equal on both sides of the belt strap.

     Only if the distance A is equal on both sides of the belt strap, does the belt strap run straight.
6. Carry out a test run to check the belt strap and the toothed belts for proper functioning.
7. Retighten the counter nut (1) at the right-hand and left-hand radial insert ball bearing (2).

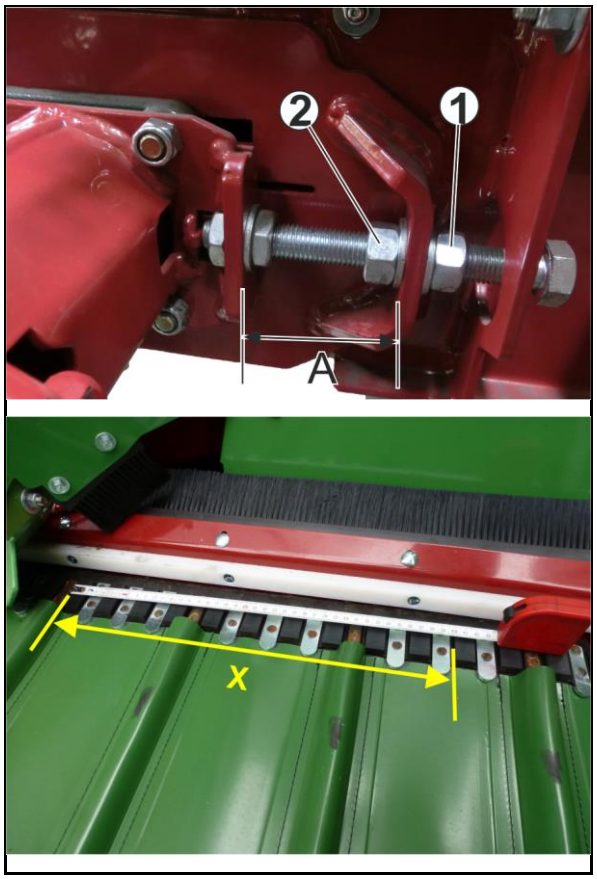


Fig. 107

10.11.3 Clean C-conveyor

1. Secure tractor and machine against accidental starting and rolling. Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling", page 83
2. Move the C-conveyor to the side until it slightly rises.
3. Unscrew the two nuts (1) at the cover (2) of the cleaning aperture.
4. Remove the cover (2) of the cleaning aperture by displacing the two nuts (1) in relation to each other.

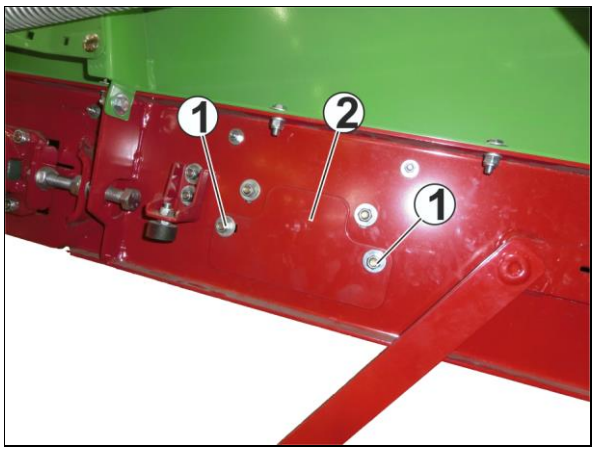


Fig. 108

5. Now remove the deposits on the interior of the C-conveyor (3) or the toothed belt (4) manually or by means of a vacuum cleaner or appropriate equipment. Make sure to avoid damage to the C-conveyor or the toothed belts!

Fig. 109

6. Remove material deposits on the driving and return rollers of the toothed belts in the interior of the C-conveyor by means of an appropriate tool (e.g. thin screwdriver) through the slots (5) in the frame.

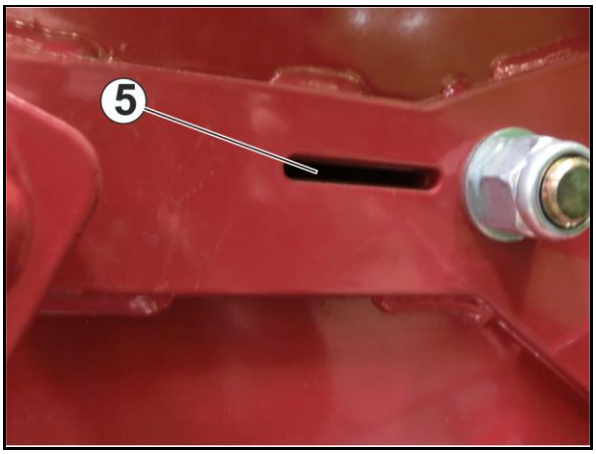


Fig. 110

7. The outer lower and upper return rollers (6) are accessible from the outside.
8. Close the cleaning aperture again by means of the cover (2) after cleaning.

Fig. 111

10.12 Replace Bowden cable of mechanical Bowden cable control unit

Disassembly

Connection to control valve of control block:

1. Unscrew the counter nut (H).
2. Remove the two screws (P) at the adapter (G).
3. Remove pin (M).
4. Strip the connecting sleeve (F) off the sliding pin (K).

Connection to operating element:

5. Remove the locking screw (A).
6. Operate lever (B) until the connecting pin (C) is visible.
7. Unscrew the threaded sleeve (D) of the remote control cable from connecting pin (C) with operating lever (B) actuated.
8. Release operating lever (B) and draw sleeve (E) completely out of the housing.

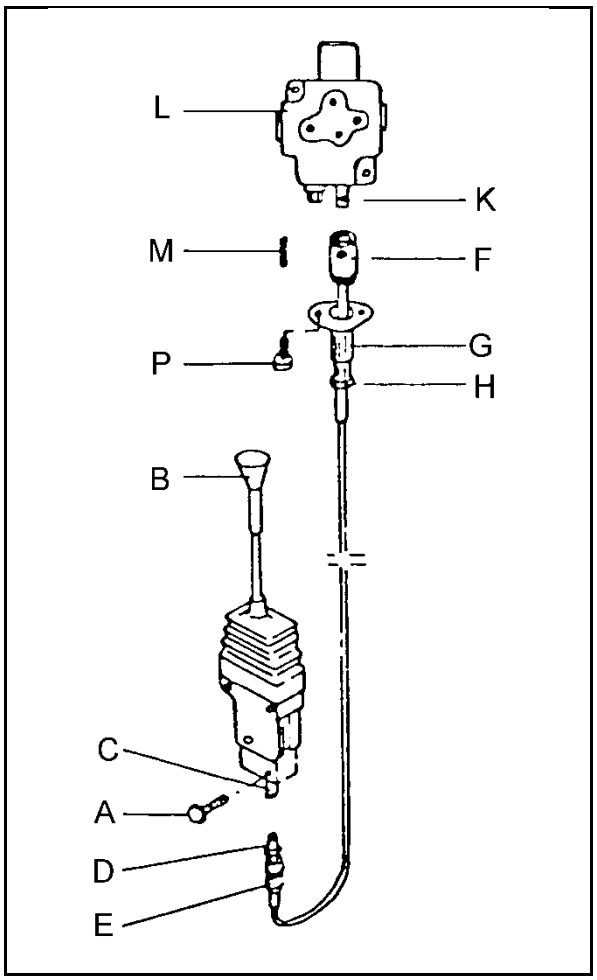


Fig. 112

Assembly

Connection to operating element:

1. Remove the locking screw (A).
2. Operate lever (B) until the connecting pin (C) is visible.
3. Screw the threaded sleeve (D) of the remote control cable into the connecting pin (C) with operating lever (B) actuated.
4. Release operating lever (B).
5. Insert sleeve (E) completely into the housing.
6. Mount locking screw (A).

Connection to control valve of control block:

7. Operate lever (B) until the connecting sleeve (F) is jutting out of the adapter (G).
   Possibly loosen counter nut (H) and turn back adapter (G).
8. Slip the connecting sleeve (F) onto the sliding pin (K).
9. Connect connecting sleeve (F) and sliding pin (K) by means of pin (M).
10. Turn the adapter (G) until it fits closely to the valve box (L).
11. Fasten the adapter (G) to the valve box (L) by means of the two screws (P) M 6 x 16.
12. Tighten counter nut (H).

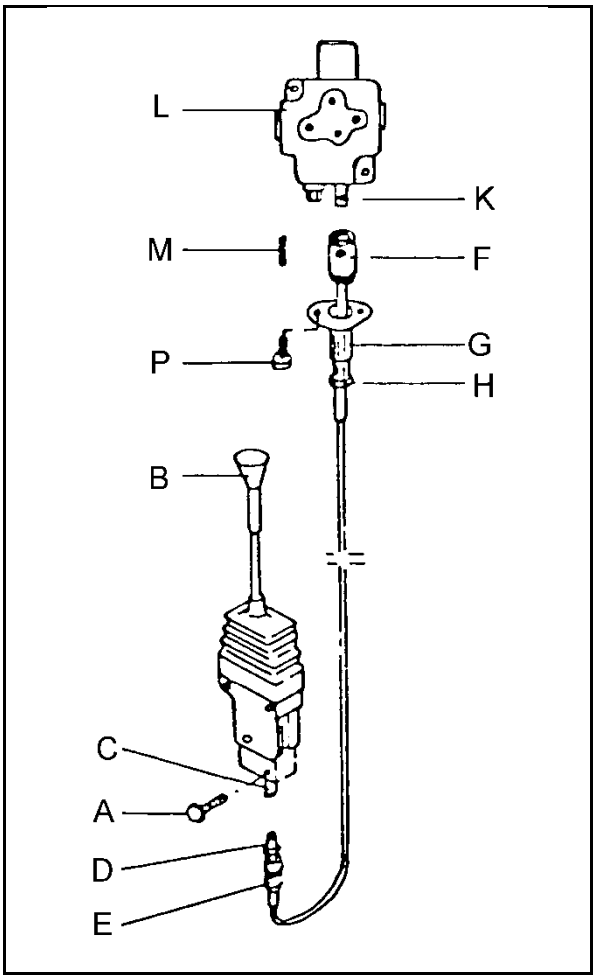


Fig. 113

10.13 Replace remote control cable adapter

1. Remove the connector at the control valve of the control block.
2. Unscrew the counter nut from the connecting sleeve (F).
3. Unscrew connecting sleeve (F).
4. Replace adapter (G).
5. Screw connecting sleeve (F) on.
6. Tighten the counter nut of connecting sleeve (F).
7. Mount the connector at the control valve of the control block.

10.14 Hydraulic system

Shop work

WARNING

Risk of infection to people due to hydraulic oil squirting out under high pressure and entering the body!

- Only an authorised workshop is allowed to carry out work on the hydraulic system (shop work).
- Depressurise the hydraulic system before starting to work on the hydraulic system.
- Absolutely use appropriate means when trying to locate leakages.
- Never try to block hydraulic hose pipe leaks with your hands or fingers.

  Hydraulic oil squirting out under high pressure may enter the skin and the body and cause serious injuries.

  If injuries caused by hydraulic oil occur, immediately contact the medical services! Risk of infection.
- Risk of explosion in case of improper working on hydraulic accumulators!

  Welding, soldering, drilling or other work on hydraulic accumulators which might affect the mechanical properties is not allowed.
- Observe the information in the chapter "Basic safety instructions", page 52, when carrying out maintenance work on the hydraulic system.

WARNING

Risk of slipping to people due to leaking hydraulic oil during work on the hydraulic system!

Immediately remove fresh oil stains by means of binding agents.

- Have the hydraulic hose pipes checked for their operational safety by an expert at least once a year.
- Replace hydraulic hose pipes in case of damage and ageing. Only use original hydraulic hose pipes of the manufacturer.
- The period of use of the hydraulic hose pipes should not exceed six years, including a maximum possible shelf life of two years.

  Even when properly stored and exposed to admissible stress, hoses and hose connections are subject to natural ageing, which involves a limited shelf life and period of use. Notwithstanding these facts, the period of use may be specified according to experience, in particular taking into account the risk potential. For thermoplastic hoses and hose pipes, other reference values may be relevant.

- Dispose of used oil according to regulations. Contact your oil supplier in case of disposal problems.
- Do not keep hydraulic oil within reach of children.
- Beware that no hydraulic oil penetrates the soil or water.

10.14.1 Depressurise hydraulic system

WARNING

Risk of accidental contact with hydraulic oil due to hydraulic oil squirting out under high pressure and entering the body, in particular in case of hydraulic systems with membrane pressure accumulator!

- Working on the hydraulic system with the system under operating pressure is not allowed.
- Depressurize the hydraulic system before carrying out work on the hydraulic system.

Relieve the respective hydraulic cylinder via the corresponding operating element with the hydraulic pump switched off.

10.14.2 Hydraulic hose pipes

10.14.2.1 Marking and period of use of hydraulic hose pipes

The marking on the fitting provides the following information:

(1) Identification of the hydraulic hose pipe manufacturer (A1HF)

(2) Date of manufacture of the hydraulic hose pipe (16/07 = year/month = July 2016)

(3) Maximum admissible operating pressure (210 bar)

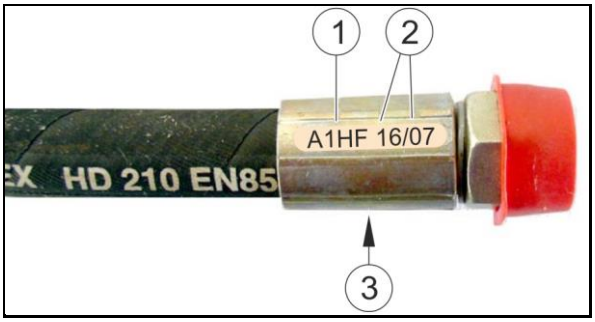


Fig. 114

After expiration of the period of use, the hydraulic hose pipe must no longer be used.

10.14.2.2 Maintenance intervals

After the first 10 service hours and then every 50 service hours:

1. Check all components of the hydraulic system for tightness.
2. Retighten screwed connections if necessary.

Before each startup:

Check hydraulic hose pipes for visible defects. Immediately remedy the following defects:

1. Eliminate chafing points on hydraulic hose pipes and tubes.
2. Immediately replace worn, damaged or overaged hydraulic hose pipes (shop work).

10.14.2.3 Inspection criteria for hydraulic hose pipes

For your own safety:

Immediately have hydraulic hose pipes replaced (shop work) as soon as you detect any of the following defects:

- Damaged outer layer down to the liner (e. g. due to chafing points, cuts, fissures).
- Embrittled outer layer (visible by cracking of hose material).
- Unnatural deformations of the hydraulic hose pipe in depressurized as well as in pressurized state or when bent (e. g. separation of layers, blistering, pinches, kinks).
- Leaks.
- Damaged, deformed or leaking fitting. Small surface damage is no reason for replacement.
- Hose slipping out of the fitting.
- Corroded fitting which may affect the function and the strength.
- Improperly laid hydraulic hose pipes, e. g. ignored bending radii, laying over sharp edges.
- The period of use of 6 years has been exceeded.

10.14.2.4 Installation and removal of hydraulic hose pipes

Shop work

When installing and removing hydraulic hose pipes, it is imperative to observe the following information:

- Only use hydraulic hose pipes of the manufacturer.
- Ensure cleanliness.
- Install hydraulic hose pipes such that the following applies to all operating states:
  - There is no tensile stress, except for that due to the dead weight,
  - there is no upsetting stress in case of short lengths,
  - external mechanical influences on the hydraulic hose pipes are avoided.

    Make sure to avoid chafing of hydraulic hose pipes against components or against each other by suitable arrangement and fixing. Protect hydraulic hose pipes by means of protective coatings if necessary. Cover sharp-edged components.
  - the bending radii do not fall below the admissible limits.
- When connecting a hydraulic hose pipe to moving parts, the hose length must be such that:
  - in the complete range of motion the bending radius does not fall below the minimum admissible limit,
  - the hydraulic hose pipe is not subject to tensile stress.
- Fix the hydraulic hose pipes to the specified fixing points. Avoid additional hose supports which affect the natural motion and length variation of the hose.
- Overcoating of hydraulic hose pipes is not allowed.

10.15 Tyres

Good tyre efficiency is a matter of regular checks and travelling at proper tyre pressure.

10.15.1 Check tyres

- Check the tyre pressure every day.

  Always ensure that the tyre pressure is properly adapted to the load and the kind of work which has generally to be carried out by the machine.
- Never overload the tyres.
- Ensure that the caps are seated on the valves and have been tightened.
- Preferably check the tyres during operation for "folds" or other abnormal deformation.

  Remove stones, pebbles, nails and other foreign objects stuck in the tyre, as otherwise they further penetrate the tyre.

  Have deeper cuts repaired as soon as possible.
- Relieve the tyres if the vehicle is not intended to be used for a longer period thus avoiding deformation of the tyres.
- Store "loose" tyres at a dark place, free of oil and other chemicals.
- Do not let tyres come near electric motors. The ozone produced by the electric motors slowly dessicates the rubber.

10.15.2 Change tyres

Observe the information in the chapter "Basic safety instructions", page 48.

WARNING

Risk of crushing and impact to people due to the machine accidentally lowering when changing wheels!

- Use lifting equipment suitable and approved for the machine's weight with sufficient lifting power.
- Place the lifting device only at the marked fixing points.
- Ensure sufficient ground stability before lifting the machine by means of a lifting device and securing the machine against accidental lowering by means of safety stands. Additionally use solid, load-distributing supports if necessary.
- Never stand under a lifted, unsecured machine.

Check the distance between underride guard and road after each tyre change! The distance must not exceed 550 mm.

Change the position of the underride guard if the distance is more than 550 mm.

1. Place the lifting device at the marked fixing points.

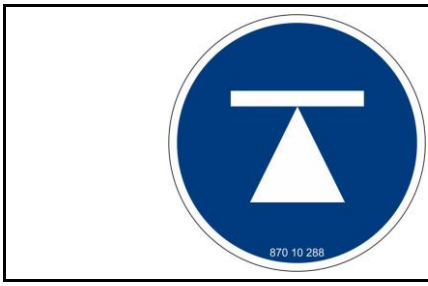


Fig. 115

2. Keep to the specified order when loosening and tightening the wheel nuts.
3. Tighten the wheel nuts at the required tightening torque, see chapter "Tightening torques of wheel nuts".
4. Check the wheel nuts for tightness after ten service hours. Retighten them if necessary.

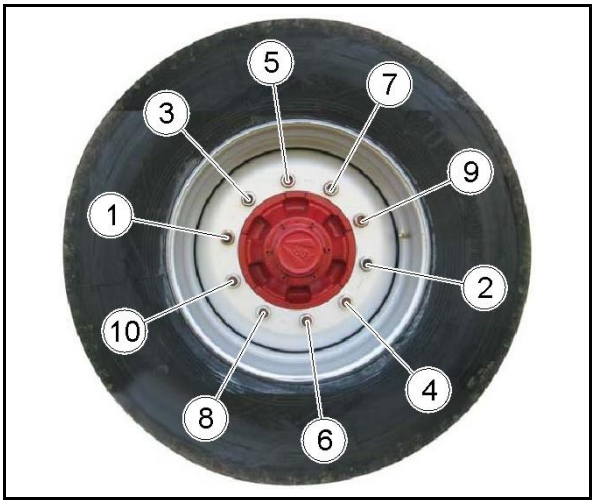


Fig. 116

10.16 Brake system and chassis

10.16.1 Check/Clean in-line filters of compressed-air brake system

The in-line filters incorporated in the hose couplings of the brake and feed line protect the compressed-air brake system from being soiled by solid particles.

The air supply to the brake system should have priority over the protection of the brake system against soiling and shall be ensured in all conditions. In case of the filter element being clogged due to soiling, an internal bridging-over element opens and unfiltered air passes through the hose coupling.

- Regularly check the degree of soiling of the filter elements in the hose couplings.
- Clean heavily soiled filter element approx. every 3-4 months, depending on the operating conditions.
- Replace damaged filter elements.

Check degree of soiling

1. Secure tractor and machine against accidental starting and rolling.
2. Disconnect the feed and brake line from the tractor.
3. Push the base plate in (1).
4. Release the slide (2).
5. Remove the base plate with O-Ring (3), the pressure spring (4) and the filter element (5) from the casing.
6. Check the degree of soiling of the filter element.

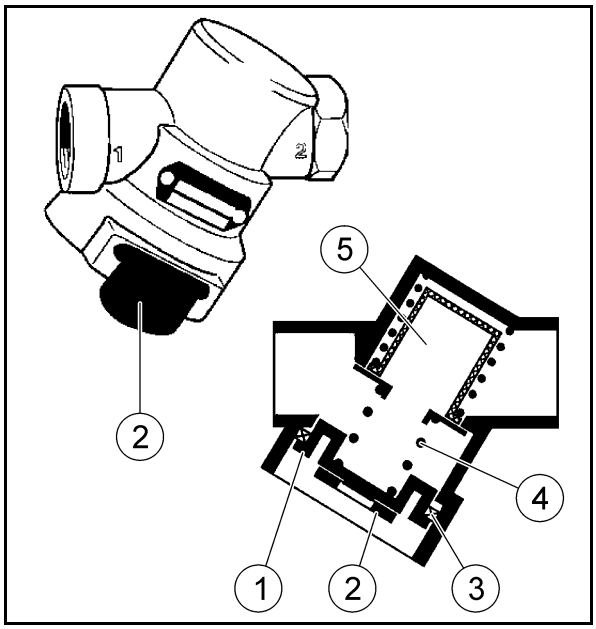


Fig. 117

Clean filter element

7. Clean the filter element with benzine or thinner (rinse).
8. Use compressed air to blow the filter element dry.
9. Reinsert the filter element, the pressure spring and the base plate with O-ring into the casing.

Ensure that the O-ring will not get jammed in the guiding slot during insertion.

10. Close the slide.
11. Connect the feed and brake line to the tractor.
12. Check the in-line filters for tightness.

10.16.2 Check brake system for proper functioning.

- Check the brake system for proper functioning before each start-up of the machine. Have any irregularities or malfunctions of the brake system promptly remedied by an authorised workshop.
- Have the brake system checked by an authorised workshop for proper functioning every 200 service hours.

  Have the brake readjusted in case of a use of approx. 2/3 of the maximum cylinder stroke in case of full brake application.

10.16.3 Set compressed-air brake system

Shop work

The brake system must be readjusted if the free travel (x) is greater than or equal to 30 mm.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Disconnect the brake and feed line of the brake system.
2. Manually actuate the brake lever in pressing direction.
3. Press the circlip at the adjusting screw (1) down and set the free travel (X) by means of the adjusting screw:

   Free travel (X) = 0.1 x length of brake lever (Y)
4. Check the brake linings (2).

   The brake linings must be replaced in case of a remaining lining thickness of:

   - 5 mm in case of riveted linings,
   - 2 mm in case of glued linings.
5. Replace the brake linings if necessary.

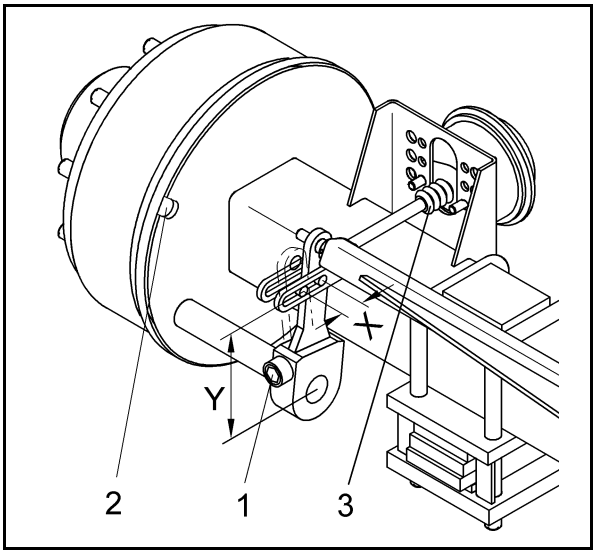


Fig. 118

10.16.4 Drain compressed-air reservoir of compressed-air brake system

Drain the compressed-air reservoir every day before the first journey!

Take the ring (2) and pull the drain valve of the compressed-air reservoir (1) down until water is no longer pouring out of the compressed-air reservoir.

Fig. 119

10.16.5 Set hydraulic brake system

Shop work

The brake system must be readjusted if the free travel (X) is greater than or equal to 40 mm.

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting and rolling before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Disconnect the hydraulic hose pipe of the brake system.
2. Manually actuate the brake lever in pressing direction.
3. Press the circlip at the adjusting screw (1) down and set the free travel (X) by means of the adjusting screw:

   Free travel (X) = 0.1 x length of brake lever (Y)
4. Check the brake linings (2).

   The brake linings must be replaced in case of a remaining lining thickness of:

   - 5 mm in case of riveted linings,
   - 2 mm in case of glued linings.
5. Replace the brake linings if necessary.

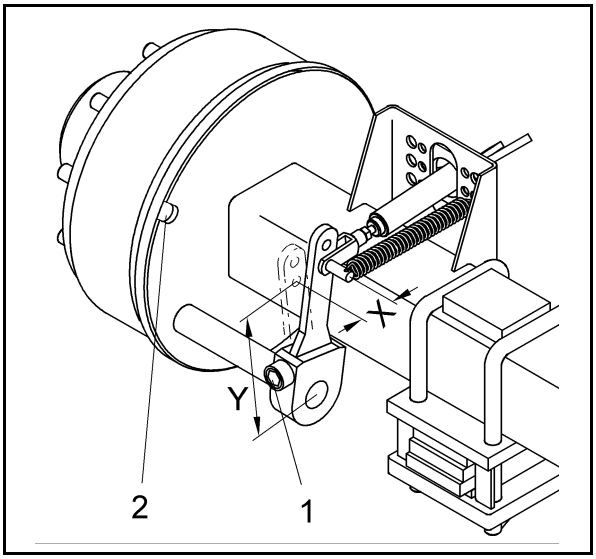
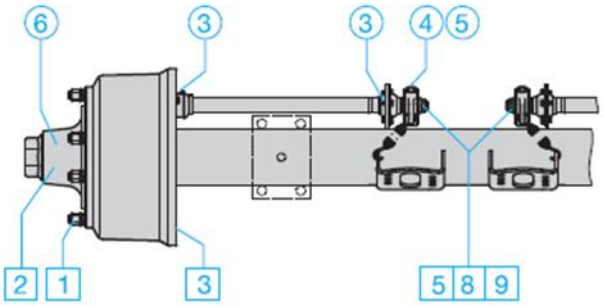
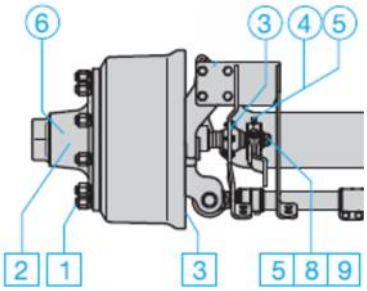


Fig. 120

10.16.6 Lubrication and maintenance plan – Chassis

Relubricate all lubrication points after cleaning the machine by means of pressure washers.



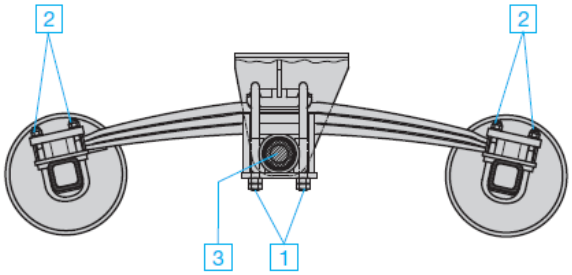


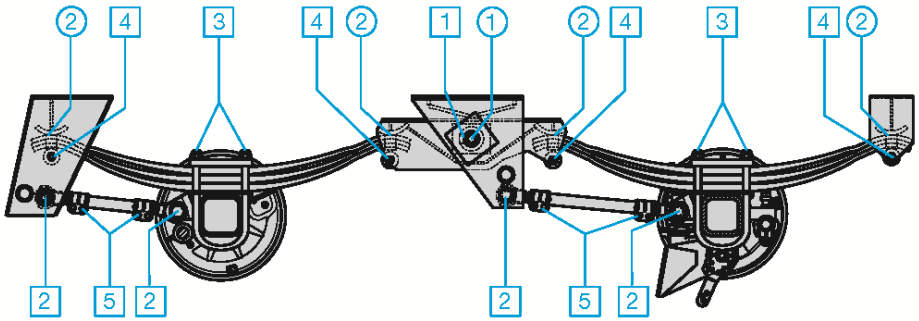
		Before start-up and after longer downtimes	After first journey with loaded material	Every 40 service hours	Every 200 service hours	Every 500 service hours or once a year	Every 1000 service hours or once a year
Lubricate with long-life grease							
(1)	Lubricate knuckle arm bearing. ***			X			
(3)	Lubricate brake shaft bearing. ***	X			X		
(4)	Lubricate standard slack adjuster. ***					X	
(5)	Lubricate automatic slack adjuster. ***					X*	
(6)	Have grease of wheel hub bearing changed (shop work!).						X
Maintenance work							
[1]	Check wheel nuts for tightness, retighten if necessary.	X**	X			X	
[2]	Check clearance of wheel hub bearing, have it readjusted if necessary (shop work!).				X		
[3]	Check brake linings for damage and wear, have them replaced if necessary (shop work!).				X		
[4]	Check brake setting at brake lever, have it adjusted if necessary (shop work!).				X		
[5]	Check brake setting at standard slack adjuster, have it adjusted if necessary (shop work!).				X		
[8]	Check brake setting at automatic slack adjuster, have it adjusted if necessary (shop work!).					X	
[9]	Check automatic slack adjuster for proper function					X*	

* Also after each change of brake linings.

** Also after each wheel change.

*** Lubricating nipples possibly grouped at another point

		After first journey with loaded material	Every 500 service hours or every 6 months
			
Maintenance work			
	Check all components for damage and wear (visual check).		X
[1]	Have spring clamps at the supporting axle checked for tightness (shop work!).	X	X
[2]	Have axle connection at the spring tension casings checked for tightness (shop work!).		X
[3]	Have the bearing bolt at the spring tension casings checked for tightness and readjusted if necessary (shop work!).	X	X

		After first journey with loaded material	Every 100 service hours	Every 500 service hours or every 6 months
				
Lubricate with long-life grease				
(1)	Lubricate swing arm bearing (not applicable with rubber-steel bushings).	X	X	
(2)	Slightly grease slide elements/slide ends of springs	X	X	
Maintenance work				
	Check all components for damage and wear (visual check).			X
[1]	Have threaded bolt of swing arm bearing checked for tightness (shop work!).			X
[2]	Have counter nuts of axle steering mechanisms checked for tightness (shop work!).	X		X
[3]	Have axle connection checked for tightness (shop work!).	X		X
[4]	Have fastening screws of rubber rollers and slide elements checked for tightness (shop work!).			X

10.16.7 Lubricate brake shaft bearing

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting, rolling and before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

Lubricate the outer and inner lubrication points (3) of the brake shaft bearing with long-life grease until fresh grease comes out of the bearings.

Only use lithium-saponified grease with a drop point above 190°C.

Make sure that no grease or oil enters the brake system!

Depending on the series, the cam bearing may not be sealed on the brake side.

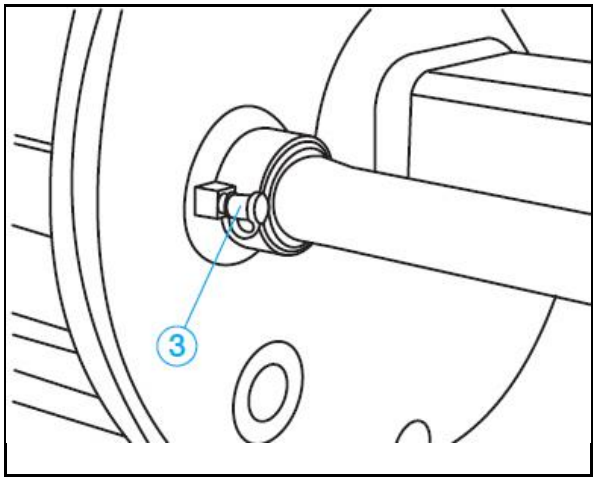


Fig. 121

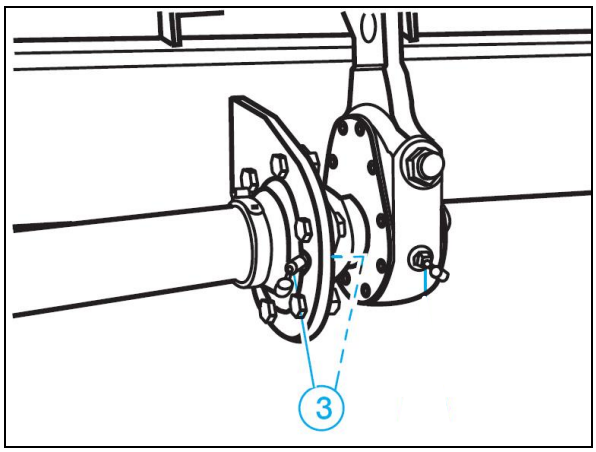


Fig. 122

10.16.8 Lubricate standard slack adjuster

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting, rolling and before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

Lubricate the lubrication points (4) of the slack adjuster with long-life grease until fresh grease comes out.

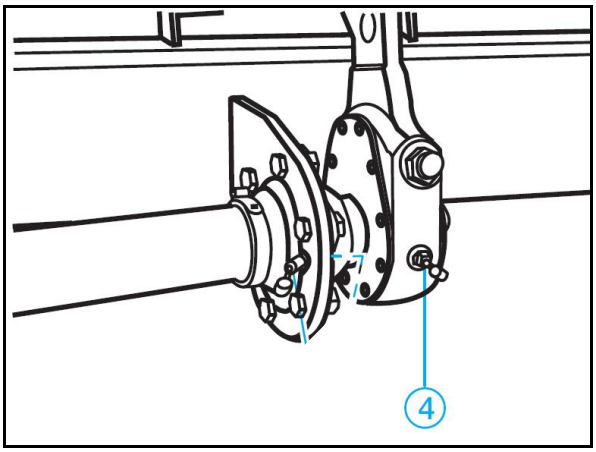


Fig. 123

10.16.9 Check clearance of wheel hub bearing

WARNING

Risk of injury due to movements of tractor and machine or machine parts!

Secure tractor and machine against accidental starting, rolling and before carrying out any work on the machine!

Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Lift the axle until the tyres are free.
2. Release the brake.
3. Place two levers between tyres and ground and check the bearing clearance.

   If there is a noticeable bearing clearance, have it readjusted (shop work!).

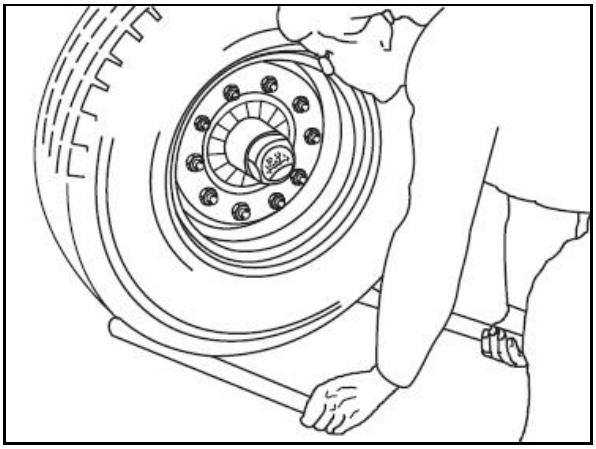


Fig. 124

10.16.10 Check brake linings

WARNING	**Risk of injury due to movements of tractor and machine or machine parts!**
	Secure tractor and machine against accidental starting, rolling and actuation before carrying out any work on the machine!
	Make sure that people leave the hazardous area of the tractor and the machine or of movable machine parts!

1. Open the inspection hole (3) by pulling the rubber plug (if available) out.

   Have the brake linings replaced (shop work!) in case of a remaining lining thickness of:

   5 mm (riveted linings)

   3 mm (N 2504 linings)

   2 mm (glued linings).

2. Reinsert the rubber plug after the check.

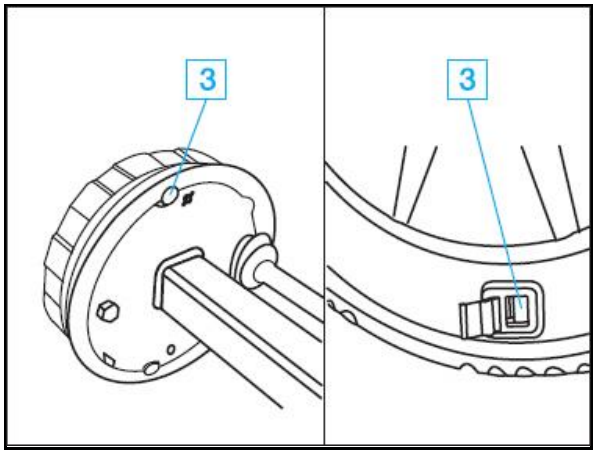
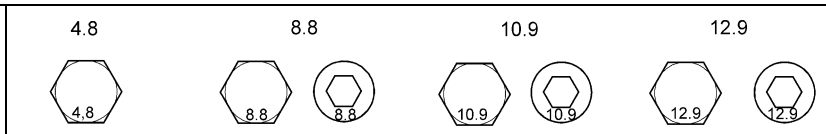


Fig. 125

10.17 Tightening torques

These tightening torques are reference values. Differing data specified elsewhere in the operating instructions or the included sub-supplier documentation shall always prevail!

Grade and marking of screw heads	
Grade and marking of nuts	

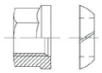
Size	Grade 4.8				Grade 8.8				Grade 10.9				Grade 12.9			
	ubricated*		dry**		ubricated*		dry**		ubricated*		dry**		ubricated*		dry**	
	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft
M6	4,8	3,5	6	4,5	9	6,5	11	8,5	13	9,5	17	12	15	11,5	19	14,5
M8	12	8,5	15	11	22	16	28	20	32	24	40	30	37	28	47	35
M10	23	17	29	21	43	32	55	40	63	47	80	60	75	55	95	70
M12	40	29	50	37	75	55	95	70	110	80	140	105	130	95	165	120
M14	63	47	80	60	120	88	150	110	175	130	225	165	205	150	260	190
M16	100	73	125	92	190	140	240	175	275	200	350	255	320	240	400	300
M18	135	100	175	125	260	195	330	250	375	275	475	350	440	325	560	410
M20	190	140	240	180	375	275	475	350	530	400	675	500	625	460	800	580
M22	260	190	330	250	510	375	650	475	725	540	925	675	850	625	1075	800
M24	330	250	425	310	650	475	825	600	925	675	1150	850	1075	800	1350	1000
M27	490	360	625	450	950	700	1200	875	1350	1000	1700	1250	1600	1150	2000	1500
M30	675	490	850	625	1300	950	1650	1200	1850	1350	2300	1700	2150	1600	2700	2000
M33	900	675	1150	850	1750	1300	2200	1650	2500	1850	3150	2350	2900	2150	3700	2750
M36	1150	850	1450	1075	2250	1650	2850	2100	3200	2350	4050	3000	3750	2750	4750	3500

* "Lubricated“ means that the screws are treated with a lubricant such as e.g. engine oil, or that phosphatized or oiled screws are used.

** "Dry" means that normal or galvanized screws without any lubrication are used.

- Regularly check the screwed connections for tightness.
- Always replace screws and nuts by parts of the same quality.
- Tighten counter nuts with plastic insert and bordered steel counter nuts at approx. 50% of the “dry” value specified in the table.
- Tighten gear or crown nuts at full torque.
- Shear bolts are designed such that they shear off (break) at a certain stress. Only use bolts of equal quality when replacing shear bolts.

10.17.1 Tightening torques of wheel nuts

		M14x1.5		M16x1.5		M18x1.5		M20x1.5		M22x1.5	
		[Nm]									
ADR											
DIN		130+10		–		270+20		–		–	
Ecrous+ Rondelles		–		–		270+20		350+30		450+60	
"jumelés"		–		–		270+20		350+30		450+60	
"M"		–		–		–		415+35		575+75	
"Bec"		–		–		270+20		350+30		450+60	
BPW											
		–		–		270±20		380±20		510±25	
FAD											
Property class		8.8	10.9	8.8	10.9	8.8	10.9	8.8	10.9	8.8	10.9
Spherical collar nut, conical nut, spherical collar screw		160	220	230	330	330	460	490	630	630	740
Flat collar nut with spherical washer 		120	170	190	260	270	360	360	450	460	550
Flat nut with pivotable flat washer		–		–		260	360	350	500	450	650

11 Remedy of malfunctions

WARNING

Risk of crushing, shearing, cuts, amputation, becoming entangled, wound up, being drawn in and risk of impact to people if:

- **lifted, unsecured machine parts accidentally come down or are unintentionally lowered , e.g. an open discharge door,**
- **tractor and machine accidentally start and roll.**
- Secure lifted machine parts against accidental lowering before working beneath lifted parts.
- Secure tractor and machine against accidental starting and rolling before eliminating any malfunctions on the machine.
  Observe the information in the chapter "Secure tractor and machine against accidental starting and rolling“ from page 83.
- Wait for the machine to stop completely before entering the hazardous area of the machine.

11.1 Machine

Malfunction	Cause	Remedy
The power requirement is too high, shear bolt of the shear bolt coupling in front of the angular gear shears off	Cutting knives blunt	Sharpen knives.
	Long stalks have wrapped around the auger front end or the scraper	Clean mixing auger.
	Foreign objects are jamming the mixing auger	Eliminate foreign objects.
	Screwed connection of the mixing auger has loosened	Retighten screwed connection.
Mixing auger does not rotate with the p.t.o. shaft powered	Gear levels at the switchgear not selected clearly	Clearly select gear level I or II.
	Shear bolt of the shear bolt coupling in front of the angular gear sheared off.	Replace shear bolt.
Machine does not mix well	Fodder is piling up in front of counter-cutter	Extend and retract counter-cutter.
Non-uniform discharge	All cutting knives retracted (out)	Extend lower cutting knives (in).
Crossover conveyor does not start	Operating error	First switch on crossover conveyor, open discharge door only then.
	Crossover conveyor too loose	Tighten crossover conveyor.

Tab. 17

11.2 Electrics

Malfunction	Cause	Remedy
Electro-hydraulic operation does not work (all functions)	No power (12 V) at the control set	Plug 3-pole plug (DIN 9680) into the socket for the tractor's power supply.
	Polarity of plug and socket are not compatible	Check polarity of plug and socket and reconnect if necessary.
	Fuse for socket defective	Replace fuse.
	Fuse for control set defective	Replace fuse.
	Insufficient power supply and amperage	Power requirement approx. 20 A (12 V). Check socket and cabling.
		Check power supply, plugs and cables.
One of the electrically operated functions does not work	Insufficient power supply	Check switches etc. (measurement at the valve plug).
	Control valve blocked	Check via emergency operation function.
Functions work irregularly	Cable cross sections of feed line too small	Select larger cable cross section - minimum 4 mm².
No hydraulic function available	Hydraulic hose pipes not correctly connected (return pipe to pressure connection)	Connect hydraulic hose pipes correctly.
	Hydraulic plugs not correctly locked in hydraulic sleeves	Insert hydraulic plugs into hydraulic sleeves until the hydraulic plugs noticeably lock.

Tab. 18

11.2.1 Emergency manual operation in case of failure of electrical system

WARNING	**Risk of injury due to movements of the machine's working tools!** Make sure that people and animals leave the hazardous area of the machine!

In case of failure of the electrical system, the solenoids (1) for switching the directional control valves and directional seat valves can be actuated directly at the electro-hydraulic control block via the emergency manual operation function.

Use a pointed object to push the armature of the solenoid at the respective switch-over valve in to actuate the required hydraulic function.

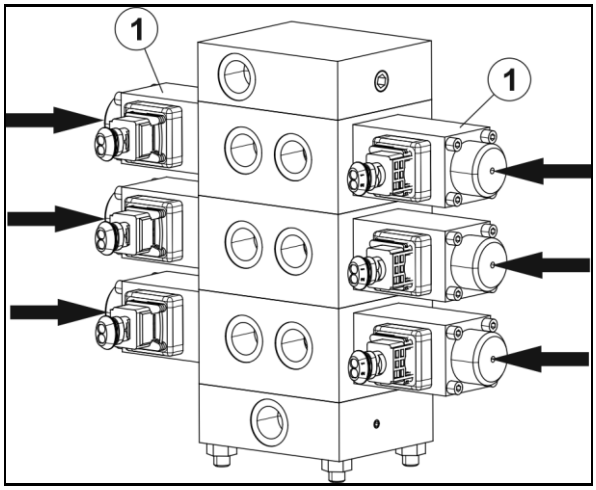


Fig. 126

(1) Entry plate

(2) Connection, pressure line P

(3) Directional control valve for e. g. hydraulic cylinder of dosage gate, crossover conveyor drive, hydraulic cylinder of discharge conveyor, hydraulic cylinder of counter-cutters etc.

(4) End plate

(5) Connection, return line T (R;S)

(6) Control block for variable conveyor speed (optional extra)

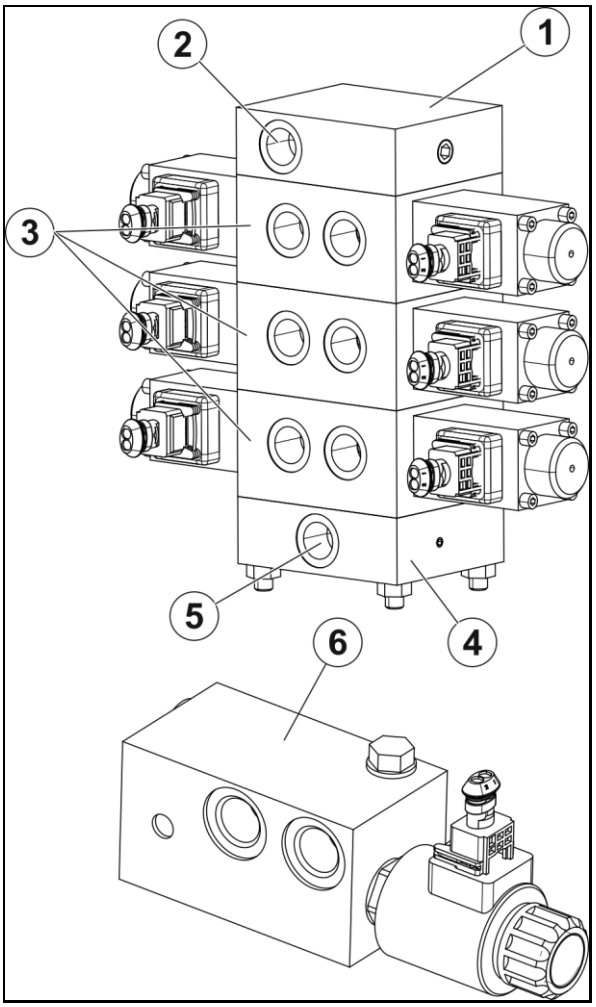


Fig. 127

11.3 Weighing device

It is absolutely imperative to observe the included operating instructions for the weighing device.

Malfunction	Cause	Remedy
Device cannot be switched on	No power supply	Check connecting cable.
		Switch on power supply, check power supply battery.
	Wrong polarity	Check polarity connecting cable. (The devices are equipped with an automatic fuse).
Device displays bars (top or bottom)	Device	Pull the terminal box plug out of the weighing computer and watch display. If the bars disappear, the weighing computer functions properly.
	Terminal box	Pull out the plugs of all weighing rods, the terminal box being plugged into the weighing computer. Watch display. If the bars disappear, the display functions properly.
	Weighing rods	Always plug only one weighing rod at a time into the terminal box or directly into the weighing computer. If the bars disappear, the respective weighing rod functions properly.
Weighed value varies	Device	See malfunction description: "Device displays bars".
	Terminal box	See malfunction description: "Device displays bars".
	Weighing rods	See malfunction description: "Device displays bars".
Scales display wrong weighed value	Weighing rods not properly installed	Always plug only one weighing rod at a time into the terminal box or directly into the weighing computer. The displayed value must increase when load is applied. Always test all rods!
	Weighing system misadjusted	Readjust scales, see included operating instructions "Recalibration".
Device displays ERROR	Internal error	Send device in for repair.

Tab. 19

12 Disassembly / Disposal

Shop work

WARNING	**Risk due to overturning or falling machine parts and operating media harmful to environment and health!** Only qualified staff is allowed to disassemble the machine. Machine parts and operating media (oils, greases etc.) must be disposed of in accordance with national and international environmental regulations.

13 Circuit diagrams

13.1 Hydraulics

13.1.1 Without on-board hydraulic system

13.1.1.1 Bowden cable

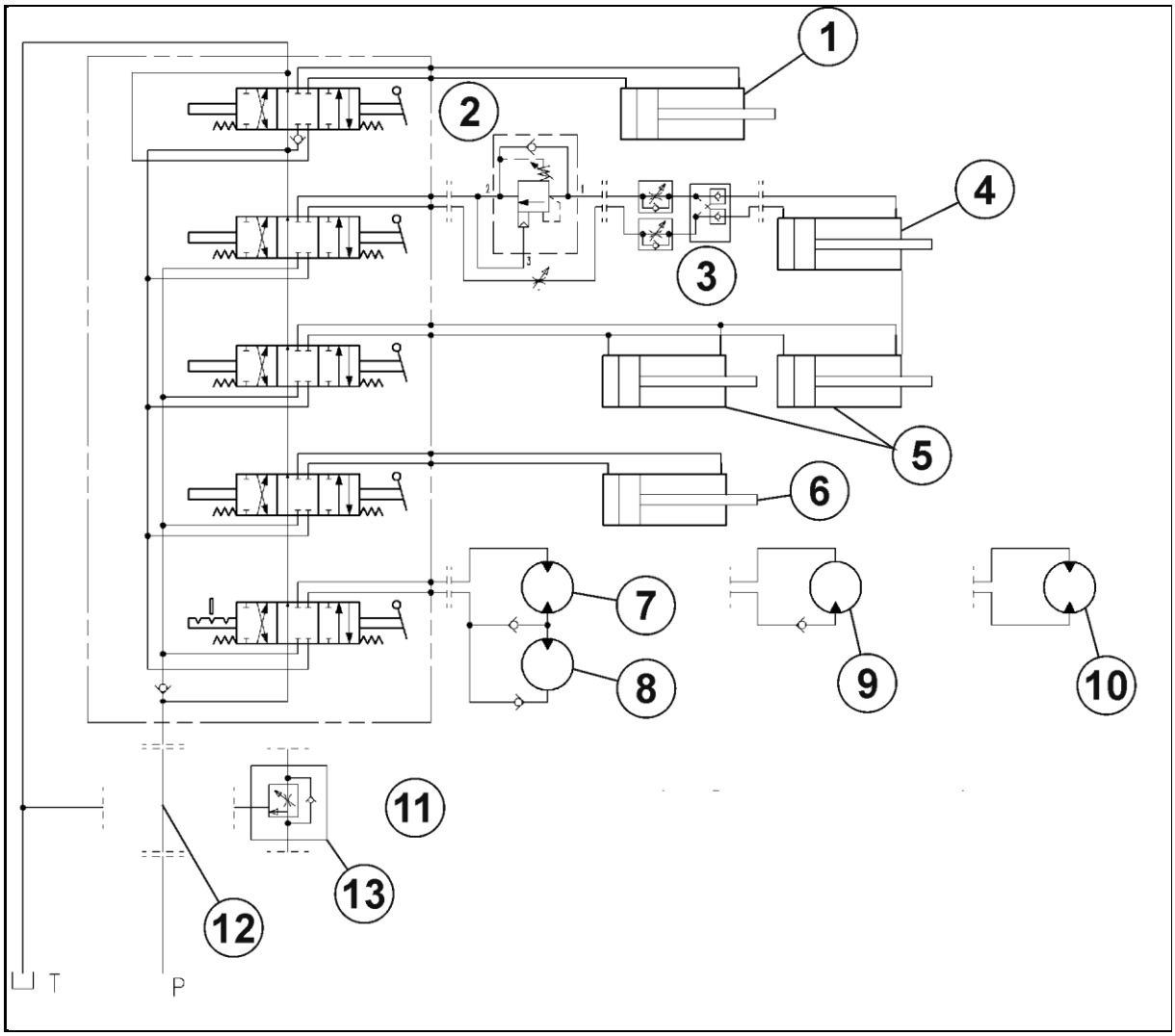


Fig. 128

(1) Discharge door
(2) Valve for discharge conveyor for side discharge
(3) Valve for conveyor extension
(4) Height adjustment for conveyor extension
(5) Hydraulic counter-cutters
(6) Hydraulic supporting leg
(7) Hydraulic motor for crossover conveyor
(8) Hydraulic motor for conveyor extension
(9) Hydraulic motor of discharge conveyor for side discharge
(10) Hydraulic motor for crossover conveyor
(11) Conveyor speed regulator
(12) Without conveyor speed regulator
(13) With manually adjustable conveyor speed regulator
(14) With electrically adjustable conveyor speed regulator

13.1.1.2 E-control set

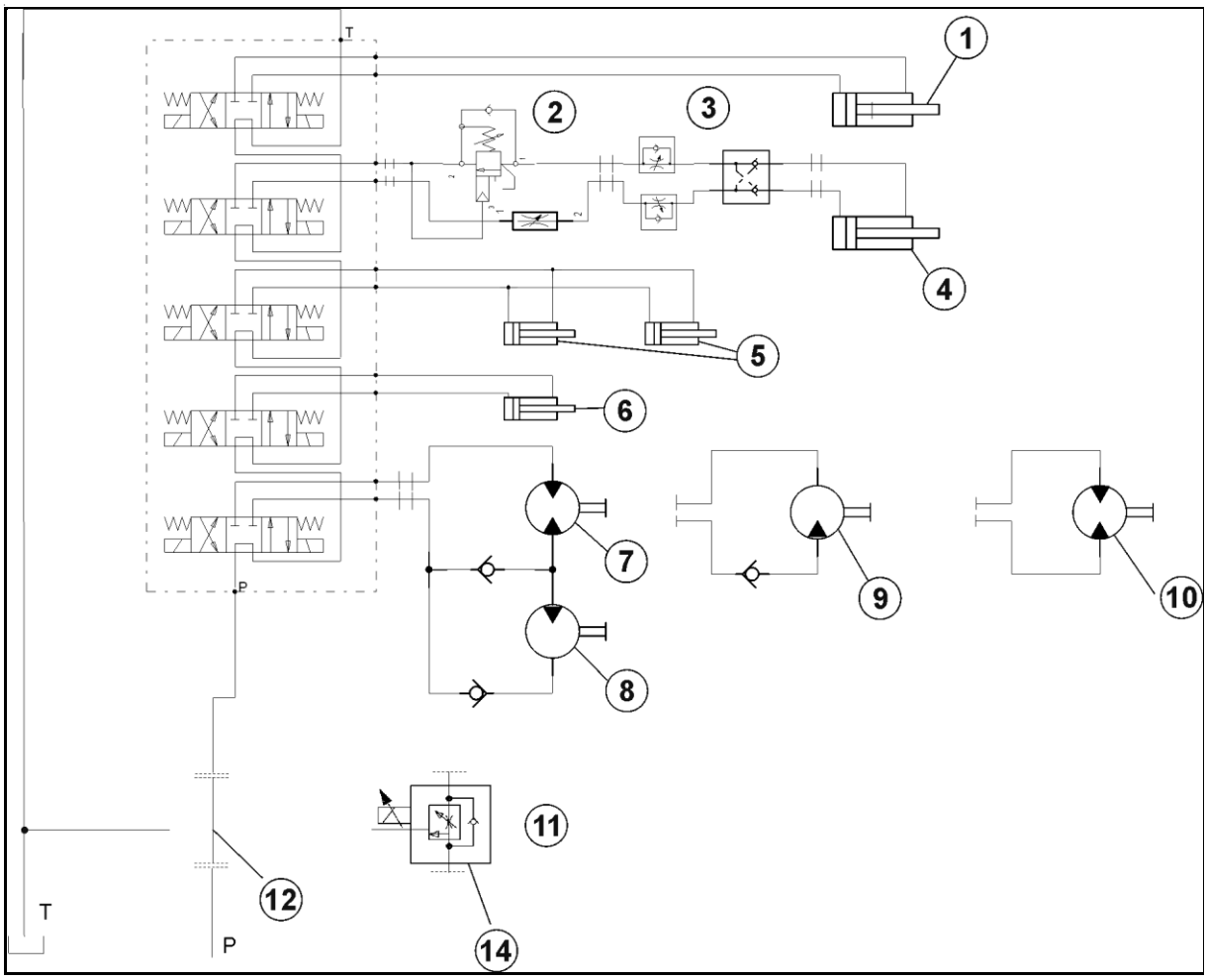


Fig. 129

(1) Discharge door
(2) Valve for discharge conveyor for side discharge
(3) Valve for conveyor extension
(4) Height adjustment for conveyor extension
(5) Hydraulic counter-cutters
(6) Hydraulic supporting leg
(7) Hydraulic motor for crossover conveyor
(8) Hydraulic motor for conveyor extension
(9) Hydraulic motor of discharge conveyor for side discharge
(10) Hydraulic motor for crossover conveyor
(11) Conveyor speed regulator
(12) Without conveyor speed regulator
(13) With manually adjustable conveyor speed regulator
(14) With electrically adjustable conveyor speed regulator

13.1.2 With on-board hydraulic system

13.1.2.1 Without straw blower

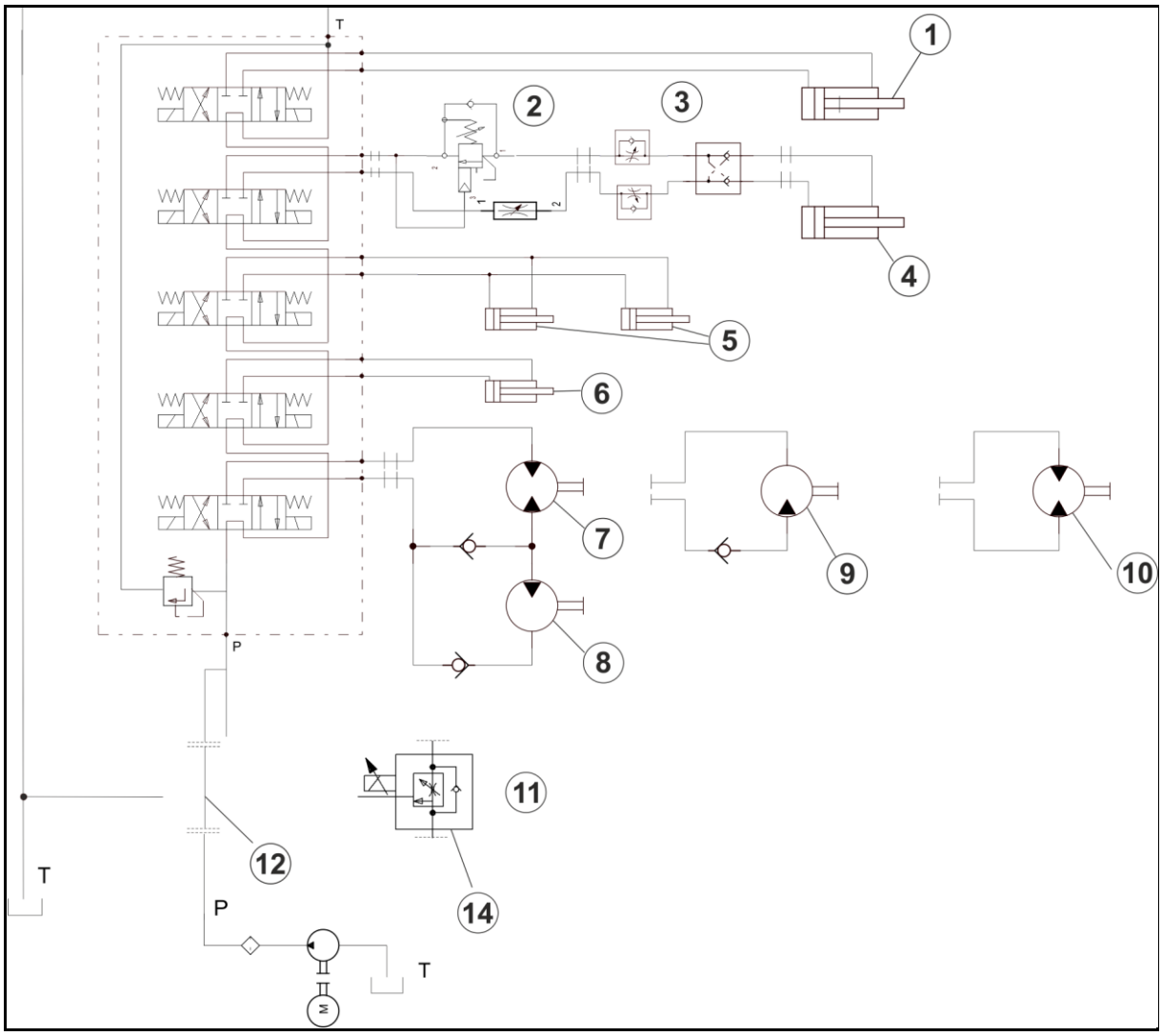


Fig. 130

(1) Discharge door
(2) Valve for discharge conveyor for side discharge
(3) Valve for conveyor extension
(4) Height adjustment for conveyor extension
(5) Hydraulic counter-cutters
(6) Hydraulic supporting leg
(7) Hydraulic motor for crossover conveyor
(8) Hydraulic motor for conveyor extension
(9) Hydraulic motor of discharge conveyor for side discharge
(10) Hydraulic motor for crossover conveyor
(11) Conveyor speed regulator
(12) Without conveyor speed regulator
(13) With manually adjustable conveyor speed regulator
(14) With electrically adjustable conveyor speed regulator

13.1.2.2 Mechanical straw blower

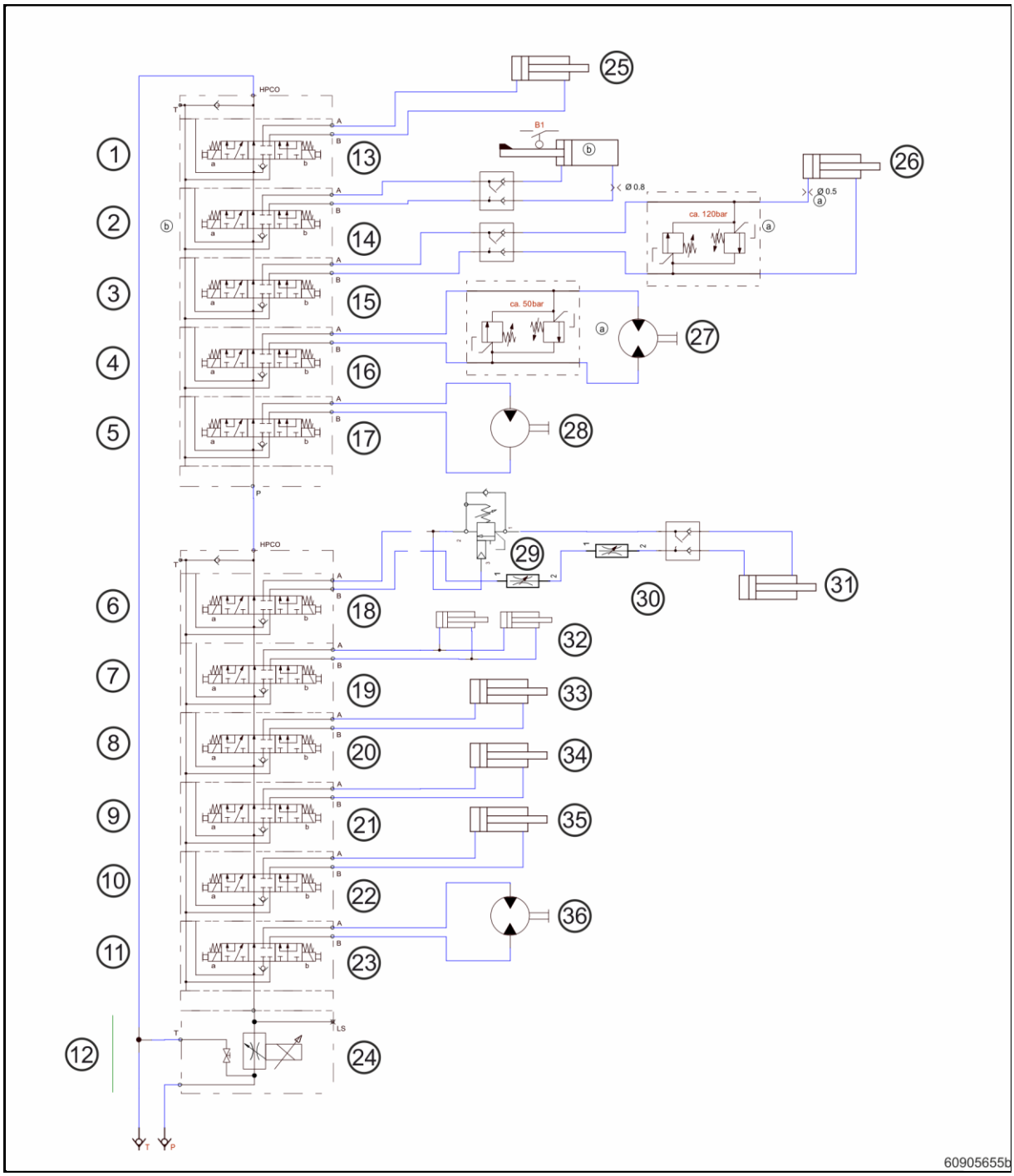


Fig. 131

(1) Y13 Dosage gate, straw blower
(2) Y63 Switch straw blower off
(3) Y23 Lift swinging flap
(4) Y73 Tower adjustment, left-hand
(5) Y43 Reverse beater
(6) Y51 Universal 1_1
(7) Y71 Extend counter-cutters
(8) Y61 Open dosage gate 3
(9) Y21 Open dosage gate 2
(10) Y11 Open dosage gate 1
(11) Y41 Crossover conveyor, right-hand
(12) optional: Current controller
(13) Y41 Close dosage gate of straw blower
(14) Y84 Switch straw blower on
(15) Y24 Lower swinging flap
(16) Y74 Tower adjustment, right-hand
(17) Y44 Beater operation
(18) Y52 Universal 1_2
(19) Y72 Retract counter-cutters
(20) Y62 Close dosage gate 3
(21) Y22 Close dosage gate 2
(22) Y12 Close dosage gate 1
(23) Y42 Crossover conveyor, left-hand
(24) Y101 Conveyor controller
(25) Dosage gate, straw blower
(26) Swinging flap
(27) Tower adjustment
(28) Beater
(29) Discharge, conveyor
(30) Conveyor extension
(31) Conveyor
(32) Counter-cutters
(33) Dosage gate 3
(34) Dosage gate 2
(35) Dosage gate 1
(36) Crossover conveyor

LS not available with E-control

With direct connection

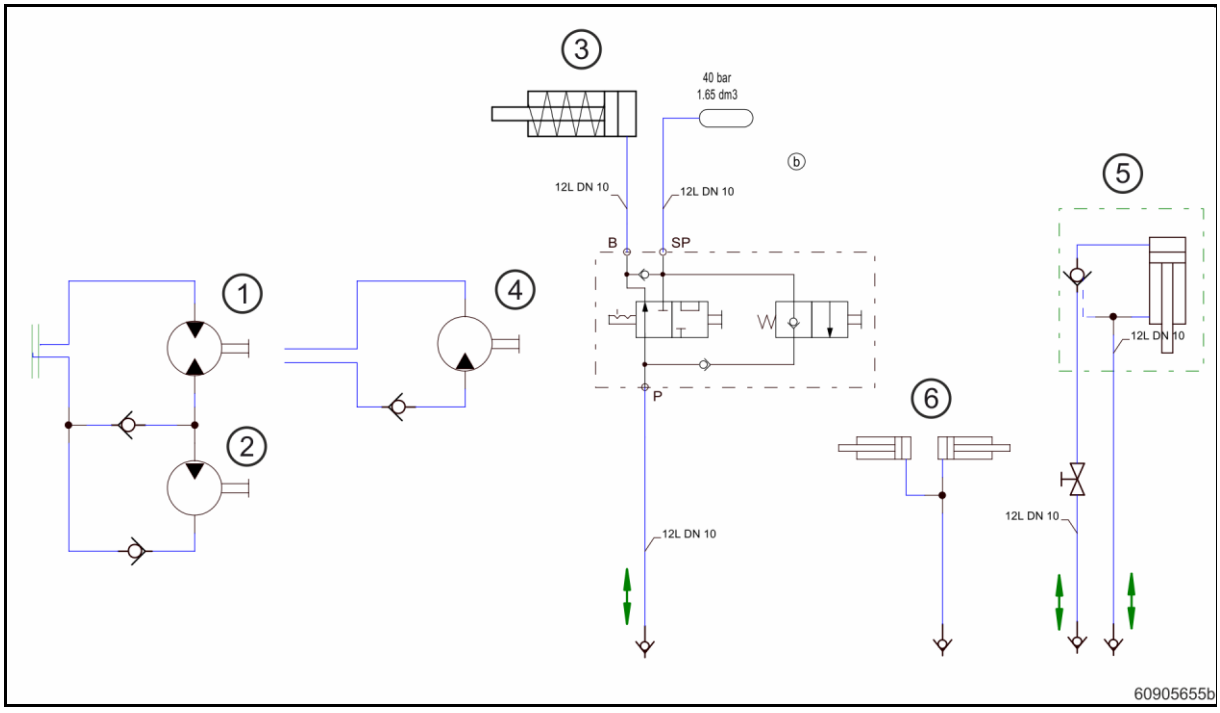


Fig. 132

(1) Crossover conveyor
(2) Conveyor extension
(3) (Hydraulic brake)
(4) Side conveyor
(5) (Supporting leg)
(6) (Passive steering)

13.2 Electronic system

13.2.1 E-control set

13.2.1.1 3-function control set

Plug	Function	
X1	Power supply	S0
XY11	Lift dosage gate	S1
XY12	Lower dosage gate	
XY21	Universal function 1_1 *	S2
XY22	Universal function 1_2 *	
XY41	Crossover conveyor, cw rotation	S3
XY42	Crossover conveyor, ccw rotation	
XA2	Weighing device	–
XE2	Work lights	S0

* Varies according to the machine's equipment.

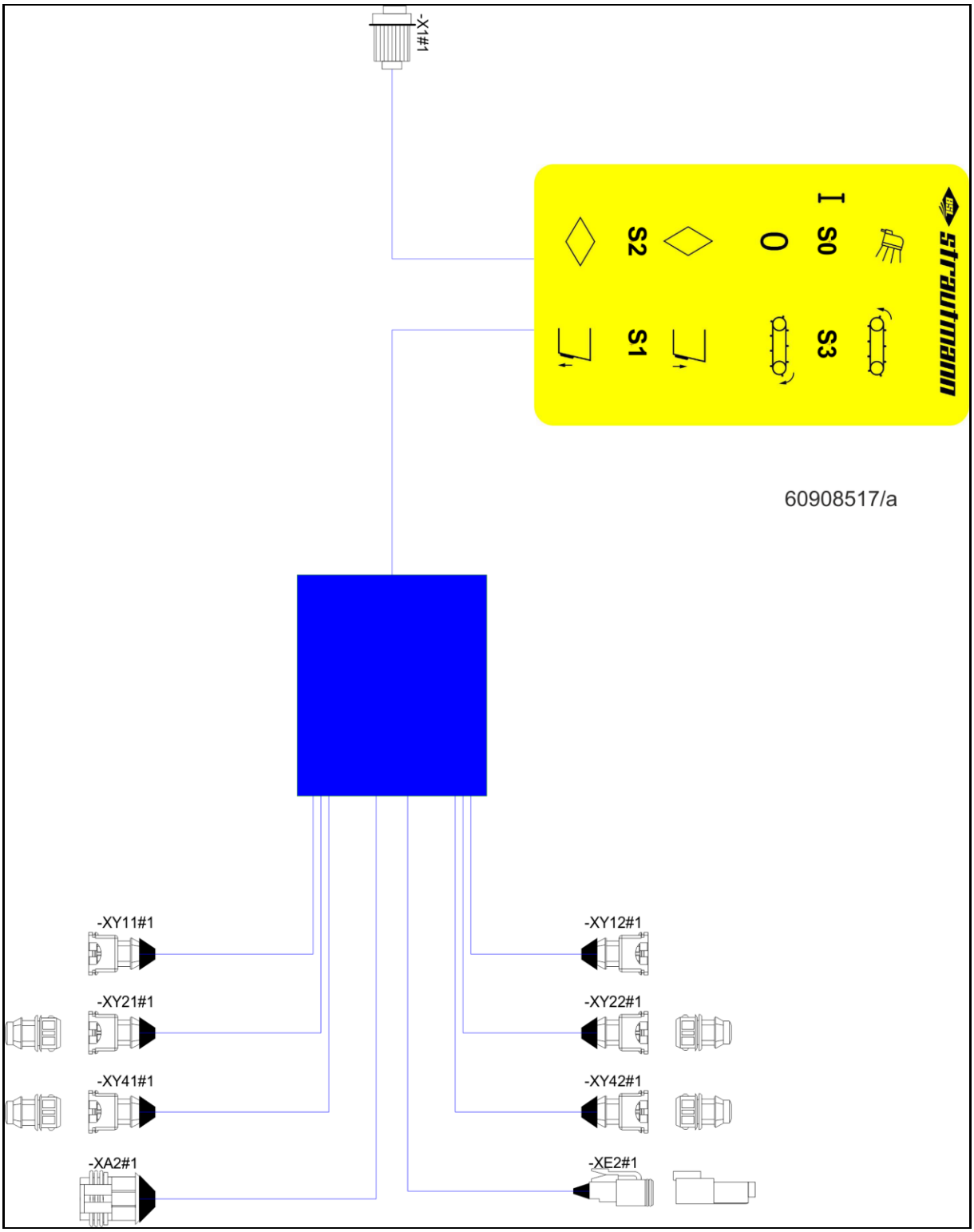

-X1#1
I S0
0
S2
S1
S3
60908517/a
-XY11#1
-XY12#1
-XY21#1
-XY22#1
-XY41#1
-XY42#1
-XA2#1
-XE2#1

Fig. 133

13.2.1.2 4-function control set

Plug	Function	
X1	Power supply	S0
XY41	Crossover conveyor, cw rotation	S4
XY42	Crossover conveyor, ccw rotation	
XY11	Lift dosage gate 1	S1
XY12	Lower dosage gate 1	
XY21	Lift dosage gate 2	S2
XY22	Lower dosage gate 2	
XY51	Universal function 1_1 *	S3 / S5
XY52	Universal function 1_2 *	
XY101	Conveyor speed (proportional solenoid)	S10
XM1	Mixing auger speed level II (switchgear)	S11
XA2	Weighing device	–
XE1	Work lights	S0
XA1	Connection between cable harness and control set	–

* Varies according to the machine's equipment.

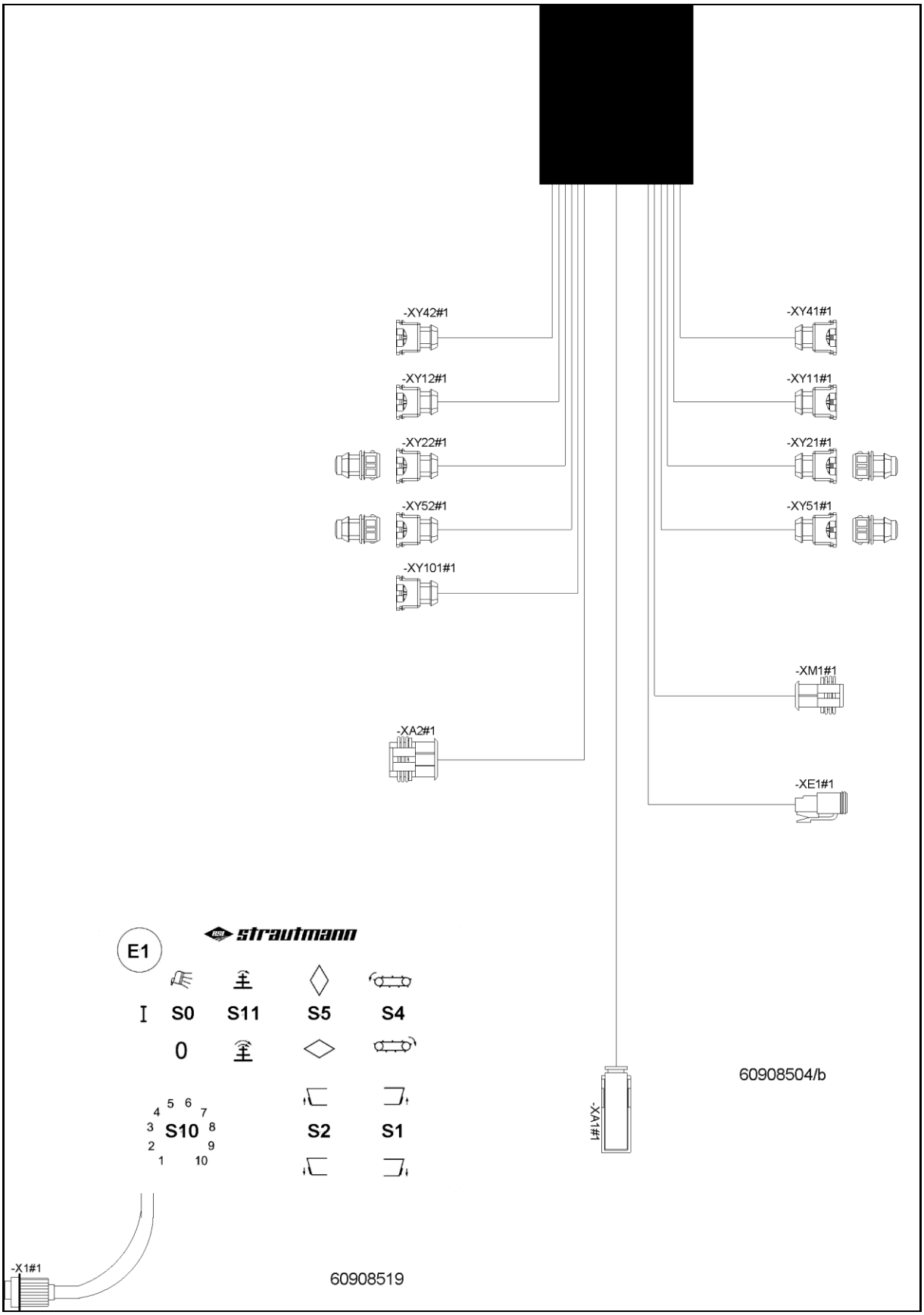

-XY42#1
-XY41#1
-XY12#1
-XY11#1
-XY22#1
-XY21#1
-XY52#1
-XY51#1
-XY101#1
-XM1#1
-XA2#1
-XE1#1
E1
strautmann
I
S0
S11
S5
S4
0
S10
S2
S1
-XA1#1
60908504/b
-X1#1
60908519

Fig. 134

13.2.1.3 7-function control set

Plug	Function	
X1	Power supply	S0
XY41	Crossover conveyor 1, cw rotation	S4
XY42	Crossover conveyor 1, ccw rotation	
XY11	Lift dosage gate 1	S1
XY12	Lower dosage gate 1	
XY21	Lift dosage gate 2	S2
XY22	Lower dosage gate 2	
XY31	Universal function 2_1 *	S3
XY32	Universal function 2_2 *	
XY51	Universal function 1_1 *	S5
XY52	Universal function 1_2 *	
XY61	Lift supporting leg Lock steering axle	S6
XY62	Lower supporting leg Unlock steering axle	
XY71	Crossover conveyor 2, cw rotation	S7
XY72	Crossover conveyor 2, ccw rotation	
XY101	Conveyor speed (proportional solenoid)	S10
XM1	Mixing auger speed level II (switchgear)	S11
XA2	Weighing device	–
XE1	Work lights	S0
XA1	Connection between cable harness and control set	–

* Varies according to the machine's equipment.

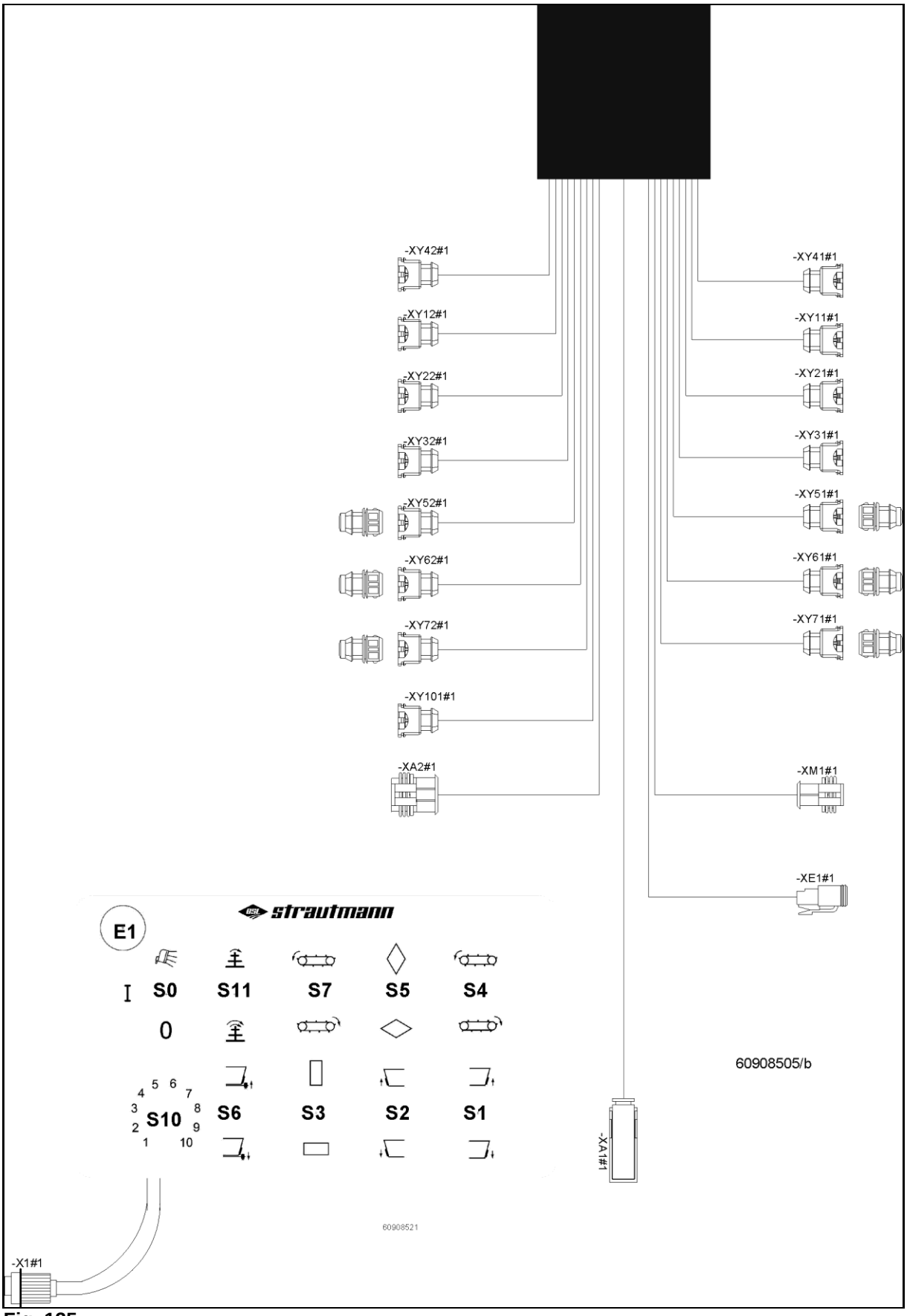

-XY42#1
-XY12#1
-XY22#1
-XY32#1
-XY52#1
-XY62#1
-XY72#1
-XY101#1
-XA2#1
-XY41#1
-XY11#1
-XY21#1
-XY31#1
-XY51#1
-XY61#1
-XY71#1
-XM1#1
-XE1#1
E1
S0
S11
S7
S5
S4
S10
S6
S3
S2
S1
60908505/b
-XA1#1
60908521
-X1#1

Fig. 135

13.2.1.4 7-function control set with straw blower

Plug	Function	
X1	Power supply	S0
XY41	Crossover conveyor, cw rotation	S4
XY42	Crossover conveyor, ccw rotation	
XY11	Lift dosage gate	S1
XY12	Lower dosage gate	
XY51	Universal function 1_1 *	S5
XY52	Universal function 1_2 *	
XY23	Lift dosage gate of straw blower Swivel blow-out pipe	S2
XY24	Lower dosage gate of straw blower Swivel blow-out pipe	
XY73	Preselection, straw blower	S7
XY74	Straw blower on	
XY33	Preselection, blow-out pipe/dosage gate of straw blower	S3
XM2	Lift/Lower ejection hood	S6
XY101	Conveyor speed (proportional solenoid)	S10
XM1	Mixing auger speed level II (switchgear)	S11
XA2	Weighing device	–
XE1	Work lights	S0
XA1	Connection between cable harness and control set	–

* Varies according to the machine's equipment.

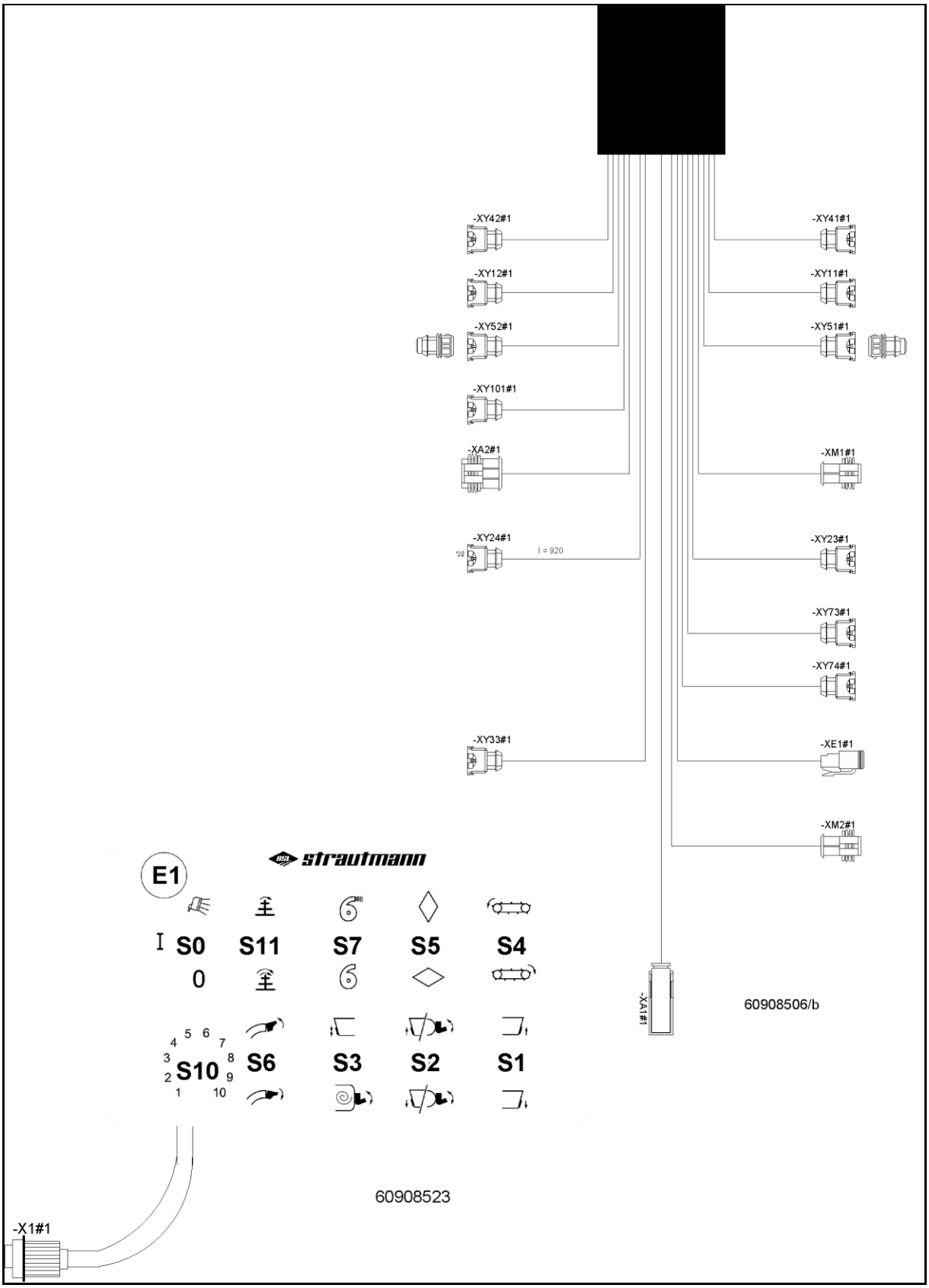

-XY42#1
-XY41#1
-XY12#1
-XY11#1
-XY52#1
-XY51#1
-XY101#1
-XA2#1
-XM1#1
-XY24#1
*28
l = 920
-XY23#1
-XY73#1
-XY74#1
-XY33#1
-XE1#1
-XM2#1
-XA1#1
60908506/b
E1
I S0
0
S11
S7
S5
S4
S10
S6
S3
S2
S1
60908523
-X1#1

Fig. 136

13.3 Weighing device

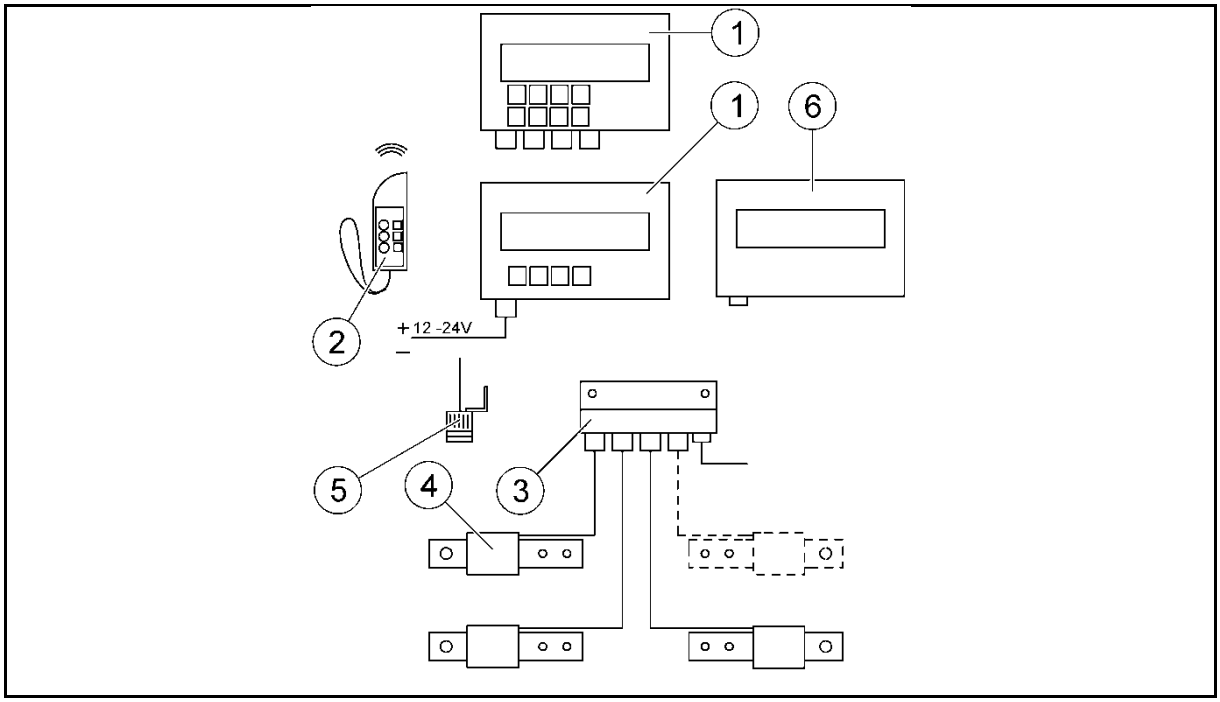


Fig. 137

(1) Weighing computer

(2) Radio remote control

(3) Collecting box

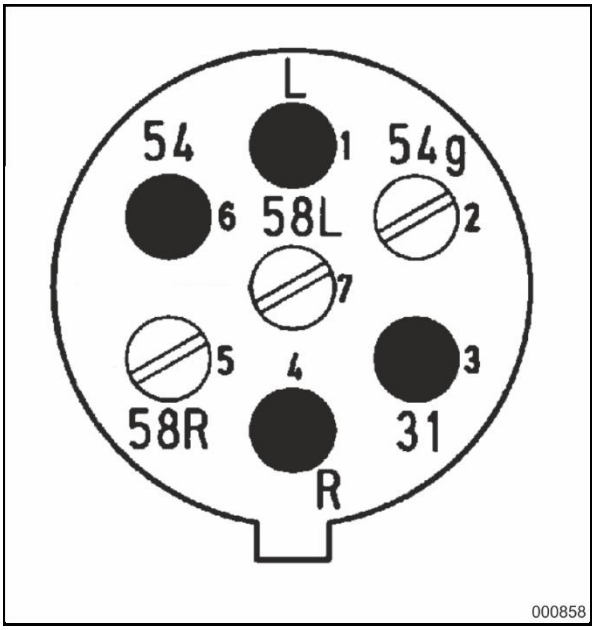
(4) Weighing rod

(5) Signal hooter

(6) Additional large-scale display

13.4 Connection of lighting system

1	L	Indicator, left-hand
2	54g NS	Rear fog light or not assigned
3	31	Ground
4	R	Indicator, right-hand
5	58R	Right-hand rear light, clearance lamp, front position light and licence plate light
6	54	Brake light
7	58L	Left-hand rear light, clearance lamp, front position light and licence plate light



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Verfasser	Freigeber	Freigabedatum	Sprache
KB	LB	21.08.2019	englisch

Zuordnung	
PG	Fodder mixing wagon
WG	Verti-Mix, Verti-Mix-L, Verti-Mix Double
Modell	Verti-Mix 951-1651, Verti-Mix 951-L, 1251-L, Verti-Mix 1501 D-3101 D