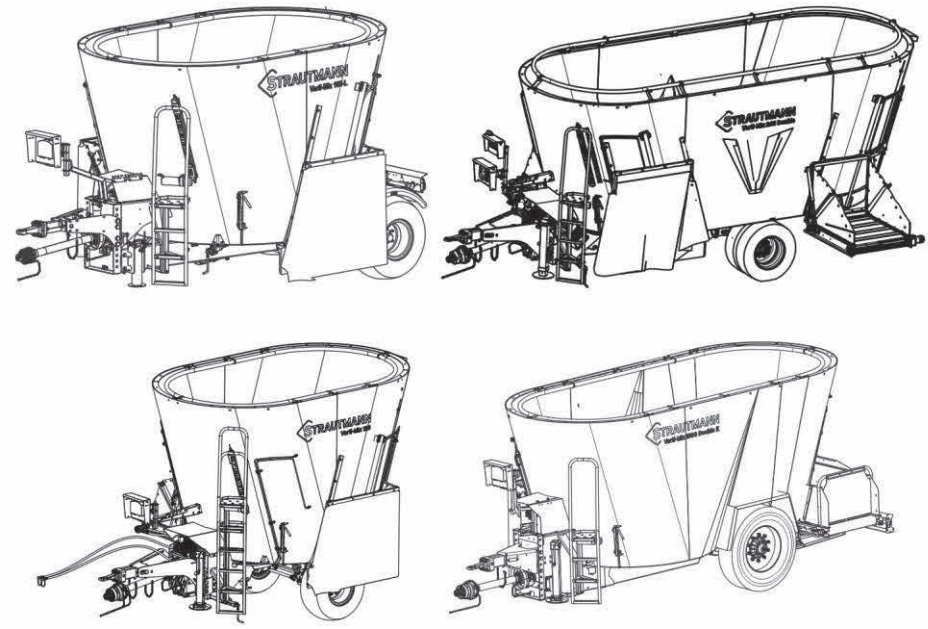
STRAUTMANN

Operating instructions

Fodder mixing wagon

Verti-Mix 75/90/105/125/120/145
Verti-Mix 75L/90L/105L/125L
Verti-Mix 115D/165D/205D/245D
Verti-Mix 1300DK/1500DK/1800DK/2100DK

W09636000_0S38001 - W09659000_0S38999



Original instructions
653009007

0.000 | 07.23

EU Declaration of Conformity

Manufacturer:

B. Strautmann & Söhne GmbH u. Co. KG

Bielefelder Str. 53 | D-49196 Bad Laer

Legal person established within the Union and authorised to compile the technical documentation:

B. Strautmann & Söhne GmbH u. Co. KG

Bielefelder Str. 53 | D-49196 Bad Laer

Description and identification of machine:

Designation:	Fodder mixing wagon
Function:	Chopping, mixing, transport and discharge of all types of silage and normal fodders used in keeping livestock
Model:	Verti-Mix
Type:	Verti-Mix 75, 90, 105, 120, 125, 145 Verti-Mix 115D, 165D, 205D, 245D Verti-Mix 1300DK, 1500DK, 1800DK, 2100DK Verti-Mix 75L, 90L, 105L, 125L
Vehicle/Machine ID number:	W09636000_0S38001 – W096399000_0S38999 W09649000_0S38001 – W09651000_0S38999 W09652000_0S38001 – W09654000_0S38999 W09656000_0S38001 – W09659000_0S38999
Trade name:	Fodder mixing wagon Verti-Mix

We hereby explicitly declare that the machine complies with all relevant provisions of the following directives:

2006/42/EC:2006-05-17	EC machinery directive 2006/42/EC
2014/30/EU:2014-02-26	Electromagnetic compatibility directive 2014/30/EU

Sources of the applied harmonised standards according to article 7 paragraph 2:

DIN EN ISO 12100-1:2013-08	Safety of machinery - General principles for design - Risk assessment and risk reduction
DIN EN 703:2004+A1:2009	Agricultural machinery - Machines for loading, mixing and/or chopping and distributing silage
DIN EN ISO 4254-1:2016-09	Agricultural machinery - Safety - Part 1: General requirements German version EN ISO 4254-1:2015
DIN EN ISO 4413:2011-04	Fluid power - General rules and safety requirements for hydraulic systems and their components German version EN ISO 4413:2010
DIN EN ISO 13854:2020-01	Safety of machinery - Minimum distances to prevent limbs from being crushed
DIN EN ISO 13857:2020-04	Safety of machinery - Safety distances to prevent hazard areas from being reached by upper and lower limbs German version EN ISO 13857:2019

Bad Laer, 31.08.2023

Dipl. Wirt.-Ing. P. Strautmann
Managing Director

Manufacturer	
Address	B. Strautmann & Söhne GmbH u. Co. KG Bielefelder Straße 53 D-49196 Bad Laer
Phone	+ 49 (0) 5424 802-0
Fax	+ 49 (0) 5424 802-76
E-mail	info@strautmann.com
Internet	http://www.strautmann.com

Customer service	
Phone	+ 49 (0) 5424 802-220
E-mail	service@strautmann.com

Identification data
They are registered on the type plate. Please enter the data of your machine here:
ID no.
Model
Year of manufacture

Contact details of dealer / of authorised workshop
Address
Phone

Table of contents

1 About these instructions

Dear customer,

You have decided in favour of a quality product from the large B. Strautmann & Söhne GmbH u. Co. KG product range. We thank you for the confidence you have shown in us.

Upon receipt of the machine, please check for transport damage or missing parts. Inspect the delivered machine for completeness, including the ordered optional extras, by means of the delivery note.

Only immediate complaints will give reason to compensation.

Read and observe these operating instructions and any other enclosed operating instructions for individual machine components before the first start-up; in case of doubt, the details and information in such sub-supplier documentation shall prevail.

These instructions contain descriptions and important information for the safe and efficient use of the machine. They are part of the machine. Therefore, always keep these operating instructions in the machine. Hand these operating instructions over to the buyer when the machine is sold.

The staff shall have carefully read and understood these instructions before starting work.

The machines are available with various optional extras. Due to the individual equipment of your machine, not all descriptions included in these operating instructions apply to your machine. Optional extras are marked in these operating instructions and are available at extra cost.

In case of any inquiries or problems, please refer to these operating instructions or call us.

Regular service and maintenance of the machine and timely replacement of worn-out or damaged parts will result in a longer service life of your machine.

1.1 Validity and re-order

Due to constant further development and improvement of our machines, deviations between the status of the technical equipment of the machine and the status of these operating instructions may occur.

Deviating specifications, illustrations and descriptions, designations, possible faults or errors do not constitute a reason for asserting any claims.

In this case or if this document

- is required in another language,
- has become illegible / unusable,
- is needed as a PDF file,

the required documents can be downloaded from the Strautmann website at www.Strautmann.com, requested from a Strautmann dealer or from the Strautmann customer service.

1.2 Target group

These operating instructions are primarily intended for the operator of the machine.

Operator

The operator has been instructed in working with the machine and informed about possible risks in case of improper behaviour.

Qualified staff

The members of staff have completed the respective professional training qualifying them to carry out maintenance and troubleshooting work.

Minimum qualification and staff requirements

► see section 2.7.1 Staff requirements, page 23

1.3 Other relevant documents

In addition, further documents shall apply, such as e.g. documentation of sub-suppliers, workshop manual and circuit diagrams. Observe and always adhere to the specifications and instructions contained therein.

► see section 12 Other relevant documents, page 213

1.4 Representational conventions

To facilitate easy and fast comprehension, different information in these instructions is represented or highlighted as follows:

1.4.1 Activities and lists

Activities which have to be carried out in a predetermined order are specified as numbered instructions. In some cases, an arrow marks the response of the machine to the respective instruction.

Instructions

1. First step
2. Second step
3. …

→ Response of machine

Adhere to the order of the steps.

Lists without predetermined order

Introductory phrase

- Information
- Information
- …

Subordinate lists

- Subitem
- Subitem
- …

Position numbers in figures, legends, continuous text

1 Machine part
2 Machine part
3 …

Position numbers in a continuous text are indicated in parentheses (1).

Lines of position in figures

Starting from the position numbers, the lines of position refer to the respective components.

A line without an arrow means that the machine part can be seen in the figure.

A line with an arrow means that the machine part is hidden in the figure and is therefore not visible.

1.4.2 References and further information

References

A preceding arrow head ► indicates a reference to further information elsewhere in the operating instructions.

Example:

► Please refer to paragraph 9.10, page 21.

Notes and additional information

NOTE

Notes are highlighted as shown here.

- Notes contain additional information, recommendations and tips.
- Notes do not contain any warnings of risks.

Environmental protection

This symbol marks information about environmental protection.

1.4.3 Location details

Any directional data in these operating instructions refer to the direction of motion.

1.4.4 Warning signs

Signal words

Warning information is highlighted by a signal word. The signal word explains the extent of a risk. The signal words DANGER, WARNING and CAUTION mark risks to people.

Risks to people are additionally marked by the general hazard symbol ⚠. It is imperative to observe these warning signs to avoid injuries or death.

The signal word *ATTENTION* marks risks of material damage. The information regarding material damage is not preceded by a symbol.

Risk levels

⚠ DANGER

Marks a dangerous situation which will cause serious injuries or even death if it is not prevented.

⚠ WARNING

Marks a dangerous situation which may cause serious injuries or even death if it is not prevented.

⚠ CAUTION

Marks a dangerous situation which may cause injuries if it is not prevented.

ATTENTION

Marks measures to avoid material damage.

Paragraph-related warning information

Paragraph-related warning information refers to entire chapters, a paragraph or several paragraphs in these instructions.

Paragraph-related warning information is structured according to the following layout:

SIGNAL WORD

Kind and source of risk

Possible consequences in case of non-observance of risk

- Measures to avoid a dangerous situation.

Embedded warning information

Embedded warning information is situation-related and refers to a certain activity or to a part within a paragraph.

Embedded warning information is structured according to the following layout:

⚠ **SIGNAL WORD** – Kind of risk. Measures to avoid a dangerous situation.

1.5 Applied terms

Term	Description
Third person/party	All other persons apart from the operator.
Risk	The source of a possible injury or damage to health.
Manufacturer	B. Strautmann & Söhne GmbH u. Co. KG
Machine	Fodder mixing wagon Verti-Mix 75-145, Verti-Mix 1300-2100DK, Verti-Mix 115-245D, Verti-Mix 75-125L
Trailer	Fodder mixing wagon Verti-Mix 75-145, Verti-Mix 1300-2100DK, Verti-Mix 115-245D, Verti-Mix 75-125L
Towing vehicle	Tractor which powers and tows the machine.
Tractor	Towing vehicle which powers and tows the machine.
Operating element	Part of an operating device, which is directly actuated by the operator, e.g. by pressing. An operating element may be an adjusting lever, a key button, rotary switch, key etc.
Shop work	Fundamental expert knowledge, especially qualified staff and adequate means (tools, lifting and supporting equipment) are required to carry out shop work in a professional and safety-conscious way.
Authorised workshop	Only authorised workshops having special expert knowledge, especially trained and qualified staff and adequate means (tools, lifting and supporting equipment) at their disposal are allowed to carry out work marked by this term on the machine.

Tab. 1: Terms

1.6 Abbreviations

Abbreviation	Description
StVZO	Road Traffic Licensing Code
TMR	Total Mixed Ration

Tab. 2: Abbreviations

2 Safety

2.1 General information on safety

The chapter Safety contains basic safety instructions and provides an overview of all important safety aspects. Further task-related safety instructions are included in the paragraphs about the individual phases during the life cycle. Adherence protects your safety.

2.2 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.

The fodder mixing wagons are only allowed to be filled by means of the following vehicles and equipment:

- Tractor with front loader
- Farm or wheeled loader
- Telescopic loader
- Provided feeding aids such as e.g. mineral feed funnel
- directly from the pipe or conveying device for concentrated feed, mineral feed etc.

The machine is only allowed to be operated by **one** person.

Travelling over paved surfaces with gradients is possible in:

- Traversing hills
  - Direction of travel to the left: 8.5 ° (15 % uphill/downhill gradient)
  - Direction of travel to the right: 8.5 ° (15 % uphill/downhill gradient)
- Slope line
  - Uphill: 8.5 ° (15 % uphill gradient)
  - Downhill: 8.5 ° (15 % downhill gradient)

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 the above is prohibited and will be regarded as incorrect.

The user will be solely responsible for any damage resulting from incorrect use; the manufacturer will not assume any liability.

2.3 Reasonably foreseeable misuse

The following points describe a reasonably foreseeable misuse of the machine:

- Non-observance of the safety labels attached to the machine and of the safety instructions included in the operating instructions
- Use of the machine beyond the limits specified under Correct Use
- Transport and processing of other materials with the machine that are not specified under Correct Use
- Overloading the machine
- Participation in road traffic with overloaded machine
- Travelling at excessive speed (6 km/h when equipped with hydraulic working brake)
- Travelling with the brake system improperly set / not ready for operation
- Accidental actuation of hydraulic functions during transport journeys
- Entry into the mixing container via the ladder and over the top edge of the container
- Travelling as passengers on the machine
- Use of the hydraulic protective box as a platform
- Operation of the machine with defective, improperly installed or inoperable safety, protective and warning devices
- Dropping of large fodder quantities into the mixing container from an excessive height
- Stripping off stuck fodder from the charging tools at the container (container top edge or overflow ring)
- Charging of the unhitched machine or unhitching of the charged machine
- Interruptions in the mixing process, in particular during transport journeys with the mixing container filled (may, depending on the duration and on the consistency of the fodder components, cause high "torques" and excessive stress on the power train when restarting the mixing unit).

- Large angular misalignment of the propeller shaft due to alignment of the tractor in relation to the fodder mixing wagon during mixing mode
- Dosage of the fodder quantity to be discharged by means of the conveyor speed with the discharge gate completely open
- Performance of troubleshooting, setting, cleaning, maintenance, service and repair work contrary to the instructions contained in the operating instructions
- Failure to carry out in due time, omit or neglect inspection, cleaning, service, maintenance and repair work
- Unauthorised alterations on the machine
- Installation of non-released/non-approved additional equipment
- Operation of the machine with overload clutches not functioning properly
- Replacement of shear bolts by bolts of greater shear force
- Non-observance of applicable road traffic regulations, safety regulations and accident prevention regulations.
- Use of non-original Strautmann spare parts

2.4 Safety-conscious working

Observe as the basic prerequisite for safe working:

- All specified safety and warning information as well as the instructions in these operating instructions
- Instructions regarding correct use
- Warning signs on the machine
- General national occupational safety, accident prevention and environmental protection rules
- National road traffic regulations for transport journeys
- Operation of the machine only in a sound safety-related condition
- Wearing of personal protective equipment
- Make sure that third parties and animals leave the hazardous area before operating the machine. Particularly be aware of children.
- Never carry passengers, animals or objects on the machine.

2.5 Technical alterations

You are only allowed to carry out technical alterations, extensions or modifications on the machine with the prior written consent of the manufacturer.

The manufacturer will not assume any liability for damage resulting from:

- Unauthorised alterations of the machine
- Use of non-approved parts
- Welding, cutting and drilling work on load-bearing parts of the machine

In case of non-observance, the declaration of conformity and the CE symbol of the machine will become invalid. Furthermore, the operating license / type approval according to national and international regulations will become invalid.

2.6 User’s obligation

The user himself is responsible for observance of the binding laws, rules, applicable local provisions and national regulations.

The user is obliged

- to exclusively have staff working with and on the machine who have been instructed how to operate the machine and possess the minimum qualification.
- to provide the necessary personal protective equipment.
- to keep all warning signs attached to the machine in legible condition. Immediately replace missing or damaged warning signs.

2.7 Operator’s obligation

Any people charged to work with and on the machine are obliged

- to acquaint themselves with the machine before starting work.
- to observe the general national occupational safety, accident prevention and environmental protection rules.
- to adhere to the instructions in these operating instructions.

2.7.1 Staff requirements

The different works described in these operating instructions place different requirements on the qualification of the people entrusted with such works.

Inexperienced and insufficiently qualified members of staff are not able to evaluate the risks associated with the handling of the machine, thus endangering themselves and other people.

- Only trained and instructed members of staff, who have been informed about the risks, are allowed to carry out the work.
- Members of staff to be trained must be supervised by experienced qualified staff members when working on the machine.
- Only people are allowed to perform this work who are physically and mentally capable and who are expected to carry out such tasks reliably and in professional and safety-conscious manner.
- Only authorised workshops are allowed to carry out work requiring special expert knowledge, tools or auxiliary materials.

Unless otherwise provided by law, the admissible members of staff, their minimum qualification and their deployment are defined according to the machine's life cycle. See the following table:

NOTE

We recommend to attend a Strautmann service training.

Staff	Activity	Qualification	Life cycle
Qualified staff for load transport	Transport and loading/unloading	Proven experience in handling suspended loads and securing loads*	Transport, loading
Qualified staff (mechanics, hydraulics, pneumatics)	Work on mechanical, hydraulic and pneumatic components	Vocational training as an agricultural mechatronic technician or an equal professional qualification (internal training course and/or external training)*	Commissioning, troubleshooting, maintenance
Qualified electricians	Electro-technical work	Professional training in electrical engineering or an equal professional qualification (internal training course and/or external training)*	Commissioning, troubleshooting, maintenance
Operator	Operation and use of machine	Person instructed by the user, based on the operating instructions, about the functioning of the machine and the risks that may occur during work	Commissioning, operation, handling, troubleshooting, maintenance
Qualified staff (disposer)	Professional disposal	Knowledge of the disposal regulations applicable at the place of operation	Disassembly, disposal

Tab. 3: Qualifications of staff

*minimum professional experience of three years

2.7.2 Personal protective equipment (PSA)

Various work activities on the machine require personal protective equipment. Wearing the personal protective equipment protects your safety.

- Wear the required personal protective equipment when carrying out work on the machine.

	**Wear safety footwear** Safety footwear provides a good anti-slip effect and protects the feet against falling objects.
	**Wear protective gloves** Protective gloves protect the hands against slight crushing, cuts, infections and hot surfaces.
	**Wear protective clothing** Close-fitting protective clothing protects people against becoming entangled by moving machine parts. Furthermore, the protective clothing protects the skin against slight mechanical effects.
	**Wear protective goggles** Protective goggles protect the eyes against flying particles and operating media squirting out.

2.8 Risk potential and residual risks

Basic risks of the machine are indicated here.

The residual risks are determined by means of a risk evaluation. Any people working on the machine, must

- be aware of such residual risks.
- have been internally instructed, taking into account the professional qualification.
- adhere to instructions to minimise residual risks and avoid accidents or damage.

2.8.1 Hazardous area 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 when there are no people 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.

The machine is only allowed to be operated from the driver seat of the tractor when there are no people within the machine's hazardous area.

Risks may arise due to the following situations:

- Work-related movements of the machine and its working tools
- Substances or foreign objects being flung out of the machine
- Accidental lowering of the lifted machine/of lifted machine parts
- Accidental starting and rolling of the machine/of tractor and machine
- Lightning strike to the machine during thunderstorm

Dangerous spots

- 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 blow-out pipe and in ejection direction on machines equipped with straw blower

2.8.2 Risks due to moving parts

Easily accessible moving parts may cause serious injuries or even death. Risk of being trapped, drawn in or caught by moving parts.

- Keep a safety distance from the moving parts.
- Never open covers during operation.
- Wait for the machine to stop completely before carrying out maintenance and repair work.
- Observe the follow-up time. Make sure that machine parts are no longer moving before opening covers.
- Wear close-fitting clothing.
- Do not wear any rings, necklaces or other jewellery.
- If you have long hair, wear a hairnet.
- Secure tractor and machine against starting and rolling, in order to prevent unintentional machine movements.

Pay particular attention during propeller shaft operation to the following:

- The operating instructions for the propeller shaft. Specifications in the sub-supplier documentation shall prevail.
- A protective device in proper condition must each be mounted at the p.t.o. shaft of the tractor and of the machine.
- 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.
- Never switch the propeller shaft on with the tractor engine turned off.
- Slip the protective element onto the p.t.o. shaft stub after removal of the propeller shaft.

2.8.3 Risks due to hydraulic and pneumatic energy

Hydraulic and pneumatic components under pressure may perform uncontrolled movements in case of improper handling. Furthermore, medium may squirt out under high pressure from pressurised components in case of a malfunction. Risk of serious injuries or even death.

- Only an authorised workshop is allowed to carry out work on hydraulic and pneumatic components.
- Before carrying out any work,
  - depressurise; discharge residual energies.
  - make sure to prevent accidental outflow of the medium.
  - secure lifted movable machine parts against accidental lowering.
  - turn the engine off. Pull the ignition key out.
  - apply the parking brake.
- Have all hose pipes checked for their operational safety by an expert at least once a year.
- Regularly check all pipes, hoses and screwed connections for leakage and visible damage. Eliminate damage immediately.
- Never try to plug hose pipe leaks with your hands or fingers. Media squirting out under high pressure may penetrate the skin and enter the body, potentially causing serious injuries.
- Never detect leakages with your bare hands. Immediately contact an authorised workshop if a leak is suspected.
- Immediately contact the medical services if injuries caused by hydraulic oil occur. Risk of serious infection.
- Risk of explosion due to improper work on hydraulic accumulators.
  - Welding, soldering, drilling or other work which might affect the mechanical properties is not allowed.

2.8.4 Risks due to electrical energy

Danger to life due to electric current when coming into contact with conductive parts. Risk of serious injuries or even death. Furthermore, switched-on electrical machine parts may perform uncontrolled movements.

- Do not reach into conductive areas.
- Have work on electrical systems and operating media carried out by qualified electricians only and in accordance with electro-technical regulations.
- Before carrying out any work on the electrical system, de-energise the system, e.g. disconnect the machine's power supply from the tractor or disconnect the battery's minus pole.
- 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.
- Always cover the plus pole of the battery as required. Risk of explosion in case of accidental ground.
- Avoid sparking and open fire in the vicinity of the battery. Risk of explosion.
- Only use the specified fuses. If the rating of the fuses used is too big, the electrical system may be destroyed. Risk of fire.
- Regularly check the electrical equipment for damage. Risk due to loose cable connections and scorched cables. Remedy defects immediately.
- Keep humidity away from conductive parts. Risk of a short circuit.
- The machine can be equipped with electronic components, 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 electronic components into the machine and their connection to the on-board electrical system, the staff authorised by the user must check on their own responsibility whether the retrofitted parts interfere with the vehicle electronics or other components.
  - Retrofitted electronic components must comply with the EMC directive as amended from time to time and bear the CE symbol.
- Never connect electrical consumers such as additional work lights to the electrical system of the machine without authorisation.

2.8.5 Risks due to hot spots and fire hazards

Risk of burns due to high surface temperatures at components and/or the drives of the machine.

- Keep a safety distance from hot components.

When carrying out work on or in the vicinity of hot spots of the machine,

- wear appropriate protective clothing.
- switch all machine parts off and allow them to cool down.

People can be seriously injured or killed by fire. Fire hazards arise from:

- Accumulation of combustible materials at hot spots.
- Damage, chafing points and leaks at electrical lines / hydraulic pipes.
- Foreign objects at movable machine parts.
- Defective machine parts.

To prevent fire hazards:

- Keep the machine in a clean condition. Immediately remove easily inflammable material such as dust and dry fodder, dirt accumulation, hay, straw, etc.
- Avoid material accumulation on rotating parts.
- Observe the maintenance intervals and adhere to the lubricant regulations.
- Check all lines (hydraulic and electrical) for proper condition. Have damage, leakage and chafing points promptly eliminated.
- Check and clean the machine several times a day if necessary.

2.8.6 Risks when handling chemical substances

Contact with oils, greases and other auxiliary materials may provoke chemical reactions. Risk of scalding when handling hot operating media and auxiliary materials.

- Observe and adhere to the applicable regulations and safety data sheets of the manufacturers when handling chemical substances.
- In case of contact with the eyes or skin, rinse the affected spot immediately with plenty of water.

2.9 Safely park tractor and machine

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

Therefore, safely park the tractor and the hitched machine before carrying out any work on the machine such as e.g. setting work or trouble-shooting.

1. Park tractor and machine on firm, even ground.
2. Lower lifted, unsecured machine parts to a secure stop position.
3. Apply the tractor's parking brake.
4. Secure tractor and machine against rolling by means of chocks.
5. Turn the tractor engine off.
6. Pull the ignition key out.
7. Keep third parties, particularly children, away from tractor and machine.
8. Secure the machine against unauthorised use.

2.10 Road safety

Hitched and attached machines change the driving characteristics of the tractor. The driving characteristics depend on the operating state and on the ground. Inappropriate driving may cause serious accidents involving high material damage and serious personal injury.

- Prior to road travel, ensure not to exceed the maximum admissible dimensions, weights, axle, tongue and towed loads.
- Prior to road travel, secure working tools and hydraulic functions against accidental actuation.
- Observe the loading condition, ensure sufficient tongue load if the machine is partly empty.
- Lower the lift axle.
- Adapt driving to the conditions. Consider your personal abilities as well as the road, cornering, traffic, visibility and weather conditions and the driving characteristics of the machine.

Avoid danger to other road users.

- Check the lighting system for proper functioning prior to road travel.
- Ensure proper installation of the traffic-related equipment prior to road travel.
- Avoid road contamination.

Brake system:

- The brake system of the tractor must be compatible with the brake system of the machine.
- In case of a manual brake pressure regulator, adapt the braking force to the respective loading condition.
- Always carry out a visual inspection and a functional check of the brake system (brake test) prior to the start of a journey.
- Have malfunctions, leakages and defects promptly remedied by an authorised workshop.
- Have the brake system regularly (according to the maintenance plan) checked by an authorised workshop.
- Only authorised workshops are allowed to carry out adjustment and repair work on the brake system.

Additionally observe the following for compressed-air brake systems:

- Ensure cleanliness during coupling and uncoupling of coupling heads to prevent malfunctions of the brake system due to contamination.
- The brake system of the hitched machine is only ready for operation when the pressure gauge on the tractor indicates 5 bar.
- Drain the air reservoir every day.

Axles:

Overloading axles reduces the service life of the axle bearings and causes damage to the axles. Damage or improper work on axles and chassis may cause sudden failure, endanger operational safety or cause accidents.

- Do not overload the machine.
- Do not bump into curbs.
- Do not exceed the speed limit.
- Exclusively use tyres approved by the manufacturer.

With the passive steering axle unlocked, unintentional machine movements may occur.

- Lock the passive steering axle at higher speeds, in order to achieve improved driving stability.
- Lock the passive steering axle when travelling on uneven roads.
- Lock the passive steering axle when traversing hills.
- Lock the passive steering axle when travelling on soft ground (e.g. when travelling over clamp silos).

Wheels and tyres:

Damage or improper work on wheels and tyres may cause sudden failure, endanger operational safety or cause accidents.

- Have damaged, worn or too old tyres replaced by an authorised workshop.
- Remove stones, pebbles, nails and other foreign objects stuck in the tyre, as otherwise they further penetrate the tyre.
- Never overload tyres.
- Ensure that the tyre pressure is properly adapted to the load and the kind of work performed by the machine.
- Check the tyre pressure at least every 2 weeks. If the machine has not been used for a longer time, check the tyre pressure before putting the machine into operation again.
- Check the tyres during operation for "folds" or other abnormal deformation.
- Ensure that the caps are seated on the valves and have been tightened.
- Only authorised workshops equipped with appropriate fitting tools are allowed to carry out repair work on tyres and wheels.
- Only mount tyres approved by the manufacturer.
- When changing the tyre size, check the traffic-related equipment such as splash guard system, warning plates, lighting, underride guard and the brake system for proper setting and adapt it if necessary.
- Only place the lifting device at the marked fixing points when changing tyres.
- Tighten or retighten the fastening screws and nuts according to the specifications of B. Strautmann & Söhne GmbH u. Co. KG.
- Relieve the tyres if they are not intended to be used for a longer period, in order to avoid deformation. Store "loose" tyres in a dark place, free of oil and other chemicals. Do not place tyres near electric motors, as the ozone produced by the motors slowly desiccates the rubber.

2.11 Service life of machine

- The service life depends on the proper use, maintenance and service as well as on the operating conditions and conditions of use of the machine.
- By observing the instructions and notes included in these operating instructions, constant readiness for operation and a long service life of the machine can be achieved.
- The replacement of worn or damaged parts can extend the machine's service life.

2.12 Repair / Disassembly / Disposal

Improper disassembly may cause significant damage to health, property and the environment due to machine parts tipping over or falling and leaking operating media.

Only qualified staff is allowed to repair, disassemble and dispose of the machine.

Machine parts and operating media must be disposed of properly.

2.13 Hygiene measures

Health hazard and transmission of infections due to contact with operating media, cleaning agents, fodder residues and contamination

- Avoid contact with forage, fodder additives, operating media and cleaning agents.
- Avoid contamination of forage by operating media, spoiled fodder residues, dirt and cleaning agents.
- Use environmentally friendly, food-safe, biodegradable greases.
- Wear appropriate personal protective equipment.
- In case of skin contact, thoroughly clean the affected areas without delay.
- Change contaminated personal protective equipment.
- Clean used tools.
- Keep the machine clean, promptly remove fodder residues.
- Adhere to general hygiene measures.

2.14 Environmental protection

Improper or careless use of hazardous substances may cause serious environmental pollution.

- Dispose of oils, greases and other auxiliary materials and consumables in accordance with the environmental regulations.
- Observe applicable local regulations regarding the disposal.
- Observe the manufacturers' specification and safety data sheets for the individual substances.
- Additionally observe the specifications in the sub-suppliers' documentation.
- Have any leaks repaired immediately.
- After proper disassembly, take worn or damaged machine parts to an appropriate recycling centre or dispose of them properly.

2.15 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:

- Non-observance of these instructions
- Incorrect use
- Improper assembly, commissioning, operation and maintenance of the machine
- Operation of the machine with defective, improperly installed or inoperable safety and protective devices
- Unauthorised modifications and technical alterations
- Deployment of non-trained staff
- Neglected maintenance
- Insufficient inspection of machine parts subject to wear
- Failure to carry out in due time, omit or neglect inspection, cleaning, service, maintenance and repair work.
- Improperly effected repairs
- Use of non-authorised spare parts
- Disasters due to foreign objects and force majeure

Technical modifications within the framework of an improvement and further development of the machine are reserved.

2.16 Safety and protective devices

Observe the following points, in order to ensure a sound condition and proper functioning of the safety and protective devices:

- Do not damage, modify, remove or disable protective devices. Increased risk of injury.
- 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.
- Immediately replace missing or defective safety and protective devices.

The machine is equipped with the following safety and protective devices:

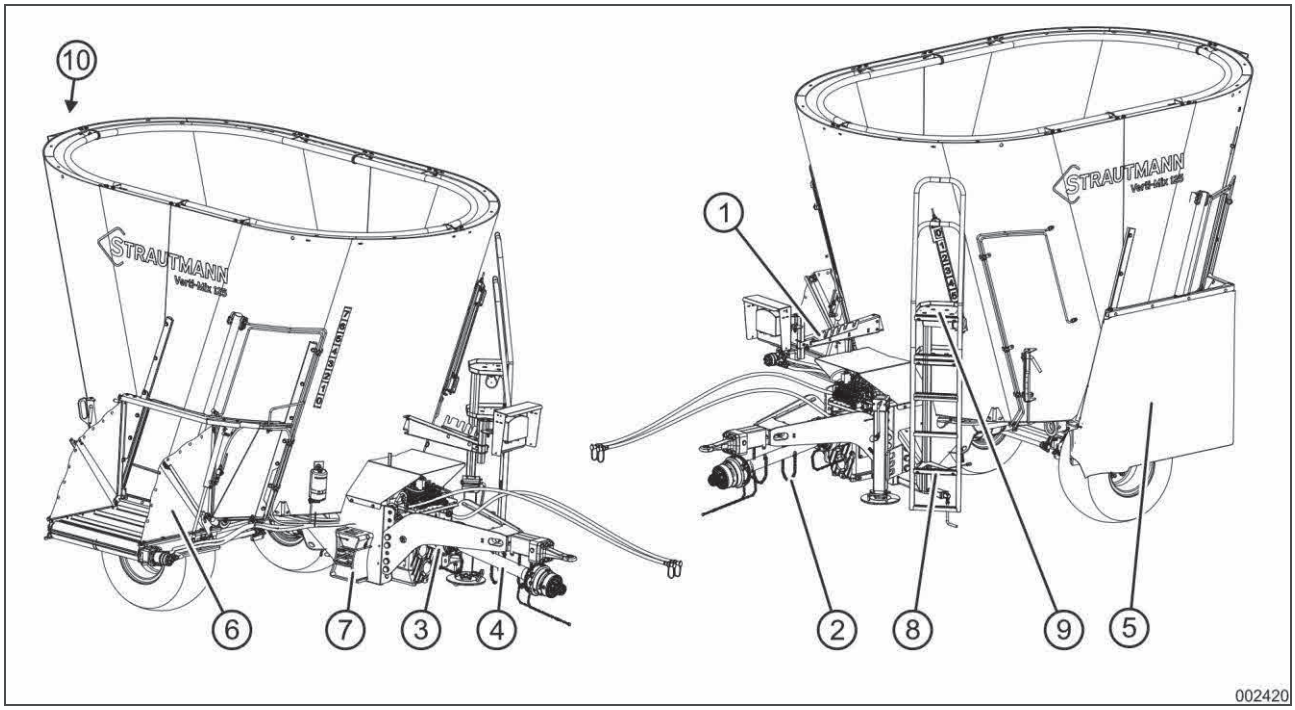


Fig. 1

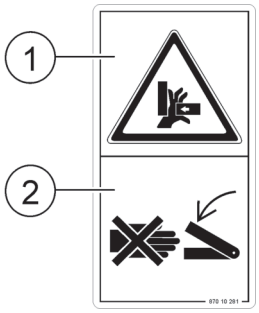
1 Hose holder for supply lines
2 Propeller shaft holder
3 Protective sleeves and covers within the power train
4 Protective devices for propeller shaft
5 Protective device, side discharge
6 Protective device, side discharge conveyor
7 Chocks
8 Ladder
9 Platform
10 Rear-view camera

2.17 Signs at the machine

Labels and signs may become soiled or otherwise unrecognisable. Thus, risks and important information may not be recognised and observed.

- Keep signs and labels in a clearly legible condition at all times.
- Do not remove or cover signs.

2.17.1 Warning signs



Warning signs mark dangerous spots on the machine and warn about residual risks.

A warning sign consists of two pictographs:

1 Pictograph for description of risk, surrounded by a triangular hazard symbol

2 Pictograph for avoidance of risk with illustrative instruction

All warning signs attached to the machine include:

- Order number
- Description of risk
- Consequences in case of non-observance
- Instruction how to avoid the risk

87007111

Risk of cuts for fingers and hands, of shearing and crushing due to moving components!

This risk may cause most serious injuries including loss of fingers and hands.

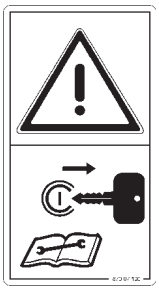
- Keep an adequate safety distance from the moving components until the movement has completely stopped.

87007117

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

Powered working tools may cause 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.



87007120

Accidental starting or rolling of tractor and machine

Risk of serious injuries or even death if accidental movements are triggered during mounting, setting, troubleshooting or maintenance work.

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

87007121

Falls of passengers on the machine

Unauthorised riding on steps or platforms may cause serious injuries or even death.

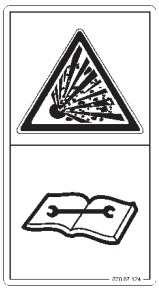
- Ensure that there are no passengers on the machine.
- Do not transport any objects on the machine.
- Never climb onto rolling machines.

87007123

Hydraulic oil squirting out under high pressure caused by leaking hydraulic hose pipes

Hydraulic oil squirting out under high pressure may penetrate the skin and enter the body, potentially causing serious injuries or even death.

- Never use your hand or fingers to seal leaks.
- Read and observe the operating instructions before carrying out service and maintenance work on hydraulic hose pipes.



87007124

Risk of explosion of pressure accumulator

The pressure accumulator being under gas and oil pressure may explode or hydraulic oil may squirt out under high pressure. This risk may cause most serious injuries or even death.

- Read and observe the information in the operating instructions before carrying out any work on the hydraulic system.
- Immediately contact the medical services if injuries caused by hydraulic oil occur.

87007126

Running-over of people due to accidental rolling of the machine parked in unsecured condition

Rolling machines may cause 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 chocks.

87007130

Risk of crushing to people standing between tractor and machine

Risk of serious injuries or even death within the swivelling range of the drawbar between tractor and hitched machine.

- Stop and secure tractor and machine against accidental rolling before carrying out any work on the machine
- Keep people away from the hazardous area.

87007552

Implants being affected by electromagnetic 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 lead to the death of their wearers.

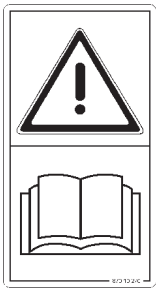
- Keep an adequate safety distance from magnets if you wear an electronic implant.
- Keep people with electronic implants away from the hazardous area.

87007557

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

Powered working tools may cause 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.



87010270

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

87010271

Risk of crushing and impact to people standing within the hazardous area of the machine

Risk of serious injuries or even death to people within the hazardous area.

- People are not allowed within the hazardous area of the machine as long as the tractor engine is running.

87010276

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

Powered working tools may cause serious injuries or even death.

- Keep an adequate safety distance from powered working tools.
- Keep people away from the hazardous area.

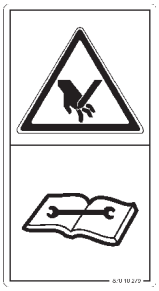
87010278

Risk of becoming entangled and wound up by powered propeller shaft

Rotating parts may entangle people and cause serious injuries or even death.

- Keep an adequate safety distance from the powered propeller shaft.

  The risk exists as long as the tractor engine is running with the propeller shaft coupled.
- Keep people away from the hazardous area.



87010279

Risk of cuts for fingers and hands due to sharp working tools.

Sharp working tools may cause serious injuries including loss of limbs.

- Read and observe the operating instructions before carrying out work on working tools.
- Wear the prescribed protective equipment.

87010281

Risk of crushing fingers and hands due to moving parts

Accessible moving parts may cause serious injuries including loss of limbs.

- Never reach into the hazardous area.

  The risk exists as long as the tractor engine is running with the propeller shaft coupled / the hydraulic/electronic system connected.
- Keep an adequate safety distance from the hazardous area.

87010287

Breaking of load-bearing parts due to work on frame elements

Load-bearing parts may break due to mechanical work on frame elements. Risk of material damage and serious injuries or even death.

As a basic principle, the following is not allowed:

- Mechanical processing of the chassis
- Drilling at the frame or chassis
- Boring-up of existing holes
- Welding on load-bearing parts.

87012568

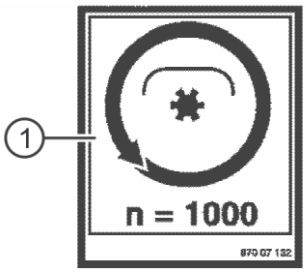
Falling from the top edge of the mixing container

Risk of serious injuries or even death when falling into the mixing container.

It is not allowed:

- to stay above the mixing container
- to bend over the mixing container
- to enter the mixing container from above.

2.17.2 Instruction signs



Instruction signs provide information referring to proper use of the machine.

An instruction sign consists of a pictograph.

1 Pictograph with visual or descriptive information or information summarised in a table

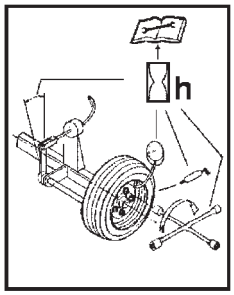
All instructions signs attached to the machine include:

- Order number
- Instruction or explanation how to use the machine properly

87007131

Required driving speed of the machine is 540 min^{-1}.

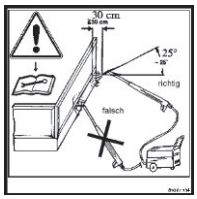
Before switching the propeller shaft on, check whether the selected speed and sense of rotation of the tractor's p.t.o. shaft have been adjusted to coincide with the admissible speed and sense of rotation of the machine.



87007133

Tyre maintenance information

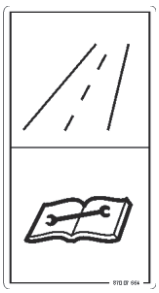
Observe the information for braking axle maintenance in the operating instructions.



87007134

Improper cleaning of machine

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



87007564

Information on road traffic

Read and observe the following chapters before travelling on public roads.

► see section 2.10 Road safety, page 29
► see section 4.14 Traffic-related equipment, page 82
► see section 6.2 Road traffic regulations, page 90
► see section 8.6 Transport journeys, page 152

87706091

Note "Lashing point"

Marks lashing points for fixing lashing equipment when transporting the machine

87010288

Note "Lifting point"

Marks fixing points of lifting equipment (jack)

2.17.3 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.

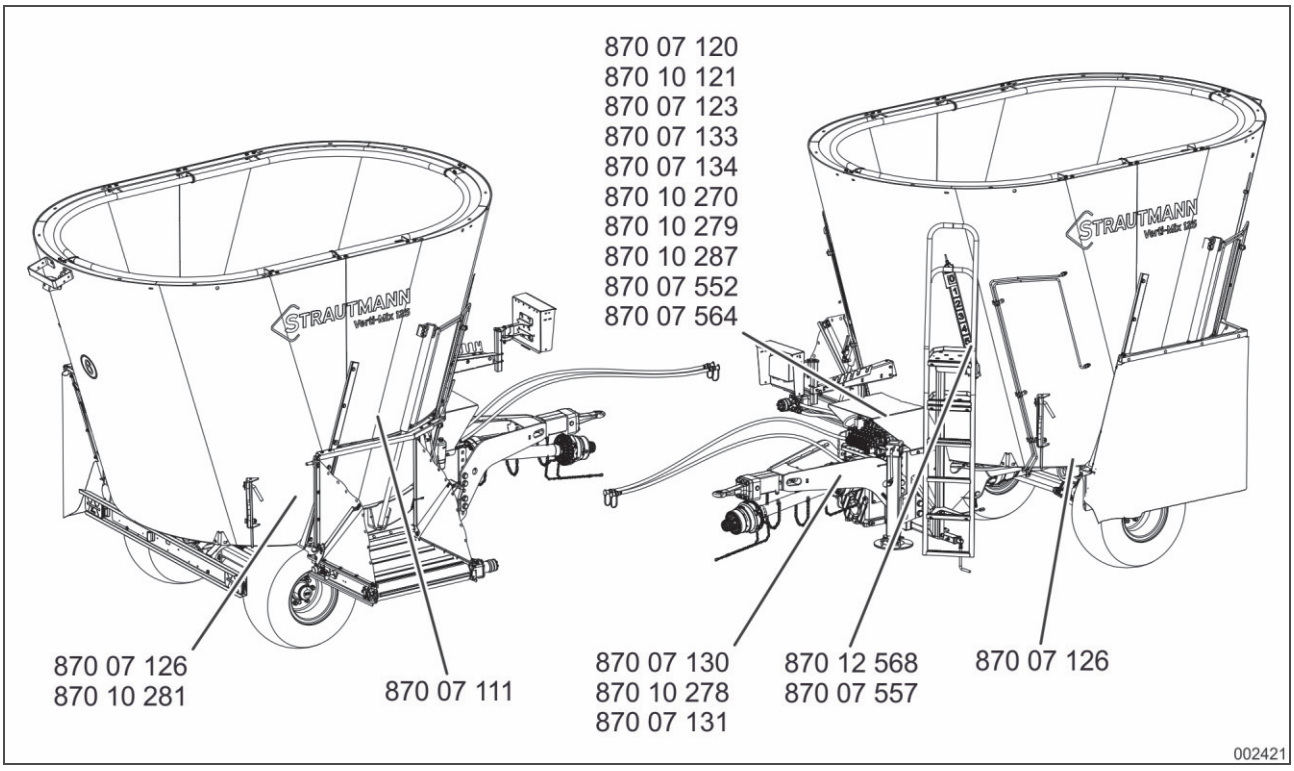


Fig. 2

Placing of warning signs at the discharge outlets

Side discharge

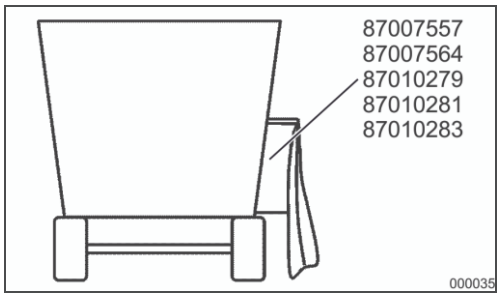


Fig. 3

Side discharge with side discharge conveyor

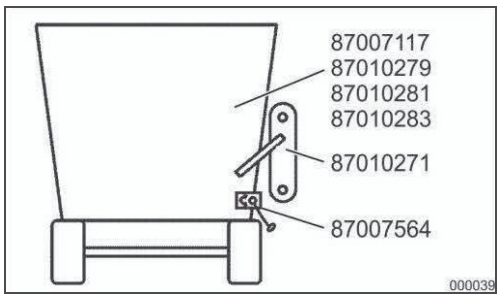


Fig. 4

Rear side discharge

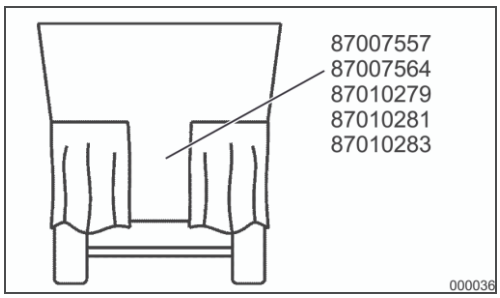


Fig. 5

Rear centre discharge

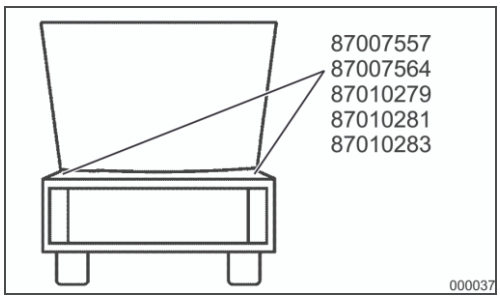


Fig. 6

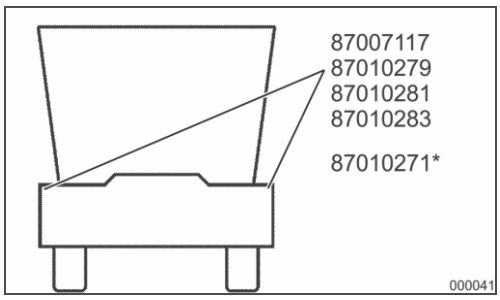


Fig. 7

Crossover conveyor

* With movable crossover conveyor

3 Technical data

3.1 General data

Designation	Unit	Verti-Mix 75-145					
		75	90	105	120	125	145
Usable mixing capacity * (payload)	m^3	7.5	9	10.5	12	12.5	14.5
Gross vehicle weight rating							
• single axle	kg	7000	7000	9000	11400	9000	11400
Admissible axle load							
• running braking axle	kg	6000	6000	7800	10000	7800	10000
• admissible tongue load	kg	1000	1000	1200	1400	1200	1400
Dead weight (approx.)							
Basic machine	kg	3050	3200	3650	4050	3850	4200
Minimum power required							
• without switchgear, 26 min^-	kW	26	30	37	47	41	55
Maximum operating pressure	bar	210					
Oil flow rate	l/min	25-45					
Power supply, weighing device / lighting system / electro-hydraulic control set	volt	12 VDC					
P.t.o. speed	min^{-1}	540					
Sound pressure level	dB(A)	≤ 84					

Tab. 4: General data

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

Designation	Unit	Verti-Mix Double			
		115D	165D	205D	245D
Usable mixing capacity * (payload)	m^3	11.5	16.5	20.5	24.5
Gross vehicle weight rating					
• single axle	kg	12,600	12,600	17,000	17,000
Admissible axle load					
• running braking axle	kg	10,800	10,800	15,200	15,200
• admissible tongue load	kg	1,800	1,800	1,800	1,800
Dead weight (approx.)					
Basic machine	kg	5,300	5,800	6,900	9,100

Designation	Unit	Verti-Mix Double			
		115D	165D	205D	245D
Usable mixing capacity * (payload)	m^3	11.5	16.5	20.5	24.5
Minimum power required					
• without switchgear, 26 min^{-}	kW	51	64	73	79
Maximum operating pressure	bar	210			
Oil flow rate	l/min	25 – 45			
Power supply, weighing device / lighting system / electro-hydraulic control set	volt	12 VDC			
P.t.o. speed	min^{-1}	540			
Sound pressure level	dB(A)	≤ 84			

Tab. 5: General data

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

Designation	Unit	Verti-Mix Double K			
		1300DK	1500DK	1800DK	2100DK
Usable mixing capacity * (payload)	m^3	13	15	18	21
Gross vehicle weight rating					
15 km/h (StVZO) • single axle	kg	13800		16000	
25 km/h (StVZO) • single axle	kg	11800		12000	
Admissible axle load					
• running braking axle	kg	10000		10000	
• admissible tongue load	kg	1800		2000	
Dead weight (approx.)					
Basic machine, empty weight	kg	4860	5330	6150	6610

Designation	Unit	Verti-Mix Double K			
		1300DK	1500DK	1800DK	2100DK
Minimum power required					
• without switchgear, 24 min^{-}	kW	51	64	73	79
Maximum operating pressure	bar	210			
Oil flow rate	l/min	25 – 45			
Power supply, weighing device / lighting system / electro-hydraulic control set	volt	12 VDC			
P.t.o. speed	min^{-1}	540			
Sound pressure level	dB(A)	≤ 84			

Tab. 6: General data

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

Designation	Unit	Verti-Mix 75-125 L			
		75L	90L	105L	125L
Usable mixing capacity * (payload)	m^3	7.5	9	10.5	12.5
Gross vehicle weight rating					
15 km/h (StVZO) • single axle	kg	8,300	8,600	8,700	8,700
Admissible axle load					
• running braking axle	kg	6,200	6,200	6,200	6,200
• admissible tongue load	kg	2100	2400	2500	2500
Dead weight (approx.)					
Basic machine	kg	2700	3000	3200	3600
Minimum power required					
• without switchgear, 26 min^{-}	kW	35	41	52	56
Maximum operating pressure	bar	210			
Oil flow rate	l/min	25 – 45			
Power supply, weighing device / lighting system / electro-hydraulic control set	volt	12 VDC			
P.t.o. speed	min^{-1}	540			
Sound pressure level	dB(A)	≤ 84			

Tab. 7: General data

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

3.2 Tyres

Designation	Unit	Verti-Mix 75-145					
		75	90	105	120	125	145
Tyres							
10.0/75-15.3	bar / psi	7 / 101	7 / 101	-	-	-	-
250/70-15	bar / psi	9.5 / 138	9.5 / 138	-	-	-	-
400/60-15.5	bar / psi	6 / 87	6 / 87	6 / 87	6 / 87	6 / 87	6 / 87
30x11.5-14.5	bar / psi	-	-	8 / 116	-	8 / 116	-
435/50R19.5	bar / psi	-	-	9 / 130	9 / 130	9 / 130	9 / 130
8.15-15		-	-	-	9 / 130	-	9 / 130

Tab. 8: Tyre pressure

Designation	Unit	Verti-Mix Double			
		115D	165D	205D	245D
Tyres					
235/75 R17.5	bar / psi	8.5 / 123	8.5 / 123	8.5 / 123	8.5 / 123
400/60-15.5	bar / psi	6 / 87	6 / 87	6 / 87	6 / 87
435/50 R19.5	bar / psi	9 / 130	9 / 130	9 / 130	9 / 130

Tab. 9: Tyre pressure

Designation	Unit	Verti-Mix Double K			
		1300DK	1500DK	1800DK	2100DK
Tyres					
315/80 R22.5	bar / psi	9 / 130	9 / 130	-	-
385/65 R22.5	bar / psi	-	-	9 / 130	9 / 130
425/65 R22.5	bar / psi	-	-	9 / 130	9 / 130

Tab. 10: Tyre pressure

Designation	Unit	Verti-Mix L			
		75L	90L	105L	125L
Tyres					
250/70-15	bar / psi	9.5 / 138	9.5 / 138	9.5 / 138	9.5 / 138
400/60-15.5	bar / psi	6 / 87	6 / 87	6 / 87	6 / 87
30x11.5x14.5	bar / psi	8 / 116	8 / 116	8 / 116	8 / 116
10.0/75-15.3	bar / psi	7 / 101	7 / 101	-	-

Tab. 11: Tyre pressure

3.3 Dimensions of wagon

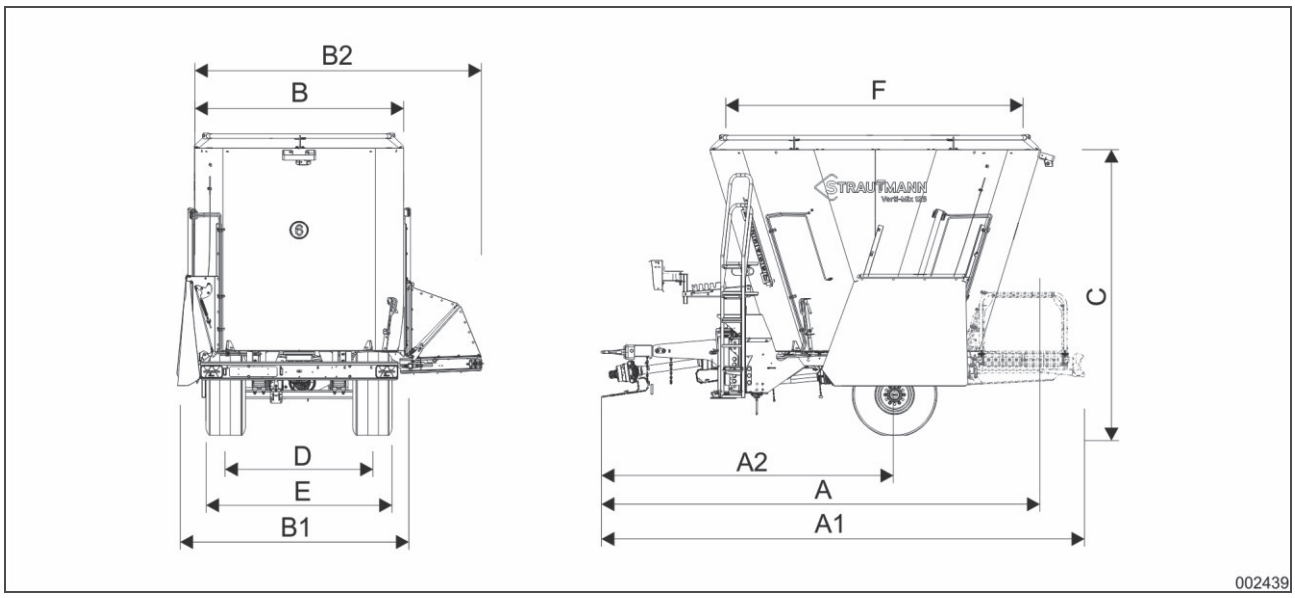


Fig. 8 Verti-Mix 75-145

Designation	Unit	Verti-Mix					
		75	90	105	120	125	145
Length							
• A (without crossover conveyor)	m	4.48	4.54	4.76	4.91	4.84	4.99
• A1 (with crossover conveyor)	m	5.01	5.01	5.05	5.18	5.05	5.18
• A2 distance Centre of drawbar lug - Centre of axle	m	3.19	3.19	3.24	3.40	3.24	3.40
• F (container)	m	3.14	3.26	3.47	3.67	3.63	3.82
Width							
• B (container)	m	2.16	2.16	2.28	2.42	2.28	2.42
• B1 (right-hand / left-hand side discharge)	m	2.25	2.25	2.38	2.53	2.38	2.53
• B1 (side discharge on both sides)	m	2.35	2.35	2.47	2.64	2.47	2.64
• B2 (with short discharge conveyor)	m	3.00	3.00	3.13	3.26	3.13	3.26
• B2 (with long discharge conveyor)	m	3.36	3.36	3.49	3.62	3.49	3.62
C= Height incl. tyres							
• with single tyres 10.0/75-15,3	m	2.45	2.64	-	-	-	-
• with single tyres 250/70-15	m	2.38	2.58	-	-	-	-
• with single tyres 400/60-15.5	m	2.50	2.70	2.83	2.94	3.09	3.19
• with single tyres 435/50R19.5	m	-	-	2.90	3.00	3.16	3.25
• with single tyres 30x11.5-14.5	m	-	-	2.71	-	2.97	-
• with single tyres 8.15-15	m	-	-	-	2.82	-	3.07
• C1 (with overflow ring)	m	C +130mm					

Designation	Unit	Verti-Mix					
		75	90	105	120	125	145
D = Track							
• with single tyres 10.0/75-15,3	m	1.5	1.5	-	-	-	-
• with single tyres 250/70-15	m	1.5	1.5	-	-	-	-
• with single tyres 400/60-15.5	m	1.5	1.5	1.6	1.72	1.6	1.72
• with single tyres 435/50R19.5	m	-	-	1.6	1.72	1.6	1.72
• with single tyres 30x11.5-14.5	m	-	-	1.6	-	1.6	-
• with single tyres 8.15-15	m	-	-	-	1.72	-	1.72
E= Outside wheel width							
• with single tyres 10.0/75-15,3	m	1.78	1.78	-	-	-	-
• with single tyres 250/70-15	m	1.76	1.76	-	-	-	-
• with single tyres 400/60-15.5	m	1.91	1.91	2.01	2.14	2.01	2.14
• with single tyres 435/50R19.5	m	-	-	2.01	2.13	2.01	2.13
• with single tyres 30x11.5-14.5	m	-	-	1.90	-	1.90	-
• with single tyres 8.15-15	m	-	-	-	2.25	-	2.25

Tab. 12: Vehicle dimensions

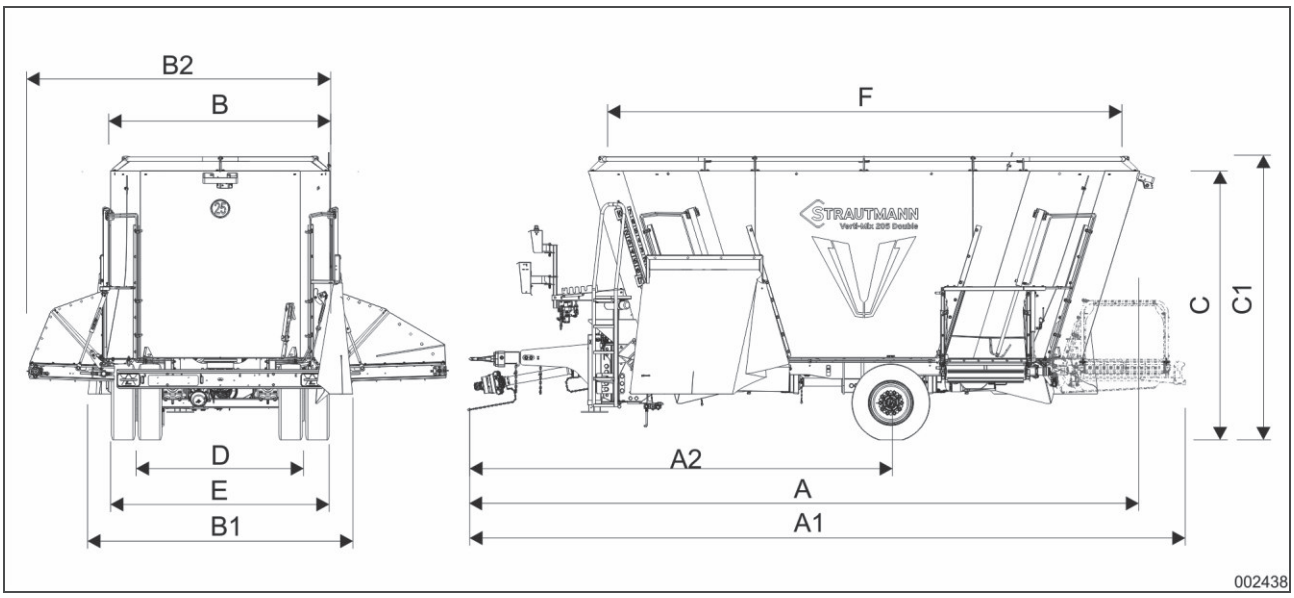


Abb. 9 Verti-Mix 115-245D

Designation	Unit	Verti-Mix Double			
		115D	165D	205D	245D
Length					
• A (without crossover conveyor)	m	6.13	6.72	6.98	7.28
• A1 (with crossover conveyor)	m	6.76	7.16	7.27	7.53
• A2 distance Centre of drawbar lug - Centre of axle	m	4.22	4.55	4.43	3.07
• F (container)	m	4.84	5.40	5.73	6.07
Width					
• B (container)	m	1.96	2.16	2.28	2.42
• B1 (right-hand / left-hand side discharge)	m	2.11	2.26	2.39	2.52
• B1 (side discharge on both sides)	m	2.22	2.37	2.48	2.63
• B2 (with short discharge conveyor)	m	2.83	3.00	3.13	3.26
• B2 (with long discharge conveyor)	m	3.19	3.36	3.49	3.62
C= Height incl. tyres					
• with double tyres 235/75R17.5	m	2.39	2.65	2.80	2.91
• with single tyres 400/60-15.5	m	2.45	2.67	2.86	2.97
• with single tyres 435/50R19.5	m	2.46	2.71	2.92	3.03
• C1 (with overflow ring)	m	C +160mm			
D = Track					
• with double tyres 235/75R17.5	m	1.5	1.5	1.72	1.72
• with single tyres 400/60-15.5	m	1.5	1.5	1.72	1.72
• with single tyres 435/50R19.5	m	1.5	1.5	1.72	1.72

Designation	Unit	Verti-Mix Double			
		115D	165D	205D	245D
E= Outside wheel width					
• with double tyres 235/75R17.5	m	2.04	2.04	2.25	2.25
• with single tyres 400/60-15.5	m	1.91	1.91	2.13	2.13
• with single tyres 435/50R19.5	m	1.91	1.91	2.13	2.13

Tab. 13: Vehicle dimensions

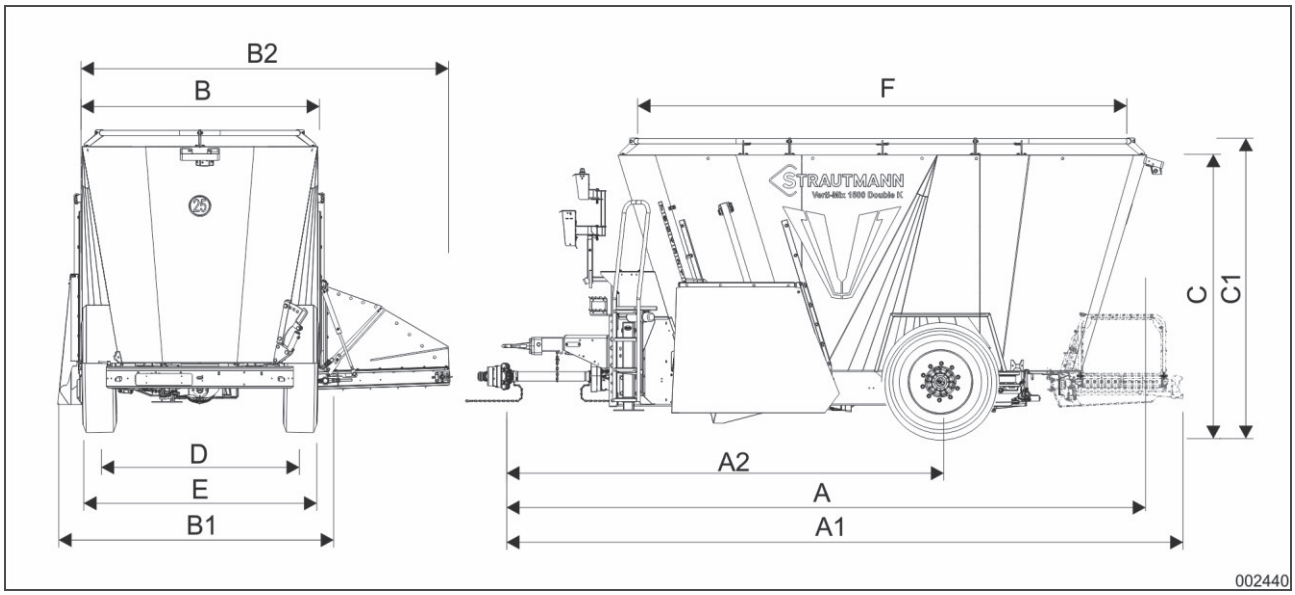


Fig. 10 Verti-Mix 1300-2100DK

Designation	Unit	Verti-Mix Double K			
		1300DK	1500DK	1800DK	2100DK
Length					
• A (without crossover conveyor)	m	5.80	5.87	6.28	6.36
• A1 (with crossover conveyor)	m	5.97	5.97	6.41	6.41
• A2 distance Centre of drawbar lug - Centre of axle	m	3.96	3.96	4.27	4.27
• F (container length, inner dimension)	m	4.28	4.42	4.83	4.99
Width					
• B (container)	m	2.16	2.16	2.42	2.42
• B1 (right-hand / left-hand side discharge)	m	2.28	2.28	2.54	2.54
• B1 (side discharge on both sides)	m	2.38	2.38	2.64	2.64
• B2 (with short discharge conveyor)	m	3.00	3.00	3.08	3.08
• B2 (with long discharge conveyor)	m	3.36	3.36	3.62	3.62

Designation	Unit	Verti-Mix Double K			
		1300DK	1500DK	1800DK	2100DK
C= Height incl. tyres					
• with single tyres 315/80 R22,5	m	2.36	2.58	-	-
• with single tyres 385/65 R22,5	m	-	-	2.61	2.86
• with single tyres 425/65 R22,5	m	-	-	2.61	2.86
• C1 (with overflow ring)	m	C +130mm			
• discharge height	m	0.57			
D = Track					
• with single tyres 315/80 R22,5	m	1.85	1.85	-	-
• with single tyres 385/65 R22,5	m	-	-	2.06	2.06
• with single tyres 425/65 R22,5	m	-	-	2.06	2.06
E= Outside wheel width					
• with single tyres 315/80 R22,5	m	2.17	2.17	-	-
• with single tyres 385/65 R22,5	m	-	-	2.45	2.45
• with single tyres 425/65 R22,5	m	-	-	2.50	2.50

Tab. 14: Vehicle dimensions

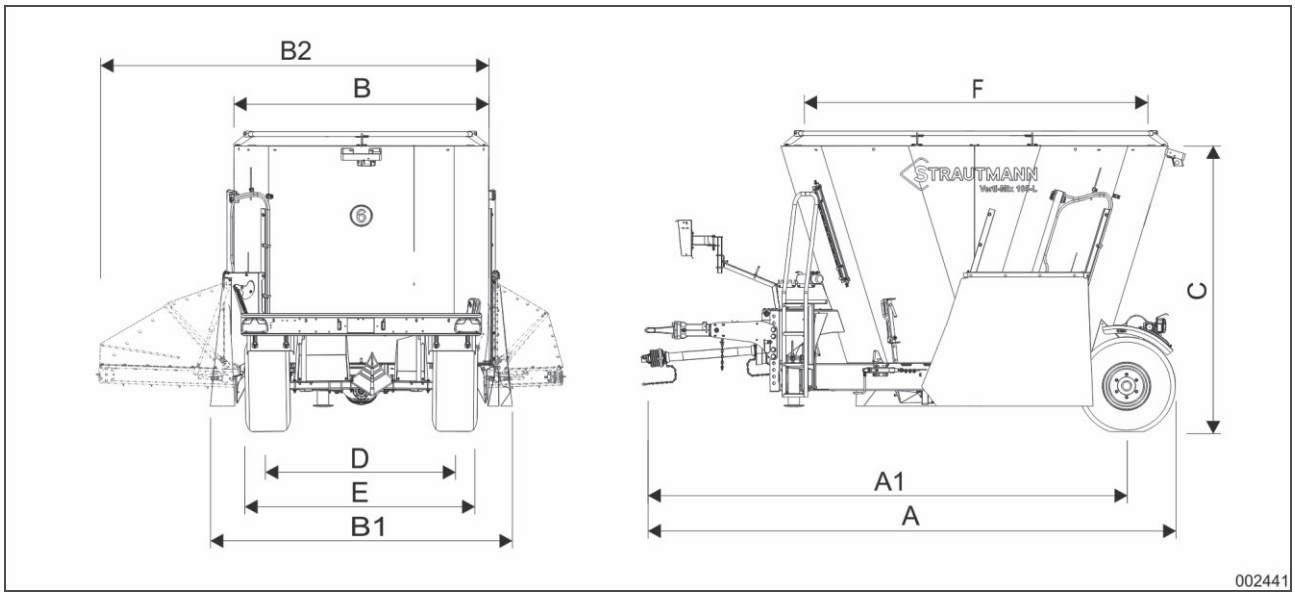


Fig. 11 Verti-Mix 75-125L

Designation	Unit	Verti-Mix L			
		75L	90L	105L	125L
Length					
• A (total length)	m	4.57	4.57	4.70	4.72
• A1 distance Centre of drawbar lug - Centre of axle	m	4.13	4.13	4.26	4.26
• F (container length, inner dimension)	m	2.74	2.86	3.06	3.23

Designation	Unit	Verti-Mix L			
		75L	90L	105L	125L
Width					
• B (container)	m	2.16	2.16	2.28	2.28
• B1 (right-hand / left-hand side discharge)	m	2.26	2.26	2.38	2.38
• B1 (side discharge on both sides)	m	2.36	2.36	2.48	2.48
• B2 (with short discharge conveyor)	m	2.82	2.82	2.95	2.95
• B2 (with long discharge conveyor)	m	3.36	3.36	3.49	3.49
C= Height incl. tyres					
• with single tyres 250/70-15	m	2.12	2.32	2.45	2.72
• with single tyres 400/60-15.5	m	2.17	2.37	2.50	2.77
• with single tyres 30x11.5x14.5	m	2.14	2.34	2.47	2.74
• with single tyres 10.0/75-15.3	m	2.13	2.33	-	-
• C1 (with overflow ring)	m	C +130mm			
D = Track					
• with single tyres 250/70-15	m	1.65	1.65	1.65	1.65
• with single tyres 400/60-15.5	m	1.65	1.65	1.65	1.65
• with single tyres 30x11.5x14.5	m	1.65	1.65	1.65	1.65
• with single tyres 10.0/75-15.3	m	1.65	1.65	-	-
E= Outside wheel width					
• with single tyres 250/70-15	m	1.91	1.91	1.91	1.91
• with single tyres 400/60-15.5	m	2.05	2.05	2.05	2.05
• with single tyres 30x11.5x14.5	m	1.95	1.95	1.95	1.95
• with single tyres 10.0/75-15.3	m	1.92	1.92	-	-

Tab. 15: Vehicle dimensions

4 Description of machine

The machine is a fodder mixing wagon facilitating the labour-intensive process in dairy cattle feeding. It serves to chop, homogeneously mix, transport and discharge silage and usual fodders used in keeping livestock.

The machine is usually filled by means of a tractor with front loader, telescopic loader, yard or wheeled loader.

Furthermore, the machine can be filled by means of feeding aids such as a feed funnel or directly from the pipe or conveying device of the fodder.

This chapter provides comprehensive information about the design and function of the machine.

The machines are available with various optional extras. Due to the individual equipment of your machine, not all descriptions included in these operating instructions apply to your machine. Optional extras are marked in these operating instructions and are available at extra cost.

4.1 General overview

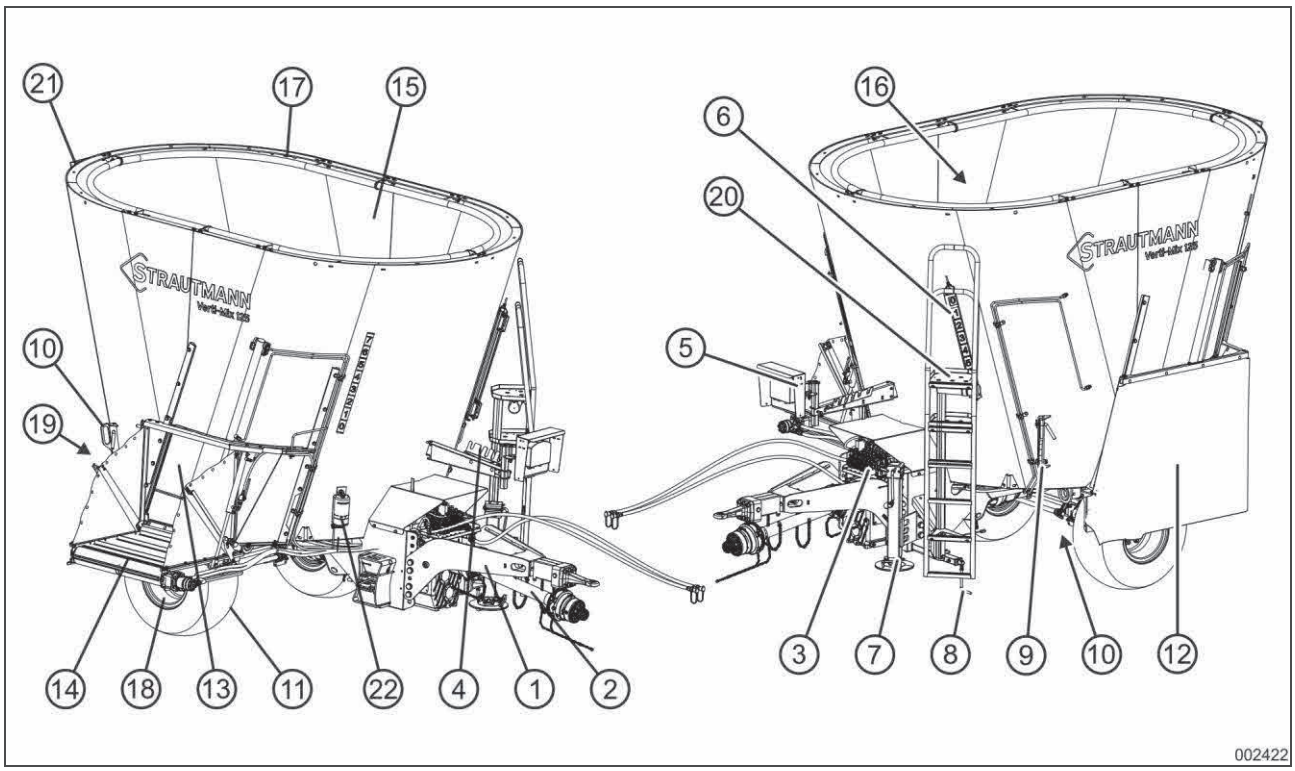


Fig. 12 Verti-Mix 75-145

1 Drawbar
2 Propeller shaft
3 Hydraulic control block*
4 Plug holder for supply lines
5 Control set of weighing device with swivelling bracket*
6 Opening scale for dosage gate with pointer for opening width
7 Supporting leg
8 Parking brake
9 Counter-cutter, mechanical or hydraulic*
10 Angular gear for mixing auger drive
11 Wheels
12 Side discharge
13 Dosage gate
14 Discharge conveyor
15 Mixing container
16 Mixing auger
17 Overflow ring
18 Braking axle
19 Lighting (multi-function lights)
20 Ladder with platform
21 Rear-view camera*
22 Compensating reservoir for gear lubricant oil of angular gears*

* Optional extra

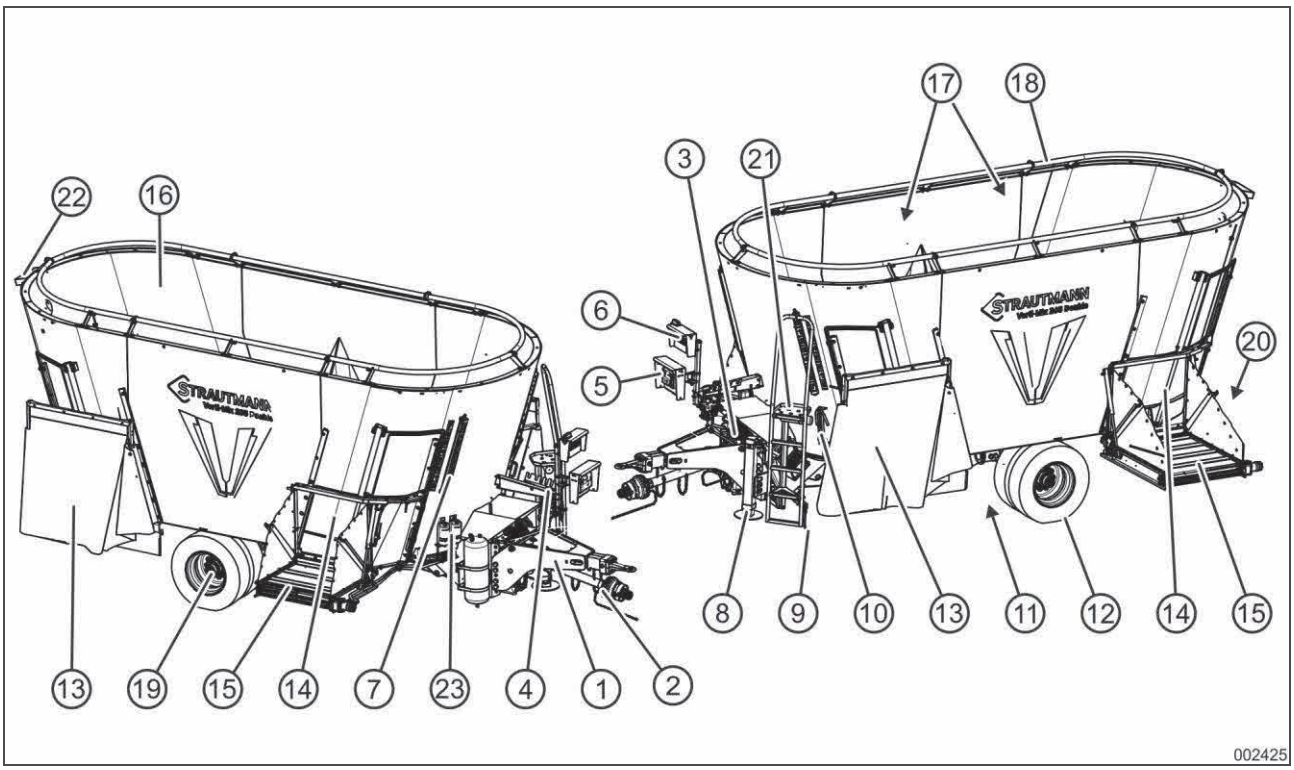


Abb. 13 Verti-Mix 115-245D

1 Drawbar
2 Propeller shaft
3 Hydraulic control block*
4 Plug holder for supply lines
5 Control set of weighing device with swivelling bracket*
6 Additional screen*
7 Opening scale for dosage gate with pointer for opening width
8 Supporting leg
9 Parking brake
10 Counter-cutter, mechanical or hydraulic*
11 Angular gear for mixing auger drive
12 Wheels
13 Side discharge
14 Dosage gate
15 Discharge conveyor
16 Mixing container
17 Mixing auger
18 Overflow ring
19 Braking axle
20 Lighting (multi-function lights)
21 Ladder with platform
22 Rear-view camera*
23 Compensating reservoir for gear lubricant oil of angular gears

* Optional extra

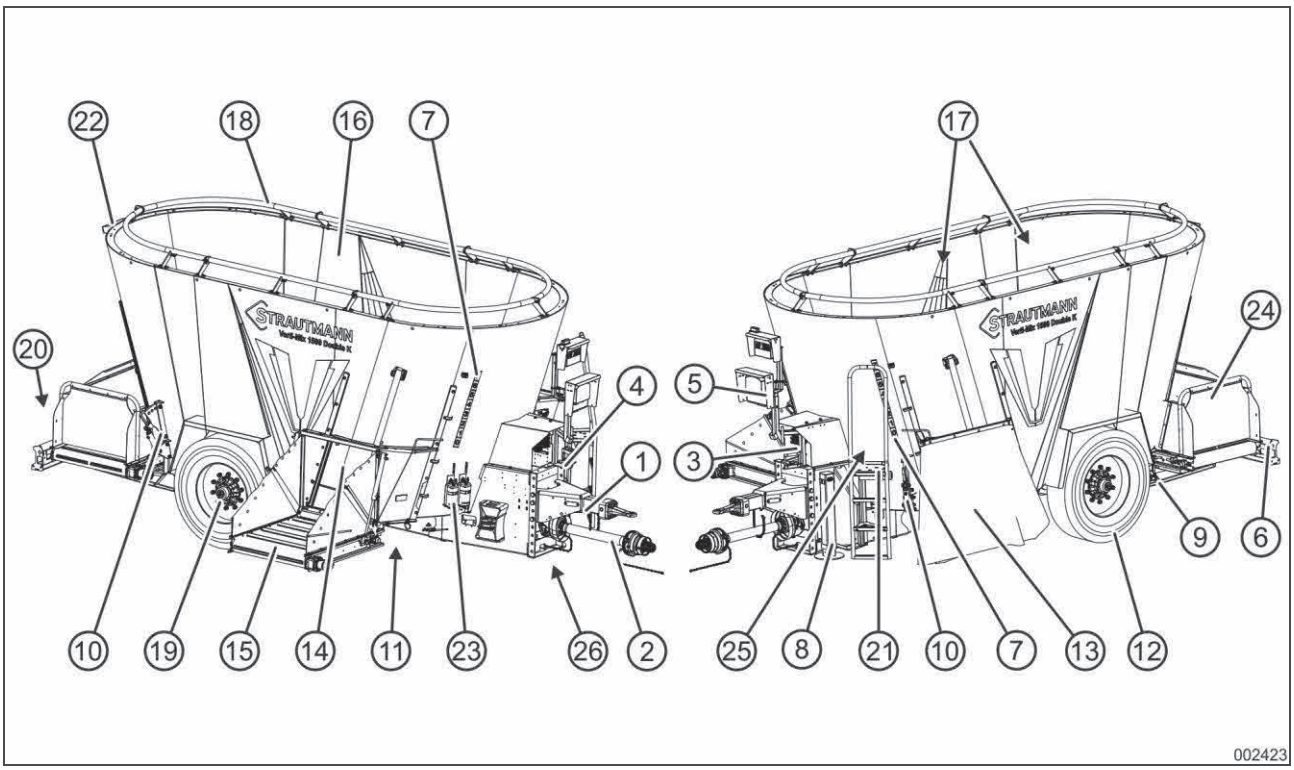


Fig. 14 Verti-Mix 1300-2100DK

1 Drawbar
2 Propeller shaft
3 Hydraulic control block*
4 Plug holder for supply lines
5 Control set of weighing device with swivelling bracket*
6 Bumper buffer*
7 Opening scale for dosage gate with pointer for opening width
8 Supporting leg
9 Parking brake
10 Counter-cutter, mechanical or hydraulic*
11 Angular gear for mixing auger drive
12 Wheels
13 Side discharge
14 Dosage gate
15 Discharge conveyor
16 Mixing container
17 Mixing auger
18 Overflow ring
19 Braking axle
20 Lighting (multi-function lights)
21 Ladder with platform
22 Rear-view camera*
23 Compensating reservoir for gear lubricant oil of angular gears
24 Rear crossover conveyor*
25 Hydraulic oil tank of on-board hydraulic system* (not illustrated)
26 Hydraulic pump of on-board hydraulic system*

* Optional extra

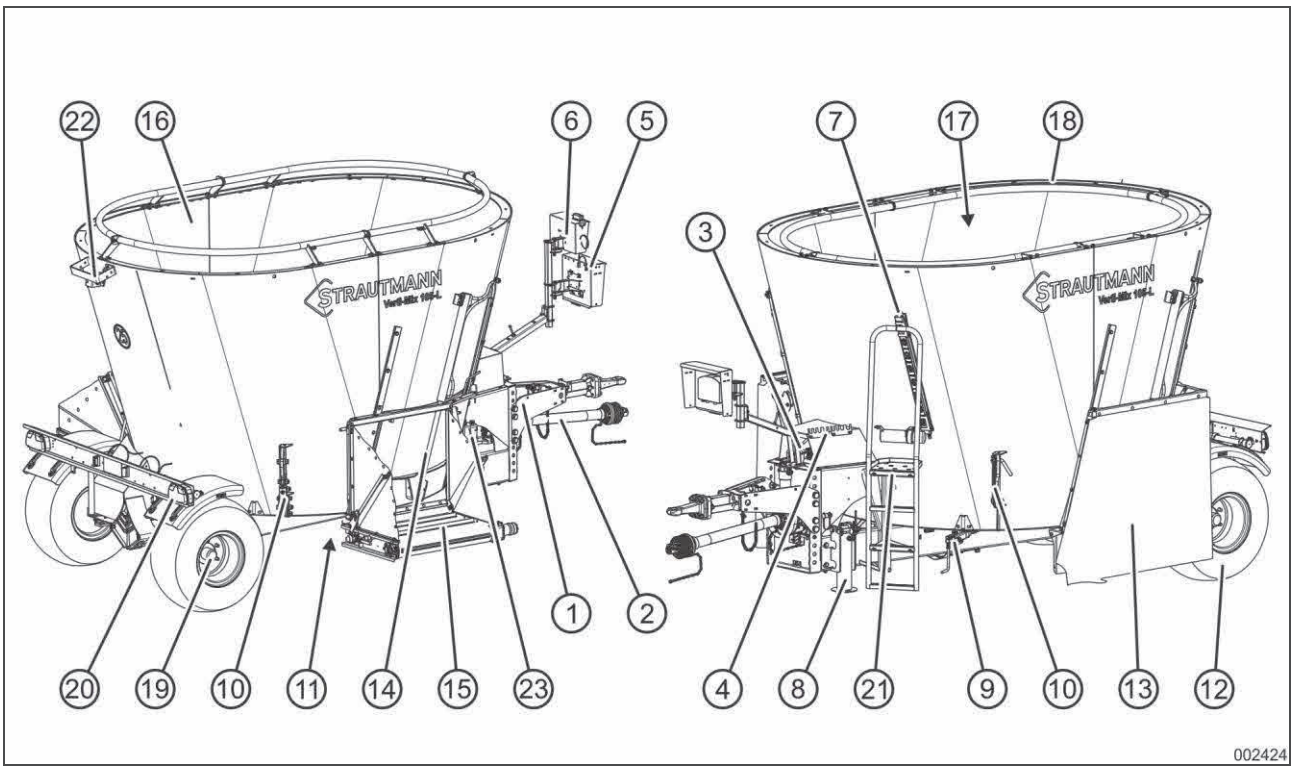


Fig. 15 Verti-Mix 75-125L

1 Drawbar
2 Propeller shaft
3 Hydraulic control block*
4 Plug holder for supply lines
5 Control set of weighing device with swivelling bracket*
6 Additional screen*
7 Opening scale for dosage gate with pointer for opening width
8 Supporting leg
9 Parking brake
10 Counter-cutter, mechanical or hydraulic*
11 Angular gear for mixing auger drive
12 Wheels
13 Side discharge
14 Dosage gate
15 Discharge conveyor
16 Mixing container
17 Mixing auger
18 Overflow ring
19 Braking axle
20 Lighting (multi-function lights)
21 Ladder with platform
22 Rear-view camera*
23 Compensating reservoir for gear lubricant oil of angular gears

* Optional extra

4.2 Equipment

Verti-Mix 75-145, 1300-2100DK, 115-245D, 75-125L	
Standard equipment	**Optional extra**
Chassis	
single axle (braking axle)	
Brake system	
hydraulic working brake 6 km/h	hydraulic service brake 25 km/h optionally with emergency brake valve (only for export, only on VM 75-145 and VM 115-245D) hydraulic brake 25 km/h without emergency brake valve (only for export, only on VM 75-145) compressed-air brake 25 km/h
Drawbar	
top linkage with drawbar lug Ø40 for 6km/h	top linkage with drawbar lug Ø40 for 25km/h bottom linkage with drawbar lug Ø40 for 25km/h bottom linkage with drawbar lug Ø50mm shell K80 (for top or bottom linkage, not on VM 75-125L)
Supporting leg	
mechanical	hydraulic fixed supporting leg (not on VM 1300-2100DK and VM 75-125L)
Container	
standard container two mechanical counter-cutters	stainless steel lining, bottom stainless steel lining, container stainless steel lining, gate two hydraulic counter-cutters inner or upper overflow ring feed funnel for mineral feed
Mixing unit	
standard mixing auger 15 mm standard set of knives	"heavy-duty" mixing auger 20 mm INNODUR wearing elements straw cutting knife bale cutting knife root crop knife magnetic system protective cover sickle-shaped scraper scraper

Verti-Mix 75-145, 1300-2100DK, 115-245D, 75-125L	
Standard equipment	**Optional extra**
Discharge	
side discharge with rubber guard	several front and rear side discharge variants with guard side discharge with discharge conveyor rear centre discharge with guard (not on VM 75-125L) crossover conveyor (not on VM 75-125L) rear right-hand and left-hand discharge with delivery behind the wheels (not on VM 75-125L and VM 1300-2100DK)
Operation	
operation via direct tractor connection	hand-operated regulator for discharge conveyor operation via Bowden cable operation via E-control
Weighing device	
without weighing device	programmable weighing device PTM HL 50 programmable weighing device PTM Advanced Super USB, optionally with data transfer CowConnect weighing system Digistar weighing device (only on VM 1300-2100DK)
Drive	
propeller shaft with shear bolt coupling drive without switchgear	wide-angle propeller shaft with shear bolt coupling drive with switchgear
Equipment	
rear ladder	lighting work lights service hours counter camera system with screen bumper buffer, crossover conveyor, rear (not on VM 75-125L) additional screen for weighing device radio remote control signal lamp for weighing device on-board hydraulic system (only on VM 1300-2100DK)

Tab. 16:

4.3 Connections

The following figure illustrates the connections or supply lines between tractor and machine.

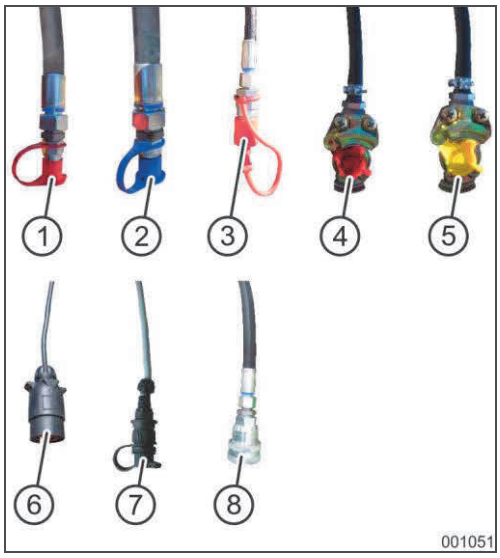


Fig. 16

1 Hydraulic connection "Flow line" DN 12 (red)
2 Hydraulic connection "Return line" DN 12 (blue)
3 Hydraulic connection for hydraulic working brake (red)
4 Compressed-air brake system, feed line (red)
5 Compressed-air brake system, brake line (yellow)
6 Lighting connection, 7-pole
7 Power supply, 3-pole
8 Hydraulic connection for hydraulic brake system with hydraulic clutch according to ISO 5676 (only with available hydraulic brake system)

4.3.1 Marking of hydraulic supply lines

The labels marking the hydraulic supply lines are attached to the front of the machine.

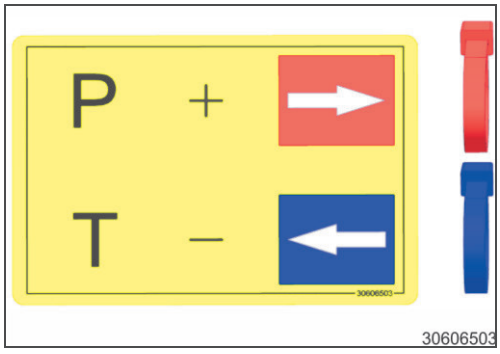


Fig. 17

Explanation of hydraulic connection symbols

Hydraulic connection "Flow line"

- P: Pressure line
  – one red cable tie

Hydraulic connection "Return line"

- T: Tank line
  – one blue cable tie

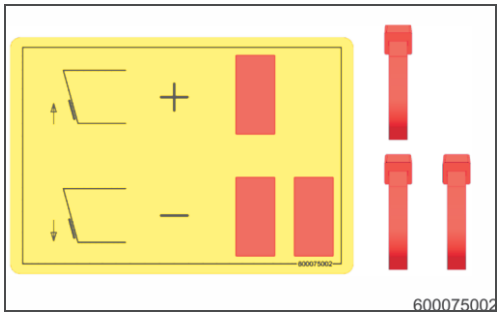


Fig. 18

Hydraulic connection, dosage gate, left-hand (double-acting)

- Pressure line (return line)
  – one red cable tie
  → Open left-hand dosage gate
- Pressure line (return line)
  – two red cable ties
  → Close left-hand dosage gate

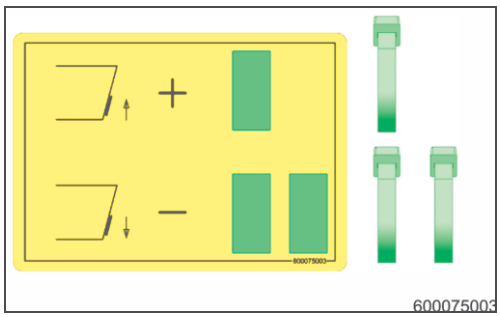


Fig. 19

Hydraulic connection, dosage gate, right-hand (double-acting)

- Pressure line (return line)
  - – one green cable tie
  - → Open right-hand dosage gate
- Pressure line (return line)
  - – two green cable ties
  - → Close right-hand dosage gate

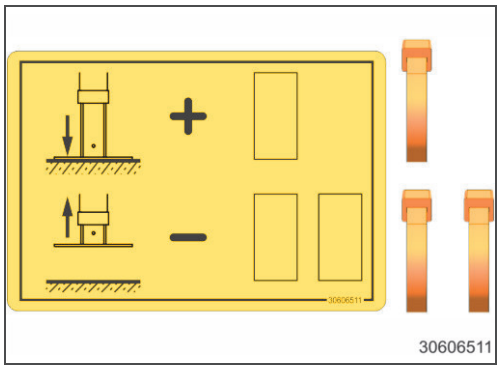


Fig. 20

Hydraulic connection, supporting leg (double-acting)

- Pressure line (return line)
  - – one yellow cable tie
  - → Lower supporting leg
- Pressure line (return line)
  - – two yellow cable ties
  - → Lift supporting leg

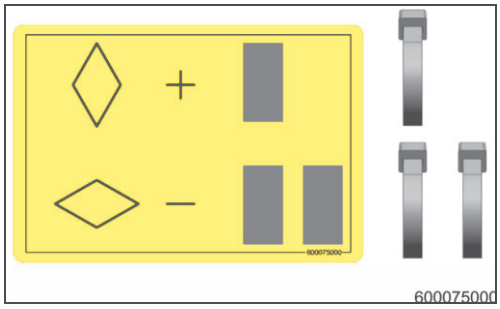


Fig. 21

Hydraulic connection, universal, rhombus (double-acting)

- Pressure line (return line)
  - – one grey cable tie
  - → Actuate optional hydraulic function
- Pressure line (return line)
  - – two grey cable ties
  - → Actuate optional hydraulic function

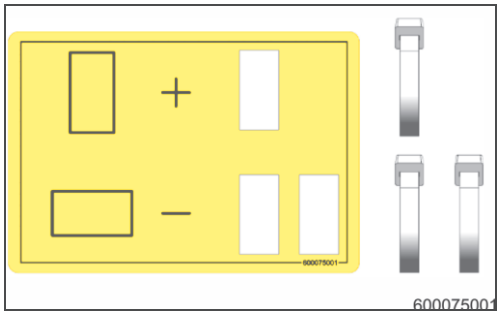


Fig. 22

Hydraulic connection, universal, rectangle (double-acting)

- Pressure line (return line)
  - – one white cable tie
  - → Actuate optional hydraulic function
- Pressure line (return line)
  - – two white cable ties
  - → Actuate optional hydraulic function

4.4 Hydraulic system

The hydraulic system consists of the following basic components:

- Hydraulic motors
- Hydraulic cylinders
- Hydraulic valves
- Hydraulic pipes and connecting parts
- Hydraulic oil filter
- Hydraulic oil tank (tractor or on-board hydraulic system)
- Hydraulic oil pump (tractor or on-board hydraulic system)

The hydraulic system is powered by the tractor's hydraulic pump. The hydraulic pump presses the hydraulic oil out of the hydraulic oil tank into the hydraulic cylinders and to the hydraulic motors. The hydraulic oil flows back into the hydraulic oil tank.

The hydraulic components are controlled by means of inserted control elements alternatively:

- directly via the control devices of the tractor (standard equipment),
- via Bowden cable operation or
- electro-hydraulically (E-control)

4.4.1 Electro-hydraulic control block

The control block is mounted in the front part of the machine. Ensure a separate oil supply of the tractor to execute the individual hydraulic functions. Depending on the machine's equipment, the control block is fitted with more or less valve discs and can operate up to six functions and, as an option, control the conveyor speed.

Depending on the machine's equipment, the individual valves (1) to (6) can be assigned the following functions*:

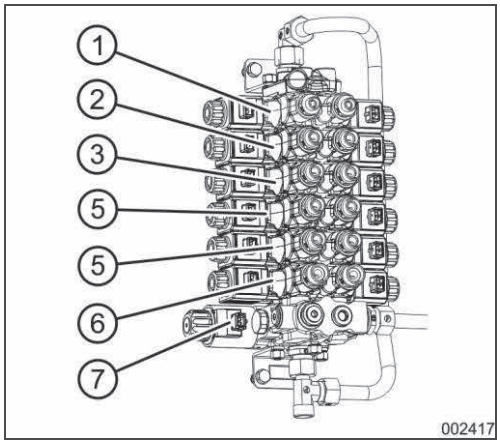


Fig. 23

- Open / Close dosage gate
- Discharge, conveyor / chute
- Unlock / Lock passive steering
- Counter-cutters in / out
- Lift / Lower supporting leg
- Crossover conveyor on / off
- Side conveyor on / off
- Conveyor extension on / off

A control valve for the flow rate (7), important for changing the conveyor speed, can be connected upstream of the block.

A high-pressure filter is mounted upstream of the control block.

*For assignment of the options at the control block applicable for the respective machine according to equipment ► see section 4.2 Equipment, page 58

4.4.2 On-board hydraulic system

Optional extra

Depending on its equipment, the machine may be fitted with an on-board hydraulic system, ► see section 4.2 Equipment, page 58. In this case, it is not necessary to connect the machine to the hydraulic system of the tractor.

NOTE

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

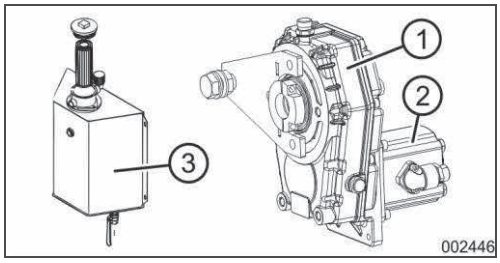


Fig. 24

If the machine is equipped with an on-board hydraulic system, it is additionally fitted with

1 a gearbox
2 a hydraulic pump
3 an oil tank with return-flow filter

4.5 Drawbar

The drawbar is attached to the container without a frame and designed as top linkage (1) or bottom linkage (2). The height adjustment is carried out by means of the positioning holes (3). This allows optimum adjustment of the drawbar lug (4) to the respective height of the coupling device of the different tractors. The drawbar lug is coupled by means of an appropriate coupling device.

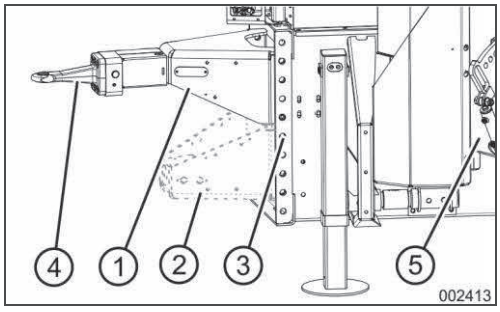


Fig. 25

1 Drawbar top linkage
2 Drawbar bottom linkage
3 Positioning holes (height adjustment)
4 Drawbar lug
5 Container

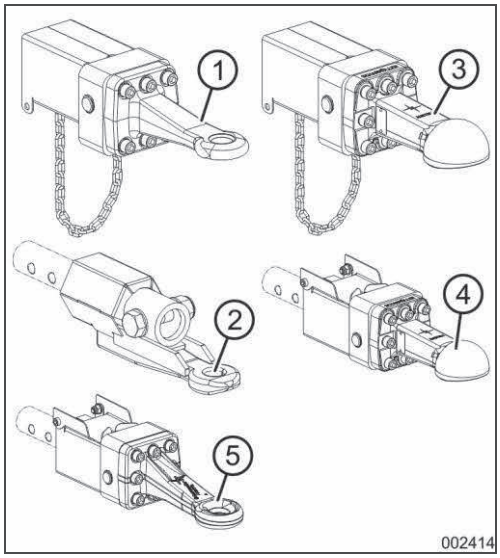


Fig. 26

4.5.1 Drawgear

Depending on the design of the tractor's coupling device, various drawgears are possible.

- With drawbar top linkage:
  - 1 Drawbar lug 40 reinforced
  - 2 Drawbar lug 40
  - 3 Shell K80
- With drawbar bottom linkage:
  - 4 Shell K80
  - 5 Drawbar lug 50

Combination options ► see section 6.5 Combination options of coupling devices and drawgears, page 94

4.6 Supporting leg

⚠ WARNING

Risk of failure of support device due to excessive tongue load or risk of tipping over if the machine is unevenly charged due to insufficient tongue load.

- Do not unhitch the machine when charged or partly charged.
- Do not charge the unhitched machine.

4.6.1 Mechanical supporting leg

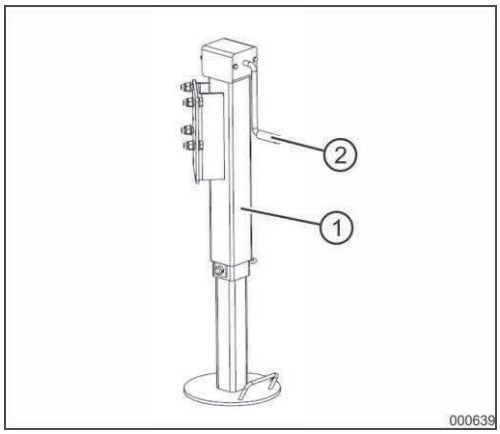


Fig. 27

The machine may be equipped with a mechanical supporting leg, which supports the unhitched machine.

The mechanical supporting leg with spindle adjustment and telescopic quick adjustment (1) is set via the crank handle (2).

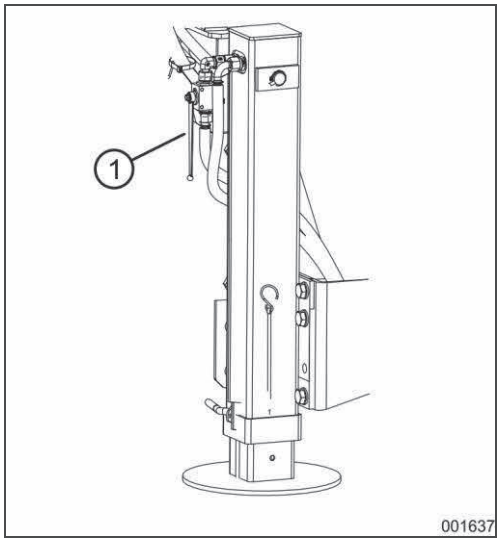


Fig. 28

4.6.2 Hydraulic supporting leg

The machine is equipped with a hydraulic supporting leg, which supports the unhitched machine.

The hydraulic supporting leg (1) is actuated via a double-acting control device of the tractor when direct control is used.

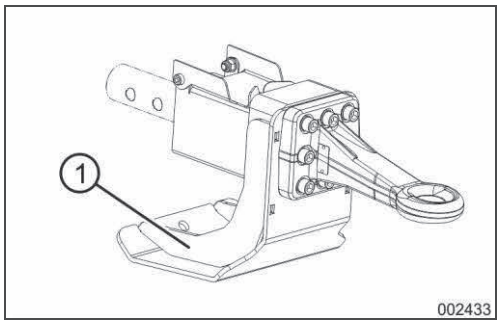


Fig. 29

4.6.3 Fixed supporting leg

The machine equipped with a bottom hitch can be fitted with a fixed supporting leg (1).

The drawbar is placed on the fixed supporting leg in unhitched condition, such that the drawgear remains freely accessible.

4.7 Power train

Depending on the machine, the power train of the Verti-Mix may be designed in different ways.

As a basic principle, the machine is powered by means of a propeller shaft from the tractor. Depending on the equipment, switchgears and, according to the number of mounted augers, mixer gearboxes are installed between the individual shafts in the power train.

The power trains for the machines described in these operating instructions are specified in the following.

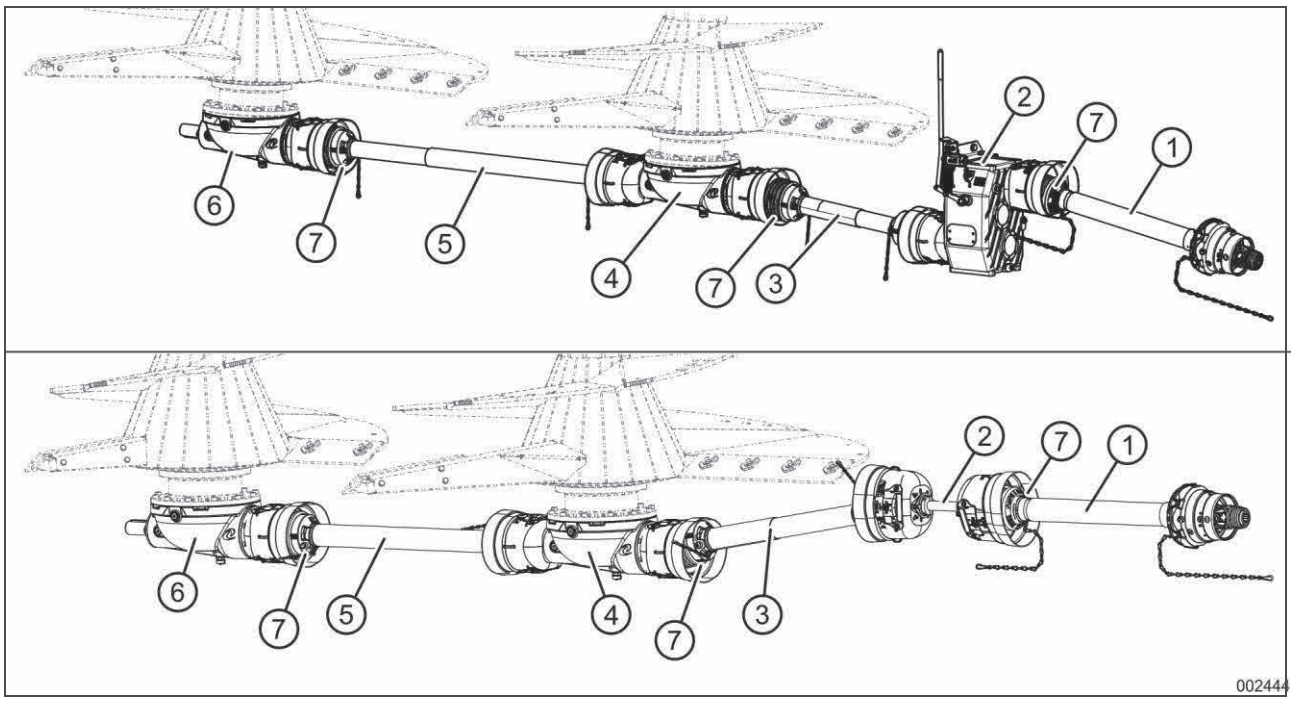


Fig. 30: Power train

The auger(s) is (are) powered by the tractor's p.t.o. shaft via:

1 a propeller shaft
   – A shear bolt at the propeller shaft (3) separates the power train in case of an overload if e.g. the mixing auger(s) get(s) jammed due to foreign objects.
2 an intermediate shaft or optionally a switchgear
3 a propeller shaft with shear bolt coupling (7)
4 a coaxial gearbox
5 a propeller shaft with shear bolt coupling (7)
   – on machines with two augers
6 a coaxial gearbox
   – on machines with two augers

The oil level of the coaxial gearboxes can be seen in the corresponding compensating reservoir mounted on the outside of the mixing container, ► see section 10.9.1 Mixer gearbox with compensating reservoir, page 180. The upper bearing in the coaxial gearbox (neck bearing) can be lubricated by means of a lubrication line / lubricating nipple mounted at the compensating reservoir.

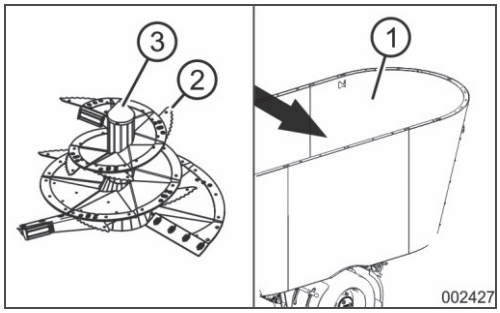


Fig. 31

4.8 Mixing container and mixing augers

Depending on the equipment, the fodder is picked up, then chopped and mixed by one or several mixing augers (3) during the mixing process in the mixing container (1). The mixing augers are powered via angular gears coupled with the power train.

The mixing augers are equipped with cutting knives (2) which loosen and chop the fodder. The knives can be adjusted and thus be optimally set to the specific conditions of use. Furthermore, the counter-cutters mounted at the side of the mixing container can be extended, e.g. when chopping and mixing round or cuboid bales. Highly-structured fodder components can be chopped more finely and mixed faster.

Due to the geometry of the container and mixing augers, a homogeneous mixture of fodder and fodder components is obtained.

Depending on the equipment, the mixing augers may include:

- a heavy-duty design with 20 mm strong windings for a longer service life
- "INNODUR" wearing elements made of stainless steel to extend the service life of the mixing auger (can also be retrofitted onto the auger windings).
- optional "long" cutting knives for processing long-fibre components, e.g. straw
- "bale knives" (extension of the upper cutting knife) for processing whole round bales
- a "root crop knife" (knife comb at the bottom front auger end) for processing / chopping beets, potatoes etc.

NOTE

Cutting knives retracted (factory setting)

- The cutting knives stand back.
- Less driving power required.
- Better loosening of bales.

Cutting knives extended:

- The cutting knives protrude.
- More driving power required.
- Supports the emptying of the mixing container in case of highly-structured mixtures.
- An extended upper cutting knife can better pick up bale components and re-include them in the intensive mixing process.

⚠ WARNING

Sharp-edged cutting knives

Risk of cuts.

- Wear cut-proof protective gloves.
- Turn the mixing auger such that the cutting knives are directed away from the discharge opening.
- Secure the machine against accidental starting.
- Cover the cutting knives by means of an edge protector.

4.8.1 Magnetic system

Optional extra

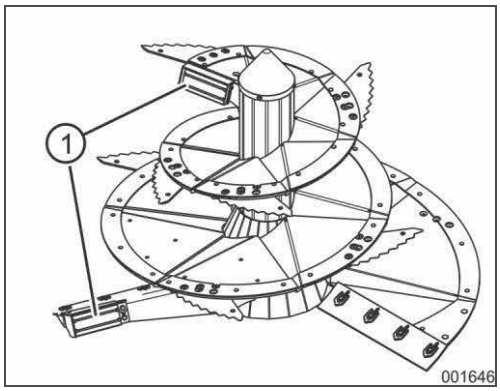


Fig. 32

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.

4.8.2 Scraper bars, mixing auger

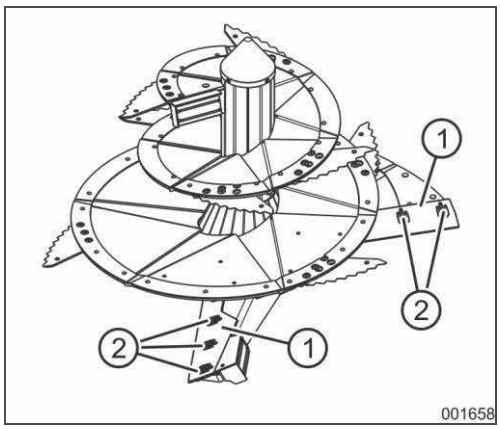


Fig. 33

The scraper bars (1) at the mixing auger can be adjusted.

The scraper bars enable almost residue-free entrainment and discharge of the mixed material from the bottom of the container.

4.8.3 Scraper

Optional extra

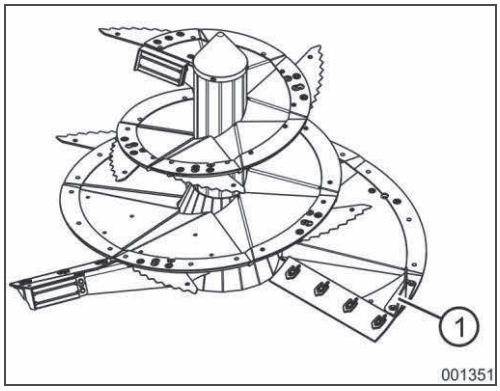


Fig. 34

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

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.

4.8.4 Protective cover

Optional extra

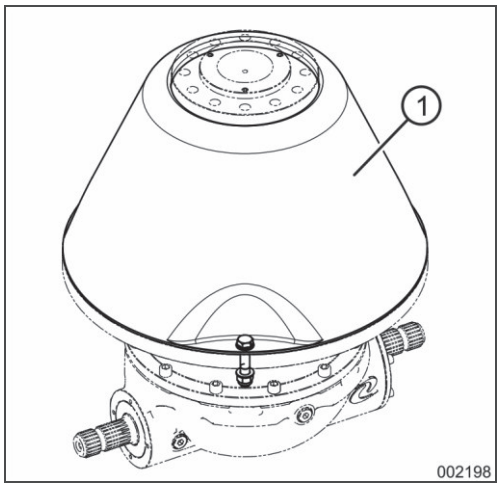


Fig. 35

The protective cover (1) made of folded sheet metal or plastic 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 adding liquid ingredients, e.g. water to prepare a compact TMR* due to the poorly structured, pappy consistence.

NOTE

Due to the addition of water and other liquid components, material may enter the area beneath the mixing auger at the coaxial gearbox. There, faulty fermentation may occur leading to contamination of the fodder.

4.8.5 Counter-cutters

Depending on the equipment, the mixing container may be fitted with mechanically adjustable or hydraulically adjustable counter-cutters. Swivel the counter-cutters (1) in to slow down the fodder during the mixing process, in particular with the container partly charged. Thus, highly-structured fodder components can be chopped more finely and mixed faster.

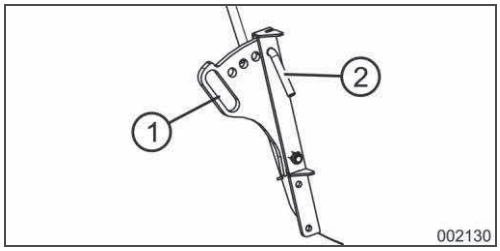


Fig. 36

Mechanical counter-cutters (standard):

Extend the counter-cutters (1) into the mixing container by manually placing the bolt (2) in 4 possible positions,

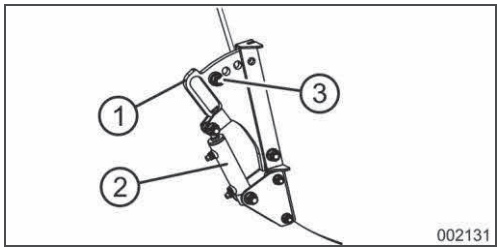


Fig. 37

Hydraulic counter-cutters (optional):

The counter-cutters (1) can be extended into and retracted from the mixing container from the driver's cabin by means of a hydraulic cylinder (2), thus enabling the optimisation of the fodder structure and the mixing time and the reduction of the power required.

Displace the limit stop screw (3) to preset four possible positions.

4.8.6 Overflow ring

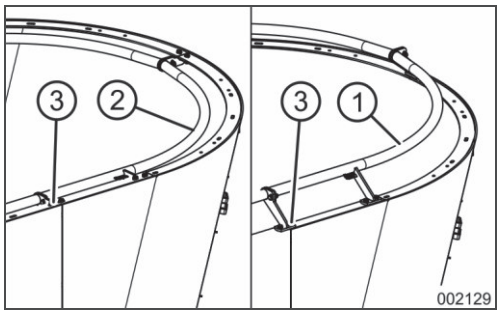


Fig. 38

The overflow ring prevents the fodder from being thrown over the container edge (3) during mixing.

The overflow ring is screwed to the top edge of the container and is available in different designs:

Depending on the machine’s equipment, it is fitted with:

- an upper overflow ring (1)
- an inner overflow ring (2)

4.8.7 Feed funnel for mineral feed

Depending on the equipment, the machine may be optionally fitted with filling options at various points for easy addition of small quantities of fodder, fodder additives and additives such as mineral feed.

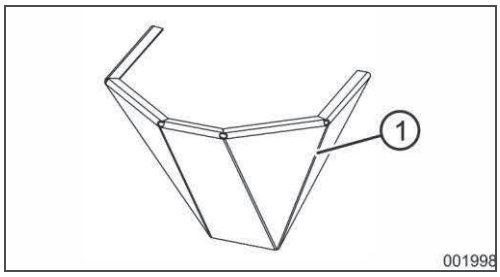


Fig. 39

Feed funnel at the container

Mineral feed or other pourable fodder additives can be manually filled into the mixing container directly from the ground through the feed funnel (1).

4.9 Discharge options

After completion of the mixing process, the fodder mixture is discharged through the discharge openings of the mixing container.

The following discharge options are available for fodder discharge:

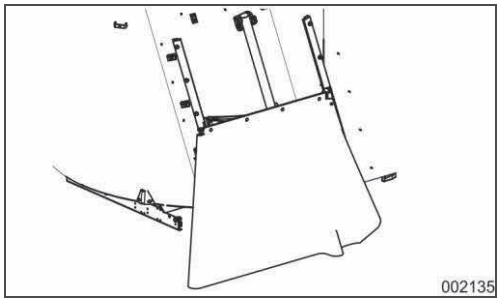


Fig. 40

Right-hand front / Left-hand rear side discharge with rubber guard

Fodder is discharged tangentially in the sense of rotation of the mixing auger

At the side discharge devices, adjustable chutes support the fodder discharge. When the gate is closed, the side chute mechanically swivels to its rest position.

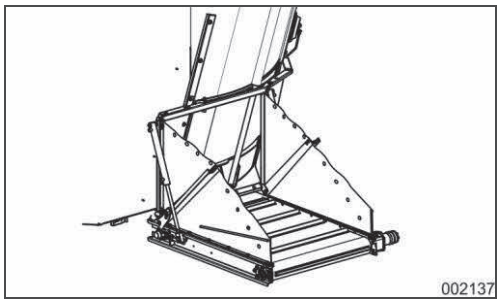


Fig. 41

Side discharge with conveyor (770, 880 or 1240 mm conveyor length)

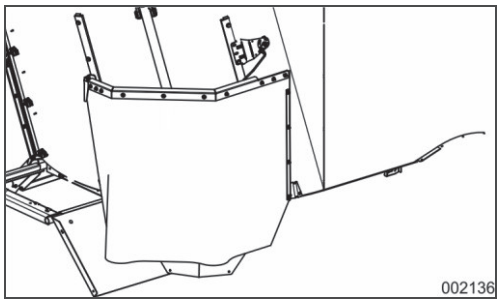


Fig. 42

Left-hand / Right-hand rear side discharge with guard (fodder discharge behind the wheel)

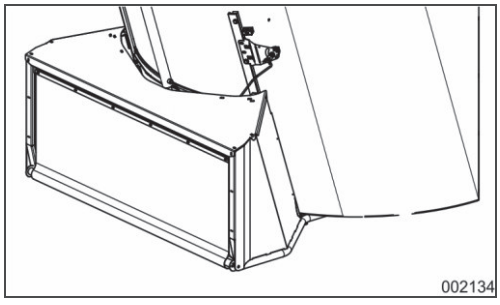


Fig. 43

Central rear discharge with rubber guard

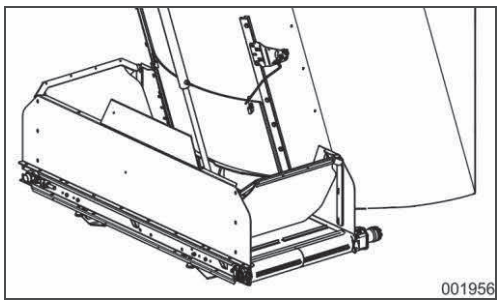


Fig. 44

Rear crossover conveyor

4.10 Weighing device

Depending on its equipment, the machine may be fitted with an external weighing device. In this case, please observe the sub-supplier documentation provided with the machine.

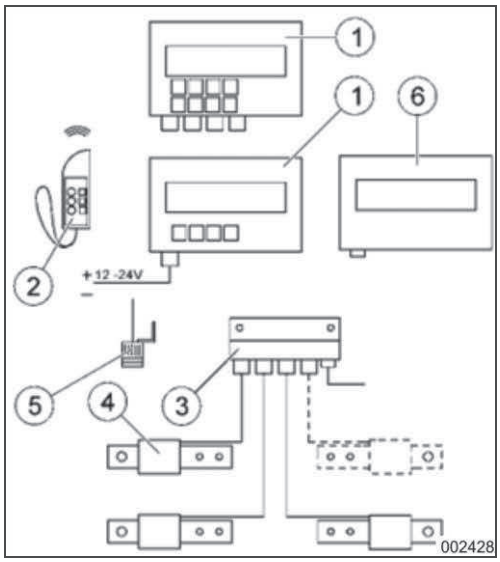


Fig. 45

1 Weighing computer
2 Radio remote control
3 Connection box
4 Weighing rods
5 Signal hooter
6 Additional screen

Additional options:

- Data transfer to the PC via USB stick
  - All weighing procedures are automatically saved and can be analysed on the PC by means of the appropriate software if required.
- Signal lamp

4.11 Chassis

Depending on the machine's equipment, the unsprung chassis consists of:

- a braking axle
  - with hydraulic working brake
  - with hydraulic service brake
  - with compressed-air brake

4.12 Vehicle axle

4.12.1 Braking axle

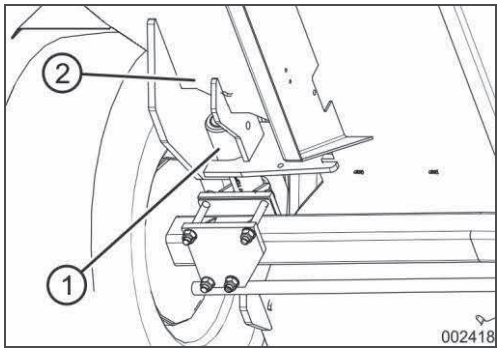


Fig. 46

All machine models are equipped with a single axle. The single axle is a braking axle.

The braking axle is directly connected to the machine / the mixing container (2) by means of the weighing rods (1).

4.13 Brake system

Depending on the machine's equipment, the brake system is

- a hydraulic working brake with parking brake for an admissible maximum speed of 6 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.
- a compressed-air brake system with manually operated brake pressure regulator and parking brake for an admissible maximum speed of 25 km/h. The compressed-air brake is designed as a dual-line compressed-air brake system.

4.13.1 Hydraulic working brake

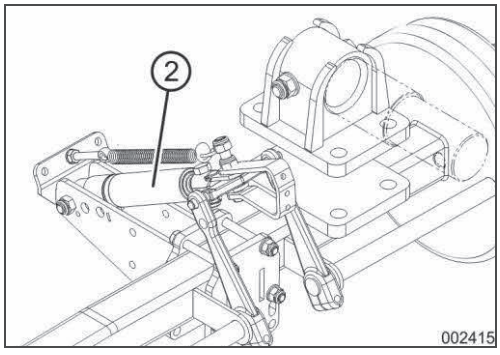


Fig. 47

The hydraulic working brake serves to slow down the movement of the machine.

The parking brake and the brake cylinder (2) of the hydraulic brake act on the brake levers at the braking axle.

The brake linkage transfers the forces produced by the brake cylinder to the brake shoes, which are pressed against the brake drums. The friction generated between brake shoes and brake drums slows the machine down.

NOTE

Observe national regulations regarding the operation of the hydraulic working brake on public roads.

ATTENTION

For this type of brake system, it is necessary to also actuate the parking brake to securely park the trailer!

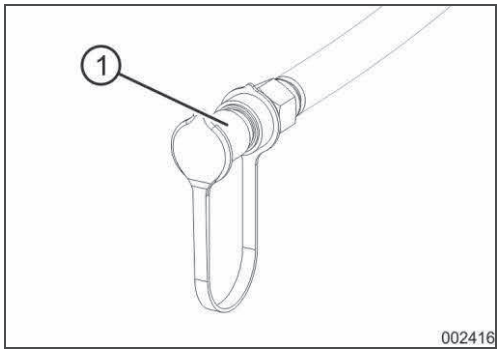


Fig. 48

The hydraulic working brake is actuated by means of the system pressure of the tractor's hydraulic system. (210 bar)

This pressure is directly forwarded into the brake cylinders.

The hydraulic working brake is connected by means of a hydraulic plug ISO 7241-A DIN 2353 (1)

- to a single-acting control device or
- to a tractor's double-acting control device with floating position.

→ The operator must actuate the respective control device on the tractor in order to slow the machine down.

– The maximum admissible speed is 6 km/h.

ATTENTION

Observance of the maintenance intervals is indispensable for proper functioning of the hydraulic working brake.

4.13.2 Hydraulic service brake

The hydraulic service brake serves to slow down the movement of the machine.

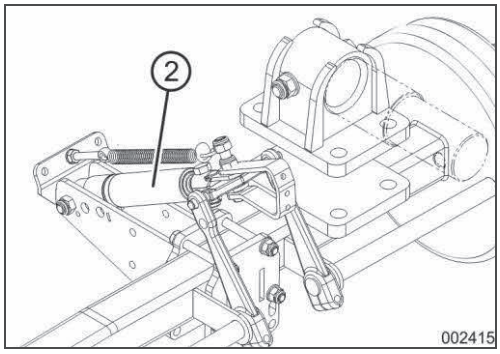


Fig. 49

The parking brake and the brake cylinder (2) of the hydraulic brake act on the brake levers at the braking axle.

The brake linkage transfers the forces produced by the brake cylinder to the brake shoes, which are pressed against the brake drums. The friction generated between brake shoes and brake drums slows the machine down.

NOTE

Observe national regulations regarding the operation of the hydraulic service brake on public roads.

ATTENTION

For this type of brake system, it is necessary to also actuate the parking brake to securely park the trailer!

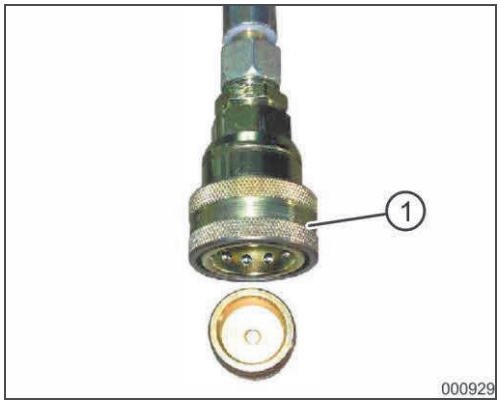


Fig. 50

The hydraulic service brake is actuated by means of the system pressure of the tractor's hydraulic brake system. (115 bar).

This pressure is directly forwarded into the brake cylinders.

The hydraulic service brake is connected to the brake valve connection of the tractor's hydraulic brake system provided for this purpose by means of a hydraulic clutch ISO 5676 (1).

→ Actuate the brake pedal on the tractor to slow the machine down.

– The maximum admissible speed is up to 25 km/h.

ATTENTION

Observance of the maintenance intervals is indispensable for proper functioning of the hydraulic service brake.

4.13.3 Hydraulic service brake system with emergency brake valve

The brake system consists of

- one or several braking axle(s)
- emergency brake valve and hydr. pressure accumulator
- brake cylinder, hydr. line and hydraulic clutch according to ISO 5676

The hydraulic brake system

- is connected to the connection of the tractor brake valve provided for this purpose.
- is controlled by actuation of the tractor brake pedal.
- acts on the wheels of the braking axle(s).
- is, depending on its version, designed for the admissible axle load and a speed limit of up to 25/40 km/h.

ATTENTION

Observance of road traffic regulations

Observe the national road traffic regulations concerning the operation of the hydraulic single-line brake system.

⚠ DANGER

Travelling with the brake system not ready for operation

Before starting the journey, carry out a brake test for 10 seconds to fill the pressure accumulator of the hydraulic brake system.

ATTENTION

With hydraulic brake system,

- it is necessary to apply the parking brake to securely park the trailer!
- it is necessary to depressurise the brake system before uncoupling!

ATTENTION

Observance of the maintenance intervals is indispensable for proper functioning of the hydraulic brake system.

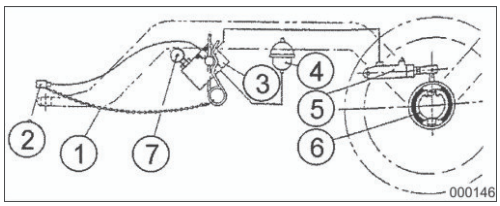


Fig. 51

1 Ripcord
2 Coupling sleeve
3 Emergency brake valve
4 Pressure accumulator
5 Brake cylinder
6 Brake drum
7 Drain valve

4.13.4 Compressed-air brake system

The compressed-air brake system

- pneumatically actuates the wheel brakes of the braking axle / braking axles.
- is connected to the tractor connections provided for that purpose.
  - The supply line marked in red serves to permanently provide the hitched machine with air, while the brake line marked in yellow is responsible for the control of the braking process.
- is, depending on its version, designed for the admissible axle load and a speed limit of up to 40 km/h.
- is equipped with an automatic brake pressure regulator.
  - The required braking force is automatically set depending on the loading condition of the hitched machine.

- is equipped with one or several compressed air reservoir(s) for air supply with a device for draining condensate.
- is equipped with a release valve for manoeuvring the machine with the brake and feed line disconnected.
- is, depending on the equipment (with tridem), fitted with spring-accumulator brake cylinders (Tristopp brake cylinders).
  - In this case, the parking brake is applied and released automatically via a double release valve, depending on the operating state of the compressed-air brake system, or manually applied and released.

⚠ WARNING

Insufficient braking ability

Risks due to insufficient braking ability of the machine may occur if

- the manual brake pressure regulator is not set properly.

– Adjust the setting of the manual brake pressure regulator before each journey and every time the loading condition changes.

- the admissible axle load or the gross vehicle weight rating of the machine is exceeded.

– Do not overload the machine.

- the compressed-air brake system is not ready for operation.

– Carry out a brake test at slow speed to check the brake for proper functioning.

ATTENTION

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

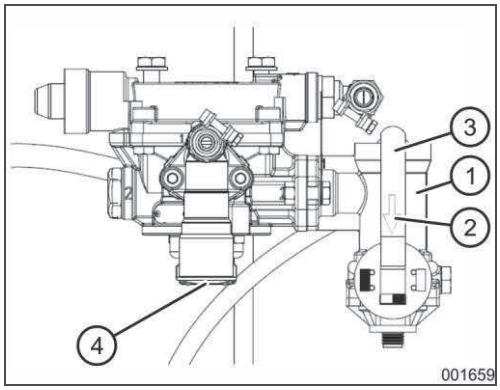


Fig. 52

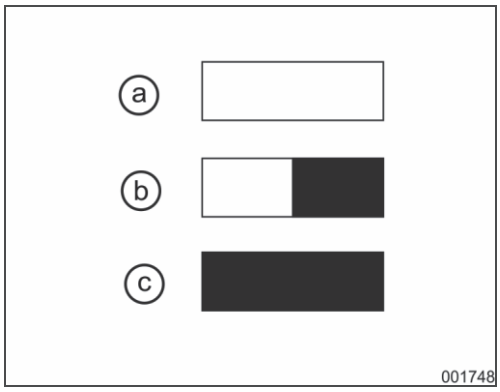


Fig. 53

4.13.5 Compressed-air brake system with hand-operated regulator

In case of a manual brake pressure regulator (1), the required braking force must be set depending on the loading condition of the hitched machine. The set braking force is displayed beneath the arrow (2).

The release valve (4) is used for actuating and releasing the service brake system (e.g. for manoeuvring work). The release valve can only be actuated in uncoupled condition. The following switch positions are possible:

- Push in as far as it will go and the service brake system releases, e. g. for manoeuvring the machine with the brake system uncoupled.
- Pull out as far as it will go and the machine is braked again by means of the system pressure coming from the air reservoir

ATTENTION

The pneumatic service brake system only releases at a minimum operating pressure of 3.5 bar.

The following three braking forces can be set by turning the hand lever (3):

a) Reduced braking force
   Loading condition – empty machine
   Disabled – on machines with a high dead weight

b) Reduced braking force
   Loading condition – empty machine / partly charged machine

c) Full braking force
   Loading condition – full machine
   (maximum admissible axle load)

4.13.6 Connection diagram, compressed-air brake system

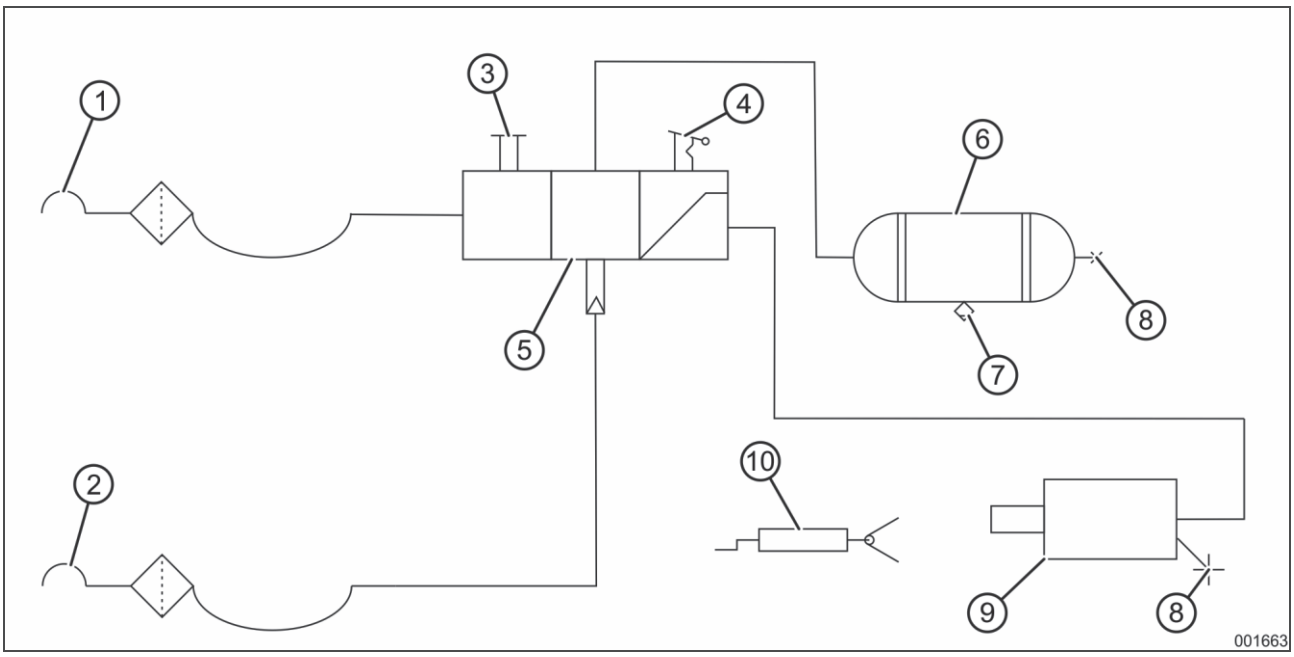


Fig. 54

1	Feed line with hose coupling (red) with filter	6	Compressed-air reservoir
2	Brake line with hose coupling (yellow) with filter	7	Drain valve
3	Release valve	8	Test connection (ISO 3583)
4	Hand-operated regulator	9	Brake cylinder
5	Trailer brake valve	10	Parking brake

4.13.7 Compressed-air brake system

The brake system consists of a compressed-air brake system with manual brake pressure regulator.

The required braking force is manually set depending on the loading condition of the hitched machine.

The compressed-air brake system

- is connected to the tractor connections provided for that purpose.
- acts on all wheels of the braking axle.
- is, depending on its version, designed for the admissible axle load and a speed limit of up to 40 km/h.
- is equipped with a release valve for manoeuvring the machine with the brake and feed line disconnected.

⚠ WARNING

Insufficient braking ability

Risks due to insufficient braking ability of the machine may occur if

- the manual brake pressure regulator is not set properly.

– Adjust the setting of the manual brake pressure regulator before each journey and every time the loading condition changes.

- the admissible axle load or the gross vehicle weight rating of the machine is exceeded.

– Do not overload the machine.

ATTENTION

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

4.13.8 Compressed-air brake system with manual brake pressure regulator

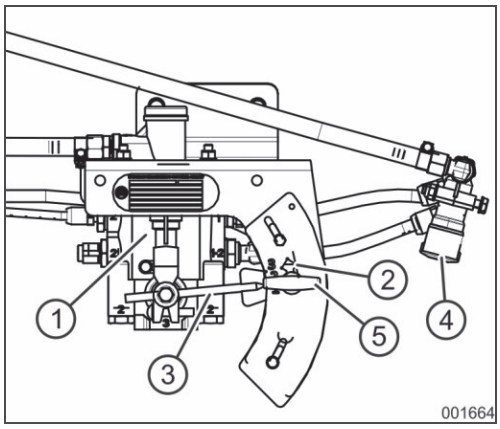


Fig. 55

In case of a compressed-air brake system with manual brake pressure regulator (1), the required braking force is set depending on the loading condition of the hitched machine. The set braking force is indicated on the scale (2).

The release valve (4) is used for actuating and releasing the service brake system. The release valve can only be actuated in uncoupled condition. The following switch positions are possible:

- Push in as far as it will go and the service brake system releases, e. g. for manoeuvring the unhitched machine.
- Pull out as far as it will go and the machine is braked again by means of the system pressure coming from the air reservoir

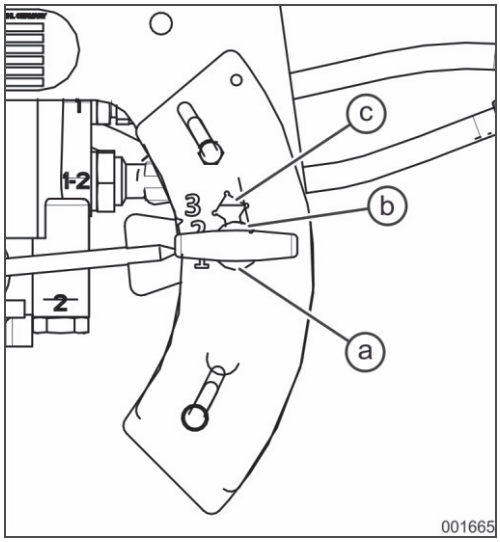


Fig. 56

ATTENTION

The pneumatic service brake system only releases at a minimum operating pressure of 3.5 bar.

Pull the T-handle (5) out and adjust the lever (3) to set the braking forces for the three following loading conditions:

a) Reduced braking force
   – empty machine

b) Reduced braking force
   – partly charged machine

c) Full braking force
   – machine charged with maximum admissible axle load

4.13.9 Connection diagram, compressed-air brake system

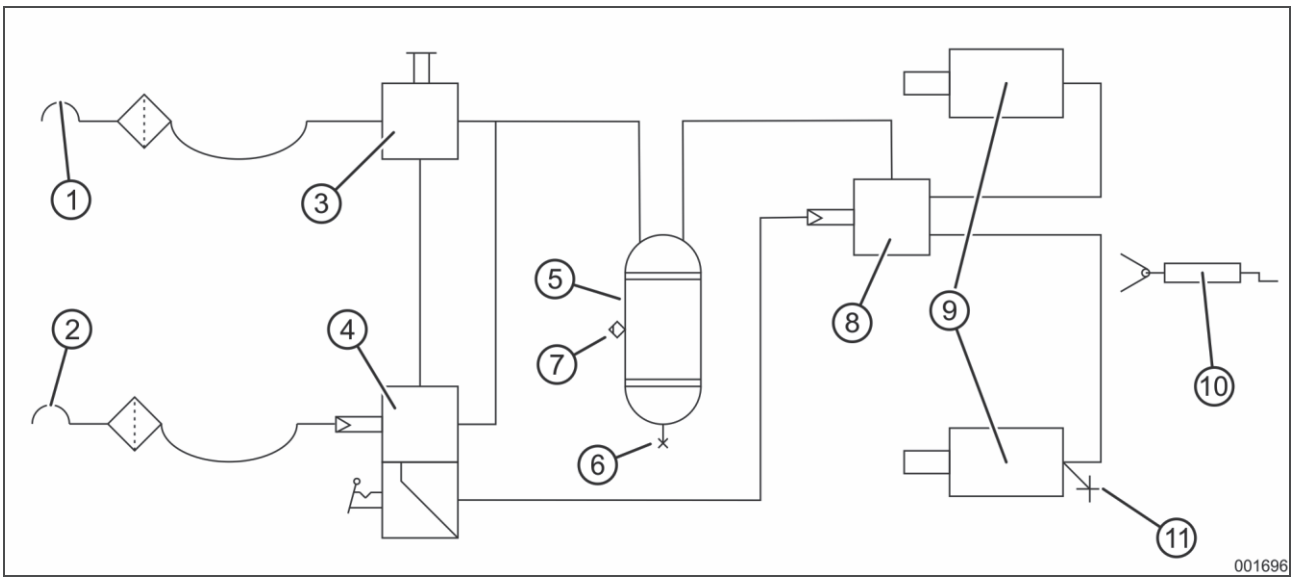


Fig. 57

1	Feed line with hose coupling (red) with filter	6	Test connection (ISO 3583), M22*1.5
2	Brake line with hose coupling (yellow) with filter	7	Drain valve
3	Release valve	8	Relay valve (optional)
4	Trailer brake valve with manual brake pressure regulator	9	Membrane brake cylinder (optional 1x or 2x)
5	Compressed-air reservoir	10	Parking brake
		11	Test connection (ISO 3583), M16x1.5

4.13.10 Parking brake with crank handle

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

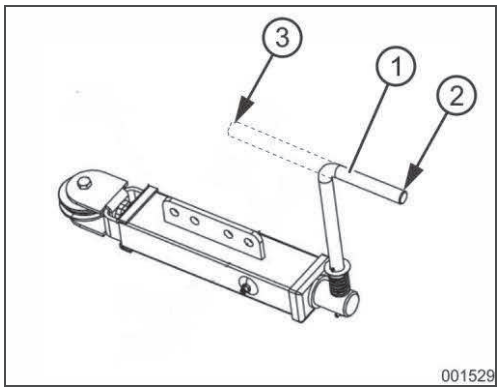


Fig. 58

1 Crank handle; in adjustment position (2)
2 Adjustment position
3 Rest position, swivelled by 180° compared to the adjustment position

4.14 Traffic-related equipment

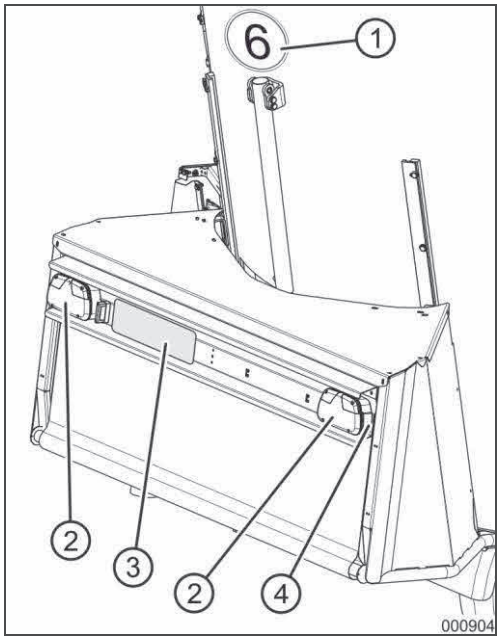


Fig. 59

Properly fix and check the traffic-related equipment for proper functioning before travelling on public roads and paths.

Depending on the machine's equipment, it is fitted with:

- a lighting and identification system according to the national road traffic regulations
- a brake system, ► see section 4.13 Brake system, page 73.

1 Speed sign
2 Multi-function light with triangular reflector
3 License plate
4 Side reflectors

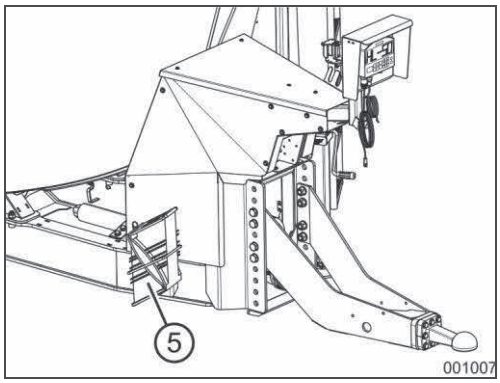


Fig. 60

5 Chocks

4.15 Type plate

The marking of the machine is treated as a document and must not be altered or made unrecognisable.

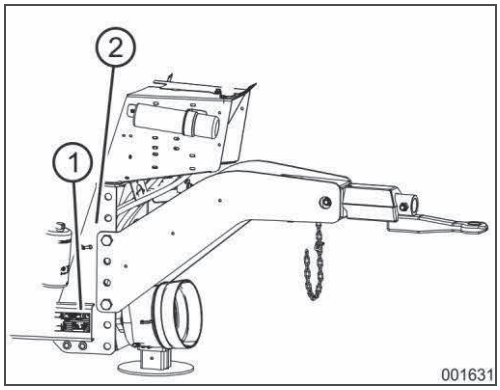


Fig. 61

1 Type plate with CE symbol
2 Vehicle identification number (machine ID number) embossed into the frame

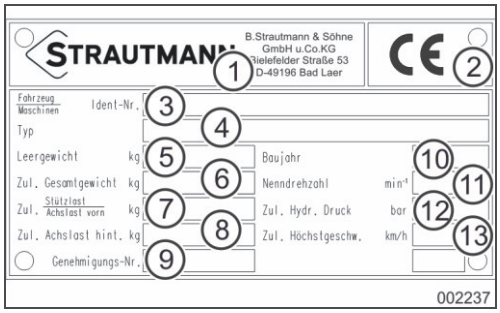


Fig. 62

Information on the type plate:

1 Manufacturer
2 CE symbol
3 Vehicle/Machine ID number
4 Model
5 Empty weight [kg]
6 Gross vehicle weight rating [kg]
7 Admissible tongue load/front axle load [kg]
8 Admissible rear axle load [kg]
9 Approval number
10 Year of manufacture
11 Rated speed [min^{-1}]
12 Admissible hydraulic pressure [bar]
13 Maximum admissible speed [km/h]

NOTE

Depending on the machine's equipment, not all fields on the type plate are filled.

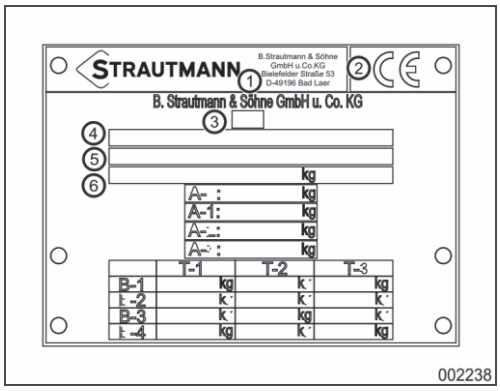


Fig. 63

Information on the EU type plate:

1 Manufacturer

2 CE symbol

3 Vehicle class

R3a Farming or forestry trailer Total axle load 3.5 – 21 t up to 40 km/h

R3b Farming or forestry trailer Total axle load 3.5 – 21 t more than 40 km/h

R4a Farming or forestry trailer Total axle load more than 21 t up to 40 km/h

R4b Farming or forestry trailer Total axle load more than 21 t more than 40 km/h

S2a Towed, interchangeable farming or forestry equipment Total axle load more than 3.5 t up to 40 km/h

S2b Towed, interchangeable farming or forestry equipment Total axle load more than 3.5 t more than 40 km/h

4 EU type approval number

5 Vehicle/Machine ID number type

6 Total axle load [kg]

A-0 Tongue load [kg]

A-1 Axle load, first axle

A-2 Axle load, second axle

A-3 Axle load, third axle

Information for rear coupling device (if available)

T-1 Drawbar trailer vehicle

T-2 Rigid drawbar trailer vehicle

T-3 Central axle trailer vehicle

B-1 Unbraked

B-2 Overrun brake

B-3 Continuous or semi-continuous brake

B-4 Hydraulic or pneumatic brake

5 Transport

5.1 Safety

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

Operative staff:

- Qualified staff for load transport (haulage contractor, crane operator)

Loading/Unloading by means of lifting devices

- Only authorise duly qualified staff to lift loads and instruct crane operators.
- Only use lifting, transport and load handling equipment and slings with sufficient lifting capacity and in technically sound condition for transport.
- Check all anchorage points and slings before each use for possible damage and replace them if necessary.
- Exclusively use the marked anchorage points when fixing slings.
- Attach slings vertically, use spacers / crossbars if necessary.
- Secure loading areas against unauthorised access.
- Move loads only under supervision.

⚠ DANGER

Suspended loads

Tilting or falling loads may cause serious or even fatal injuries.

- Never stand beneath suspended loads.
- Observe the total weight, anchorage points and the centre of gravity of the load.
- Observe the transport instructions and symbols on the load to be transported.

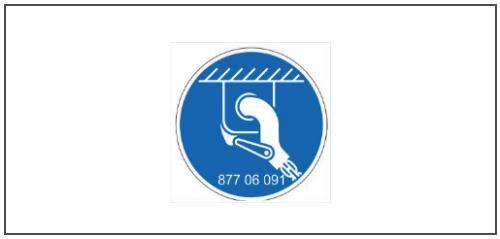


Fig. 64

Lashing and anchorage points for fixing slings and lashing loads are identified by the adjacent pictograph.

Application points for lifting device (e.g. jack) are marked by the adjacent symbol.

Loading/Unloading by means of tractor

- The tractor must be able to safely decelerate the machine.
- If the machine is equipped with a compressed-air brake system, start moving the machine only when the pressure gauge on the tractor indicates 5 bar.

⚠ WARNING

Uncontrolled movements due to tractor

Insufficient stability and insufficient steerability and braking ability of the tractor may cause dangerous tractor and machine movements.

- Properly hitch the machine only to an appropriate tractor.

5.2 Lashing and anchorage points

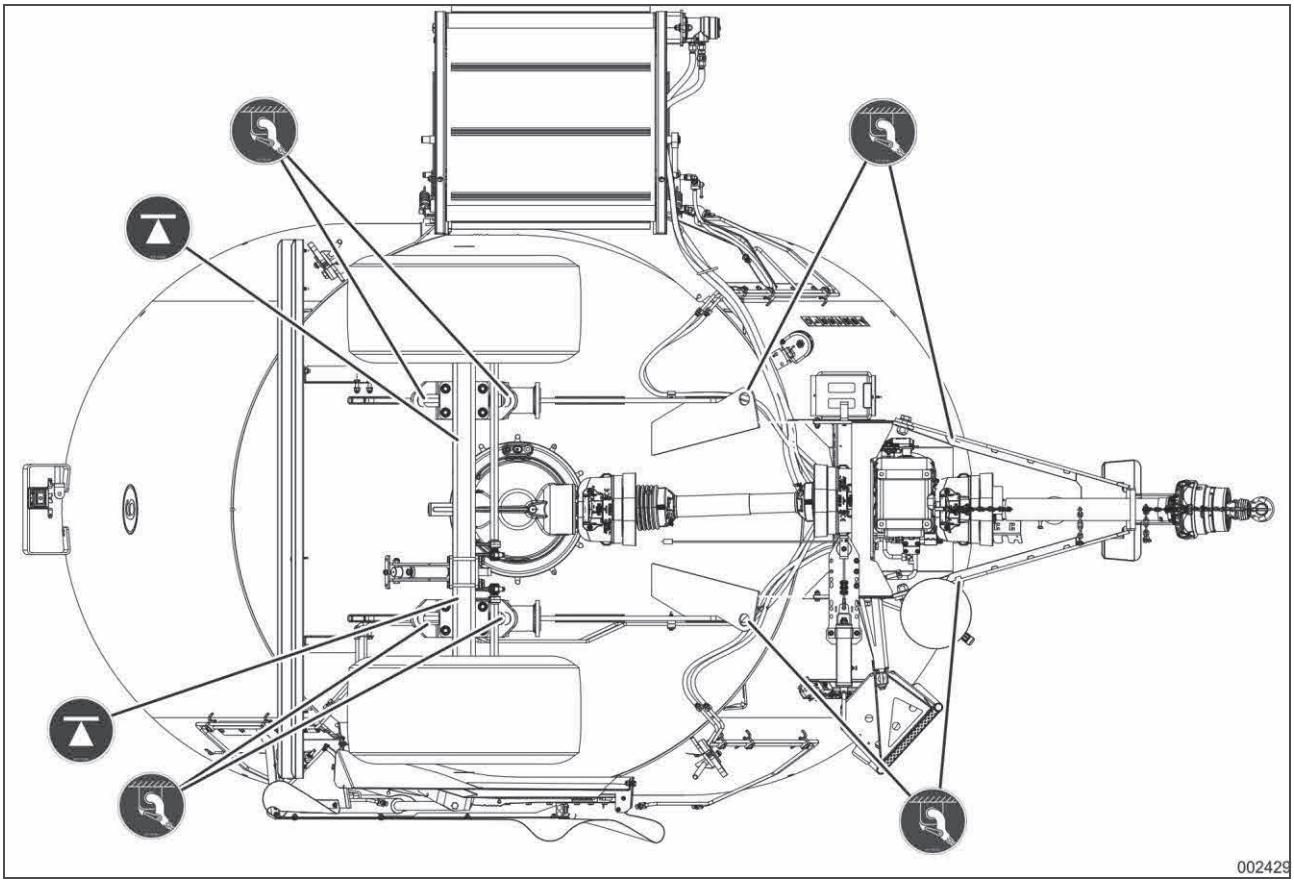


Fig. 65 Verti-Mix 75-145

Lashing and anchorage points

Application points for lifting device (jack)

Observe the safety instructions ► see section 5.1 Safety, page 85

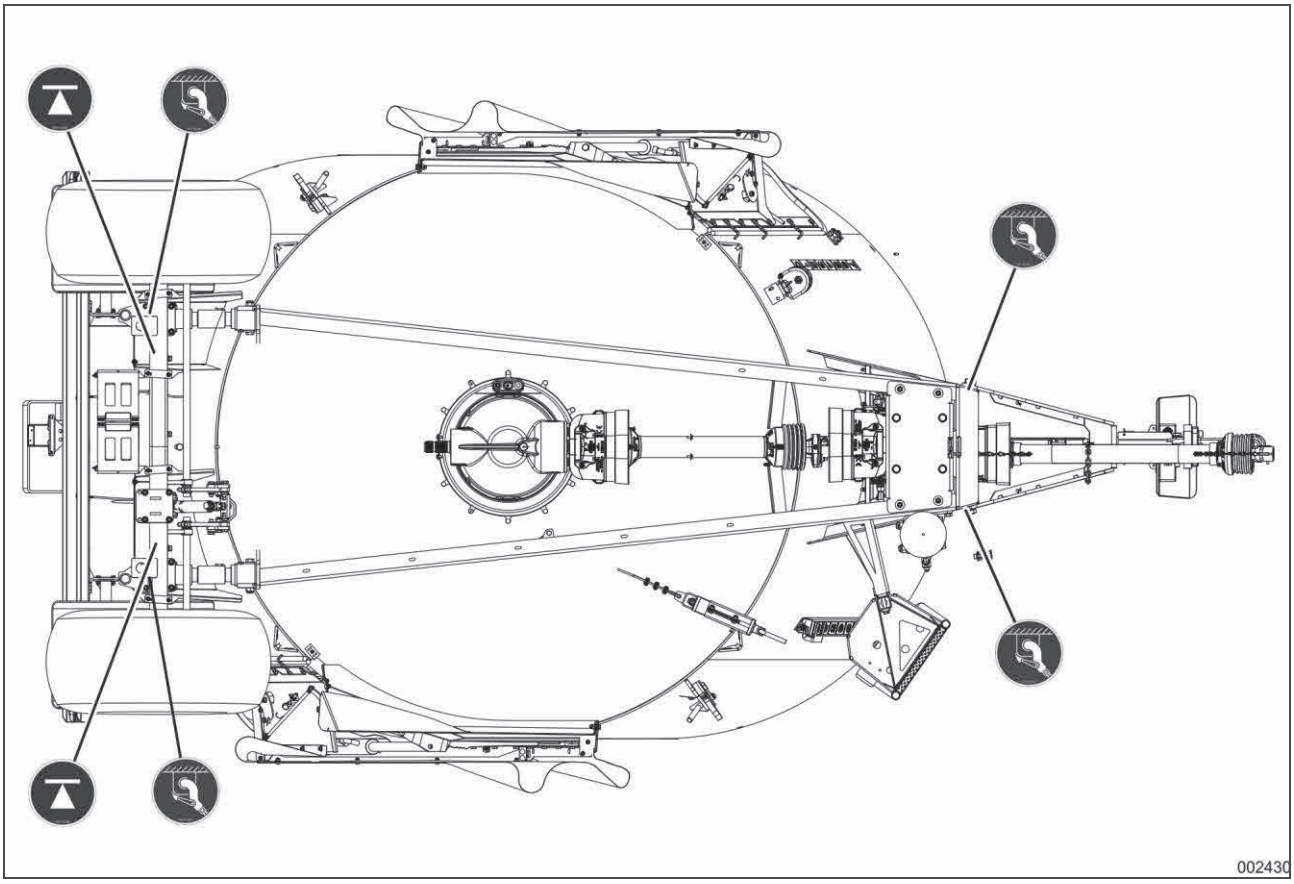


Fig. 66 Verti-Mix 75L-125L

Lashing and anchorage points

Application points for lifting device (jack)

Observe the safety instructions ► see section 5.1 Safety, page 85

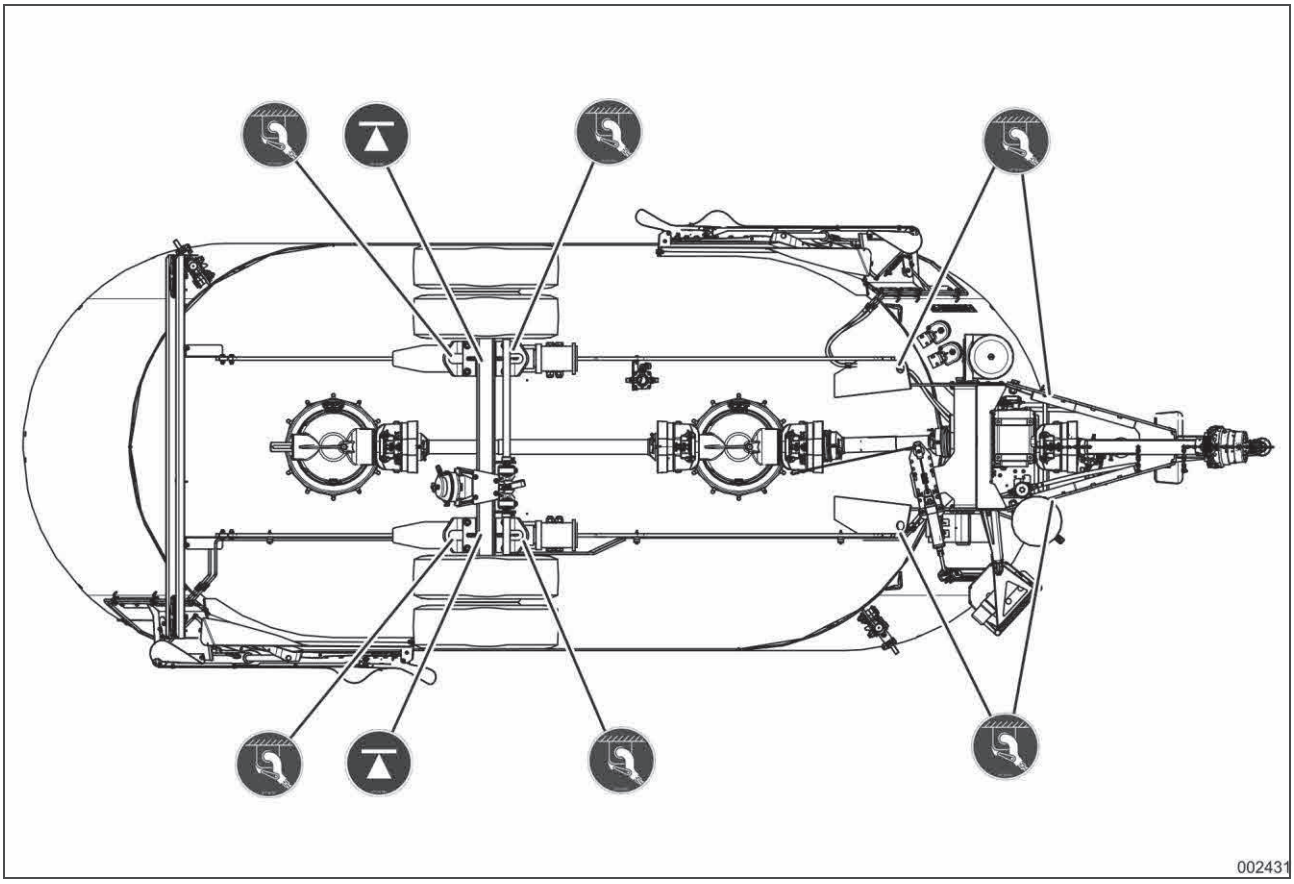


Fig. 67 Verti-Mix 115-245 Double

Lashing and anchorage points

Application points for lifting device (jack)

Observe the safety instructions ► see section 5.1 Safety, page 85

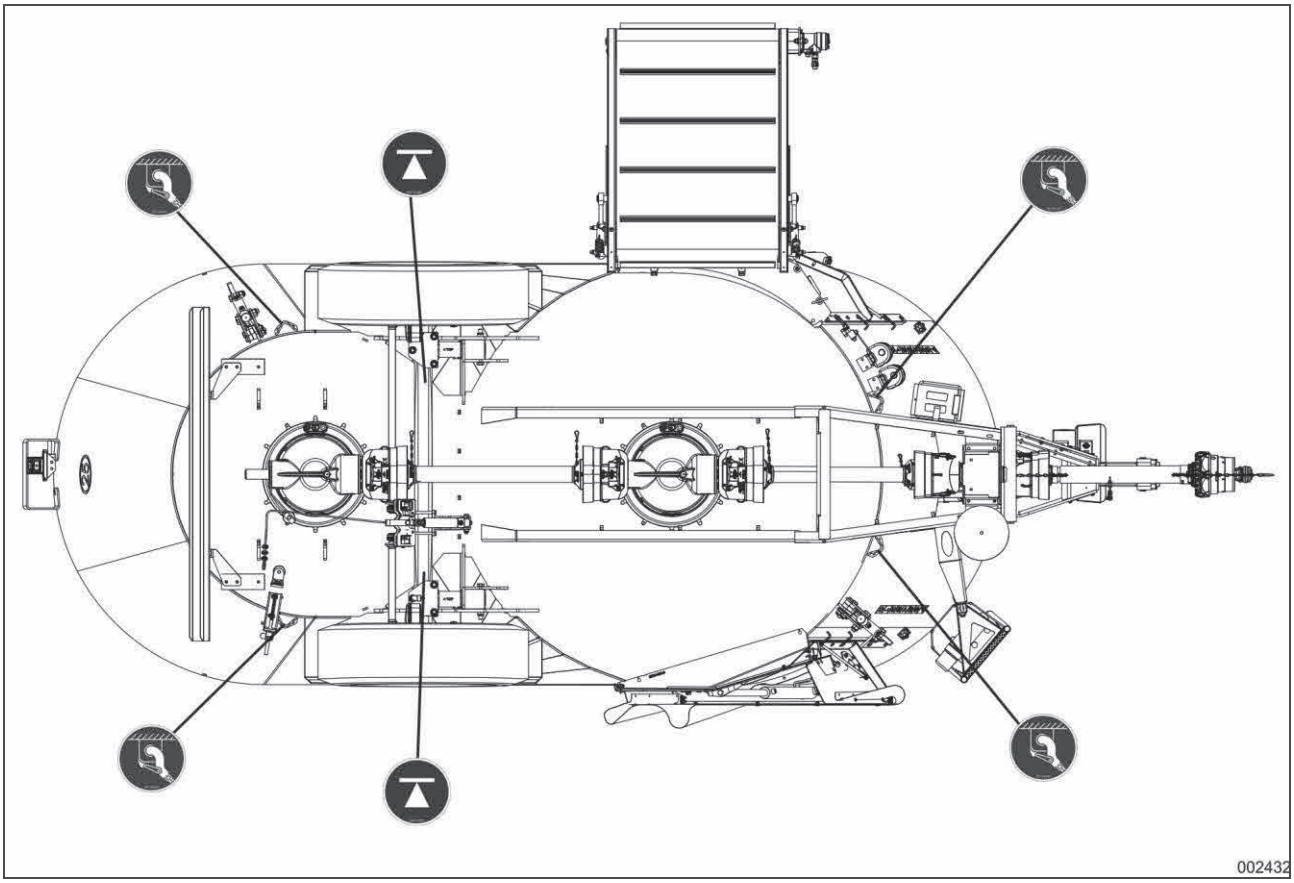


Fig. 68 Verti-Mix 1300-2100 Double K

Lashing and anchorage points

Application points for lifting device (jack)

Observe the safety instructions ► see section 5.1 Safety, page 85

6 Commissioning

6.1 Safety

As a basic principle, the following is applicable:

- Do not put the machine into operation until the operating instructions have been fully read and understood by all persons involved.
- Commissioning may only take place if the machine is guaranteed to be in an operational and roadworthy condition.
- Only put the machine into operation when there is a good view of the working area. Adjust the outside mirrors and camera properly to view the hazardous areas.
- People are not allowed
  - within the operating/hazardous area of the machine.
  - within the turning and swivelling range of movable machine parts.
  - within the discharge area of the machine.
  - beneath lifted and unsecured movable machine parts.
- Wear close-fitting clothing. Loose-fitting clothing may be more easily caught by moving machine parts.
- Only actuate powered machine parts if there are no people within the machine’s hazardous area.
- Observe the applicable road traffic regulations.
- Observe the applicable accident prevention and safety regulations.

6.2 Road traffic regulations

NOTE

The following points include information for the registration and the operation of the machine in Germany. When using the machine in other countries, observe the respective applicable national regulations and laws. Regulations and laws are subject to constant further development and modifications, therefore, we cannot assume any guarantee for the following points.

As standard, the machine is delivered without expert report for obtaining an individual operating license.

The maximum admissible speed is 6 km/h.

In terms of the StVZO, the machine is a hitched farming or forestry machine.

Farming or forestry equipment:

- with a gross vehicle weight rating of more than 3 t and an admissible speed limit of more than 6 km/h requires an operating license for travelling on public roads.
- is, independent of its operating speed when used for farming or forestry purposes in farming and forestry businesses, not subject to licensing (no license plate, no testing of roadworthiness).
- that does not require a license has to be equipped with the license plate of a tractor registered for the farming or forestry business.

Apply for operating license or registration

Machines with individual approval (expert report for obtaining an individual operating license) require an application for the individual operating license or for the registration to be submitted to the local registration office for travelling on public roads.

For farming or forestry equipment with EU type approval, i.e. EU Certificate of Conformity (CoC)

- use the EU Certificate of Conformity (CoC) to apply for the registration at the local registration office.
- the EU Certificate of Conformity (CoC) is sufficient as an operating license for travelling on public roads.

6.3 Tractor's compatibility

Incorrect use of the tractor may cause risks due to failure of components.

- Do not exceed the following admissible limit values:
  - Total weight of the tractor
  - Axle loads of the tractor
  - Tongue load at the tractor's coupling point
  - Towing capacity of the coupling device
  - Load-bearing capacity of the tractor tyres
- The gross vehicle weight rating of the tractor, which is specified in the vehicle registration certificate, must exceed the sum of:
  - the tractor's empty weight
  - the ballasting mass
  - the tongue load of the hitched machine
- 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. Perform a braking test.
- Equip the tractor with mirrors if necessary, such that the hazardous areas on both sides of the machine are clearly visible from the tractor.

6.4 Required tractor equipment

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

Engine output of tractor
For the necessary power requirement, please refer to the chapter "Technical data".

Tab. 17: Engine output

Electrical system	
Battery voltage	12 V
Socket for lighting	7-pole
Socket for power supply	3-pole (DIN 9680) The feed line of the 3-pole socket must have a minimum cable cross section of 4 mm² and be protected with a 25 A fuse.

Tab. 18: Electrical system

Hydraulic system	
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	Hydraulic oil HLP 46 or equivalent ATTENTION – Damage due to mixing of hydraulic oils. Check the compatibility of the hydraulic oils before connecting the machine to the hydraulic system of the tractor. Contact the agricultural machinery dealer to check if necessary. Never mix different types of hydraulic oil.

Tab. 19: Hydraulic system

NOTE

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

Although you are free to choose, 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 backpressure. Thus, a free return line reduces heating-up of the hydraulic oil and fuel consumption.

Operation via direct connection (availability according to equipment)	
Hydraulic component	**Required control devices on the tractor**
Dosage gate	• Double-acting control device
Hydraulic supporting leg	• Double-acting control device
Hydraulic counter-cutters	• Double-acting control device
Hydraulic motor for crossover conveyor	Optional: • Double-acting control device or • single-acting control device and depressurised return line (max. back pressure in return line 5 bar, conveyor runs only in one direction)
Side discharge conveyor	• Double-acting control device (folding in and out)
Hydraulic motor for side discharge conveyor:	Optional: • Double-acting control device or • single-acting control device and depressurised return line (max. back pressure in return line 5 bar)
Conveyor extension	• Double-acting control device (folding in and out)

Tab. 20: Direct connection

Bowden cable or electro-hydraulic operation (E-control)	
Component	**Required control devices on the tractor**
Optional extra	Optional: • Double-acting control device or • single-acting control device and depressurised return line (max. back pressure in return line 5 bar)

Tab. 21: Bowden cable or E-control

Brake system	
Hydraulic working brake up to 6 km/h	• Hydraulic clutch according to ISO 7241-A DIN 2353 • Single-acting control device (180 bar)
Compressed-air brake system	• Hose coupling (red) for feed line • Hose coupling (yellow) for brake line
Hydraulic service brake up to 25 km/h (only for export)	• Hydraulic clutch according to ISO 5676 (115 bar) • Connection to the hydraulic brake system of the tractor

Tab. 22: Brake system

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

Tab. 23: Mirrors

6.5 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.

- Only couple admissible combinations of tractor and hitched machine.

NOTE

The maximum admissible tongue load is indicated on the type plate of the coupling device, in the operating instructions and in the vehicle registration certificate of the tractor.

Tractor's coupling device	Machine's drawgear
Bolt-type coupling DIN 11028 / ISO 6489-2	• Drawbar lug 40 reinforced DIN 11026 / ISO 5692-2 • Drawbar lug 40 DIN 74054-1/2 / ISO 8755
Non-automatic bolt-type coupling DIN 11025	• 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
Tow hook (hitch hook) ISO 6489-1	• Drawbar lug 50 (hitch ring) ISO 20019 / DIN9678
Draw pin (Piton-Fix) ISO 6489-4	• Drawbar lug 50 (hitch ring) ISO 20019 / DIN9678
Ball-type coupling K80 ISO 24347	• Shell K80 ISO 24347

Tab. 24: Coupling devices and drawgears

6.6 D_C value and towing capacity

The D_C value is the theoretical thrust between tractor and rigid-drawbar trailer; it is a calculated reference value of forces between moving masses.

- Calculate the actual D_C value to check whether the coupling device of your tractor has the required D_C value.
- The calculated D_C value must be **equal or less than** (≤) the specified D_C value of the tractor's coupling device and the drawgear of the rigid-drawbar trailer. In each case, the lowest D_C value shall be relevant.

  If the calculated D_C value is higher, calculate the admissible towing capacity for the tractor.
- Do not exceed the calculated towing capacity when filling the trailer.

⚠ WARNING

Risk of accident due to breaking components

An inadmissibly high load exerted on the coupling device and drawgear may cause failure of components and provoke dangerous situations to people.

- Only combine compatible coupling devices and drawgears.

6.6.1 Calculate Dc value

The actual Dc value can only be calculated from the gross vehicle weight rating of both quantities (tractor and trailer) as follows:

$$D_C\,(kN) = g \times \frac{T \times C}{T + C}$$

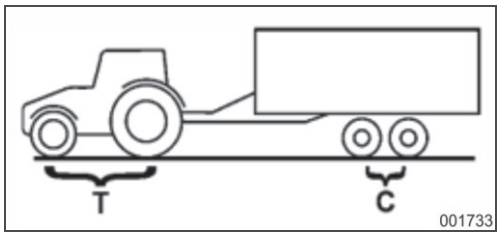


Fig. 69

T Gross vehicle weight rating of tractor in [t]
(see operating instructions and vehicle registration certificate of tractor)

C Axle load/Sum of axle loads of the machine charged with the admissible mass (payload) in [t] without tongue load

g Gravitational acceleration (9.81 m/s²)

Calculation example:

T = 14 t Gross vehicle weight rating of tractor in [t]

C = 18 t Admissible axle load(s) of rigid-drawbar trailer in [t]

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

NOTE

The Dc value for the coupling device is directly indicated on the type plate of the coupling device, in the operating instructions and in the vehicle registration certificate of the tractor.

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

The Dc value for the drawgear is directly indicated on the type plate of the drawgear.

6.6.2 Calculate towing capacity

The lowest D_C value of the tractor's coupling device or of the drawgear of the rigid-drawbar trailer determines the admissible towing capacity C of the 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 the tractor determines the admissible load capacity of the trailer.

The towing capacity is calculated as follows:

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

T	Gross vehicle weight rating of tractor in [t] (see operating instructions and vehicle registration certificate of tractor)
D_C	Lowest D_C value of the tractor's coupling device, of the drawgear of the rigid-drawbar trailer or of the combination in [kN]
g	Gravitational acceleration (9.81 m/s²)
C	Maximum towing capacity in [t]

Calculation example:

T = 14 t	Gross vehicle weight rating of tractor in [t]
D_C = 70 kN	D_C value of tractor's coupling device in [kN]
D_C = 77.5 kN	D_C value of drawgear at rigid-drawbar trailer in [kN]
D_C = 77.2 kN	D_C value for the combination to be coupled in [kN]

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

In this example, the admissible axle load is 14.5 t due to the D_C value of the tractor's coupling device.

Do not exceed the calculated towing capacity when charging the trailer.

6.6.3 Calculate ballast of the tractor and machine combination

⚠ CAUTION

Risk of accident due to insufficient stability, steering and braking ability of the tractor.

Check the tractor for compatibility and the distribution of weight in the tractor and machine combination before hitching or attaching the machine.

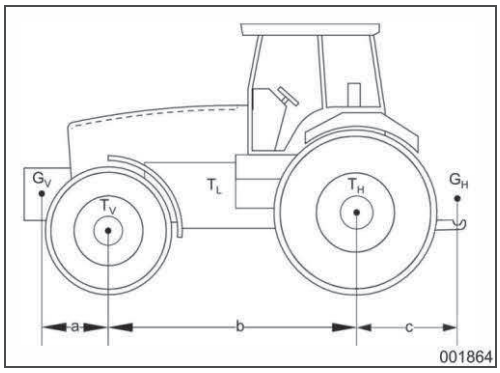


Fig. 70

T_L	Empty weight of tractor [t]*
T_V	Front axle load of empty tractor [t]*
T_H	Rear axle load of empty tractor [t]*
G_H	Tongue load or weight of rear-mounted equipment [t]**
G_V	Weight of front ballast [t]
a	Distance between centre of gravity of front ballast and centre of front axle [m]
b	Wheelbase of tractor [m]*
c	Distance between centre of rear axle and coupling point [m]

* see operating instructions / vehicle registration documents of tractor

** Due to different loading and operating conditions, the tongue load / the weight of the rear-mounted equipment may vary significantly.

Calculation of required front ballast

In order to ensure sufficient steerability of the tractor, it must have the following minimum ballast at the front:

Calculation of minimum ballast $G_{V\,min}$:

$$G_{V\,min} = \frac{G_H \times c - T_V \times b + 0{,}2 \times T_L \times b}{a + b}$$

Calculation example:

G_H = 3 t	Tongue load or weight of rear-mounted equipment (maximum value) [t]
c = 1.5 m	Distance between centre of rear axle and coupling point [m]
T_V = 2 t	Front axle load of empty tractor [t]
b = 2.4 m	Wheelbase of tractor [m]
T_L = 6 t	Empty weight of tractor [t]
a = 1.2 m	Distance between centre of gravity of front ballast and centre of front axle [m]

$$G_{V\,min} = \frac{3\ t \times 1.5\ m - 2\ t \times 2.4\ m + 0.2 \times 6\ t \times 2.4\ m}{1.2\ m + 2.4\ m} = 0.7\ t$$

Calculation of the actual front axle load of the tractor

The admissible axle load of the tractor's front axle and the load capacity of the front wheels must not be exceeded.

For the calculation of the maximum actual front axle load, apply the minimum tongue load or the minimum weight of the rear-mounted equipment.

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

For the calculation of the minimum actual front axle load, apply the maximum tongue load or the maximum weight of the rear-mounted equipment.

$$T_{V\,act} = \frac{G_v \times (a + b) + T_V \times b - G_H \times c}{b}$$

Calculation example:

$G_V = 0.8$ t	Weight of front ballast [t]
a = 1.2 m	Distance between centre of gravity of front ballast and centre of front axle [m]
b = 2.4 m	Wheelbase of tractor [m]
$T_V = 2$ t	Front axle load of empty tractor [t]
$G_H = 3$ t	Tongue load or weight of rear-mounted equipment [t]
c = 1.5 m	Distance [m] between centre of rear axle and coupling point

$$T_{V\,act} = \frac{0.8\text{ t} \times (1.2\text{ m} + 2.4\text{m}) + 2\text{ t} \times 2.4\text{ m} - 3\text{ t} \times 1.5\text{m}}{2.4\text{ m}} = 1.3\text{ t}$$

Calculation of the actual total weight of the tractor

The gross vehicle weight rating of the tractor must not be exceeded.

$$T_{Total} = T_L + G_V + G_H$$

Calculation example:

$T_L = 6$ t	Empty weight of tractor [t]
$G_V = 0.8$ t	Weight of front ballast [t]
$G_H = 3$ t	Tongue load or weight of rear-mounted equipment [t]

$$T_{Total} = 6\text{ t} + 0.8\text{ t} + 3\text{ t} = 9.8\text{ t}$$

Calculation of the actual rear axle load of the tractor

The admissible rear axle load of the tractor and the load capacity of the rear wheels must not be exceeded.

$T_{H\ act} = T_{Total} - T_{V\ act}$

Calculation example:

T_{Total} = 9.8 t actual total weight of tractor [t]

$T_{V\ act}$ = 1.3 t actual front axle load of tractor [t]

$T_{H\ act} = 9.8\ t - 1.3\ t = 8.5\ t$

6.7 Hitch and unhitch machine

6.7.1 Safety

As a basic principle, the following is applicable:

- Properly hitch the machine only to an appropriate tractor.
- Always check the machine for visible defects before hitching and unhitching.
- Do not exceed admissible limit values,
  ► see section 3 Technical data, page 43.
- 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. Any 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 stopped.
- Put the support device into support position when hitching and unhitching the machine. Keep limbs away from the area between support device and ground. Risk of crushing and shearing.
- Always park the unhitched machine in a stable position. Observe the ground condition; beware of soft surfaces.
- Do not unhitch the machine when charged or partly charged. Risk of tipping over if the machine is unevenly charged due to insufficient tongue load or risk of failure of support device due to excessive tongue load.
- Do not charge the unhitched machine.
- Properly use the provided coupling devices of the tractor and the machine.
- Take particular care when hitching and unhitching the machine. Crushing and shearing zones exist within the area of the coupling points between tractor and machine.
- Coupled supply lines must easily give way to any movements during cornering without any stress, buckling or chafing and must not chafe against external components.

⚠ WARNING

Hitch the machine to the tractor

Improper hitching of the machine to the tractor may cause serious accidents.

- During hitching, observe all operating instructions:
  - of the tractor
  - of the machine
  - of the propeller shaft

6.7.2 Hitch machine

In the following, the procedure for hitching the machine is listed. The individual steps are described in detail in the respective subchapters and must be observed, see cross-references.

1. Make sure that people leave the hazardous area between tractor and machine.
2. Reverse the tractor to the machine until the position for coupling the device has been reached.
3. Secure tractor and machine against rolling.

► see section 2.9 Safely park tractor and machine, page 29

4. Connect the hydraulic hose pipes.

► see section 6.9.2 Connect hydraulic hose pipes, page 110

5. Mount the control set on the tractor (if available).

► see section 6.12 Mount control set on the tractor, page 123

6. Connect the electrical supply lines and the lighting system.
7. Couple the drawbar.

► see section 6.8.2 Couple drawbar, page 104

8. Connect the brake system.
   – Hydraulic working brake
     ► see section 6.10.1.1 Couple hydraulic working break, page 111
   – Hydraulic service brake
     ► see section 6.10.2.1 Couple hydraulic service break, page 112
   – Compressed-air brake system
     ► see section 6.10.3.1 Connect brake and feed line, page 114
9. Couple the propeller shaft.
   ► see section 6.11.3 Couple propeller shaft to tractor, page 122
10. If available, insert the control set or the Bowden cable control set for the supporting leg into the holder of the tractor.
11. Lift the supporting leg to transport position.
    – Mechanical supporting leg
    ► see section 6.13.1 Lift to transport position, page 124
    – Hydraulic supporting leg
    ► see section 6.13.2 Lift to transport position, page 126
12. Release the parking brake.

6.7.3 Unhitch machine

In the following, the procedure for unhitching the machine is listed. The individual steps are described in the respective subchapters and must be observed.

⚠ WARNING

Insufficient stability

The machine may start to move. Risk of tipping over.

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

NOTE

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

1. Secure the machine against rolling.
   ► see section 2.9 Safely park tractor and machine, page 29
2. Lower the supporting leg to support position.
   – Mechanical supporting leg
   ► see section Lower to support position, page 124
   – Hydraulic supporting leg
   ► see section Lower to support position, page 126
3. Disconnect the electrical supply lines and the lighting system and place them in the plug holder provided for this purpose at the machine.
4. Disconnect the hydraulic hose pipes.
   ► see section 6.9.3 Disconnect hydraulic hose pipes, page 110
5. Disconnect the brake system.
   – Hydraulic working brake
   ► see section 6.10.1.2 Uncouple hydraulic working break, page 112
   – Hydraulic service brake
   ► see section 6.10.2.2 Uncouple hydraulic service break, page 113
   – Compressed-air brake system
   ► see section 6.10.3.4 Disconnect brake and feed line, page 117
6. Uncouple the propeller shaft.
   ► see section 6.11.4 Uncouple propeller shaft from tractor, page 123
7. If available, insert the control set or the Bowden cable control set for the supporting leg into the holder of the machine.
8. Uncouple the drawbar.
   ► see section 6.8.3 Uncouple drawbar, page 107

6.8 Drawbar

6.8.1 Adapt mounting height of drawbar

Adapt the mounting height of the drawbar to the respective tractor model if the machine hitched to the tractor is not horizontally aligned on even ground.

The mixing auger only works at its optimum in horizontally aligned position.

NOTE

When horizontally aligning the machine, use the top edge of the mixing container for guidance.

⚠ WARNING

Sinking of machine

Risk of crushing due to accidental sinking of chassis during work on the drawbar.

- Ensure sufficient ground stability.
- Use additional solid, load-distributing supports if necessary.

This work requires expert knowledge and appropriate tools.

Operative staff:

- Qualified staff or
- authorised workshop

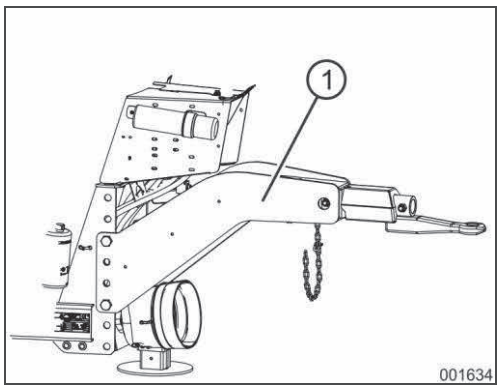


Fig. 71

1. Park the machine in horizontal position on firm ground.
2. Switch the machine off.
3. Use the chocks to secure the machine against accidental rolling.
4. Unhitch the machine from the tractor.
5. Move the tractor forward until the coupling device of the tractor uncovers the drawgear of the drawbar.
6. Align the machine in horizontal position by means of the supporting leg.
   – The top edge of the mixing container must be in parallel to the ground.
7. Align the coupling device on the tractor, such that the coupling device can take up the drawgear of the drawbar.
8. Have the mounting height of the drawbar (1) adapted by an authorised workshop if the adjusting range for the coupling device on the tractor is not sufficient to hitch the machine in horizontal position.
9. Check the free space around the propeller shaft.
   – There must be sufficient free space in any operating state to avoid damage to the propeller shaft.

6.8.2 Couple drawbar

As a basic principle, the following is applicable:

- Properly hitch the machine only to an appropriate tractor.
- Do not exceed admissible limit values.
  ► see section 3 Technical data, page 43.
- Check whether the coupling device of the tractor is licensed for taking up the machine's drawgear.
- Properly hitch the machine to the tractor.
- Never use damaged or deformed hitch systems.
- People are not allowed between tractor and machine, while the tractor is approaching the machine. Any 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 stopped.

Bolt-type coupling

1. Secure the machine against rolling.
2. Prepare for hitching up:
   – Remove the coupling bolt (non-automatic bolt-type coupling)
   – Open the hitch, i.e. it must be prepared for coupling (automatic bolt-type coupling)
3. Reverse the tractor and approach the machine, 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).

⚠ WARNING

Risk of accident when approaching the machine.

Keep people away from the hazardous area between tractor and machine.

4. Secure the tractor against accidental starting and rolling.
5. Check that the connection is secure after coupling:
   – Secure the inserted coupling bolt by positive locking (non-automatic bolt-type coupling)
   – Check whether the automatic bolt-type coupling is locked (control pin, end position of operating lever, etc.)
6. Connect the supply lines.
7. Lift the supporting leg to transport position.
8. Release the parking brake of the machine.

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

1. Secure the machine against rolling.
2. Lower the tow hook.
3. Reverse the tractor and approach the machine,
   – such that the lowered tow hook can take up the drawbar lug.

⚠ WARNING

Risk of accident when approaching the machine.

Keep people away from the hazardous area between tractor and machine.

4. Lift the tow hook to catch the drawbar lug.

→ The drawbar lug automatically engages and is fixed between the tow hook and the locking mechanism (holding-down device).

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

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

1. Secure the machine against rolling.
2. Reverse the tractor and approach the machine.

⚠ WARNING

Risk of accident when approaching the machine.

Keep people away from the hazardous area between tractor and machine.

3. Secure the tractor against accidental starting and rolling.
4. Remove the holding-down device (cross bolt) above the draw pin.
5. Connect the supply lines.
6. Drive as close as possible towards the machine, such that the draw pin can take up the drawbar lug.
7. Lower the drawbar by means of the supporting leg until the draw pin engages in the drawbar lug.
8. Secure the tractor against accidental starting and rolling.
9. Fix and secure the cross bolt above the draw pin.
10. Lift the supporting leg to transport position.
11. Release the parking brake of the machine.

Ball-type coupling and shell

⚠ WARNING

Unhitch the machine from the tractor

When travelling on particularly uneven ground or over clamp silos, the shell might loosen from the ball-type coupling. Risk of dangerous situations to people due to unintentional unhitching of the machine.

- Check the free space between holding-down device and shell.
- Mount shorter holding-down device if necessary.

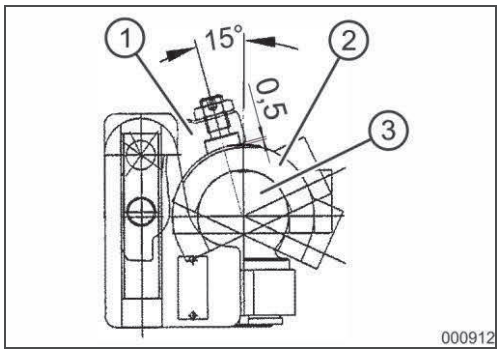


Fig. 72

If the free space between holding-down device (1) and shell (2) is not sufficient, mount a shorter holding-down device on the tractor's ball-type coupling (3).

NOTE

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

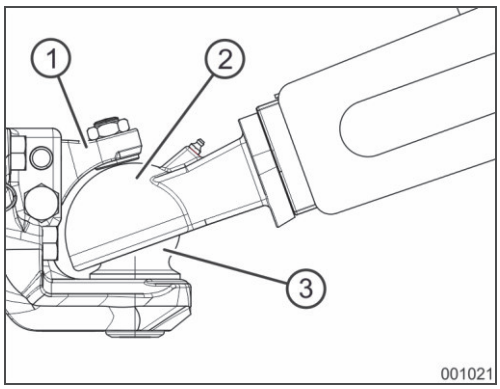


Fig. 73

1. Secure the machine against rolling.
2. Prepare for hitching up:
   – Remove grease and dirt from the holding-down device (1), the shell (2) and the ball head (3).
   – Lubricate the ball head and the surface of the shell with new grease.
   – Unlock the holding-down device (1) at the bearing block.
   – Swivel the holding-down device to coupling position.
   – Clean and grease the ball head.
3. Reverse the tractor and approach the machine, such that the ball head can take up the shell.

⚠ WARNING

Risk of accident when approaching the machine.

Keep people away from the hazardous area between tractor and machine.

4. Secure the tractor against accidental starting and rolling.
5. Lower the drawbar by means of the supporting leg until the ball head (3) engages in the shell (2).
6. Lock and secure the holding-down device at the bearing block.
7. Connect the supply lines.
8. Lift the supporting leg to transport position.
9. Release the parking brake of the machine.

6.8.3 Uncouple drawbar

⚠ WARNING

Insufficient stability

Insufficient stability of the unhitched machine may cause the machine to move. Risk of tipping over.

- Park the empty machine in horizontal position on firm ground.
- Secure the machine against rolling.

Bolt-type coupling

1. Secure the tractor against accidental starting and rolling.
2. Secure the machine against 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 into the plug holder.
6. Prepare for unhitching:
   – Remove the coupling bolt (non-automatic bolt-type coupling)
   – Open the trailer hitch (automatic bolt-type coupling).
7. Move the tractor forward.

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

1. Secure the tractor against accidental starting and rolling.
2. Secure the machine against 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 into the plug holder.
10. Move the tractor forward.

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

1. Secure the tractor against accidental starting and rolling.
2. Secure the machine against rolling.
3. Remove the holding-down device (cross bolt) above the draw pin.
4. Lower the supporting leg to support position.
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 into the plug holder.
10. Move the tractor forward.

Ball-type coupling and shell

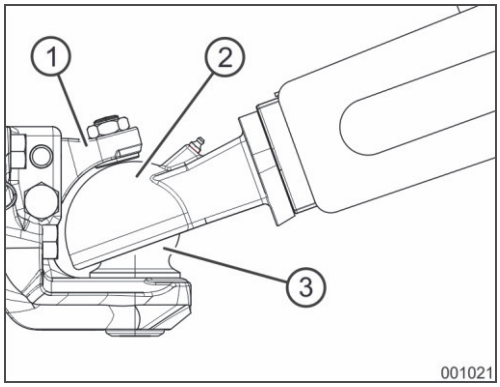


Fig. 74

1. Unlock the holding-down device (1) 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 (2) disengages from the ball head (3).
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 into the plug holder.
9. Move the tractor forward.

6.8.4 Secure the machine against unauthorised use

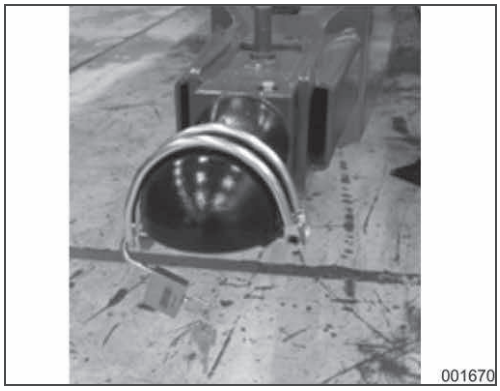


Fig. 75

A machine hitched to a tractor can be secured against unauthorised use by

- locking the tractor cabin,
- parking the machine in a closed area which is not accessible to unauthorised persons.

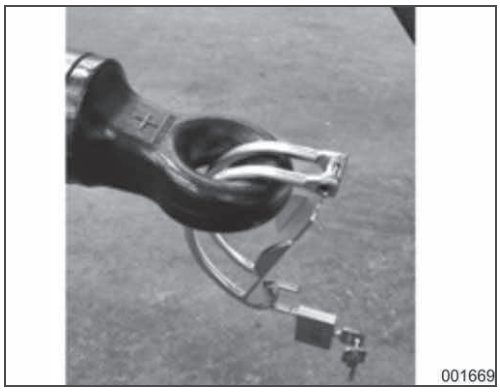


Fig. 76

A parked machine can be secured against unauthorised use by

- parking the machine in a closed area which is not accessible to unauthorised persons,
- installing the immobiliser (see adjacent illustrations).

6.9 Hydraulic hose pipes

6.9.1 Safety

As a basic principle, the following is applicable:

- Improperly connected hydraulic hose pipes may cause malfunctions of the hydraulic system. Check the assignment of the hydraulic hose pipes at the control block of the machine if the coloured markings (dust caps) are missing ► see section 4.3.1 Marking of hydraulic supply lines, page 60:
  - P = Pressure line
  - T (R;S) = Return line
  - LS = Load-sensing control line
- Check the compatibility of the hydraulic oils before connecting the machine to the hydraulic system of the tractor.
- Never mix different types of hydraulic oil.
- Observe the maximum admissible operating pressure of the hydraulic oil.
- Only connect clean hydraulic plugs and sleeves.

- Insert 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 and must not chafe against external components.

⚠ WARNING

Risk of infection due to hydraulic oil squirting out

Hydraulic oil squirting out under high pressure may penetrate the skin and enter the body, potentially causing serious injuries. Risk of serious infection.

- Depressurise the hydraulic system of the tractor and the machine before connecting and disconnecting the hydraulic hose pipes.
- Always set the operating element at the control device on the tractor to neutral position.

6.9.2 Connect hydraulic hose pipes

1. Depressurise the control device and set the operating elements on the tractor to neutral position
2. Connect the hydraulic hose pipes to the tractor's control devices:
   – Pressure line to a single-acting or double-acting control device.
   – Return line to a depressurised return port.

6.9.3 Disconnect hydraulic hose pipes

⚠ CAUTION

Burns due to hot components

Risk of burns due to hot components of the hydraulic hose pipes

- Do not touch considerably warmed-up components of the hydraulic hose pipes, particularly do not touch any hydraulic plugs and sleeves.

1. Set the operating elements to neutral position and depressurise the control device
2. Switch the tractor engine off.
3. Disconnect the hydraulic hose pipes.
4. Use the dust caps to protect the hydraulic plugs against soiling.
5. Place the hydraulic hose pipes into the plug holder.

6.10 Brake system

NOTE

The braking axle needs to run in during the first service hours, such that the brake lining adjusts 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 a transport journey.

6.10.1 Hydraulic working brake

6.10.1.1 Couple hydraulic working break
Arbeitssbremse

As a basic principle, the following is applicable:

- Only connect clean hydraulic plugs and sleeves.
- Insert 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 and must not chafe against external components.
- Check the brake system for proper functioning before carrying out a transport journey.

⚠ WARNING

Insufficient braking ability

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

For a machine equipped with a hydraulic working brake, the admissible maximum speed is 6 km/h.

Fig. 77

NOTE

Observe national regulations regarding the operation of the hydraulic working brake on public roads.

1. Swivel the operating element at the control device on the tractor to floating position.
2. Remove the dust cap from the hydraulic plug.
3. Connect the hydraulic plug with the hydraulic sleeve to a single-acting or a double-acting control device of the tractor.
   – Only connect to a control device with floating position.
4. Carry out a visual inspection to check couplings and lines for tightness.
5. Release the parking brake.
6. Carry out a control braking at low speed.

6.10.1.2 Uncouple hydraulic working break
Arbeitssbremse

1. Apply the parking brake.
2. Relieve the brake hydraulics.
   – Swivel the operating element to floating 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. Place the hydraulic brake line into the plug holder.

6.10.2 Hydraulic service brake

6.10.2.1 Couple hydraulic service break

As a basic principle, the following is applicable:

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

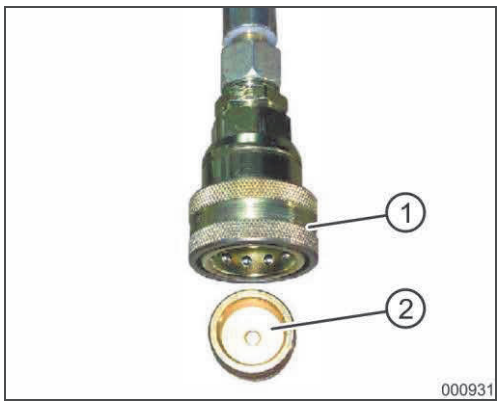


Fig. 78

1. Depressurise the hydraulic brake system of the tractor.
2. Remove the hydraulic clutch (1) from the machine's blanked-off connecting piece (2).
3. Couple the machine's hydraulic clutch to the tractor's hydraulic connection of the hydraulic brake system.
4. Carry out a visual inspection to check couplings and lines for tightness.
5. Release the parking brake of the machine.
6. Carry out a control braking at low speed.

6.10.2.2 Uncouple hydraulic service break

1. Apply the parking brake of the machine.
2. Depressurise the hydraulic brake system.
3. Uncouple the hydraulic clutch (1).
4. Slip the hydraulic clutch onto the machine's blanked-off connecting piece (2).

6.10.2.3 Connect hydraulic single-line brake system

1. Properly fix the hydraulic clutch of the brake line to the coupling device at the tractor provided for this purpose.
2. Connect the ripcord of the parking brake or the emergency brake valve to the tractor. The ripcord must be in horizontal position between the vehicles if the machine is torn off.
3. If equipped with emergency brake valve:

   Start the engine and press the brake pedal of the tractor for 10 seconds to fill the pressure accumulator of the brake system with oil.
4. Carry out a visual inspection to check couplings and lines for tightness.
5. Release the parking brake.
6. Carry out a control braking at low speed.

6.10.2.4 Disconnect hydraulic single-line brake system

⚠ WARNING

Rolling of machine

Risk of dangerous situations to people caused by the machine rolling due to released brake system

Secure the machine against accidental rolling by means of the parking brake and additional chocks if necessary.

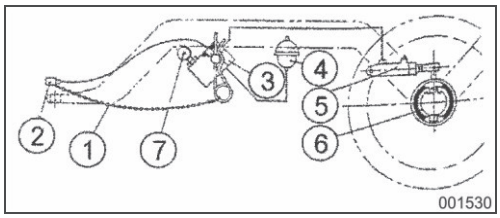


Fig. 79

1. Secure the machine against rolling by means of the parking brake and additional chocks if necessary.
2. Depressurise the brake system of tractor and machine.
3. If equipped with emergency brake valve:

   Press the drain valve (7) at the brake valve (3) to empty the pressure accumulator (4).

   → The hydraulic oil flows back to the tractor and the pressure accumulator is depressurised.
4. Remove the ripcord (1) from the tractor.
5. Uncouple plugs and plug-in couplings from the tractor and securely fasten them in the plug holder of the machine.

6.10.3 Compressed-air brake system

6.10.3.1 Connect brake and feed line

As a basic principle, the following is applicable:

- 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 have damaged sealing rings replaced.
- 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 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

Rolling of machine

Risk of dangerous situations to people caused by the machine rolling due to released brake system

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

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

Fig. 80

1. Open the caps of the hose couplings on the tractor.
2. Remove the hose coupling of the brake line (yellow) (2) from the hose and plug holder.
3. Clean soiled sealing rings or have damaged sealing rings replaced.
4. Properly fix the hose coupling of the brake line (yellow) (2) to the yellow marked coupling device at the tractor.
5. Remove the hose coupling of the feed line (red) (1) from the hose and plug holder.
6. Clean soiled sealing rings or have damaged sealing rings replaced.
7. Properly fix the hose coupling of the feed line (red) (1) to the red marked coupling device at the tractor.
8. Release the parking brake of the machine and/or remove the chocks.
9. Test the brakes before starting a journey to check the efficiency of the service brake system.

6.10.3.2 Set braking force (hand-operated regulator)

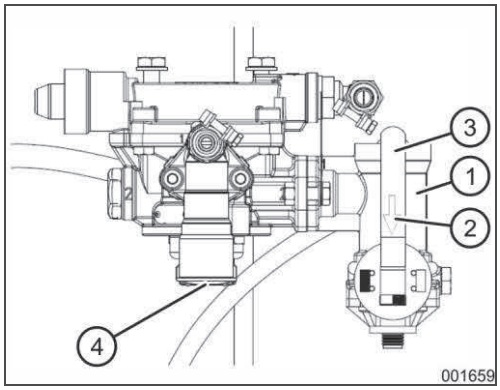


Fig. 81

1 Hand-operated brake pressure regulator
2 Read-off mark
3 Hand lever
4 Release valve

Example – Machine half filled: Turn hand lever (3) such that the "Half load" symbol is below the read-off arrow (2).

Actuate the release valve (4) to release the brake e.g. to manoeuvre the unhitched machine.

► see section 6.10.3.5 Manoeuvre unhitched machine by a manoeuvring vehicle, page 118

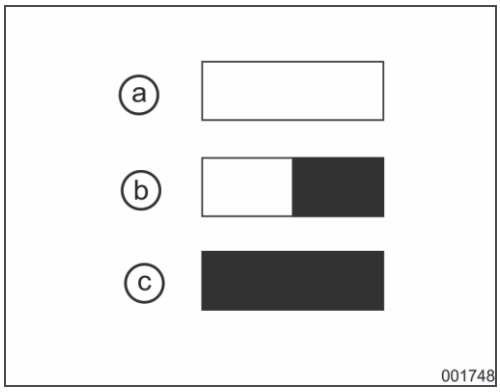


Fig. 82

The brake pressure regulator (1) can be used to manually adapt the braking effect (braking force) of the brake system by means of the hand lever (3) to the current loading condition of the machine. Read the set braking force below the read-off arrow (2). The following braking force settings are possible: Full Load, Half Load and Empty.

a) Reduced braking force – empty machine*

b) Reduced braking force

Loading condition – empty* / partly charged machine

c) Full braking force

Loading condition – full machine

(maximum admissible axle load)

* Due to the high dead weight of some machines, the brake pressure regulator must be set to half load when these machines are empty.

NOTE

It is imperative to adapt the braking effect of the brake system to the current loading condition of the machine by means of the brake pressure regulator before carrying out a transport journey.

Only with the braking effect adapted

- is the pressure released by the trailer brake valve limited.
- are there no jolting impacts.
- is the combination of tractor and machine sensitively and gradually slowed down.
- does the combination of tractor and machine remain in straight position due to advanced braking.

6.10.3.3 Set braking force (manual brake pressure regulator)

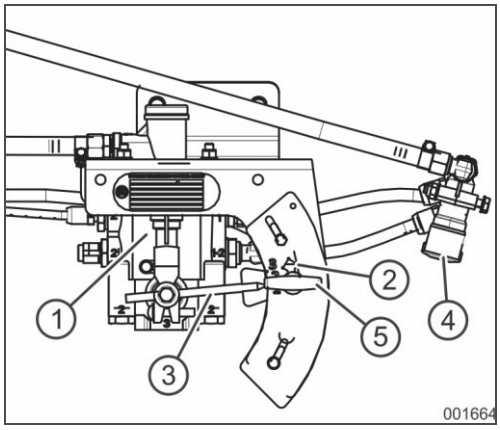


Fig. 83

1 Brake valve with manually operated brake pressure regulator
2 Scale
3 Hand lever
4 Release valve
5 T-handle

Example – Machine half filled: Move hand lever (3) such that the T-handle on the scale (2) is in position "Half load".

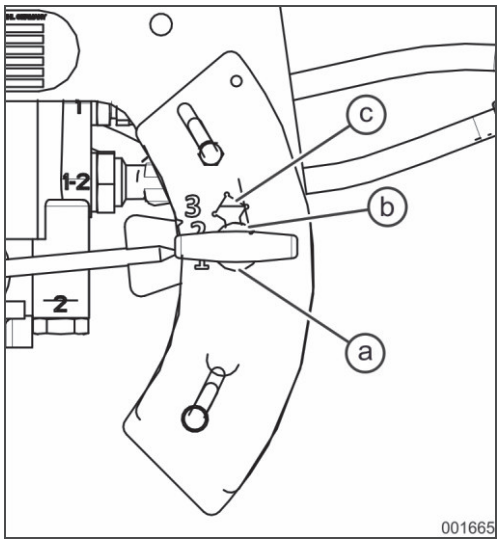


Fig. 84

The hand lever (3) can be used to adapt the braking effect (braking force) of the brake system to the current loading condition of the machine.

The set braking force is indicated beneath the T-handle (5).

Pull the T-handle (5) out and adjust the lever (3) to set the braking forces for the three following loading conditions:

a) Reduced braking force
   – empty machine
b) Reduced braking force
   – partly charged machine
c) Full braking force
   – machine charged with maximum admissible axle load

NOTE

It is imperative to adapt the braking effect of the brake system to the current loading condition of the machine by means of the brake pressure regulator before carrying out a transport journey.

Only with the braking effect adapted

- is the pressure released by the trailer brake valve limited.
- are there no jolting impacts.
- is the combination of tractor and machine sensitively and gradually slowed down.
- does the combination of tractor and machine remain in straight position due to advanced braking.

6.10.3.4 Disconnect brake and feed line

⚠ WARNING

Rolling of machine

Risk of dangerous situations to people caused by the machine rolling due to released brake system

In case of a pressure drop in the feed line, the brake system of the machine is automatically in brake position.

- Always disconnect the hose coupling of the feed line (red) first and then the hose coupling of the brake line (yellow).
- It is imperative to observe this order, as otherwise the brake system will be released and the non-braked machine may start to move.

Secure the machine against accidental rolling by means of the parking brake and additional chocks if necessary.

NOTE

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 brake.

Fig. 85

1. Secure the machine against rolling.
2. Disconnect the hose coupling of the feed line (red) (1).
3. Disconnect the hose coupling of the brake line (yellow) (2).
4. Close the hose couplings and fasten them in the hose and plug holder provided for this purpose.
5. Close the caps of the hose couplings at the tractor.

6.10.3.5 Manoeuvre unhitched machine by a manoeuvring vehicle

⚠ WARNING

Rolling of machine

Risk of dangerous situations to people caused by the machine rolling due to released brake system

- Tightly connect the machine with the braked manoeuvring vehicle before releasing the brake. After releasing, the machine is exclusively decelerated by the manoeuvring vehicle.

1. Hitch the machine to the braked manoeuvring vehicle.
2. Release the parking brake of the machine.
3. Push the release valve (4) in as far as it will go.
   → The service brake is released and the machine can be manoeuvred.
4. Move the machine by the manoeuvring vehicle.
5. Apply the parking brake of the manoeuvring vehicle after completion of manoeuvring.
6. Pull the release valve (4) out as far as it will go.
   → 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.

Release valve, see:

► see section 6.10.3.2 Set braking force (hand-operated regulator), page 115
► see section 6.10.3.3 Set braking force (manual brake pressure regulator), page 116

6.10.4 Parking brake

Release parking brake

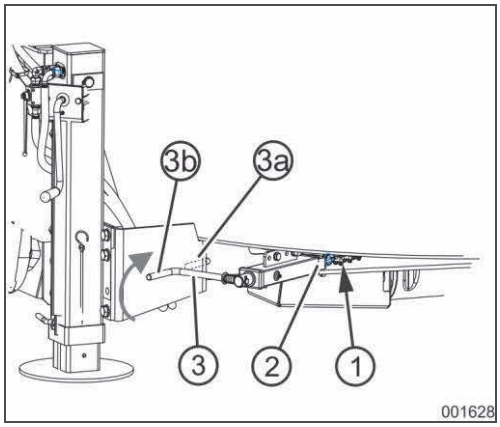


Fig. 86

ATTENTION

Chafing points

- Ensure that the cable does not rest on or chafe against other vehicle components.
- The cable must sag slightly when the parking brake is released.

1. Swivel the crank handle (3) from its rest position (3a) by 180° into its adjustment position (3b).
2. Turn the crank handle counterclockwise until the cable (1) is relieved.

→ The parking brake is released.

3. Swivel the crank handle to its rest position.

Apply parking brake

NOTE

Correct the setting of the parking brake if the tension path of the spindle (2) is no longer sufficient.

1. Swivel the crank handle (3) from its rest position (3a) by 180° into its adjustment position (3b).
2. Turn the crank handle clockwise.

→ The parking brake is applied via the cable (1).

Secure parking brake if fixed supporting leg is available

NOTE

Ensure that the crank handle is fixed in the holder provided for this purpose when putting the drawbar down.

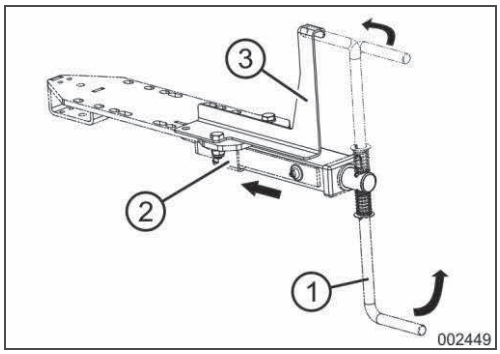


Fig. 87

In order to ensure on machines

- equipped with a parking brake mounted at the drawbar
- and a fixed supporting leg

that the crank handle does not drag on the ground, it can be fixed in a holder provided for this purpose.

1. Swivel the crank handle (1) upwards and turn it by 180° from its rest position to its adjustment position.
2. Push the parking brake in the clamping bracket (2) towards the crank handle holder (3).

→ The crank handle is fixed in the holder.

6.11 Propeller shaft

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

6.11.1 Safety

As a basic principle, the following is applicable:

- Observe the operating instructions for the propeller shaft.
- A protective device in proper condition must each be mounted at the p.t.o. shaft of the tractor and of the machine.
- The protective devices on the tractor and on the machine and the protective devices of the extended propeller shaft must overlap by at least 50 mm. If not, the machine must not be powered via the propeller shaft.
- Never use the propeller shaft without protective device or with a damaged protective device or without proper handling of the clip chain.
- There must be sufficient free space around the propeller shaft in any operating state to avoid damage to the propeller shaft.
- 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.
- Never switch the propeller shaft on with the tractor engine turned off.
- Slip the protective element onto the p.t.o. shaft stub after removal of the propeller shaft.

6.11.2 Adjust length of propeller shaft

Only an authorised workshop is allowed to carry out structural alterations on the propeller shaft. Observe the enclosed operating instructions for the propeller shaft.

- Structural alterations on the propeller shaft which are not specified in the enclosed operating instructions for the propeller shaft are not allowed.
- Take a sufficient transverse contact ratio into account when adapting the propeller shaft length.
- Have the length of the propeller shaft checked in all operating states by an authorised workshop before coupling the propeller shaft to the tractor for the first time.
- Adapt the length if necessary to prevent a compression or insufficient transverse contact ratio.
- The adjustment of the propeller shaft only applies to the current tractor model. Readaptation of the propeller shaft may be necessary if hitching the machine to another tractor.

NOTE

The propeller shaft reaches its shortest operating position during extreme cornering. The propeller shaft reaches its longest operating position during straight travelling.

- Observe possible changes in inclination between tractor and machine, e.g. in case of ramp travel.
- Observe specific differences between top and bottom linkage.

⚠ WARNING

Rolling of tractor and machine

Risk of crushing if tractor and machine accidentally roll.

- Secure tractor and machine against accidental starting and rolling before entering the hazardous area between the tractor and the hitched machine.

This work requires expert knowledge and appropriate tools.

Operative staff:

- Authorised workshop

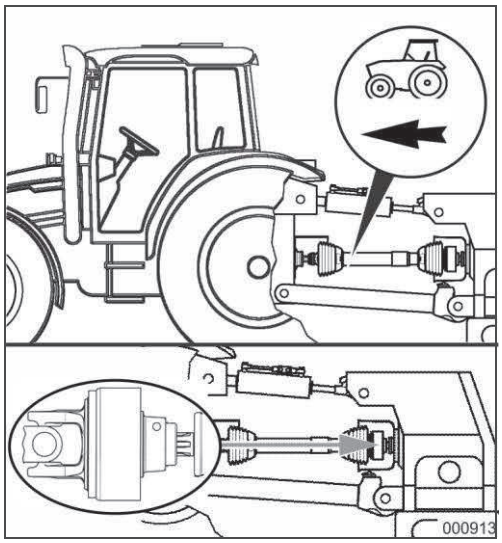


Fig. 88

1. Park the machine in horizontal position on firm ground.
2. Use the chocks to secure the machine against accidental rolling.
3. Hitch the machine to the tractor.
   – Do not couple the propeller shaft.
4. Take the shortest operating position of the propeller shaft.
5. Secure tractor and machine against accidental starting and rolling before entering the hazardous area between tractor and machine.
6. Pull the propeller shaft apart.
7. Slip the fork of the propeller shaft half with the tractor symbol onto the p.t.o. shaft of the tractor until the locking mechanism noticeably engages.
8. Slip the fork of the other propeller shaft half onto the p.t.o. shaft of the machine until the locking mechanism noticeably engages.
9. Determine the length and shorten the propeller shaft.
   – See enclosed operating instructions for the propeller shaft.
10. Reinsert the shortened propeller shaft halves into each other.
11. Lubricate the p.t.o shaft of the tractor and the machine's p.t.o. shaft before coupling the propeller shaft.

6.11.3 Couple propeller shaft to tractor

When coupling the propeller shaft, observe:

- Admissible driving speed of the machine
- Correct driving direction of the propeller shaft
- Proper fitting length of the propeller shaft
- Proper mounting position of the propeller shaft. The tractor symbol on the protective tube of the propeller shaft indicates the propeller shaft connection at the tractor.

⚠ WARNING

Risk of becoming entangled by powered propeller shaft

The powered propeller shaft may catch clothing and draw it in and fling away foreign objects.

- Check the safety and protective devices of the propeller shaft for proper functioning before each start-up of the machine.
- Immediately turn the tractor engine off in case of emergency.

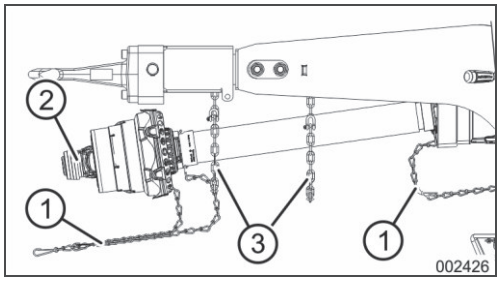


Fig. 89

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. Turn the engine off.
5. Secure the tractor against accidental starting and rolling.
6. Make sure that the p.t.o. shaft has been switched off.
7. Release the p.t.o. shaft brake on the tractor if necessary.

8 Slip the propeller shaft onto the p.t.o. shaft stub until the locking mechanism (2) noticeably engages.

9. Secure the propeller shaft guard at the tractor and at the machine against rotating by means of the clip chains (1).
   - Fix the clip chains at right angles to the propeller shaft if possible.
   - 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.
10. Check the free space around the propeller shaft.

There must be sufficient free space in any operating state to avoid damage to the propeller shaft.

6.11.4 Uncouple propeller shaft from tractor

⚠ CAUTION

Burns due to hot components

Risk of burns due to hot components of the propeller shaft

- Do not touch considerably warmed-up propeller shaft components, particularly do not touch any couplings.

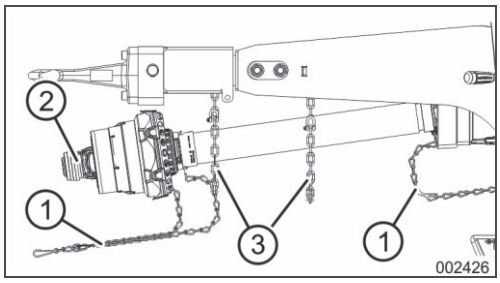


Fig. 90

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

NOTE

Clean and lubricate the propeller shaft before longer downtimes.

6.12 Mount control set on the tractor

6.12.1 Mount holder for Bowden cable control set

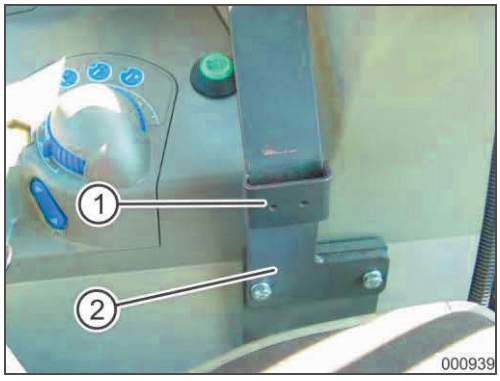


Fig. 91

The pocket is included in the scope of delivery.

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

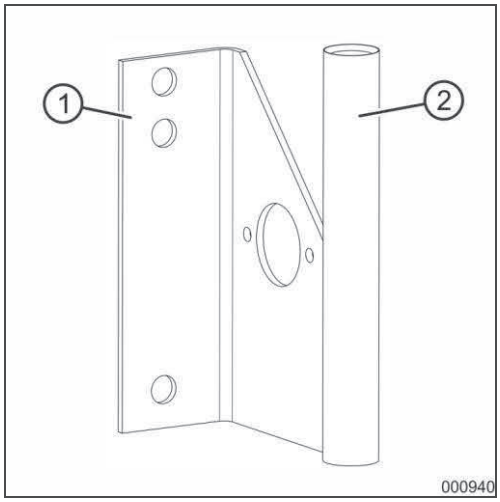


Fig. 92

6.12.2 Mount E-control set

Optional extra

The holder with mounting element is included in the scope of delivery.

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. Insert the 3-pole plug (DIN 9680) of the power supply cable into the 3-pole socket of the tractor.
   – Pole 15/30 = Plus
   – Pole 31 = Minus

NOTE

- 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 with a minimum rating of 25 A.
- The feed line of the 3-pole socket must have a minimum cable cross section of 4 mm^2.

6.13 Supporting leg

The unhitched machine rests on the supporting leg.
Depending on the machine’s equipment, it is fitted with:

- a mechanical parking support
- a mechanical supporting leg
- a hydraulic supporting leg

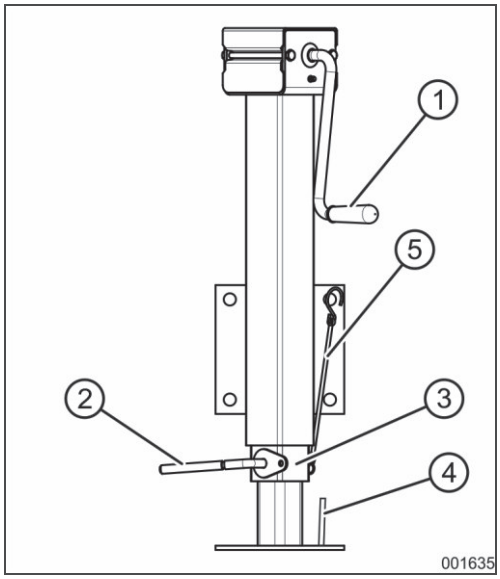


Fig. 93

6.13.1 Mechanical supporting leg

Use the crank handle (1) to lift or lower the mechanical supporting leg with spindle adjustment and telescopic quick adjustment (3).

- Turn clockwise; the supporting leg is lifted to transport position
- Turn counterclockwise; the supporting leg is lowered to support position

Lift to transport position

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

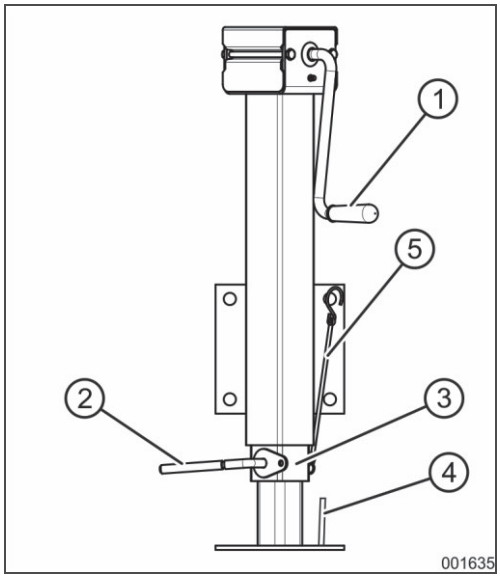


Fig. 94

Lower to support position

1. Secure tractor and machine against accidental starting and rolling
2. Use one hand to grip the handle (4) of the telescopic quick adjustment (3).
3. Use the other hand to unlock and remove the locking bolt (2).
4. Lower the telescopic quick adjustment of the supporting leg to a position just above the ground.
5. Secure the supporting leg in the lowered position by means of the locking bolt.
6. Secure the locking bolt against accidental losing by means of the spring cotter (5).
7. Use the crank handle (1) to lower the supporting leg to support position.
   – Turn the crank handle clockwise.

6.13.2 Hydraulic supporting leg

Optional extra

Depending on the machine's equipment, the supporting leg 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 the control set (electro-hydraulic operation, optional extra).

⚠ WARNING

Risk of crushing due to hydraulic supporting leg

Risk of crushing fingers, hands and feet due to movements of the supporting leg

- Keep an adequate safety distance from the supporting leg as long as parts are moving.
- Keep people away from the hazardous area before actuating the hydraulic supporting leg.

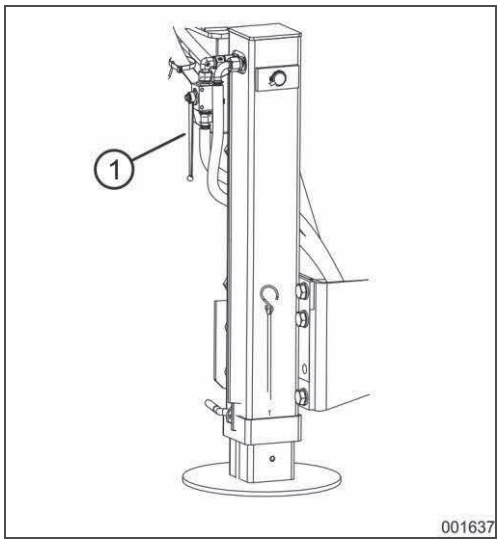


Fig. 95

Lift to transport position

1. Keep people away from the hazardous area between tractor and machine before lifting the supporting leg.
2. Open the stop-cock (1) to lift the supporting leg.
3. Keep hold of the 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.

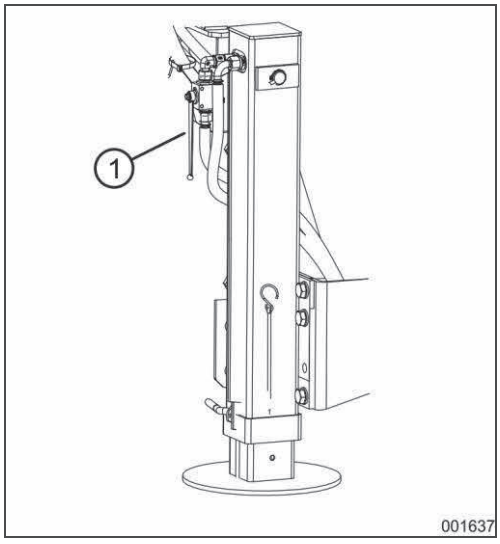


Fig. 96

Lower to support position

1. Keep people away from the hazardous area between tractor and machine before lowering the supporting leg.
2. Open the stop-cock (1) to lower the supporting leg.
3. Keep hold of the 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.

6.13.3 Fixed supporting leg

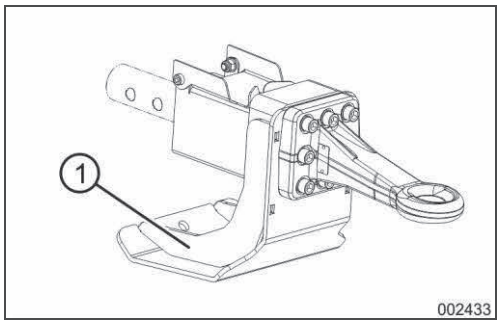


Fig. 97

The machine is placed on the fixed supporting leg (1) of the bottom hitch in unhitched condition, such that the drawgear remains freely accessible.

Lifting and lowering is executed via the hitch hook of the tractor.

6.14 Set conveyor speed

Optional extra

The conveyor speed of the conveyor belts 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 flow regulation valve

- manually directly at the machine or
- by remote control via the control set from the tractor.

NOTE

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

6.14.1 Manually set conveyor speed

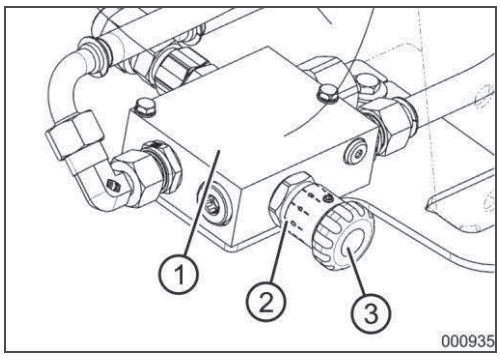


Fig. 98

1. Set the conveyor speed directly on the machine via the rotary knob (3) at the flow regulation valve (1).
2. Position (2) indicates the scale value for the set conveyor speed:
   – Scale value 0 = lowest conveyor speed
   – Scale value 10 = highest conveyor speed.

6.14.2 Set conveyor speed via control set

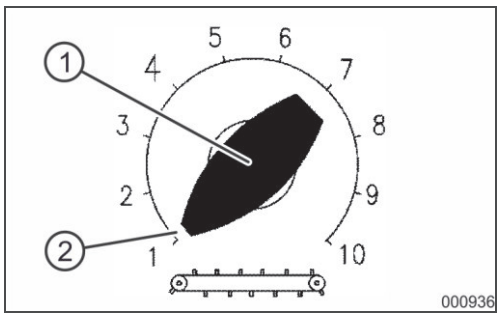


Fig. 99

1. Set the conveyor speed via the control dial (1) on the control set.
2. Pointer (2) indicates the scale value for the set conveyor speed:
   – Scale value 0 = lowest conveyor speed
   – Scale value 10 = highest conveyor speed.

6.14.3 Set control dial range of E-control set

The control range of the control dial of the E-control set and thus the drive speed of the conveyor belts can be adapted as required.

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

Becoming entangled by powered conveyor

The running conveyor may catch clothing. Risk of injury due to being drawn in and wound up.

- Keep people and animals away from the hazardous area.
- Immediately switch the conveyor off if people or animals enter the hazardous area.

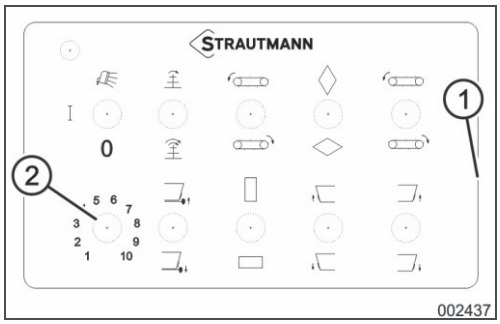


Fig. 100

1. Hitch the machine to the tractor.
   - Couple the drawbar.
   - Connect the flow and return line of the hydraulic system.
   - Connect the control set of the E-control.
2. Secure tractor and machine against rolling.
3. Pry the casing open.
   - Insert a screwdriver into the slit (1) on the right-hand side of the control set.
   - Press the handle of the screwdriver to the outside.

NOTE

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

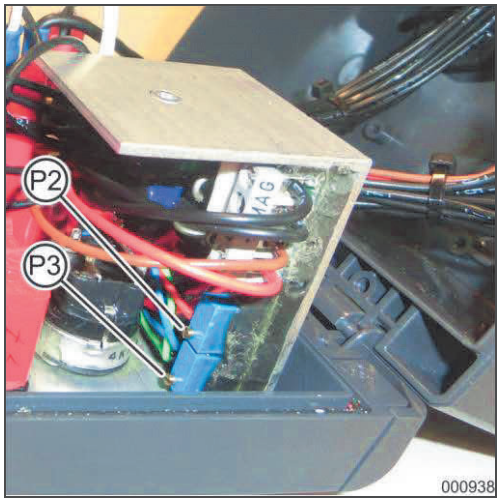


Fig. 101

4. Start the machine and switch the conveyor on.
5. Set the control dial (2) to position “2“ (minimum operating 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 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. Turn the control dial and observe the conveyor to finally check the entire control range.
   – Correct the control range via the trimmer potentiometers if necessary.

NOTE

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

10. Close the casing of the control set.

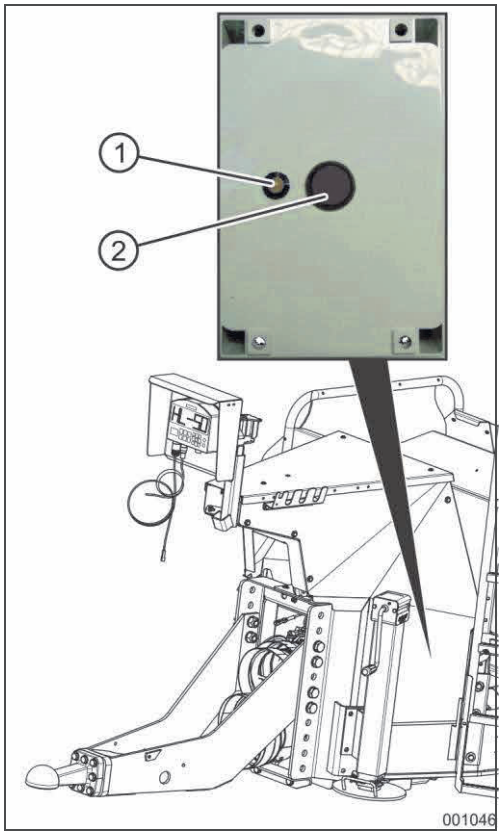


Fig. 102

6.15 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 to 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.

Press the button (2) to activate the power supply via the battery.

- The signal lamp flashes red.
- The weighing device is supplied with power for 45 minutes.

When the machine is connected to the tractor, the power supply is provided via the three-pole plug of the E-control set.

NOTE

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 to 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 [1]	Charging time [2]
15 minutes	0.5 hours
30 minutes	1.0 hours
45 minutes	1.5 hours
60 minutes	2.0 hours

Tab. 25: Operation and battery charging time

1) Operation of weighing device without connection to tractor

2) Minimum charging time of battery

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 overcharging. The power supply unit is connected to the 3-pole plug of the E-control set by means of a charging cable.

6.16 Check machine for proper functioning

Check the machine for proper functioning before the first start-up and each time before starting work.

1. Hitch the machine to the tractor.
2. Completely lubricate the machine and the propeller shaft, ► see section 10.5.2 Lubrication plan – Machine, page 173.
3. Check the oil level of all gearboxes in the compensating reservoir, ► see section 10.9.1 Mixer gearbox with compensating reservoir, page 180.
4. Check all functions of the machine before filling the mixing container for the first time.
   - Open and close the dosage gate.
   - Check the brake system for proper functioning.

   If available:
   - Lower the hydraulic supporting leg to support position and lift it to transport position.
   - Extend and retract the hydraulic counter-cutters into and from the mixing container.
   - Let the crossover conveyor run in both driving directions.
   - Let the crossover conveyor run at different conveyor speeds.
   - Lower the conveyor extension to working position and lift it to transport position.
   - Lower the discharge conveyor for side discharge to working position and lift it to transport position.
   - Let the discharge conveyor for side discharge run in driving direction (in working position).
   - Let the discharge conveyor for side discharge run at different conveyor speeds (in working position).
   - Check the weighing device for proper functioning.
   - Check the lighting system for proper functioning.

Should abnormalities

- in the operating behaviour of the machine (e.g. unexpected operating noise, vibrations, imbalance, excessive temperatures) be noticed,
- foreign objects, coarse contamination, oil leaks, loosened fastening or connecting screws be identified during the visual inspection of the machine,

the causes / defects must be eliminated before the first start-up or further operation of the machine.

If the abnormalities cannot be exactly localised, consultation with an authorised workshop or with the Strautmann customer service is required.

7 Control system

Depending on the machine’s equipment, the machine’s hydraulic and electrical function(s) is (are) actuated 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).

NOTE

The actuating speed of the 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 or the machine's control block may be necessary.

Information about the required control devices, ► see section 6.4 Required tractor equipment, page 92.

7.1 Tractor direct 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 or a single-acting control device with depressurised return line is required on the tractor for each function (hydraulic component) of the machine.

The individual functions of the machine are actuated from the tractor via the operating element on the respective control device.

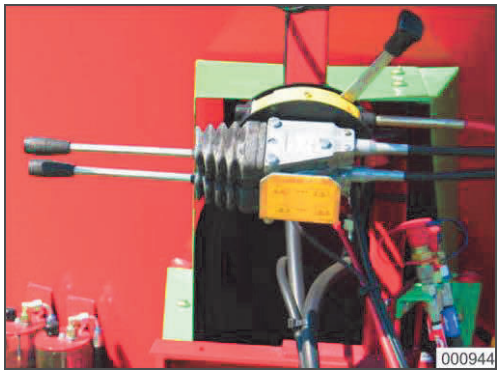


Fig. 103

7.2 Bowden cable control set

The individual hydraulic components of the machine are connected to a control block. For 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.

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 equipped with one or several operating element(s) in touch-control or latch-in 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 actuated and held. If 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.

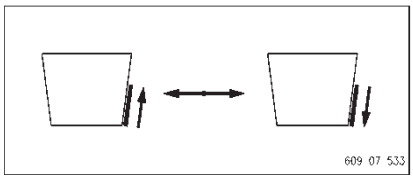
The operating elements can be set to three positions:

- Function I
- Neutral position
- Function II

7.2.1 Symbols on the control set

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

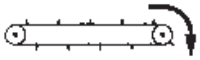
Open and close dosage gate

Symbol	Position of hand lever	Dosage gate
	front (touch-control)	right open
	neutral position	no movement
	rear (touch-control)	right close
	front (touch-control)	left open
	neutral position	no movement
	rear (touch-control)	left close
	front (touch-control)	front/rear open
	neutral position	no movement
	rear (touch-control)	front/rear close

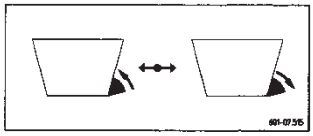
Switch crossover conveyor

Symbol	Position of hand lever	Crossover conveyor / Conveyor extension / Discharge conveyor
	front (latch-in)	crossover conveyor * on – to the left
	neutral position	crossover conveyor off
	rear (latch-in)	crossover conveyor * on – to the right

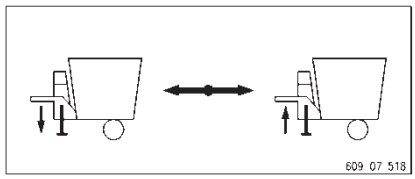
Switch discharge conveyor

Symbol	Position of hand lever	Crossover conveyor / Conveyor extension / Discharge conveyor
	front (latch-in)	discharge conveyor on
	neutral position	discharge conveyor off

Extend and retract counter-cutters

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

Lift and lower supporting leg

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

Change mixing auger speed

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

Extend and retract deflector plate

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

7.3 E-control set

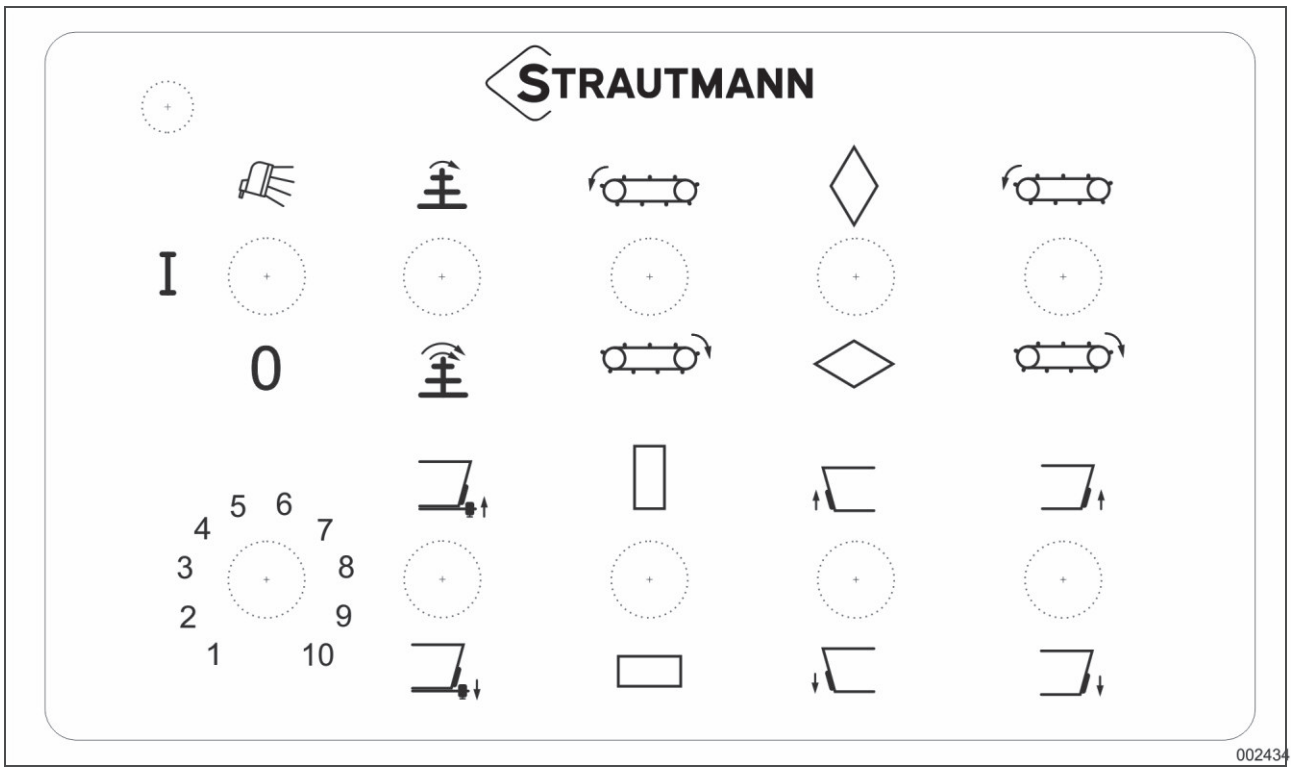


Fig. 104:

The individual hydraulic components of the machine are connected to a control block. The oil for the control block is supplied via:

- a double-acting control device of the tractor's hydraulic system.
- a single-acting control device and a free return line of the tractor's hydraulic system.

The E-control set serves to actuate the hydraulic functions of the machine from the tractor, provided that:

- the oil supply for the hydraulic control block of the machine has been switched on.
- the power supply has been connected to the tractor's power supply (12 V) via the 3-pole plug (DIN 9680).

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

Depending on the machine's equipment, the control set has a different design. 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 actuated and held. If the operating element is released, it returns to its neutral position and the movement is stopped.
- In latch-in design for movements requiring continuous action for constant loads e. g. hydraulic motors.
- In control-dial design for setting the actuating speed of the hydraulic functions in 10 steps (e.g. conveyor speed for crossover conveyor, discharge conveyor).

The operating elements can be set to three positions:

- Function I
- Neutral position
- Function II

The control set is mounted on the tractor within view and easy reach, see ► see section 6.12.2 Mount E-control set, page 124

NOTE

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.

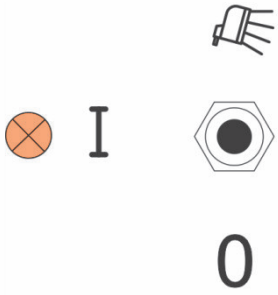
7.3.1 Symbols on the control set

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

Control lamps

Symbol	Control lamp	Description
	lights up red does not light up	control system on control system off

Switch control set on and 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 design)	off (red control lamp does not light up)

Change mixing auger speed

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

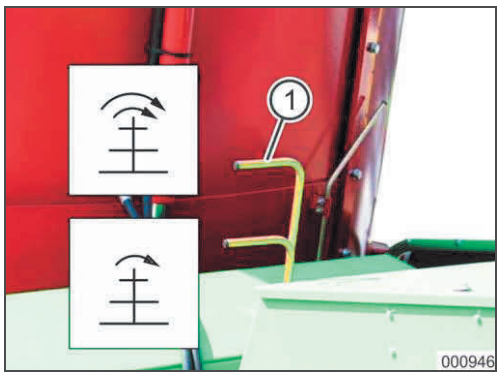


Fig. 105

NOTE

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

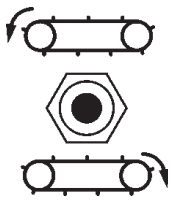
The position of the indicator pipe (1) of the electrical remote control indicates the set speed (gear level).

Indicator pipe	Speed
top	fast
bottom	slow

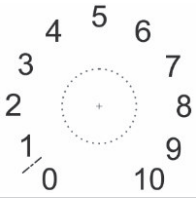
Extend and retract deflector plate

Symbol	Position of key button	Deflector plate
	top (touch-control design)	extend
	neutral position	movement stops
	bottom (touch-control design)	retract

Switch crossover conveyor / conveyor extension / discharge conveyor

Symbol	Position of toggle switch	Crossover 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

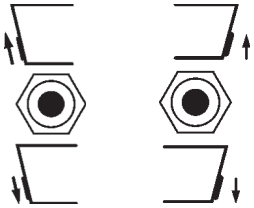
Set conveyor speed for conveyor belts

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

Lift and lower supporting leg

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

Open and close dosage gate

Symbol	Position of key button	Dosage gate
	top (touch-control design)	open
	neutral position	movement stops
	bottom (touch-control design)	close

Switch work lights on and off

Symbol	Position of toggle switch	Work lights
	top (latch-in design)	on
	bottom (latch-in design)	off

Extend and retract counter-cutters

Symbol	Position of key button	Counter-cutters
	top (touch-control design)	extend
	neutral position	movement stops
	bottom (touch-control design)	retract

8 Operation

8.1 Safety

As a basic principle, the following is applicable:

- Acquaint yourself with all mechanisms and operating elements of the machine and their functions before starting work. During operation will be too late.
- Wear close-fitting clothing. Loose-fitting clothing may be more easily caught by moving machine parts.
- Start the machine only if all protective devices have been installed and are in protective position.
- 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.
- Safely support folded-up covers before working beneath them.
- Immediately replace missing or defective protective devices.
- Observe the maximum payload of the attached/hitched machine and the admissible axle and tongue loads of the tractor. Run the machine when 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.
- Immediately switch the tractor's p.t.o. shaft off in case of a response of the overload clutch.
- Only actuate powered machine parts if there are no people within the machine’s hazardous area.
- Check the hazardous area behind the machine before starting reverse travel. If a rear-view camera (optional extra) is available, set it such that you have a complete view of the rear hazardous area.
- Secure the tractor against accidental starting and rolling before leaving the tractor.

  ► see section 2.9 Safely park tractor and machine, page 29

Operative staff:

- Operator

8.2 Fill machine

As a basic principle, the following is applicable:

- The mixing container must be charged by means of appropriate equipment only, such as:
  - Tractor with front loader
  - Farm or wheeled loader
  - Telescopic loader
  - Conveyor system
- People are not allowed on a level with or above the mixing container.
- People are only allowed to fill the mixing container manually if they cannot accidentally fall into 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.
- Alternatively: 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.
- Remove baler twine, films 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 smoothly 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 the tractor and cause additional load to all powered components.

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

- Due to the different fodder components to be mixed, the filling quantity for one mixing container filling cycle may vary. Avoid overload; in case of overload
  - the individual fodder components cannot be mixed homogeneously.
  - mechanical damage to the power train may occur.
  - cutting knives of the mixing auger may bend.

⚠ WARNING

Failure of components due to overload

Overload may cause insufficient stability, steering and braking ability of the tractor. Risk of accident.

- Observe the maximum load capacity of the hitched machine.
- Observe the admissible axle and tongue loads of the tractor; run the machine only with partly filled mixing container if necessary.

ATTENTION

Damage to the machine due to overload

Overload affects the machine's performance and service life and may occur

- if fodder components become entangled by 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, ► see section 8.3 Mix fodder components, page 147.

The fodder components should freely move in the mixing container when the mixing auger is powered.

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

NOTE

If only one tractor is available, the mixing container can also be filled when unhitched. The mixing process is, however, 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.

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.

8.2.1 Filling procedure

1. Check the mixing container for foreign objects before starting the tractor.
   – Remove foreign objects from the mixing container if necessary.
2. Start the tractor engine.
3. Park the tractor with the hitched machine on even ground.
4. Align the tractor in a straight line in front of the machine.
   – Further angular misalignment of the propeller shaft causes increased wear.
5. Secure tractor and machine against rolling.
6. Close open dosage gates if applicable.
7. Swivel the weighing device (if available) from the tractor into filling direction.
8. Switch the weighing device on and start the programme (if available).
9. Keep people away from the hazardous area (charging area).
10. Switch the tractor's p.t.o. shaft on (not in case of power shift gearbox).

→ The mixing auger starts.

11. Let the tractor engine run at appropriate speed to ensure that the tractor engine runs smoothly and does not stall when the mixing container is being filled.
12. Fill the mixing container.
    – By means of appropriate equipment (e.g. tractor with front loader, yard or wheeled loader).

8.2.2 Filling order

NOTE

For loosening round or cuboid bales, a higher power is required.

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 drive speed.
3. Increase the drive speed of the mixing auger after the bale has been loosened.
4. Retract the counter-cutters out of the mixing container.

1. Fill highly structured fodder components (hay, straw etc.) in with the mixing auger powered.
   – Before filling in the next component, let mixing continue until the long stalks have been sufficiently chopped.
2. Fill in grass silage.
3. Fill in concentrated feed, grain feed etc.
4. Fill in mineral feed by means of the loading tool (shovel), through the feed funnel (optional extra) or via a conveyor system.
5. 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.
6. 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.
7. Fill in maize silage, grain silage.

8.3 Mix fodder components

The type and 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.

⚠ DANGER

Falling into the mixing container

Do not bend over the mixing container. Monitor the mixing process by means of the surveillance camera.

1. 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.
2. Reduce the drive speed of the mixing auger if light fodder components are thrown over the edge of the mixing container during mixing.

3. Extend the counter-cutters if necessary.

NOTE

Damage to the machine due to overload of power train

Interruptions in the mixing process, in particular during transport journeys with the mixing container filled, may, depending on the duration and the consistency of the fodder components, cause high "torques" and excessive stress on the power train when restarting the mixing unit.

Avoid interruptions in the mixing process.

NOTE

The use of the counter-cutters allows finer chopping and faster mixing of highly structured fodder components. ► See the following paragraph.

NOTE

Sharp-edged cutting knives reduce the required mixing auger power. Regularly sharpen cutting knives, ► see section 10.12.3 Grind cutting knives, page 192.

8.3.1 Apply counter-cutters

Depending on the structure of the fodder components, the counter-cutters can be extended into the mixing container in four possible positions.

- Extend the counter-cutters only with the mixing auger stopped.
- Extend the counter-cutters into the mixing container only as far as to ensure that the fodder will not become entangled by / pile up on the counter-cutters.
- The counter-cutters slow down the horizontal revolving of the fodder in the mixing container and serve e.g. for chopping and mixing round or cuboid bales.
- The further the counter-cutters protrude into the mixing container, the better their effect and the larger the slowing-down effect.

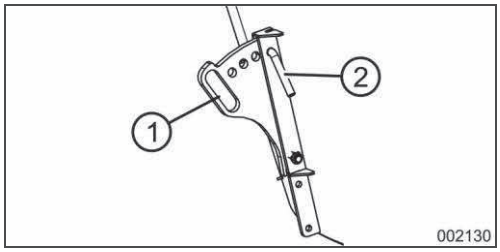


Fig. 106

Standard equipment (manual adjustment)

1. Pull the locking bolt (2) out.
2. Extend or retract the counter-cutter (1).
3. Insert the locking bolt (2) into the desired position.

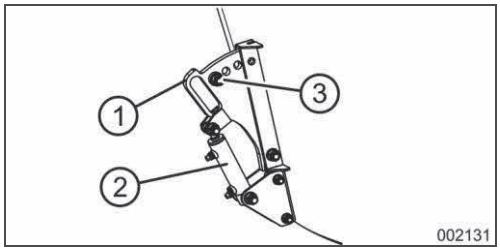


Fig. 107

Optional extra (hydraulic adjustment)

The optional extra equipment of the counter-cutters (1) includes a hydraulic cylinder (2) enabling extending and retracting via remote control.

The hydraulic cylinders enable the extension of the counter-cutters in four possible positions by placing the bolt (3) respectively.

Depending on the tractor's equipment, remote control is effected:

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

8.4 Discharge fodder

Important information for fodder discharge:

- Open the dosage gate completely when discharging very dry, long-stalk and highly structured fodder.
- Open the dosage gate according to the desired discharge quantity when discharging highly pourable fodder.
- When discharging the fodder, the 750 p.t.o. shaft (if available) can be used and the tractor engine can be run at reduced speed.
- Increase the drive speed of the mixing auger 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.
  - Gear level II or p.t.o. shaft speed 1000 min^{-1}
  - Select second or third gear for power shift gearbox.
- 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.

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 drive speed of the mixing auger.
- the opening width of the dosage gate.
- the travelling speed of the tractor on the feeding table.

The higher the drive speed of the mixing auger, the wider the opening width of the dosage gate, and the slower the travelling speed of the machine, the larger the fodder quantity discharged onto the feeding table.

8.4.1 Discharge procedure

⚠ WARNING

Objects being flung out

Risk of objects being flung from the conveyor belt through the discharge opening and causing injuries during fodder discharge.

- Make sure that people and animals leave the hazardous area before switching the conveyor belt on and opening the discharge opening.

Keep to the specified order during discharge.

Note: Optional extras are put in parentheses (...).

Start discharge

1. (Set conveyor belt to working position if it can be swivelled/moved, ► see section 8.6.2 Secure side discharge conveyor, page 154.)
2. Switch the p.t.o. shaft on.
3. (Switch the conveyor belt on.)
4. Switch the mixing auger on.
5. Open the dosage gate.

Finish fodder discharge

1. Close the dosage gate.
2. Switch the mixing auger off.
3. (Switch the conveyor belt off when the fodder discharge has finished.)
4. Switch the p.t.o. shaft off.
5. (Set the conveyor belt to transport position if it can be swivelled/moved, ► see section 8.6.2 Secure side discharge conveyor, page 154.)

8.5 Change gear level by means of switchgear

The mixing augers can be alternatively powered at gear level I or II providing different speeds.

Gear level I	
High driving speed	• for producing small mixing quantities • for completely emptying the mixing container
Gear level II	
Low driving speed	• 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

Tab. 26: Gear levels | 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 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 control set
- the amount of load of the mixing auger in the mixing container:
  - Empty or slightly filled mixing container
  - Fully filled mixing container

Two different procedures for changing gear level by means of the switchgear are described below.

8.5.1 Change gear level with small amount of load

Procedure for changing the gear level with an empty or slightly filled mixing container – small amount of load of mixing auger:

1. Switch the tractor's p.t.o. shaft off.
2. Select the gear level via the mechanical or electrical remote control set.
3. Switch the tractor's p.t.o. shaft on.

→ During restart of the p.t.o. shaft, changing the gear level is initiated in the switchgear.

8.5.2 Change gear level with large amount of load

Procedure for changing the gear level with fully filled mixing container – large amount of load of mixing auger:

1. Switch the tractor's p.t.o. shaft off.
2. Prepare for change of gear level:
   – Switch the tractor engine off if the p.t.o. shaft drive of the 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 is freely movable.
   – Select the function "Switched-off p.t.o. shaft freely movable with the tractor engine running" at your tractor (if available).
3. Select the gear level via the mechanical or electrical remote control set.
4. Switch the tractor's p.t.o. shaft on.

→ During restart of the p.t.o. shaft, changing the gear level is initiated in the switchgear.

8.6 Transport journeys

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

As a basic principle, the following is applicable:

- Observe the national road traffic regulations.
- Adapt driving to the conditions. Consider personal abilities as well as the road, cornering, traffic, visibility and weather conditions, the driving characteristics of the tractor and the influences exerted by the attached/hitched machine.
- Avoid sudden changes of direction, particularly when travelling uphill and downhill and when traversing hills. Risk of tipping over.
- Shift down to a lower gear before travelling downhill and observe the instructions in the operating manual of the tractor.

- Observe the broad overhang and the flywheel mass of the machine when cornering with attached/hitched machine.
- Observe the maximum payload of the attached/hitched machine and the admissible axle and tongue loads of the tractor.
- The tractor's front axle load must never fall below 20 % of the tractor's empty weight, in order to ensure sufficient steerability. Use front weights if necessary.
- Ensure sufficient steerability and braking ability of the tractor. Machines attached or hitched to a tractor and front or tail weights influence the driving behaviour as well as the steerability and the braking ability of the tractor.

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 and the braking effect. The tractor must ensure the specified deceleration for the combination of tractor and machine.
- Ensure that parts of the loaded material do not risk to fall off the machine onto the road.
- whether all movable machine parts are in transport position secured by the provided transport locks.
- whether the work lights are switched off.
- the transport equipment for proper installation, e.g. lighting, warning and protective devices.
- whether the intended route is appropriate for the traffic.

⚠ WARNING

Machine movements

Risk of dangerous situations to people due to machine movements caused by unintentional actuation of the hydraulic system.

Before carrying out transport journeys:

- Set the control set to "Road Travel" mode or switch it off.
- Switch the oil circulation between tractor and machine off.
- Damage due to overload of the power train, ► see section 8.3 Mix fodder components, page 147

NOTE

Always switch the work lights off when travelling on public roads.

⚠ CAUTION

Unintentional actuation of hydraulic functions

When the machine is equipped with an on-board hydraulic system, always

- close the stop-cock
- switch the propeller shaft off

prior to transport journeys.

8.6.1 Secure protective devices

Fig. 108

1. Secure the protective devices (1) by means of an elastic strap (2) during side or rear discharge.

8.6.2 Secure side discharge conveyor

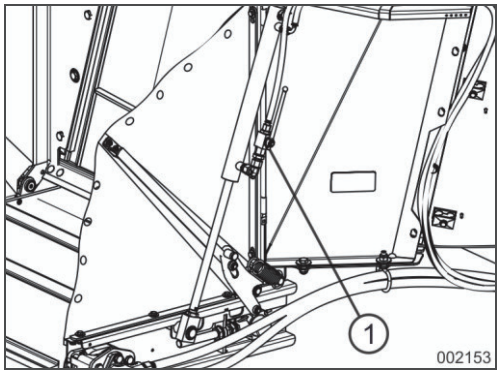


Fig. 109

On machines with extension at the side discharge, the stop-cock is mounted on the side of the discharge conveyor. It must be closed during road travel, in order to secure the discharge conveyor extension in its transport position and prevent it from accidentally folding out to the side.

1 Stop-cock
- – closed (at a right angle to the line)
- – open (parallel to the line)

The following variants are possible:

- short conveyor with 1 hydraulic cylinder
- longer conveyor with 2 hydraulic cylinders

NOTE

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

9 Malfunctions

9.1 Safety

Malfunctions specified in this chapter must be eliminated by qualified staff authorised and trained by the user or by an authorised workshop.

In order to locate and eliminate malfunctions, special know-how is required in some cases, which is not provided within the scope of these operating instructions.

Observe the general occupational safety, accident prevention rules and the applicable documents such as the sub-suppliers' documentation.

Contact an authorised workshop, a Strautmann dealer or the Strautmann customer service in case of malfunctions not specified below.

As a basic principle, the following is applicable:

- Park the machine on firm, even ground.
- Safely park the machine and secure it against accidental rolling.
- Secure lifted machine parts against accidental lowering.
- Keep people away from the hazardous area.
- Only carry out work with the machine stopped.
- If safety and/or protective devices must be removed, reinstall them immediately after completion of work and check them for proper functioning.
- Wear personal protective equipment required for the respective work to be carried out.
- Have work on the electrical system only carried out by qualified electricians.
- Risk of accident due to damaged safety-related parts; immediately replace damaged parts.
- Malfunctions affect the safe operation of the machine. Immediately eliminate detected malfunctions.
- Ensure tidiness and cleanliness in the operating area.
- Observe all safety and warning instructions in the operating instructions.
- Work that is too demanding for the technical qualifications of the staff involved or requires special tools / aids should be carried out by an authorised workshop, a Strautmann dealer or the Strautmann customer service.

9.2 List of malfunctions, 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 cutting knives
	Long stalks have wrapped around the front auger end or the scraper	Clean mixing auger
	Foreign objects are jamming the mixing auger	Remove foreign objects
	Screwed connection of 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 Gearbox in neutral position	Clearly select gear level
	Shear bolt of shear bolt coupling in front of the angular gear sheared off	Replace shear bolt
Unsteady run / Imbalance of mixing unit	Heavily soiled mixing augers	Clean mixing augers
	Missing balancing weights at the mixing augers	Install balancing weights at the mixing augers
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
Crossover conveyor does not start	Operating error	First switch on crossover conveyor, open dosage gate only then
	Crossover conveyor too loose	Tighten crossover conveyor
Unsteady run of power train	Propeller shaft angled too much	Align tractor and machine in a straight line during mixing
	Worn / Worn out propeller shaft / bearing	Replace defective parts
Machine wobbles heavily during road travel	Tyre pressure too low	Correct tyre pressure according to table
	Machine overload	Adapt charging degree
	Rough road track at high speeds	Lock passive steering axle Reduce travelling speed
Poorly controllable braking effect in hydraulic brake system	Air in hydraulic brake system	Bleed hydraulic brake system

Malfunction	Cause	Remedy
Braking power too low	Machine overload	Adapt charging degree
	Travelling at excessive speed	Adapt travelling speed
	Brake linings worn	Readjust brake linkage
		Replace brake linings
	Improper settings of brake system	Check and correct settings of brake system
	Insufficient contact between brake lining and brake drum during braking	Retract braking axle(s)

Tab. 27: List of malfunctions, machine

9.3 List of malfunctions, electrical system

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

Tab. 28: List of malfunctions, electrical system

9.4 List of malfunctions, hydraulic system

Malfunction	Cause	Remedy
No hydraulic function available	Interrupted hydraulic oil flow	Switch oil circulation between tractor and machine on
		Check hydraulic plugs for wear
	Hydraulic hose pipes not connected properly (return line to pressure connection)	Connect hydraulic hose pipes properly
	Hydraulic plugs not properly locked in hydraulic sleeves	Insert hydraulic plugs into hydraulic sleeves until hydraulic plugs noticeably lock
	System screw at electro-hydraulic control block not properly set	Check setting and readjust if necessary
Control block leaking	Defective O-rings	Replace O-rings
	Loose tie rod	Tighten tie rod at 17 Nm
	Leaking screw plugs	Seal screw plugs by means of liquid threadlocker or sealing tape
Cylinders extend for their functions, but do not retract	No return flow to tractor	Check control device on the tractor
	Worn hydraulic plug	Replace hydraulic plug
Conveyor extension / Side discharge conveyor cannot be swivelled	Stop-cock closed	Open stop-cock
Hydraulic system excessively heating up	Volume flow from tractor too large	Adjust volume flow to tractor valve
	Hydraulic plugs too small	Provide appropriately large hydraulic plugs
	Hydraulic clutches worn	Provide new hydraulic clutches

Tab. 29: List of malfunctions, hydraulic system

9.5 List of malfunctions, weighing system

NOTE

It is absolutely imperative to observe the enclosed operating instructions for the weighing device.

Malfunction	Cause	Remedy
Device cannot be switched on	No power supply	Check connecting cable
		Switch power supply on, 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 is working 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 is working 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 is working properly.
Weighed value varies	Device	See malfunction description: "Device displays bars"
	Terminal box	
	Weighing rods	
Scale displays 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 scale, see enclosed operating instructions "Recalibration".
Device displays ERROR	Internal error	Send device in for repair.

Tab. 30: List of malfunctions, weighing device

9.6 Basic check, weighing device

NOTE

Observe the sub-supplier documentation

The basic check of the weighing device in case of non-stable weight display or error message is carried out in four steps.

1. Use the tare key to set the weighing device to "0".
   → The error disappears and the weight display is stable.
   • The display was beyond the value range.
   → The error does not disappear.
   • Continue with step 2.

2. Check of weighing computer

• Pull the signal plug off the weighing computer.
   → The error disappears and the weight display is stable.
   • Continue with step 3.
   → The error does not disappear.
   • Check the plug-in connections for moisture.

3. Check of weighing rods

Disconnect all connecting cables of the weighing rods from the connection box and then separately plug them into the connection for the signal plug at the weighing computer.

• Plug the connecting cable for the first weighing rod in.
   → The error disappears and the weight display is stable.
   • Continue with the next connecting cable until all weighing rods have been separately checked.
   → The error does not disappear at individual connections.
   • Replace the respective weighing rod.
   → The error does not disappear at any connection.
   • Replace the weighing computer.

NOTE

The longer the testing time, the better.

The testing time should be at least 3 minutes.

4. Check of connection box

• Connect the connection box without the weighing rods to the signal plug of the weighing computer.
   → The error disappears and the weight display is stable.
   • Connect the weighing rods one after the other.
   → The error does not disappear.
   • Replace the connection box.

9.6.1 Eliminate blockages

⚠ WARNING

Unsecured machine parts

Increased risk of accident due to unsecured machine parts or uncontrolled machine movements.

- Secure lifted parts against lowering, e.g. open dosage gate.
- Secure the machine against accidental starting and rolling.
- Wait for the machine to stop completely before entering the hazardous area.

⚠ CAUTION

Sharp-edged cutting knives

Sharp-edged cutting knives of the mixing auger may be within the discharge opening area. Risk of cuts.

- Do not reach into the cutting knives when eliminating blockages.
- Wear cut-proof protective gloves.

ATTENTION

Machine damage due to change of sense of rotation

- Never change the sense of rotation of the tractor's p.t.o. shaft to eliminate blockages.

1. Switch the p.t.o. shaft off.
2. Completely open the dosage gate of the clogged discharge opening if necessary.
3. Secure tractor and machine against accidental starting and rolling
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 dosage gate.
7. Switch the p.t.o. shaft on.
8. Power the mixing auger at the desired drive speed.
9. Open the dosage gate.
   – Set the desired opening width.
10. Continue fodder discharge.

9.7 Replace shear bolts of shear bolt coupling

Operative staff:

- Qualified staff

1. Secure tractor and machine against accidental starting and rolling.
2. Eliminate the cause of the overload (e.g. clogging of discharge opening), ► see section 9.6.1 Eliminate blockages, page 161.
3. Strip the propeller shaft off the p.t.o. shaft of the tractor.
4. Open the fitting apertures at the guard. Observe the provided operating instructions for the propeller shaft.
5. Remove the residues of the shear bolt (1).
6. Rotate the power train such that the boreholes of the coupling halves face each other.
7. Replace the shear bolt (1) by a new bolt.
8. Close the fitting aperture.
9. Couple propeller shaft.

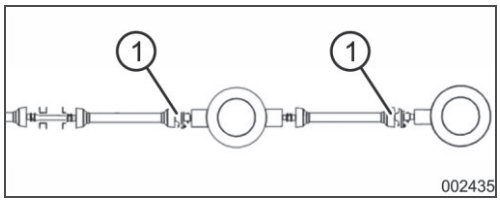


Fig. 110

On the one-auger and two-auger mixers, the shear bolts (1) are mounted at the propeller shaft in front of the respective mixer gearbox.

For information about the design of the power train, please refer to ► see section 4.7 Power train, page 65

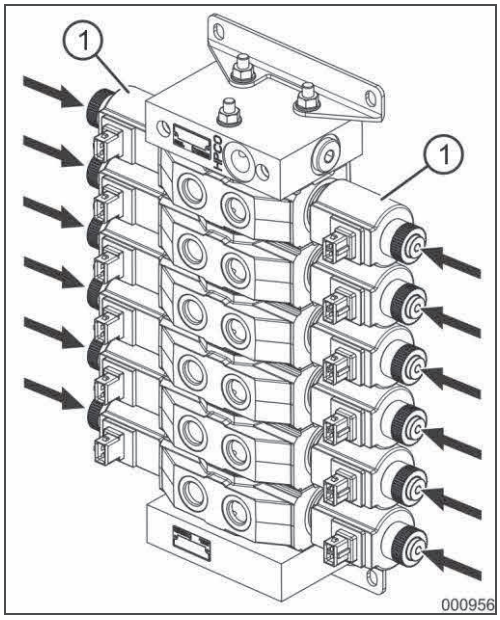


Fig. 111

9.8 Emergency manual operation

In case of a failure of the electrical system, the hydraulic functions can be actuated via the emergency manual operation function.

Operative staff:

- Qualified staff

⚠ WARNING

Movements of working tools

Risk of dangerous situations to people caused by unintentional movements of working tools due to the actuation of the emergency manual operation function.

- Keep people away from the hazardous area.

The control valves (1) for switching the directional control valves and directional seat valves are actuated directly at the electro-hydraulic control block via the emergency manual operation function.

1. Secure the machine against accidental starting and rolling.
2. ***ATTENTION*** – Risk of damage to the proportional solenoids due to the use of a sharp-edged object. Use a blunt object to push in the armature of the solenoid at the respective switch-over valve to actuate the desired hydraulic function.

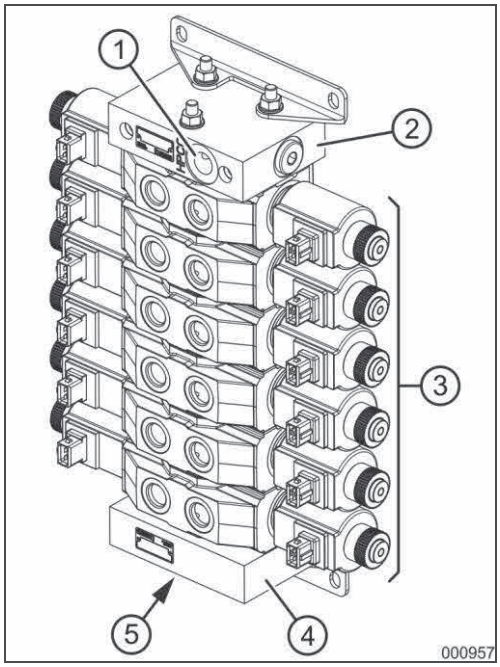


Fig. 112

Control block

1 Connection, return line T (R; S)
2 End plate
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 Entry plate
5 Connection, pressure line P

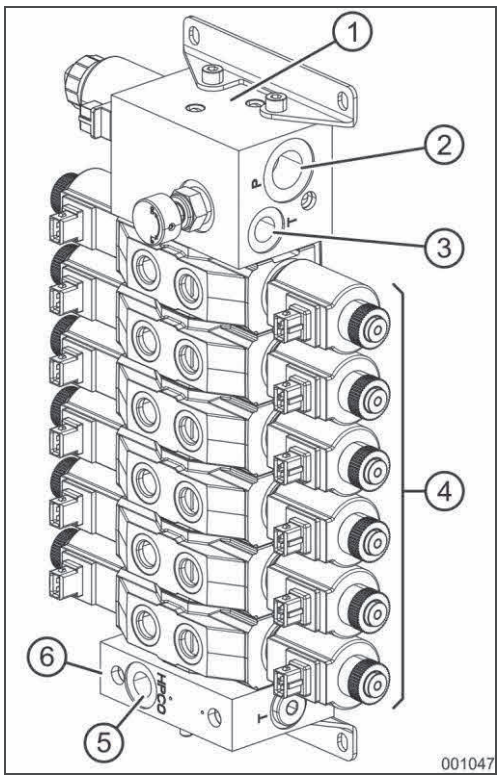


Fig. 113

Control block with flow regulation valve

1 Control block for variable conveyor speed (optional extra)
2 Connection, pressure line P
3 Connection, return line T (R; S)
4 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.
5 Connection, pressure line P
6 Entry plate

Simultaneously actuate the proportional valve.

10 Service and maintenance

Fig. 114

10.1 Safety

As a basic principle, the following is applicable:

- Carry out the specified service and maintenance work on the machine in due time.
- Observe the maintenance intervals for wearing parts.
- Replace damaged or worn parts immediately.
- Secure the tractor against accidental starting and rolling before carrying out service or maintenance work on the machine and climbing onto the machine.
- Wait for the machine to stop completely before entering the hazardous area.
- Existing mechanical, hydraulic, pneumatic and electrical or electronic residual energies may cause accidental machine movements.

  Beware of possible residual energies. Warning signs mark the components with residual energies.
- Wear / Use appropriate personal protective equipment.
- Use safe and appropriate equipment.
- Use a mobile service platform to reach elevated machine components and to carry out cleaning, maintenance and repair work without any risk.
- Fix larger assemblies carefully to lifting equipment before replacing them.
- Secure the lifted machine or lifted machine parts against accidental lowering before carrying out service and maintenance work.
- Risk of crushing, shearing, cuts, becoming entangled and being drawn in to parts of the body due to powered machine parts if protective devices are open or removed.

  Always close open protective devices or mount previously removed protective devices before powering the machine.

  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 chocks.

- Check screws and nuts for firm seating at regular intervals (approx. every 50 service hours). Retighten loosened screws and nuts.
- Check loosened screwed connections for firm seating.
- Use appropriate equipment and gloves when replacing working tools with blades.
- Disconnect the generator and battery cable on the tractor and all electrical/electronic plug-in connections before carrying out electrical welding work on the tractor and/or on the attached/hitched machine.
- Protect adjacent parts when carrying out welding, drilling and grinding work and when working with cut-off wheels. This applies in particular to power, hydraulic, brake and supply lines.
  – Cover lines or remove them at especially critical spots.
- Dispose of oils, greases and filters properly.
- Check all hose pipes with special care for visible defects.
- Observe environmental protection measures when carrying out service and maintenance work on the machine.
- Immediately eliminate any leaks.
- Observe applicable local regulations regarding the disposal. This applies also to parts having come into contact with operating media.
- Properly handle and dispose of substances and materials used for cleaning the machine. This applies in particular when working on lubrication systems and devices and when carrying out cleaning work using solvents.
- Load-bearing parts may break due to mechanical work on frame elements. Risk of material damage and serious injuries or even death.

  As a basic principle, the following is not allowed:
  – Drilling at the frame or chassis.
  – Boring-up of existing holes.
  – Welding on load-bearing parts.
- Exclusively use original spare parts or parts approved by the manufacturer.
- After finishing maintenance work, check the safety and protective devices for proper functioning.
  – Immediately replace missing or defective protective devices.

10.2 Maintenance instructions

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

  In case of higher loads and amount of stress, maintenance work must be carried out at respectively shorter intervals.
- In case of doubt, the maintenance intervals, time intervals and service hours specified in the sub-supplier documentation shall prevail.
- Warranty claims can only be asserted if maintenance, cleaning and repair work as well as inspections have been carried out verifiably, on time, regularly and properly.

10.3 Lubricants and operating media

Lubricant and operating medium	Specification	Manufacturer	Name
Hydraulic oil	HLP 46 DIN 51 524	AVIA	RSL 46
		ARAL	Vitam DF TOP 46
Gear lubricant oil	SAE 80W API GL 4 MIL-L-2105	AVIA	AVIA Gear Oil MZ 80W
		ARAL	EP 80W
		SHELL	Spirax S3 G 80W
		TOTAL	Transmission Gear 7 80W
Grease	KP2N-20 DIN 51 825 NLGI2 DIN 51818		Lithium soap-based multi-purpose grease
		Shell	Gadus S3 V220C 2

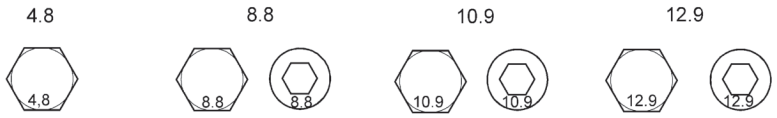
Tab. 31: Lubricants and operating media

10.4 Tightening torques

The tightening torques listed here are reference values. Differing data specified elsewhere in the operating instructions or the enclosed sub-supplier documentation shall always prevail.

- Check screwed connections for firm seating at regular intervals (approx. every 50 service hours).
- Always replace screws and nuts by parts of the same quality.
- Tighten gear or crown nuts to 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.

10.4.1 Metric standard threads

Grade and marking of screw heads	
Grade and marking of nuts	

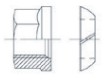
	Grade 4.8				Grade 8.8				Grade 10.9				Grade 12.9			
	lubricated*		dry **		lubricated*		dry **		lubricated*		dry **		lubricated*		dry **	
Size	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft	Nm	lb·ft
M6	4.8	3.5	6	4.5	9	6.5	11	8.5	13	9.5	17	12	15	11.5	19	14.5
M8	12	8.5	15	11	22	16	28	20	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

Tab. 32: Tightening torques for standard threads

* "Lubricated“ means that the screws are treated with a lubricant such as e.g. engine oil, or that phosphatised or oiled screws are used.

** "Dry" means that normal or galvanised screws without any lubrication are used.

10.4.2 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

Tab. 33: Tightening torques for wheel nuts

10.5 Maintenance and lubrication plan

Scheduled service and maintenance of the machine is an important prerequisite for reliable functioning. Insufficient maintenance may provoke malfunctions or damage causing downtimes and repair costs.

Due maintenance work is specified in the maintenance plan and lubrication plan and listed according to the intervals.

The minimum qualification required for the staff to carry out the respective work is specified in the column "Performer" and in front of the description of the maintenance activity.

If increased wear is detected during regular checks, reduce the required maintenance intervals according to wear.

10.5.1 Maintenance plan – Machine

Before each start-up		
Maintenance work	**Performer**	**See**
Visual inspection and functional check of machine	Operator	► page 132
Hydraulic system – Visual inspection for defects and damage	Operator	► page 199
Brake system – Visual inspection and functional check by means of brake test	Operator	► page 205
Traffic-related equipment and lighting – Check for proper functioning (before participating in road traffic)	Operator	► page 82
Check wheel nuts and axle connection for firm seating [1)]	Qualified staff	► page 169

1) also after each wheel change

After the first 10 service hours		
Maintenance work	**Performer**	**See**
Mixer gearbox and switchgear – Check oil level *	Operator	► page 180
Spur gear and oil tank, on-board hydraulic system – Check oil level *	Operator	► page 201
Hydraulic system – Check all components for tightness	Qualified staff	► page 197
Check wheel nuts for firm seating [1)]	Qualified staff	► page 169

* after commissioning / after a change of the gear lubricant oil

1) also after each wheel change

Daily		
Maintenance work	**Performer**	**See**
Tyres – Check tyre pressure and carry out visual inspection for defects	Operator	► page 204
Compressed-air brake system – Drain compressed-air reservoir	Operator	► page 206
Crossover conveyor, discharge conveyor, conveyor extension – Check tension and carry out visual inspection for defects	Operator	► page 184

Every 50 service hours		
Maintenance work	**Performer**	**See**
Check oil level of mixer gearbox and switchgear – Lubricate machine according to lubrication plan.	Operator	► page 173
Crossover conveyor, side discharge conveyor – Lubricate flange bearing according to lubrication plan	Operator	► page 173
Hydraulic system – Check all components for tightness	Qualified staff	► page 197
Compressed-air brake system – Check filter in hose coupling.	Qualified staff	► page 206

For the first time after 250 service hours,		
Maintenance work	**Performer**	**See**
Hydraulic system – Clean / Replace hydraulic filter	Authorised workshop	► see page 62

After 1000 service hours for the first time, then every 2000 service hours or once a year		
Maintenance work	**Performer**	**See**
Brake system and brake linings – Check for damage, wear and proper functioning	Authorised workshop	► page 208 ► page 205
Mixer gearbox – Change oil	Authorised workshop	► page 180
Hydraulic hose pipes – Check for operational safety	Authorised workshop	► page 199
Check frame and drawbar for fissures	Authorised workshop	
Spur gear and oil tank, on-board hydraulic system – Change oil and filter	Authorised workshop	► page 201 ► page 202
Visually inspect all components for damage and wear	Authorised workshop	–
Brake system and brake linings – Check for damage, wear and proper functioning	Authorised workshop	► page 208 ► page 205
Compressed-air brake system – Clean filter in hose coupling	Authorised workshop	► page 206
Check and retighten drawbar connection	Authorised workshop	► page 167
Check play of wheel hub bearing	Authorised workshop	► page 210
Check wheel nuts for firm seating	Authorised workshop	► page 204
Check axle connection for firm seating	Authorised workshop	
Check brake setting at manual slack adjuster	Authorised workshop	► page 209
Hydraulic system – Clean / Replace high-pressure safety filter	Authorised workshop	► page 62

Before longer downtimes		
Maintenance work	**Performer**	**see**
Thoroughly clean the machine.	Operator	
Completely lubricate the machine	Operator	
Protect all movable and blank parts of the machine against corrosion	Operator	
Touch up paintwork	Qualified staff	

ATTENTION

Do not expose the machine to the weather if it is not in use for a long period of time.

If required/worn		
Maintenance work	**Performer**	**See**
Shear bolt coupling – Replace shear bolt	Qualified staff	► page 162
Dosage gate – Check gap size	Qualified staff	► page 183
Magnetic system – Clean magnets	Operator	► page 192
Mixing auger – Grind cutting knives	Authorised workshop	► page 192
Mixing auger – Replace cutting knives	Authorised workshop	► page 185
Mixing auger – Adjust scraper bar	Authorised workshop	► page 193
Crossover conveyor, discharge conveyor – Tighten and adjust conveyor belt	Qualified staff	► page 184
Crossover conveyor, discharge conveyor – Clean driving roller, carrying roller and pulleys	Qualified staff	► page 183
Mechanical Bowden cable operation – Replace Bowden cable	Qualified staff	► page 195
Remote control cable – Replace adapter	Qualified staff	► page 196
Tyres – Change	Qualified staff	► page 204
Brake linkage – Set	Authorised workshop	► page 209
Brake linings – Replace	Authorised workshop	► page 208
Hydraulic hose pipes – Replace	Authorised workshop	► page 199

10.5.2 Lubrication plan – Machine

NOTE

- Observe the enclosed sub-supplier documentation for lubrication of the propeller shaft(s).
- Relubricate all lubrication points after cleaning the machine by means of a pressure washer.

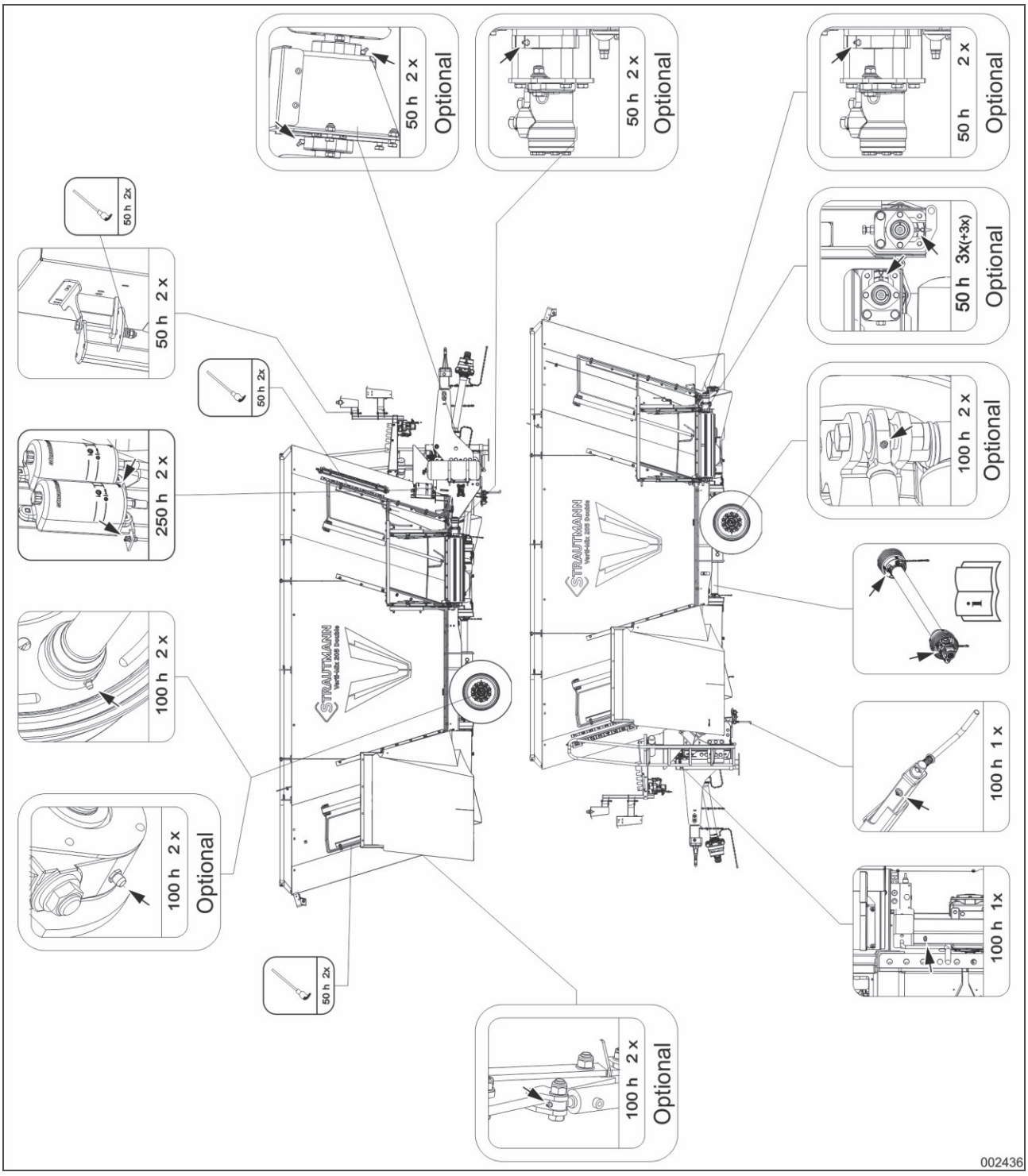


Fig. 115

10.6 Enter the mixing container

As a basic principle, the following is applicable:

- Park the machine on firm, even ground.
- Safely park the machine and secure it against accidental rolling.
- Secure lifted machine parts against accidental lowering.
- Never enter the mixing container through the discharge opening as long as the engine is running, the propeller shaft is coupled and the dosage gate has not been secured against accidental lowering.
- Risk of crushing when opening and closing the dosage gates.
- Keep people and animals away from the hazardous area.
- Only carry out work in an empty mixing container that is as clean and dry as possible.
- Wear personal protective equipment.
  - Non-slip safety footwear
  - Cut-proof protective gloves
- Risk of tripping. Pay particular attention to the scraper(s) of the mixing auger(s) near the bottom.

⚠ WARNING

Falling from the top edge of the mixing container

Risk of serious injuries or even death when falling into the mixing container.

It is not allowed

- to stay above the mixing container.
- to bend over the mixing container.
- to enter the mixing container from above.

⚠ WARNING

Implants being affected by electromagnetic fields

Risk of harm to health or even death to persons with electronic implants such as pacemakers due to magnetic fields.

- Keep an adequate safety distance from magnets if you wear an electronic implant.

⚠ CAUTION

Sharp-edged cutting knives

Risk of cuts.

- Wear cut-proof protective gloves.
- Cover the cutting knives by means of an edge protector.

Operative staff:

- Authorised workshop

Only authorised qualified staff is allowed to carry out work in the mixing container.

Authorised and qualified staff of an authorised workshop

- are able to adequately assess the risks and take appropriate safety measures,
- have appropriate personal protective equipment at their disposal,
- have appropriate tools at their disposal,

to enter the mixing container and carry out work there without any risk in a professional and safe manner.

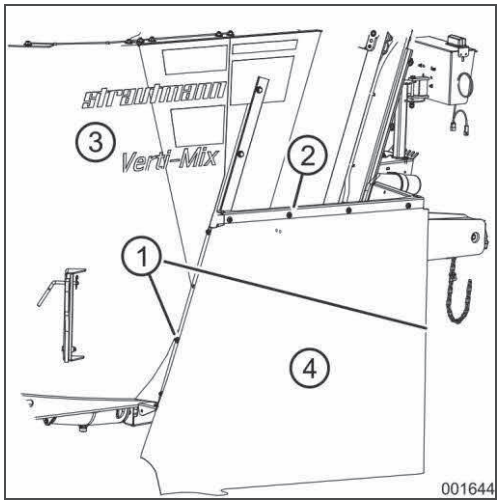


Fig. 116

1. Completely open the dosage gate of the discharge opening through which you want to enter the mixing container.
2. Secure tractor and machine against accidental starting and rolling.
3. Strip the propeller shaft off the tractor's p.t.o. shaft to enable manual rotation of the mixing auger via the propeller shaft if necessary.
4. ⚠ **CAUTION** – Risk of cuts due to cutting knives. 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 (4) and mixing container (3).
6. Remove the screwed connection (2) of the swivel pin and take off the protective cover (4).
7. Enter and leave the mixing container carefully through the discharge opening or the crossover conveyor and the discharge opening.
8. Properly fix the protective cover (4) again at the mixing container after finishing all necessary work in the mixing container.

10.7 Clean machine

- Regularly and thoroughly clean the machine. Dirt binds humidity thus causing rust formation.
- Remove wrapping twine from the drive shafts and the beaters. Wrapping twine causes damage to bearings and shaft seals and leads to imbalance.
- Immediately eliminate dirt accumulation in the area of drive shafts, bearings and gearboxes (shaft seals and ventilators). Dirt binds humidity thus causing leakages, contamination of lubricants, unnecessary wear and premature failure of drive components.
- Lubricate the machine after cleaning, especially after cleaning by means of a pressure washer / steam blaster or fat-dissolving agents.

⚠ WARNING

Toxic and flammable detergents

Risk of poisoning and risk of fire due to the use of inadmissible detergents.

- Never use fuels, benzene, paraffin or mineral oils as detergents.
- Observe the data sheets.

ATTENTION

Damage to components or the electronic system

When using a pressure washer/steam blaster for cleaning, observe:

- the operating instructions of the pressure washer/steam blaster manufacturer.
- Keep to the maximum admissible injection pressure of 80 bar.
- Do not exceed the water temperature of 60°C.
- Do not clean electronic components.
- Do not clean chromium-plated components.
- Do not aim the jet directly at the following components:
  - Lubrication points and bearings,
  - hydraulic components,
  - seals.
- Keep a minimum distance of 30 cm between the cleaning nozzle and the machine.
- Never aim the cleaning nozzle jet at the components at right angles. The spray angle must at least be 25°.
- Do not use any chemical additives.

- Carry out cleaning work at a washing area provided for this purpose.
- Observe the environmental protection rules.
- Dispose of used detergents and empty containers in accordance with the environmental regulations.

10.8 Lubricate machine

- Observe the specified intervals and lubricants according to the lubrication plan.

  ► see section 10.5.2 Lubrication plan – Machine, page 173

  Observe the enclosed sub-supplier documentation where applicable.
- Remove the dirt from the lubricating nipples before carrying out lubrication work.
- Exclusively use appropriate lubricants approved by the manufacturer, ► see section 10.3 Lubricants and operating media, page 167

ATTENTION

Damage to components

Damage to bearings, seals etc. may occur if the lubricating pressure is excessive and the grease gun used is not equipped with a protective device.

- Do not exceed the maximum lubricating pressure of 250 bar.

- Use environmentally friendly, biodegradable oils and greases where lubricants may penetrate the fodder or the ground.
- Remove excess grease at the lubricating nipple immediately.
- Observe the environmental protection rules.

10.9 Gear lubricant oil

Change the oil

- when the oil change interval has been reached,
- at least once a year
- or the gear lubricant oil has been contaminated e.g. due to humidity, condensate or metal abrasion.

Let the machine warm up before changing oil.

The flowability of the gear lubricant oil is at its optimum at operating temperature (30-40°C).

The optimum oil level / filling quantity

- must be regularly checked (according to maintenance plan / abnormalities detected during visual inspection of the machine),
- can be determined at an oil temperature of 0-20°C at the inspection glass / inspection plug,
- must be checked several times a day in case of an oil change after a test run / operation of the machine.

ATTENTION

Damage to the machine due to lack of oil or poor oil quality

- Always ensure a sufficient oil level.
- Change oil contaminated due to humidity, condensate or metal abrasion.
- Do not mix different types of oil.
- Immediately eliminate dirt accumulation, wrapping twine and humidity in the area of shaft seals, bearings and ventilators.
- Have any leaks, defective shaft seals and ventilators repaired immediately.
- Do not clean the gearboxes by means of a pressure washer/steam blaster or fat-dissolving agents.

⚠ CAUTION

Risk of slipping due to leaking oil

Risk of slipping and falling to people due to leaking oil during topping-up of oil or oil change.

- Immediately remove oil spills by means of binding agents.
- Have any leaks repaired immediately.

Dispose of used oil properly.

- Have any leaks repaired immediately.

Change the oil

- when the oil change interval has been reached,
- at least once a year
- or the gear lubricant oil has been contaminated e.g. due to humidity, condensate or metal abrasion.

Let the machine warm up before changing oil.

The flowability of the gear lubricant oil is at its optimum at operating temperature (30-40°C).

The optimum oil level / filling quantity

- must be regularly checked (according to maintenance plan / abnormalities detected during visual inspection of the machine),
- can be determined at an oil temperature of 0-20°C at the inspection glass / inspection plug,
- must be checked several times a day in case of an oil change after a test run / operation of the machine.

ATTENTION

Damage to the machine due to lack of oil or poor oil quality

- Always ensure a sufficient oil level.
- Change oil contaminated due to humidity, condensate or metal abrasion.
- Do not mix different types of oil.
- Immediately eliminate dirt accumulation, wrapping twine and humidity in the area of shaft seals, bearings and ventilators.
- Have any leaks, defective shaft seals and ventilators repaired immediately.
- Do not clean the gearboxes by means of a pressure washer/steam blaster or fat-dissolving agents.

⚠ CAUTION

Risk of slipping due to leaking oil

Risk of slipping and falling to people due to leaking oil during topping-up of oil or oil change.

- Immediately remove oil spills by means of binding agents.
- Have any leaks repaired immediately.

Dispose of used oil properly.

- Have any leaks repaired immediately.

10.9.1 Mixer gearbox with compensating reservoir

Check oil level

Operative staff:

- Operator

NOTE

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

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

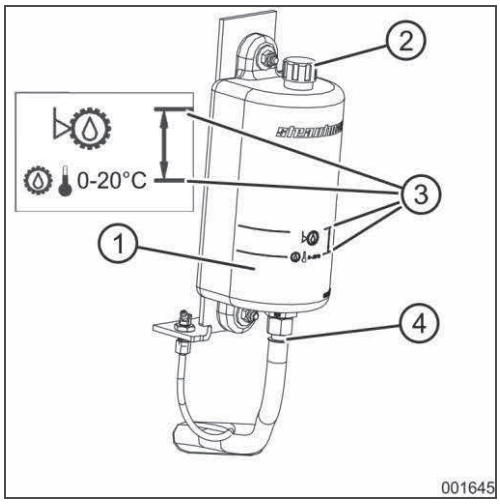


Fig. 117

1. Check the oil level in the compensating reservoir (1).
   The oil level must be visible between the two markings (3).
2. Top up gear lubricant oil if necessary.
   – Unscrew the vent screw (2).
   – Top up gear lubricant oil.
   – Screw the vent screw (2) in.

Change oil

Operative staff:

- Authorised workshop

1. Park the machine on even ground.
2. Switch the machine off and secure it against rolling.
3. Place a drip tray with an appropriate capacity beneath the compensating reservoir (1).
4. Unscrew the vent screw (2).
5. Unscrew the hose pipe (4).
   → The gear lubricant oil drains off into the drip tray.
6. Screw the hose pipe (4) on.

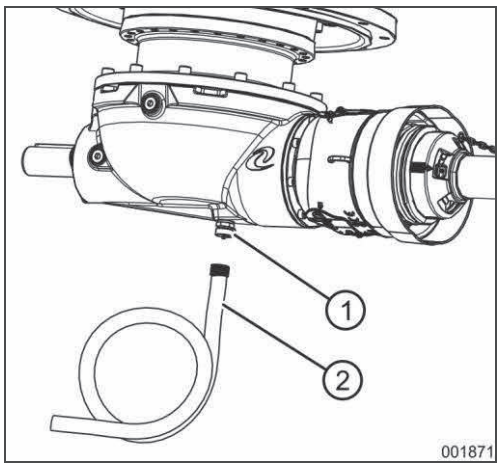


Fig. 118

7. Place the drip tray beneath the drain valve (1).
8. Hang the oil drain hose (2) into the drip tray.
9. Unscrew the cap of the drain valve (1).
10. Screw the oil drain hose (2) onto the drain valve.
    → The drain valve opens and the gear lubricant oil drains off into the drip tray.
11. Wait until no more oil comes out of the oil drain hose.
12. Connect the filling pump to the oil drain hose.
13. Fill gear lubricant oil through the filling pump into the mixer gearbox until the gear lubricant oil is flowing in the compensating reservoir and the oil level is visible between the two markings (Fig. 117/2).

NOTE

Fill the gear lubricant oil slowly into the mixer gearbox, in order to avoid formation of bubbles, which would prevent filling-in of a sufficient quantity of gear lubricant oil.

14. Unscrew the oil drain hose from the drain valve.
15. Disconnect the filling pump from the oil drain hose.
16. Screw the cap (1) onto the drain valve.
17. Screw the vent screw onto the compensating reservoir.
18. Carry out a test run for several minutes.
19. Check the oil level.
20. Top up gear lubricant oil through the vent opening.

NOTE

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

Dispose of used oil properly.

10.9.2 Switchgear

Check oil level

Operative staff:
- Operator

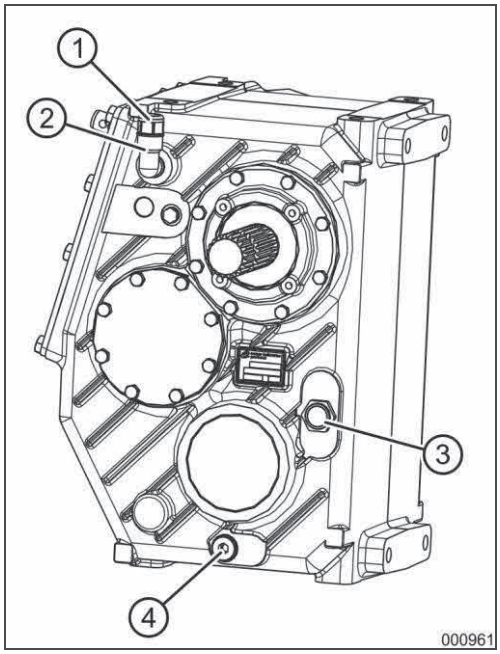


Fig. 119

1. Unscrew the inspection plug (3).
   The oil must be visible up to the level of the threaded hole.
2. Top up gear lubricant oil if necessary.
   – Loosen the vent screw (1).
   – Top up gear lubricant oil through the filler neck (2).
   – Screw the vent screw (1) in.
3. Screw the inspection plug (3) in.

Change oil

Operative staff:
- Authorised workshop

1. Park the machine on even ground.
2. Switch the machine off and secure it against rolling.
3. Place a drip tray with an appropriate capacity beneath the gearbox.
4. Unscrew the oil drain plug (4) and the vent screw (1).

→ The gear lubricant oil drains off into the drip tray.

5. Wait until no more oil comes out of the oil drain opening.
6. Screw the oil drain plug (4) in.
   – Apply sealant.
   – Tighten the oil drain plug.
7. Unscrew the inspection plug (3).
8. Fill in gear lubricant oil through the filler neck (2) until the oil is visible at the level of the threaded hole.
9. Screw the inspection plug (3) in.
10. Clean and screw in the vent screw (1).
11. Check the oil level after 10 service hours.

Dispose of used oil properly.

10.10 Dosage gate – Check gap size

Operative staff:

- Qualified staff

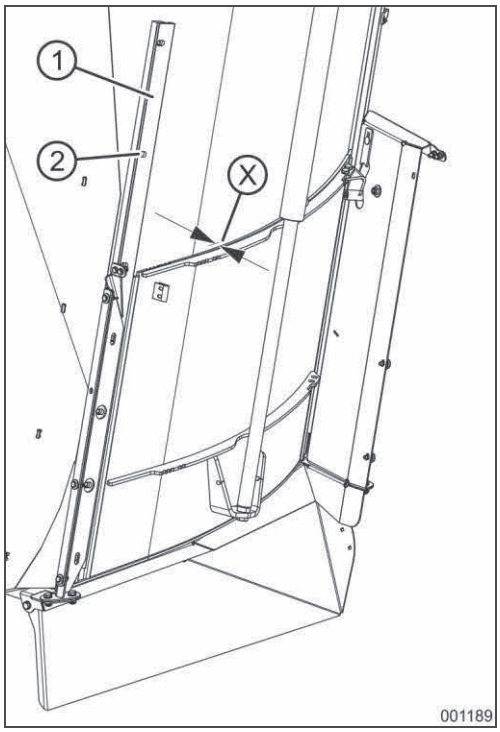


Fig. 120

1. Close the dosage gate completely.
2. Secure the machine against accidental starting and rolling.
3. Measure the distance X between the dosage gate and the mixing container.
   – Required distance = 5 mm
4. Adjust the distance X if necessary:
   – Loosen the screws (2) at the L straps (1).
   – Move the L straps (1) in the oblong holes, such that the distance X is approx. 5 mm.
   – Retighten the screws (2).

10.11 Crossover conveyor, discharge conveyor, conveyor extension

Incorrect tension of the conveyor belt may cause damage and downtimes of the machine. Therefore, check the tension of the respective conveyor belt every day.

Clean the driving and carrying rollers and pulleys if fodder residues have piled up on the rollers.

The conveyor belt must run straight or must not rub along the frame; straighten it if necessary.

10.11.1 Check and visually inspect tension of conveyor belt

Operative staff:

- Operator

1. Secure tractor and machine against accidental starting and rolling.
2. Check the tension of the conveyor belt.
   - A properly tightened conveyor belt sags by approx. 10 to 15 mm in its centre.
   - The ambient temperature influences the tension. Low temperatures shorten the conveyor, high temperatures lengthen it.
3. Lubricate the flanged bearings of the conveyor belt at least every 50 service hours.
4. Check the conveyor belt (1) and the belt fastener (2) of the conveyor belt for visible defects.
5. Have the conveyor belt replaced by an authorised workshop in case of damage (fissures, raised corners).

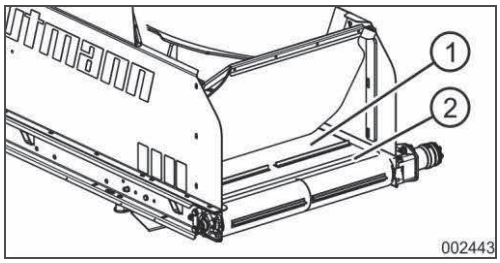


Fig. 121

10.11.2 Tighten and adjust conveyor belt

Operative staff:

- Qualified staff

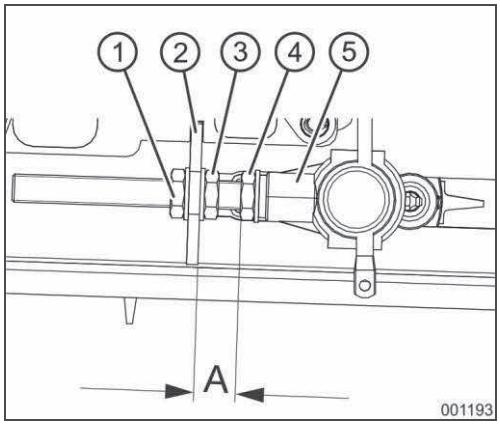


Fig. 122

1. Secure tractor and machine against accidental starting and rolling.
2. Unscrew the counter nut (1) at the right-hand and left-hand radial insert ball bearing (5).
3. Equally turn the two clamping nuts (3),
   - The conveyor belt must sag by approx. 10 to 15 mm in its centre.
   - The distance A between the profiles (2) and the nut (4) must be equal on both sides of the conveyor belt.
4. Carry out a test run.
   - Check whether the conveyor belt has an equal distance to the frame at the return rollers on both sides.
   - Readjust the distance by turning the clamping nuts (3) if necessary.
5. Tighten the counter nut (1) at the right-hand and left-hand radial insert ball bearing (5).

10.12 Mixing auger – Cutting knives

Blunt cutting knives require a higher mixing auger power. Therefore, grind the cutting knives as required.

10.12.1 Check cutting knives

Operative staff:

- Operator

  Only an authorised workshop is allowed to carry out work in the mixing container.

⚠ WARNING

Falling from the top edge of the mixing container

Risk of serious injuries or even death when falling into the mixing container.

It is not allowed

- to stay above the mixing container.
- to bend over the mixing container.
- to enter the mixing container from above.

1. Daily check the cutting knives from the service platform or the ladder for visible defects.
2. Have damaged or worn cutting knives replaced in good time.
3. Remove broken-off cutting knife particles from the mixing container to avoid consequential damage.

10.12.2 Replace cutting knives

Operative staff:

- Authorised workshop

Observe the safety instructions when entering the mixing container, ► see section 10.6 Enter the mixing container, page 174.

⚠ CAUTION

Sharp-edged cutting knives

Risk of cuts.

- Wear cut-proof protective gloves.
- Cover the cutting knives by means of an edge protector.

⚠ CAUTION

Risk of crushing due to magnetic pull

Risk of injury to fingers and hands if tools are pulled by the magnet. Risk of cuts, crushing and even fractures.

- Wear cut-proof protective gloves.
- Do not put your free hand onto the magnet.
- Do not use any magnetic tools if possible.

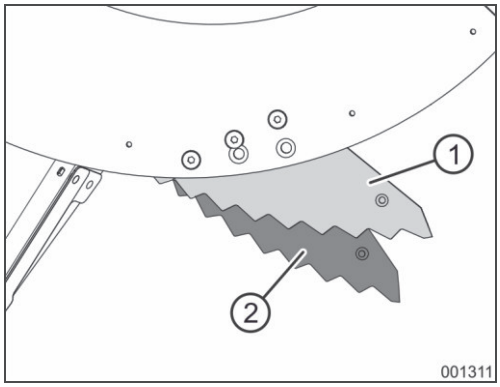


Fig. 123

Some cutting knives can be mounted in two positions:

- Position (1) | retracted (factory setting):
  - Less driving power required
  - Better loosening of bales
- Position (2) | extended:
  - More driving power required
  - Supports the discharge of highly structured mixtures at the discharge opening
  - Better picking-up of bale components and their re-inclusion in the intensive mixing process.

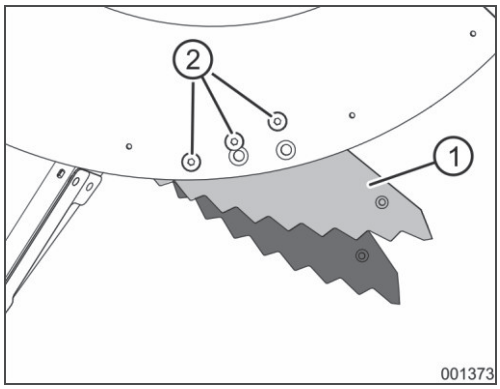


Fig. 124

4. Loosen the screws (2).
5. Change the position of the cutting knife (1) or replace cutting knife.
6. Positioning of individual cutting knives, ► see section 0 , page 188.

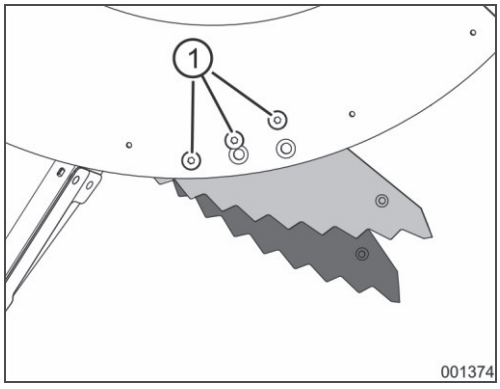


Fig. 125

7. Screw in again and tighten the screws (1).

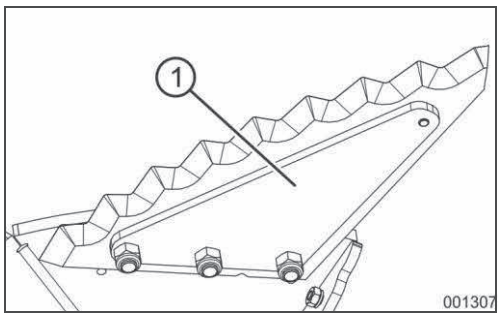


Fig. 126

1. Mount a knife supporting plate beneath the top cutting knife of the mixing auger:
2. Straight knife supporting plate (1) with the "Standard" and "Straw" sets of knives.

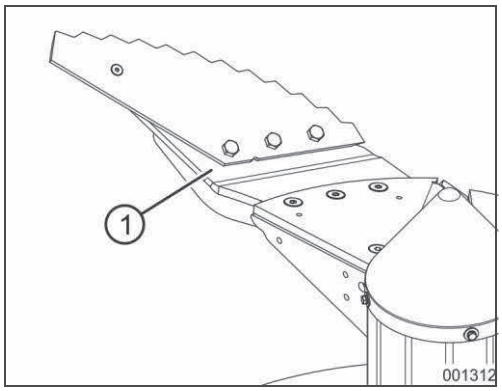


Fig. 127

1. Angled bale knife supporting plate (1) with "Bale" set of knives.

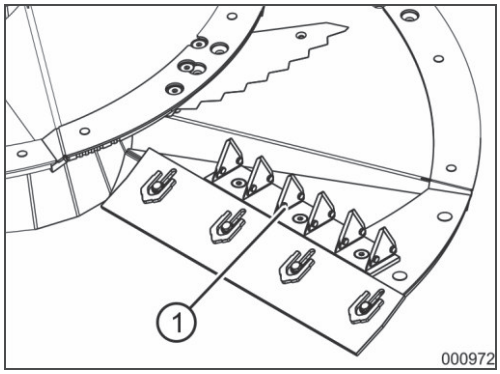


Fig. 128

1. Mount a root crop knife (1) in addition to the cutting knives onto the bottom end of the mixing auger if necessary.
2. Remove any foreign objects (tools etc.) from the mixing container.
3. Thoroughly clean the mixing container.

Knives Positions – 9 Knives

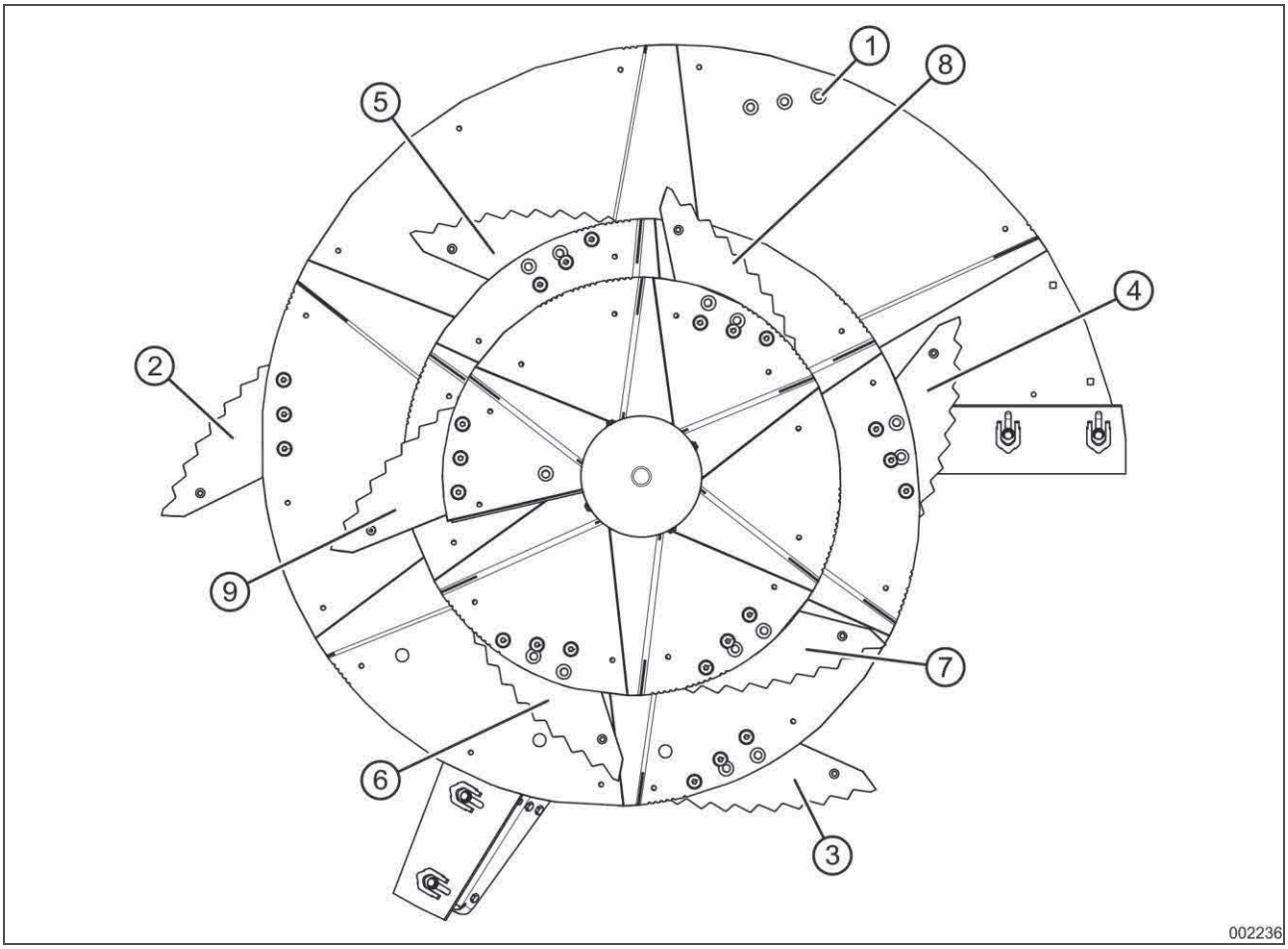


Fig. 129

	Position								
Set of knives	**1****	**2**	**3***	**4***	**5***	**6**	**7**	**8**	**9**
Standard	–								
Straw	–								
Bales	–								

Tab. 34: Positions – Set of knives

short knife

long knife

* *The extended cutting knives are most effective in these positions.*

** *Only in special cases, a cutting knife is used in this position, e.g. when using special fodder components.*

Knives Positions – 7 Knives

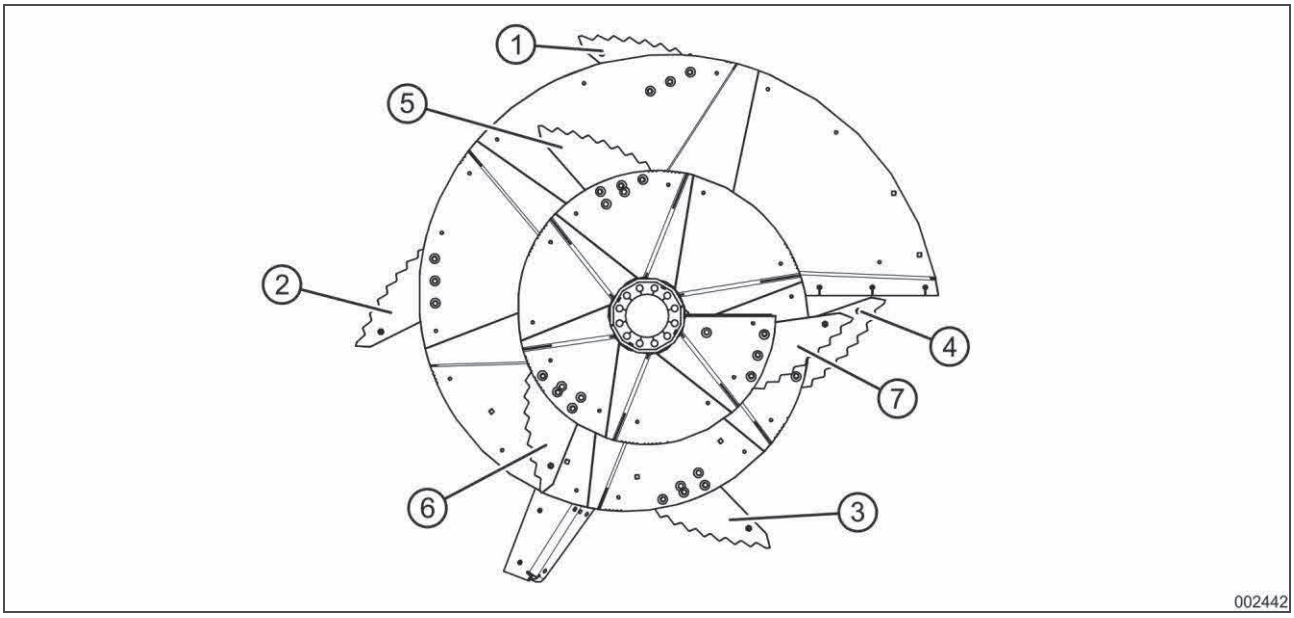


Fig. 130

	Position						
Set of knives	**1****	**2**	**3***	**4***	**5***	**6**	**7**
Standard	–						
Straw	–						
Bales	–						

Tab. 35: Positions – Set of knives

 short knife

 long knife

* *The extended cutting knives are most effective in these positions.*

** *Only in special cases, a cutting knife is used in this position, e.g. when using special fodder components.*

Knives Positions – 6 Knives

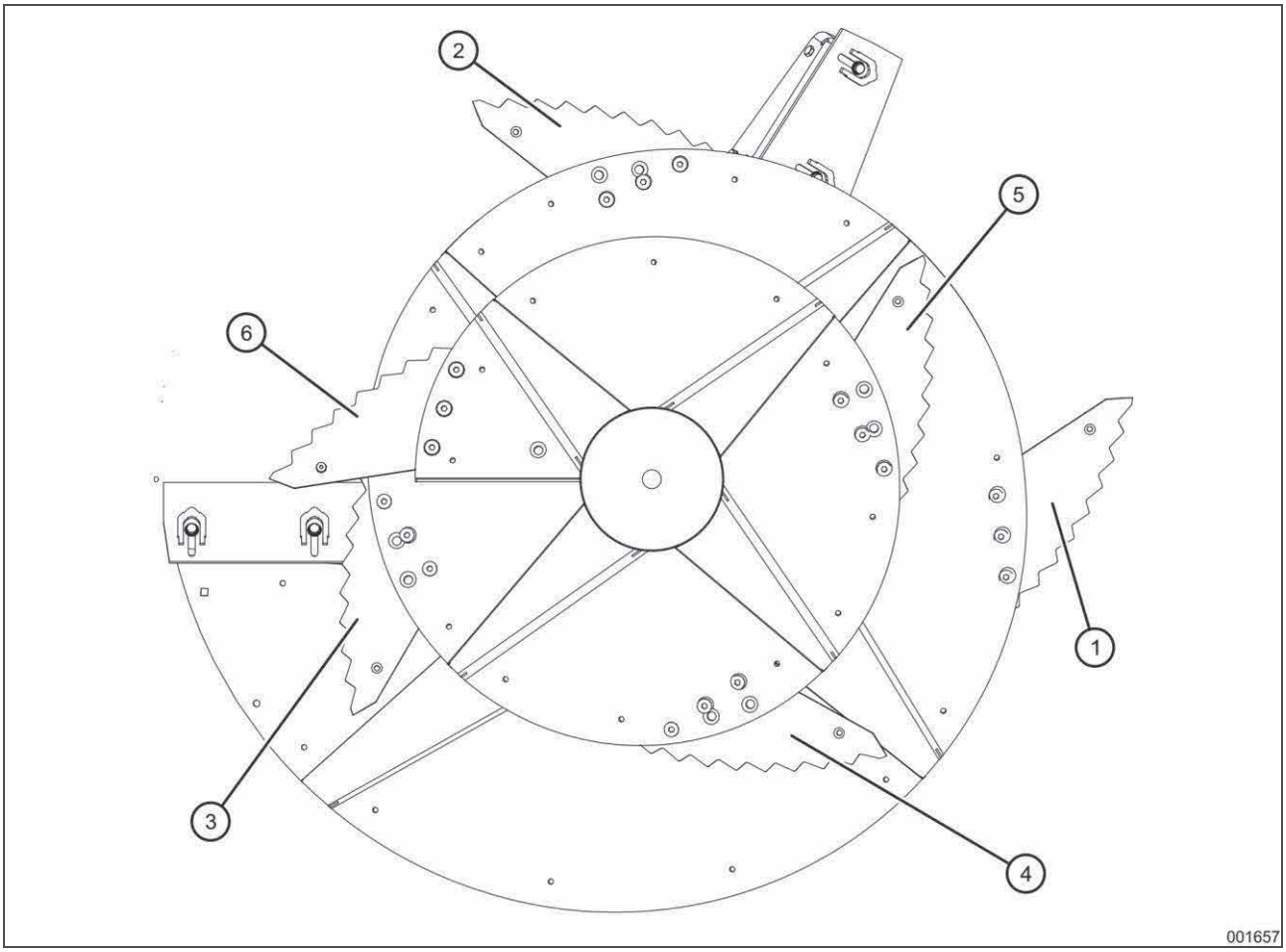


Fig. 131

	Position					
Set of knives	**1**	**2***	**3***	**4***	**5**	**6**
Standard						Ksp
Straw						Ksp
Bales						Lb

Tab. 36: Positions – Set of knives

short knife

long knife

Ksp short knife with supporting plate

Lb long knife with angled supporting plate

* *The extended cutting knives are most effective in these positions.*

Knives Positions – 4 Knives

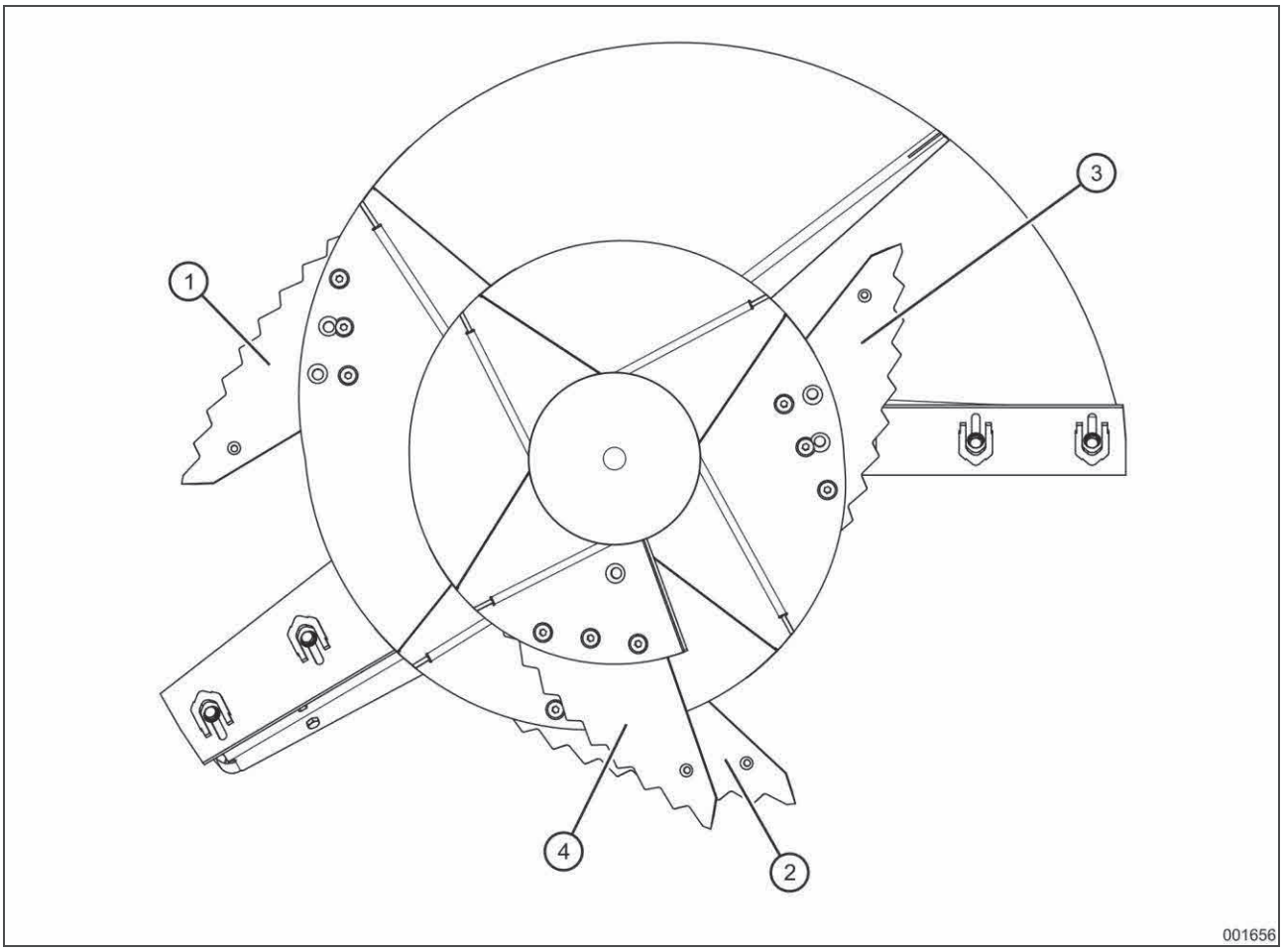


Fig. 132

	Position			
Set of knives	**1***	**2***	**3***	**4**
Standard				Ksp
Straw				Ksp
Bales				Kmh

Tab. 37: Positions – Set of knives

short knife

Ksp short knife with supporting plate

Kmh short knife with angled supporting plate

long knife

* *The extended cutting knives are most effective in these positions.*

10.12.3 Grind cutting knives

Operative staff:

- Authorised workshop

Observe the safety instructions when entering the mixing container, ► see section 10.6 Enter the mixing container, page 174.

⚠ CAUTION

Sharp-edged cutting knives

Risk of cuts.

- Wear cut-proof protective gloves.
- Cover the cutting knives by means of an edge protector.

⚠ CAUTION

Eye injuries due to abrasive particles

Flung-away abrasive particles and foreign objects may penetrate the eyes.

- Wear protective goggles.

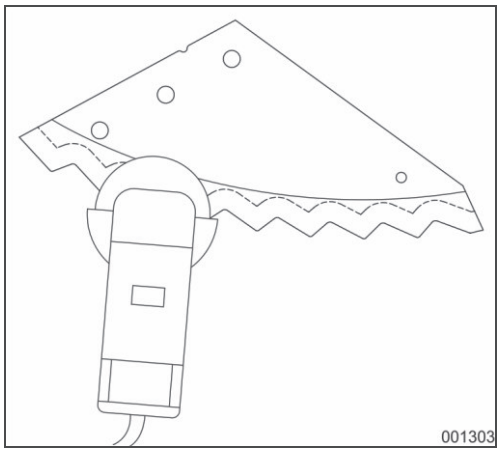


Fig. 133

1. Insert a flap grinding wheel into a right-angle grinder.
2. Carefully grind the cutting knives on their smooth side.
   – Never regrind the cutting knives on their corrugated side.

NOTE

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

3. Remove any foreign objects (tools etc.) from the mixing container.
4. Thoroughly clean the mixing container.

10.13 Mixing auger – Magnetic system

Operative staff:

- Operator

Observe the safety instructions when entering the mixing container, ► see section 10.6 Enter the mixing container, page 174.

⚠ CAUTION

Sharp-edged cutting knives

Risk of cuts.

- Wear cut-proof protective gloves.
- Cover the cutting knives by means of an edge protector.

⚠ CAUTION

Risk of crushing due to magnetic pull

Risk of injury to fingers and hands if tools are pulled by the magnet. Risk of cuts, crushing and even fractures.

- Wear cut-proof protective gloves.
- Do not put your free hand onto the magnet.
- Do not use any magnetic tools if possible.

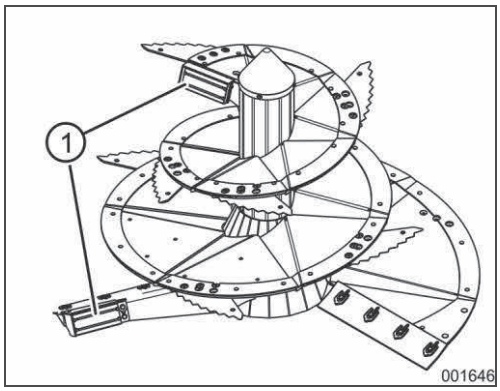


Fig. 134

⚠ WARNING

Implants being affected by electromagnetic fields

Risk of harm to health or even death to persons with electronic implants such as pacemakers due to magnetic fields.

- Keep an adequate safety distance from magnets if you wear an electronic implant.

1. Eliminate all foreign objects from the magnets (1).
2. Remove all foreign objects, tools and other auxiliary materials from the mixing container after cleaning the magnets.

10.14 Mixing auger – Scraper bars

Operative staff:

- Operator

Observe the safety instructions when entering the mixing container, ► see section 10.6 Enter the mixing container, page 174.

On mixing augers with adjustable scraper bar, the distance between mixing auger and container bottom can be adjusted.

This is necessary under the following conditions.

- The distance to the container bottom falls below the minimum value of 3 mm. (Scratch marks)
- Jamming and catching of fodder below the scraper bars.
- Larger quantities of fodder residues remaining on the container bottom.

⚠ CAUTION

Sharp-edged cutting knives

Risk of cuts.

- Wear cut-proof protective gloves.
- Cover the cutting knives by means of an edge protector.

⚠ CAUTION

Risk of crushing due to magnetic pull

Risk of injury to fingers and hands if tools are pulled by the magnet. Risk of cuts, crushing and even fractures.

- Wear cut-proof protective gloves.
- Do not put your free hand onto the magnet.
- Do not use any magnetic tools if possible.

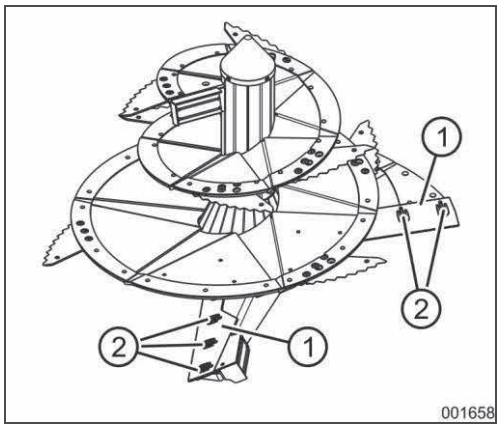


Fig. 135

⚠ WARNING

Implants being affected by electromagnetic fields

Risk of harm to health or even death to persons with electronic implants such as pacemakers due to magnetic fields.

- Keep an adequate safety distance from magnets if you wear an electronic implant.

Determine the smallest distance to the container bottom and set the distance of both scraper bars at this spot to 3 mm.

1. Strip the propeller shaft off the tractor's p.t.o. shaft to enable manual rotation of the mixing auger via the propeller shaft.
2. Loosen the screwed connection at the scraper bars.
3. Set the minimum distance of 3 mm.
   – Replace the scraper bar in case of wear if it is no longer possible to set the minimum distance.
4. Tighten the screwed connection.
5. Remove all tools and other auxiliary materials from the mixing container after completion of setting work.

10.15 Mechanical Bowden cable operation

10.15.1 Replace Bowden cable

Operative staff:

- Qualified staff

1. Secure tractor and machine against accidental starting and rolling

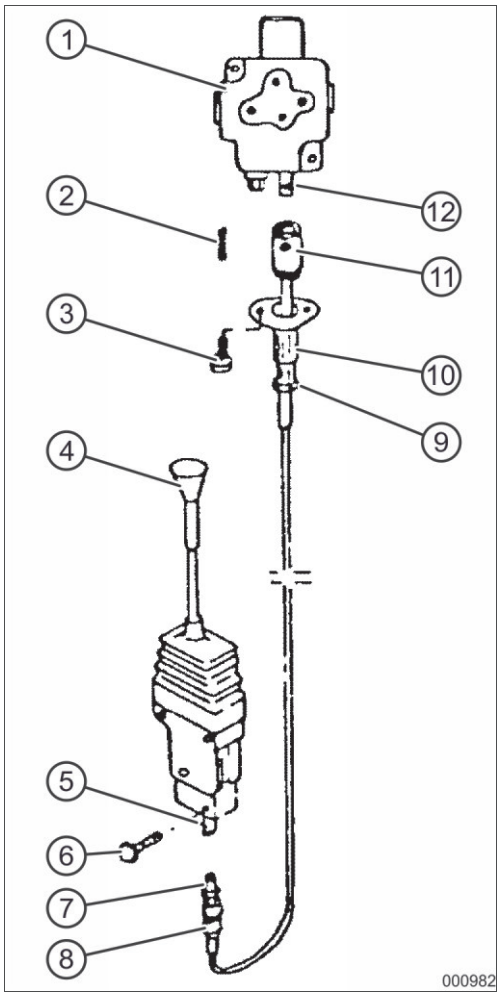


Fig. 136

Disassembly

Connection to control valve of control block

2. Unscrew the counter nut (9).
3. Loosen both screws (3) at the adapter (10).
4. Remove the pin (2).
5. Strip the connecting sleeve (11) off the sliding pin (12).

Connection to operating element

6. Loosen the locking screw (6).
7. Actuate the operating element (4) until the connecting pin (5) is jutting out.
8. Unscrew the threaded sleeve (7) from the connecting pin (5) with the operating element (4) actuated.
9. Release the operating element (4).
10. Pull the sleeve (8) completely out of the casing.

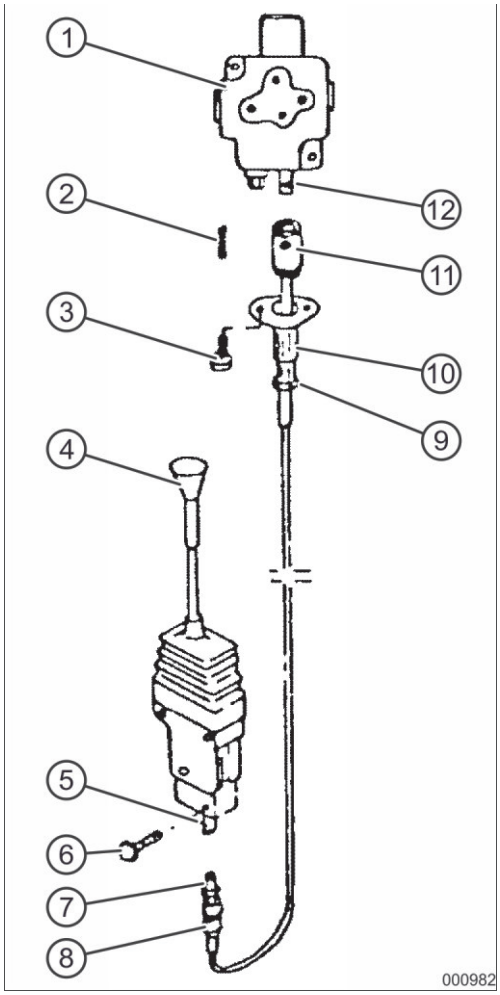


Fig. 137

Installation

Connection to operating element

1. Actuate the operating element (4) until the connecting pin (5) is jutting out.
2. Screw the threaded sleeve (7) into the connecting pin (5) with the operating element (4) actuated.
3. Release the operating element (4).
4. Insert the sleeve (8) completely into the casing.
5. Screw the locking screw (6) in.

Connection to control valve of control block

6. Actuate the operating element (4) until the connecting sleeve (11) is jutting out of the adapter (10).
   – Possibly loosen the counter nut (9) and turn back the adapter (10).
7. Slip the connecting sleeve (11) onto the sliding pin (12).
8. Connect the connecting sleeve (11) and the sliding pin (12) by means of the pin (2).
9. Turn the adapter (10) until it fits closely to the valve box (1).
10. Use the two screws (3) to screw the adapter (10) to the valve box (1).
11. Tighten the counter nut (9).

10.15.2 Remote control cable – Replace adapter

Operative staff:

- Qualified staff

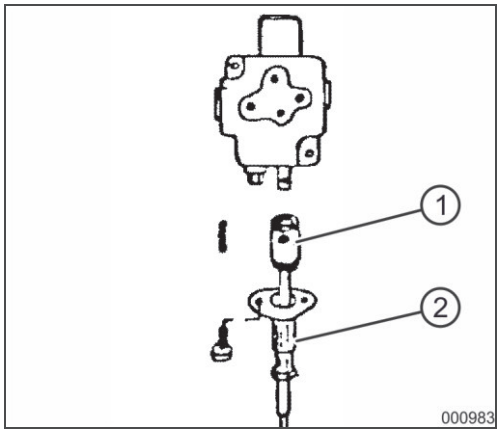


Fig. 138

1. Secure tractor and machine against accidental starting and rolling
2. Remove the connector at the control valve of the control block.
3. Unscrew the counter nut from the connecting sleeve (1).
4. Unscrew the connecting sleeve (1).
5. Replace the adapter (2).
6. Screw the connecting sleeve (1) on.
7. Tighten the counter nut of the connecting sleeve.
8. Mount the connector at the control valve of the control block.

10.16 Hydraulic system

10.16.1 Safety

Hydraulic components under pressure may perform uncontrolled movements in case of improper handling. Furthermore, medium may squirt out under high pressure from pressurised components in case of a malfunction. Risk of serious injuries or even death.

- Only an authorised workshop is allowed to carry out work on hydraulic components.
- Before carrying out any work,
  - depressurise; discharge residual energies.
  - make sure to prevent accidental outflow of the medium.
  - secure lifted movable machine parts against accidental lowering.
  - safely park the machine and secure it against accidental rolling and starting.
- Have all hose pipes checked for their operational safety by an expert at least once a year.
- Regularly check all pipes, hoses and screwed connections for leakage and visible damage. Eliminate damage immediately.
- Never try to plug hose pipe leaks with your hands or fingers. Media squirting out under high pressure may penetrate the skin and enter the body, potentially causing serious injuries.
- Never detect leakages with your bare hands. Immediately contact an authorised workshop if a leak is suspected.
- Immediately contact the medical services if injuries caused by hydraulic oil occur. Risk of serious infection.
- Risk of explosion due to improper work on hydraulic accumulators.
  - Welding, soldering, drilling or other work which might affect the mechanical properties is not allowed.

⚠ CAUTION

Risk of slipping due to leaking oil

Risk of slipping and falling to people due to leaking oil during topping-up of oil or oil change.

- Immediately remove oil spills by means of binding agents.

- Dispose of used oil properly.
- Ensure that no hydraulic oil penetrates the soil or waters.
- Observe the environmental protection rules.

10.16.2 Maintenance intervals

After the first 10 service hours and then every 50 service hours

Operative staff:
- Qualified staff

1. Check the hydraulic system for proper functioning, check components for tightness and proper pipe routing.
2. Retighten all screwed connections if necessary.

Before each start-up

Operative staff:
- Operator

1. Check hydraulic hose pipes for visible defects.
2. Remedy or have remedied defects immediately.
   – Eliminate chafing points at hydraulic hose pipes and tubes (qualified staff/authorised workshop).
   – Have worn, damaged or aged hydraulic hose pipes immediately replaced (authorised workshop).
3. Immediately remove dirt accumulations within the area of hydraulic components. Dirt binds humidity thus causing corrosion, leakages, unnecessary wear and premature failure of drive components.

10.16.3 Depressurise hydraulic system

⚠ WARNING

Risk of infection due to hydraulic oil squirting out

Hydraulic oil squirting out under high pressure may penetrate the skin and enter the body, potentially causing serious injuries. Risk of serious infection. This applies in particular to hydraulic systems with a membrane pressure accumulator.

- Never carry out work on the hydraulic system with the system under operating pressure.
- Depressurise the hydraulic system before carrying out work on the system.

- Relieve the respective hydraulic cylinder via the corresponding operating element with the hydraulic pump switched off.

10.16.4 Hydraulic hose pipes

Replace hydraulic hose pipes in case of damage and ageing.

Have hydraulic hose pipes immediately replaced by an authorised workshop if one of the following defects is detected:

- Damaged outer layer down to the liner (e.g. due to chafing points, cuts, cracks)
- Embrittled outer layer (visible by cracking of hose material)
- Unnatural deformations of the hydraulic hose pipe in depressurised as well as in pressurised state or when bent (e.g. separation of layers, blistering, pinches, kinks)
- Leaks
- Damaged, deformed or leaking fitting
- Hose slipping out of the fitting
- Corroded fitting which may affect the function and strength
- Improperly laid hydraulic hose pipes, e.g. ignored bending radii, laying over sharp edges
- Hydraulic hose pipe is older than six years

The period of use of the hydraulic hose pipes must 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.

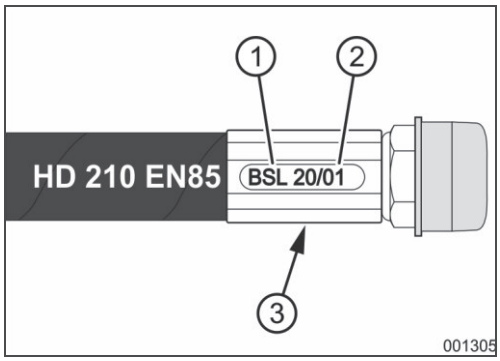


Fig. 139

Markings:

1 Manufacturer (BSL)

2 Date of manufacture (20/01 = year/month = January 2020)

3 Maximum admissible operating pressure (210 bar)

NOTE

After expiration of the period of use, the hydraulic hose pipe must no longer be used.

10.16.4.1 Install and remove hydraulic hose pipes

Operative staff:
- Authorised workshop

- Only use original hydraulic hose pipes of the manufacturer.
- Ensure cleanliness.
- Install hydraulic hose pipes such that in any operating state
  - there is no tensile stress, except for that due to the dead weight.
  - there is no upsetting stress in case of short lengths.
  - the bending radii do not fall below the admissible limits.
  - 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.
- 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 hydraulic hose pipes.
- Overcoating of hydraulic hose pipes is not allowed.

10.16.5 Replace hydraulic filter

⚠ WARNING

Risk of infection due to hydraulic oil squirting out

Hydraulic oil squirting out under high pressure may penetrate the skin and enter the body, potentially causing serious injuries. Risk of serious infection.

- Never replace the hydraulic filter when the hydraulic system is pressurised.
- Only replace the hydraulic filter when the hydraulic system of the machine is not connected to the tractor.

Operative staff:
- Authorised workshop

- Have the filter element replaced by an authorised workshop according to the maintenance plan. Then as necessary, at least every 1,000 service hours.
- The filter is equipped with a bypass. If the filter element is contaminated, the oil flows to the hydraulic control block in unfiltered condition and may damage it.
  – Soiled filters cause stronger heating-up of oil.

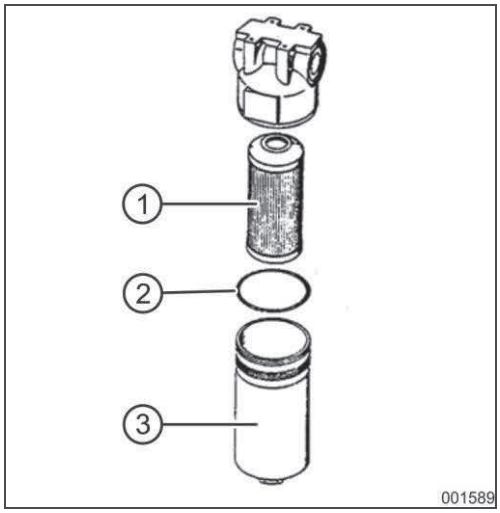


Fig. 140

1. Depressurise the machine.
2. Disconnect the hydraulic system of the machine from the tractor.
3. Unscrew the filter casing (3) from the filter head.
4. Pull off the soiled filter element (1).
5. Clean the filter casing.
6. Grease the thread at the filter casing.
7. Check the O-ring (2) for damage and replace it if necessary (Ø 67.95 mm x 2.62 mm).
8. Lubricate the O-ring of the new filter element.
9. Slip the new filter element on as far as it will go.
10. Screw the filter casing into the filter head as far as it will go and turn it back by a one quarter of a turn.
11. Switch the hydraulic system on and bleed the filter at an appropriate point.
12. Check the filter for leaks.

10.17 On-board hydraulic system

10.17.1 Spur gear for driving mechanism with on-board hydraulic system

Check oil level

Operative staff:
- Operator

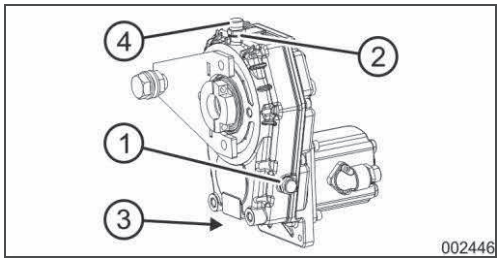


Fig. 141

1. Check the oil level at the inspection glass.

– The oil level must be visible at the inspection glass (1) of the spur gear.

2. Top up gear lubricant oil if necessary.
   – Loosen the vent screw (4).
   – Top up gear lubricant oil through the filler neck (2).
   – Screw the vent screw (4) in.

Change oil

Operative staff:
- Authorised workshop

1. Park the machine on even ground.
2. Switch the machine off and secure it against rolling.
3. Place a drip tray with an appropriate capacity beneath the gearbox.
4. Unscrew the oil drain plug (3) and the vent screw (5).

→ The gear lubricant oil drains off into the drip tray.

5. Wait until no more oil comes out of the oil drain opening.
6. Screw the oil drain plug (3) in.
   – Apply sealant.
   – Tighten the oil drain plug.
7. Fill in gear lubricant oil through the filler neck (2) until the oil becomes visible at the inspection glass.
8. Clean and screw in the vent screw (4).
9. Check the oil level after 10 service hours.

Dispose of used oil properly.

10.17.2 Oil tank, on-board hydraulic system

NOTE

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

Check oil level

Operative staff:
- Operator

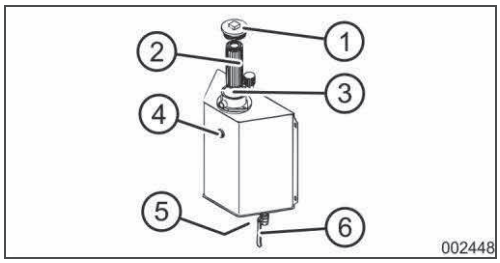


Fig. 142

1. Check the oil level at the inspection glass.

– The oil level must be visible at the inspection glass (4) of the spur gear.

2. Top up hydraulic oil if necessary.
   – Loosen the vent screw (1).
   – Top up gear lubricant oil through the filler neck (3).
   – Screw the vent screw (1) in.

Change oil

Operative staff:
- Authorised workshop

1. Park the machine on even ground.
2. Switch the machine off and secure it against rolling.
3. Place a drip tray with an appropriate capacity beneath the gearbox.
4. Unscrew the oil drain plug (5) and the vent screw (1).

→ The gear lubricant oil drains off into the drip tray.

5. Wait until no more oil comes out of the oil drain opening.
6. Screw the oil drain plug (5) in.
   – Apply sealant.
   – Tighten the oil drain plug.
7. Replace the filter element (2) if necessary.
8. Fill in hydraulic oil through the filler neck (3) until the oil becomes visible at the inspection glass (4).
9. Clean and screw in the vent screw (1).
10. Check the oil level after 10 service hours.

Dispose of used oil properly.

10.18 Tyres and wheels

Assembly and repair work on tyres and wheels requires expert knowledge and appropriate tools.

Operative staff:
- Authorised workshop

10.18.1 Safety

As a basic principle, the following is applicable:
- Park the machine on firm, even ground.
- Safely park the machine and secure it against accidental rolling.
- Use lifting equipment with sufficient lifting power to lift the machine.
- Lift the machine only at the marked fixing points.
- Secure the lifted machine/machine parts against accidental lowering.
- Deflate the tyre before removing it.
- Relieve the tyres if the vehicle is not intended to be used for a longer period, thus avoiding deformation of the tyres.

- Store removed tyres in a dark place, free of oil and other chemicals.
- Do not place tyres near electric motors. The ozone produced by the electric motors slowly desiccates the rubber.
- Never overload the tyres.

10.18.2 Check tyres

Check the condition of the tyres and the tyre pressure every day.

Tyre pressure, ► see chapter "Technical data".

Operative staff:
- Operator

1. Visually check tyres for damage.
   – Remove foreign objects stuck in the tyre.
   – Have damage such as deeper cuts repaired as soon as possible.
2. Check tyre pressure and refill if necessary.
   – Keep to the side of the wheel when refilling. A compressed-air hose with a length of approx. 1.5 m between the tyre valve and the air pistol makes work easier.
3. ⚠ **WARNING** – Burst of tyres. Do not exceed the maximum admissible tyre pressure.
4. Check whether the caps are firmly seated on the valves.

10.18.3 Change wheel / tyres Tighten wheel nuts

Tighten all wheel nuts according to instructions.

Operative staff:
- Qualified staff

Fig. 143

1. Park the machine on an even, paved surface and secure it against accidental starting and rolling.
2. Place the lifting device at the marked fixing points.
3. Lift the machine.

   ⚠ **WARNING** – Risk of crushing limbs due to unintentional lowering. Do not stand beneath the lifted machine.

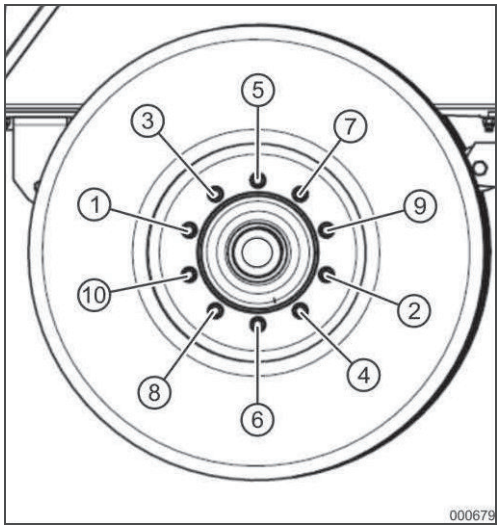


Fig. 144

4. Unscrew the wheel nuts.
   – Keep to the order, always loosen the opposite wheel nut, see numbering.
5. Change the wheel.
6. Tighten the wheel nuts.
   – Use a torque wrench to tighten the wheel nuts crosswise, see numbering.
   – Observe the tightening torque,
   ► see section 10.4.2 Wheel nuts, page 169
   – The threads must be clean, undamaged, free of grease and smooth-running.
   – Check the wheel nuts ten hours after completion of assembly and retighten them if necessary. Then check them every 50 service hours for firm seating.

ATTENTION

Risk due to incorrect settings

Exclusively mount tyres approved by the manufacturer.

When changing the tyre size, have the traffic-related equipment such as the splash guard system, warning plates, lighting, underride guard and the brake system checked for proper setting by qualified staff and adapted if necessary, even if the tyre combination is already included in the vehicle registration documents.

10.19 Brake system and axles

10.19.1 Check brake system for proper functioning.

As a basic principle, the operator has to check the brake system for proper functioning before each start-up of the machine.

Immediately contact an authorised workshop in case of irregularities or malfunctions of the brake system.

- 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.

Operative staff:

- Operator (before each journey)
- Authorised workshop (every 200 service hours)

Functional check, compressed-air brake system:

- The compressed-air brake system is considered as tight when the pressure loss is equal to or less than 0.2 bar within 5 minutes.
- In case of full brake application, the max. admissible pressure loss is 0.7 bar.

10.19.2 Compressed-air brake system

10.19.2.1 Drain compressed-air reservoir

⚠ WARNING

Contact with contaminated liquid

The liquid in the compressed-air reservoir is under high pressure.

- Do not stand directly beneath the compressed-air reservoir when draining.
- Wear personal protective equipment.

Drain the compressed-air reservoir every day before the first journey.

Operative staff:

- Operator

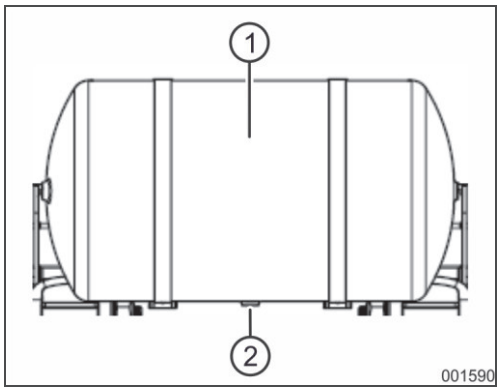


Fig. 145

1. Take the ring (2) and pull the drain valve of the compressed-air reservoir (1) down.
2. Pull until water is no longer pouring out of the compressed-air reservoir.

10.19.2.2 Check and clean filters

The 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 must 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 elements approx. every 3-4 months, depending on the operating conditions.
- Replace damaged filter elements.

Operative staff:

- Qualified staff

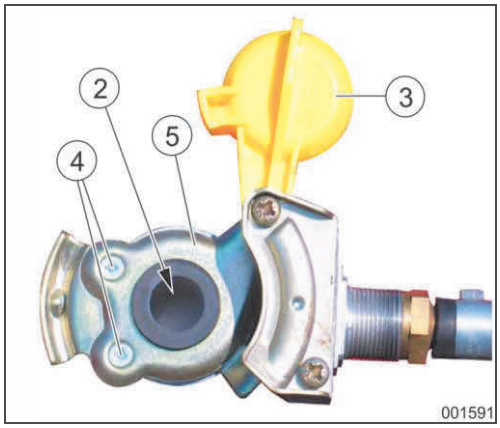


Fig. 146

1. Secure tractor and machine against accidental starting and rolling.
2. Disconnect the feed and brake line from the tractor.
3. Open the lid (3).
4. Remove the two Phillips screws (4).
5. Open the cover (5) by swivelling.
6. Remove the filter element (2) from the hose coupling.
7. Rinse the filter element with benzene or thinner.
8. Use compressed air to blow the filter element dry.
9. Reinsert the filter element into the hose coupling.
10. Close the cover.
11. Screw the cover by means of the two Phillips screws.
12. Connect the feed and brake line to the tractor.
13. Check the in-line filters for tightness.

10.19.3 Check brake linings

Operative staff:
- Operator

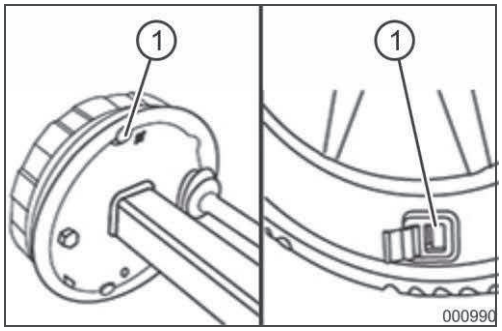


Fig. 147

1. Secure tractor and machine against accidental starting and rolling
2. Open the inspection hole (1).
   – Pull the rubber plug out (if available).
3. Check the brake linings.
   Replace the brake linings when the wear mark is reached or in case of a remaining lining thickness of:
   – 5 mm in case of riveted linings
   – 3 mm in case of glued linings
4. Have the brake linings replaced by an authorised workshop if necessary.
5. Reinsert the rubber plug after the check.

10.19.4 Lubricate brake shaft bearing

Operative staff:
- Operator

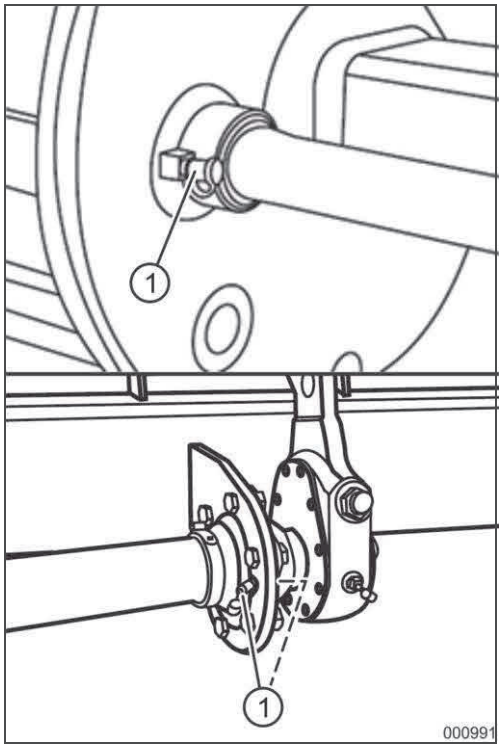


Fig. 148

1. Secure tractor and machine against accidental starting and rolling
2. Lubricate the outer and inner lubrication points (1) with long-life grease until fresh grease comes out of the bearings.
   – Only use lithium-saponified grease with a drop point above 190°C.

NOTE

Depending on the series, the cam bearing may not be sealed on the brake side.

Make sure that no grease or oil enters the brake system.

10.19.5 Lubricate manual slack adjuster

Operative staff:

- Operator

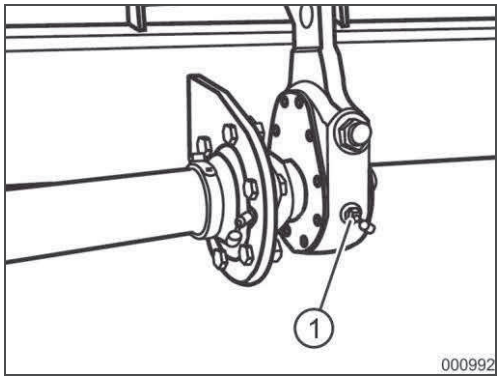


Fig. 149

1. Secure tractor and machine against accidental starting and rolling
2. Lubricate the lubrication points (1) with long-life grease until fresh grease comes out of the bearings.
   – Only use lithium-saponified grease with a drop point above 190°C.

10.19.6 Check and set manual slack adjuster

The free travel X of the brake cylinder should be approx. 10-12% of the brake lever length.

Example:

Brake lever length 150 mm = Free travel 15-18 mm

The brake lever length is measured between the centre of the brake shaft and the articulation point of the brake cylinder.

The braking power is transferred 100% if the brake cylinder and the brake lever are positioned in an angle of 90° to one another when the brake is actuated. If the angle is less than 90° with the brake actuated, the braking power is reduced.

Functional check:

1. Manually actuate the slack adjuster in pressing direction.
2. Have the wheel brake readjusted if the free travel X of the brake cylinder exceeds 12 % of the brake lever length.
3. Have the wheel brake readjusted if the angle between the cylinder push rod and the slack adjuster is less than 90°.

Operative staff:
- Authorised workshop

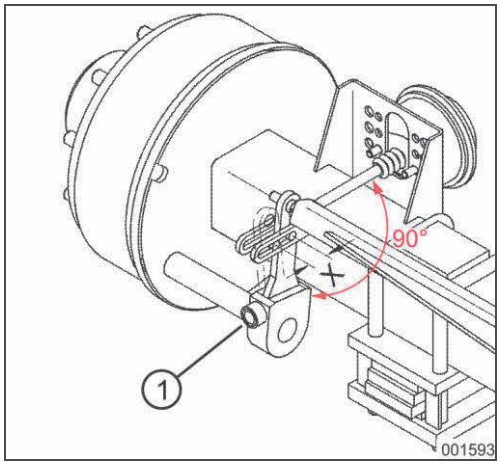


Fig. 150

1. Secure the machine against accidental starting and rolling by means of chocks and the parking brake of the tractor.
2. Release the service and parking brake of the tractor.
3. Disconnect the lines of the machine's brake system.
4. Depressurise the machine's brake system. (Set release valve of compressed-air brake system to manoeuvring mode.)
5. Press the circlip down and turn the adjusting screw (1) clockwise to align the slack adjuster with the brake cylinder clevis.
6. Turn the adjusting screw back counterclockwise and set the free travel X to 10-12% of the brake lever length.
7. The angle between the slack adjuster and the cylinder push rod must now be 90° ± 10° with the brake actuated.

10.19.7 Check play of wheel hub bearing

Operative staff:
- Qualified staff

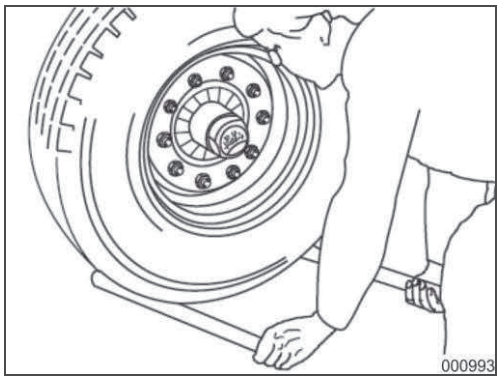


Fig. 151

1. Park tractor and machine on an even surface and secure them against accidental starting and rolling.
2. Place the lifting device (jack) at the marked fixing points.
3. Lift the axle only until the tyres clear the ground.
4. Release the brake of the machine.
5. Place two levers between tyres and ground and check the bearing play.
   – Have the bearing readjusted by an authorised workshop if there is a noticeable bearing play.

10.19.8 Adjust bearing play of wheel hub bearing

Operative staff:

- Qualified staff

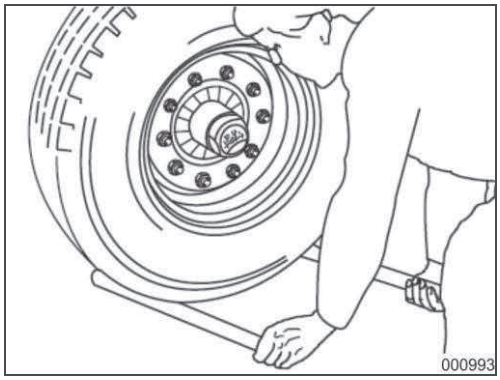


Fig. 152

1. Secure tractor and machine against accidental starting and rolling
2. Place the lifting device (jack) at the marked fixing points.
3. Lift the axle only until the tyres clear the ground.
4. Release the brake.
5. Remove the grease cap and the split-pin.
6. Screw on the hub axle nut until the run of the hub slightly stops.
7. Unscrew the hub axle nut up to the next split-pin hole.
8. Secure the hub axle nut against accidental loosening by means of a split-pin.
9. Check the run.
10. Fill the grease cap with fresh grease and reinsert it.

11 Spare parts

NOTE

Immediately replace machine parts which are not in sound condition.

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

In case of replacement, only use original parts or parts approved by the manufacturer. Use of other parts not meeting the technical specifications of the manufacturer may cause damage.

- Order and sale of spare parts are handled by authorised workshops and Strautmann dealers.
- It is imperative to indicate the data of the front page or of the spare parts list when ordering spare parts:
  - Machine ID number
  - Spare parts list number (if available)
  - Article number (if available)
  - Article designation
  - Quantity
- The manufacturer recommends to stock spare and wearing parts according to the spare parts list, in order to reduce or avoid standby and downtimes in case of a malfunction.
- Our machines and spare parts are constantly being further developed. Therefore, modifications in the spare parts lists or to the spare parts on offer may occur.
- For continuous up-to-date information and spare parts lists, please refer to our online spare parts catalogue.
- Furthermore, our online spare parts catalogue offers you a lot of useful functions such as filtering according to machine type, year of manufacture and equipment options to obtain a reliable and quick selection of the desired parts.
- Our online catalogue is available at www.Strautmann.com under the menu items Service – Ersatzteilservice (Spare parts service) – Ersatzteil Onlinekatalog (Online spare parts catalogue).

12 Other relevant documents

ATTENTION

The manufacturer will not assume any liability for damage caused by repairs and settings resulting from insufficiently qualified staff, lack of expertise, missing documents or false information.

Only adequately qualified and trained staff is allowed to carry out work on the electrical and hydraulic systems.

Other relevant documents for repair and setting work are:

- Workshop manual,
- circuit diagrams,
- repair and assembly instructions,
- Tutorial videos
- sub-supplier documentations.

Other relevant documents can be requested from authorised workshops, authorised Strautmann dealers or from the Strautmann customer service.

To ensure that enquiries can be processed as quickly and efficiently as possible, the following information is required:

- Machine number
- Brief description of problem
- Contact (name, company, customer number)
- Phone number
- E-mail address

NOTE

We recommend to attend a Strautmann service training. The "Other relevant documents" are part of the training material.

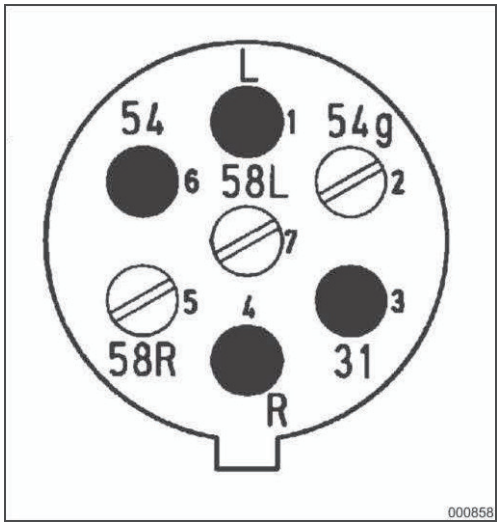


Fig. 153

12.1 Connection, lighting

Line	Number	Designation
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

Tab. 38: Connection, lighting

13 Index

Verfasser	Freigeber	Freigabedatum	Sprache
Eva Hoppe	M. Ebmeyer	31.08.2023	englisch

	Zuordnung
Produktgruppe	Fodder mixing wagon
Warengruppe	Warengruppe
Modell	Verti-Mix 75-145, Verti-Mix 1300-2100DK, Verti-Mix 115-245D, Verti-Mix 75-125L