Original operating instructions

BMS *alpha* ^{CR}

Type: *alpha* ^{CR}

Country of manufacture: Germany

Read the operating instructions prior to any commissioning

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Contents

1 General information

1.1 Operating instructions

These operating instructions are valid for the machine named on the cover sheet.

The operating instructions convey important notes for the safe and efficient handling of the machine. It is part of the machine and must be kept in legible condition and accessible in the immediate vicinity of the machine for the personnel working there at all times.

The prerequisite for safe working on and with the machine is the compliance with all specified safety instructions and directives.

The operating instructions are the basis for all actions on the machine and the basis for all training courses that take place on the machine. Personnel must therefore have read the operating instructions carefully before starting any work.

In addition, the national accident prevention regulations applicable at the operating site of the machine and general safety regulations must be observed.

1.2 Address

BMS Bau-Maschinen-Service AG
Daimlerstraße 10

33378 Rheda-Wiedenbrück, Germany

Tel.: +49(0)5242/9646-0
Fax: +49(0)5242/9646-29

Email: info@bmsbaumaschinen.de

1.3 Revision status

Date	Chapter	Reason	Responsible
19/05/2020	Operating instructions	Initial version	unique

1.4 Typographical conventions

In order to be able to optimally work with the operating instructions, the following clarifications on typographical conventions must be observed.

List

- First level bullet points.
  - Second level bullet points.

Instruction

1. Step 1 of the instruction
2. Step 2 of the instruction
3. Step 3 of the instruction

The sequence of action steps must be adhered to.

Tips

➢ Tips for situations that allow you to work efficiently.

1.5 Explanation of symbols

Explanatory symbols

Indicates a hotline.

Indicates maintenance work.

Indicates an inspection e.g. before starting work (as part of maintenance).

Indicates maintenance work that may be carried out only by service personnel (see section 1.11) or by a specialist workshop authorized by **BMS**.

Warnings and safety instructions

The following symbols are used in these operating instructions to illustrate hazards and notes:

DANGER

Designates a danger situation that results in severe physical injuries or death.

WARNING

Designates a possible danger situation that can result in severe physical injuries or death.

CAUTION

Designates a possible danger situation that can result in slight to moderate injuries.

NOTE

Designates a situation that can result in material damage.

1.6 Limitation of liability

All information and notes in these operating instructions were compiled taking into consideration valid standards and regulations, the state of the art as well as our long-standing insights and experiences.
The obligations as well as the general terms and conditions agreed in the supply contract and the regulations valid at the time of contract conclusion apply.

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

- failure to observe the operating instructions,
- use other than the intended one
- personnel that are not trained and not instructed,
- unauthorized/technical modifications and changes,
- improper assembly, commissioning, operation and maintenance of the machine,
- Failure to observe the notes in the operating instructions regarding transportation, storage, assembly, commissioning, operation, maintenance. This applies in particular to the 1st inspection after 50 operating hours,
- use of not approved/incorrect spare parts that do not meet the manufacturers specifications.

1.7 Copyright protection

These operating instructions are protected by copyright for BMS-Bau-Maschinen-Service AG.

The operating instructions include regulations and drawings or sections of drawings of a technical nature that may not be copied, distributed or used without authorization for competition purposes or disclosed to third parties either in part or in full.

The operator of the machine is permitted to make copies – even in excerpts – expressly for internal use in connection with the operation of the machine.

BMS-Bau-Maschinen-Service AG reserves the right to grant permission for the use for publications or for forwarding copies or information from these operating instructions to third parties.

Any violations will result in a claim for compensation for the manufacturer. Additional claims remain reserved.

1.8 Conformity

The declaration of conformity is based on the applicable guidelines (with their associated amending directives) in the version at the time of commissioning. Please refer to the declaration of conformity for information on the individual guidelines.

The declaration of conformity is in the Appendix.

1.9 Customer service

Our customer service is available for technical information.

In addition, our employees are always interested in new information and experiences that result from the application and which could be valuable for the improvement of our add-on devices.

Tel.: +49(0)5242/9646-0
Fax: +49(0)5242/9646-29

Email: info@bmsbaumaschinen.de

If questions arise in practice, you can also contact **BMS** directly.

Service/workshop:
Telephone: +49(0)5242/9646-17
Email: werkstatt@bmsbaumaschinen.de

Spare parts warehouse:
Telephone: +49(0)5242/ 9646-15
Email: versand@bmsbaumaschinen.de

1.10 Personnel conventions

Manufacturer

BMS-Bau-Maschinen-Service AG is the manufacturer of the machine and is hereinafter referred to as “manufacturer”.

Personnel

Personnel are all persons who operate and work on the machine. The different requirements for these persons are described in Section 1.11.

System operator

The operator is any natural or legal person who uses the machine or makes it available to third parties for use. The operator is responsible for the safety of the operator or third parties during use.

1.11 Personnel requirements

Any activities on and with the machine must be performed only by persons who can carry out their work properly and reliably and who meet the listed requirements.

The responsibilities are assigned with specification of the symbols listed below in the beginning of each chapter.

Target group	Symbol
Operating personnel	O
Specialist personnel	F
Specialist personnel for electrical equipment	E
Service personnel	S

Chapters "Safety" and "Technical data" are an exception. These chapters are relevant for all target groups.

Operating personnel

Operating personnel are persons who were instructed thoroughly and verifiably by the operator in their assigned tasks and possible hazards.

Operating personnel are responsible for operating the machine.

Tasks above and beyond that may be performed by operating personnel only if these are specified in the operating instructions and if the operator has expressly assigned them to the person.

Specialist personnel

Specialist personnel are persons one who perform the assigned work properly, detect possible hazards on their own and prevent personal or material damage based on their professional training, knowledge and experience as well as their knowledge of the pertinent regulations.

Their tasks include the identification, containment and elimination of errors and malfunctions.

They are also responsible for the scheduled and standardized maintenance to reduce and avoid incidents.

Specialist personnel for electrical equipment

Specialist personnel for electrical equipment (qualified electricians) are persons who, based on their technical training, knowledge and experiences as well as knowledge of the pertinent rules and regulations, are capable of properly performing work on electrical systems, detecting possible hazards independently and preventing personal and material damage from electrical voltage.

All works on the electrical equipment must principally only be carried out by a qualified electrician.

Service personnel

Authorised service personnel of BMS Bau-Maschinen-Service AG are considered to be service personnel.

Their tasks include the identification, containment and elimination of errors and malfunctions.

They are also responsible for the scheduled and standardized maintenance to reduce and avoid incidents.

Unauthorized persons

Persons who were not instructed are unauthorised persons.

In case of doubt, talk to persons who might be unauthorised. Expel unauthorised persons from the working area.

Any person other than those described in the section "Personnel requirements" is considered to be unauthorized. The operator of the add-on device will be solely responsible for any resulting damage.

2 Safety

2.1 General information

This section provides an overview of important safety aspects for the protection of the operator and personnel against possible hazards and the safe and failure-free flow of operation.

Failure to observe the listed directives, warnings, and safety instructions can result in considerable hazards.

2.2 Intended use

The **BMS** *alpha* ^{CR} is a screed machine used for the production and transport of building materials. Only the materials listed below may be mixed and transported with the machine:

- Screed up to a grain diameter of 16 mm.
- Other materials are permitted only in consultation with and with the written approval of the manufacturer.

The machine must not be operated in closed rooms due to the exhaust gases produced.

The compressed air connection may only be used to convey material to the machine. Any other use is only permitted after consultation with and with the written consent of the manufacturer.

2.3 Improper use

Any use of the add-on device other than the one described in “intended use” is deemed to be inappropriate use. The operator is solely liable for any resulting damage.

2.4 Obligations of the machine operator

The machine is used in the industrial field. The machine operator is therefore subject to the legal obligations of industrial safety.

Next to the warnings and safety instructions in these operating instructions, safety, accident prevention and environmental guidelines valid for the application area of the machine must be adhered to.

The operator must -

- obtain information on the valid industrial safety regulations.
- determine possible additional hazards resulting from the special operating conditions at the operating site of the machine with a hazard assessment.
- implement the necessary behavioural requirements for the operation of the machine at the operating site in the operating instructions.
- check during the entire application period of the machine whether the issued operating instructions comply with the current version of regulations.
- adjust the operating instructions, insofar as necessary, to new regulations, standards and operating conditions.
- clearly regulate and define the responsibilities for installation, operation, maintenance and cleaning of the machine.
- ensure that all employees working on the machine have read and understood the operating instructions. In addition, the operator must verifiably train and inform personnel working on the machine about possible hazards at regular intervals.
- provide the specified and recommended protective equipment for personnel assigned to work on the machine.

The operator must ensure that:

- the machine is always in technically flawless condition.
- the vehicle with which the machine is towed is approved by the Technical Control Board (TÜV) and is suitable for approval in accordance with German traffic regulations (StVO).
- the machine is serviced according to the specified maintenance intervals.
- all safety devices of the machine are checked regularly for completeness and function.
- Replace damaged or illegible pictograms, marks, signs or labels immediately.

2.5 Responsibility of personnel

Next to the warnings and safety instructions in these operating instructions, safety, accident prevention and environmental guidelines valid for the application area of the device must be adhered to.

In particular, personnel must:

- obtain information on the valid industrial safety regulations.
- adhere to the behavioural requirements in the operating instructions for the operation of the machine at the operating site.
- properly exercise the assigned responsibilities for the operation, maintenance, and cleaning of the machine.
- have read and understood the operating instructions before starting to work for the first time,
- use the stipulated protective equipment. It must be checked regularly and replaced if damaged. In particular, hearing protection must be worn when operating the machine.
- avoid abnormal postures when working.

Furthermore, all employees working on the machine are within the scope of their tasks responsible for

- ensuring that the machine is in perfect technical condition.
- that machine being serviced according to the specified maintenance instructions.
- all safety devices being checked regularly for completeness and function.
- order, cleanliness and sufficient workplace lighting being ensured.

In case of malfunction of the machine the personnel must

- notify the competent authority of the malfunction.

2.6 Personal protective equipment

Working requires wearing personal protective equipment in order to minimize health hazards. Therefore:

- Before starting any work, put on the respective specified protective equipment properly and wear it during work.
- In addition, always observe the signs with pictograms for personal protective equipment in the working area without fail.

Industrial safety clothing

Closely fitting work clothing with low tear strength, with narrow sleeves and no protruding parts, predominantly as protection against getting caught by moving machine parts.

Do not wear rings, necklaces or other jewellery.

Solid protective gloves

To protect hands against rubbing, abrasions, scratches, grazes, cuts, punctures or similar superficial skin injuries.

Safety footwear

To protect feet against injuries from falling parts and against slipping and falling on slippery surfaces.

Ear protection

To protect against hearing damage.

Safety goggles

To protect against injuries to the eyes from parts flying around, particles, fluid splashing or escaping compressed air.

Mouthguard

To protect against lung damage.

Industrial safety helmet

To protect against head injuries, for example during maintenance work in the machine.

2.7 Residual hazards

The machine was subjected to a risk assessment. The hazards determined in doing so were, in as much as possible, removed and detected risks reduced. But the machine still harbours residual risks which are described in the following section.

The warnings and safety instructions listed in here and in the action chapters of these instructions must be observed without fail in order to prevent possible damage to health and dangerous situations.

Danger zones which cannot be avoided due to the construction of the machine are marked with warning signs.

2.7.1 Warning signs on the machine

CAUTION

Risk of injury through illegible signs.

Labels and signs that have become blurred or illegible no longer sufficiently mark danger points and cannot indicate possible risks of injury.

- Keep pictograms, safety, warning and operating instructions in perfectly legible condition at all times.
- Replace damaged or illegible pictograms, marks, signs or labels immediately.

Pictogram	Location	Explanation
	On the battery, On the generator	Dangerous electrical voltage warning
	On the motor	Hot surfaces warning
	At the front	Hand injury warning
	On the battery	Warning against burns

Pictogram	Location	Explanation
	At the cooling	Automatic start-up warning
	At the machine	Warning of an explosion hazard
	At the cooling	Warning of rotating components
	At battery and fuel tank	Warning of flammable liquids
	On the exhaust machine	Warning of harmful gases
	Protective conductor terminal	Labelling connection point of the external protective conductor.
	Next to the earthing screws	Identifies the protective conductor connection

2.8 Security risks

2.8.1 Risks from moving components

Motorised moving assemblies can pose dangers that lead to injuries (e.g. crushing, body parts being drawn in).

Operate the machine only with all protective devices installed and functioning properly.

Ensure that nobody is at risk from the starting machine before switching on or starting up the machine! No one may reach into the running machine. When operating the machine, do not bring any body parts into the area of moving components. Always maintain the safety distance.

Before entering the danger zone, switch off the voltage supply and secure it against being switched on again. Before starting to work in danger zone, always wait until all components with a trailing movement have come to a standstill and residual energy is automatically dissipated.

2.8.2 Risks from thermal hazards

Components/assemblies are integrated in the machine which become hot during operation. There is a risk of burns when touching the hot surfaces. Wear appropriate personal protective equipment when working on hot components (e.g. motors).

Ensure that all components/assemblies have cooled down to the ambient temperature before performing any work.

2.8.3 Risks from noise

The emission value (sound pressure level) from the machine can be found in the technical data section. Depending on local conditions, a higher sound pressure level can occur which can cause hearing damage or even deafness.

Hereby applies: At a sound pressure level of >80 dB(A) at the workstation, the necessary personal protective equipment (hearing protection) must be worn for all work.

2.8.4 Risks from electrical current

Touching live parts can lead to serious injury or even death. For this reason, work on electrical equipment may only be carried out by qualified electricians.

Before starting any work on electrical equipment, disconnect the machine from the power supply and check that it is voltage-free. Secure the power supply against being switched on again.

Check the electrical equipment regularly for external damage (e.g. to the insulation) and loose connections at cable terminals. If defects are detected, switch off the voltage supply immediately and arrange for repair.

The electrical equipment (e.g. also cables and plugs) must not come into contact with water.

Only use undamaged extension cables that are suitable for use in the respective environment and whose core cross-section is sufficiently dimensioned.

Do not bridge or disable fuses. When replacing defective fuses, always make sure that the current is correct.

2.8.5 Risks due to hazardous substances

Health hazards can occur with incorrect handling of auxiliary and working materials (oils, greases, etc.). Observe the operating material notes in the safety data sheets of the manufacturer.

Always wear the necessary personal protective equipment when handling auxiliary and operating materials. When refilling, use devices that prevent splashing and spilling.

Dispose of used auxiliary and operating materials in accordance with the local, nationally applicable legal regulations.

Water-polluting substances such as e.g. greases, lubricating oils or solvent-containing cleansing liquid and the like must not pollute the ground or get into the sewer system. These substances must be collected, stored, transported and disposed of in suitable containers.

2.8.6 Risks from pressure vessels

The mixing and delivery vessel is a pressure vessel. It is subject to the pressure vessel regulation §8 group IV.

The required pressure vessel test was carried out by the manufacturer. An acceptance test of the system is required before the first commissioning (§9) and at regular intervals (§10). The tests are carried out by an approved testing centre.

2.9 Safety and protective devices

The machine is equipped with various protective devices. The protective devices with which the operating personnel comes into direct contact are listed below.

Non-functioning, bridged or decommissioned safety and protective devices do not protect against the hazards and can lead to severe injuries or death.

- Always check that all protective devices are installed correctly and functional before starting work.
- Never decommission protective devices.

2.9.1 Emergency stop button

Figure 1: Position of the emergency stop button

The emergency stop button (1) is a pushbutton, which serves to switch off the machine in an emergency. As soon as the emergency stop button is pressed, the drive motor stops and the compressed air supply to hydraulics and compressor is closed.

We recommend closing the levers for the upper and lower air (see Section 4.6) beforehand, if possible.

After an emergency stop has been triggered, mixing and delivery vessel and the delivery hoses must be cleaned immediately.

Function test

1. Press the emergency stop button while the machine is running.
2. The machine switches off.

   If the machine does not switch off, the safety switch is defective and must be repaired before the machine is put into operation.

2.9.2 Safety switch

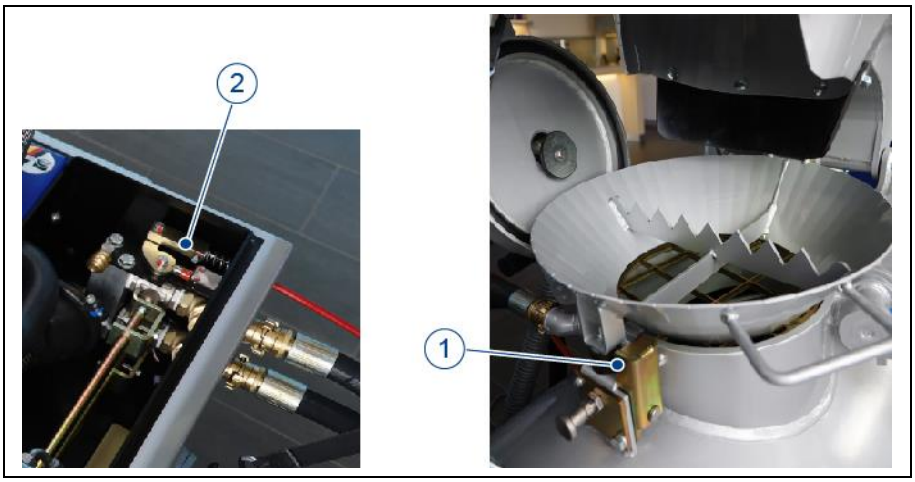


Figure 2: Safety switch on the dome

The dome screen is equipped with a safety switch (1). This ensures that the machine can be operated only with the dome screen installed and closed.

The dome screen can be lifted out of the dome and swivelled to the side for work in the delivery vessel. In this case the safety switch is open. This status is displayed on the control panel.

2.9.3 Breakaway cable

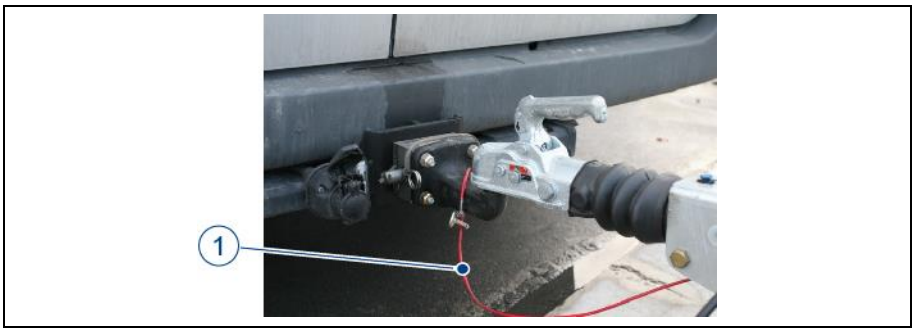


Figure 3: Breakaway cable

The trailer must be connected to the towing vehicle via the breakaway cable (1) when the vehicle is in motion. If the trailer is detached from the towing vehicle while driving, the handbrake of the trailer is actuated via the breakaway cable.

2.9.4 Hose

To prevent the hoses of the risers from tearing off under their own weight, they must be secured with the hose holders.

2.10 Working safely

During work on components, assemblies or individual components, persons can be injured on the danger points through unauthorized start-ups of the energy supply.

Before any work on components, assemblies or individual components, observe the procedure for securing against restarting described in the following.

Before starting work

1. Stop the machine.
2. Disconnect the battery.
3. Attach a warning to the control system and enter the name of the responsible person authorised to switch the machine back on in the label.

After completing the work

1. Reinstall all safety devices properly and check their function.
2. Ensure that there are no persons at the danger points and in the entire danger zone.
3. Connect the battery.
4. Subsequently remove the sign and release the main switch.

2.11 Spare parts

Only original spare parts specified by **BMS** may be used. The information in the parts lists or spare parts lists is decisive in this case.

Other components not supplied by the manufacturer can influence the safety functions and the behaviour of the machine. They are therefore not permitted for use.

Spare parts that have exceeded the maximum use-by date may no longer be used.

When ordering spare parts, state the machine type, chassis number and the designation from the spare parts list.

2.12 Structural changes

Structural changes, additions and conversions to the machine may only be carried out with the written approval of the manufacturer.

Unauthorised modifications invalidate the declaration of conformity. The warranty becomes void.

2.13 Disposal

Legal national and community regulations for environmental protection and disposal must be observed in the handling of the machine. In-company regulations must be compared with the appropriate manufacturer's information and adjusted, if necessary.

Incorrect or negligent disposal can cause considerable environmental pollution.

- Observe the handling and disposal regulations in the safety data sheets of hazardous substances.
- Do not discharge any operating and auxiliary materials into the sewer system, the ground or water bodies.
- Collect and dispose of oils/greases accordingly
- Dispose of / recycle any hazardous wastes (e.g. circuit boards, cables, plastic materials, etc.) and any replacement parts properly.

3 Technical data

3.1 Chassis

3.1.1 Standard

Information	Value
General	
Length	4,620 mm
Width	1,555 mm
Height	1,585 mm
Filling height	920 mm
Content mixing vessel	265 l
Chassis 2.0 t	
Weight (actual) *	1,770 kg
Permissible total weight	2,000 kg
Support load	100 kg
Max. permissible support load	120 kg
Axis	ALKO B 2000-4
Axle load	2,000 kg
Tyre pressure	4 bar
Wheels	205 R14C
Torque wheel bolt	150 Nm
Chassis 2.5 t	
Weight (actual) *	1,790 kg
Permissible total weight	2,500 kg
Support load	100 kg
Max. permissible support load	120 kg
Axis	ALKO B 2500-8
Axle load	2,500 kg
Tyre pressure	4.5 bar
Wheels	225/70R15C
Torque wheel bolt	325 Nm

* according to equipment

3.1.2 Feeder

Information	Value
General	
Length	4,830 mm
Width	1,555 mm
Height	2,360 mm
Filling height	450 mm
Content mixing vessel	265 l
Chassis 2.0 t	
Weight (actual) *	1,910 kg
Permissible total weight	2,000 kg
Support load	100 kg
Max. permissible support load	120 kg
Axis	ALKO B 2000-4
Axle load	2,000 kg
Tyre pressure	4 bar
Wheels	205 R14C
Torque wheel bolt	150 Nm
Chassis 2.5 t	
Weight (actual) *	1,990 kg
Permissible total weight	2,500 kg
Support load	100 kg
Max. permissible support load	120 kg
Axis	ALKO B 2500-8
Axle load	2,500 kg
Tyre pressure	4.5 bar
Wheels	225/70R15C
Torque wheel bolt	325 Nm

* according to equipment

3.1.3 Feeder/scraper

Information	Value
General	
Length	4,830 mm
Width	1,555 mm
Height	2,700 mm
Filling height	450 mm
Content mixing vessel	265 l
Chassis 2.0 t	
Weight (actual) *	1,980 kg
Permissible total weight	2,000 kg
Support load	100 kg
Max. permissible support load	120 kg
Axis	ALKO B 2000-4
Axle load	2,000 kg
Tyre pressure	4 bar
Wheels	205 R14C
Torque wheel bolt	150 Nm
Chassis 2.5 t	
Weight (actual) *	2,000 kg
Permissible total weight	2,500 kg
Support load	100 kg
Max. permissible support load	120 kg
Axis	ALKO B 2500-8
Axle load	2,500 kg
Tyre pressure	4.5 bar
Wheels	225/70R15C
Torque wheel bolt	325 Nm

* according to equipment

3.2 Machine

Information	Value
General	
Delivery head	Up to approx. 30 floors (depending on material)
Conveyor range	Approx. 180 m
Drive	Deutz TD 2.2
Diesel motor	44.5 kW at 2600 min^{-1}
Ambient temperature	Max. +50 °C
	Min. 0 °C
Fuel	Commercial summer or winter diesel
Filling volume diesel tank	75 l
Hydraulics	
Hydraulic circuit	Open
Pump	Gear pump
Height volume	14.0 cm^3
Max. pressure	210 bar
Tank capacity	20 l
Hydraulic oil	**BMS**
Supercharger	
Air volume	6 m^3/min
Max. pressure	9 bar
Compressor oil	**BMS** 46 max. capacity 10 l
Electrical system	
Voltage	12 V
Battery	12 V 90 Ah
Lighting voltage	Depending on the version: 12 V or 24 V
Cooling	
Oil cooler	3 separate circuits for engine oil, compressor oil and hydraulic oil
System	Open system
Accessories delivery hoses The delivery hoses must be approved for	
Operating pressure	10 bar
Diameter *	50 mm (minimum diameter)

* Only delivery hoses with the same diameter may be used.

3.3 Identification of the machine

3.3.1 Nameplate

The nameplate serves to identify the machine and chassis. It is located on the side of the machine.

Figure 4: Nameplate

3.3.2 Machine equipment

Machine type	*alpha* ^{CR}			
Coupling device	DIN towing eye			
	Ball head coupling			
Lighting voltage	12 V			13 pin plug
	24 V			15 pin connector
Certification		100 km/h	80 km/h	
Machine design	Standard			
	Feeder			
	Feeder/scraper			
Delivery scope	Operating instructions			Turned over
	Storage box			
	Lubrication gun			
Equipment options	GPS positioning machine			
	Filter hood			
	Air blast gun / cleaning gun			
	Silo construction and silo control			
	Ball head coupling with lock			

- In addition, you will for all versions need:
  - a discharge stand,
  - hoses with couplings (total length at choice)
    The hoses must have a minimum diameter of 50 mm and be suitable for an operating pressure of min. 10 bar.

4 Layout and function

4.1 Personnel

Target groups: O, F, E, S

Target group definition see Chapter 1.11, page 14.

4.2 Overview

The alpha CR can be roughly divided into two areas:

– Chassis

  This includes the carriage shaft, the chassis, the mixing and delivery vessel and the feeder or feeder with scraper.

– Machine

  This includes the structure with control panel as well as the drive, cooler, compressor unit, hydraulic unit and battery.

Figure 5: Machine overview

1 Feeder/scraper (option)
2 Mixing and delivery vessel
3 Axis
4 Carriage shaft
5 Setup

4.3 Chassis

Overview

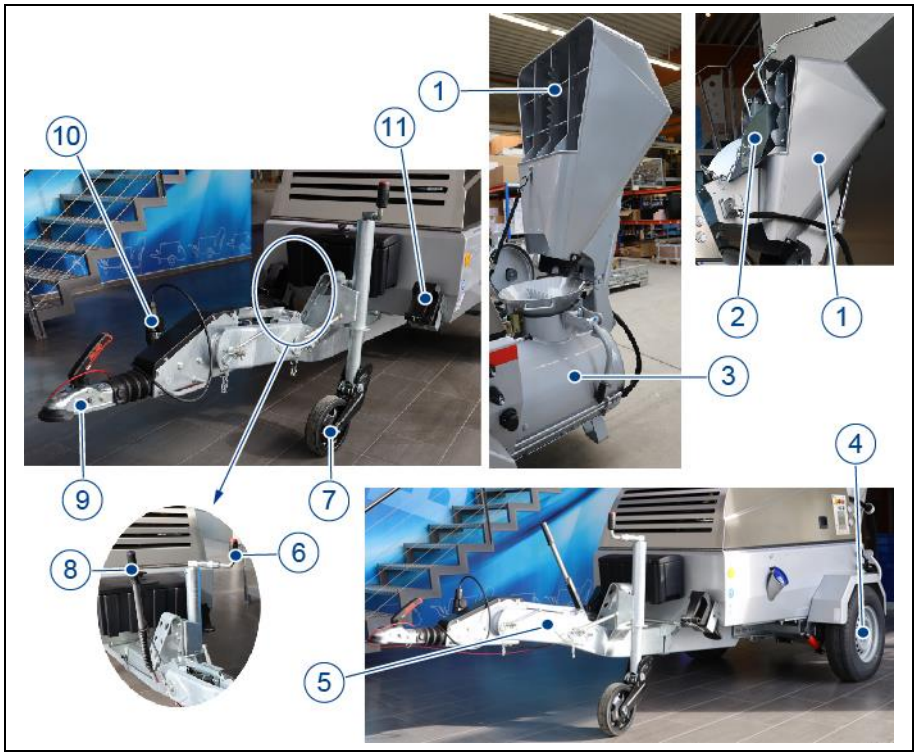


Figure 6: Chassis elements

1	Feeder (option)	2	Scraper (option)
3	Mixing and delivery vessel	4	Axle with wheels
5	Overrun device	6	Support wheel crank
7	Support wheel	8	Handbrake
9	Clutch with overrun brake	10	Plug
11	Brake shoe		

Chassis

The **BMS** *alpha* ^{CR} is a non self-propelled machine. It is subject to the Road Traffic and Approval Regulations.

When using the trailer in public road traffic, the relevant regulations as well as the national regulations of the country in which the **BMS** *alpha* ^{CR} is used must be observed.

The vehicle has been approved by the TÜV and is suitable for registration according to the StVO.

Certification

For Germany, the approval of the trailer with the assignment of its own registration number and the 2-year technical inspection by an approved testing centre is mandatory.

Outside Germany, the respective registration guidelines of the country of registration must be observed.

Approval in other European countries is in accordance with the regulations applicable there.

NOTE

Please observe the maximum permitted speed when registering!

With appropriate equipment, approval for a maximum speed of 100 km/h is possible. The permitted maximum speed can be found in Section 3.3.

Coupling device with overrun brake

WARNING

Danger from incorrectly fitted coupling device / DIN towing eye!

An incorrectly fitted coupling device / DIN towing eye can lead to failure of the overrun brake and thus to traffic accidents.

- The coupling device / DIN towing eye must be adjusted to the coupling height of the towing vehicle.
- The coupling device / DIN towing eye must be in a straight line to the towing vehicle's coupling device (parallel to the ground)

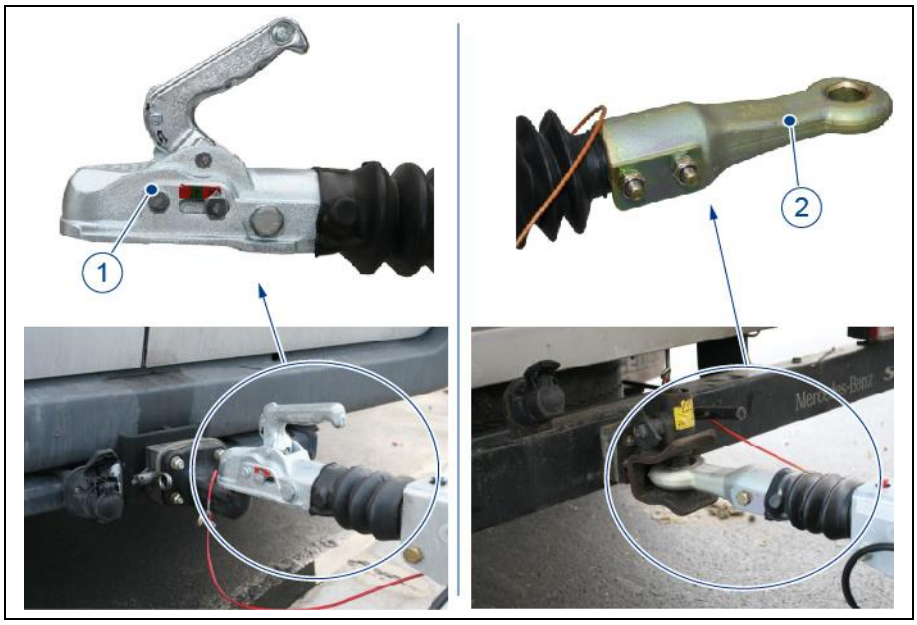


Figure 7: Coupling device

The chassis is optionally designed for transport with a ball coupling (1), usually for passenger cars, or a DIN towing eye (2), usually for trucks or vans.

The integrated overrun brake brakes the trailer when the towing vehicle is braked and on steep downhill runs.

When braking the towing vehicle or driving downhill, the draw bar of the overrun device is pushed in, depending on the magnitude of the draw bar force. This causes the brake to be applied.

The brake also responds initially during reversing. However, the braking effect is almost cancelled by the reverse rotation.

Overrun device

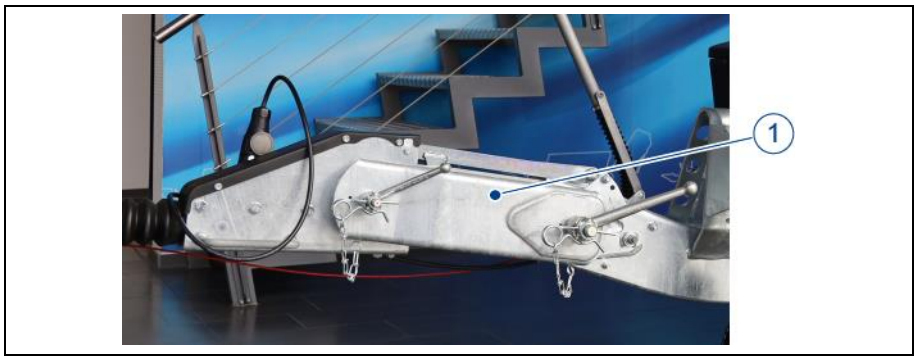


Figure 8: Overrun device

The coupling device is adjusted to the coupling height by means of the outlet device (1). The carriage shaft remains parallel to the ground while the coupling device can be adjusted in height.

Handbrake and brake shoes

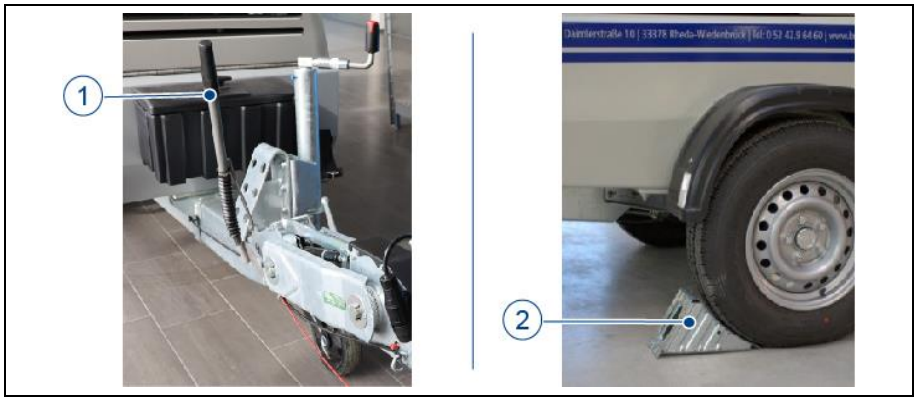


Figure 9: Handbrake and brake shoes

The handbrake (1) as well as the brake shoes (2) are used to safely stop the **BMS** *alpha* ^{CR}.

When parking the **BMS** *alpha* ^{CR} in connection with the towing vehicle, the trailer must be secured with the handbrake. If the parking area is not level or the trailer is standing without the towing vehicle, it must be additionally secured with the brake shoes. The trailer has 2 brake shoes which are mounted in special brackets at the front of the chassis on both sides.

Support wheel

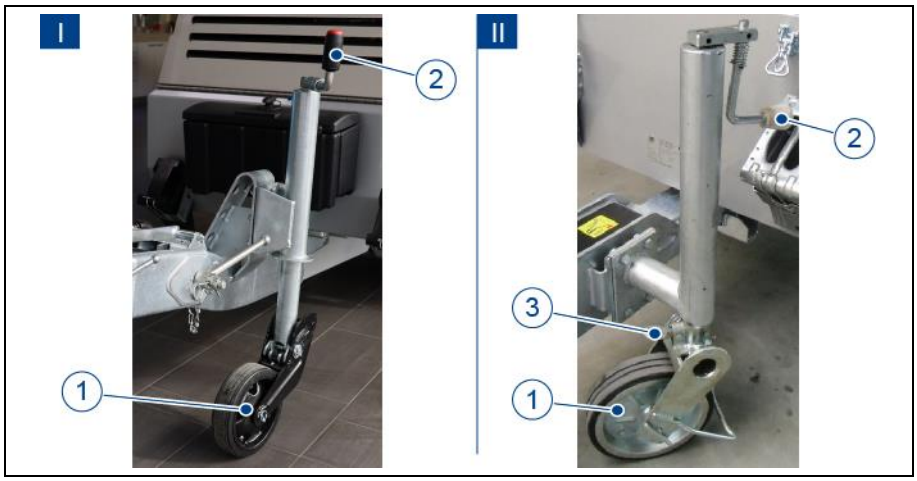


Figure 10: Support wheel

Version I

The support wheel (1) is used to park the trailer.

The support wheel is up when the trailer is in motion. To park the trailer, the support wheel must be turned downwards using the support wheel crank (2). The support wheel must be turned out until the trailer is aligned horizontally.

Version II

The support wheel (1) is used to park the trailer.

The support wheel is up when the trailer is in motion. To park the trailer, the support wheel is first turned down a little. Pressing on the support wheel latch (3) folds it down until it engages in the lower position. Turn the support wheel downwards using the support wheel crank (2) until the trailer is level.

Axle with wheels

Figure 11: Axle with wheels

The Euro axle is mounted with rubber bodies. The two wheels (1) are located on the axle. Shock absorbers (2) cushion the trailer. In driving mode the trailer is braked by the wheel brakes. These comply with the pollutant ordinance and EC directive.

Only the wheels listed in the vehicle documents (registration certificate part I) may be fitted. When changing wheels, the hub and wheel connection, wheel type and wheel type must correspond exactly to the specifications in the vehicle registration document.

When using the **BMS** *alpha* ^{CR} in winter, we recommend using M&S tires or all-season tires with the properties shown in the figure (3).

- Winter tyres are not mandatory (status 10/2011). However, in the event of an accident or getting stuck, the tyres, which may not be suitable for the weather conditions, can be criticised.

  Legal changes are possible at any time.
  Please inform yourself regularly about the relevant regulations and laws.

Mixing and delivery vessel

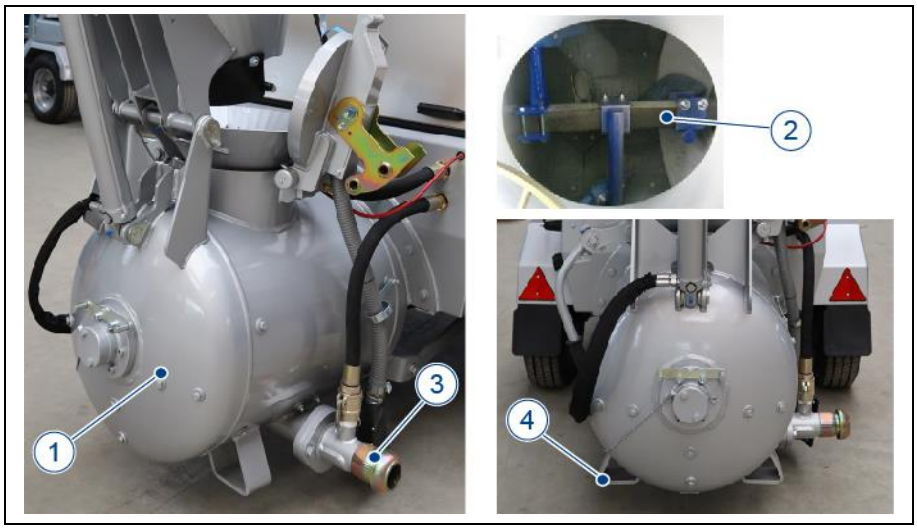


Figure 12: Mixing and delivery vessel

The building material is mixed in the mixing and delivery vessel (1), with the pressure vessel being operated as a compulsory mixer.

The lateral openings on the vessel serve to accommodate the mixing shaft (2), the mixing shaft bearing and the seal. The mixing shaft is equipped with mixing blades for mixing the material to be conveyed (mix). The mixing shaft blades convey the mix into the delivery hose, which is connected to the connection (3), after pressure has been applied in the vessel. The delivery capacity can be further increased by means of the selectable power mode.

The mixing shaft is driven by the diesel motor via a pulley and gearbox. The mixing time is set individually via the automatic mixing time control before starting the pumping operation (after switching on the machine).

At the rear of the mixing and delivery vessel there are two vessel feet (4), which ensure that the **BMS** *alpha* ^{CR} stands firmly when the support wheel is correctly adjusted.

Feeder and scraper

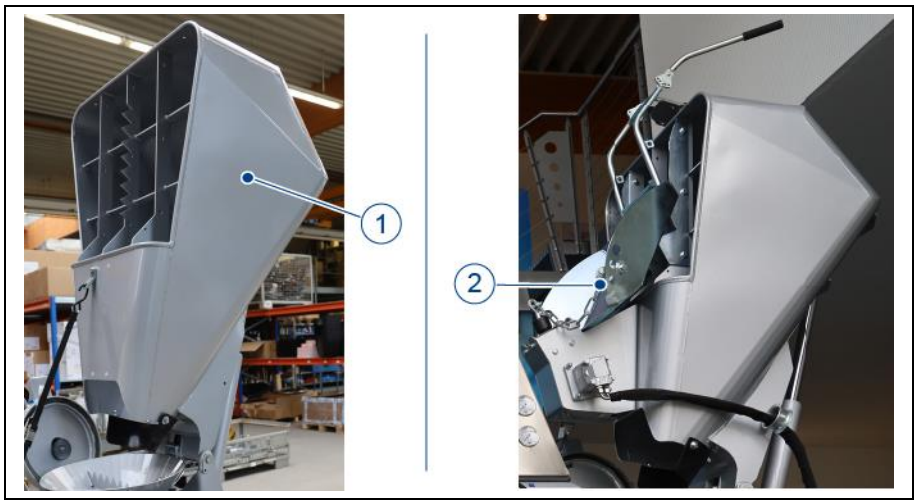


Figure 13: Feeder and scraper

The feeder (1) allows new material to be fed into the feeder during the automatic mixing and delivery operation. The feeder can be loaded in the discharged state. This enables a more ergonomic working method. The hydraulic tilting process takes over the filling into the mixing and delivery vessel.

The operating person can prepare the next mix during the delivery process, thus enabling continuous operation.

The scraper (2) can only be mounted in combination with a feeder (1). The scraper considerably facilitates filling the feeder. The scraper shovel is pulled through the sand pile by means of a steel cable and transports it into the lowered feeder. Manual shovelling of sand or gravel is no longer necessary.

The scraper is operated via radio remote control. The transmitter is mounted on the shovel, the receiver in the motor compartment.

4.4 Machine

Overview

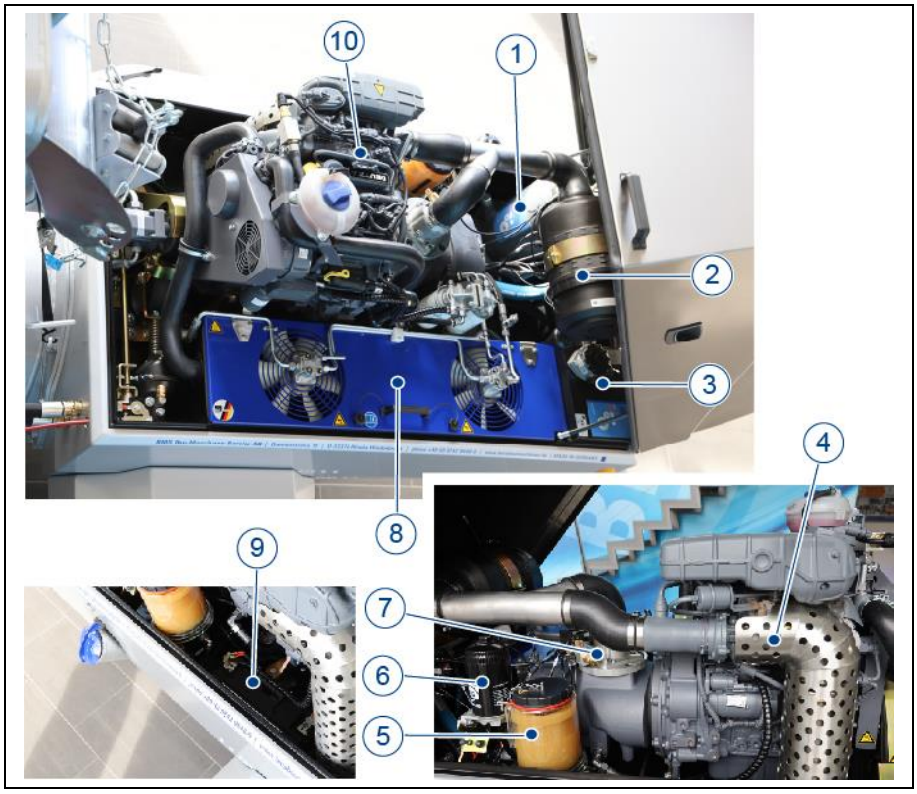


Figure 14: Interior view of the structure

1	Separator	2	Screw compressor air filter
3	Hydraulics	4	Exhaust gas machine
5	Lubrication system	6	Filter cartridge
7	Compressor with controller	8	Cooling unit
9	Battery	10	Diesel motor

Compressor unit

Figure 15: Compressor unit

The compressor unit consists of screw compressor (1), separator (3) and regulator with air filter (2). It monitors and controls the set operating mode of the compressor.

After starting the motor, the screw compressor builds up the machine pressure. In the operating mode "Delivery" the motor runs at the set speed. The screw compressor delivers the maximum air volume.

When the maximum set machine pressure (approx. 8 to 9 bar) is reached, the machine automatically shuts down and the screw compressor runs at idle.

At a lower pressure, the screw compressor switches on again automatically.

If the pressure drops below 2 bar (mixing vessel empty), the screw compressor switches off in automatic mode. In manual mode, the low pressure enables the machine to be cleaned.

As soon as the motor is switched off or fails, the compressor, i.e. the entire unit, vents via the drain valve.

Central lubrication

The automatic lubrication machine ensures regular lubrication of the front and rear seals and the front and rear bearings of the mixing shaft.

The lubrication system is activated via the multifunction display. See Section 14.3.

The fill level and function of the lubrication system must be checked regularly. The existing grease quantity is sufficient for approx. 500 operating hours in standard operation.

4.4.1 Options

Filter hoods

The filter hoods protect the cooling unit from rapid and excessive contamination by dust.

The filters also allow the cooling unit to be cleaned more quickly and easily.

Air blast gun / cleaning gun

The optional air blast gun / cleaning gun can be used as a cleaning tool. It is connected to the internal air extraction connection of the machine.

GPS tracking machine

With the GPS tracking machine the machine can be located at any time.

Ball head coupling with lock

The lock serves as an anti-theft device.

4.5 Functional sequence

During the filling of the mixing and delivery vessel with the components of the building material to be mixed, the material is mixed. The mixer works as a compulsory mixer. Depending on the option, the material is filled directly into the mixing and delivery vessel or via a feeder with or without scraper. The mixing and delivery vessel is filled with material to just below the dome.

The operator closes the dome cover after the scheduled mixing time has elapsed. The mixing and delivery vessel and the delivery hose are pressurized with the compressed air generated by the compressor unit.

The upper air flows into the mixing and delivery vessel. The lower air flows into the delivery hose.

The levers for the delivery rate of the upper and lower air are adjusted according to the delivery distance and delivery height. The upper air, in conjunction with the mixing blades, forces the mix into the delivery hose.

The lower air forces the mix in the delivery hose through the delivery hose to the discharge stand.

Screed pumps are flow conveyors. The mix is conveyed discontinuously. This method of operation creates compressed air cushions between the "material packs". Material and compressed air are discharged alternately from the discharge stand.

4.6 Operating elements

4.6.1 Machine

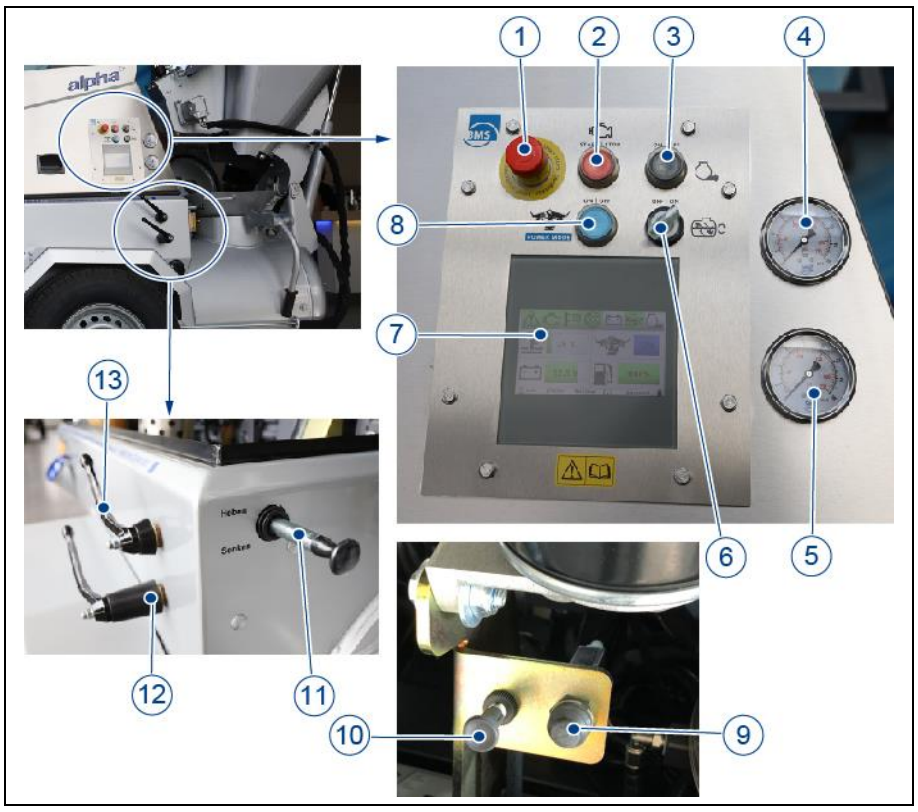


Figure 16: Operating elements

1	Emergency stop button	2	Start/stop button motor
3	On/Off button delivery	4	Pressure gauge compressor pressure
5	Pressure gauge vessel pressure	6	On/Off switch mixer shaft
7	Multifunction display	8	On/Off button power mode
9	Switch control on	10	Pull switch for work lamp
11	Lever raise/lower feeder	12	Lever lower air flow rate
13	Lever upper air flow rate		

Emergency stop button (1)

The emergency stop button is a pushbutton for emergency shutdown of the machine. Before restarting the machine, the cause that led to the emergency stop must first be eliminated. Then the emergency stop button must be unlocked by turning and simultaneously pulling it out. See also Section 2.9.1.

Start/stop button motor (2)

Switches the diesel motor on/off. To start the diesel motor, press the motor start/stop button until the diesel motor is running. To stop the motor, press the motor start/stop button again.

On/off button delivery (3)

Activates/deactivates the automatic conveyor.

Compressor pressure gauge (4)

The compressor pressure is displayed on the pressure gauge (4). This pressure display can be used to monitor the delivery process. Possible blockages can be recognised when the compressor pressure drops.

Boiler pressure gauge (5)

The pressure in the mixing and delivery vessel is displayed on the pressure gauge (5). The quantity of upper and lower air can be adjusted with the lever (10) and (11) only when the vessel pressure is sufficient.

- ➢ When the lower air is open, the delivery pressure shown on the pressure gauge corresponds to the vessel pressure.

On/Off switch mixing unit (6)

This is a two-position switch. It switches the mixing unit in the mixing and delivery vessel on/off.

Multifunction display (7)

Via the multifunctional display, e.g. fill levels are monitored and fault and warning messages are issued. It is also possible to switch over to manual mode. For more information on the controls on the multifunction display, see Section 4.6.2. For information on the individual menus, see Section 4.7.

On/Off button power mode (8)

Activates/deactivates the power mode. In the activated power mode, the speed of the motor is increased during delivery and the delivery capacity is increased

Control switch on (9)

The control is switched on via the "Control on" switch. Only when the control is switched on can the machine be operated using the operating elements on the outside of the machine.

Pull switch for work lamp (10)

The pull switch can be used to switch on the work lamp for the interior of the machine.

➢ If you have switched on the work lamp, it must be switched off at the end of work, otherwise there is a risk of battery discharge.

Raising/lowering the feeder lever (11)

WARNING

Risk of crushing in the swivel range of the feeder.

There is a risk of injury within the swivel range of the feeder when operating the lever for lifting/lowering the feeder.

– No persons may be present within the swivel range of the feeder.

– Wear the required PPE.

The feeder is raised or lowered using the lever (11). The lever must first be pulled out. The feeder can then be raised or lowered by swivelling the lever up or down.

Lower air (12) / upper air (13) delivery rate lever

The levers can be used to set the delivery rate of the lower air or upper air for the mixing and delivery vessel.

Horizontal position: The air supply of the lower air / upper air is open.

Vertical position: The air supply of the lower air / upper air is closed.

The setting of the upper and lower air depends on several factors:

- Delivery hose nominal diameter,
- Type of hose coupling (integrated inside or outside),
- Delivery hose length,
- Delivery head,
- Composition of the mixture,
- Type of delivery,
- Consistency of the mix (viscosity).

4.6.2 Multifunction display

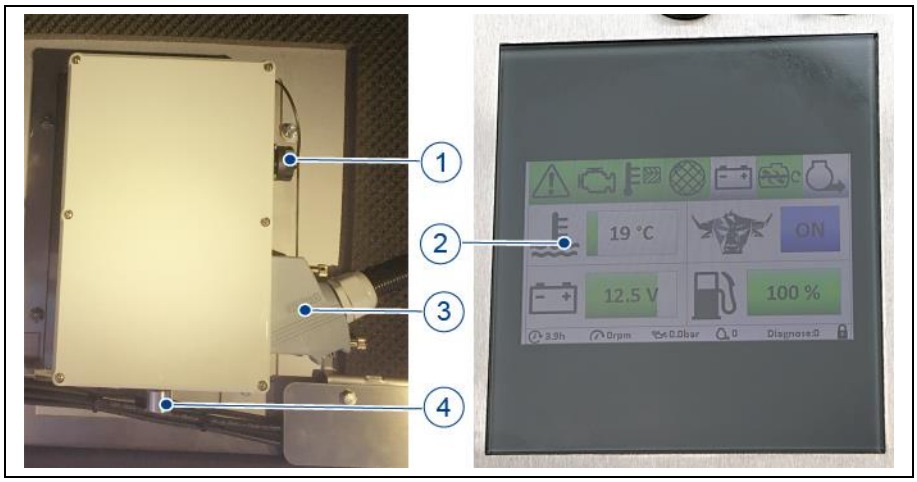


Figure 17: Rear side multifunction display

1	Deutz diagnostic interface	2	Multifunction display
3	Machine wiring harness connection	4	Selector switch

Deutz diagnostic interface (1)

The Deutz readout device is connected to this diagnostic interface.

Selector switch

The selector switch is used to navigate within and between the individual menus of the multifunction display. By pressing the selector switch, you can select buttons and acknowledge inputs.

4.6.3 Scraper radio system

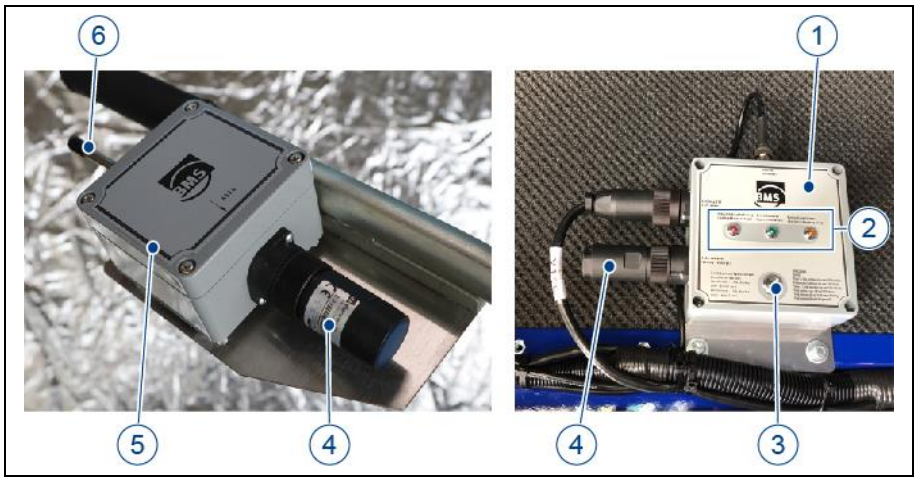


Figure 18: Scraper radio system

1	Radio receiver	2	LED display
3	Save/reset button	4	Battery
5	Radio transmitter	6	Thumb button

LED display

The LED display shows the different operating states of the radio system of the scraper.

- Red LED: If the red LED lights up, an error has occurred or the address is changed.
- Green LED: If the green LED lights up, the radio system is in operation. It indicates the operating mode.
- Yellow LED: If the yellow LED lights up, the battery is being charged.

Save reset button (3)

This key has two functions, depending on the length of actuation: Save and reset.

Saving the address

1. Press the button (3) for 1 second. The red LED lights up after 1 s.
2. Operate the radio transmitter via the thumb button until the red LED flashes.
3. Press the button (3) again for 1 s. The red LED goes out.

Resetting the address

1. Press the button (3) and keep it pressed for 3 seconds. The address is reset.

Thumb button

Via the thumb button the cable winch of the scraper is controlled. As long as you keep the thumb button pressed, the rope is rolled up by the winch. If the thumb button is not actuated, the rope can be unwound via the free wheel of the rope drum.

4.7 Menus

The multifunction display shows machine statuses, settings can be made and functions can be switched on and off. Navigation and selection of buttons is done via the selector switch (see Section 4.6.2).

Selecting buttons

1. Highlight the button by turning the selector switch.
2. Press the selector switch.

   This turns functions on and off and calls up menus.

Enter the value

1. Highlight the button by turning the selector switch.
2. Press the selector switch
3. Set the value by turning the selector switch.
4. Press the selector switch to confirm the set value.

4.7.1 General display area

The lower part of the multifunction display contains a general display area. This area is displayed for all menus.

Figure 19: General display area

The displays in this area have the following meaning:

No.	Meaning
1	Hour counter Displays the operating hours.
2	Speed indicator Displays the current motor speed in rpm (revolutions per minute).
3	Oil pressure display Shows the current motor oil pressure in bar.
4	Mixture counter Shows the number of mixtures made. The mixture counter is automatically reset when the machine is switched off.
5	Diagnosis Shows the sum of the pending error codes.
6	Key lock When the lock is closed, the key lock is activated. Deactivating the key lock 1. Press the selector switch. 2. Press and hold the selector switch for 3 seconds. When the lock is open, you can navigate through the menus by turning the selector switch. ➢ If the selector switch is not operated for 30 s, the key lock is activated and the main screen is displayed.

4.7.2 Main menu

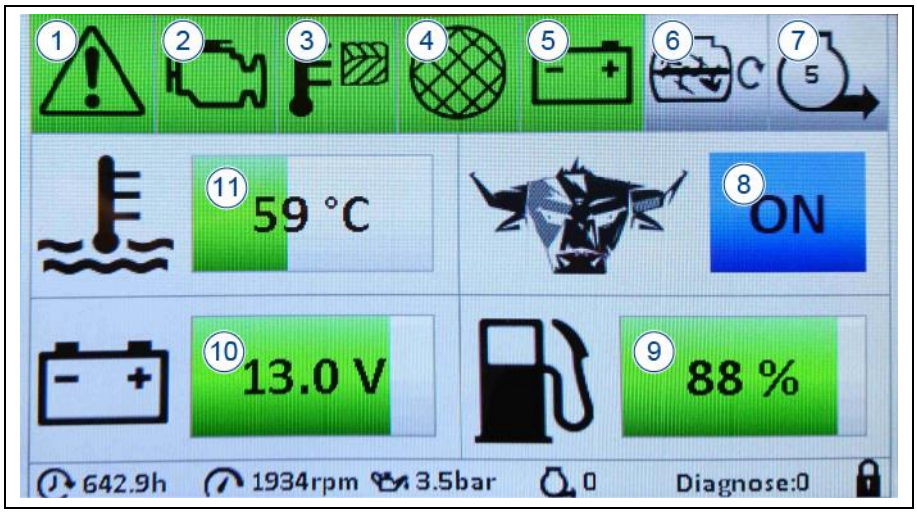


Figure 20: Main menu

The displays in the main menu have the following meaning:

No.	Meaning
1	Emergency stop control display – Green: The emergency stop button (see Section 4.6.1) was not pressed. – Red: The emergency stop switch was pressed The machine stops and starting is only possible after unlocking the emergency stop button.
2	Engine control display – Green: The motor runs smoothly. – Yellow: A warning message is present which does not lead to the motor being switched off. – Red: An motor fault is present which prevents the motor from starting or causes the motor to be switched off.
3	Compressor temperature check display – Green: The temperature of the compressor is within the permissible range. – Red: The compressor is too hot (over 120 °C). The machine switches off and starting is possible only after the fault has been rectified.
4	Control display dome screen – Green: The safety switch on the dome screen is closed. – Red: The safety switch on the dome screen is open (unlocked). The machine switches off and starting is only possible after the safety switch on the dome screen has been closed.

No.	Meaning
5	Load control display – Grey: The motor is switched off. – Yellow: While the motor is starting. – Green: While the motor is running.
6	Mixing unit control display – Grey: The mixing unit is switched off. – Green: The mixing unit is switched on.
7	Delivery control display When the mixing time is switched on, the preset time is displayed as a numerical value in seconds – Grey: The automatic delivery machine is switched off. – Flashing yellow: The mixing time is running out. – Yellow: When delivery is activated, the control indicator lights up yellow until 2 bar minimum pressure is reached. – Green: When delivery is activated, the control indicator lights up green after the minimum pressure is reached.
8	Power Mode – Standard operation: The OFF key is highlighted in grey. – Power mode: The key ON is highlighted in blue. The power mode is activated
9	Fuel gauge Shows the fill level in the tank in %.
10	Battery voltage The battery voltage is displayed in V (Volt) as a numerical value – Green: The current battery voltage is OK – Yellow/red: The current battery voltage is too low.
11	Coolant temperature Shows the coolant temperature in °C.

4.7.3 Submenu

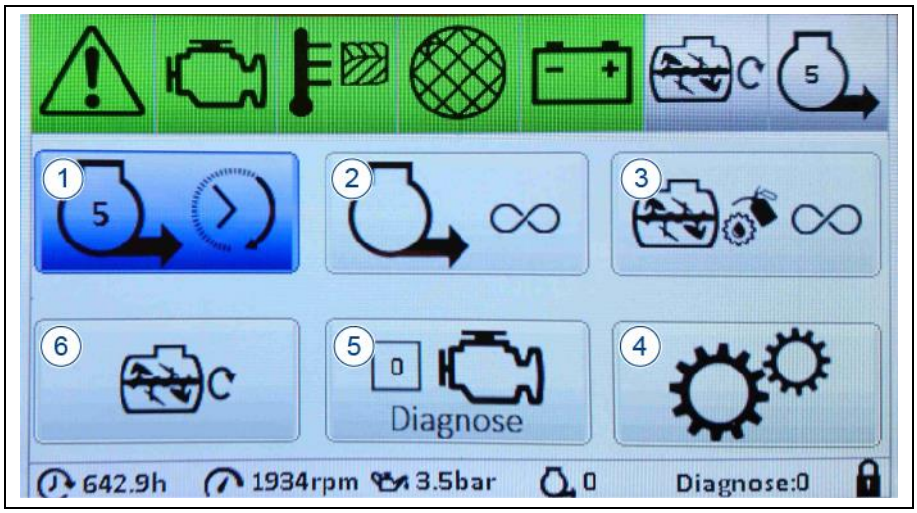


Figure 21: Submenu

The buttons in the submenu have the following meaning:

No.	Meaning
1	Set mixing time default
2	This button is used to switch manual mode on/off. The machine conveys permanently. ➢ If the motor is running smoothly, the button is displayed in green.
3	Switch continuous lubrication on/off
4	Call up the service area This area is accessible only to specialist personnel and is protected with a code. The code entry menu opens after selection.
5	Calling up the diagnostic menu The button displays the sum of the pending diagnostic codes.
6	Switch the continuous mixer on/off.

4.7.4 Diagnostic menu

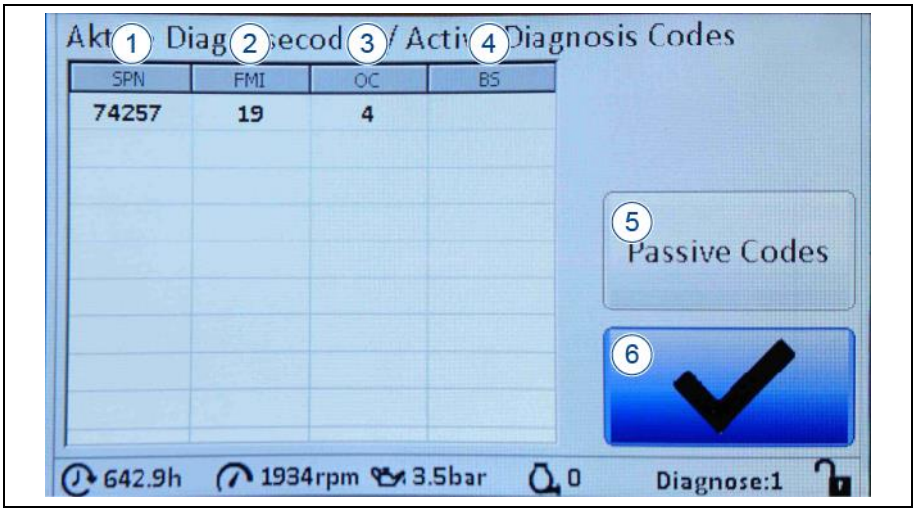


Figure 22: Diagnostic menu

No.	Meaning
1	SPN SPN means Suspect Parameter Number. This number indicates the code for the diagnostic cause.
2	FMI FMI means Failure Mode Identifier. This number indicates the subgroup of the SPN.
3	OC OC means Occurrence Counter (event counter). This counter shows how often the SPN has occurred.
4	BS BS means operating hours. The operating hour during which the diagnostic code was reported is displayed.
5	Calls up the Passive diagnostic codes menu. The Passive diagnostic codes menu displays the diagnostic codes that are not currently pending.
6	After selection, the diagnostic menu is closed and the submenu is displayed.

Passive codes menu

The Passive diagnostic codes menu displays the diagnostic codes that are not currently pending. The menu is structured in the same way as the diagnostic menu. The meaning of the table columns displayed corresponds to the table columns in the Diagnostic menu (see page 60)

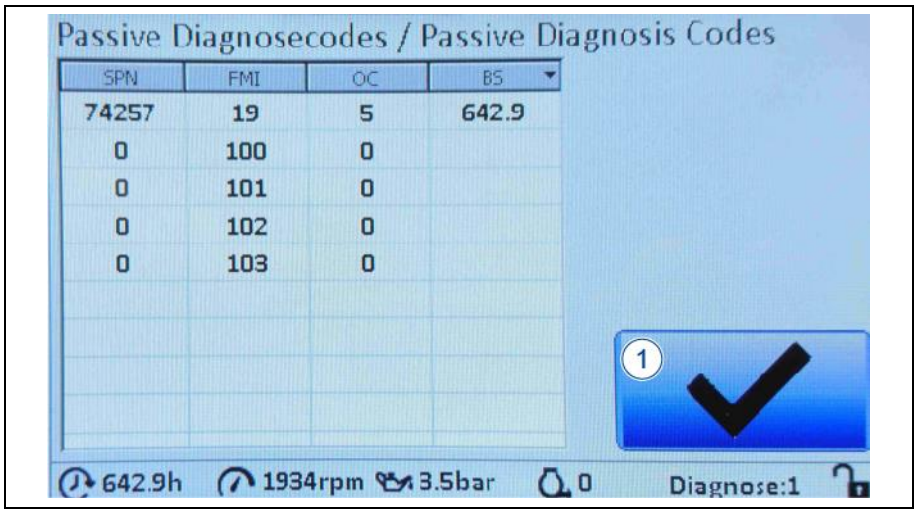


Figure 23: Diagnostic menu

No.	Meaning
1	After selection, the Passive diagnostic codes menu is closed and the submenu is displayed.

Machine internal diagnostic codes

SPN	FMI	Meaning
0	100	Triggering of the compressor temperature switch
0	101	For 5 s no D+ signal with running motor
0	102	Emergency stop actuation for less than 1 s
0	103	Dome screen switch actuation for less than 1 s

4.7.5 Messages

The following messages can be displayed using the multifunction display.

Message text	Meaning
DPF regeneration required	The message is displayed when the diesel particulate filter needs one. Regeneration is carried out by starting the motor.
Remaining regeneration time	The message appears during regeneration. It indicates the remaining regeneration time.
xxxh Service	This message is displayed shortly before the operating hours specified in the service interval are reached. ➢ Pressing any key makes the service message disappear. It is displayed again each time the machine is restarted. Only after resetting the service confirmation, this message will not be displayed again until the next service message.

5 Transport

The machine is either collected by the customer or delivered by a forwarding agent. It is not packaged.

5.1 Transport inspection

Upon receipt of the machine, check the delivery scope for completeness and damage.

The transport restraints must be removed only after the machine has been set up.

In the event of externally visible transport damage, proceed as follows:

- Inform the manufacturer immediately.
- Do not accept the machine or only under reserve.
- Enter the extent of damage on the transport documents and note it on the delivery note of the transport company or, in case of collection, directly on the acceptance certificate.

➢ Immediately enter a complaint for any defects upon receipt of the machine. Claims based on transport damage can be asserted only within the valid complaint periods.

5.2 Transport restraints

The transport restraints may be dismantled only before work is started. They must be stored in a safe place and reassembled before driving operation.

Lashing strap

The raised feeder is secured against lowering during travel operation with the lashing strap.

6 Driving operation

6.1 Personnel

Target groups: O, F, S

Target group definition see Chapter 1.11, page 14.

6.2 General instructions

WARNING

Risk of injury due to changes to the chassis.

Modifications can lead to traffic accidents.

- Make changes to the lighting, tyres and rims only after ABE.
- The machine may be moved only with the provided DIN towing eye or the ball head coupling.

➢ The formation of white rust on the chassis does not cause any damage. You can prevent the formation of white rust by ensuring sufficient ventilation or air circulation when parking the trailer.

6.3 Checks before coupling

Before coupling the trailer to a towing vehicle, the trailer must be checked for proper and roadworthy condition. During this check it must be verified that:

- the condition of the tyres is in order,
- the tyre pressure is correct,
  - ➢ Tyre inflation pressure must be checked regularly, as incorrect tyre pressure changes the driveability unfavourably. (For tyre pressure see Section 3.1).
- the wheel nuts are tight,
  - ➢ On new vehicles and after a wheel change, the wheel nuts must be tightened to the prescribed torque (see Section 3.1) after 50 km of driving.
- the tread depth of the tyres meets the requirements,
  - ➢ Tread depth according to regulation 1.6 mm. **BMS** recommends a tread depth not less than 4 mm.
- the rear light unit with number plate is mounted on the vessel and electrically connected,
- the lighting machine is damaged or defective,
- the on-board voltage and lighting of the trailer and towing vehicle (12 V or 24 V) are the same
- the lighting machine is working properly,
- the coupling device has the correct carriage shaft load and this corresponds to the towing vehicle,
- the delivery container and optionally the feeder is empty and cleaned.

➢ The machine may be transported only with the mixing and delivery vessel completely emptied and cleaned. Additional weight impairs the driving stability.

6.4 Coupling

WARNING

Risk of injury due to insufficiently suitable towing vehicle.

Coupling to an inadequately suitable towing vehicle can lead to traffic accidents.

- Only towing vehicles with a coupling device which have a suitable carriage shaft load may be used.
- The towing vehicles used must be sufficiently powered and have sufficient braking power.
- The towing vehicle must have the same on-board voltage as the machine.

Coupling to a ball coupling is described in the following. If a DIN towing eye is used, coupling is carried out via the towing vehicle's coupling device. Further information on coupling can therefore be found in the documentation of the coupling device.

1. Secure the machine against rolling away with the brake shoes on both wheels.

Figure 24: Turn the support wheel downwards

2. Pull the locking device (1) backwards and fold the crank (2) upwards until it engages.

3. Turn the support wheel (3) with the crank (2) down until the carriage shaft (4) is parallel to the ground. The distance X is equal to the distance Y.

➢ There are support wheel variants where you must first fold the support wheel downwards over the support wheel latch.

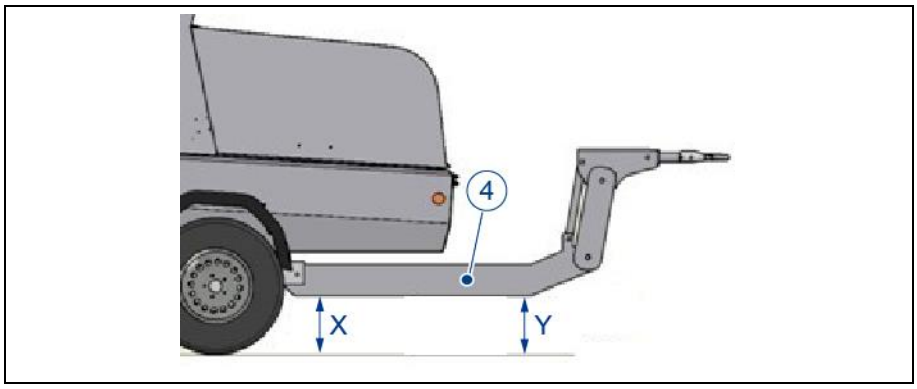


Figure 25: Aligning the carriage shaft

4. Pull out the spring cotter pins (5) by the locking levers (6).

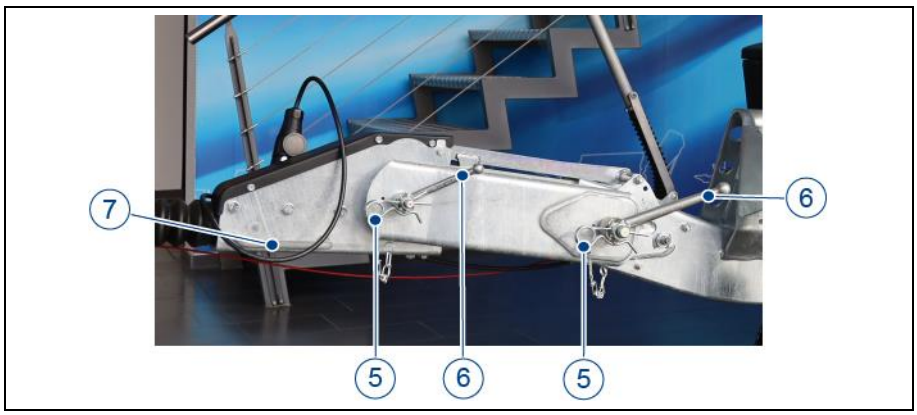


Figure 26: Adjustable overrun device

5. Release the locking levers (6) and turn them all the way up.

CAUTION

Risk of crushing at clamping points.

If the overrun device is adjusted, there is a danger of crushing in the swivel range.

- Persons must not hold any limbs in the swivel range of the overrun device.
- Wear appropriate PPE

6. Adjust the overrun device up/down on handle (7) so that the carriage shaft (4) is parallel to the ground at the correct coupling height Z. The distance X is equal to the distance Y.

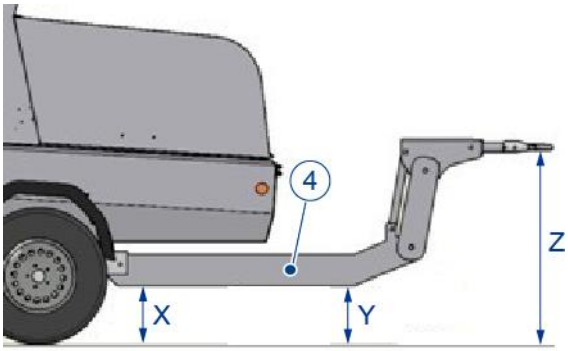


Figure 27: Align carriage shaft at coupling height

WARNING

Danger due to incorrect setting of the overrun device.

Incorrect setting of the overrun device can interfere with the function of the brake system and thus lead to traffic accidents.

- The overrun device must be parallel to the carriage shaft.
- Check the safety of the carriage shaft, clutch, hand and overrun brake prior to each drive.

7. Tighten the locking levers (6) and secure them with the spring pins (5). To ensure that the parking levers are firmly seated, tap each parking lever once with a hard rubber hammer (in the parking direction).

➢ After approx. 50 km the locking levers must be retightened.

8. Drive the towing vehicle to the coupling device.
9. Release the parking brake on the trailer by pressing the brake lever downwards.
10. Slide the coupling device over the towing hook on the towing vehicle.

11. Couple the trailer. The coupling lever automatically tilts down.
12. Check that the coupling lever is firmly engaged.

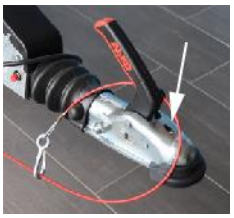
Figure 28: Attaching the breakaway cable

13. Attach the breakaway cable.

    The breakaway cable is hooked either into a suspension eye on the towing vehicle with the snap hook (I) or laid around the tow hook (II).

➢ The suspension eye should be located in the immediate vicinity of the coupling point, otherwise the handbrake may be inadvertently applied when cornering.

14. Check that the trailer is properly coupled.



– Is the coupling engaged?
  The marking must be in the green field. If the marking in the red field is (×), the trailer is not properly coupled. If the marking in the red field is (-), the coupling is defective.

In both cases where the marking is in the red field, the trailer must not be used. The coupling must be checked by service personnel or a specialist workshop authorised by **BMS** and replaced if necessary.

– Breakaway cable is undamaged?
  If the breakaway cable is defective, it must be replaced immediately.
– Is the breakaway cable attached?

Figure 29: Turn the support wheel upwards

15. Turn the support wheel (3) upwards with the crank (2) until it stops.

➢ There are support wheel variants in which you have to fold the support wheel upwards shortly before the stop until it engages. Only then turn the support wheel upwards until it stops.

16. Pull the locking device (1) backwards and fold the crank (2) upwards until it engages.

17. Check whether the support wheel is dirty. If necessary, remove any adhering dirt.

18. Mount the rear light unit with number plate by placing it on the bolts (8) on the mixing and delivery vessel and secure it with the locking springs (9).

Figure 30: Removing the rear light unit

19. Insert the plug of the rear light unit into the socket (10) underneath the levers for the delivery of the upper and lower air. Make sure that the plug is secured by the socket flap.

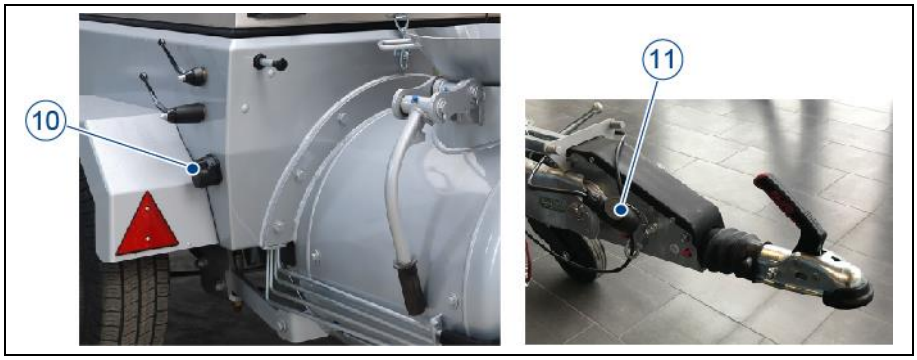


Figure 31: Electrical connection

➢ Pay attention to the lighting voltage 12 V / 24 V.

20. Connect the towing vehicle electrically to the trailer. To do this, insert the plug (11) from the trailer into the socket on the towing vehicle.

21. Check the function of the lighting and brake system of the trailer.

6.5 Prepare driving operation

For safety reasons, it is essential that you familiarise yourself with the operation of the trailer before moving it in road traffic. Please contact **BMS** if you have any questions or concerns regarding this manual (see Section 1.2 for contact details).

Before each journey, proceed as follows to prepare for driving:

1. Remove the brake shoes and fix them in the brackets on both sides of the trailer.
2. Close the hood of the machine and lock it with the clamping lever (1).

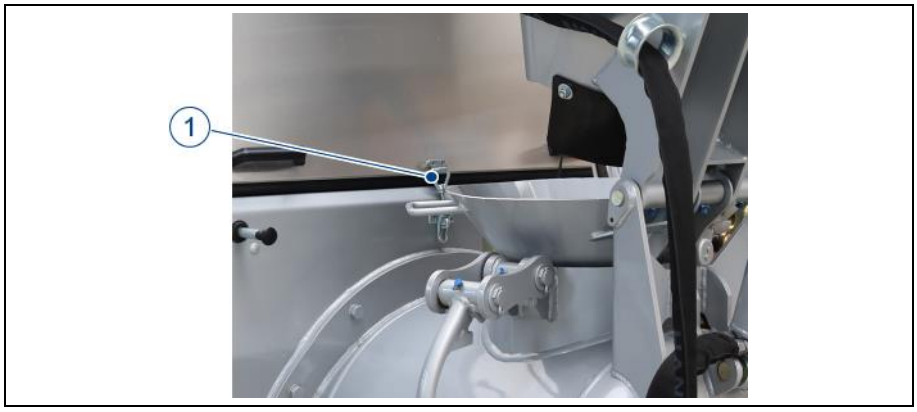


Figure 32: Closing the hood

3. Check the closure of the canopy to ensure that no parts come loose while driving.
4. Check that all spring cotter pins (2) are fitted to the scraper.

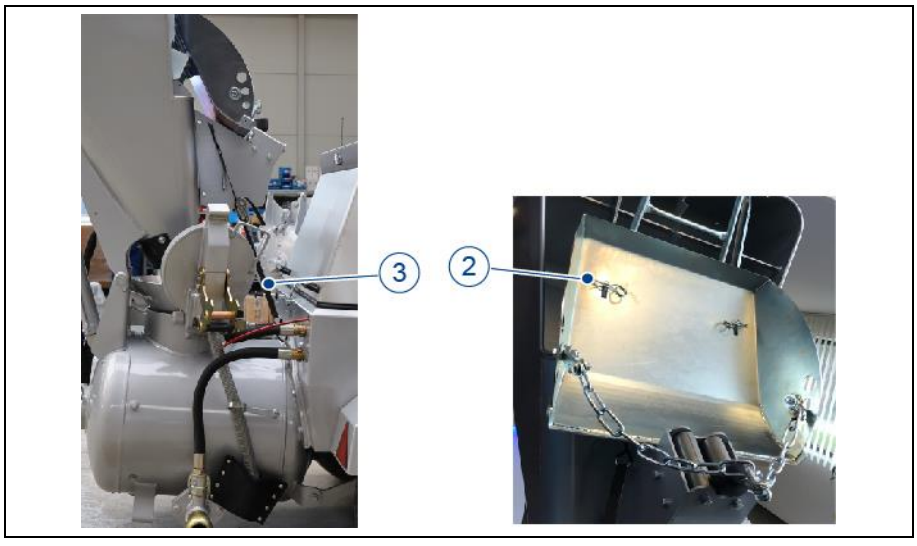


Figure 33: Mounting the transport restraint

5. Fit the transport restraint / lashing strap (3) to the feeder. Tighten the lashing strap (3).

6. Check that the trailer is properly coupled (see Section 6.4). Also observe the checks before coupling hereby (see Section 6.2).
7. Check the function of the lighting and brake system.
8. Check tyre pressure and tyres.
9. Check that the nameplate on the machine is clearly legible.
10. Check whether the coupling device has the correct carriage shaft load and whether this corresponds to the towing vehicle.
11. Make sure that the driver has the required driving licence class for the towing vehicle.

6.6 Notes for driving operation

WARNING

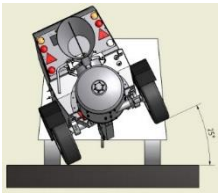
Danger due to eccentric centre of gravity.

During driving operation the machine may tip over due to an eccentric centre of gravity.

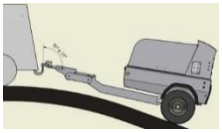
- Empty and clean the mixing and delivery vessel before travelling.
- If an optional feeder or scraper is fitted, empty and clean it before travelling.
- The towing vehicle must have the same on-board voltage as the machine.

When driving, it is imperative that you observe the road traffic regulations (StVO § 3, § 18 para. 5). Additionally, observe the national regulations of the country in which the **BMS** *alpha* ^{CR} is used.

When driving, the following points must be observed:



- The trailer must not be tilted more than 25° in transverse direction (danger of tipping over).



- The trailer must not be tilted more than +/- 20 ° from the horizontal in longitudinal direction (driving direction).
- The machine is designed so that the carriage shaft load reaches approx. 50 % of the permissible carriage shaft load. The minimum and maximum permissible carriage shaft load must not be exceeded or undercut. The carriage shaft load is at least 25 kg and at most 100 kg.
  - ➢ Additional loading of an uncleaned hopper or feeder can change the carriage shaft load and have a negative effect on the travel behaviour.
- When manoeuvring the machine, a second person must always be called for help or must be available within easy reach.

6.7 Uncoupling and parking

WARNING

Risk of crushing due to tilting components.

Faulty assembly can cause tilting of the machine.

- When setting up the machine, the machine feet on the mixing and delivery vessel must be on the ground and the support wheel must be sufficiently extended.
- If the ground is loose, you can use planks, for example, to prevent unintentional movement of the machine.
- The towing vehicle must have the same on-board voltage as the machine.

Location criteria

The location of the machine must meet the following criteria:

- Firm, level and horizontal ground,
- Existence of sufficient free space for unhindered working, e.g. correspondingly large distance to walls or other obstructions,
- The necessary working space must be available for maintenance and service work,
- There must be no explosive or other hazardous substances in the vicinity that can be sucked in,
- Largely dust-free environment,
- There must be good ventilation so that no exhaust gases are sucked in,
- The machine must not be installed under danger points (e.g. danger of falling objects),
- It should be favourable for hose installation so that the hoses do not cause any danger to third parties and the delivery hoses can be laid on the shortest possible route.
- Escape possibilities in case of danger to the operating person must be considered,
- The machine is not intended for operation in potentially explosive atmospheres.

Procedure

1. Place the trailer on a surface corresponding to the location criteria.
2. Secure the towing vehicle.
3. Secure the trailer by applying the handbrake (1) and securing the trailer against rolling away with the brake shoes (2).

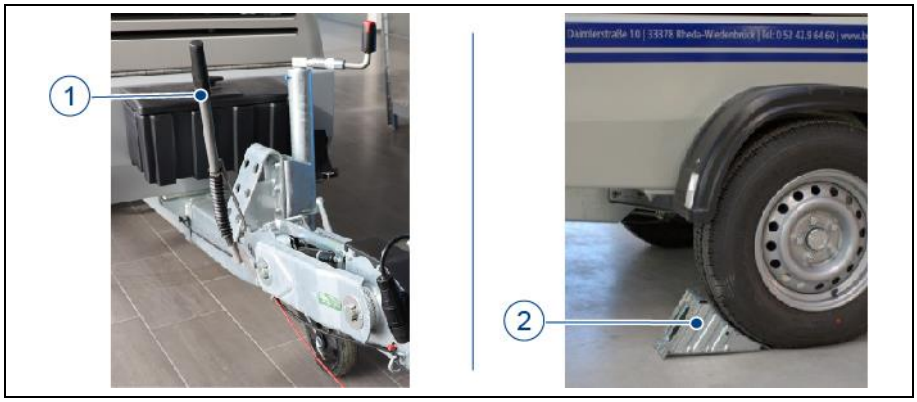
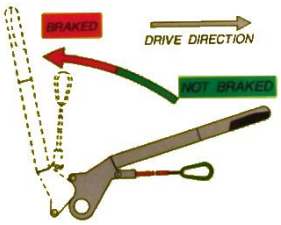


Figure 34: Securing the trailer



When using the handbrake, make sure that it is always fully applied. However, the handbrake lever must not be in a vertical position.

A safe braking effect is guaranteed at a position of up to approx. 70 ° for the applied brake. As soon as the handbrake lever is in a position above 70 °, this means that the braking force has decreased. In this case, the brakes must be checked by **BMS** or a specialist workshop authorized by **BMS**.

➢ When parking the uncoupled trailer, always use the brake shoes to prevent the trailer from rolling away.

4. Pull the locking device (2) backwards and fold the crank (3) upwards until it engages.

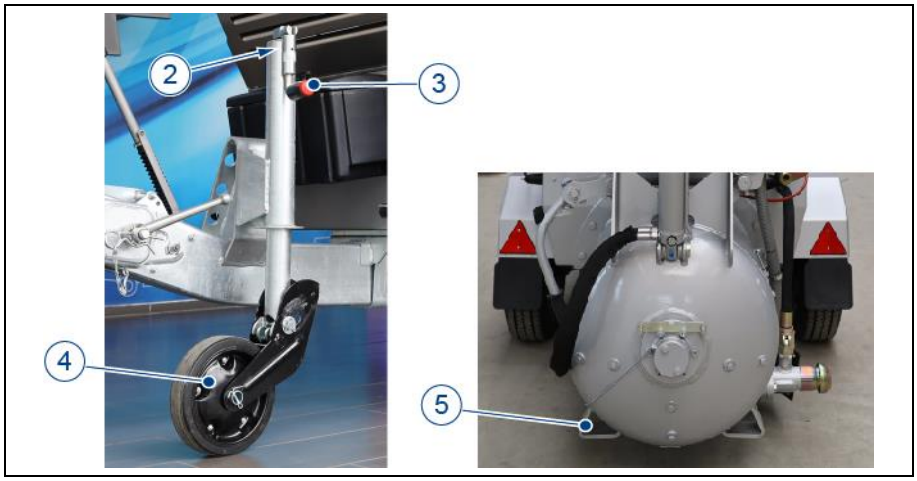


Figure 35: Parking the trailer

5. Turn the support wheel (4) with the crank (3) downwards until the mixing and delivery vessel is standing on the ground with its feet (5).
   - ➢ If necessary, you can place a board underneath.

- ➢ There are support wheel variants where you must first fold the support wheel downwards over the support wheel latch.

6. Check whether the support wheel is dirty. If necessary, remove any adhering dirt.
7. Remove the plug from the socket on the towing vehicle and connect it to the socket (6) on the carriage shaft.

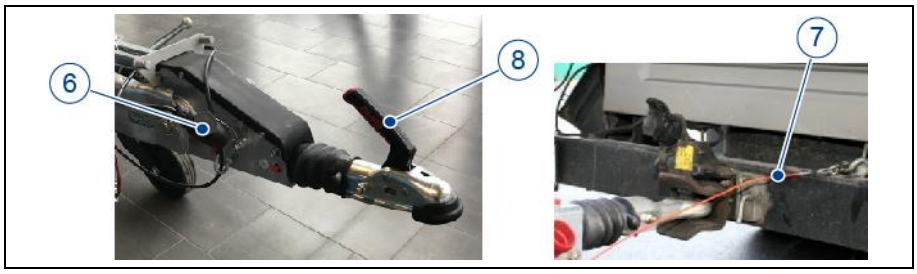


Figure 36: Uncoupling the trailer

8. Detach the breakaway cable (7) from the towing vehicle.
9. Open the coupling device by pulling the lever (8) upwards.

10. Release the plug connection for the rear light unit. Pull the plug out of the socket (9).
11. Pull the two spring cotter pins (10) out of the bolts.
12. Lift the rear light unit with number plate out of the bolts on the mixing and delivery vessel.
13. Install the rear light unit on the coupling.

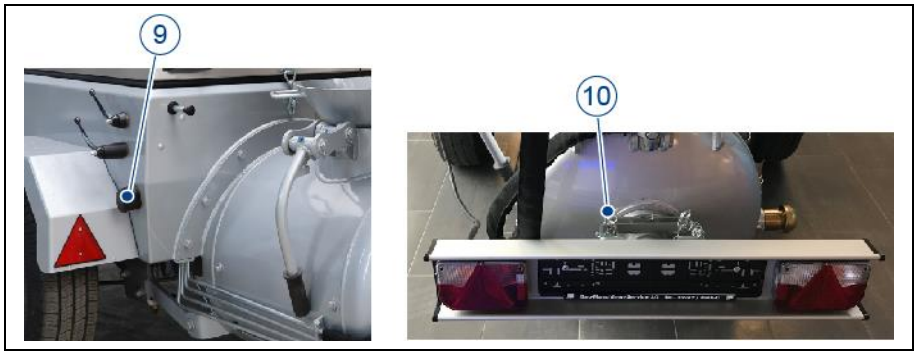


Figure 37: Removing the rear light unit

Parking in public places

If you park the trailer with or without a towing vehicle in public places, the rear light unit must be fitted correctly.

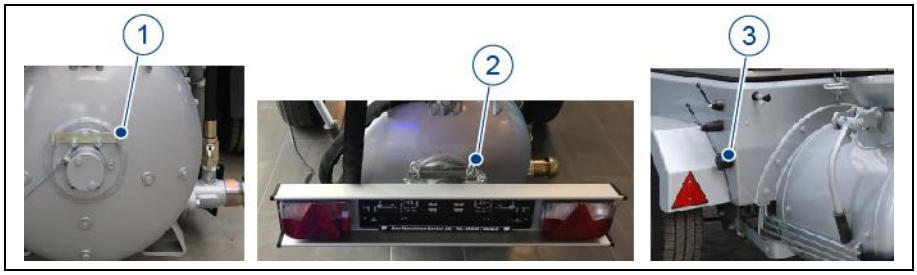


Figure 38: Parking in public places

1. Mount the rear light unit with number plate by placing it on the bolts (1) on the mixing and delivery vessel and secure it with the locking springs (2).
2. Insert the plug of the rear light unit into the socket (3) underneath the levers for the delivery of the upper and lower air. Make sure that the plug is secured by the socket flap.

Driving in winter

After driving in winter on salt-wet roads, the chassis must be cleaned with water after parking.

Prolonged parking

The following points must be observed during longer periods of parking:

- Cover the tyres when the machine is not in operation for a longer period of time.
- Observe ventilation.
- Clean the machine after it has been parked.
- If necessary fit anti-theft device.
- If the trailer is parked in public places with or without a towing vehicle, the rear light unit must be installed according to regulations.

7 Work mode

7.1 Personnel

Target groups: O, F, S

Target group definition see Chapter 1.11, page 14.

7.2 Personal protective equipment

7.3 Safety instructions for work mode

DANGER

Electrical voltage hazard.

Touching live parts will lead to death. Damage to the insulation or individual components can be life-endangering.

- With defective electrical components, disconnect the voltage supply immediately and arrange for repairs.
- Keep moisture away from live parts.
- Work on electrical components must be carried out only by qualified electricians.

WARNING

Risk of injury from inappropriate operation.

Inappropriate operation can lead to severe injuries.

- The machine must be operated only by trained and operator-authorized personnel.
- Ensure that protective devices are installed correctly and function perfectly before carrying out any work.
- Never decommission protective devices.
- Wear personal protective equipment.

WARNING

Risk of injury from moving components.

Movable parts can cause severest injuries during operation.

- Do not stay in or close to danger zones.
- Do not decommission safety devices.
- Never reach into running devices.
- Before working at danger points, wait for running components to come to a standstill and for residual energy to dissipate.

WARNING

Risk of injury due to hazardous materials.

Hazardous substances contain components that are hazardous to health and can lead to poisoning, chemical burns or skin irritations.

- Observe the manufacturer’s safety data sheet.
- Avoid spilling and fog formation.
- Do not operate the machine in closed rooms.

WARNING

Risk of injury from falling objects.

Objects can fall onto the operator from higher places.

- Set up the machine at a sufficient distance.
- Wear a protective helmet.

WARNING

Risk of injury due to defective components.

Components like delivery hoses and couplings may be damaged and thus cause injuries.

- Perform a visual inspection of all components.
- Do not operate the machine if there are defects.

NOTE

Lay the delivery hoses using the shortest possible route.

Make changes of direction in generous radii (approx. 40 cm) so that the hoses do not kink.

Install as few hose coupling points as possible.

Attach the risers very carefully with the hose holders provided so that the hoses do not break off under their own weight.

If in doubt, secure all connected hose couplings against opening.

Check hoses and couplings regularly for wear. (For wear and ageing see maintenance list)!

7.4 Connecting delivery hoses

WARNING

Tripping hazard from faulty laying of delivery hoses.

The delivery hoses laid on the floor pose a tripping hazard and thus a falling risk.

- During installation of the machine, ensure that the delivery hoses are covered or labelled appropriately.
- If possible, lay delivery hoses so that they do not pose a hazard for transportation and passenger traffic.
- Observe the regulations of the trade associations, especially the accident prevention regulations.

WARNING

Danger of injury due to defective or tearing off delivery hoses.

Torn or broken or defective delivery hoses and couplings can cause personal injury and considerable material damage.

- Only use delivery hoses with an operating pressure of at least 10 bar and a minimum diameter of 50 mm.
- Do not use different minimum diameters. This can lead to blockages.
- The machine may be operated only with mounted discharge stand.
- Use only approved and non-defective delivery hoses and couplings.

NOTE

According to the safety inspection sheet for the proper condition of the delivery hoses and their couplings, the following checks must be carried out:

- Hoses for wear
- Hoses for cracks and fabric damage
- Couplings for wear
- Weld seams for function and breakage.

If damaged or worn, replace delivery hoses and couplings immediately. Make sure that the operating pressure is correct.

1. Connect the delivery hose (1) to the outlet (2) of the mixing and delivery vessel.

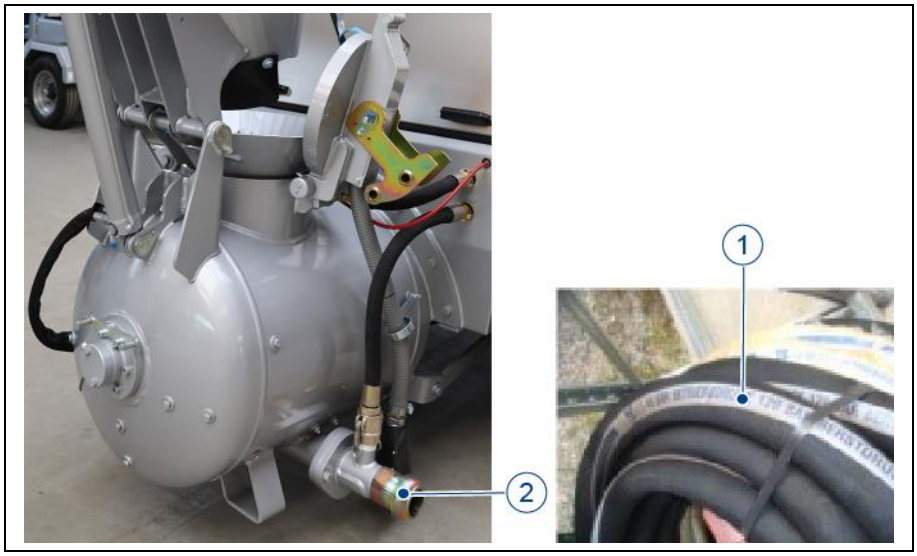


Figure 39: Connecting the delivery hose

2. Lay the delivery hoses (1) as straight as possible and with as few hose connections as possible.
3. Connect the individual delivery hoses

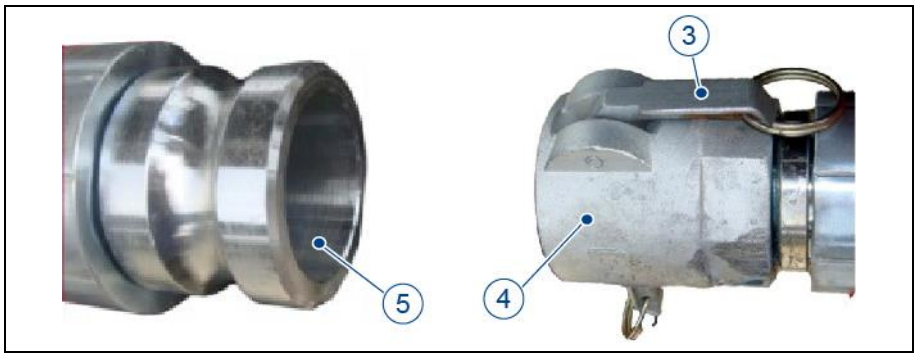


Figure 40: Establishing hose connections

For hose connections, make sure that the rubber seals in the coupling sleeves are clean and present.

To make a hose connection, open the two levers (3) (folding out), insert the plug (5) into the socket (4) and close the two levers (3) on the socket (folding in). The lock is secure.

➢ When laying through rooms with passenger or building material traffic, it is advisable to additionally secure the levers against unintentional folding out. This can be secured, for example, by a wire sling around the levers.

4. Secure the hose line with axle stands.

   ➢ To ensure that the material is transported quickly and safely on level ground, lay the hose line shortly behind the machine using a secured support stand. For longer, level hose lines, place a stand under the hose line approx. every 20 metres. Ensure that the support stand is securely connected to the ground so that it also serves to secure the hose line.

5. Mount a discharge stand (6) at the end of the hose line (1).

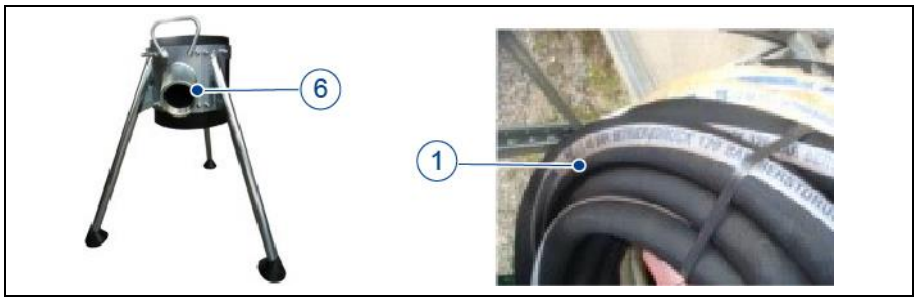


Figure 41: Mounting the discharge stand

7.5 Prepare work operation

1. Make sure that the delivery hoses and couplings are in perfect condition and correctly connected (see Section 7.4).

WARNING

Risk of injury due to hazardous materials.

Spillage of oil in the motor compartment can cause fires and toxic fumes.

- Wipe off spilled oil (hydraulic oil, compressor oil, oil for diesel motors) directly with an absorbent cloth.
- Use a funnel when filling.
- Only carry out work after the machine has cooled down sufficiently.

2. Check the oil level on the diesel motor. Proceed as follows:

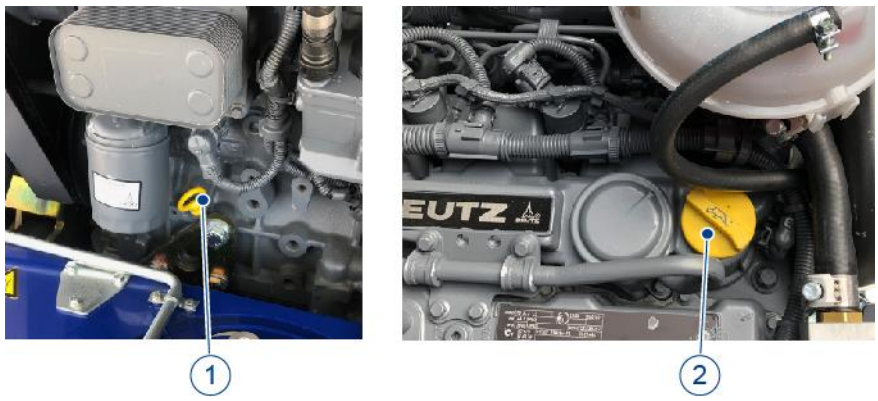


Figure 42: Check oil level

- Pull out the oil dipstick (1) when the motor is warm and wipe it with a lint-free cloth or absorbent paper.
- Then insert the oil dipstick (1) and pull it out again after 10 s.
- Carry out a visual inspection of the oil dipstick (1). The oil must be between the MIN and MAX marks. If the oil level is near MIN or below MIN, a corresponding amount of oil must be topped up via the oil filler neck (2).

➢ The oil must not exceed the MAX mark.

3. Check the cooling water level of the diesel motor via the level indicator on the reservoir (1).

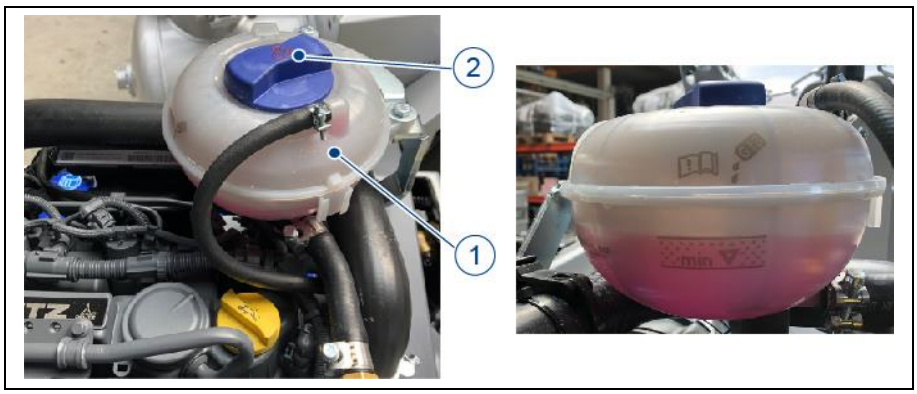


Figure 43: Checking the cooling water level

– If the level is below MIN, an appropriate amount of water (if necessary cooling machine protective agent) must be topped up via the filler neck (2).

➢ Water quality and requirements for the cooling machine protective agent can be found in the manufacturer's manual for the diesel motor.

4. Check the oil level on the diesel motor. Proceed as follows:

Figure 44: Check hydraulic oil level

- Pull out the dipstick (3) when cold and wipe it with a lint-free cloth or absorbent paper.
- Then insert the dipstick (3) and pull it out again.
- Carry out a visual inspection of the dipstick (3). The hydraulic oil must be between the MIN and MAX marks. If the level is close to MIN or below MIN, a corresponding quantity of hydraulic oil must be topped up via the filler neck (4).

➢ The hydraulic oil must not exceed the MAX mark.

5. Check the fuel quantity on the fuel gauge and top up via the filler neck (5) of the fuel tank if necessary.

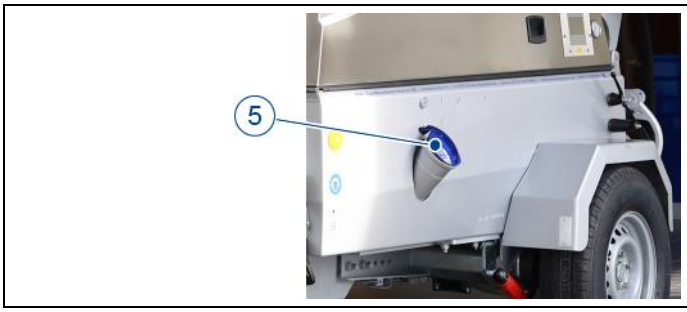


Figure 45: Topping up fuel

➢ The fuel cap is secured with a cap. The cap must be unlocked from the motor compartment.

NOTE

The use of incorrect or impure fuel can lead to motor damage.

6. Check the air filter (6) for dirt. Replace the air filter and the safety cartridge if necessary.

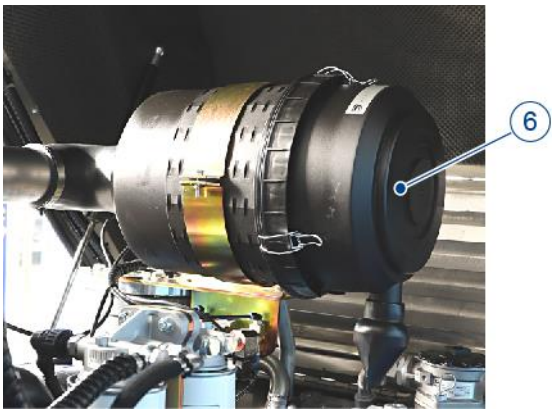


Figure 46: Check the air filter

7. Check the oil level of the compressor oil in the separator (7). Proceed as follows:

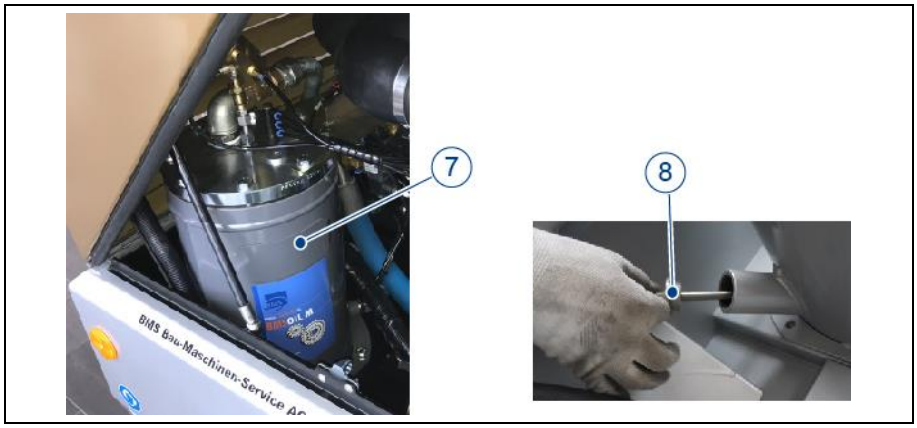


Figure 47: Check the compressor oil level

- Pull out the dipstick (8) when cold and wipe it with a lint-free cloth or absorbent paper.
- Then insert the dipstick (8) and pull it out again.
- Carry out a visual inspection of the dipstick (8). The compressor oil must be between the MIN and MAX marks. If the level is near MIN or below MIN, a corresponding quantity of compressor oil must be topped up.

➢ The compressor oil must not exceed the MAX mark.

8. Check the fill level in the supply tank of the central lubrication unit. Top it up if necessary.

WARNING

Risk of injury from moving components.

The fan blade continues to turn after the machine has been switched off and can lead to injuries.

- Never reach into running devices.
- Before working at danger points, wait for running components to come to a standstill and for residual energy to dissipate.

9. Check and clean the cooling unit (9). Remove the air filter by pulling it up.

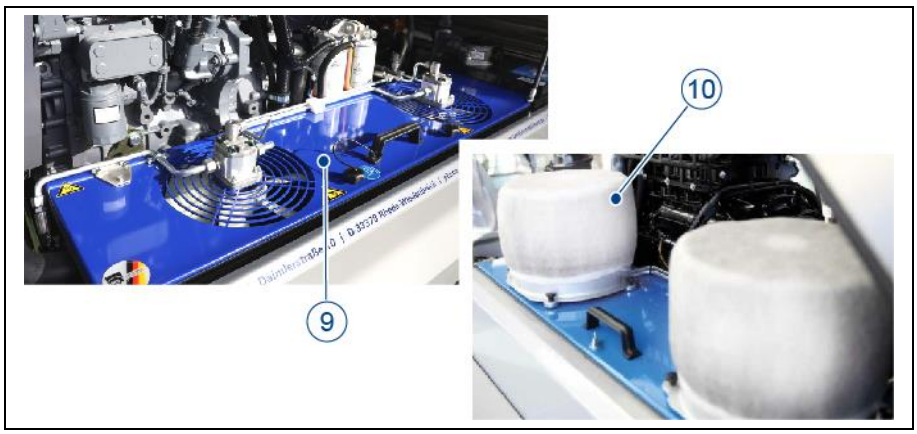


Figure 48: Cooling unit

- The air filter consists of a metal stand which is attached to the base plate with magnets. The filter cover should be cleaned regularly.
- If you use the option filter hoods (10), the cooling unit (9) will not become so dirty. An inspection is always necessary on a regular basis.

7.5.1 Preparing the feeder for filling

The feeder must be prepared for filling both the version with feeder and the version with feeder and scraper.

1. Make sure the rear light unit is dismantled. Disassembly is described in Section 6.7.
2. Loosen the safety catch on the feeder, which is intended for transport. To do this, remove the lashing strap from feeder and mixing and delivery vessel.
   - ➢ Keep the lashing strap in a safe place. Transporting the machine with the version feeder or feeder with scraper is not permitted without securing the lashing strap.

7.6 Commissioning

WARNING

Risk of injury from moving components.

Movable parts can cause severest injuries during operation.

- Do not stay in or close to danger zones.
- Never reach into running devices.
- In particular, never open the dome screen during operation.
- Never take the safety switch, which protects against opening the dome sieve during operation, out of operation.
- Only carry out work when the dome screen is closed.

Checks before commissioning

The following basic checks must be carried out before each commissioning:

- Is the machine installed correctly.
- Is the machine secured against rolling away.
- Does the ground have sufficient bearing capacity.
- Are all safety and protective devices fitted and functional.
- Is the machine technically in order.
- Are all cables and connections connected and secured.
- Are all machine closures closed (tank, oil, cooler, battery, filter, etc.).
- Are all lubrication points greased sufficiently.
- Is the central lubrication functioning properly.
- Are the delivery hoses, couplings and seals in perfect condition.
- Is the discharge stand mounted correctly.
- Do delivery hoses and couplings match each other.
- Are securing devices (hose holders, suspension eyes) for the laid delivery hoses are in place. Are the delivery hoses and delivery hose connections adequately secured.
- Have the delivery hoses been laid correctly (see Section 7.4).

Starting the machine

NOTE

If necessary, the work lamp can be switched on. The switch for the work lamp is located in the motor compartment.

When the work lamp is switched on, make sure that it is switched off at the end of work, otherwise there is a risk of battery discharge.

1. Close the machine cover.
2. Make sure that the emergency stop button is unlocked.
3. Switch on the voltage supply via the "Control unit on" switch.
4. Press the "Start/stop motor" button on the control panel.
   Press the button until the motor runs. This can take a few seconds depending on the outdoor temperature.
   - ➢ If the motor switches off after the button is released, repeat the starting procedure a few times. Depending on the outside temperature (minus temperatures), max. 5 times.
     If the motor continues to stop after this, check the fuel level, compressor oil and motor oil level and the indicator lights on the multifunctional display again. If everything is in order, contact the service personnel.
   - ➢ After replacing the pre-filter or after a long period of machine downtime, starting problems may occur due to a lack of fuel supply.

7.7 Operation in working mode

WARNING

Danger of injury from intervention in the mixing unit.

If the two-position switch is in the "Mixing unit off" position, friction of the power belt can cause the mixing unit to continue to be driven.

- Do not stay in or close to danger zones.
- Never reach into running devices.
- In particular, never open the dome screen while the machine is running.
- Never take the safety switch, which protects against opening the dome sieve during operation, out of operation.
- Only carry out work when the dome screen is closed.

NOTE

Never switch the machine off when it is full and leave it standing for a longer period of time. Material may settle.

Therefore, avoid pauses in the material feed, as material standing in the pump and hose can solidify (risk of blockage!).

7.7.1 Filling the mixing and delivery vessel

The material components are mixed together in the mixing and delivery vessel. Fill the mixing and delivery vessel only when the mixing unit is switched on. The maximum filling height is approx. 20 mm below the upper apex of the mixing and delivery vessel. When mixing with a full mixing and delivery vessel, the material is lifted into the dome approx. 50 mm.

Depending on the design, the mixing and delivery vessel is filled directly (standard), via the feeder (version with feeder) or via the scraper (version feeder with scraper).

Standard

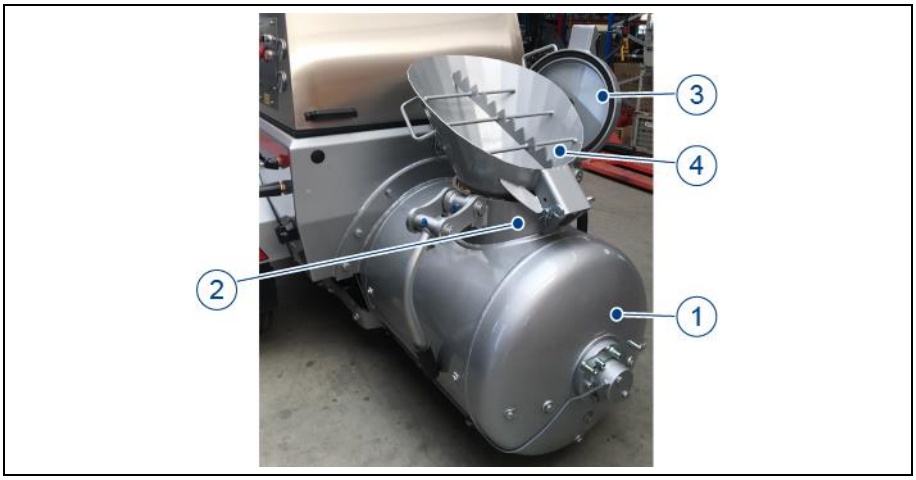


Figure 49: Filling the mixing and delivery vessel (standard)

1. Open the cover (3) of the filling dome (2) as far as it will go.
2. Fold the hopper (4) onto the filling dome (2) of the mixing and delivery vessel (1).
   - ➢ The toothing of the hopper (4) is used to easily tear open bagged material.
3. Switch on the mixing unit using the two-position switch.
4. Fill the mixing and delivery vessel (1) approx. halfway with material (sand, gravel, etc.).
5. Add the required quantity of binder and aggregates according to the finished product requirement via the hopper.
6. Add the required water quantity to the mixing and delivery vessel (1).

7. Fill the mixing and delivery vessel (1) with the remaining sand, gravel or aggregates.
8. Check the consistency and top up with water if necessary.
9. Fold the hopper (4) back and clean the edge of the dome.
10. Close the dome cover (see Section 7.7.2).

Version feeder

WARNING

Risk of injury from moving components.

Movable parts can cause severest injuries during operation.

- Do not stay within the swivel range of the feeder or its vicinity.
- Do not decommission safety devices.
- Wear the stipulated personal protective equipment.

WARNING

Risk of crushing in the swivel range of the feeder.

There is a danger of crushing when the feeder is raised and lowered.

- When working in the area of the feeder, do not reach into or stay in the swivel range of the feeder.
- Wear the stipulated personal protective equipment.

NOTE

The dome cover of the mixing and delivery vessel must be open when the feeder is swivelled.

Otherwise the dome cover and the feeder can be damaged.

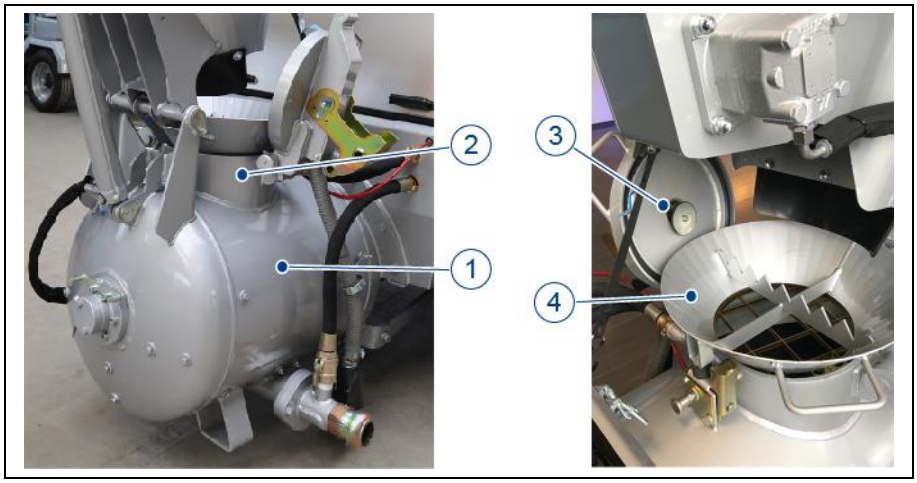


Figure 50: Filling the mixing and delivery vessel (feeder)

1. Open the cover (3) of the filling dome (2) as far as it will go.
2. Fold the hopper (4) onto the filling dome (2) of the mixing and delivery vessel (1).
   - ➢ The toothing of the hopper (4) is used to easily tear open bagged material.
3. Switch on the mixing unit using the two-position switch.
4. Pull the "Raise/lower feeder" lever horizontally out of its latch and swivel it downwards. The feeder is lowered for filling.
5. Fill the feeder with material (sand, gravel, etc.) up to below the grid. This corresponds approximately to one vessel filling.

NOTE

The feeder is suitable only for filling with sand or gravel. You must not add any binding agent or water to the feeder.

There is a risk of heavy soiling. Cleaning is only possible with great effort. A dirty feeder can have a too high total weight. The function can be impaired (up to non-functioning!).

6. Pull the "Raise/lower feeder" lever horizontally out of its locking device and swivel it upwards until the material slides into the mixing and delivery vessel (1).

7. Fill the mixing and delivery vessel to half its capacity and then swivel the feeder down again using the "Raise/lower feeder" lever.
8. Add the required quantity of binder and aggregates according to the finished product requirement via the hopper.
9. Add the required water quantity to the mixing and delivery vessel (1).
10. Swivel the feeder upwards again via the "Raise/lower feeder" lever.
11. Fill the mixing and delivery vessel (1) with the remaining sand and gravel up to the lower edge of the filling dome.
12. Swing the feeder down again using the "Raise/lower feeder" lever.
    - ➢ The feeder can be refilled during the mixing and delivery time.
13. Check the consistency and top up with water if necessary.
14. Fold the hopper (4) back and clean the edge of the dome.
15. Close the dome cover (see Section 7.7.2).

Version feeder with scraper

WARNING

Risk of injury from moving components.

Movable parts can cause severest injuries during operation.

- Do not stay within the swivel range of the feeder or its vicinity.
- Do not decommission safety devices.
- Wear the stipulated personal protective equipment.

WARNING

Risk of crushing in the swivel range of the feeder.

There is a danger of crushing when the feeder is raised and lowered.

- When working in the area of the feeder, do not reach into or stay in the swivel range of the feeder.
- Wear the stipulated personal protective equipment.

NOTE

The dome cover of the mixing and delivery vessel must be open when the feeder is swivelled.

Otherwise the dome cover and the feeder can be damaged.

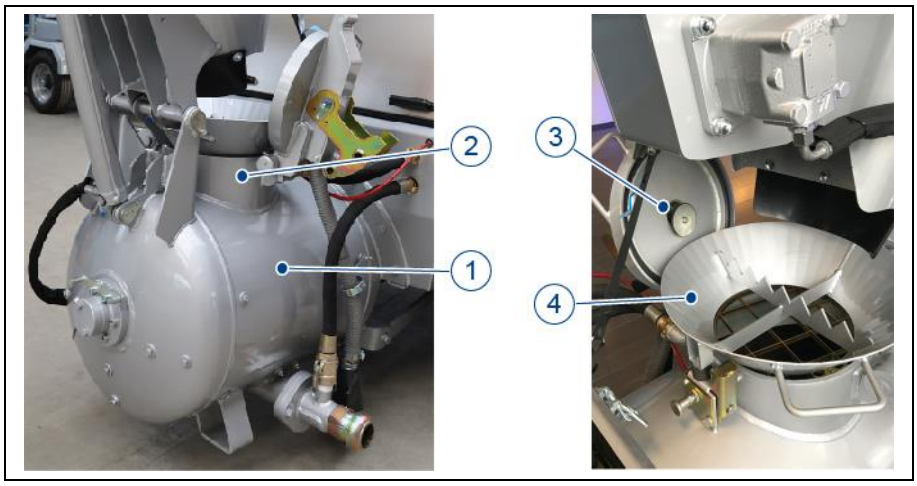


Figure 51: Open the mixing and delivery vessel

1. Open the cover (3) of the filling dome (2) as far as it will go.
2. Fold the hopper (4) onto the filling dome (2) of the mixing and delivery vessel (1).
   - ➢ The toothing of the hopper (4) is used to easily tear open bagged material.
3. Switch on the mixing unit using the two-position switch.
4. Pull the "Raise/lower feeder" lever horizontally out of its latch and swivel it downwards. The feeder is lowered for filling.

5. Release the spring cotter pin (5) on the scraper.

Figure 52: Removing the scraper shovel

6. Remove the scraper shovel from the holder of the feeder.
   - ➢ Store the spring cotter pin in a safe place, as transport is not permitted without securing.
7. Take the scraper shovel out of the shovel holder and place the shovel in working position.

NOTE

If the scraper is used to pull material that is outside the working area (I) in area (II) of the scraper, there is increased rope wear.

The machine must be aligned with the sand or gravel pile.

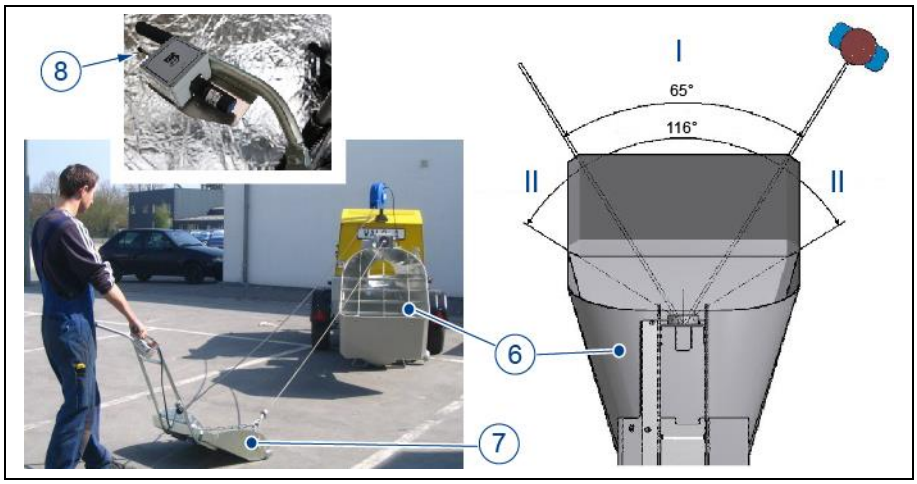


Figure 53: Scraper working area

8. Pull out the scraper rope by hand over the free wheel of the rope drum.
   - ➢ If the thumb button (8) of the radio system is not actuated, the rope can be pulled out via the free wheel of the rope drum.
9. Use the scraper shovel (7) to pull a ramp of sand or gravel in front of the feeder (6).
   - ➢ The machine must be aligned so that the sand pile is always centred in front of the feeder (6).
10. Pull the scraper shovel (7) manually behind the sand pile.
11. Operate the thumb button (8) of the radio system and keep it pressed. The rope is wound up by the winch. The scraper shovel (7) is pulled through the sand pile and loaded.
    - ➢ Depending on the position of the scraper shovel (7), you can influence the amount of sand to be transported.
12. Pull the filled scraper shovel (7) over the ramp to the tipping point of the feeder (6).
13. Switch off the winch by releasing the thumb button (8).
14. Empty the scraper shovel (7) into the feeder (6).
15. Repeat the process until the feeder (6) is filled.

NOTE

The feeder is suitable only for filling with sand or gravel. You must not add any binding agent or water to the feeder.

There is a risk of heavy soiling. Cleaning is only possible with great effort. A dirty feeder can have a too high total weight. The function can be impaired (up to non-functioning!).

16. Pull the "Raise/lower feeder" lever horizontally out of its locking device and swivel it upwards until the material slides into the mixing and delivery vessel.
17. Fill the mixing and delivery vessel to half its capacity and then swivel the feeder down again using the "Raise/lower feeder" lever.

18. Add the required quantity of binder and aggregates according to the finished product requirement via the hopper.
19. Add the required quantity of water to the mixing and delivery vessel.
20. Swivel the feeder upwards again via the "Raise/lower feeder" lever.
21. Fill the mixing and delivery vessel with the remaining sand and gravel up to the lower edge of the filling dome.
22. Swing the feeder down again using the "Raise/lower feeder" lever.
    - ➢ The feeder can be refilled during the mixing and delivery time.
23. Check the consistency and top up with water if necessary.
24. Fold the hopper back and clean the edge of the dome.
25. Close the dome cover (see Section 7.7.2).

7.7.2 Closing the mixing and delivery vessel

WARNING

Risk of injury due to pressure loss in the mixing and delivery vessel.

Material jamming, ageing or other incidents can cause cracks and leaks. This leads to pressure loss in the mixing and delivery vessel, which can cause material to escape and cause serious injuries.

– Do not stay in or close to danger zones.

– Replace a damaged rubber seal on the dome cover immediately.

1. Make sure that the edge of the dome has been cleaned.
2. Check the rubber seal on the dome cover for damage and replace it if necessary.
3. Close the dome cover.

Figure 54: Dome cover closed

4. Fold the vessel vent (1) to the rear stop.
5. Press the dome cover down on the handle (2).
6. Press the toggle lock over the baffle.
7. Push the lever (3) of the toggle lock down as far as it will go.
8. Close the vessel ventilation (1) and secure the toggle lock.

➢ The lid of the mixing and delivery vessel is now closed and secured against unintentional opening.

7.7.3 Switch on the mixing unit

1. Set and activate the mixing time on the multifunctional display.

WARNING

Risk of injury from inappropriate operation.

The mixing time must not be adjusted while the machine is running.

– Always set the mixing time before switching on the mixing unit.

– Do not stay in or close to danger zones.

2. Set the two-position switch to the "Mixing unit on" position.

   ➢ The necessary operating pressure builds up after the machine has been started. The vessel pressure can be read off on the pressure gauges.

   ➢ Likewise, the belt tensioner, which is pressurised, tensions the drive belt of the mixing unit.

7.7.4 Delivery of the mix

1. Make sure that the dome cover is closed and the mixing unit is switched on.
2. Set the appropriate flow rate at the levers for upper and lower air (see Section 4.6). (See Section “Delivery of the first mixture” below).

➢ The ideal delivery pressure depends on the type of delivery. The delivery rate must be adapted to the length of the delivery hose, the diameter of the delivery hose and the delivery height or distance.

- Delivery to upper floors: The optimum delivery pressure is between 4 and 5.5 bar.
- Delivery to lower levels: The optimum delivery pressure is between 2 and 3 bar.
- Delivery on level ground: The optimum delivery pressure is between 3 and 4 bar.

In most cases, a combination of different types of delivery is required. In this case, set the pressure range with the highest value.

3. After the mixing time has elapsed (follow-up time according to the time setting if this option has been ordered), delivery of the mix starts.

➢ The motor runs at the set speed and the compressor delivers the maximum amount of air. The pressure rises in the air machine of the compressor and in the mixing and delivery vessel. The pressure in the mixing and delivery vessel and the rotating mixing unit presses the mix through the vessel outlet into the delivery hose. The interplay of compressed air and mixing unit conveys the mix through the delivery hose to the discharge stand and ejects it.

Automatic delivery machine

NOTE

The mixing time must already be set and activated before the automatic delivery machine is started.

1. Switch on the automatic delivery machine via the "Start/Stop delivery" button.
   - ➢ The motor runs at the set speed and the compressor delivers the maximum amount of air. The pressure in the mixing and delivery vessel increases and delivery begins. As the volume in the vessel decreases, the delivery air escapes increasingly via the delivery hoses and the pressure drops. Conveying runs automatically until the preset residual pressure of approx. 2 bar is fallen short of. The machine switches off delivery and the compressed air. The machine continues to run in the mixed operation function.

Delivery of the first mixture

1. Open the levers for upper and lower air completely.
2. Switch on the automatic delivery machine via the "Start/Stop delivery" button.
   - ➢ The machine builds up pressure and begins to convey slowly.
3. Reduce the upper air and, if necessary, the lower air a little until the machine delivers optimally.
   - ➢ If no pressure builds up within 15 s, the air escapes via the lower air of the still empty delivery hose.
4. Briefly close the lever for the lower air completely until sufficient pressure has built up in the mixing and delivery vessel.
5. Open the lever for the lower air halfway.
6. When the delivery starts, change the delivery rate of the upper and lower air until the optimum delivery rate of the mixed material is set.

7.7.5 Venting the mixing and delivery vessel

WARNING

Danger of injury from escaping, spraying mix.

There may still be residual pressure in the mixing and delivery vessel after the delivery process has ended. There is a risk that the mix is pulled along with the escaping air during venting and that the vent is blocked.

– Open the vessel vent slowly so that the pressure is reduced slowly.

Depending on the length of the delivery hose and/or delivery height, the vessel pressure can rise to approx. 8 bar during the delivery process. At the end of the delivery process, the vessel pressure drops automatically.

After the vessel pressure falls below 2 bar (fixed setting), the compressor switches off. No further air is delivered by the compressor. The residual pressure of 2 bar remains in the mixing and delivery vessel.

Therefore, before opening the dome cover, it must be ensured that the mixing and delivery vessel is depressurized.

➢ As the vessel ventilation (1) locks the toggle lock, opening the dome cover without prior ventilation is excluded by the design.

The mixing and delivery vessel can be vented at any time (even during delivery). The procedure for venting during the delivery process (see Section "Venting during the delivery process").

1. Check the vessel pressure at the pressure gauges for the upper and lower air.

   ➢ If a pressure gauge indicates pressure, the mixing and delivery vessel must be vented.

2. Slowly swivel the vessel vent (1) up.

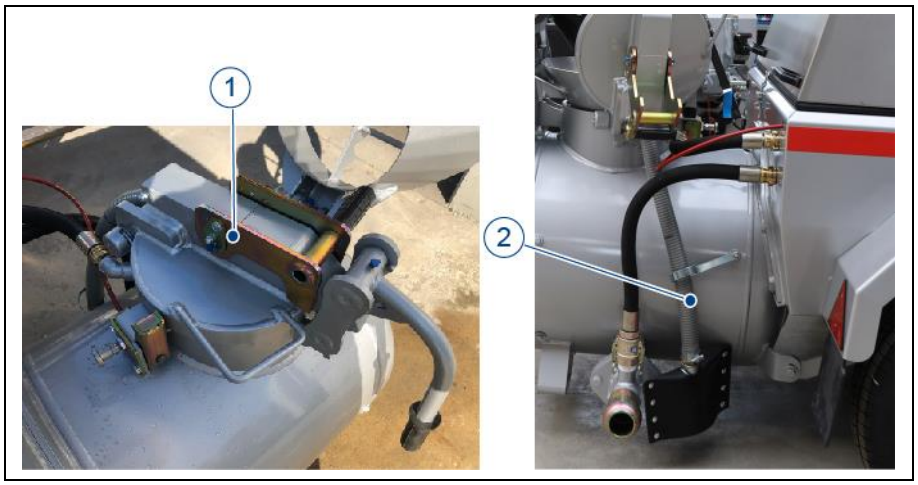


Figure 55: Venting the mixing and delivery vessel

- If at that moment a delivery of mix is running, it will be interrupted by the pressure drop.
- The vessel pressure escapes via the venting system and is deflected to the ground through the venting hose (2).

Venting during the delivery process

The procedure for venting during the delivery process or in the event of a blockage is described in the following.

1. Switch off the compressor with the "Start/stop delivery" button.
2. Slowly swivel the vessel vent (1) up (see previous section)

7.7.6 Open the mixing and delivery vessel

Figure 56: Open the dome cover

3. Make sure that the mixing and delivery vessel is vented.
4. Open the vessel vent (1) to the rear stop.
5. Swivel the toggle lock (2) upwards.
6. Open the dome cover using the handle (3).

7.8 Interrupting the delivery of mix

NOTE

The mix may harden if work is interrupted for a longer period of time. The time depends on the material properties.

Residues in the delivery hose and/or in the mixing and delivery vessel can lead to blockages or block the mixing unit.

1. Switch off delivery via the "Start/stop delivery" button.
2. Close the levers for upper and lower air. The delivery air switches off and the delivery of the mix is thus interrupted.

7.9 Stopping the working operation

WARNING

Risk of injury due to pressurized components.

The delivery hoses are under pressure and opening the hose couplings can cause severe injuries.

- Before opening, stop the machine and ensure that the delivery hoses are depressurized.
- Wear safety goggles. Residual pressures cause the conveyed material to be discharged at an accelerated rate when the hose couplings are opened.
- If conveyed material gets into the eyes, wash them out thoroughly and consult a doctor immediately.

1. Run the mixing and delivery vessel until empty. Collect residual material and dispose of it in an environmentally friendly manner.
   ➢ Follow the instructions for the material used.
2. Wash the entire machine from the outside with water and a hand brush.
3. Pump the mixing and delivery vessel empty at a low speed while adding clear water.
4. Wash off any remaining material with a strong water jet.
5. Switch off the motor using the "Start/Stop motor" button.
6. Disassemble the delivery hose line.
7. Clean the delivery hose inside and outside (see Section 8.5.4). Clean the hose couplings and the associated seals in particular with clear water.
8. Preserve the machine with a biodegradable **BMS** machine care product.
9. Install the rear light unit and connect it electrically to the trailer (see Section 6.4).

Additionally with option feeder

WARNING

Risk of injury from moving components.

Movable parts can cause severest injuries during operation.

- Do not stay within the swivel range of the feeder or its vicinity.
- Do not decommission safety devices.
- Wear the stipulated personal protective equipment.

1. Wash the outside and inside of the feeder with water and a hand brush if necessary.
2. Preserve the feeder with a biodegradable **BMS** machine care product
3. Open the dome cover (see Section 7.7.6 on this).
4. Fold the hopper onto the filling dome of the mixing and delivery vessel. (See also Section 7.7.1 on this).
5. Pull the "Raise/lower feeder" lever horizontally out of its latch and swivel the feeder upwards until it is above the filling dome of the mixing and delivery vessel.

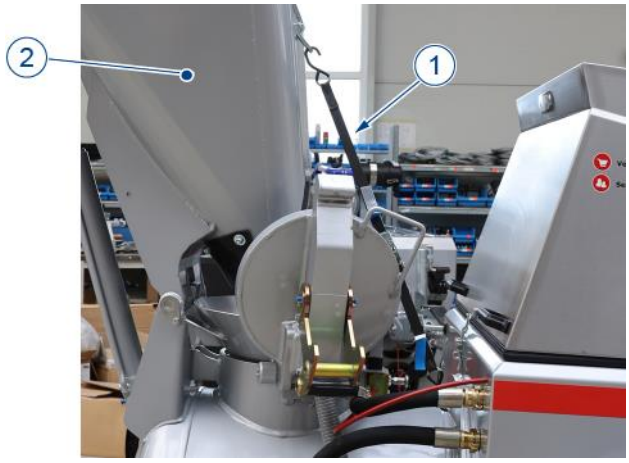


Figure 57: Feeder transport restraint

6. Secure the feeder (2) with the lashing strap (1).
   - ➢ Transporting the machine version with feeder or feeder with scraper is not permitted without the lashing strap securing device fitted.

Additionally for the option feeder with scraper

WARNING

Risk of injury from sharp-edged, pointed parts.

A damaged pull rope can cause serious injuries when being wound up.

- Do not let the pull rope run through your hand when winding it up.
- Wear protective gloves.
- Check the pull rope for damage each time it is wound up, especially for any torn steel fibres. Damaged pull ropes must be replaced immediately.

WARNING

Risk of injury from moving components.

Movable parts can cause severest injuries during operation.

- Do not stay within the swivel range of the feeder or its vicinity.
- Do not decommission safety devices.
- Wear the stipulated personal protective equipment.

Figure 58: Installing the scraper

1. Release the pull rope (1) from the scraper shovel.
2. Roll up the pull rope by pressing and holding down the thumb button (2) on the radio transmitter.
3. Wash the outside and inside of the feeder with water and a hand brush if necessary.
4. Preserve the feeder with a biodegradable **BMS** machine care product.
1. Clean the outside and inside of the scraper shovel with water and a hand brush if necessary.
2. Preserve the scraper shovel with a biodegradable **BMS** machine care product.

3. Hook the scraper shovel in the shovel holder on the feeder.
4. Secure the scraper shovel with spring cotter pins (3).
   - ➢ Transporting the machine version with feeder with scraper is permitted only with a secured scraper shovel.
5. Insert the rechargeable battery of the radio transmitter into the charger on the radio receiver in the motor compartment of the machine.

   - ➢ Ensure that the radio transmitter battery is inserted into the charger at the end of work.
     If the battery is defective, send the device to **BMS** for repair.
6. Open the dome cover (see Section 7.7.6 on this).
7. Fold the hopper onto the filling dome of the mixing and delivery vessel. (See also Section 7.7.1 on this)
8. Pull the "Raise/lower feeder" lever horizontally out of its latch and swivel the feeder upwards until it is above the filling dome of the mixing and delivery vessel.

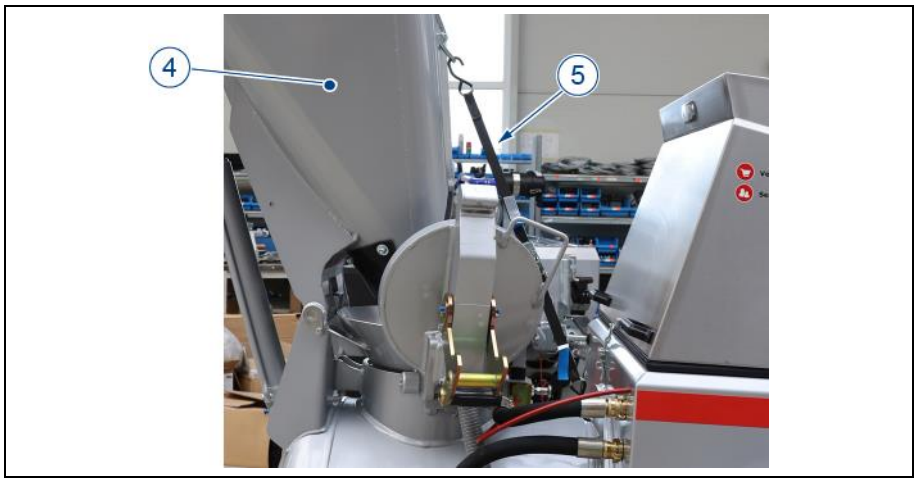


Figure 59: Transport restraint feeder/scraper

9. Secure the feeder (4) with the lashing strap (5).
   - ➢ Transporting the machine version with feeder or feeder with scraper is not permitted without the lashing strap securing device fitted.

7.10 Winter operation

With operation in the winter, the machine can be used only up to a temperature of 0 °C. The machine must not be operated without protection covers .

If you use the machine at low ambient temperatures, you must also take the following points into account:

- Prepare the workstation accordingly.
- Do not use frozen material.
- Only use winter diesel as fuel.
  - ➢ Due to special additives it is also flowable at low temperatures. Summer diesel can gel in the lines and clog them.
- Only use motor oil whose viscosity corresponds to the outside temperature.
- If the temperature is extremely low, remove the battery in the evening and store it in a warm room. The battery may be reinstalled only shortly before starting the machine.
- If the battery is not maintenance-free, ensure that the acid level (10-15 mm above the top of the plate) and the acid density are correct. Check the acid density regularly with a standard acid tester.

8 Cleaning

8.1 Personnel

Target groups: O, F, S

Target group definition see Chapter 1.11, page 14.

8.2 Personal protective equipment

8.3 Safety instructions for cleaning

DANGER

Electrical voltage hazard.

Touching live parts will lead to death. Damage to the insulation or individual components can be life-endangering.

- With defective electrical components, disconnect the voltage supply immediately and arrange for repairs.
- Keep moisture away from live parts.

WARNING

Risk of injury from unauthorized restarting.

Persons can be injured through an unexpected start-up of the energy supply while working on individual components.

- Before cleaning the machine, it must be completely disconnected from the power supply via the emergency stop button and secured against being switched on again.
- Always disconnect one battery contact.

CAUTION

Danger from cleaning agents.

The use of cleaning agents can lead to injuries to the skin or respiratory passages.

- Wear appropriate personal protective equipment.
- No solvent-containing cleaning agents may be used.
- Observe the notes in the safety data sheets for the cleaning agents that are used.

Observe the national and local legal regulations governing environmental protections and disposal when handling cleaning agents and residual materials.

8.4 Air extraction connection

CAUTION

Risk of injury from compressed air.

Compressed air can lead to injuries.

- Never point compressed air at people.
- Never use compressed air to clean clothing.
- Do not use compressed air for breathing.

The machine is optionally equipped with an air blast gun / cleaning gun. This can be connected to the air extraction connection.

If the machine is not equipped with this option, the operator can connect external cleaning equipment and other consumers to this air supply.

8.4.1 Connection of an external device

NOTE

The air sampling line must not be used to convey media other than air.

The air sampling line does not have a check valve. The compressor could be damaged.

1. Close the levers for the delivery rate of the upper and lower air.
2. Switch off the mixer via the multifunction display.

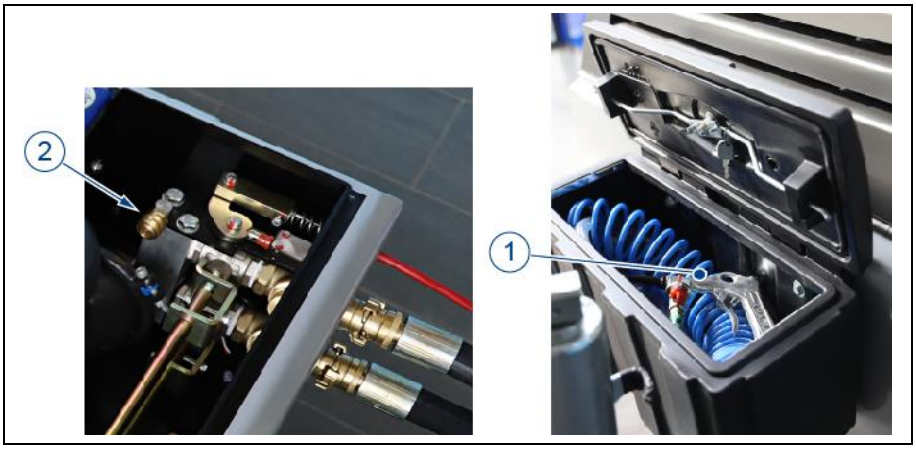


Figure 60: Connect the cleaning device

3. Connect the cleaning gun / cleaning device (1) to the quick coupling (2) of the air extraction connection.
4. Switch on the voltage supply to the machine using the "Control unit on" switch.
5. Set the machine to manual mode via the multifunction display.

8.5 Cleaning the machine

If work is interrupted for a longer period of time or at the end of work, the mixing and delivery vessels and the delivery hoses must be emptied and cleaned.

At the end of work, the machine must also be cleaned completely and the lubrication points greased according to the lubrication schedule.

8.5.1 Cleaning the vessel ventilation unit

At the end of work and during longer interruptions and if necessary during work, the vessel ventilation unit must be cleaned.

1. Switch the machine off via the "Control unit on" switch.
2. Secure the machine against restarting To do this, disconnect a battery contact.

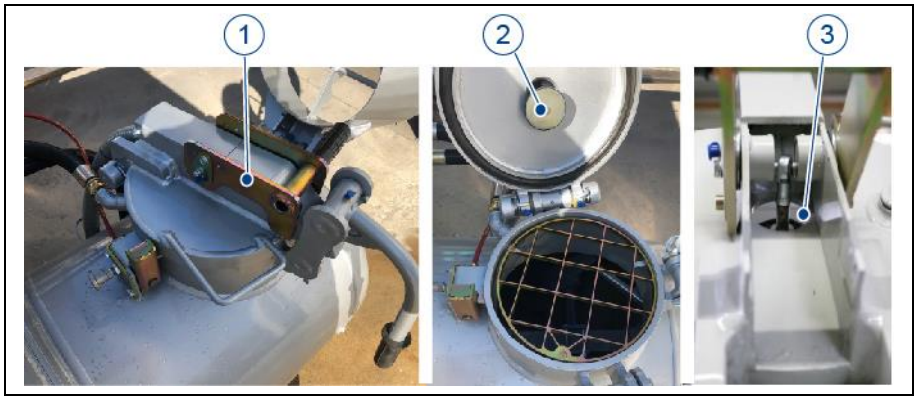


Figure 61: Cleaning the vessel ventilation unit

3. Fold the vessel vent (1) backwards as far as it will go.
4. Open the dome cover (see Section 7.7.6).
5. Rinse the air vent (3) and the sealing cone (2) with plenty of water.
6. Mechanically loosen stuck material residues with a scraper or similar.
   - ➢ Take care not to damage the sealing cone (2).
7. If there is material residue in the air duct of the dome cover, close the dome cover (see Section 7.7.2).
8. Loosen the cover screws and pull the cover out.
9. Remove the material residues from the air duct with water or mechanically with a scraper.
10. After cleaning, screw the cover to the dome cover.
11. Close the dome cover if necessary (see Section 7.7.2).

8.5.2 Cleaning the mixing and delivery vessel

1. Switch the machine off via the "Control unit on" switch.
2. Secure the machine against restarting To do this, disconnect a battery contact.
3. Open the dome cover (see Section 7.7.6).
4. Lift up the dome screen and swivel it to the side.
5. Remove adhering residual material from the entire mixing and feed tank.
6. Clean the vessel vent.
7. Rinse the vessel vent with plenty of water.
8. Rinse the mixing and delivery vessel with plenty of water.
9. Remove the material residues from the mixing shaft seals at the front and rear.
10. After cleaning, grease the lubrication points on the mixing and delivery vessel, the dome cover and the vessel ventilation.

8.5.3 Cleaning the upper and lower air

The upper air and lower air hoses as well as the connections may be contaminated by material residues. At the end of work and during longer interruptions, the upper air and lower air hoses and their connections must be cleaned.

1. Switch the machine off via the "Control unit on" switch.
2. Secure the machine against restarting To do this, disconnect a battery contact.

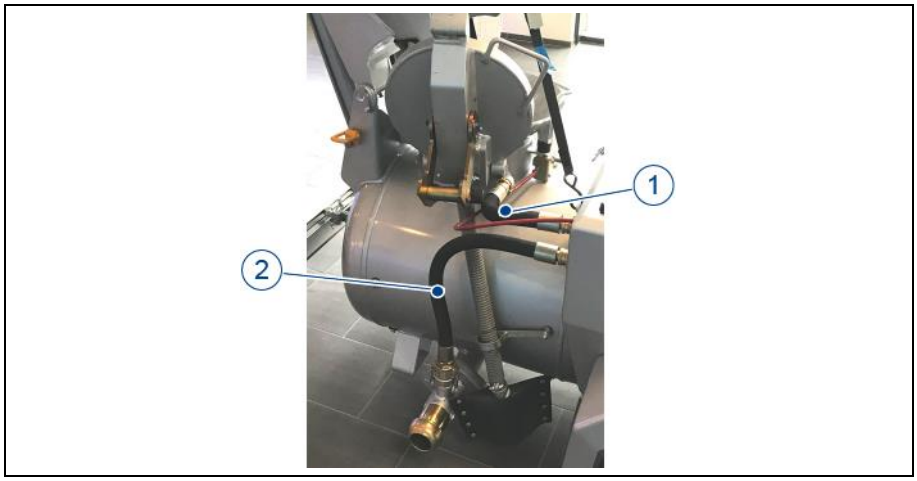


Figure 62: Cleaning the air hoses

3. Loosen the hose coupling of the upper and lower air hoses (1) and (2) on the mixing and delivery vessel.

4. Release the hose coupling of the upper and lower air hoses on the machine.
5. Rinse the hoses thoroughly with water.
6. Visually check the upper and lower air connection on the mixing and feed hopper and clean them.
7. Visually check the check valves and clean them thoroughly with water.
   - ➢ Loosen heavy soiling with a pointy object and then rinse with plenty of water.
8. After cleaning, reconnect upper air and lower air hoses (1) and (2).
   - ➢ Ensure that the air hoses are installed correctly. Connect the top air hose to the top air of the mixing and delivery vessel and the machine's upper air connection. Connect the lower air hose to the vessel outlet and the lower air connection of the machine.

8.5.4 Cleaning the delivery hoses

WARNING

Risk of injury due to pressurized components.

The delivery hoses are under pressure and opening the hose couplings can cause severe injuries.

- Before opening, stop the machine and ensure that the delivery hoses are depressurized.
- Wear safety goggles. Residual pressures cause the conveyed material to be discharged at an accelerated rate when the hose couplings are opened.
- If conveyed material gets into the eyes, wash them out thoroughly and consult a doctor immediately.

When cleaning the mixing and delivery vessel, the delivery hoses are already freed from the coarsest contamination by the air flow.

- ➢ Proper cleaning must be carried out without fail, as otherwise blockages in the delivery hoses may occur.

1. Loosen the hose coupling at the vessel outlet.
2. Insert a wet sponge rubber ball into the delivery hose.
3. Reconnect the delivery hose to the vessel outlet.
4. Fill the mixing and delivery vessel with water.
5. Close the dome cover (see Section 7.7.2).

6. Switch on manual operation via the multifunction display. In manual mode, the sponge rubber ball is pressed through the delivery hoses together with the water. The sponge rubber ball and the water clean the delivery hoses from the inside.
7. Switch off manual mode on the multifunction display
8. Repeat the procedure if necessary.
9. Switch the machine off via the "Control unit on" switch.
10. Remove the material residues from the sponge rubber ball.
11. Loosen the hose coupling at the vessel outlet and the hose couplings of the hose line.
12. Clean the hose couplings with water and visually check them for damage.
13. Clean the connection at the vessel outlet and visually check it for damage.
14. Clean the outlet stand and visually inspect it for damage.

NOTE

Damaged hose couplings, connections, seals and hoses must be repaired or replaced immediately.

9 Troubleshooting

9.1 Personnel

Target groups: O, F, S

Target group definition see Chapter 1.11, page 14.

9.2 Personal protective equipment

9.3 Safety instructions for troubleshooting

DANGER

Electrical voltage hazard.

Touching live parts will lead to death. Damage to the insulation or individual components can be life-endangering.

- Work on electrical components must be carried out only by qualified electricians.
- With defective electrical components, disconnect the voltage supply immediately and arrange for repairs.
- Keep moisture away from live parts.

9.4 List of possible errors

Error	Possible cause	Remedy
Chassis		
Braking effect insufficient.	The carriage shaft retracts completely during braking.	Have the brakes readjusted in a specialist workshop.
	Brake linings damaged or worn.	Have the brake pads replaced at a specialist workshop. Always replace the brake shoe set.
	Large friction losses occur in the brake mechanism. Corrosion on the carriage shaft.	Have the brake mechanism overhauled and smoothed in a specialist workshop.
Brake noises	The brake pads grind or make other noises	Brake a few times as the brake pads may not be properly run in. ➢ Do not obstruct traffic while applying the brake. If this does not remedy the problem, contact a specialist workshop.
Brakes overheat.	The brake system is incorrectly adjusted.	Have the brake system checked at a specialist workshop and readjusted if necessary.
	Corrosion on the brake mechanism.	
	The brake mechanism is bent.	
The effect of the handbrake is insufficient.	The handbrake is incorrectly adjusted.	Have the handbrake readjusted at a specialist workshop.
	The handbrake mechanism is stiff.	Have the handbrake checked at a specialist workshop.
Chassis – braking effect of the overrun device insufficient		
The carriage shaft is fully retracted during braking.	The brake pads are at the wear limit.	Have the brake pads checked at a specialist workshop and replaced if necessary.
	The brake linkage is bent.	Have the brake linkage replaced at a specialist workshop.
	The brake pads are damaged.	Have the brake pads replaced at a specialist workshop.
The brake mechanism is stiff.	Corrosion on the brake mechanism.	Have the brake mechanism checked at a specialist workshop.
	The brake mechanism is bent.	Have the brake mechanism replaced in a specialist workshop.
	The brake mechanism is worn.	Have the brake mechanism checked at a specialist workshop and replaced if necessary.

Error	Possible cause	Remedy
Chassis – jerky, unstable driveability		
Brake machine has too much play.	The brake mechanism is incorrectly adjusted.	Have the brake mechanics checked at a specialist workshop and readjusted if necessary.
	The brake mechanism is worn.	Have the brake mechanism checked at a specialist workshop and replaced if necessary.
	The brake mechanism is bent.	Have the brake mechanism replaced in a specialist workshop.
The machine already brakes when you release the accelerator.	Defective shock absorbers.	Have the shock absorbers replaced at a specialist workshop.
	The brake system is incorrectly adjusted.	Have the brakes checked at a specialist workshop and readjusted if necessary.
Chassis – reversing impossible or difficult		
Brakes lock during reversing	The handbrake is applied or not fully released.	Release the handbrake.
The carriage shaft is fully retracted.	Gas dampers of the brake mechanism are defective.	Have the brake mechanism replaced in a specialist workshop.
Brake machine is set too tight.	Corrosion on the brake mechanism.	Have the brake mechanism checked at a specialist workshop.
	The brake mechanism is bent.	Have the brake mechanism replaced in a specialist workshop.
Chassis – ball coupling		
Ball coupling does not lock on the towing vehicle.	The ball coupling is dirty.	Clean and grease the ball coupling.
	The ball coupling is stiff.	Make the ball coupling smooth-running.
	Corrosion on the ball coupling.	Clean and grease the ball coupling.
	The ball coupling has mechanical damage.	Have the ball coupling checked in a specialist workshop and replaced if necessary.
Mixing shaft		
Mixing shaft not running.	The mixing and delivery container is too full.	Empty the mixing and delivery container. The maximum filling height of approx. 20 mm below the edge of the dome must not be exceeded.
	Drive belt defective.	Have the drive belt replaced by service personnel.
	Belt tensioning cylinder defective.	Have the belt tensioning cylinder replaced by service personnel.

Error	Possible cause	Remedy
Mixing shaft blocked.	There are too many solids (stones) in the mixing and delivery vessel.	Empty the mixing and delivery vessel and remove the blockage of the mixing shaft (solids).
Tension pulley on the drive belt has no function.	No pressure due to belt tensioning cylinder.	Check drive belt, have it replaced by service personnel if necessary. Check the belt tensioning cylinder
Mixing material delivery		
Machine does not deliver.	The mixing shaft is not running.	See mixing shaft error.
	There is a blockage in the vessel outlet.	See Section 9.5.
	There is a blockage in the hose line.	See Section 9.5.
	Air hoses of upper and lower air are dirty.	Check air hoses and connections and clean if necessary. See Section 8.5.3.
	The delivery air cannot be switched on.	Have switches / electrical connections checked by a qualified electrician.
	The mixing time is set incorrectly.	Check the mixing time setting and adjust if necessary.
Charge indicator light		
The charging indicator of the multifunctional display does not light up yellow when the machine is switched on.	The battery is discharged/defective.	Check the acid level. Charge the battery. Replace defective battery if necessary.
	The battery connection is loose/oxidised.	Clean the battery connection. Tighten the battery terminal.
	The cable connection is damaged.	Check the cable connection, repair if necessary.
	The "Control unit on" switch is not on.	Switch on the "Control unit on" switch.
	The "Control unit on" switch is defective.	Have the "Control unit on" switch checked by a qualified electrician and replaced if necessary.
	The "Start/stop motor" button is defective.	Have the "Start/stop motor" button checked by a qualified electrician and replaced if necessary.
	The main fuse has tripped.	Switch on the main fuse.
	The machine cover is open.	Close the machine cover.

Error	Possible cause	Remedy
Charge control display of the multifunction display does not turn green after the starting procedure.	The cable connection is loose.	Have the cable connections checked by a qualified electrician, if necessary have the cables replaced.
	The cables are defective.	Check the cables, have them replaced if necessary.
	The connections are oxidized.	Have the connections checked by a qualified electrician, if necessary have them replaced.
	The alternator is defective.	Have the alternator checked by a qualified electrician, repair if necessary.
Diesel motor		
Motor does not start.	The battery is too weak.	Check the battery, recharge it. Carry out a jump start (see Section 9.6) Replace the battery if necessary.
	The "Start/stop motor" button is defective.	Have the "Start/stop motor" button checked by a qualified electrician and replaced if necessary.
	The starter motor is defective.	Check the starter motor and have it replaced if necessary.
	There is too little fuel in the tank.	Check the fill level in the tank.
	The fuel prefilter and/or the fuel filter are dirty.	Check the fuel prefilter and/or the fuel filter, replace if necessary.
	The dome screen indicator on the multifunctional display lights up red.	Check that the dome screen is present and correctly inserted.
The motor stops immediately after the "Start/stop motor" button is released.	Problems with the safety chain, oil pressure and oil temperature.	Check the fluid levels and check the safety switches and have them replaced by a qualified electrician if necessary.
	Cable connections on safety switches have come loose.	Have the cable connections checked by a qualified electrician, if necessary have the cables replaced.
	The fuel prefilter and/or the fuel filter are dirty.	Check the fuel prefilter and/or the fuel filter, replace if necessary.
	The alternator is defective.	Check the alternator, repair if necessary.

Error	Possible cause	Remedy
Motor has no power.	The fuel prefilter and/or the fuel filter are dirty.	Check the fuel prefilter and/or the fuel filter, replace if necessary.
	The air filter is dirty.	Check the air filter, clean or replace if necessary.
	The injection nozzle(s) are defective.	Have the motor checked at a specialist workshop and the injection nozzles replaced if necessary.
Supercharger		
Compressor does not regulate.	Air loss in the control system	Have the control system checked in a specialist workshop.
	The control valve is defective or dirty.	Have the control valve checked in a specialist workshop.
	The safety valve is defective or incorrectly set.	Have the safety valve checked in a specialist workshop.
Air consumption exceeds the capacity of the compressor.	Air loss in the upper and lower air area.	Check air connections and air hoses.
	The main air line is defective.	Have the main air line checked by a specialist workshop and repaired if necessary.
	The vessel outlet is defective.	Check the vessel outlet and the air extraction connection.
	The air extraction connection is leaking.	Have the air extraction connection repaired by a specialist workshop if necessary.
Delivery quantity from the compressor is too low.	The air filter is dirty.	Check and clean the air filter. Replace the air filter if necessary.
	The air deoiling device is blocked.	Have the air deoiling device checked in a specialist workshop and replaced if necessary.
	The motor speed is too low.	Have the motor speed checked at a specialist workshop and adjusted if necessary.

Error	Possible cause	Remedy
Oil mist escapes with the air flow. Oil residues on the mixing and delivery vessel and on the hoses.	The compressor oil level is too high.	Drain the compressor oil up to the mark. Change oil and oil filter.
	Wrong compressor oil.	Fill with original compressor oil.
	The air deoiling element is defective.	Have the air deoiling device checked in a specialist workshop and replaced if necessary.
	The suction control valve is defective.	Have the suction control valve checked in a specialist workshop and replaced if necessary.
Compressor becomes too hot.	The compressor oil level is too low.	Check the compressor oil level and top up if necessary.
	The compressor oil is dirty.	Replace the compressor oil filter.
	The oil and water cooler is dirty.	Clean the oil and water cooler.
	The air deoiling device is blocked.	Have the air deoiling device checked in a specialist workshop and replaced if necessary.
	The compressor cooling is insufficient.	Install the machine only in well ventilated areas.
Scraper radio system		
Transmitter indicator light of the radio system does not light up (transmitter).	The transmitter battery is flat.	Insert the replacement battery from the charger.
	The transmitter is defective.	Have the transmitter checked in a specialist workshop.
Receiving control lamp of the radio system does not light up (receiver).	The cable connection has come loose or is defective.	Have the cable connections checked by a qualified electrician, if necessary have the cables replaced.
	No radio connection between transmitter and receiver.	Have the transmitter and receiver checked in a specialist workshop.
	The transmitter is reversed, does not match the receiver.	Check whether the transmitter has been interchanged.
	An interference transmitter covers the radio signals of the transmitter.	Change the location and try again.

9.5 Blockage in the conveyor machine

Problems with delivery can occur in the form of "blockages". A blockage is a stuck material plug in the vessel outlet or in the hose line. Therefore, with a blockage, no more material is conveyed and the vessel pressure increases.

NOTE

In the event of a malfunction caused by a blockage, the blockage must be removed.

It is important to find and remove the cause of the blockage so that further plugs are avoided.

9.5.1 Cause for blockage

Blockages are caused mainly by:

- Non-pumpable material mixtures, i.e. too lean or too thick,
- Mixtures that have been standing for too long, water and viscous material have settled,
- Damaged or kinked delivery hoses.

Other possibilities for blockages are:

- The nominal diameter of the delivery hoses does not meet the requirements.
- The material and the nominal width of the delivery hoses are not matched.
- The nominal width of the delivery hoses is different.
- The hose couplings are damaged or do not match.
- Foreign bodies in the delivery machine are too large.
- Material grain size too large (greater than 16 mm).
- The material is already setting (aggregates or dwell time in the machine).

9.5.2 Find a blockage

WARNING

Risk of injury due to incorrect blockage removal.

A blockage in the delivery hose can strike back into the mixing and delivery vessel and cause serious injuries when the dome cover is open.

- Never open the mixing and delivery vessel in the event of a blockage.
- Wear appropriate personal protective equipment during removal.
- Stop work until the mixing and delivery vessel is depressurized.

As soon as the mixing and delivery vessel is depressurized, the delivery hose is also depressurized up to the first blockage in the hose line.

1. Check, starting from the outlet of the mixing and delivery vessel, by carefully stepping on it and by pressing in the delivery hose where the blockage begins.
   - The hose is soft and easily deformed in the area where there is no blockage.
   - In the area where the blockage is located and between two blockages, the delivery hose is hard.
   - If there is a blockage in the vessel outlet, the whole hose is soft and flexible.
   - ➢ Please note that there may be several blockages.
2. Check the further course of the delivery hose and find out if there is more than one blockage.

9.5.3 Remove blockages

WARNING

Risk of injury due to pressurized components.

Although the mixing and delivery vessel is depressurized, the delivery hoses may be under pressure. The delivery hoses can "flap" and when the hose couplings are opened, mix can escape abruptly, causing serious injuries.

- Before opening, stop the machine and ensure that the delivery hoses are depressurized.
- Wear safety goggles. Residual pressures cause the conveyed material to be discharged at an accelerated rate when the hose couplings are opened.
- If conveyed material gets into the eyes, wash them out thoroughly and consult a doctor immediately.

WARNING

Risk of injury due to incorrect blockage removal.

Incorrect removal of blockages in the delivery hoses can lead to serious injuries due to burst delivery hoses or hose couplings.

- Never use compressed air to push blockages out of the hoses.
- Stop work until the mixing and delivery vessel is depressurized.
- Wear appropriate personal protective equipment during removal.
- Make sure that no person is in the danger zone.

1. As soon as you notice a blockage, close the levers for the upper and lower air.
2. Switch off the machine using the "Start/stop motor" button.
3. Vent the mixing and delivery vessel via the vessel vent (see Section 7.7.5).
4. Check the vessel pressure at the corresponding pressure gauge. The mixing and delivery vessel must be depressurized.
   - ➢ As soon as the mixing and delivery vessel is depressurized, the delivery hose is also depressurized up to the first blockage in the hose line.
5. Move the part of the delivery hose where you suspect the blockage strongly back and forth (shake the hose). The blockage should come loose.

6. Check the delivery hose for other blockages (see Section 9.5.2).
7. Make sure that there is no residual pressure in the delivery hose.
   - A pressureless hose is soft and flexible.
   - If there is residual pressure, the hose is firm.
8. Loosen the couplings of the delivery hose in which the blockage was.
9. Loosen the blockage by tapping, shaking and bending.
10. Shake the blockage out of the delivery hose.

Several blockages

Sometimes there are several blockages in the delivery hose.

1. Deform the delivery hose to determine whether the delivery hose is depressurized.
2. If there is a residual pressure, e.g. between two blockages in the delivery hose, move the delivery hose back and forth, tap the delivery hose and thereby help to reduce the residual pressure and thus to loosen the blockage.
3. Make sure that the delivery hose can be deformed easily over its entire length.
4. Loosen the couplings of the delivery hose in which the blockage was.
5. Loosen the blockage by tapping, shaking and bending.
6. Shake the blockage out of the delivery hose.
7. If there is other blockage in the delivery hose, repeat this procedure.

Stubborn blockage

Sometimes blockages cannot be removed by simply moving the machine back and forth.

1. If the blockages are stuck, insert a water hose into the delivery hose.
2. Lay out the delivery hose at a slight slope so that any water that gets in can drain off.
3. Push the water hose through the delivery hose against the escaping water.
   - ➢ The mix is dissolved by the water and runs out with the water.
4. When no more material is rinsed out, pull out the water hose.
5. Check that all blockages have been removed. If there are still blockages, repeat the procedure until the delivery hose is free.

9.5.4 Recommissioning after blockage removal

1. Check all delivery hoses and hose couplings.
2. Re-install the hose line and connect it to the machine (see Section 7.4).
   - ➢ Defective hoses and couplings that lead to blockages or danger must not be put back into operation.
3. Carry out a safety check. The machine can then be put back into operation.

9.5.5 Avoiding blockage

In order to avoid blockages, care must be taken when designing the delivery line and the composition of the mixture to ensure that

- use the delivery hoses tied up on the outside,
- use delivery hoses with a larger nominal diameter,
- produce mix with sufficient consistency.

As soon as you notice that the mix is conveyed only insufficiently or not at all, you can:

- add more water if the mix is too dry,
- replace defective or dirty hose couplings,
  - ➢ The water escapes from the hose couplings due to defective or leaking hose couplings
- check the hose couplings and, if necessary, clean the couplings, replace the seals or replace the hose couplings

9.6 Battery empty

NOTE

Pay attention to the correct sequence when connecting and disconnecting the jumper cables.

Otherwise a short circuit can damage the electronic system.

The battery is charged while the motor is running, just like in a passenger vehicle. If the battery is empty in exceptional cases, e.g. when the work lights are not switched off, you can start the motor of the machine in conjunction with the battery from the towing vehicle.

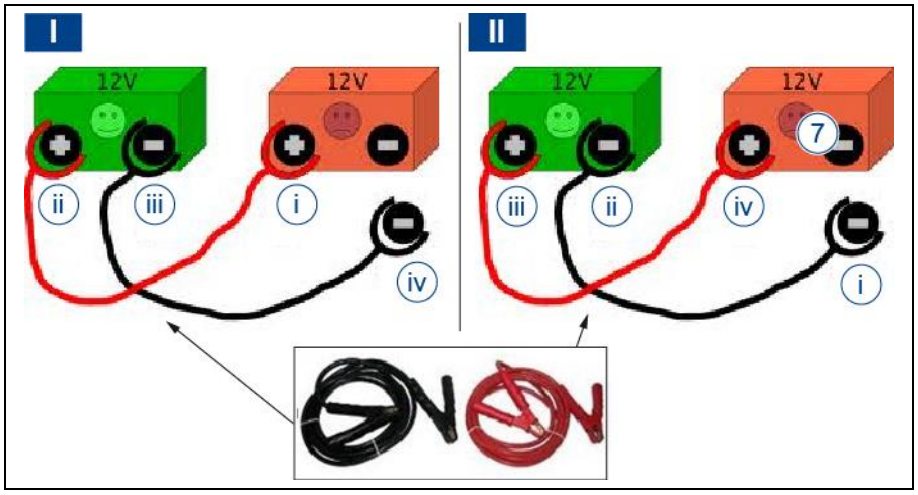


Figure 63: Connecting (I) / disconnecting (II) booster cables

1. Make sure that the battery voltage of dispenser battery and machine battery is identical (12 V).
2. Start the motor in the towing vehicle (donor battery).
3. Connect the positive terminal of the receiver battery to the positive terminal of the donor battery with a red booster cable.
4. Connect the negative pole of the donor battery to earth (bare metal part of the machine) using the black booster cable.
5. Start the motor of the machine (see Section "Starting the machine")
6. Disconnect the booster cables in the following order:
   - Remove the black booster cable from the ground (body).
   - Disconnect the black booster cable from the negative terminal of the donor battery.
   - Disconnect the red booster cable from the positive terminal of the donor battery.
   - Disconnect the red booster cable from the positive terminal of the receiver battery.

10 Maintenance

10.1 Personnel

Target groups: F, S

Target group definition see Chapter 1.11, page 14.

10.2 Personal protective equipment

10.3 Safety instructions for maintenance and servicing

DANGER

Electrical voltage hazard.

Touching live parts will lead to death. Damage to the insulation or individual components can be life-endangering.

- Before maintenance and repair work, switch off the electrical machine and secure it against restarting.
- Keep moisture away from live parts.
- Work on electrical components must be carried out only by qualified electricians.

WARNING

Risk of injury from inappropriate maintenance.

Inappropriate maintenance can lead to severe injuries. Observance of the maintenance intervals is decisive for the proper and durable functioning of the chassis and machine.

- Maintenance work must be performed only by instructed and operator-authorized specialist personnel.
- Ensure adequate assembly clearance before starting work.
- Before recommissioning, ensure that all protective devices are installed correctly and functional.
- Wear personal protective equipment.

WARNING

Risk of injury from unauthorized restarting.

Persons can be injured through an unexpected start-up of the energy supply while working on individual components.

– Before carrying out any work on individual components, ensure that the power supply is switched off and secured against being switched on again.

WARNING

Risk of injury due to hazardous materials.

Hazardous substances contain components that are hazardous to health and can lead to poisoning, chemical burns or skin irritations.

– Observe the manufacturer’s safety data sheet.
– Avoid spilling and fog formation.
– Do not eat, drink or smoke near the machine.
– Avoid skin and eye contact.

WARNING

Risk of injury from the high-pressure system on the motor

There is a risk of injury from improper disassembly or improper repair of the high pressure machine for the fuel and the fuel lines. The motor can also be damaged.

– Maintenance work on the motor, in particular on the fuel lines and the high-pressure system for the fuel, must be carried out only by trained specialist personnel authorised by the operator.
– Wear personal protective equipment.

NOTE

Only suitable and undamaged tools must be used for maintenance and repair work.

The machine must be carefully cleaned before starting the work.

During maintenance and repair work, ensure a clean environment and that no loose parts remain in the machine.

Only original spare parts or spare parts expressly approved by the manufacturer must be used.

Modifications and welding work on pressure vessels are prohibited.

Incorrect or negligent disposal can cause considerable environmental pollution.

- Have specialized companies dispose of electrical scrap, electronics components, lubricants, operating supplies and other auxiliary materials.
- Observe the handling and disposal regulations in the safety data sheets of hazardous substances.
- Disposal must take place in accordance with the applicable national rules and regulations.

In case of doubt, consult the manufacturer or obtain information from local authorities or specialist disposal companies regarding environmentally friendly disposal.

10.4 General instructions

Maintenance work must be carried out to ensure safe and effective operation of this machine.

We expressly draw your attention to the fact that all necessary checks, inspections and preventive maintenance work must be carried out properly and professionally.

All regular maintenance work must be carried out by an authorised specialist company when the operating hours are reached.

Repairs may only be carried out by persons who are technically qualified and have the necessary qualification.

Maintenance / repair work and inspections must be recorded in writing after they have been carried out. The following must be specified:

- work carried out,
- parts used,
- performing workshop,
- status of the operating hours counter,
- date of implementation,
- any special incidents.

The documentation must be presented on request. Otherwise we decline any liability or warranty for this machine.

10.5 Maintenance schedules

10.5.1 Maintenance schedule chassis

Personnel	Interval	Maintenance	Comment
	After 50 km	Check the firm seat of the wheel nut.	After the first 50 km after a wheel change, retighten the wheel nuts with a torque spanner. Observe the tightening torque in doing so (see Section 3.1).
	After 50 km Before driving	Check tyre pressure.	Check the tyre pressure after the first 50 km after a wheel change and then weekly (see Section 3.1).
	Before driving	Check the condition of the tyres.	Tread depth must be at least 2 mm. **Note:** Pay particular attention to tyre damage caused by construction site operation.
	Before driving	Perform a visual inspection of the rear light unit for the following items: – Illuminant undamaged, – Cables and plug connections.	Replace defective or damaged illuminants, cables and plug connections.
	Before driving	If an optional feeder is used, secure it against sagging with a lashing strap.	Observe road traffic regulations.
	Before driving	Secure the scraper with the spring cotter pins.	
	After 200 km	Check toothed belt tension and adjust if necessary.	Have the brake system checked on a brake tester in a specialist workshop and readjusted if necessary. **Note:** Only after the first 200 km, then as required.
	Weekly	Grease the chassis.	Grease all moving parts with grease or spray grease.
	Weekly	Preserve the machine.	Spray the machine with preservative agent (see Section 11.4).

Personnel	Interval	Maintenance	Comment
	Before driving, weekly	Check parallel adjustment of the overrun device for play and ease of movement.	Visual inspection of the parallel adjustment of the overrun device. Grease it if necessary in the event of sluggishness. If this is not remedied, contact a specialist workshop.
	Before driving, weekly	Check the function of the parking brake.	Carry out a driving test by moving off with the parking brake applied. In case of malfunction, contact a specialist workshop.
	Before driving, weekly	Check the function of the overrun brake.	Carry out a driving test. In case of malfunction, contact a specialist workshop.
	Before driving, weekly	Check breakaway cable guide and function of the tear rope.	Check breakaway cable for damage. Replace a damaged breakaway cable. In case of malfunction, contact a specialist workshop.
	Before driving, weekly	Check function and locking of the support wheel.	Check support wheel for damage. Replace a damaged support wheel. In case of malfunction, contact a specialist workshop
	Before driving, weekly	Check function and tightness of the towing eye or ball coupling.	If the coupling or ball head of the towing vehicle is damaged, contact a specialist workshop.
	Every 1000 km or monthly	Grease the lubrication points of the overrunning brake device.	Lubricate all lubrication points with a grease gun.
	Every 3 months	Check screws of the following components for tightness: – Overrun device, – Frame – Chassis	Observe the tightening torques for the individual screw connections.
	Every 3 months	Check the function of the overrun braking device.	Check the function of the overrun braking machine on a brake test bench in a specialist workshop and, if necessary, readjust or have defective parts replaced.
	Every 3 months	Check shock absorber for oil loss.	Check the shock absorber on a brake tester in a specialist workshop and readjust if necessary or have defective parts replaced.

Personnel	Interval	Maintenance	Comment
	Every 3 months	Check the play on the draw bar of the overrun device.	Check the play on the draw bar at a specialist workshop and readjust if necessary or have defective parts replaced. Maximum play is 1.5 mm.
	Every 3 months	Check the parallel adjustment of the overrun braking machine for play and ease of movement.	Check the parallel adjustment of the overrun braking machine in the specialist workshop and readjust if necessary or have defective parts replaced.
	Every 3 months	Check the brake system for function.	Check the function of the brake system on a brake tester in the specialist workshop and readjust if necessary or have defective parts replaced.
	Every 3 months	Check the parking brake for function.	Check the function of the parking brake on a brake tester in a specialist workshop and readjust if necessary or have defective parts replaced.
	Every 3 months	Check breakaway cable guide and function of the tear rope.	Visually check the breakaway cable guide and the function of the breakaway cable in a specialist workshop and have it readjusted if necessary or have defective parts replaced.
	Every 3 months	Check function and locking of the support wheel.	Have the support wheel checked in a specialist workshop for smooth running, correct locking and condition of the wheel. Have the guide smooth-running and defective parts replaced if necessary.
	Every 3 months	Check wheel bearing and wheel bearing clearance.	Have the wheel bearing and wheel bearing clearance checked in a specialist workshop and have the wheel bearing replaced if necessary. **Note:** If a replacement is necessary, always replace both wheel bearings.
	Every 3 months	Check towing eye or ball head coupling for tight fit or wear.	Have the towing eye or ball-head coupling checked in a specialist workshop and defective parts replaced if necessary.

10.5.2 Maintenance schedule machine

Regular maintenance

Personnel	Interval	Maintenance	Comment
	Regularly	Check gas adjustment control.	Contact **BMS**
	Regularly	Check air filter for the following components: – motor – compressor.	Clean the motor air filter and compressor air filter as required, replace if necessary. **Note:** Never clean filters with compressed air! Filter change every 500 operating hours.
	Regularly	Check fuel prefilter and fuel filter.	Check fuel prefilter and fuel filter and renew if necessary. Filter change every 500 operating hours.
	Regularly	Check motor oil filter.	Check motor oil filter and replace if necessary. Filter change every 500 operating hours.
	Regularly	Check compressor oil filter.	Check compressor oil filter and replace if necessary. Filter change every 500 operating hours.
	Regularly	Check air deoiling device.	Check air deoiling device and replace if necessary. **Note:** Always replace the seal between the cover and the tank housing! Replace the air deoiling device every 1000 operating hours.
	Daily before starting up	Check the function of safety and protective devices	All safety devices must be installed and functional.
	Daily before starting up	Visual inspection of the entire machine for defects.	Pay particular attention to the following points: – Corrosion. – Seals. – Cables and wiring.
	Daily before starting up	Check the lock and securing of the hood.	The hood may bounce during travel. During operation, an open hood can lead to insufficient cooling and thus to damage to the machine.

Personnel	Interval	Maintenance	Comment
	Daily before starting up	Check the function of the dome screen safety device.	Operate the dome screen safety device with the master key. Clean and grease the lock carefully. **Note:** The machine must not be operated without the dome screen safety device functioning properly.
	Daily before starting up	Check the fuel level.	Fill up fuel before starting work Fuel: Diesel (DIN EN 590)
	Daily before starting up	Check motor oil level.	Check the oil level with the oil dipstick (see Section 7.5). The oil level must be between min. and max. If necessary, top up motor oil to the max. mark. Lubricant/s: **BMS** 10 W 40 LA low-ash
	Daily before starting up	Check cooling water level.	Check the cooling water level at the reservoir (see Section 7.5). If necessary, top up with water and cooling machine protective agent according to the manufacturer's specifications.
	Daily before starting up	Check hydraulic oil level.	Check the hydraulic oil level with the oil dipstick in cold condition (see Section 7.5). The hydraulic oil level must be between min. and max. If necessary, top up hydraulic oil up to the max. mark.
	Daily before starting up	Check compressor oil level.	Check the oil level with the oil dipstick (see Section 7.5). The oil level must be between min. and max. If necessary, top up the compressor oil to the max. mark.
	Daily before starting up	Check delivery hoses and hose couplings.	Replace the delivery hoses and hose couplings as soon as damage to the delivery hoses and hose couplings is detected.
	Daily	Check the grease nipples of the dome cover and locking lever, lubricate if necessary.	Grease dome cover and locking lever regularly. To do this, lubricate the grease nipples with 2 blows from the grease gun.
	Daily	Check the seal of the dome cover.	If the seal is porous or damaged, if material residues have pressed themselves into the seal, replace it.

Personnel	Interval	Maintenance	Comment
	Daily	Check the sealing cone of the vessel ventilation.	Check sealing cone for tightness, clean and readjust if necessary. If the sealing cone is damaged, have it replaced in a specialist workshop.
	Daily	Check the lubricating nipple of the feeder, lubricate if necessary.	Grease the feeder regularly. To do this, lubricate the grease nipples with 2 blows from the grease gun.
	Daily	Cleaning the cooler	Clean cooler with compressed air. Take care not to damage or bend the cooling fins.
	Daily	Check the fill level of the central lubrication system. Check central lubrication for function.	Fill up central lubrication if necessary. Observe the lubrication schedule. Lubricant/s: **BMS** KL2K DIN 51502
	Weekly	Check V-belt and power belts.	Tighten V-belts if necessary. Have damaged belts replaced in a specialist workshop.
	Weekly	Check the upper and lower air lines for dirt and clean them if necessary.	Air lines must be removed (see Section 8.5.4)
	Weekly	Check check valves for dirt.	The non-return valves can be checked for soiling by looking into the connections with the top and bottom air hoses removed. If they are dirty, clean the non-return valves and remove them if necessary.
	Weekly	Check the vessel vent for damage or soiling.	Remove the cover of the vessel vent on the dome cover and clean the vessel ventilation. If necessary, have damaged parts replaced in a specialist workshop.
	Weekly	Visual inspection of the wear plates.	Never work off the wear plates so far that the vessel wall is already exposed.
	Weekly	Visual inspection of the mixing unit for damage.	Replace opened or cracked mixing blades immediately. **Note:** Danger of damage to the mixing unit. In case of damage, contact a specialist workshop.

Personnel	Interval	Maintenance	Comment
	Weekly	Check the condition of the mixing shaft bearing.	Have the mixing shaft bearing replaced in a specialist workshop if necessary.
	Weekly	Lubricate the grease nipple on the rear, outer mixing shaft bearing.	Lubricate the rear, outer mixing shaft bearing with 4 strokes from the grease gun.
	Weekly	Grease lubrication points.	Grease must escape through the bearings after lubrication. Otherwise, a defective lubrication line may prevent the bearings from being greased.
	Weekly	Check the steel cable of the scraper shovel.	In case of damage (including individual, torn steel threads) replace the steel cable.
	14tägig	Check the grease nipples of the tensioning rocker in the motor compartment, lubricate if necessary.	Grease the tensioning rocker regularly. To do this, lubricate the grease nipples with 2 blows from the grease gun.

10.5.3 Inspection after 500 operating hours

➢ We recommend having the inspection carried out by **BMS** or a **BMS** approved specialist workshop, as the maintenance work is decisive for the safety, trouble-free operation and service life of your **BMS** *alpha* ^{CR}.

Personnel	Maintenance	Comment
	Engine oil change.*	Use **BMS** motor oil.
	Change motor oil filter.*	
	Compressor oil change.	Use **BMS** compressor oil.
	Hydraulic oil change.	Use **BMS** hydraulic oil.
	Change fuel filter.*	
	Check motor air filter.*	Replace if necessary
	Check compressor air filter.*	Replace if necessary
	Check gas distributor ventilation.	Clean if necessary.
	Change separator oil filter.	Specify **BMS** no. chassis number.
	Change hydraulic oil filter.*	Specify **BMS** no. chassis number.
	Check V-belt alternator.	Specify **BMS** no. chassis number.

Personnel	Maintenance	Comment
	Check hose clamps on cooling machine and motor.	If leaking, tighten and replace if necessary.
	Check radiator for dirt.	Wash out if necessary.
	Check battery acid level.	Check acid level and top up if necessary.
	Check electrical connections.	Pay attention to corrosion. Clean or replace if necessary.
	Check motor and compressor mountings.	Replace if necessary
	Check tyre pressure.	Tyre pressure (see Section 3.1)
	Check overrun brake.	Check, adjust if necessary.
	Check contacts of lighting and illuminants.	Clean/replace contacts if necessary. Replace illuminant if necessary.
	Grease lubrication points.	**BMS**, lubrication points according to lubrication schedule
	Top up central lubrication.	**BMS** grease cartridge 2.5 kg
	Check hydraulics (hoses, valves, motor, pump).	Only for **BMS** *alpha* ^{CR} B and **BMS** *alpha* ^{CR} B/S Seal or replace if necessary.
	Check power belt and belt relief.	**BMS**

Personnel	Maintenance	Comment
	Check gear holder for deformation	Adjust if necessary.
	Check upper and lower air hoses.	**BMS**
	Check check valves for dirt.	**BMS**
	Check vessel vent	
	Check 2-bar switch-off.	**BMS**
	Check dome cover bearing.	Replace if necessary
	Check cover seal on dome cover.	**BMS**
	Check bearing of toggle lock.	Replace if necessary
	Check hopper bearing.	Replace if necessary

* Maintenance is part of the maintenance kit no. W 500 **BMS** *alpha* ^{CR}

10.5.4 Inspection every 1000 operating hours

➢ We recommend having the inspection carried out by **BMS** or a **BMS** approved specialist workshop, as the maintenance work is decisive for the safety, trouble-free operation and service life of your **BMS** *alpha* ^{CR}.

Personnel	Maintenance	Comment
	Engine oil change.*	Use **BMS** motor oil.
	Change motor oil filter.*	
	Change fuel filter.*	
	Check motor air filter.*	Replace if necessary
	Check compressor air filter.*	Replace if necessary
	Change the air deoiling device.	
	Check gas distributor ventilation.	Clean if necessary.
	Change hydraulic oil filter.	
	Hydraulic oil change.	Use **BMS** hydraulic oil.
	Check V-belt alternator.	Replace if necessary Specify **BMS** no. chassis number.
	Check hose clamps on cooling machine and motor.	If leaking, tighten and replace if necessary.

Personnel	Maintenance	Comment
	Check radiator for dirt.	Wash out if necessary.
	Check battery acid level.	Top up the acid level if necessary.
	Top up central lubrication.	**BMS** grease cartridge 2.5 kg
	Check electrical connections.	Pay attention to corrosion. Clean or replace if necessary.
	Check motor and compressor mountings.	Replace if necessary
	Check power belt and belt relief.*	**BMS**
	Check gearbox holder for deformation.	Adjust if necessary.
	Check tyre pressure.	Tyre pressure (see Section 3.1)
	Check overrun brake.	Check, adjust if necessary.
	Check contacts of lighting and illuminants.	Clean/replace contacts if necessary. Replace illuminant if necessary.
	Grease lubrication points.	**BMS**, lubrication points according to lubrication schedule
	Check upper and lower air hoses.	**BMS**

Personnel	Maintenance	Comment
	Check check valves for dirt.	**BMS**
	Check vessel venting	
	Check 2-bar switch-off.	**BMS**
	Check cover seal on dome cover.	**BMS**
	Check dome cover bearing.	Replace if necessary
	Check hopper bearing.	Replace if necessary
	Check bearing of toggle lock.	Replace if necessary
	Check hydraulics (hoses, valves, motor, pump).	Only for **BMS** *alpha* ^{CR} B and **BMS** *alpha* ^{CR} B/S Seal or replace if necessary.
	Check hydraulic return filter display.	Change filter and hydraulic oil if necessary.

* Maintenance is part of the maintenance kit no. W 1000 **BMS** *alpha* ^{CR}

10.5.5 Inspection every 1500 operating hours

➢ We recommend having the inspection carried out by **BMS** or a **BMS** approved specialist workshop, as the maintenance work is decisive for the safety, trouble-free operation and service life of your **BMS** *alpha* ^{CR}.

Personnel	Maintenance	Comment
	Engine oil change.	Use **BMS** motor oil.
	Change motor oil filter.*	
	Change fuel filter.*	
	Check motor air filter.*	Replace if necessary
	Check V-belt alternator.	Replace if necessary Specify **BMS** no. chassis number.
	Check hose clamps on cooling machine and motor.	If leaking, tighten and replace if necessary.
	Check radiator for dirt.	Wash out if necessary.
	Check battery acid level.	Top up the acid level if necessary.
	Check electrical connections.	Pay attention to corrosion. Clean or replace if necessary.
	Check motor mount.	Replace if necessary
	Check tyre pressure.	Tyre pressure (see Section 3.1)

Personnel	Maintenance	Comment
	Check overrun brake.	Check, adjust if necessary.
	Check contacts of lighting and illuminants.	Clean/replace contacts if necessary. Replace illuminant if necessary.
	Grease lubrication points.	**BMS**, lubrication points according to lubrication schedule
	Check hydraulics (hoses, valves, motor, pump).	Only for **BMS** *alpha* ^{CR} B and **BMS** *alpha* ^{CR} B/S Seal or replace if necessary.
	Change hydraulic oil filter.	
	Hydraulic oil change.	Use **BMS** hydraulic oil

10.6 Lubrication schedule

NOTE

Avoid contamination at the lubrication points. Contamination and sand in the bearing points lead to premature wear.

Grease gun and grease nipples must be cleaned before lubrication.

Only use the lubricants listed and never mix different types, as some greases are not compatible with each other. They gum up and the lubricating effect decreases drastically.

In addition, follow the enclosed manufacturer's instructions for the motor, axle and carriage shaft.

Position	Lubrication point / activity	Figure
Chassis	Lubricate support wheel (version I) via grease nipple Quantity: 1 pcs.	
	Lubricate support wheel (version II) via grease nipple Quantity: 1 pcs.	
	Lubricate overrun device via grease nipple	
	Lightly oil all moving parts of the carriage shaft or spray with spray grease	

Position	Lubrication point / activity	Figure
Motor	Lubricate front shaft bearing via grease nipple Quantity: 1 pcs.	
Machine	Lubricate dome cover via grease nipple Quantity: 2 pcs.	
	Lubricate clamping lever via grease nipple Quantity: 2 pcs.	
	Lubricate funnel via grease nipple Quantity: 1 pcs.	
Feeder	Lubricate lifting cylinder via grease nipple Quantity: 2 pcs. (top and bottom)	
	Lubricate cardan shaft via grease nipple Quantity: 4 pcs.	

10.7 External inspections

The machine is subject to the road traffic regulations and the pressure vessel regulations and must be regularly inspected and tested by external testing agencies.

Interval	Testing	Testing centre / inspector	Comment
Before initial commissioning	Pressure and acceptance test mixing and delivery vessels	Expert	Has already been performed by **BMS**.
annually, if required	Expert inspection according to BGR 183, or BetrSichV of 27/09/2002		
24 months	Demonstration of the machine for examination of traffic safety	Approved monitoring agency e.g. TÜV, Dekra	
24 months	External inspection of the mixing and delivery vessel	Expert	Pressure Vessel Regulation Group IV
60 months	Internal inspection of the mixing and delivery vessel	Expert	Pressure Vessel Regulation Group IV
120 months	Pressure test of the mixing and delivery vessel	Expert	Pressure Vessel Regulation Group IV

10.8 Maintenance and repair work

Before maintenance and repair work may be carried out, the machine must be stopped and the conveyor machine must be depressurized.

1. Switch off the motor using the "Start/stop motor" button.
2. Vent the mixing and delivery vessel via the vessel vent and check the vessel pressure at the pressure gauge (see Section 7.7.5).
3. Close the upper and lower air by means of the corresponding levers (see Section 4.6).
4. Check that the delivery hoses are depressurized.
5. Switch the control unit off using the "Control unit on" button.

To prevent the machine from being switched on again unexpectedly and unintentionally, secure the machine against being switched on again during maintenance work on the machine.

1. Disconnect the battery.
2. Secure the machine against unauthorized restarting.
3. Place a sign indicating maintenance work.

10.8.1 Changing tyres

CAUTION

Risk of injury from heavy loads.

Standing under a jacked-up trailer/vehicle can cause injury if the trailer/vehicle falls.

– Do not stand under the trailer/vehicle when the trailer/vehicle is jacked up.

– Wear personal protective equipment.

➢ The trailer has no spare wheel. However, we recommend having a spare wheel in the towing vehicle.

Figure 64: Changing tyres

1. Turn off the machine.
2. Apply the parking brake and place the brake shoes under the stationary wheel.
3. Slightly loosen the wheel nuts (1) of the wheel to be changed.
4. Use a jack (2) to jack up the trailer on the corresponding side. The contact points (3) for the jack (2) are located under the axle, as close as possible to the tyre.
   ➢ Refer to the instructions for the towing vehicle for how to use the jack.
5. Remove the wheel nuts (1) of the wheel to be changed.
6. Remove the wheel.

7. Mount the new wheel with the wheel nuts (1). Tighten the motor fastening screws with a torque spanner.
   - ➢ Observe the tightening torques for the wheel nuts (see Section 3.1).
8. Lower the trailer again and pull out the jack (2) from under the trailer.
9. Check the tyre pressure (see Section 10.8.2).

NOTE

After changing a tyre, you must retighten the wheel nuts after driving approx. 50 km.

Use a torque spanner and observe the tightening torques for the wheel nuts.

10.8.2 Checking the tyre pressure

3. Connect a compressed air supply to the valve of the tyre via a compressed air hose with pressure gauge.
4. Read the pressure on the pressure gauge.
5. If the pressure differs from the specified tyre pressure (see Section 3.1), adjust the tyre pressure with the connected compressed air supply.
   - – Tire pressure too low: Fill up with air until the correct value is reached.
   - – Tire pressure too high: Bleed air from the tyre until the correct value is reached.

10.8.3 Oil change (compressor, motor and hydraulic oil)

Incorrect or negligent disposal can cause considerable environmental pollution.

- Lubricants, oils and other waste produced when using the machine must be disposed of in a professional and environmentally friendly manner.
- Disposal must take place in accordance with the applicable national rules and regulations.

In case of doubt, consult the manufacturer or obtain information on the environmentally responsible disposal from the local authorities or disposal specialists.

We recommend having all oil changes carried out by **BMS** or a specialist workshop recognised by **BMS**.

10.8.4 Battery maintenance

WARNING

Risk of injury due to hazardous materials.

Explosive gases can develop in batteries. The acid in the battery is corrosive and must not come into contact with skin or clothing.

- Avoid sparks or naked flames near batteries.
- Do not place tools on batteries.
- Keep batteries clean and dry.
- Avoid skin and eye contact.
- Wear personal protective equipment.

Incorrect or negligent disposal can cause considerable environmental pollution.

- Observe the handling and disposal regulations in the safety data sheets of hazardous substances.
- Disposal must take place in accordance with the applicable national rules and regulations.

In case of doubt, consult the manufacturer or obtain information on the environmentally responsible disposal from the local authorities or disposal specialists.

1. Check the liquid level of the battery.
   - ➢ The electrolyte level must reach the mark or the liquid must be 10 to 15 mm above the lead plates of the cells.
2. If the fill level is too low, fill the battery with distilled water.
3. Measure the acid density with a commercially available acid tester.
4. Grease the contacts with Vaseline or acid-free pole grease.

➢ If the machine is not used for a longer period of time, we recommend removing the battery and recharging it regularly.

11 Storage

11.1 Personnel

Target groups: O, F, S

Target group definition see Chapter 1.11, page 14.

11.2 Personal protective equipment

11.3 Storing the machine

Have all necessary maintenance work carried out by **BMS** or a specialist workshop authorized by **BMS** before storing the unit.

If the machine is stored, it must be adequately protected against dust and dirt. It must be stored in a frost-free, clean, dry room. The following must be observed here:

- Clean the **BMS** *alpha* ^{CR} thoroughly.
- Cover the tyres and check the tyre pressure at regular intervals.
- Ensure sufficient ventilation at the storage location.
- Store the machine in a dry and clean place.
- Check the operating supplies levels. Top up with the appropriate operating supplies if necessary.
- The storage period should not exceed approx. 3 months.

If the storage period is longer than 3 months, additional protective measures must be taken:

- Clean the **BMS** *alpha* ^{CR} with a high-pressure cleaner and then preserve the machine.
- Remove any additional heavy oil encrustations inside the machine with a cold or lime cleaner.
- Maintain the motor as described in the enclosed manual of the manufacturer.
- Jack up the machine during longer standstills to relieve the tyres and prevent deformation.
- Grease all moving parts on the chassis and spray the machine with preservative.

11.4 Preserving the machine

Incorrect or negligent disposal can cause considerable environmental pollution.

- Lubricants, oils and other waste produced when using the machine must be disposed of in a professional and environmentally friendly manner.
- Disposal must take place in accordance with the applicable national rules and regulations.

In case of doubt, consult the manufacturer or obtain information on the environmentally responsible disposal from the local authorities or disposal specialists.

1. Store the machine in a dry, well-ventilated location.
2. Let the motor warm up and then switch it off.
3. Clean the oil exhaust filter if necessary.
4. Fill up with anti-corrosion oil instead of the normal motor oil.
5. Drain the fuel from the tank.
6. Fill the tank with a mixture of 90% diesel fuel (possibly winter diesel) and 10 % anti-corrosion oil.
7. Let the motor run for approx. 10 minutes.
8. Switch off the motor.
9. Turn the motor several times by hand to preserve the cylinders and combustion chambers.
10. Remove the V-belts and store them packaged.
11. Spray the grooves of the V-belt pulleys with anti-corrosion agent.
12. Close the intake and exhaust openings.

11.5 Disposal

The **BMS** *alpha* ^{CR} consists of different materials. If components have to be replaced and disposed of, dispose of / recycle them in accordance with the regional or national regulations of the country of use.

Incorrect or negligent disposal can cause considerable environmental pollution.

– Observe the information on disposal in Chapter 2.

In case of doubt, consult the manufacturer or obtain information on the environmentally responsible disposal from the local authorities or disposal specialists.

12 Optional versions

12.1 *alpha* ^{E32} and *alpha* ^{E63}

This section describes the special features of ***alpha*** ^{E32} and ***alpha*** ^{E63}.

Figure 65: View ***alpha*** ^{E32} and ***alpha*** ^{E63}

12.1.1 Interior view

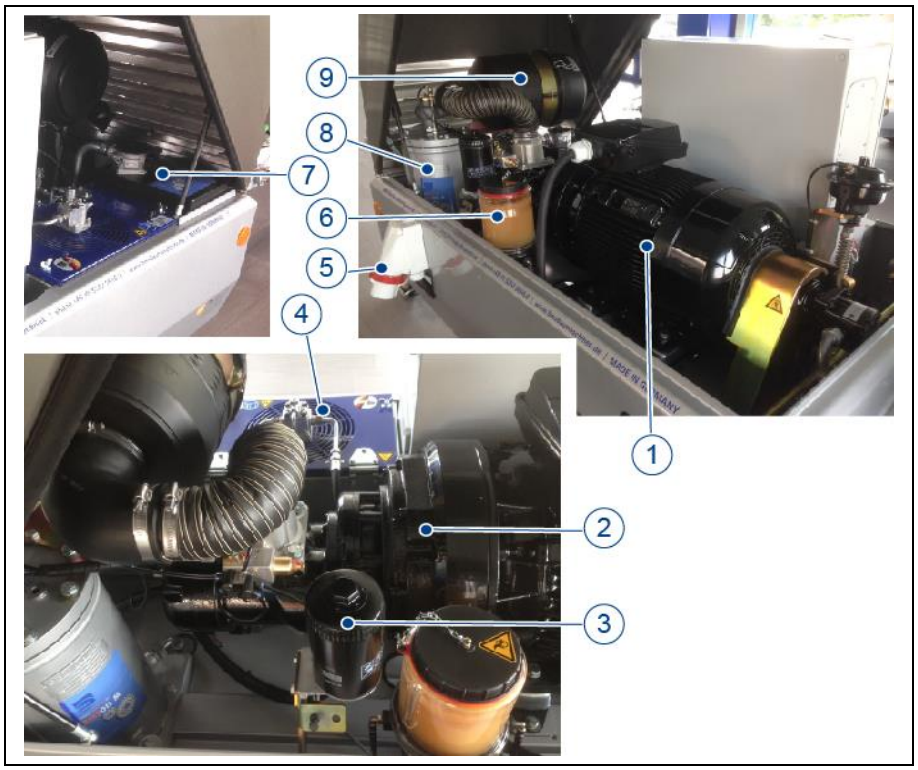


Figure 66: Interior view ***alpha*** *E32* and ***alpha*** *E63*

1	Electric motor (30 kW)	2	Compressor
3	Oil filter	4	Cooler
5	Current connection	6	Central lubrication system
7	Oil container	8	Oil separator
9	Air Filter		

12.1.2 Control cabinet

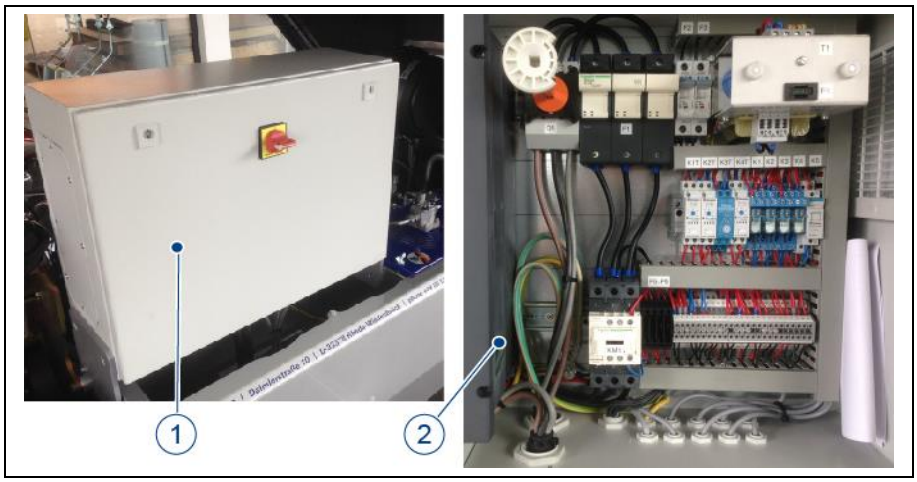


Figure 67: Control cabinet ***alpha*** *E32* and ***alpha*** *E63*

1 Control cabinet

2 Interior view control cabinet

Equipment designation

Designation	Component	Allocation
Q1	Main switch	
F1	Main fuse	
F2	Fuse	Transformer
F3	Fuse	Transformer
F4	Fuse	Transformer 12 V DC
F5	Fuse	Start
F6	Fuse	Lubrication system
F7	Fuse	Headlights
F8	Fuse	Motor control
F9	Fuse	Machine control
KM1	Main contactor	
K1	Relay	Vessel safety switch
K2	Relay	Compressor motor start
K3	Relay	Safety chain
K4	Relay	Sponsorship
K5	Relay	Release radio etc.

Designation	Component	Allocation
K1T	Time relay	Release machine control
K2T	Time relay	Start-up time pressure shutdown
K3T	Time relay	Mixing time
K4T	Time relay	Lubrication system

12.1.3 Operating elements

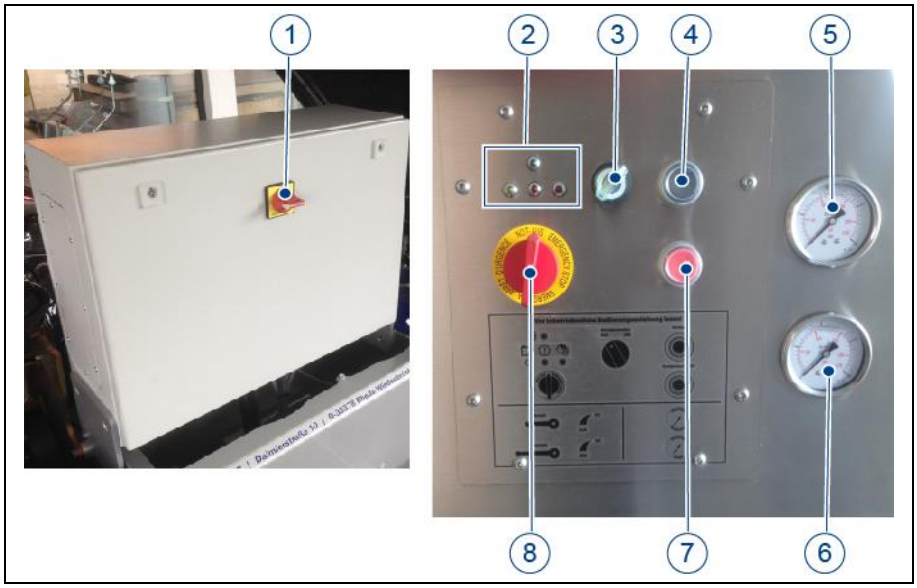


Figure 68: Operating elements ***alpha*** *E32* and ***alpha*** *E63*

1 Main switch
2 LED display
3 On/Off switch mixing unit
4 Button Compressor on
5 Pressure gauge compressor pressure
6 Pressure gauge vessel pressure
7 Button Compressor off
8 Emergency stop button

Main switch (1)

The control system is switched on via the main switch. Only when the control is switched on can the machine be operated using the operating elements on the outside of the machine

LED display (2)

The LED display shows the different operating states of the machine.

(i) Lights green when the main switch is switched on and the operating voltage is present.

(ii) Lights yellow when the mixing time control is switched on.

(iii) Lights red if a malfunction has occurred.

(iv) Lights red if the safety switch on the boiler is not closed.

On/Off switch mixing unit (3)

This is a two-position switch. It switches the mixing unit in the mixing and delivery vessel on/off.

Button Compressor on (4)

The delivery of the compressor is switched on via the button (4).

Pressure gauge compressor pressure (5)

The compressor pressure is displayed on the pressure gauge (4). This pressure display can be used to monitor the delivery process. Possible blockages can be recognised when the compressor pressure drops.

Boiler pressure gauge (6)

The pressure in the mixing and delivery vessel is displayed on the pressure gauge (5). The quantity of upper and lower air can only be adjusted when the pressure in the boiler is sufficient.

➢ When the lower air is open, the delivery pressure shown on the pressure gauge corresponds to the vessel pressure.

Button Compressor off (7)

The delivery of the compressor is switched off via the button (7). The button (7) must also be operated for venting during delivery or in the event of a blockage.

Emergency stop button (8)

The emergency stop button is a rotary switch for switching off the machine in an emergency. If the emergency stop button is actuated, the machine switches off immediately. The drive motor stops and the hydraulics and compressor do not build up pressure. Before restarting the machine, the cause that led to the emergency stop must first be eliminated.

12.1.4 Current connection

DANGER

Electrical voltage hazard.

Touching live parts will lead to death. Damage to the insulation or individual components can be life-endangering.

- With defective electrical components, disconnect the voltage supply immediately and arrange for repairs.
- Keep moisture away from live parts.

WARNING

Tripping hazard from faulty laying of energy supply lines.

Electrical cables must not be laid in traffic routes without protection. Stepping on or driving over them can damage the insulation and the live wires. In addition, loose cables can cause tripping hazards.

- Cover the cables with plastic cable bridges or feed cables from above.
- If possible, lay energy supply lines so that they do not pose a hazard for transportation and passenger traffic.
- Observe the regulations of the trade associations, especially the accident prevention regulations.

Observe the following points when connecting the power:

- The power connection may only be made with the permanently mounted cable (option) or an approved and safe extension cable.
- The extension cable must have a wire cross-section of at least 4 × 16.0 mm² at a maximum cable length of 60 m.
  For cable lengths over 60 m, a cross-section of at least 4 × 25 mm² is required.
- The connecting cable (extension cable) must be completely unrolled.
- Make sure that the connection point is sufficiently fused (63 A), faultless and safe.

When operating frequency inverters, please also note that the site power distributor or the supply line is equipped with an all-current intensive residual current circuit breaker.

NOTE

When using frequency inverters, DC residual currents with low residual ripple occur in the event of a fault. The pulse current-intensive residual current (RCD) circuit breakers that have proven themselves in industry cannot switch this type of residual current safely. For this reason, all-current-intensive residual-current circuit breakers must be used when operating with frequency inverters.

12.1.5 Notes on the delivery hoses

Observe the following points for the delivery hoses and their routing:

- Only use approved delivery hoses and hose couplings with a minimum diameter of 50 mm, an operating pressure of 10 bar and a burst pressure of 40 bar.
- To prevent blockages, do not use delivery hoses with different nominal diameters.
- When setting up the machine and when laying the cables, make sure that no employees or persons outside the company are hindered or endangered. In individual cases, appropriate warning signs may have to be put up.
- The delivery hoses and hose couplings are subject to natural wear due to abrasion and ageing. Check the delivery hoses and hose couplings for perfect condition. Check the delivery hoses, the couplings on the hoses, the connection couplings on the mixing and delivery vessel or the pump.
  - ➢ The inspection must be carried out by a specialist (safety control sheet) at least every 3 months.

13 Lists

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14 Appendix

- Declaration of conformity
- Drawings
- Circuit diagrams

14.1 Declaration of conformity

Konformitätserklärung im Sinne der Maschinenrichtlinie
2006/42/EG Anhang II 1A

Hersteller:	BMS Bau-Maschinen-Service AG © Daimlerstr. 10 D-33378 Rheda-Wiedenbrück Germany
Produkt:	Estrichmaschine
Modell/Typ:	*alpha* ^{CR} *alpha* ^{CR} B *alpha* ^{CR} B/S
Datum::	27.02.2020

Hiermit erklären wir, dass das oben genannte Produkt allen einschlägigen Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.

Das oben genannte Produkt erfüllt die Anforderungen der folgenden einschlägigen Richtlinien:

- DIN EN ISO 12100, Sicherheit von Maschinen
- EMV-Richtlinie 2004/108/EG
- EN 60204-1 elektrische Ausrüstung für Industriemaschinen
- Niederspannungs-Richtlinie 2014/35/EU
- Druckgeräterichtlinie 2014/68/EU

Folgende spezielle Vorschriften für Mörtelmaschinen wurden angewandt:

- DIN EN 12001, Förder-, Spritz- und Verteilermaschinen für Beton und Mörtel
- EN 12151, Maschinen und Anlagen zur Herstellung von Beton, Mörtel, sicherheitstechnische Anforderungen
- BGR 183 BG Regeln für Mörtelförderer und Mörtelspritzmaschinen
- BS EN 12001

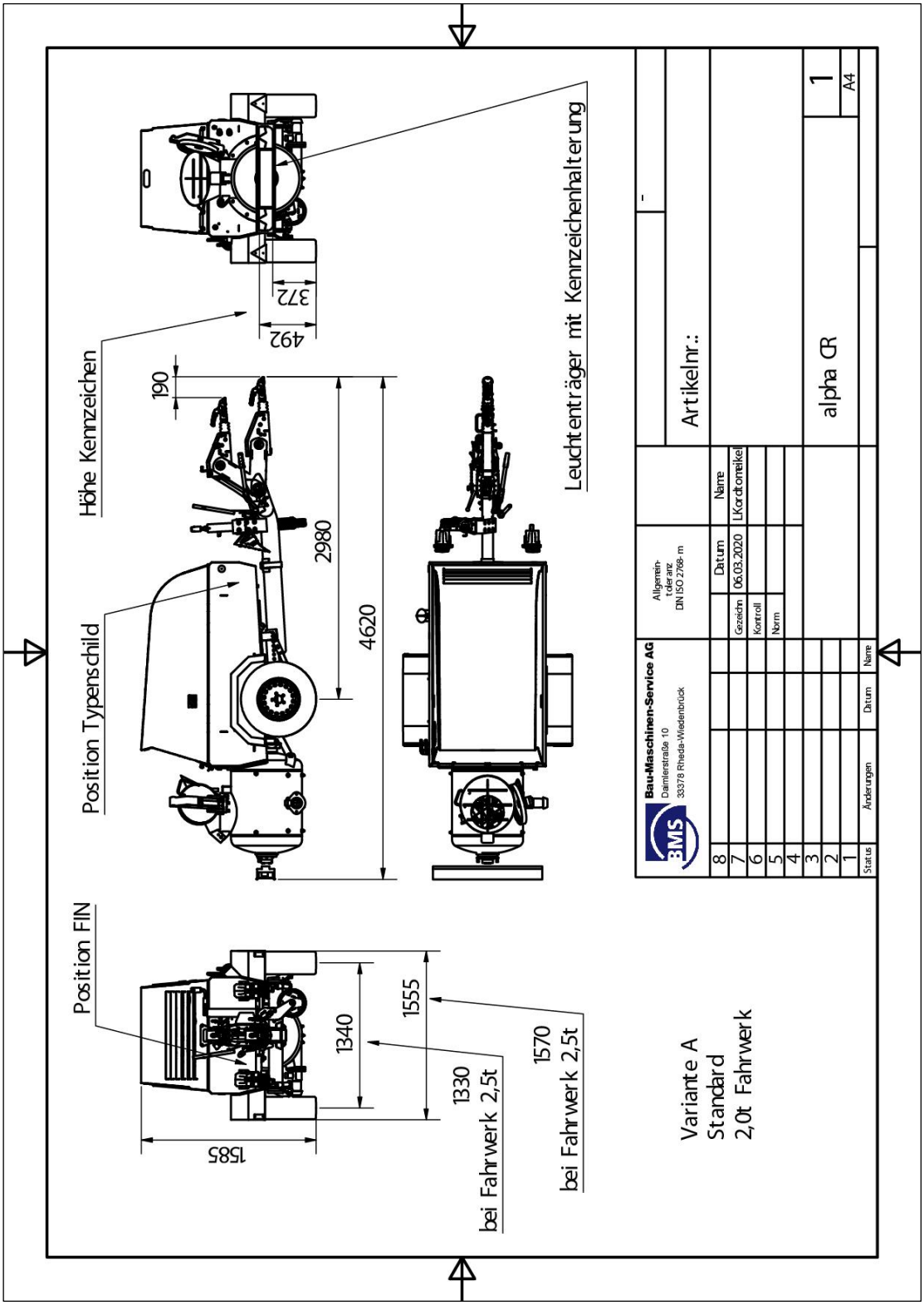
Eine vollständige Liste der angewendeten Normen, Richtlinien und Spezifikationen liegt beim Hersteller vor.

Eine Technische Dokumentation ist vollständig vorhanden.

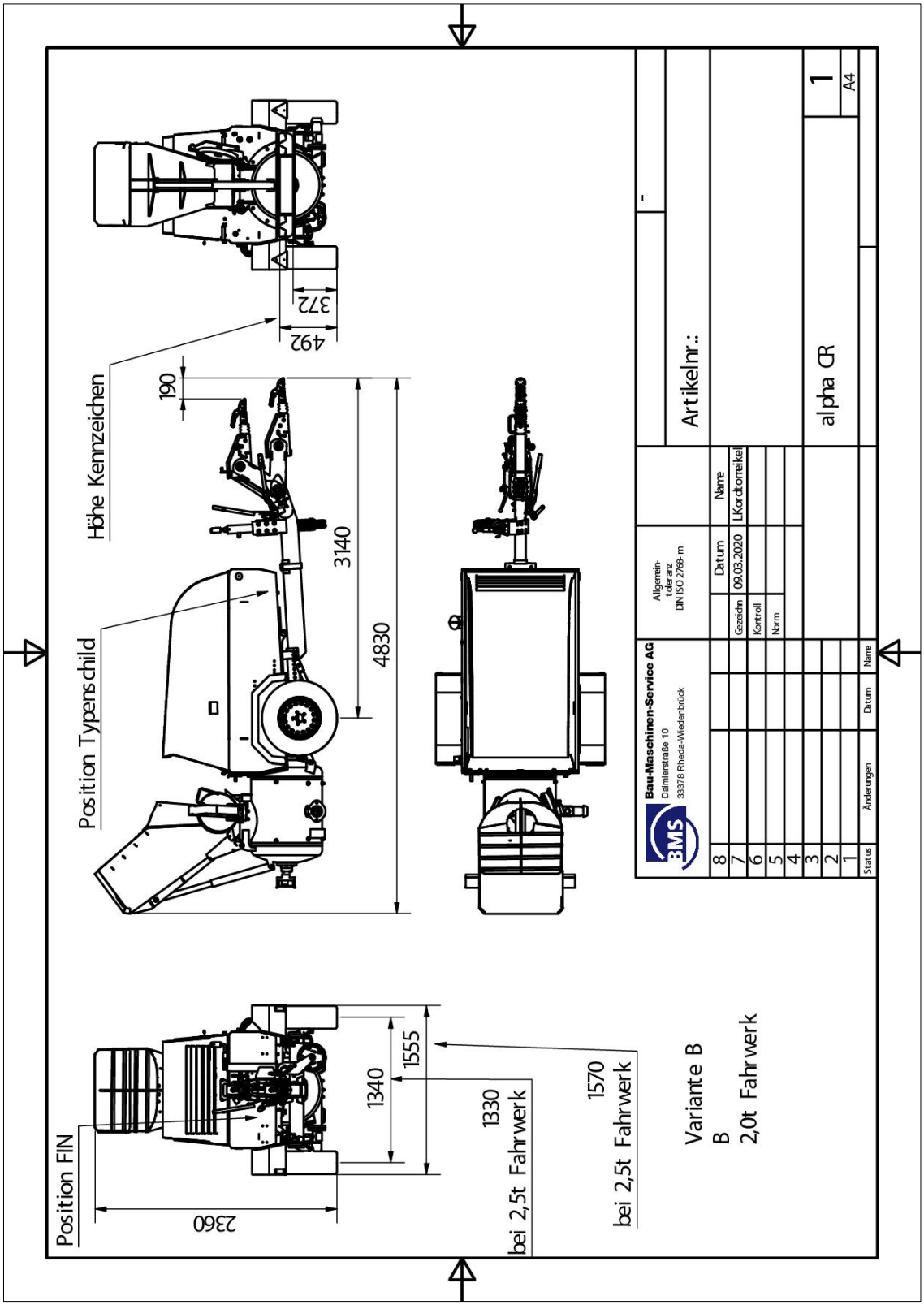
Die zur Anlage gehörende Betriebsanleitung liegt vor.

14.2 Drawings

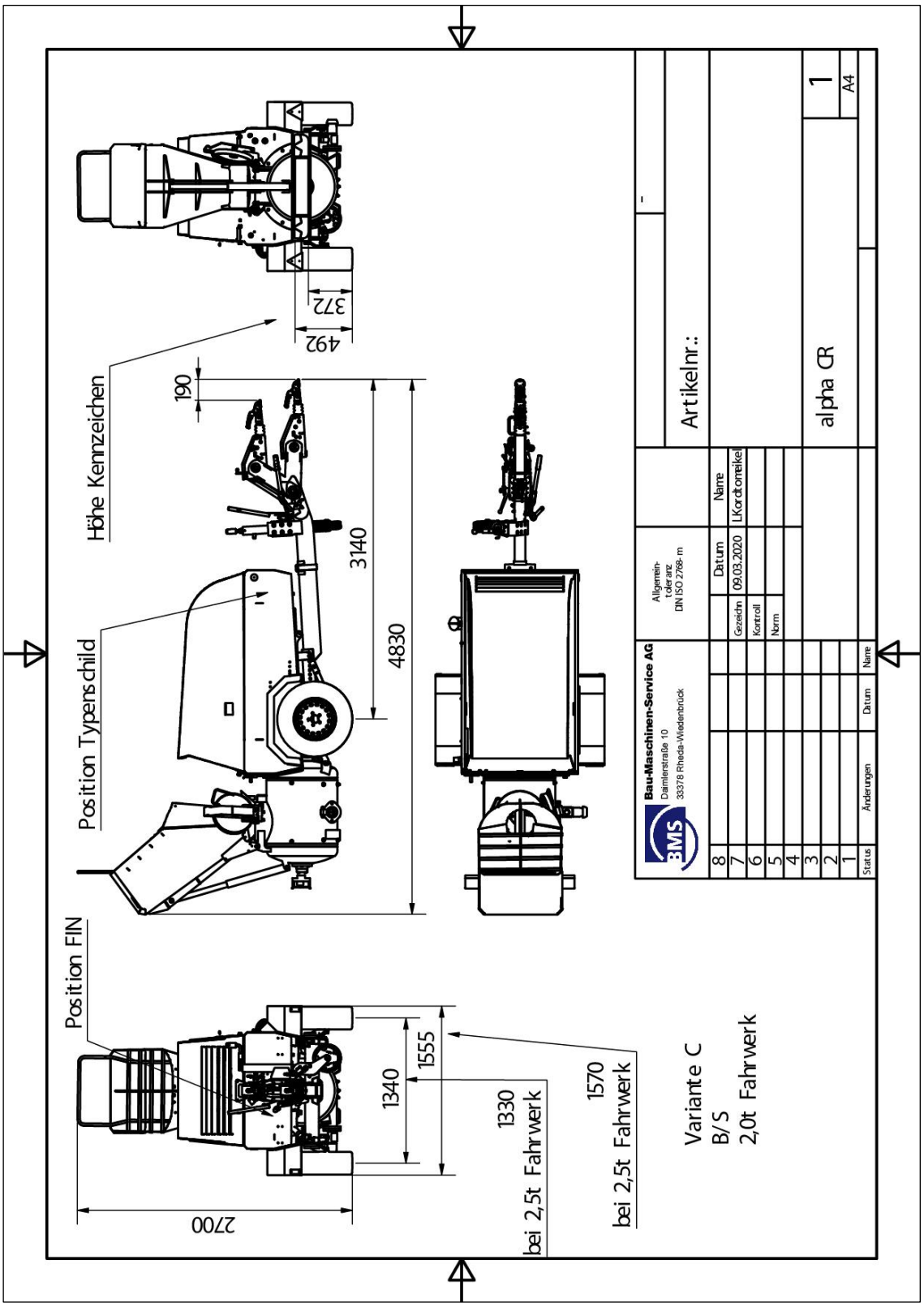
14.2.1 BMS *alpha* ^{CR} (standard)



14.2.2 BMS *alpha* ^{CR} B (feeder)

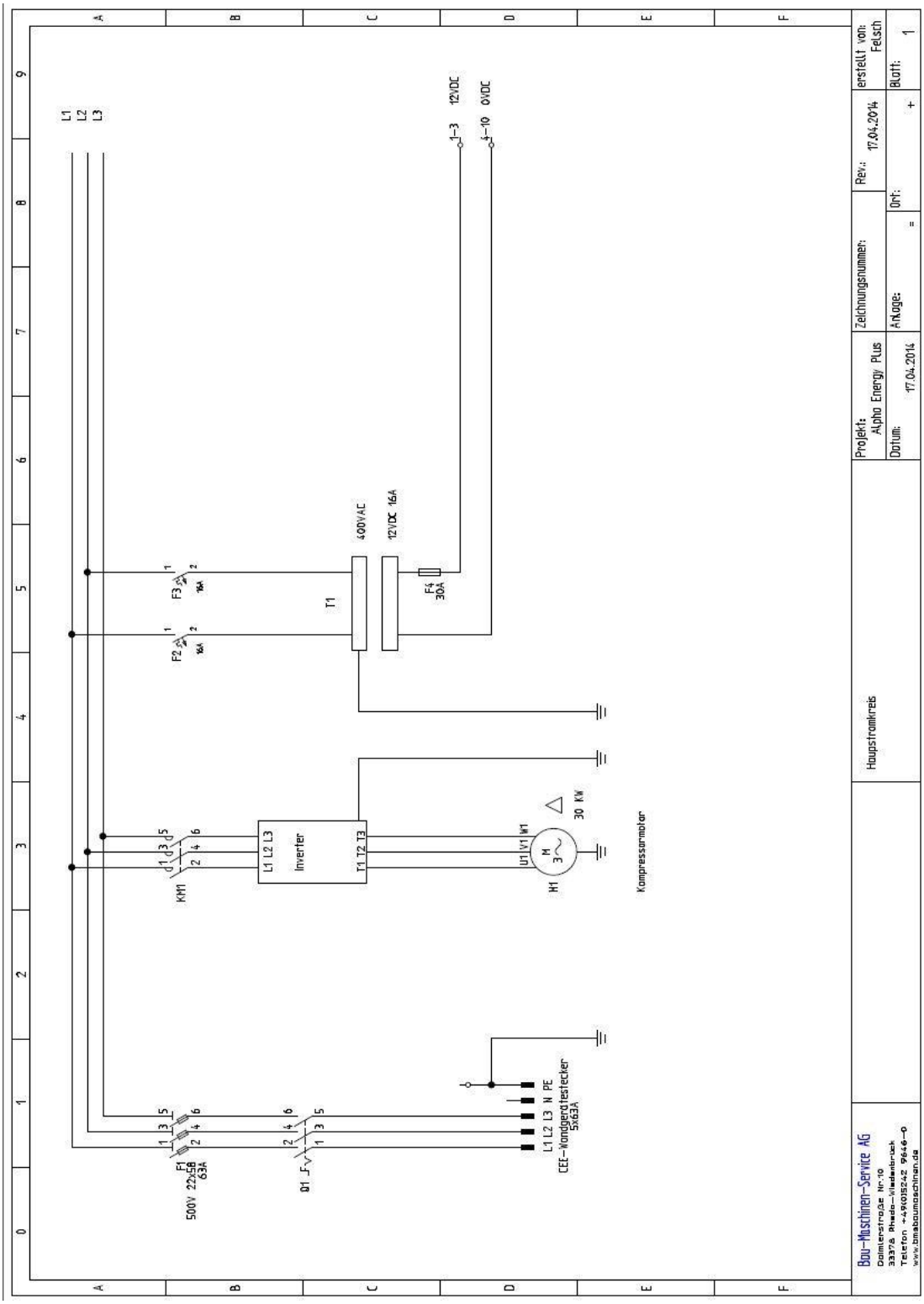


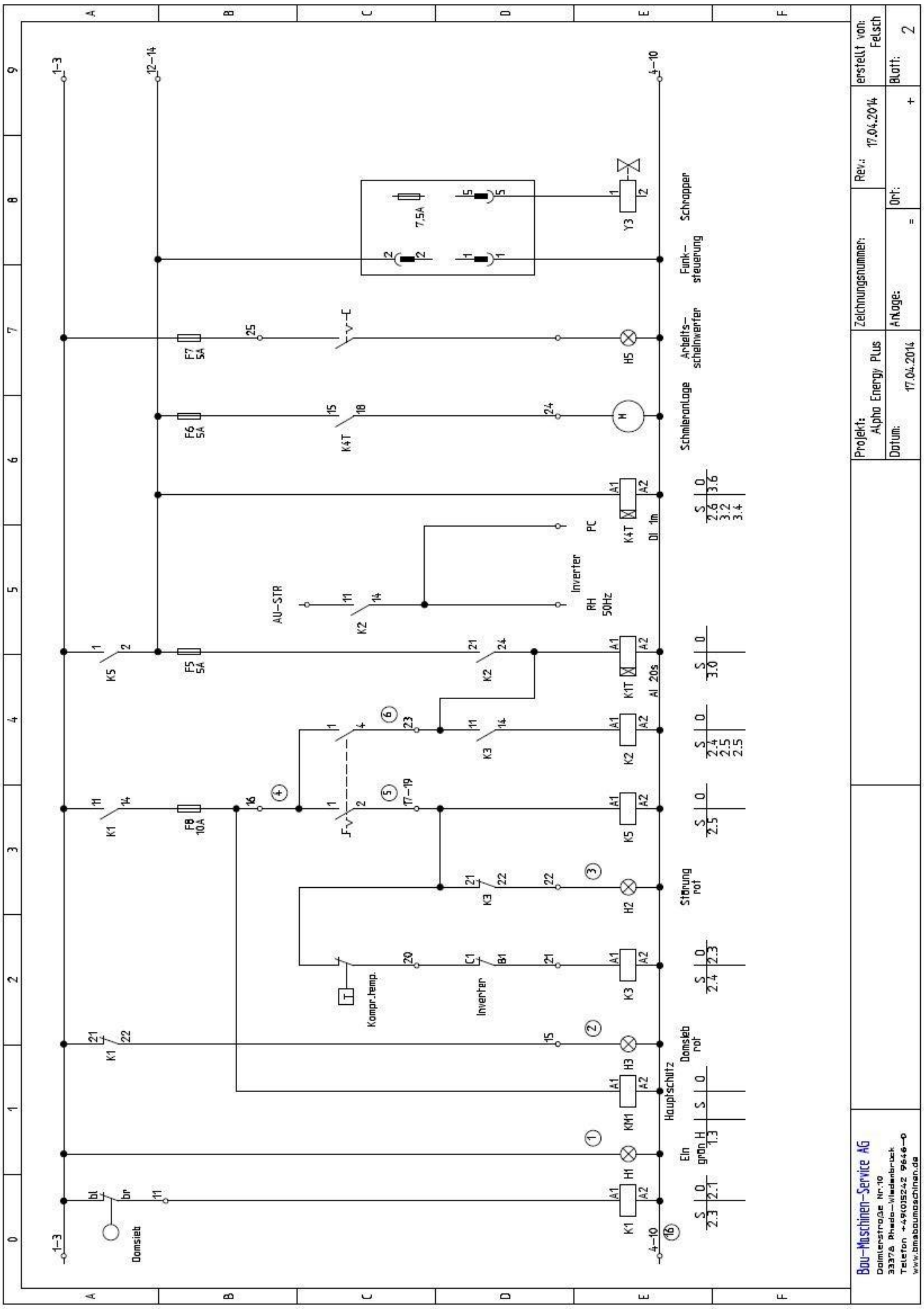
14.2.3 BMS *alpha* ^{CR} B/S (feeder/scraper)

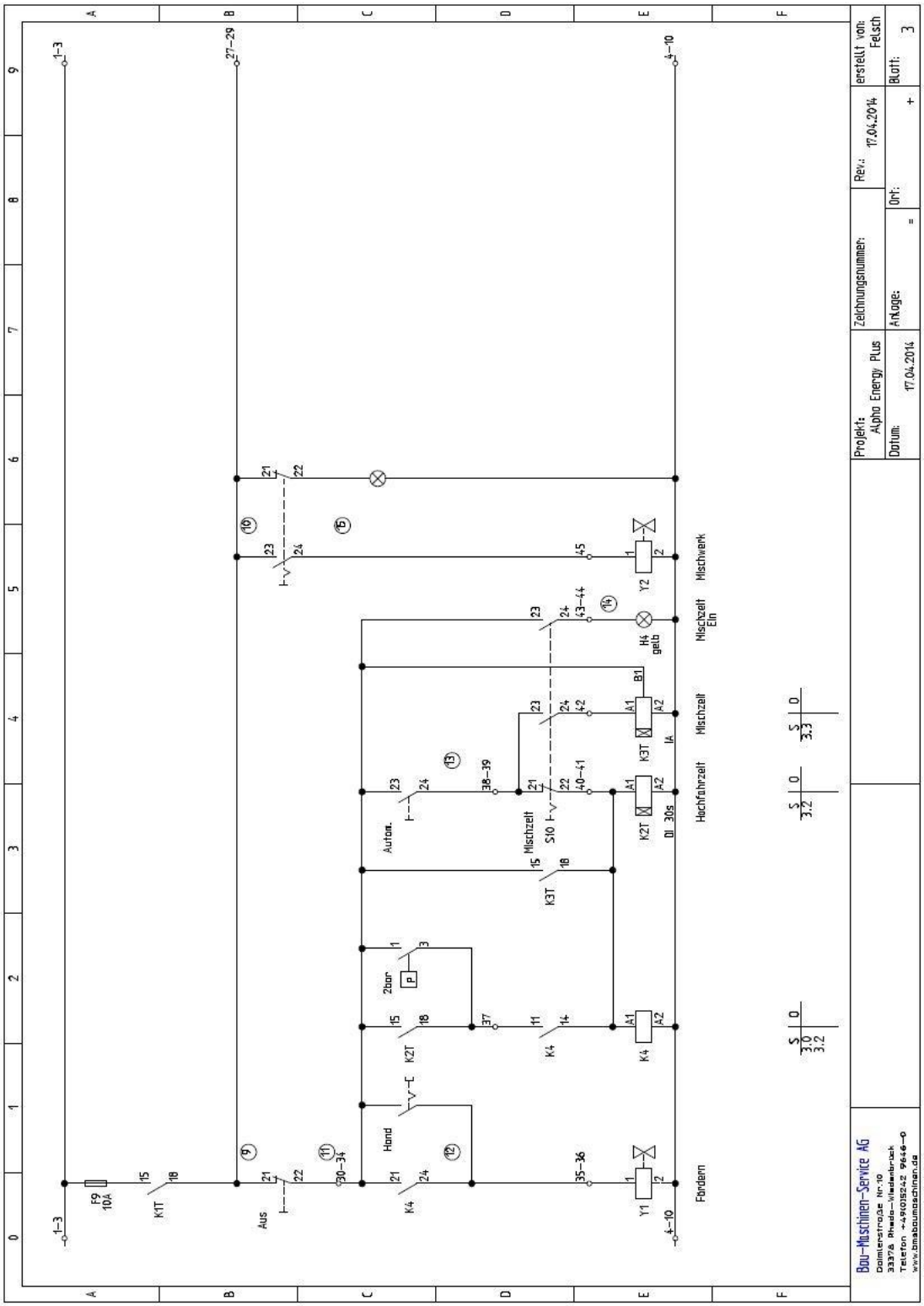


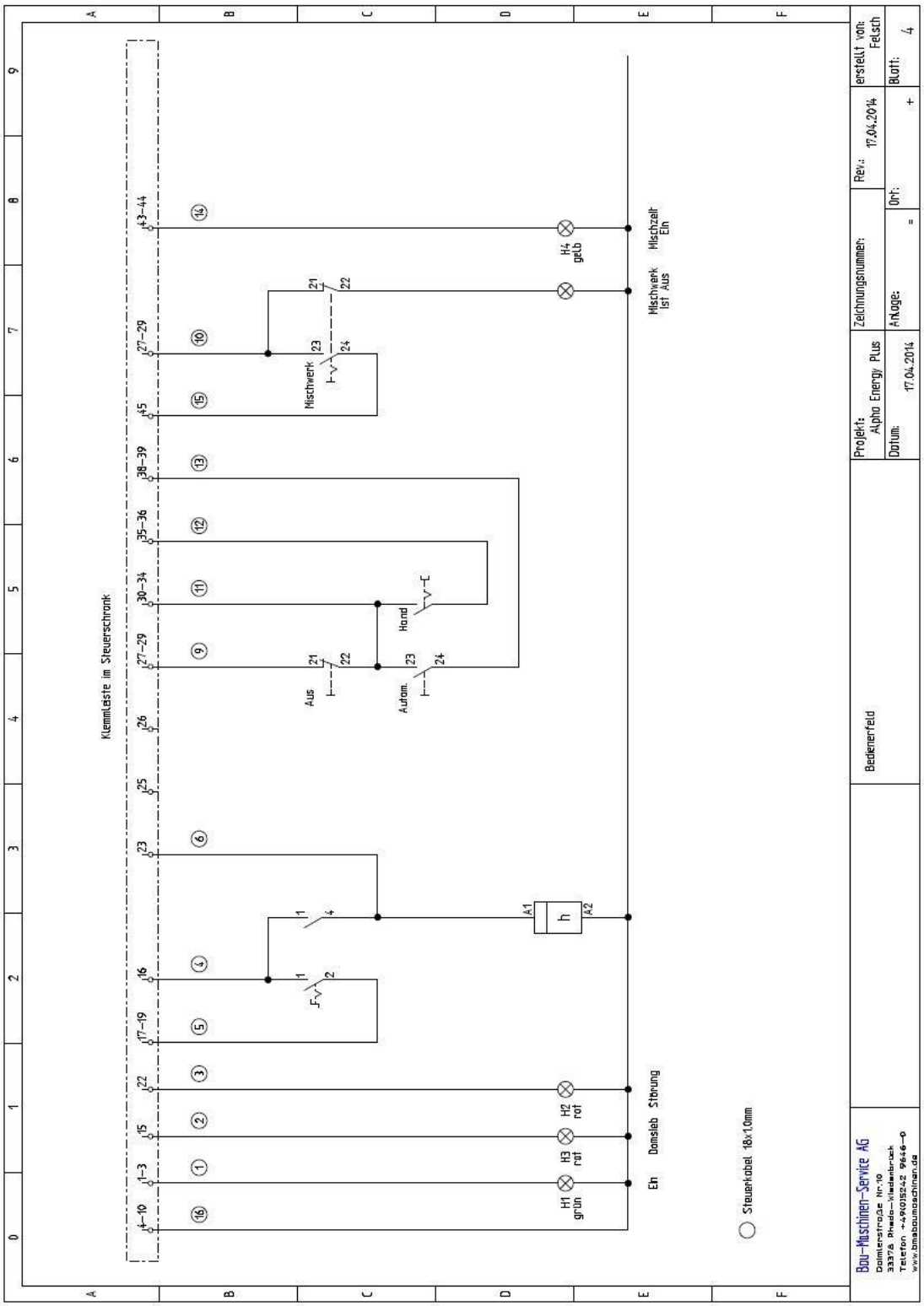
14.3 Circuit diagrams

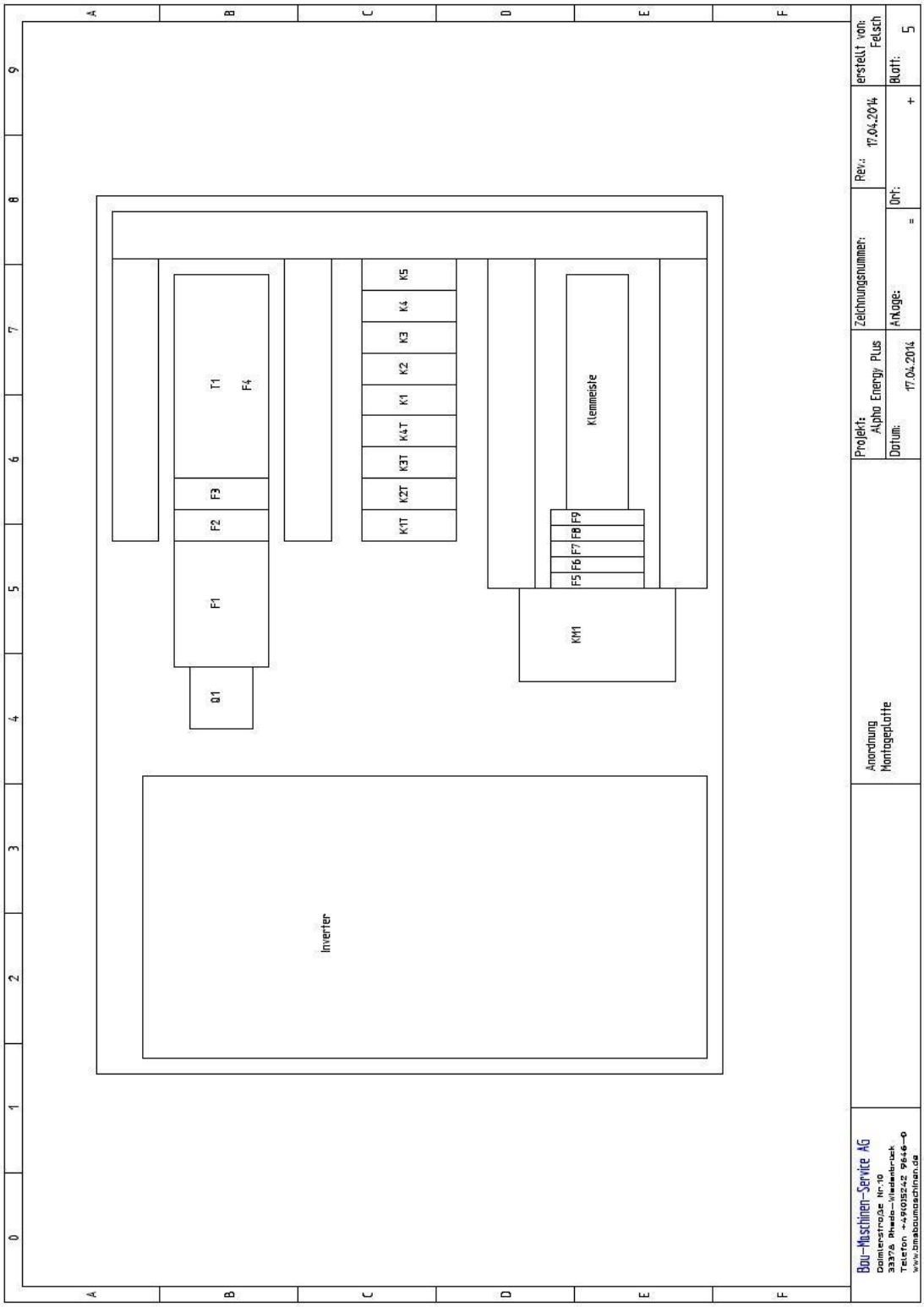
14.3.1 Circuit diagrams *alpha E32* and *alpha E63*




Domsieb
Kompr.temp.
Inverter
AU-STR
PC
Inverter
RH
50Hz
Schmieranlage
Arbeits-scheinwerfer
Funk-steuerung
Schrapper
Hauptschütz
Ein grün
Domsieb rot
Störung rot
Projekt: Alpha Energy Plus
Datum: 17.04.2014
Zeichnungsnummer:
Anlage:
Rev.: 17.04.2014
Ort:
erstellt von: Felsch
Blatt: 2
Bau-Maschinen-Service AG
Daimlerstraße Nr.10
33378 Rheda-Wiedenbrück
Telefon +49(0)5242 9646-0
www.bmsbaumaschinen.de


Projekt: Alpha Energy Plus
Datum: 17.04.2014
Zeichnungsnummer:
Anlage:
Ort:
Rev.: 17.04.2014
erstellt von: Felsch
Blatt: 3
Bau-Maschinen-Service AG
Daimlerstraße Nr.10
33378 Rheda-Wiedenbrück
Telefon ++49(0)5242 9648-0
www.bmsbaumaschinen.de
Mischzeit Ein
Mischwerk
Mischzeit
Hochfahrzeit
Fördern
Hand
Aus
Autom.
Mischzeit
2bar
F9 10A
K1T
K2T
K3T
K4
Y1
Y2
H4 gelb
1A
DI 30s
S10


Klemmleiste im Steuerschrank
Mischwerk
Aus
Hand
Autom.
Mischzeit Ein
Mischwerk ist Aus
H4 gelb
H2 rot
H3 rot
H1 grün
Ein Domsleb Störung
Steuerkabel 18x1,0mm
Bedienerfeld
Projekt: Alpha Energy Plus
Datum: 17.04.2014
Zeichnungsnummer:
Anlage:
Ort:
Rev.: 17.04.2014
erstellt von: Felsch
Blatt: 4
Bau-Maschinen-Service AG
Domsleb Str. 10
33378 Rheda-Wiedenbrück
Telefon +49(0)52 42 96 6-0
www.bmsbaumaschinen.de


T1
F4
F3
F2
F1
Q1
K5
K4
K3
K2
K1
K4T
K3T
K2T
K1T
Klemmleiste
F5 F6 F7 F8 F9
KM1
Inverter
Anordnung
Montageplatte
Projekt:
Alpha Energy Plus
Datum:
17.04.2014
Zeichnungsnummer:
Anlage:
Ort:
Rev.:
17.04.2014
erstellt von:
Felsch
Blatt:
5
Bau-Maschinen-Service AG
Daimlerstraße Nr. 10
33178 Paderborn
Telefon +49(0)5254 9646-0
www.bmsbaumaschinen.de