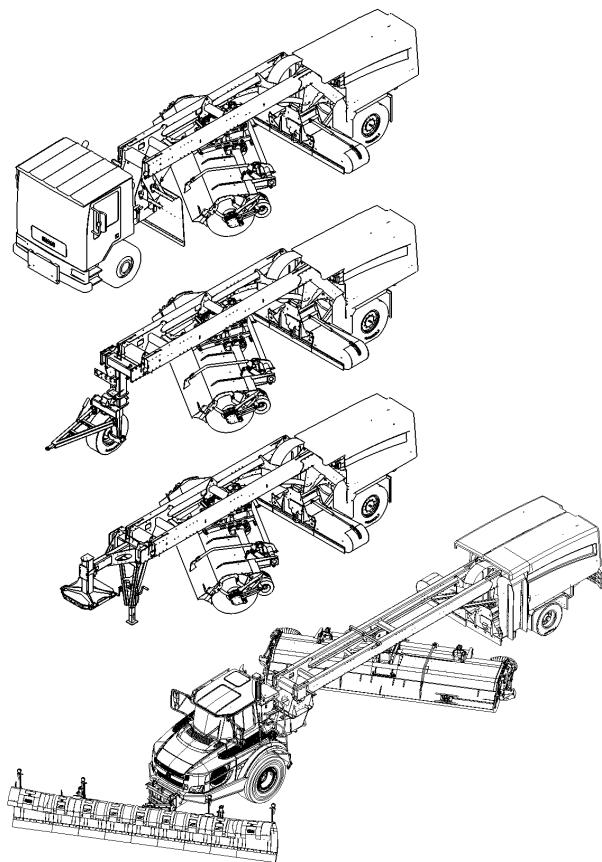




a brand of aebi schmidt

Snow Clearance

Towed Jet Sweeper
Model: TJS / TJS- C



Operating Instructions for Driving Personnel (Translation of Original Operating Instructions)

Valid from 12/ 2022

Valid till:

Revision: 1

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1 Foreword

Read this User Manual thoroughly before putting the machine into operation. Any references to other documents that are made in this User Manual automatically include those documents as part of the description/instructions. (e.g. for engines, vehicles etc.).

This User Manual contains all the important instructions for using and carrying out maintenance on your machine. If these instructions are adhered to, the machine will be able to complete its tasks satisfactorily and will achieve a long service life.

Anyone working with the machine must fully understand the machine functions and must be able to safely operate the machine. To ensure this is the case, the User Manual should always be available with the machine.

The User Manual belongs with the machine and should remain with it should it be transferred to a third party.

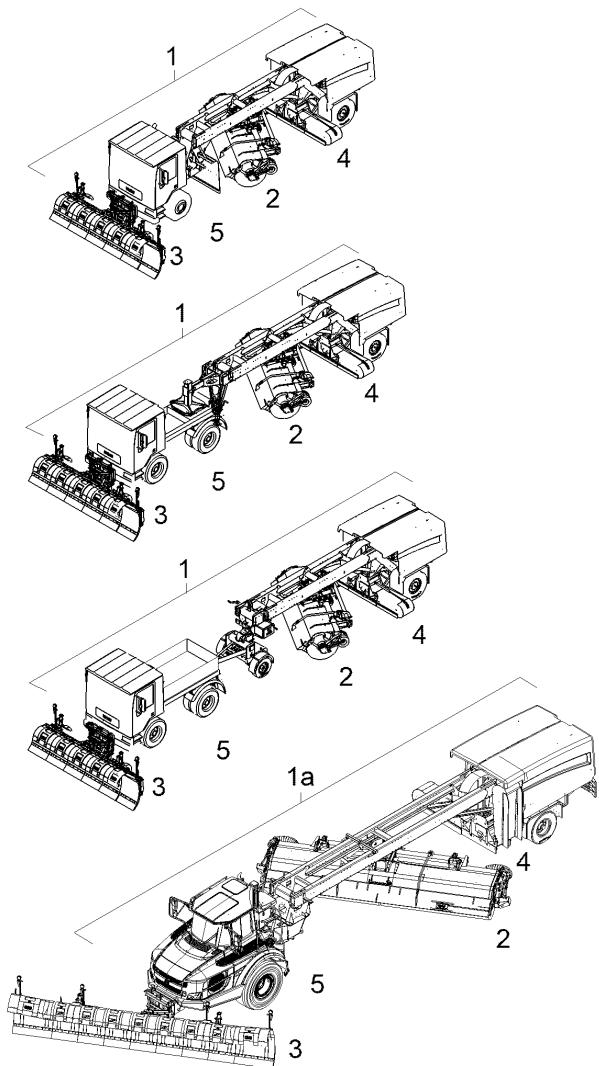
The User Manual must not be reprinted, translated or copied without written permission.

We reserve the right to make changes to the technical details included in the specifications and diagrams in this User Manual. No claims can be made as a result of these changes. Special equipment can be described as long as it requires an explanation.

Should you have any questions or problems with the machine, our service department will be pleased to assist you.

2 General information

2.1 Operating manual



In these operating instructions, the Towed Jet Sweeper Model TJS (1) or TJS-C (1a) will be referred to only as TJS and/or "machine".

The TJS or TJS-C is comprised of the following attachments, which are referred to by their names in the operating instructions:

- Snow plough (3)
- Sweeper unit (2) consisting of the sweeping brush and raising and lowering facility main components
- Blast nozzle (4) consisting of blower and blast shaft main components
- Vehicle (5)

Read these operating instructions carefully and make yourself familiar with the features of the TJS/TJS-C in advance. Make sure that you read thoroughly and understand the contents of this manual, particularly the safety instructions. Only then can you be confident that you are operating the TJS/TJS-C safely and economically.

Anyone working with the TJS/TJS-C must fully understand the TJS/TJS-C functions and must be able to safely operate the machine.

These operating instructions contain all the important indications for the use and maintenance of the TJS/TJS-C. As such, it is advisable to ensure that the operating manual is always within reach of the TJS/TJS-C.

To prolong superior performance, we recommend that you maintain the TJS/TJS-C in strict compliance with the instructions in this manual, and use only genuine Aebi Schmidt replacement parts. In this way, the TJS/TJS-C can complete its tasks to your satisfaction and offer a long service life.

The directions "right" and "left" in this manual refer to the direction of travel or from the driver's line of vision, facing forwards.

The control panel can be adapted to your specific requirements. In this case, certain functions that are described in these operating instructions may not be activated on your control panel. Changes to set parameters may only be performed by Aebi Schmidt customer service.

The operating instructions belong with the TJS/TJS-C and should remain with it should it be transferred to a third party.

2.2 Explanation of symbols

This operating manual contains information to help avoid accidents and personal injury. The relevant sections of text are marked with the following symbols:

**DANGER!**

Draws attention to a hazardous situation!

This situation will lead to death or serious injury if not avoided.

**WARNING!**

Draws attention to a hazardous situation!

This situation may lead to death or serious injury if not avoided.

**CAUTION!**

Hazardous situation!

This situation may lead to minor or moderate injury if not avoided.

This operating manual contains information to help avoid damage to property and the environment. The relevant sections of text are marked with the following symbols:

**IMPORTANT!**

This situation will lead to machine damage if not avoided.

**ENVIRONMENT!**

This situation will lead to environmental damage if not avoided.

**NOTE**

Additional information

Notice on understanding the machine and its functions, tips for simplifying work and optimising the use of machine performance.

2.3 Conversion table

Group	Unit	Meaning	Conversion
Time	s	Seconds	-
	min	Minutes	1 min = 60 s
	h	Hours	1 h = 60 min
Lengths	mm	Millimetres	1 mm = 0.001 m
	cm	Centimetres	1 cm = 0.01 m
	m	Metres	-
	km	Kilometres	1 km = 1000 m
	" (in)	Inches	1" = 2.54 cm
	ft	Feet	1 ft = 30.48 cm
	yd	Yards	1 yd = 3 ft = 0.9144 m
Electric	V	Volts	-
	A	Amperes	-
	Ah	Ampere hours	-
Force	Nm	Newton metres	-
Speed	m/s	Metres per second	1 m/s = 3.6 km/h
	km/h	Kilometres per hour	-
	mph	Miles per hour	1 mph = 1.61 km/h
	m/s^2	Metres per second ²	-
	rpm or U/min	Revolutions per minute	-
	Hz	Hertz (frequency)	1 Hz = 1 s^{-1}
Volume	ml	Millilitres	1 ml = 0.001 l
	l	Litres	-
	cm^3 or ccm	Cubic centimetres	1 cm^3 = 1 ml

Group	Unit	Meaning	Conversion
Weight	g	Grams	-
	kg	Kilograms	1 kg = 1000 g
	t	Tons	1 t = 1000 kg
	lb	Pounds	1 lb = 0.45 kg
Temperature	°C	Degrees Celsius	°C = (°F-32)*5/9
	°F	Degrees Fahrenheit	°F = °C*1.8+32
Pressure	mbar	Millibar	1 mbar = 0.001 bar
	bar	Bar	-
	psi	Pound per square inch	1 psi = 0.069 bar
Performance	W	Watts	-
	kW	Kilowatts	1 kW = 1000 W
	HP	Horse power	1 HP = 0.74 kW
Flow volume	l/min	Litres per minute	-
	l/h	Litres per hour	-
Other	db(A)	Decibels	-
	°	Angle	-

Group	Unit	Meaning	Conversion
Time	s	Second	-
	min	Minute	1 min = 60 s
	h	Hour	1h = 60 min

Group	Unit	Meaning	Conversion
Lengths	mm	Millimetre	1 mm = 0.001 m
	cm	Centimetre	1 cm = 0.01 m
	m	Metre	-
	km	Kilometre	1 km = 1000 m
	" (in)	Inch	1" = 2.54 cm
	ft	Foot	1 ft = 30.48 cm
	yd	Yard	1 yd = 3 ft = 0.9144 m
	Mile	1 mile (statute)	0.6214 mile = 1 km
	Mile	1 mile (nautical)	0.54 mile = 1 km
Electrical	V	Volt	-
	A	Ampere	-
	Ah	Ampere hour	-
Force	Nm	Newton metre	-
Speed	m/s	Metre per second	1 m/s = 3.6 km/h
	km/h	Kilometres per hour	-
	mph	Miles per hour	1 mph = 1.61 km/h
	m/s ²	Metre per second ²	-
	min ⁻¹ (rpm)	Per minute (revolutions per minute)	-
	Hz	Hertz (frequency)	1 Hz = 1 s ⁻¹
Volume	ml	Millilitre	1 ml = 0.001 l
	l	Litre	-
	cm ³ or ccm	Cubic centimetre	1 cm ³ = 1 ml
	cu.in.	Cubic inch	0.061023 cu.in. = 1 cm ³
	cu.ft.	Cubic foot	35.3156 cu.ft. = 1 m ³
	Pint		1 pint = 473.18 ml
	Gallon		1 gallon = 3.785 l

Group	Unit	Meaning	Conversion
Weight	g	Gram	-
	kg	Kilogram	1 kg = 1000 g
	t	Ton	1 t = 1000 kg
	lb.	Pound	1 lb. = 0.45 kg
	gr	Grain	15.432 gr = 1 g
	oz.	Ounce	0.0353 oz. = 1 g
Temperature	°C	Degrees Celsius	°C = (°F-32)*5/9
	°F	Degrees Fahrenheit	°F = °C*1.8+32
Pressure	mbar	Millibar	1 mbar = 0.001 bar
	bar	Bar	-
	psi	Pound per square inch	1 psi = 0.069 bar
	lbf./ft. ²		2048 lbf./ft. ² 1 kp/cm ²
Output	W	Watt	-
	kW	Kilowatt	1 kW = 1000 W
	HP	Horse power	1 HP = 0.74 kW
	HP	Horse power	0.9863 HP = 0.746 kW
Volumetric flow	l/min	Litres per minute	-
	l/h	Litres per hour	-
Miscellaneous	db(A)	Decibel	-
	°	Angular dimension	-

2.4 Abbreviations

Abbreviation	Meaning
AC	Alternating Current
ADC	Automatic Drive Control
Betr.SichV	Ordinance on Industrial Safety and Health
and/or	and/or, respectively

Abbreviation	Meaning
approx.	approximately
DC	Direct current
DIN	German Industry Standards
DOF	Diesel oxidation catalyst
DPF	Diesel particle filter
possible/any	possible/any
If required	If required
cpl.	Complete
LED	Light-emitting diode
le	Left
MA	Torque
max.	Maximum
MIL	Malfunction indicator light
min.	Minimum
No.	Number
OBD	On-board diagnosis
PA	Polyamide
ri	Right
SCR	Selective Catalytic Reduction
StVZO	German Road Traffic Licensing Act
AF	Software
etc.	And so on, etc.
UVV	Accident Prevention Regulations
e.g.	For example
Perm.	permissible
Ø	Diameter
%	Percent

3 Safety

3.1 Regulations

Additional airport regulations must be observed during use.

3.2 Modifications to the machine

Modifications to the machine

Aebi Schmidt must first approve any alterations, additions or modifications that may affect the safety of the machine. This also applies to settings for safety devices and welding of load-bearing parts or to modifications to the hydraulic or electronic systems.

3.3 General safety regulations

The safety instructions are provided where there is direct danger. General safety instructions are described hereafter and must be adhered to.



WARNING!

Supplementary to the operating instructions.

Non-observance can cause accidents that result in injuries.

- ▶ Generally applicable statutory and other regulations regarding accident prevention and environmental protection must be observed and followed.

**WARNING!**

Persons can be overlooked when working on exposed areas of the machine.

There is a risk of people becoming entangled or being run over when turning on the machine or driving it away.

- ▶ Work on the machine may only take place if it is safely parked.
-

**WARNING!**

Steps and treading surfaces may be slippery.

When used, people may fall.

- ▶ Keep dirt, grease, oil, snow, and ice away from steps and treading surfaces.
-

**WARNING!**

Excessive physical strain.

Spinal injuries are possible, for example.

- ▶ Assistance is to be sought or a suitable lifting device is to be used for work that requires excessive physical exertion.
-

**WARNING!**

Non-recognition of danger zones.

Danger zones are marked with safety and hazard instructions.

Non-observance can cause severe injuries.

- ▶ All safety and hazard instructions for the machine must be observed and retained in a complete and legible condition.
-

**WARNING!**

Control panel functions that require a password are usually dangerous.

People may be caught and injured by the suction effect.

Persons that use password-protected functions must:

- ▶ Have undergone training and instruction for these functions.
- ▶ These people must be informed of the dangers of the individual functions.
- ▶ The password is only to be passed on to trained and instructed personnel.
- ▶ After the work is complete, the password must be cleared by switching the ignition off.

**WARNING!**

Non-recognition or failure of legal warning equipment.

Machine dimensions, for example, may not be recognised. This can cause serious accidents with injuries.

- ▶ Check that any warning signs required (in Germany the StVZO [German Road Traffic Licensing Regulations] and approved instructions for winter service vehicles) are complete and functional and observe them.

**WARNING!**

Low-quality replacement parts.

Low-quality replacement parts may not fulfil their functions. This can cause serious accidents with injuries.

- ▶ Use only original parts or replacement parts of the same quality.

**WARNING!**

Sharp edges may arise due to the incorrect adjustment of machine parts, like the wiper, or due to wear of components.

Sharp edges can lead to cutting injuries.

- ▶ Corresponding personal protective equipment such as protective gloves and goggles must be worn during maintenance and repair work.
-

**WARNING!**

Working on the machine

The machine can start to move and cause injuries.

- ▶ Work may only be carried out on the machine if the vehicle is safely parked.
 - ▶ Protective and safety equipment may only be removed for maintenance and repair work.
 - ▶ The machine is only permitted to be put into operation with the protective and safety equipment fitted.
-

**WARNING!**

Plastics may contain hazardous materials (such as adhesives, solvents or hardeners).

Prolonged skin contact with plastics may lead to skin irritations.

- ▶ Gloves must be worn for prolonged contact with rubber or plastic parts, such as changing the plastic cutting-edges etc.
-

**WARNING!**

The range of vision is limited by the machine.

People can be run over.

- ▶ When driving off with the machine, the driver must ensure that there are no persons located in the danger zones.
-

**WARNING!**

Machine movements when starting and using the machines.

People may be caught and injured.

- ▶ Absolutely ensure that no persons are located in the danger zone around the machine.
-

**CAUTION!**

Electronic devices (e.g. telephone and radio equipment) can cause interference and thus jeopardise the operating safety of the machine.

This circumstance can influence the operating safety of the machine and cause accidents with injuries.

- ▶ Use or install only equipment with an EMC test (E-certificate).
-

3.4 Intended use

The machine is intended for use on air traffic surfaces. The machine is only intended for removing snow, water and ice. Its use for any other or additional purpose, e.g. brushing grit, construction site dirt, etc., constitutes misuse. Do not operate the machine in the vicinity of substances that are hazardous to health, flammable or explosive.

3.5 Target groups

Vehicle owner

The vehicle owner is responsible for the machine. The owner must ensure that:

- The machine is in a safe condition compliant with regulations.

- The regular safety inspection (inspection according to accident prevention regulations in Germany) must be performed.
- Only qualified expert driving personnel must start up the machine.
- The driver has been instructed not to exceed the statutory working hours. Exceeding the working time can lead to overload of the driver and cause accidents.
- Only suitable workshop personnel must perform maintenance and repair work.
- Use only original parts or replacement parts of the same quality. Low-quality replacement parts may pose a safety risk.

Driving and operating personnel



WARNING!

Poorly trained or unqualified driving personnel.

This can cause serious accidents.

- ▶ Sufficiently and regularly train the driving personnel, e.g., after longer work breaks.
-

Requirements for the machine driver

- Valid driving licence to drive the machine.
- Training and instruction for the machine.
 - Vehicle
 - Auxiliary engine
 - Snow plough
 - Sweeping and suction unit
- Driver training with the machine.

Once training, instruction and driver training for the complete machine have been successfully completed, this should be confirmed in writing.

Important information is often forgotten.

After driving personnel have not used the vehicle for a long time:

- Before every winter season, refresher training must be carried out to maintain safety when using the machine.

Workshop personnel

Only expert workshop personnel authorised by Aebi Schmidt may maintain and service the machine to exclude any risks to people or the environment from the machine.

The authorised workshop personnel have the necessary specialised knowledge and tools for carrying out the required work on the machine properly.

The authorised personnel are herein-after referred to as the workshop personnel only.

3.6 Personal protection equipment

The personal protective equipment must guarantee safe use. Damaged protective equipment must not be used. It must be replaced immediately.

Hearing protection



- Reduced risk of hearing damage

Hearing protection must be worn from 85dB(A).

Safety shoes



- Reduce injuries to feet
- Improve grip

Gloves



- Prolonged skin contact with plastics may lead to skin irritations. Plastics may contain hazardous materials (such as adhesives, solvents or hardeners).
- Protect hands from the cold. Skin can freeze onto cold objects.

- Sharp or pointed objects (such as cutting-edge change) can injure hands.
- Sharp edges may arise due to wear, damage to components, and so on. These sharp edges may cause hand injuries, e.g. when cleaning the machine.
- Fluids (such as oils, coolant, battery acid, etc.) can damage hands.
- For reasons of hygiene and safety, the wearing of gloves is recommended when cleaning the machine.

Reflective clothing, weather protection and protective clothing



- Reflective clothing improves visibility when outside the vehicle. Weather protective clothing should protect against dangers to health when working in the open air. Protective clothing improves protection against damaging influences such as maintenance work, cleaning the machine, etc.

Facial protection



- The wearing of facial protection is recommended when working with high-pressure cleaners. Facial protection protects the eyes, in particular from splashed dirt particles, when cleaning the machine.

3.7 Danger zone of the machine

General notes on the danger zone



WARNING!

Non-observable machine movements.

Persons could get caught or be run over by the machine.

- If machine movements are performed or the machine is started up, no one may be in the danger zone. If necessary, a safety spotter who has a line of sight to the driver must be used.

Snow plough danger zone



WARNING!

The snow plough performs movements.

People may be caught and injured.

- The danger zone is described in the operating instructions of the snow plough. These operating instructions must be strictly observed to prevent accidents.

- The pivot area of the snow plough
 - People can be caught between the snow plough and the vehicle.

- Pivot range of the folding blades on the snow plough
 - People can be crushed between the folding blades and vehicle.
- Raising and lowering range of the snow plough
 - People can be caught between the snow plough and the ground below.
- Between the snow plough and the vehicle plate
 - People can be crushed when driving the vehicle up to the snow plough for attachment.

Wheels of the steerable rear axle turned

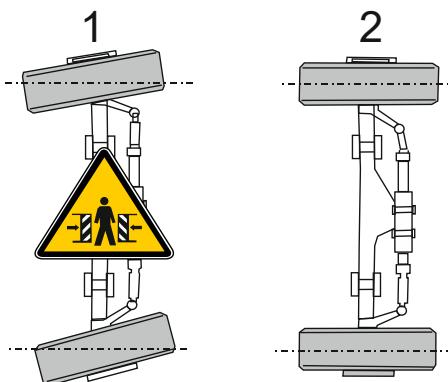


WARNING!

Wheels can unexpectedly move into straight-ahead driving due to the pressure reservoir.

People may be crushed.

- ▶ Do not stand or be otherwise located between the fenders and turned wheels.
When parking the machine, always set the rear axle steering wheels to straight ahead.
- ▶ Before maintenance and repair work on the steerable rear axle, always empty the pressure reservoir.



Machine with turned wheels of the rear axle steering (1). During maintenance work, always set the rear axle steering in the straight-ahead position (2) and empty the pressure reservoir.

Shunting, reverse travel

Shunting and reverse travel are dangerous. The responsibility for this driving manoeuvre always lies with the driver. Driving in reverse is only allowed if it is ensured that nobody is endangered. If necessary, a suitable person must be appointed as a spotter.



WARNING!

If the driver cannot see the area to the rear during reverse travel.
The rear-view camera does not replace the spotter.
People can be run over.
► If the area to the rear of the vehicle is not visible, a spotter must be used.

Driving into junctions



WARNING!

Due to the snow plough mounted on the front that protrudes, driving into crossings or side roads can constitute a dangerous situation.

This can lead to collisions with other vehicles.

► A safety spotter is always to be used in unclear intersections, junctions, etc.

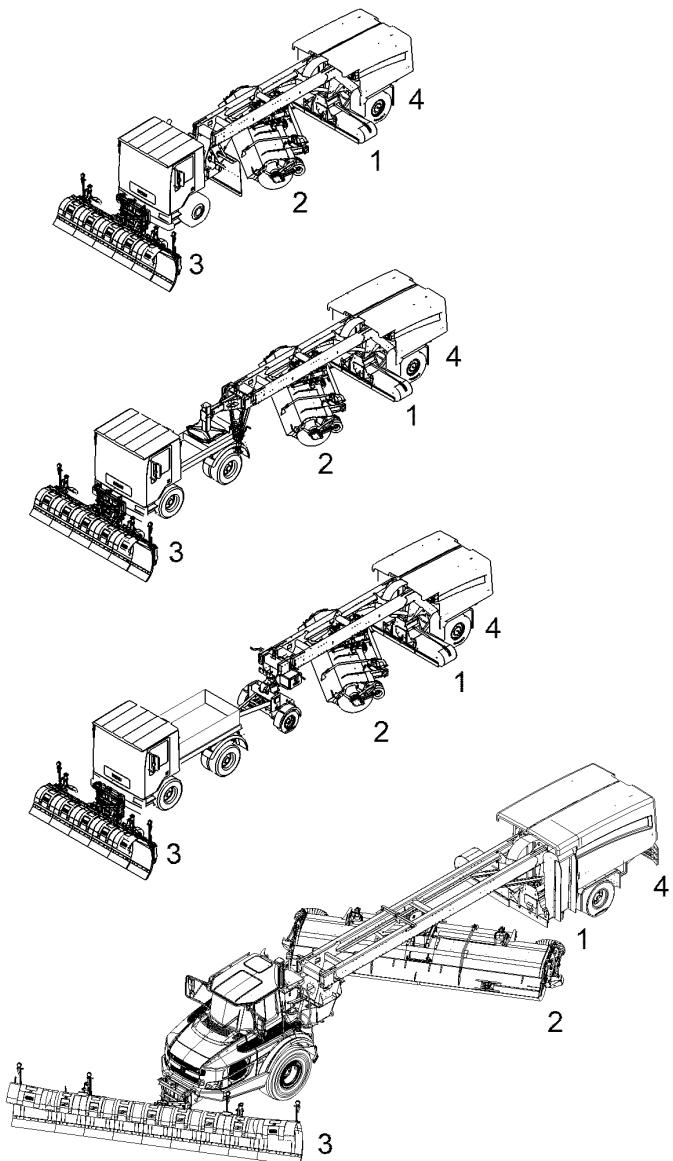
Danger zone when steering the TJS

**WARNING!**

Pivoting, lowering and lifting movements of the machines.

People may be caught and crushed.

- Keep a safe distance when the TJS is running.

**Snow plough (3)**

- See the snow plough's operating instructions.

Sweeper unit (2)

- The movement must be stopped immediately if somebody steps into the raising, lowering and pivoting area of the sweeper unit.
- Persons must keep a safe distance of at least 5 m.

Blast nozzle (1)

- Movement is to be stopped immediately if somebody steps into the raising and lowering area of the blast nozzle.
- Persons must keep a safe distance of at least 5 m.

Rear axle auxiliary steering (4)

- Turned wheels can unexpectedly switch to the straight-ahead position. Never enter the area between the turned wheels and the vehicle frame. When parking the TJS, always turn the steering into the straight-ahead position.

Danger zone during snow clearance with the TJS

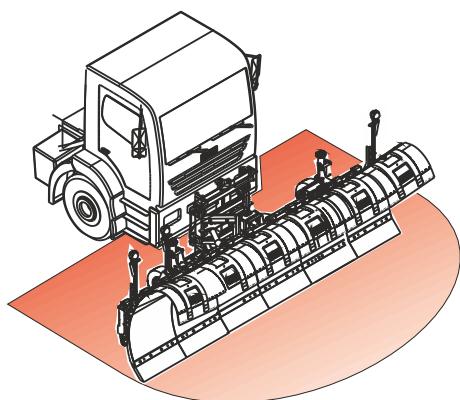


WARNING!

Throwing of objects hidden in the snow.

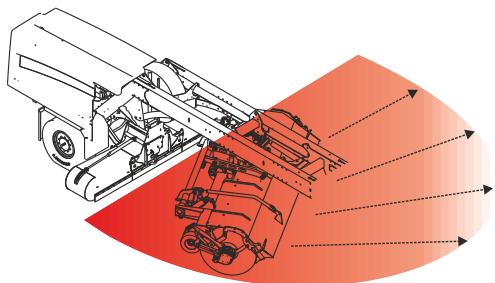
Persons could be hit by objects.

- ▶ Observe the required distance.
It should be noted that heavy objects hidden in the snow (such as stones, lumps of ice, etc.) may fly further than the snow itself. If persons are in or enter the danger zone, the TJS must be stopped and the drive of the blast nozzle and the sweeper unit must be switched off immediately.



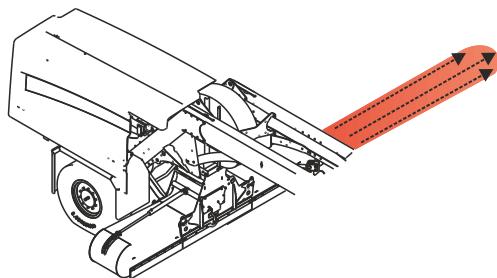
Snow plough

- See the snow plough operating instructions for the safety distance.



Sweeper unit

- Direction of snow discharge, sweeping direction
 - 15 m to the side
 - To the front 10 m



Blast nozzle

- Direction of snow discharge, blower direction
 - 30 m to the side.

Rear axle steering

- When the auxiliary steering is switched on, unusual driving behaviour may occur when negotiating curves. Inexperienced drivers drive slowly.

Open/close the engine cover danger zone

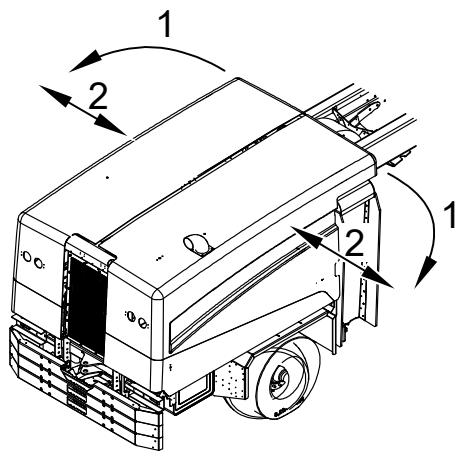
There are three ways to open the engine cover.

- Engine cover with swivel mechanism
- Engine cover with tilt mechanism
- Engine cover with swivel-tilt mechanism

Depending on the design of your snow-clearing machine, the engine cover can be swivelled or tilted outwards when opened.

Motor cover with swivel mechanism

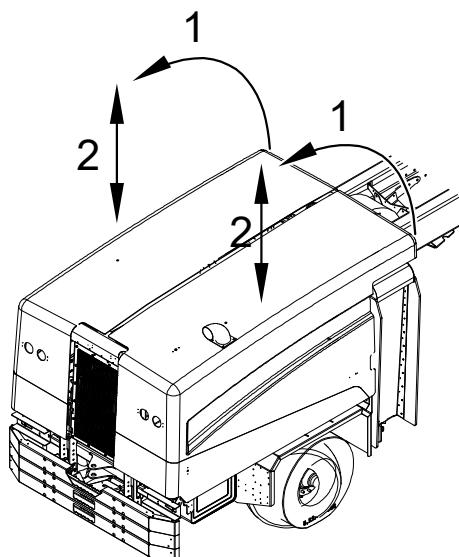
Motor cover is opened and closed manually. The engine cover swivels outwards (1) when opened.



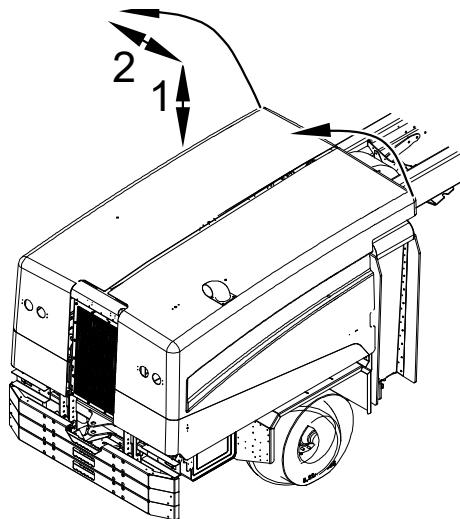
- People can be crushed between the engine cover and the outer wall.
- The engine cover can hit the outer wall and get damaged.
 - Before opening the engine cover, ensure sufficient clearance (2).

Engine cover with tilting mechanism

Engine cover is opened and closed hydraulically. The engine cover tilts upwards (1) when opened.



- The engine cover can collide with the ceiling. Objects on the ceiling can fall and injure people. The ceiling and engine cover can get damaged.
 - Before opening the engine cover, ensure sufficient clearing height (2).

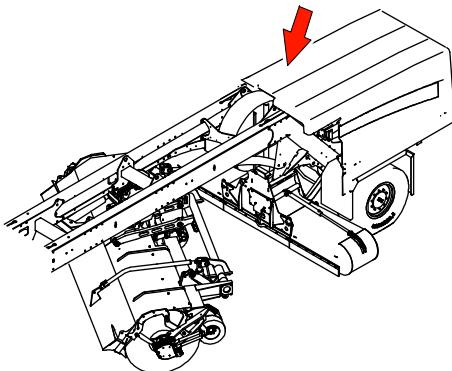


Engine cover with swivel-tilt mechanism

Engine cover is opened and closed hydraulically. The engine cover tilts upwards (1) and swivels outwards (2) when opened.

- The engine cover may collide with the outer wall and ceiling. Objects on the ceiling can fall and injure people.
 - Before opening the engine cover, ensure sufficient clearance.
- People can be crushed between the engine cover and the outer wall.

Engine cover



Never start driving the TJS with the engine cover open.

- Close engine cover

3.8 Protective and safety equipment

Mirrors

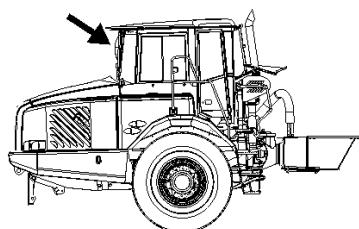
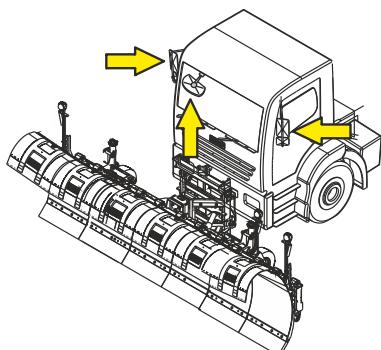


WARNING!

Non-observance of danger zones through mirrors

People may be caught and injured by the TJS.

- ▶ The danger zones are visible through mirrors. Before use, adjust the mirrors in such a way that the danger zones can be seen. Always keep mirrors clean. Destroyed mirrors must be replaced as quickly as possible.



Danger zones that can be viewed through mirrors

- The pivot area of the snow plough
 - People can be caught between the snow plough and the vehicle.
- Raising and lowering range of the snow plough
 - People can be caught between the snow plough and the ground below.

- Between the snow plough and the vehicle plate
 - People can be crushed when driving the vehicle up to the snow plough for attachment.
- The pivot area of the cross brush
 - People can be crushed between the cross brush and frame parts.
- Raising and lowering range of the cross brush
 - People can be crushed between the cross brush and frame parts.
- Raising and lowering movement of the blast nozzle
 - People can be caught between the blast nozzle and frame parts.

Emergency stop button

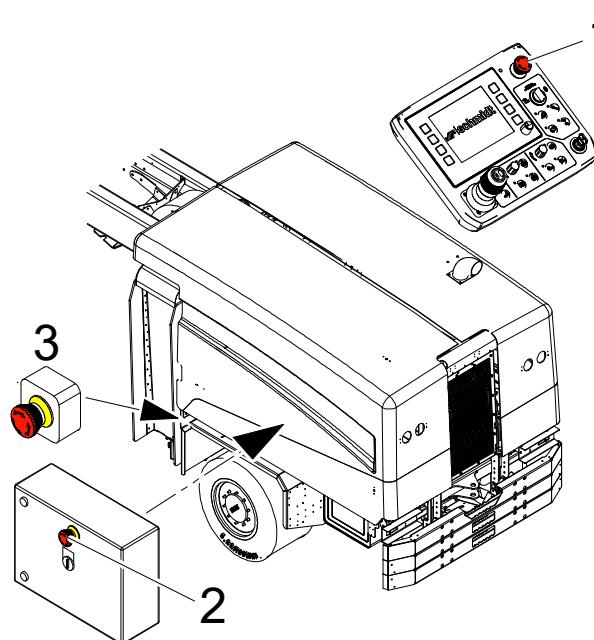


WARNING!

People enter the danger zone of the TJS.

Persons could be caught by the machines of the TJS.

► EMERGENCY STOP buttons serve to quickly shut down the TJS in the event of an emergency or to avoid a hazard.



1 The emergency stop button can be found on the following:

- Control panel (1).
- Electrical cabinet (2).
- At the rear left and right (3).

Fire extinguisher



The fire extinguisher is located behind the driver's cab.

The operational readiness of the fire extinguisher must be checked according to the manufacturer's information. The manufacturing date or final inspection date on the fire extinguisher applies.

Park the TJS safely



WARNING!

If the TJS is not parked properly, the TJS or parts of it can move. and cause accidents.

- In case of any work performed on the TJS, you must park it safely.

Park TJS safely.

- Park the TJS on level ground that is able to support its weight

- Using auxiliary steering, set the wheels of the front and rear axles in the straight-ahead position.
- Lift or lower the cross brush onto the castor wheels and swivel it into the transit lock.
- Raise the blower unit.
- Park the snow plough safely (see separate operating instructions from the snow plough manufacturer).
- Turn off the control panel to steer the TJS.
- Apply handbrake. Turn the vehicle and auxiliary engines off and remove the ignition key.
- Lock the driver's cab doors.
- If necessary, place chocks under both wheels so that the TJS cannot roll away.

3.9 Lashing and mounting points

The TJS is not approved for driving on public roads. The TJS must be loaded onto another vehicle for transport on public roads.



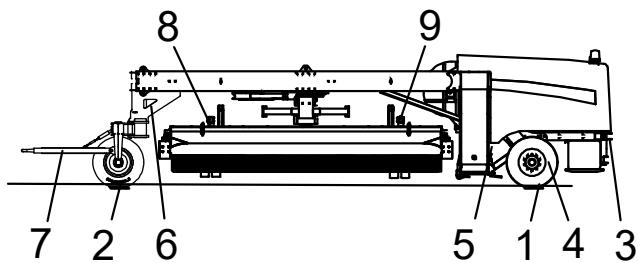
Lashing points

For road transport, the pertinent regulations for fastening and lashing must be observed.

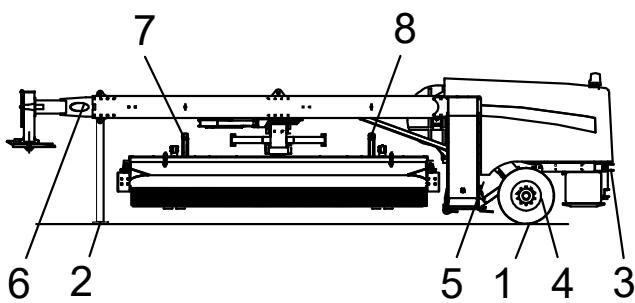
Lashing points are marked with this symbol.

Lashing and fastening points, model TJS-4-Rad

- Push TJS into the loading area with the appropriate vehicle.
- Secure the rear wheels (1) and castor wheel (2) with chocks against rolling and sideways movement.
- Lash TJS down and against deceleration and acceleration forces. Hang the lashing straps in the following eyelets or frame parts and tighten.
 - Tow hooks (tighten to the rear 3)
 - Axle on the left and right (4)
 - Eyelets on the left and right of the frame (5)
 - Breach on the frame part on the left and right (6)
 - Drawbar (7)
- Secure brush against swinging. Hang the lashing strap on support tube at the level of the castor wheels (8/9) and lash down.



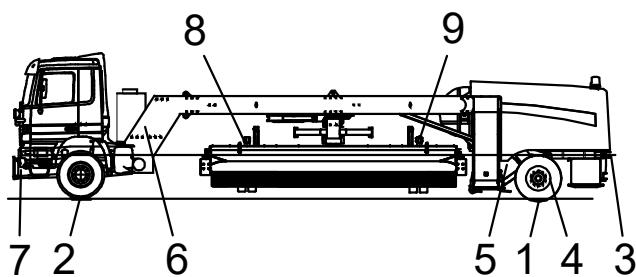
Lashing and fastening points, model TJS



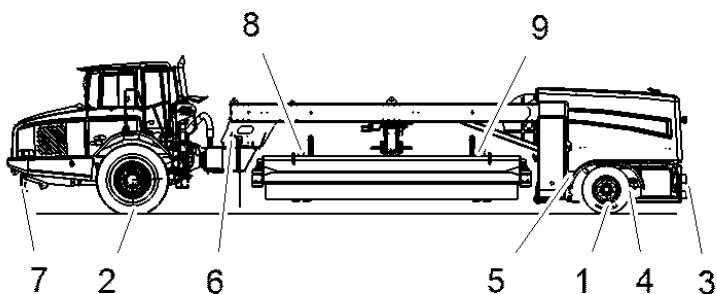
- Push TJS into the loading area with the appropriate vehicle and park on support leg.
- Secure the rear wheels (1) and castor wheel (2) with chocks against rolling or slipping and sideways movement.
- Lash TJS down and against deceleration and acceleration forces. Hang the lashing straps in the following eyelets or frame parts and tighten.
 - Tow hooks (tighten to the rear 3)
 - Axle on the left and right (4)
 - Eyelets on the left and right of the frame (5)
 - Breach on the frame part on the left and right (6)
- Secure brush against swinging. Hang the lashing straps on support tube at the level of the castor wheels (7/8) and lash down.

Lashing and fastening points, model TJS with power head

- Drive TJS into the loading area. Tighten the handbrake and close vehicle.
- Secure the rear wheels (1) and wheels of the power head (2) with chocks against rolling and sideways movement.
- Lash TJS down and against deceleration and acceleration forces. Hang the lashing straps in the following eyelets or frame parts and tighten.
 - Tow hooks (tighten to the rear 3)
 - Axle on the left and right (4)
 - Eyelets on the left and right of the frame (5)
 - Eyelets on the frame part on the left and right (6)
 - Frame part on the vehicle plate on the left and right (7).
- Secure brush against swinging. Hang the lashing strap on support tube at the level of the castor wheels (8/9) and lash down.



Lashing and fastening points TJS-C



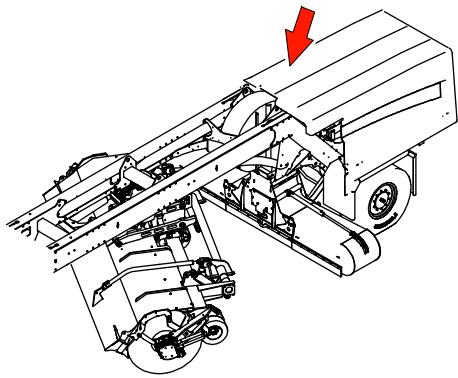
- Drive TJS into the loading area. Tighten the handbrake and close vehicle.
- Secure the rear wheels (1) and wheels of the tractor unit (2) with chocks against rolling and sideways movement.
- Lash TJS down to resist deceleration and acceleration forces. Hang the lashing straps in the following eyelets or frame parts and tighten.
 - Tow hooks (tighten to the rear 3).
 - Axle on the left and right (4).
 - Eyelets on the left and right of the frame (5).
 - Eyelets on the frame part on the left and right (6).
 - Frame part on the left and right side of the vehicle plate (7).
- Secure brush against swinging. Hang the lashing strap on support tube at the level of the castor wheels (8/9) and lash down.

Suspension points

The TJS does not have any eyelets to raise the TJS.

3.10 Covers

Engine cover

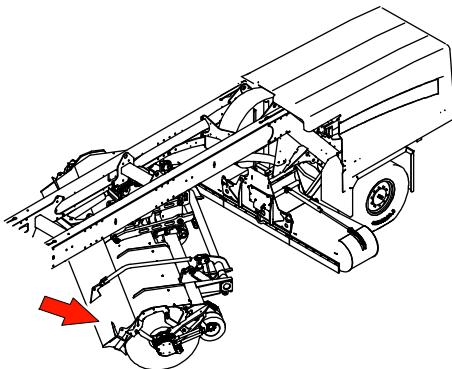


The engine cover covers the danger zones of the complete drive unit. Only the maintenance personnel may open the engine cover for the work on the drive unit.

Danger zones:

- Engine and engine mountings
 - People can seriously burn themselves on the engine and engine mountings.
- Blower
 - People may be caught by the rotating fan impeller and seriously injured.
 - Dirt particles can be ejected.
- Rotating ventilation wheel on the cooler
 - People may be caught and seriously injured.
- Water and oil cooler
 - People could be seriously burnt or scalded on the water and oil cooler.

Cylinder brush

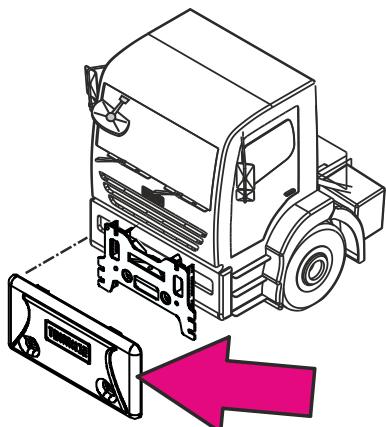


The cover goes over the cylinder brush.

The danger zones are:

- Rotating brushes
 - People may be caught by the brush and seriously injured.
 - People may be hit and injured when dirt particles are flung out.

Front-mounting plate



The cover is mounted to the front-mounting plate on the front side.

Function of the protective covering

- Covers corners and edges
- Protects against injuries
- Prevents soiling of the front-mounting plate

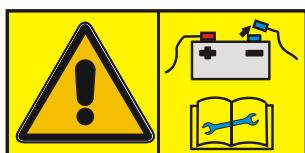
3.11 Labelling

Danger signs



The sign is located in the cab

- Read and follow the operating instructions before putting the machine into operation.



The sign is located in the battery box

- Remove the negative terminal on the battery before undertaking any repairs.

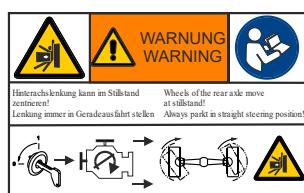


The sign is located on the rear side of the machine and on the cross brush.

- STOP Do not enter machine danger zones



The machine may be lashed down at these points.



The sign is located in the cab.
Rear axle steering can be centred at a standstill.

- Always park the machine safely.
The steerable rear axle must always be in the straight-ahead position.



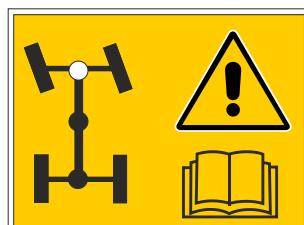
The sign is located above the steerable rear axle.

- Rear axle steering can be centred at a standstill.
- Do not stand or be otherwise located between the fenders and turned wheels.



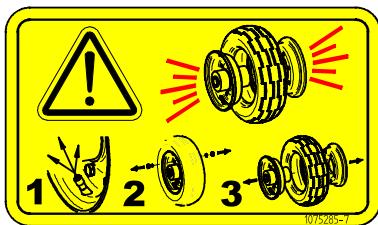
Attention: Hot drive parts, risk of burns

- Do not perform maintenance work until the drive parts have cooled down.



Differential lock; the sign is located in the cab.

- Read the operating instructions before putting the differential lock into place.

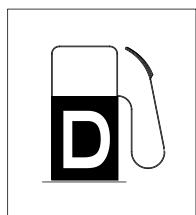


Remove the tyres; the plate is located on the trailing wheel on the sweeper unit.

There is a risk of injury if parts the wheel or tyres slip. When removing a tire or a rim half, make sure that they are not under pressure.

1. Let the air out
2. Take off the fastening bolts on the wheel halves.
3. Remove the wheel halves from the tyre.

Information signs



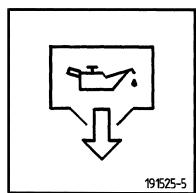
The sign is located on the diesel tank on the rear side.

- Only fill with standard vehicle diesel fuel (DIN EN 590).
- See also vehicle manufacturer's notes.

10 bar

Tyre pressure; the sign is located on the trailing wheel of the sweeper unit.

- Information sign. Recommended tyre pressure: 10 bar.



The sign is located in the middle on the frame.

- Oil drain plug for the diesel engine

ATF-A OEL

Sign is located on the hydraulic tank.

- Hydraulic oil topped up at the factory

3.12 Noise emission and vibration

Noise emission

The sound level at the workplace (driver's cab) is less than 70 dB (A) during normal operation.

Vibration

Hand-arm vibration

The value is less than 2.5 m/s²

Whole-body vibration

The value is less than 0.5 m/s²

Noise prevention

It is possible to prevent or reduce noise by lower the speed of the blower and sweeper units. This will reduce the clearing performance accordingly.

Vibration prevention

It is possible to avoid or lower vibrations by reducing the clearing speed. This will reduce the clearing performance accordingly.

3.13 Lifting loads

If, for example, lifting equipment and load lifting devices are used for the assembly and disassembly of the machines (snow plough, sweeper, blower, etc.), it is essential to observe this:

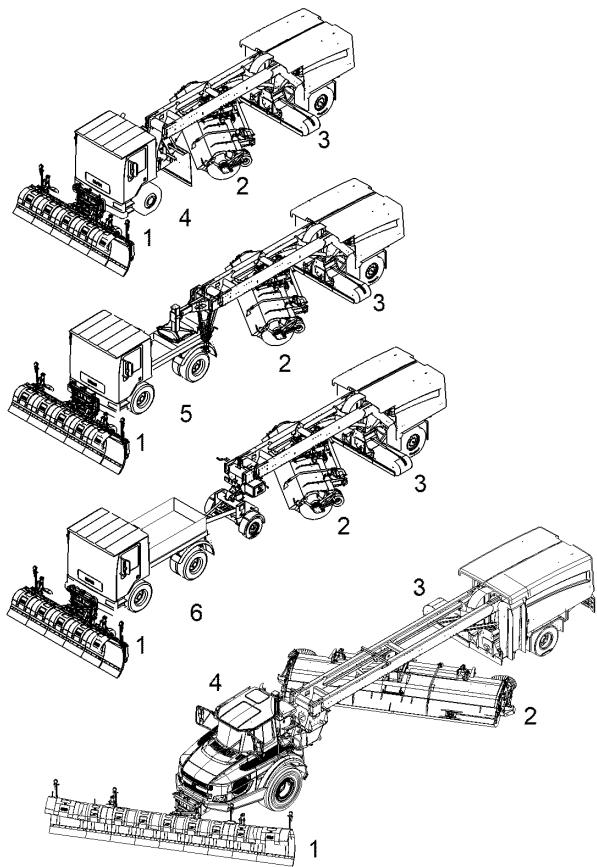
- Only use hoists and load handling devices that have been regularly inspected by a competent person.
- Before lifting, note the weight and the position of the centre of gravity.
- Lifting equipment and load handling devices must be suitable for the load.
- Hoists and load handling devices must be visually inspected before use.
- Professional lifting and setting down of the load.
- Ensure that no-one is in the danger zone during the performance test.

3.14 Installation and operation of additional devices

The installation guidelines of the base vehicle manufacturer must be observed for the installation, connection and operation of attachments to the vehicle.

4 Description of the machine

General information



The TJS is intended for use in winter on air traffic surfaces. It is a combination of snow plough (1), sweeper (2) and blast nozzle (3). A modified HGV is used as the towing vehicle.

Towing vehicles

- HGV power head (4)
- HGV with step deck trailer (5)
- HGV for trailer operation (6)
- Tractor unit (4)

Snow plough

The snow plough serves for initial clearing of the air traffic surfaces.

Sweeper

The sweeper sweeps the remaining snow to the side.

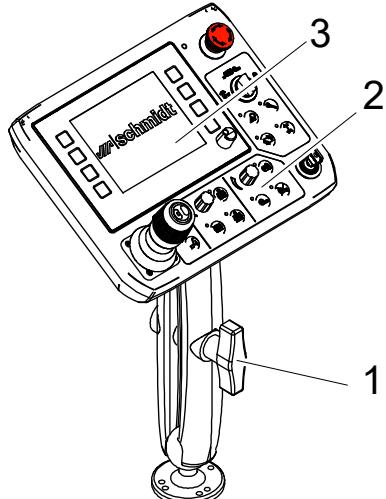
Blast nozzle

The blast nozzle clears the traffic surface of drifting snow with a simultaneous drying effect.

4.1 Description of parts

Control panel

The control panel is integrated into the driver's cab of the tow-vehicle.



The machine is set up for your wishes and operating conditions. It is therefore possible that some of the following options or functions are password-protected or have not even been unlocked or are not active.

The control panel consists of:

- Control panel holder (1)
- Switches/buttons (2)
- Display, control unit (3)

Rear mount / engine cover

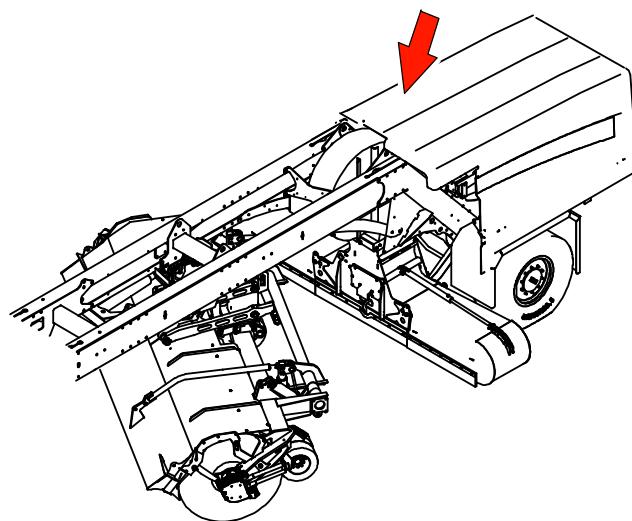


IMPORTANT!

Depending on the design of the exhaust system, it is possible that the tailpipe of the exhaust system is open at the top when the engine cover is open. Water can enter the engine through the exhaust tailpipe.

The diesel engine can be destroyed.

- If there is a risk of water entering the engine via the exhaust system when the engine cover is open (e.g., when cleaning the machine), always close the engine cover.



The engine cover protects the rear mount. For the visual inspection of the oil level in the hydraulic tank, the engine cover must be opened. The visual inspection takes place from the ground.

Only maintenance personnel may climb onto the drive unit.

Cold weather package

According to design, the cold weather package consists of the following:

- Hydraulic oil heater
- Coolant heater
- Battery charger

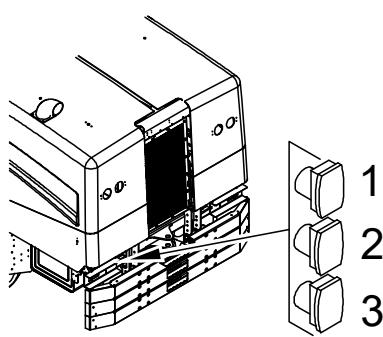


IMPORTANT!

Drive away without disconnecting the electrical plug-in connections.

The external and machine-specific electrical installation may be destroyed.

- ▶ Before driving away, always disconnect the plug-in connections.

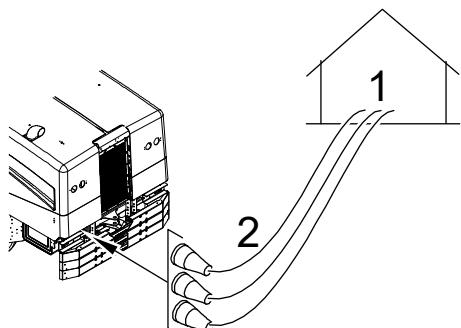


Cold weather package for drive unit, 120 V connection

The plug-in connectors for the power supply of the cold weather package of the TJS are located at the rear left.

Electrical connections on the TJS

- Heater 400W for hydraulic oil (1)
- Heater 1500W for coolant (2).
- Power supply for battery charger 800W (3).



External power supply

- The external power supply (house connection) for the cold weather package must correspond with the local safety regulations (1).
- The provided cable must be used as a connecting cable (2) between the house connection and machine.

Commissioning

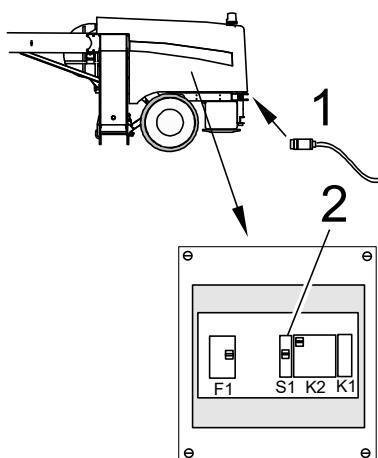
- Park the vehicle safely.
- Establish the power supply between the TJS and the house connection.
 - The heaters and battery charger are in operation.

Decommissioning

- Disconnect all connecting cables from the external power supply and machine.

Cold weather package for rear mount, 230 V connection

The plug-in connector (1) for the power supply of the cold weather package is located at the rear left.



Commissioning

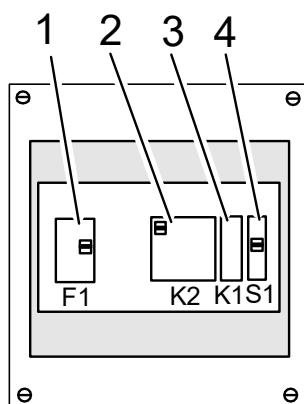
- Park the vehicle safely.
- Route the cable of the external power supply so that no-one can trip over the cable and no vehicles drive over the cable and damage it.
- Connect the external power supply (1) 230 V to the rear mount.
- The heaters can be switched on and off with a switch (2) in the distributor box. Depending on the design, the engine can then no longer be started.

Decommissioning

- Disconnect the external power supply (1) from the rear mount.

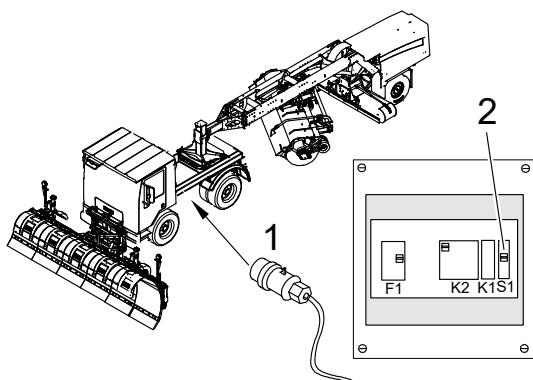
Distributor box

- Residual current circuit breaker (RCCB switch) (1)
- Relay for winter operation (2)
- Relay for summer operation (3)
- Toggle switch (4)
 - Summer operation: The battery charger is switched on.
 - Winter operation: The battery charger and heaters are switched on.



Cold weather package for vehicle, 230V connection

The plug-in connector (1) for the power supply of the cold weather package of the vehicle is located at the rear left behind the ladder.



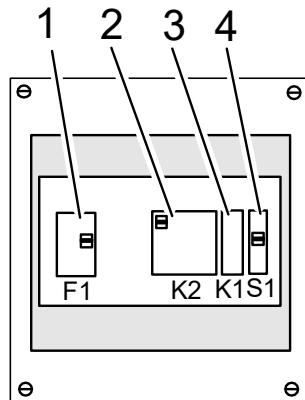
Commissioning

- Park the vehicle safely.
- Route the cable of the external power supply so that no-one can trip over the cable and no vehicles drive over the cable and damage it.
- Connect the external power supply (1) 230 V to the vehicle.
- The heaters can be switched on and off with a switch (2) in the distributor box. Depending on the design, the engine can then no longer be started.

Decommissioning

- Disconnect the external power supply (1) from the vehicle.

Distributor box



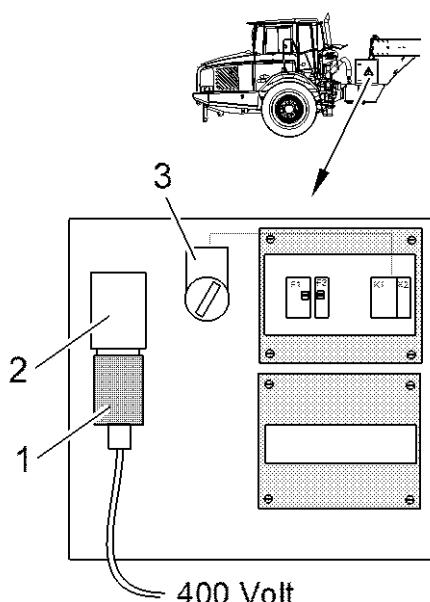
- Residual current circuit breaker (RCCB switch) (1)
- Relay for winter operation (2)
- Relay for summer operation (3)
- Toggle switch (4)
 - Summer operation: The battery charger is switched on.
 - Winter operation: The battery charger and heaters are switched on.

Cold weather package for the TJS-C, 400 V/16A connection

The plug-in connector for the power supply of the cold weather package of the TJS is located at the rear left behind the cab.

Commissioning:

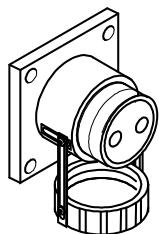
- Park the vehicle safely.
- Establish the external 400 Volt power supply (1) to the plug-in connection (2).
- Switch on the cold weather package with the rotary switch (3). The vehicle can then no longer be started.



Shutting down:

- Switch off with the rotary switch (3).
- Disconnect the external power supply (1) from the vehicle.

Remote start connector 24V



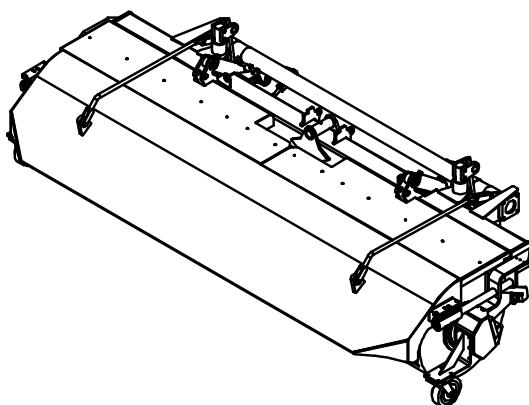
The remote start connector is located in the battery area.

A helping vehicle can jump-start the TJS through the remote start connector.

Jump starting

- Turn off the ignition and all electrical consumers of the TJS.
- Connect the jumper cables on the TJS and the helping vehicle.
- Start the engine of the helping vehicle and let it run at high speed.
- Start the engine of the TJS.
- After a successful start of the engine, remove the jumper cables.

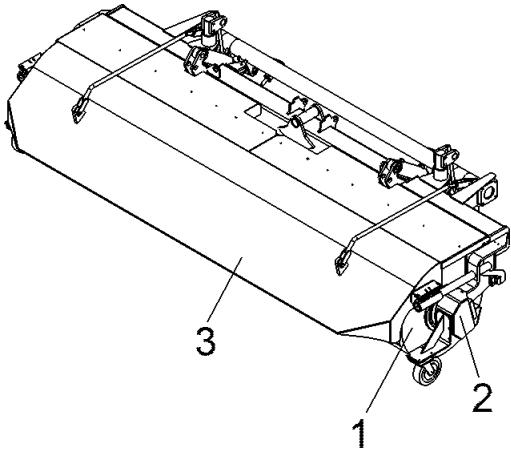
Cross brush



General description

The cross brush (1) can be optionally equipped with a 16 or 21 piece cassette or cylindrical brush system. The cross brush is connected to the lifting device on the carrier vehicle via two quick release pins. The cross brush is pivoted by hydraulic cylinders. The pivot point is directly above the cross brush. The cross brush is equipped with a camber compensator so that the cross brush can be easily adapted

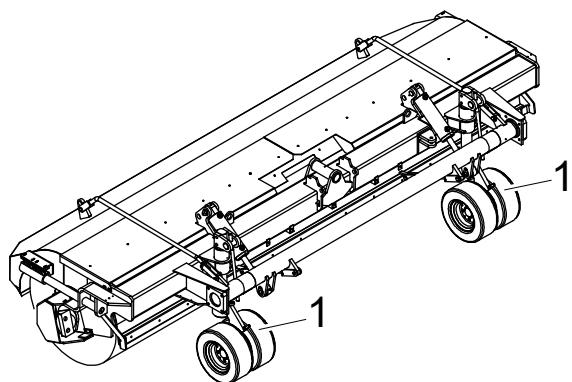
to different ground conditions. Lifting and lowering is performed using the hydraulic lifting device.



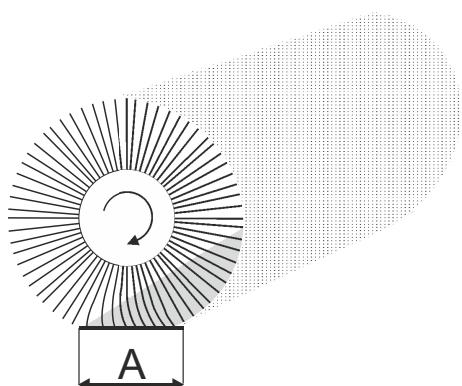
To prevent snow build-up in the brush cover, the front spoiler (3) is automatically adapted during the adjustment of the brush diameter. The front spoiler (3) is designed so that the flattest possible snow discharge to the side and to achieve the least amount of snow turbulence.

The cross brush (1) is driven by two hydraulic motors (2). Profile bars are arranged in a star shape in the centre of the cross brush, and the cassette brushes are attached to these. When the flange and/or clamping collars (depending on model) have been released at the end of the brush, the cassette brushes can easily be inserted or removed. The brush shaft does not have to be removed to do this. The hydraulic lines are connected with threaded couplings.

Sweeping range



The brush contact (sweeping range) is adjusted by an automatic sweeping range setting. The sweeping range (A) is the surface area with which the brush lies on the sweeping surface. The sweeping range is set using the castor wheels (1).



Large influence on the sweeping result:

- Sweeping surface (even, uneven)
- Sweep speed
- Brush (plastic-steel brush)
- Snow properties (wet, dry)

At the factory, the sweeping range (A) is set to about 60 mm.



NOTE

Brush wear

Wide sweeping range:

- ▶ Extensive brush wear
- ▶ Good cleaning
- ▶ High brush driving force



NOTE

Brush wear

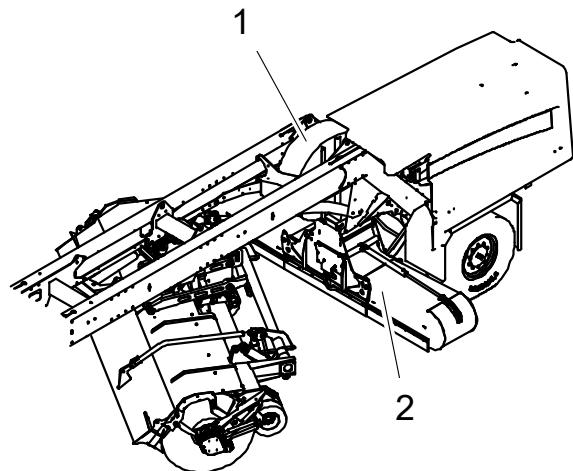
Low sweeping range:

- ▶ Minor brush wear
- ▶ Reduced cleaning effect
- ▶ Low brush driving force

Vibrator

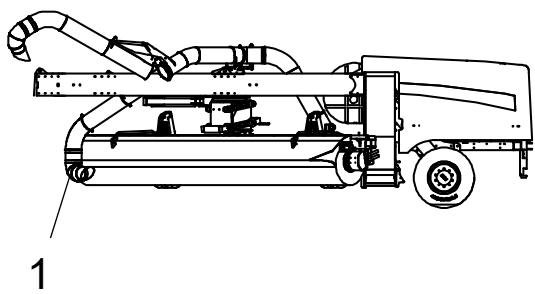
Loosens snow build-up from the cross brush. Control (intermittent operation, activation time – break time) takes place automatically or manually via the control panel.

Blowing equipment "Standard"



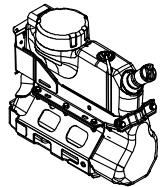
The blower unit consists of a fan (1) and the air duct (2) as the blast nozzle and is situated in front of the drive unit. A hydraulic motor drives the fan. The air can be discharged to the right or the left via a folding air duct split into two parts and control flaps in the blast nozzle. The blower unit is designed for the optimal discharge of great amounts of air. The blown air can be output in 2 levels of different power. The air is blown out immediately above the ground-surface, to clean the swept surface from remaining snow and to dry it. The air ducts can be folded in hydraulically for transport.

Blower equipment "Blowing in front of the brush"



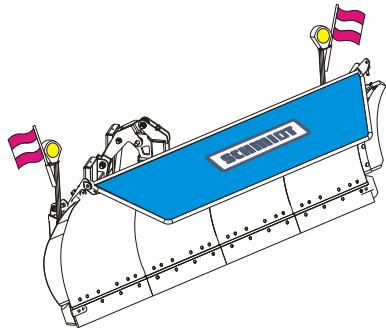
The air for this blower equipment is supplied by the standard blower equipment fan. The air for the blast nozzles (1) in front of the cross brush supports moving snow to the side by the cross brush and minimizes stirring up snow.

Carbamide (AdBlue®) tank



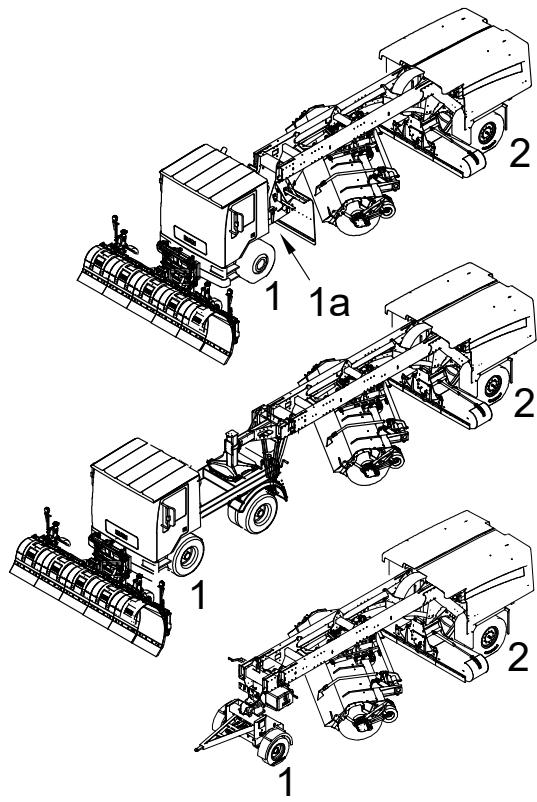
Depending on the exhaust gas cleaning system, the machine is fitted with carbamide (AdBlue®) technology.

Snow plough



When handling the snow plough, the operating instructions for the snow plough must be observed.

Steering modes



Standard steering

The TJS is steered via the steering axle (1) or the articulated steering (1a) of the towing vehicle

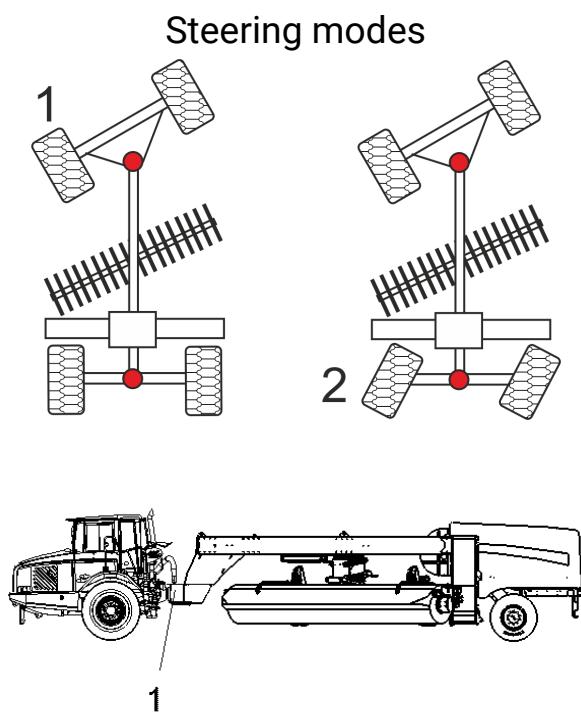
Rear-axle auxiliary steering

In the case of rear-axle auxiliary steering, the rear axle (2) is automatically steered.

The steering locks for the front and rear axles are in opposite directions. The steering angle of the rear axle is controlled automatically via the steering angle of the front axle of the tow vehicle. The rear-axle auxiliary steering is suitable for tight turning and for shunting in limited spatial conditions.

Additional steering TJS-C

- Front axle steering (1). Only front axle (tractor unit) steerable.
- Auxiliary steering (2). Front (tractor unit) and rear axle steerable. The steering locks for the front and rear axles are in opposite directions. Suitable for negotiating tight bends.



The auxiliary steering steers the rear axle at all times. The steering angle of the rear axle is controlled via the sensor (1) on the tractor unit.

**WARNING!**

Unusual vehicle movements.

Collisions with people or objects.

- ▶ Only experienced drivers are permitted to put the machine into operation with auxiliary steering. Practising driving is to be undertaken on closed terrain.
- ▶ Vehicle can overturn. When steering, always execute steering movements slowly.
- ▶ Before the machine is put into operation with the auxiliary steering, the operating and maintenance instructions of the manufacturer of the steering must be read and understood. Perform practice driving on blocked off terrain.

The auxiliary steering is hydraulically operated. The hydraulic oil supply is provided through a hydraulic pump, which is driven by the auxiliary engine.

As the vehicle speed increases, the steering angle of the rear axle becomes progressively smaller to deliver more stable driving behaviour. As of a speed of approx. 40 km/h, the rear axle no longer has any steering angle. If the vehicle speed is decreased, the stop angle becomes a factor for the rear axle again.

Fault during driving

In the event of a fault of the auxiliary steering, the steering axle is hydraulically locked in the straight-ahead position by means of a pressure reservoir (requirement of the German Road Traffic Licensing Regulations). For the driver, the vehicle is in a state that is safe to steer.

Automatic steering movement

The auxiliary steering is automatically set to the straight-ahead position in the following operating states:

- When the ignition of the vehicle and auxiliary engine is switched off
- If the emergency stop is pressed.
- Fault in the electrical activation of the auxiliary steering.
- Fault in the hydraulic system of the auxiliary steering

Electrohydraulic unit for the control hydraulics

Hydraulic functions for the control hydraulics can be performed with the electrohydraulic unit. In this way maintenance tasks can be carried out on the machine without the auxiliary engine having to be started.

- Switch on the ignition of the auxiliary engine.
- Press and hold the mounting button.
- Execute the function with the corresponding button or joystick.

Opening/closing the hydraulic unit of the engine cover

The control unit for raising and lowering the engine cover is located at the rear left or right of the machine, depending on the model.

**WARNING!**

The raising of the engine cover permits access to the drive. Drive parts may rotate and be hot.

People may burn themselves or be caught by rotating parts.

- The engine cover may only be opened when the engine is switched off and cooled down.

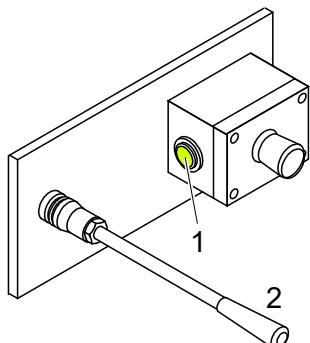
IMPORTANT!

At the opening of the engine cover, it may collide with adjacent parts.

The engine cover and adjacent parts may be damaged.

- Ensure that there is sufficient space before opening the engine cover.
-

Opening/closing the electrohydraulic unit of the engine cover

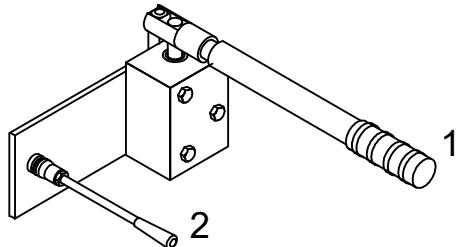


The engine cover can be opened and closed using the electrohydraulic system.

The electrohydraulic system is supplied by the batteries of the machine. The oil is supplied from the main tank of the machine.

Open and close the engine cover.

- Switch on the ignition for the auxiliary engine.
- Switch on the electrohydraulic pump by actuating the button (1).
- Press valve lever (2).
 - Upwards: Open the engine cover
 - Downwards: Close the engine cover



Opening/closing the manual-hydraulic unit of the engine cover

The engine cover can be opened and closed using the hydraulic hand pump. The auxiliary engine does not need to be started.

Open and close the engine cover.

- Actuate hydraulic hand pump (1) and valve lever (2).
 - Open the engine cover: Move the valve lever (2) upwards.
 - Close the engine cover: Move the valve lever (2) downwards.

Anti-locking brake system (ABS) on the rear axle

The anti-locking brake system (ABS) is a technical system for improving traffic safety. It works above all in hazardous situations, where in the case of sharp braking (when the brakes are applied fully) it counteracts the tendency of the wheels to lock by controlling the braking pressure at short intervals.

Engine cover



WARNING!

The opening of the engine cover permits access to the drive.
Drive parts may rotate and be hot.

People may burn themselves or be caught by rotating parts.

- ▶ The engine cover may only be opened when the engine is switched off and cooled down.

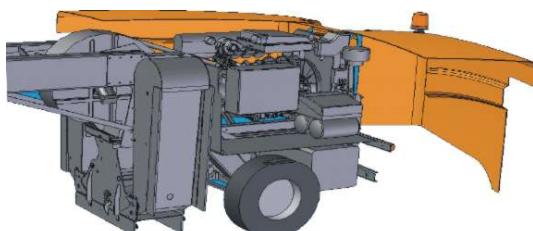


IMPORTANT!

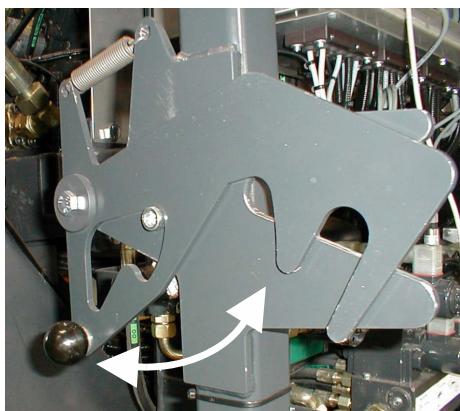
At the opening of the engine cover, it may collide with adjacent parts

The engine cover and adjacent parts may be damaged.

- ▶ Ensure that there is sufficient space before opening the engine cover.

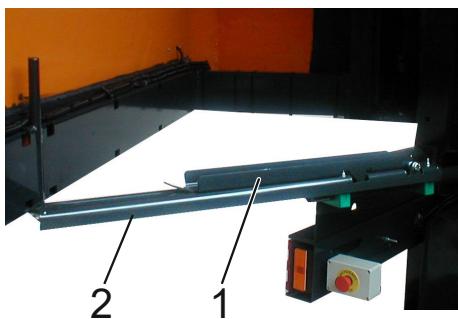


The engine cover covers the engine and the rear mount.



Mechanical interlock

The engine cover can be opened to the side by unlocking the catch.



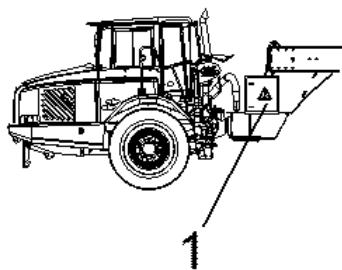
By resting the support rod (1) in the guide rail (2), the engine cover is held open. To close the engine cover, lift the support rod.

**WARNING!**

Risk of crushing and entrapment

Movements on the sweeper unit can be executed using the hand-held control.

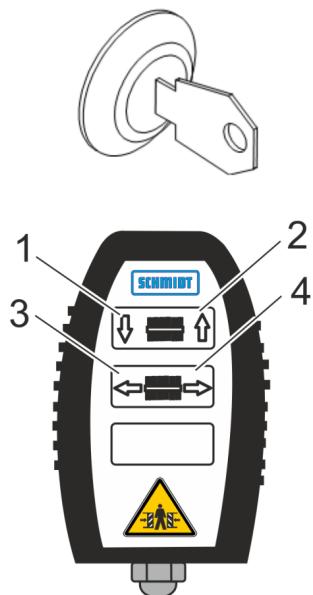
- ▶ All persons must be out of the danger zone when the sweeper unit is controlled with the hand-held control.
- ▶ The power cable for the hand-held control must be laid out away from the rotating brush to prevent it from being trapped.
- ▶ Only qualified and trained drivers and workshop personnel are permitted to operate the sweeper unit with the hand-held control.

**Swivel the sweeper unit into transport position**

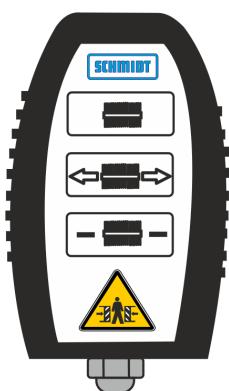
The hand-held control is located in the electrical switch cabinet (1) behind the driver's cab.

Operation:

- When the control panel fails to pivot the sweeper unit into the transport position.



- Start the ignition of the auxiliary engine.
- Lower the sweeper unit (1).
- Lift the sweeper unit (2).
- Swivel the sweeper unit to the left (3).
- Swivel the sweeper unit to the right (4).



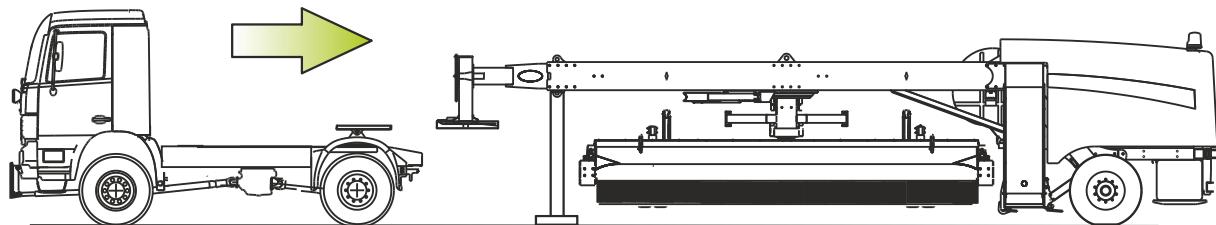
Control sweeper unit for changing brushes

The hand-held control is for the workshop personnel to control the sweeper unit when replacing the brush.

They should be safely stored to prevent unauthorised usage.

5 Installing and removing machinery

Jet sweeper with fifth wheel



Coupling



WARNING!

Incorrect handling of the TJS

People can be run over by the TJS, caught by rotating and swivelling parts and get seriously injured.

- ▶ The personnel responsible for driving the TJS must be properly trained, informed of and made responsible for preventing possible dangers and they must read the operating instructions before driving and operating the TJS.



WARNING!

People can be crushed between the vehicle and the TJS.

There is a risk of severe injury to people.

- ▶ When coupling the TJS to the vehicle, ensure that no one is situated between the vehicle and the TJS. Under no circumstances is the machine to be moved without checking the status of the hook-up to the trailer.

**IMPORTANT!**

If not observed, damage to the machinery results.

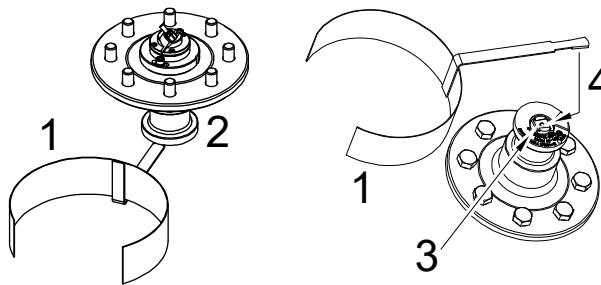
- ▶ When hooking up, move the carrier vehicle in a direct line under the fifth wheel plate. The TJS is not to be moved in to and connected at an angle. This can lead to running askew or to damage to the system.

- Ensure that there is free access behind the carrier vehicle and the TJS. All electrical and pneumatic cables are to be routed so that the cables cannot be pinched or damaged when hooking up.
- Unlocking the fifth wheel.
- Check the height of the fifth wheel plate of the TJS by adjusting the support leg with the crank (1) if necessary. The fifth wheel plate of the TJS must be set at the same height or slightly higher (max. 50 mm) than the fifth wheel hitch on the towing machine.



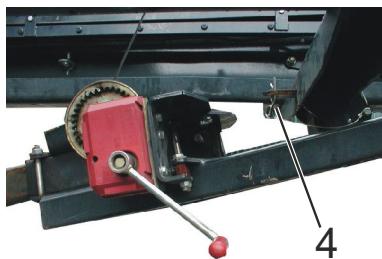
- Make sure the reaction arm (1) is firmly in the wedge connection on the king-pin (2).

If the reaction arm has been dismantled, it must be mounted before coupling to the vehicle.

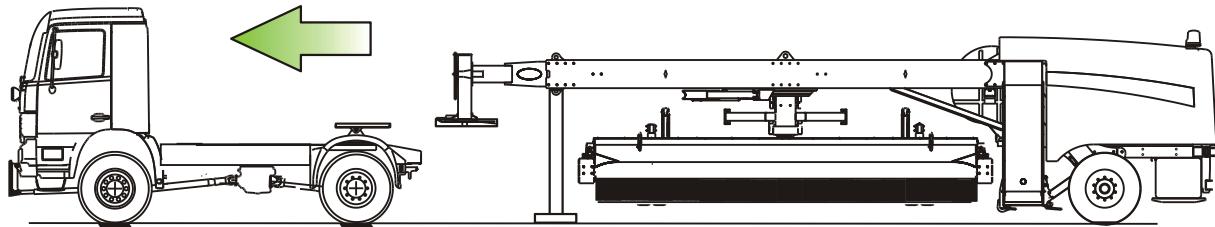


- 4 • Clean the wedge connection (3) on the king-pin
- Insert the reaction arm into the wedge connection and slightly pretension it (4).
- After coupling the TJS to the vehicle, slowly set the vehicle in motion and check the functioning of the auxiliary steering of the TJS.
- Make sure that there are no persons or objects between the vehicle and the TJS. Move the carrier vehicle carefully toward the TJS until the catch on the fifth wheel locks in place automatically.
- Check whether the catch is locked properly.

- Put the support leg up into transport position.
 - Use the crank (1) to wind the leg in until the weight is off of it.
 - Pivot the cross brush into the working position (see chapter "Commissioning the TJS").
 - Loosen the brace by removing the safety bolt (2).
 - Crank the support leg up into the transport position with the winch (3) and secure against falling down with the bolt (4).
- Pivot the cross brush into transport position (see chapter "Decommissioning the TJS").
- Perform a visual inspection for whether the fifth wheel plate is sitting on the hitch with no gaps between.
- Connect all supply lines to the vehicle. Pay attention to the coloured designations on lines and the type of connector (number of pins) when making electrical connections.
- Check functionality
- Release the parking brake and remove the chocks.



Uncoupling



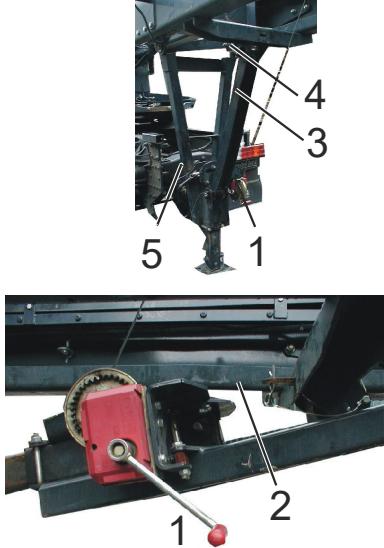
IMPORTANT!

Damage to the coupling system

- ▶ When uncoupling, the carrier vehicle is to be moved directly away from the fifth wheel plate. Extending at an angle can result in damage to the system.

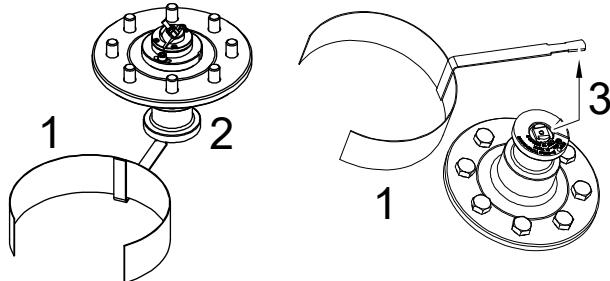
- The TJS is only to be parked on an even and sufficiently sturdy surface.
- Secure the TJS against rolling (activate the parking brake and put chocks in place).
- Pivot the cross brush into the working position (see chapter "Commissioning the TJS").

- Lower support leg.
 - Raise the support leg with the winch (1) until the safety bolt (2) is free of pressure and can be removed.
 - Lower the support leg with the winch (1)
 - Secure the brace (3) with bolt (4).
 - Extend the support leg (5) until there is very little pressure on the fifth wheel of the tow vehicle.
- Pivot the cross brush into transport position.
- Disconnect the supply lines between the vehicle and the TJS. Protect the cable connections with protective caps against contamination.



- Unlock the fifth wheel latch and move the tow vehicle ahead.



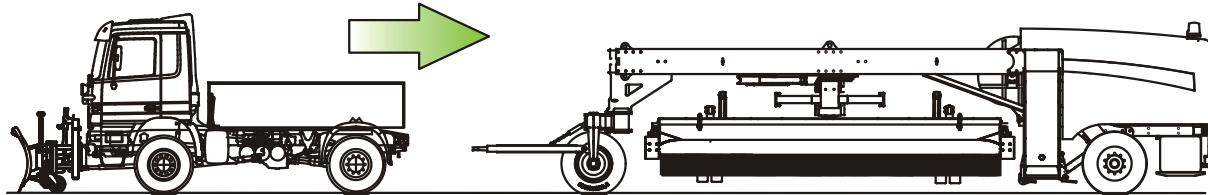


If the TJS is loaded onto a transport vehicle, there is a risk that the reaction arm (1) will become detached from the king-pin (2) due to the vibration of the transport vehicle and be lost.

The reaction arm should be dismantled before loading.

- Push the reaction arm out of the wedge connection (3).
- Fasten the reaction arm to the TJS in a captive manner or store it in the vehicle.

Jet sweeper with drawbar



Coupling



WARNING!

Incorrect handling of the TJS

People can be run over by the TJS, caught by rotating and swivelling parts and get seriously injured.

- ▶ The personnel responsible for driving the TJS must be properly trained, informed of and made responsible for preventing possible dangers and they must read the operating instructions before driving and operating the TJS.

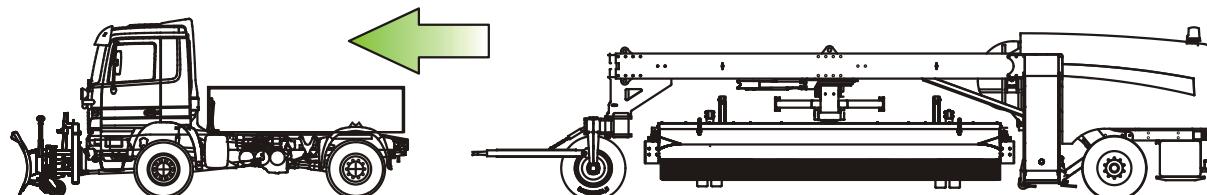
**WARNING!**

People can be crushed between the vehicle and the TJS.

There is a risk of severe injury to people.

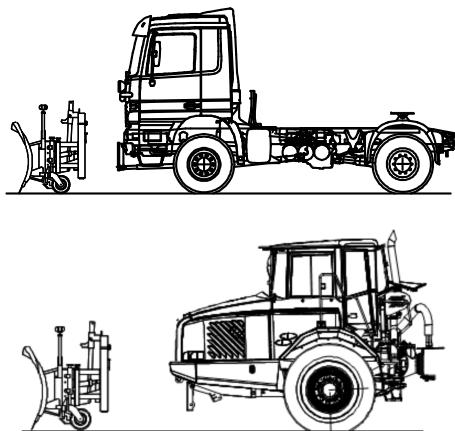
- ▶ When coupling the TJS to the vehicle, ensure that no one is situated between the vehicle and the TJS. Under no circumstances is the machine to be moved without checking the status of the hook-up to the trailer.

- Ensure that there is free access behind the carrier vehicle and the TJS. All electrical and pneumatic cables are to be routed so that the cables cannot be pinched or damaged when hooking up. The drawbar is to be set to the height of the trailer hitch.
- Make sure that there are no persons or objects between the vehicle and the TJS. Move the tow vehicle carefully to the TJS until the catch on the trailer hitch is firmly locked in place.
- Check whether the catch is locked properly.

Uncoupling

- The TJS is only to be parked on an even and sufficiently sturdy surface.
- Secure the TJS against rolling (activate the parking brake and put chocks in place).
- Pivot the cross brush into transport position.
- Disconnect the supply lines between the vehicle and the TJS. Protect the cable connections with protective caps against contamination.
- Unlock the trailer hitch and move the tow vehicle ahead.

Connecting and disconnecting the snow plough



See snow plough operating instructions.

The attachment and removal of the machines may only be performed by authorised workshop personnel.

6 Commissioning

Initial commissioning prior to hand-over to the customer



WARNING!

Incorrect assembly and commissioning of the machine and cause accidents.

- ▶ Initial mounting and initial operation of the machine must be carried out at the manufacturer plant or in an authorised specialised workshop. The personnel must have the necessary knowledge.

Handover to the customer and operating and maintenance personnel

The operating and maintenance personnel must receive extensive training in the content of these operating instructions for the machine.

Once instruction and driver's training for the machine have been successfully completed, this should be confirmed in writing.

Pre-operational checks



WARNING!

The machine may start moving unexpectedly

People could be run over

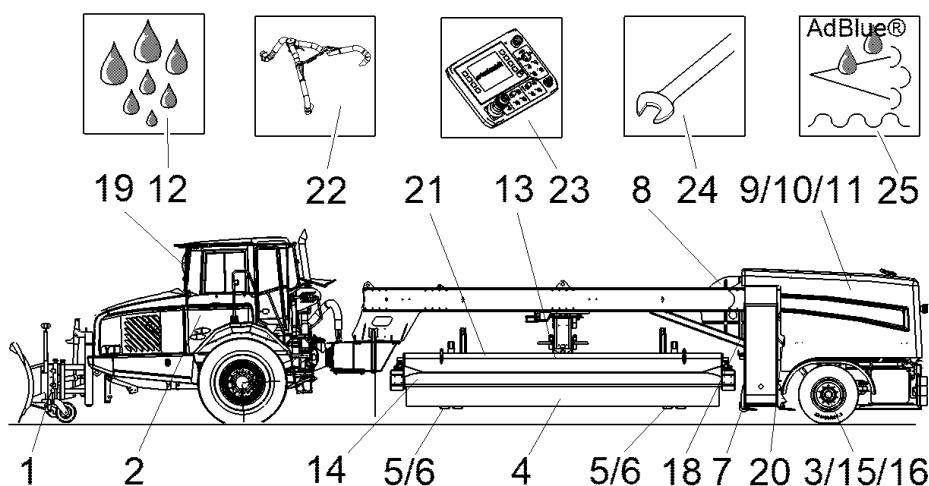
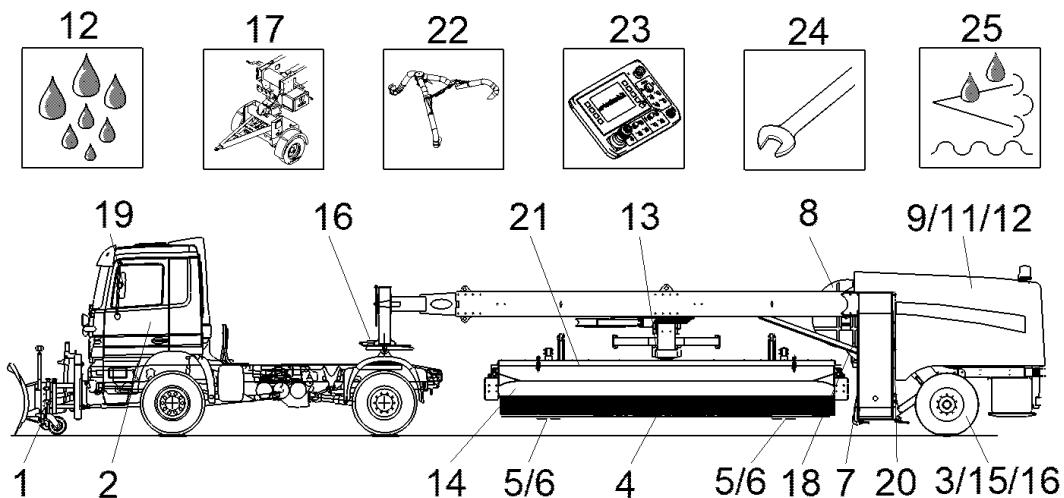
- ▶ The machine must be parked safely before inspection work is carried out.

**CAUTION!**

To protect against damaging influence whilst inspection work is being performed.

Illness due to external influences

- ▶ Wear warning, weatherproof, and protective clothing.
-



Item	Designation	Inspection work
1	Snow plough	See snow plough manufacturer's operating instructions
2	Vehicle	See the vehicle manufacturer's operating instructions

Item	Designation	Inspection work
3	Wheels	<p>Check wheel condition (see chapter "Wear dimensions") and tyre pressure (9 bar).</p> <p>Check that wheel nuts are tightly fastened.</p> <p>Make sure to torque the wheel nuts after the first 50 km after changing tyres or wheels (tightening torque 630 Nm see chapter Changing Wheels and Tyres)</p>
4	Cylindrical brush	Wear (see chapter on Wear dimensions)
5	Twin wheel	<p>Check the wheel condition (see chapter on wear dimensions) and tyre pressure (10 bar).</p> <p>Check that wheel nuts are tightly fastened.</p> <p>Make sure to torque the wheel nuts after the first 50 km after changing tyres or wheels (tightening torque 140 Nm see chapter "Changing wheels and tyres")</p>
6	Castor wheel lifting device	Ice-free
7	Rubber bars	Ground clearance, wear (see chapter Wear dimensions).
8	Fan	<p>Check intake grille for damage</p> <p>Check the fan housing for foreign objects</p>
9	Diesel engine	<p>See engine manufacturer's operating instructions.</p> <p>The maintenance personnel must check the engine oil level using the dipstick</p>

Item	Designation	Inspection work
10	Hydraulic tank and hydraulic hoses	Hydraulic tank oil level. Check through the sight-glass on the tank. Oil deficiencies are indicated on the display in the control panel. Hydraulic hoses (see chapter "Wear dimensions")
11	Cooler unit	Check intake grille for damage Check fan housing for foreign objects.
12	Leaks	Hydraulic, fuel, cooling system. Leaks may cause fires.
13	Cross brush	Tighten screws and bolts when required
14	Wiper	Distance to cross brush 20 mm
15	Axle	See manufacturer's operating and maintenance instructions.
16	Axle, steering	See also manufacturer's operating and maintenance instructions.
17	Front wheel axle	Check wheel condition (see chapter on Wear dimensions) and tyre pressure (8 bar) Check that wheel nuts are tightly fastened. After changing tyres, tighten the wheel nuts again after 50 km (Torque 600 Nm)
18	Central lubrication unit	Check the fill level of the grease reservoir
19	Mirrors	Check that the mirrors are clean and properly adjusted
20	Engine cover	Check engine cover is correctly sealed and locked on the left and right.
21	Cover of the cross brush	Check the cover for damage
22	Blowing ahead of the brush	Check fastening of the pipe system

Item	Designation	Inspection work
23	Display	Observe error messages
24	Maintenance work	Check to see that maintenance work that workshop personnel were to carry out has been completed.
25	Carbamide (AdBlue®) tank	Check fill level. The fill level is shown on the display in the control panel.

6.1 Maintenance work

All maintenance work that the driver performs must be able to be carried out from the ground.



WARNING!

It is possible that the danger zone cannot be seen

When turning on the TJS or driving it away, people may be caught or run over.

- ▶ Work on the TJS may only take place if it is safely parked.

Vehicle

See separate manufacturer's operating instructions.

Auxiliary engine

See separate manufacturer's operating instructions.

Filling the fuel tank



WARNING!

Danger of poisoning

Diesel fuel can be hazardous to health if it is swallowed, inhaled or comes into contact with skin.

- ▶ Always wear gloves when refuelling.
- ▶ Keep your face as far as possible from the filling port.

**WARNING!**

Fuel is highly flammable

Fuel can cause burns to body parts

- ▶ Only refuel the clearing vehicle with the engine at a standstill and outdoors or in a well-ventilated area.
- ▶ The following absolutely must be avoided: Fire, open flame, smoking, sparks, etc.

**ENVIRONMENT!**

Spilled or leaking fuel

Fuels can cause considerable damage to the environment.

- ▶ Catch any spilled or leaking fuel with suitable containers.
- ▶ Clean any dirty surfaces.
- ▶ Dispose of fuel and consumables properly.

**IMPORTANT!**

Build-up of condensation water in the fuel tank

Danger of oxidation in the fuel tank

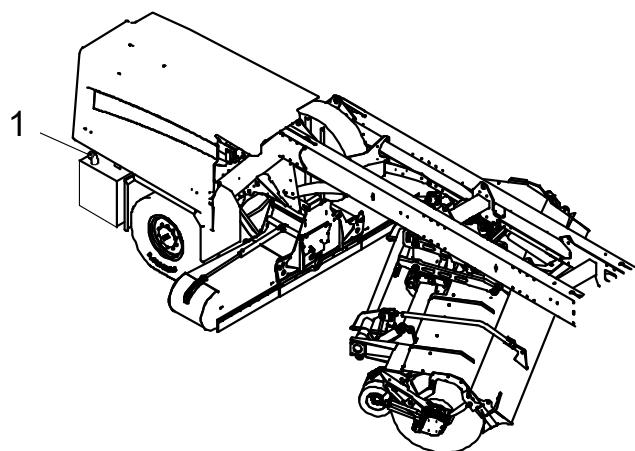
- ▶ Minimize the build-up of condensation water. Always fill up the tank directly after use.

**IMPORTANT!**

Fuels that are not permitted or contaminated can.

Can cause damage the diesel engine.

- ▶ Only use fuel that is approved by the engine manufacturer and does not contain any impurities.



The auxiliary engine has a fuel tank at the rear.

The fuel tank can be filled via the filling port (1) at the rear.

- Stop the vehicle, apply the hand brake and remove the ignition key from the vehicle and auxiliary engine.
- Put on gloves. Open the filling port cover (1) and unscrew.
- Fill clean fuel approved by the engine manufacturer. The sieve in the filling port must be cleaned with diesel fuel from time to time; replace the sieve if it is damaged.
- Close the fuel tank securely each time after refuelling

Fill the carbamide (AdBlue®) tank

See the engine manufacturer's operating instructions for detailed information.

Observe the safety data sheet of the AdBlue® manufacturer.

**WARNING!****Risk of injury**

Carbamide (AdBlue®) must not come into contact with the skin, eyes or clothes.

- ▶ Wear protective gloves
- ▶ Rinse the area affected by carbamide (AdBlue®) immediately with lots of water.
- ▶ If carbamide (AdBlue®) comes into contact with the mouth, rinse immediately with lots of water and drink lots of water.
- ▶ Immediately change any clothes that come into contact with carbamide (AdBlue®).
- ▶ Should any allergic reactions arise, seek immediate medical attention.
- ▶ Keep carbamide (AdBlue®) away from children

**WARNING!****Risk of injury**

In high temperatures, ammonia fumes could be released from an open carbamide (AdBlue®) tank lid.

- ▶ Do not breathe in ammonia vapours; keep a sufficient distance.
- ▶ Ammonia fumes produce a pungent smell and irritate the skin, mucous membrane and eyes.

**IMPORTANT!**

Contaminated or thinned carbamide (AdBlue®).

If not observed, damage to the machinery results.

Do not dilute or mix carbamide (AdBlue®) fluid with other fluids.

- ▶ In case of incorrect fuelling, the ignition must not be switched and the engine must not be commissioned under any circumstances.
- ▶ Only use carbamide (AdBlue®)

**ENVIRONMENT!**

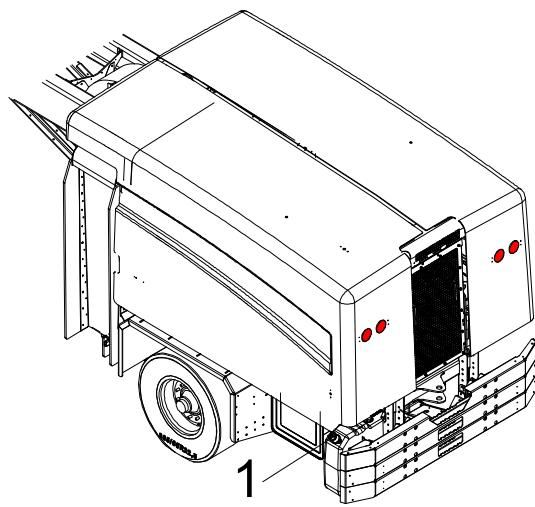
Leaking or spilled carbamide (AdBlue®)

If not observed, environmental damage results.

Leaking carbamide (AdBlue®) can contaminate water and soil.

- ▶ Dispose of carbamide (AdBlue®) according to the environmental requirements in force.

Depending on the version, the tank for carbamide (AdBlue®) can be located at the rear left (1) or right.



- Stop the vehicle, apply the hand brake and remove the ignition key from the vehicle and auxiliary engine.
- Switch off the carbamide (AdBlue®) preheating.
- Put on gloves.
- Open the filling port cap (1) and unscrew.
- Fill clean carbamide (AdBlue®)

Rinse off any leaked carbamide (AdBlue®) from painted and aluminium surfaces with lots of water.
Dilute any carbamide (AdBlue®) that has leaked on to the ground with lots of water.
Do not reuse carbamide (AdBlue®) that has leaked or been transferred, e.g. during repairs.

7 Operation

Vehicle

Observe the carrier vehicle manufacturer's operating instructions for driving the machine.

You absolutely must pay attention when driving on slippery surfaces:



IMPORTANT!

If there is no speed compensation between the left and right wheels when the differential lock is engaged, or if individual wheels spin, this can result in damage to the axle drive.

If not observed, damage to the machinery results.

- ▶ Switch the distribution gear and differential locks on or off only at low speed (maximum of 7 km/h) or, better, when the vehicle is at a standstill.
- ▶ Activate differential locks shortly before driving onto slippery surfaces.
- ▶ Deactivate the distribution gear and differential locks shortly before driving onto surfaces with good traction.
- ▶ Make sure that the differential locks are switched off when travelling on surfaces with good traction.



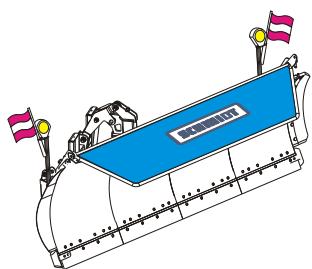
CAUTION!

When the longitudinal differential in the distribution gear is locked and the drive train is subjected to stress, the functionality of the ABS may be limited.

If the speed is not compensated between the left and right wheels, the vehicle will be hard to steer, leading to a severe accident.

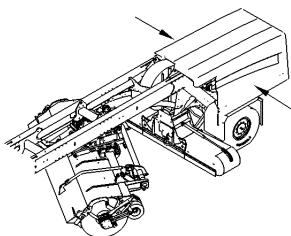
- ▶ Always adapt your manner of driving, especially speed, to the road conditions, visibility and traffic situation.

Snow plough



Observe the snow plough manufacturer's operating instructions for operating the snow plough.

Engine cover



Never start driving the TJS with the engine cover open.

- Close the engine cover.

Adjustment work



WARNING!

Adjustment work during driving.

The driver can lose control of the vehicle and cause an accident.

- ▶ Adjust the mirrors, control panel, seat, etc. before starting the vehicle.

Adjust the mirrors

Turn the mirrors to the position that allows the danger zone to be seen.

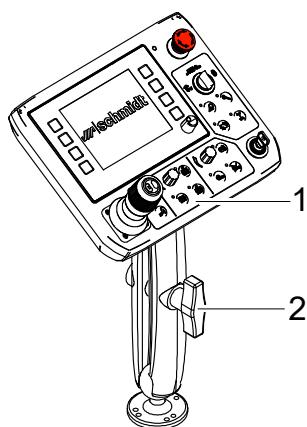
Adjust the control panel ergonomically

Correctly adjusted control panel

- Optimal view of the display.
- Fatigue-free operation of the switches and buttons.

Adjust the control panel

- Hold the control panel (1) firmly
- Carefully loosen the toggle screw (2)
- Move the control panel into the desired position and hold there
- Tighten the toggle screw hand-tight



Start the auxiliary engine



WARNING!

Diesel engines produce toxic exhaust e.g. carbon monoxide.

This exhaust leads to poisoning.

- ▶ Never allow the engine to run in an enclosed space without sufficient ventilation.
-



IMPORTANT!

Use of the machine at temperatures below 15°C.

The drive unit can get damaged.

- ▶ Start the diesel engine. The drive unit automatically enters a 5-minute heat-up phase and/or the heat-up phase lasts until the liquids (coolant, hydraulic oil and motor oil) have reached 15°C. Remaining warm-up time is shown on the display.
 - ▶ Do not start using the machine until the heat-up phase has come to an end.
-

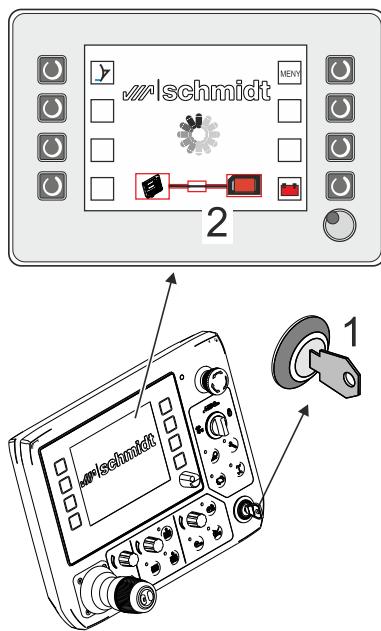


WARNING!

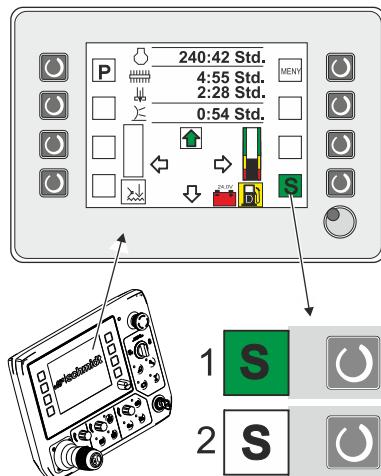
Unintentional movements of the cross brush or blast nozzle during transit.

People and objects can get caught.

- ▶ As an additional safety measure, set the operating mode switch to “90



- Switch on the ignition (1)
 - The connection of the programmable logic controller (PLC) from the main computer to the control panel is established. The connection status is shown on the display (2).
 - The camera for rear view monitoring is on standby. The camera can be switched on by applying the reverse gear or using the button on the control panel.
 - The power supply to various consumers is established.



- Start the auxiliary engine
 - Actuate the button (1) with a green symbol. The start-up procedure is initiated. The operation of the starter motor must not exceed 30 sec.

**NOTE**

Start button with white symbol (2).

The motor cannot be started.

Error in the electrical controller.

- ▶ Emergency stop activated.
- ▶ CAN connection to the engine interrupted.
- ▶ Electrical problems on engine.

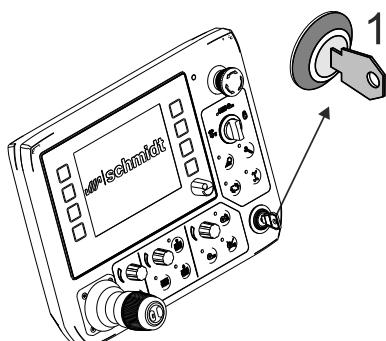
**IMPORTANT!**

Diesel engine will not start

The starter motor can overheat.

- ▶ Interrupt the starting procedure after about 30 seconds.
Repeat the starting procedure after about 60 seconds.

Shutting down the auxiliary engine



To cool the engine after use, let it run at idle speed for about 2 minutes.

Shutting down the auxiliary engine

- Parking the vehicle safely
- Switch off the ignition with the key switch (1).
 - Engine shuts down
 - The ignition is off

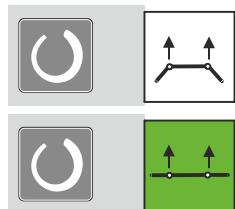
**IMPORTANT!**

Incorrect procedure when shutting down the auxiliary engine.

This can damage the engine.

- ▶ Observe the operating instructions of the engine manufacturer

Controlling the side blades on the snow plough

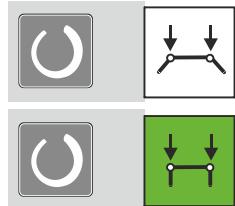


In the case of snow ploughs with folding blades

Open the blades.

- Press the white display button.
 - The side blades on the snow plough fold out.
- Button display green.
 - The plough blades are folded out.

Close the blades.



- Press the white display button.
 - Snow plough pivots from the working position into the middle position.
 - The side blades on the snow plough open.
- Button display green.
 - The plough blades are folded in.

Joystick



WARNING!

The machines are started by the lowering function.

People can be hit or entangled by machine movements.

- ▶ The driver must be aware of the danger zones of the individual attachments.
- ▶ The drive must absolutely observe the chapter on danger zones.

**WARNING!**

Sequence of movements when starting the machines.

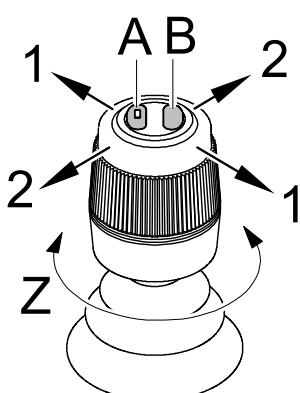
During the sequence of movements of the machine, people can be crushed or caught in rotating parts.

- ▶ The danger zone must be observed using the mirrors on the vehicle.
- ▶ Manual operation
If persons are located in or move into the danger zone(s) of the machines, when pivoting the joystick, release the joystick immediately and when lowering, briefly operate the raise function.
- ▶ Automatic operation
If persons are located in or move into the danger zone(s) of the machines, press the EMERGENCY STOP button immediately.

**NOTE**

Blast nozzle control

- ▶ The machine can be controlled only in automatic operation.

**Lifting/lowering the preselected machines (1)**

Raising the selected machines

- Auxiliary engine is set to idle speed
- The machines are switched off.

Lowering the selected machines

- Auxiliary engine is set to working speed
- The machines are started.

Swivelling the preselected machines (2)

Sweeper

- The sweeper swings from the transport position to the raised working position. On leaving the transport position, the green indicator light goes out.

Blast nozzle

- The air flow is diverted according to the direction of sweeping.

Snow plough

- Snow plough pivots into the raised working position.
- The snow plough is swivelled according to the direction of sweeping.

Additional functions

Additional functions that can be controlled via the joystick.

Swivelling the snow plough (Z) only

- Before pivoting, raise the snow plough to relieve the load from the castor wheels and avoid damaging them. The auxiliary engine does not need to be started for this function.
- The snow plough can be swivelled in the desired direction.

Raising/lowering the eject lock (A+1 or B+1)

Snow plough with eject locks.

Follow the operating instructions of the plough manufacturer.

By pressing the buttons (A+1) or (B +1), the eject locks can be raised and lowered.

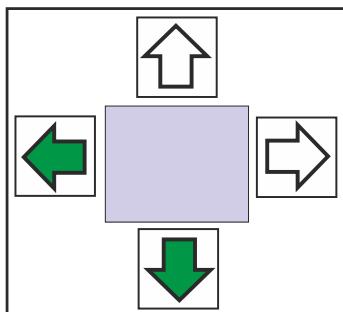
Display



NOTE

Snow plough

- ▶ Snow plough movements are not shown in the display.



None or flashing arrows

- Sweeping and blast nozzles are not in the working position

Arrows light up

- Sweeping and blast nozzle in working position. 2 arrows must always light up (machines are lowered and pivoted).

Joystick, manual and automatic operation



WARNING!

The preselected machines are started by the lowering function.

People can be hit or entangled by machine movements.

- ▶ The driver must be aware of the danger zones of the individual attachments.
- ▶ The drive must absolutely observe the chapter on danger zones.


WARNING!

Sequence of movements when starting the machines.

During the sequence of movements of the machine, people can be crushed or caught in rotating parts.

- ▶ The danger zone must also be observed using the mirrors on the vehicle.
- ▶ If persons are located in or move into the danger zone(s) of the machines, press the EMERGENCY STOP button immediately


NOTE

Blast nozzle control

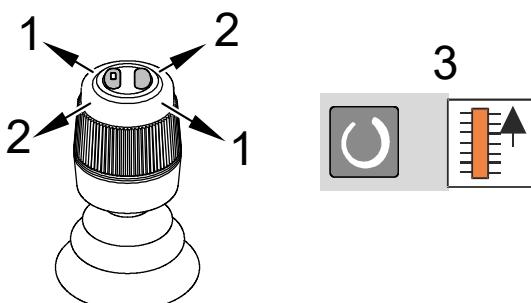
- ▶ The machine can be controlled only in automatic operation.


NOTE

Setting the sweeping range

When the machine is switched off, the sweeping range information is lost.

- ▶ The sweeping range must be readjusted before each use.

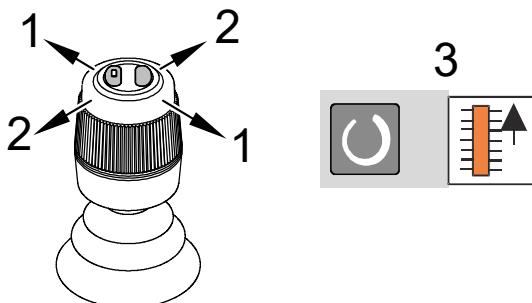
Joystick, manual operation

Bringing the machines into working position in manual operation

Joystick must be pressed and held until the machines have reached the end positions.

Joystick movement	Preselected machine		
	Cross brush	Blast nozzle	Snow plough
Lift (1)	X*	X	X
Swivel (2) to the working position	X	--	X

Joystick move- ment	Preselected machine		
	Cross brush	Blast nozzle	Snow plough
Lower (1)	X**	--***	X

- * Required to lift the sweeper out of the transit lock.
- ** The diesel engine goes to working speed, the cross brush drive is switched on, and the sweeping range is adjusted.
- *** The blast nozzle can only be put into working position in automatic operation.



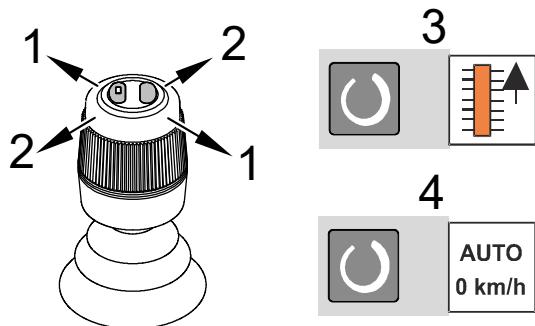
Bringing the machines into the trans-
port position in manual operation

Joystick must be pressed and held until the machines have reached the end positions.

Joystick move- ment	Preselected machine		
	Cross brush	Blast nozzle	Snow plough
Lift (1)	X	X	X
Swivel (2) into the transport position	--*	--	X

- * The sweeper can only be brought into the transport position using the button (3). The button must be pressed and held until the machine has reached the end position.

Joystick, automatic operation



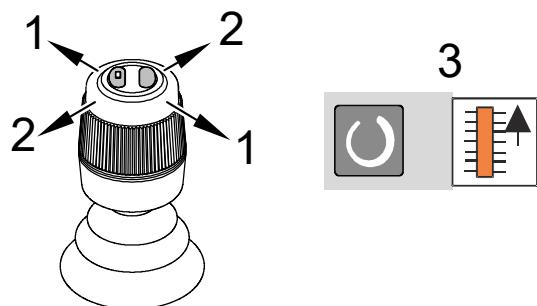
Bringing machines into the working position in automatic operation

- The automatic function is enabled at a driving speed of over 3 km/h.
- When the machine is stationary, the automatic function can be enabled manually.
 - Press the button (4) and execute the desired function within 5 seconds.

Operate the joystick (tap function), machines execute the functions to the end positions.

Joystick movement	Preselected machine		
	Cross brush	Blast nozzle	Snow plough
Lift (1)	X*	X	X
Swivel (2) to the working position	X	--	X**
Lower (1)	X***	X	X

- * Required to lift the sweeper out of the transit lock. This function is also carried out automatically via the pan function.
- ** The snow plough is lifted slightly when the vehicle is stationary to relieve the load on the trailing wheels when swivelling.
- *** The diesel engine goes to working speed, the cross brush drive is switched on, and the sweeping range is adjusted.



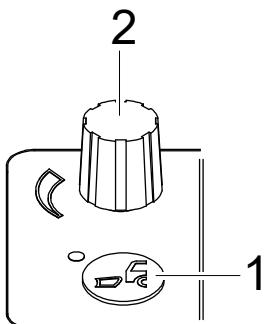
Bringing the machines into the transport position in automatic operation

Operate the joystick (tap function), machines execute the functions to the end positions.

Joystick move- ment	Preselected machine		
	Cross brush	Blast nozzle	Snow plough
Lift (1)	X	X	X
Swivel (2) into the transport position	--*	--	X

- * The sweeper can only be brought into the  transport position using the button (3).

Snow plough control



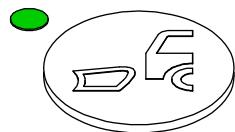
Overview

- Preselect snow plough control and switch it off (1).
- Increase or decrease the relief (2).

Preselecting and switching off snow plough control

Preselecting snow plough control

- Press the button; the indicator light is green
 - Snow plough control is preselected
 - The snow plough can be controlled by the joystick



Switching off snow plough control

- Press the button; the indicator light goes out.
 - The snow plough lifts automatically.

Setting the snow plough relief



NOTE

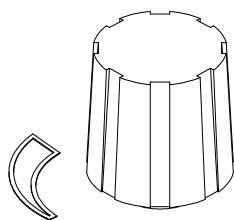
Change of the snow plough relief during use.

The springs of the vehicle are loaded and/or relieved. Move the vehicle frame and thus the mounting points of the sweeper up or down. The sweeping range is changing.

- ▶ After every change of the snow plough relief, the sweeping range must be reset.

Increase relief

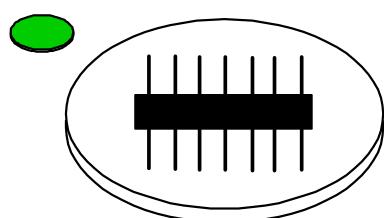
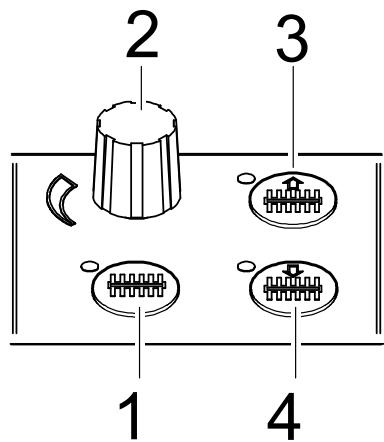
- Turn potentiometer to the right.
 - Front axle is loaded and traction and steerability are increased.
 - Wear of the cutting-edges is reduced.
 - The clearing of packed snow or ice is only conditionally possible.



Reduce relief

- Turn the potentiometer to the left
 - Front axle is unloaded and traction and steerability worsen.
 - Wear of the cutting-edges increases.
 - The clearing of packed snow or ice is only possible.

Sweeper drive



Overview

- Preselect the sweeper drive and switch it off (1).
- Change the brush speed (2).
- Manually reduce the sweeping range (castor wheels extend) (3).
- Manually enlarge the sweeping range (castor wheels retract) (4).

Preselecting the sweeper drive

- Press the button; the indicator light is green.
 - The sweeper drive is pre-selected.
 - The sweeper can be controlled by the joystick. The sweeping range must be adjusted before each use.

Switching off the sweeper drive

- Press the button; the indicator light goes out.
 - The sweeper lifts automatically.

Change brush speed



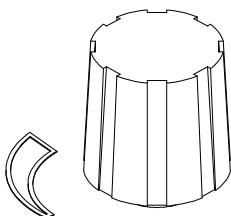
NOTE

The brush speed has considerable influence on brush wear and the cleaning effect.

- Set the brush speed to suit your needs.

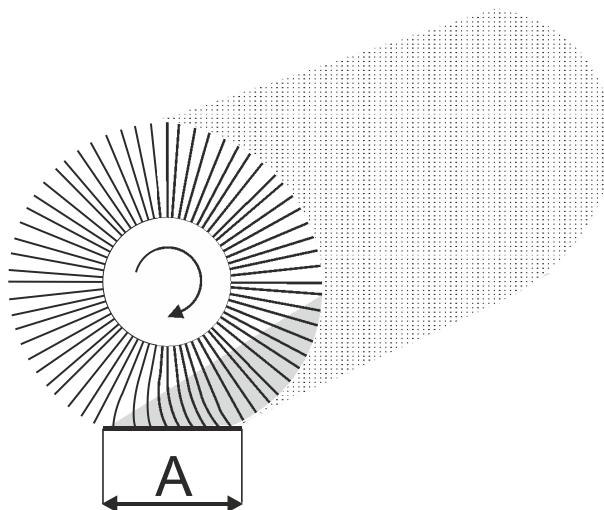
The brush speed changes proportionally to brush wear (brush diameter). This ensures that the cleaning effect is almost always constant. Increase the brush speed; turn the potentiometer to the right

- Sweeping surface cleaned more effectively.
- Wide-ranging snow discharge.
- Increased brush wear.
- Higher fuel consumption.



Reduce the brush speed; turn the potentiometer to the left.

- Poorly cleaned sweeping surface.
- Shorter snow discharge.
- Reduced wear.
- Lower fuel consumption.



Setting the sweeping range

Factory setting

The contact surface (dimension A) for new brushes is approx. 100 mm

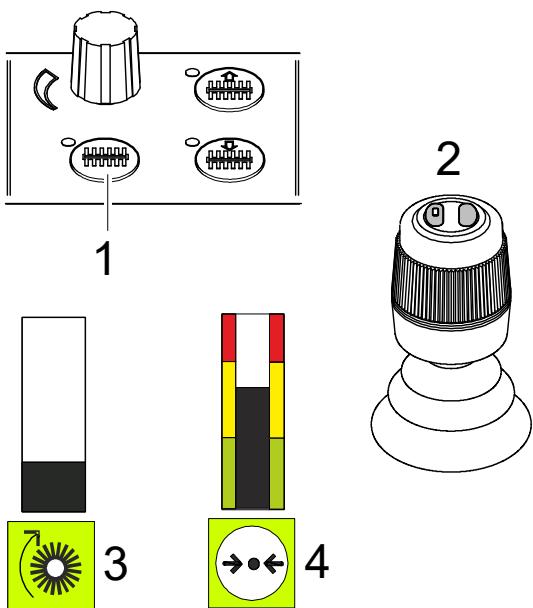
The factory setting is stored in the password-protected area.

Only workshop personnel exclusively and expertly authorised by Aebi Schmidt may change the stored sweeping range.

The sweeping range is adjusted automatically.

Set the sweeping range automatically

After each restart of the machine, the sweeping range must be readjusted.



- Place the machine on a level and snow-free surface.
- Start the diesel auxiliary engine
- Select the sweeper (1)
- Lower the sweeper using the joystick (2).
 - Sweeper brush turns with reduced speed.
 - The brush speed (3) and hydraulic drive output of the cross brush (3) symbols in the display flash green; the adjustment procedure has started. The adjustment process is complete when the symbols light up.
- Raise the sweeper. The sweeper is ready for use.

Correct the sweeping range manually

This function is required to adjust the sweeping range minimally. It is used mainly for changing air traffic surface conditions (rough/smooth, wet/dry, etc.).



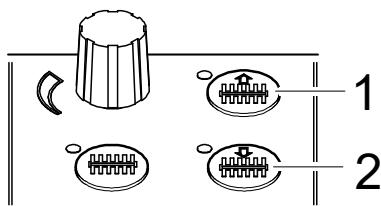
IMPORTANT!

Sweeping range too large.

The brush cover (spoiler) can collide with the brush.

The brush and brush cover (spoiler) can be damaged.

- ▶ After each press of the button (one increment), the button is locked. The first locking period amounts to about 4 seconds. After that, the locking period is always doubled (safety switching).
- ▶ The castor wheels may be run in for a maximum of 6 steps.



Reducing the sweeping range

- Press the button (1) briefly
 - The castor wheels on the cross brush extend one step. The indicator light illuminates for about 2 seconds.

Increasing the sweeping range

- Actuate button (2) briefly.
 - The castor wheels on the cross brush retract one step. The indicator light illuminates for about 2 seconds.

Blast nozzle control

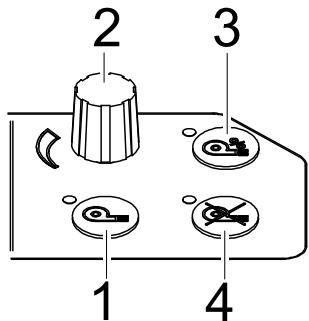
The blast nozzle can only be controlled in automatic mode.

**CAUTION!**

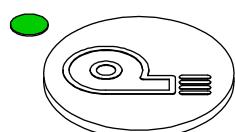
The blower blast nozzle creates a high air speed.

People might be knocked over or injured by objects that are thrown up or ejected.

- ▶ Reduce the blast air or switch it off when passing persons, vehicles or loose objects. Observe the danger zone.

**Overview**

- Preselect and switch off the blower nozzle control (1).
- Reduce the blower speed continuously by 50% (2).
- Reduce blower power by 50% (3)
- Turn the blower on/off. The blower unit remains in working position (4).

**Preselecting the blast nozzle control**

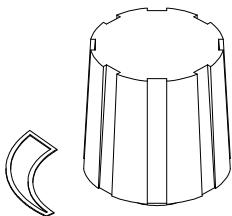
- Press the button; the indicator light is green
 - Blower nozzle control is preselected
 - The blast nozzle can be controlled by the joystick. Automatic operation must be switched on.

Switching off the blast nozzle control

- Press the button; the indicator light goes out.
 - Blast nozzle lifts automatically.

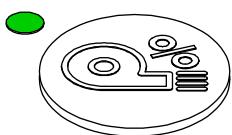
Setting the blower speed

Reduce the blower speed continuously by 50%.



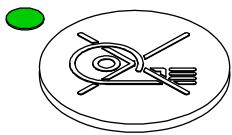
- Reduced cleaning of the air traffic surfaces.
- Shorter snow discharge.
- Reduced drying effect of the air traffic surfaces.
- Less hazard due to loose objects being blown away
- Lower fuel consumption

Reduce blower speed and press the button; blower output is reduced by 50 %.



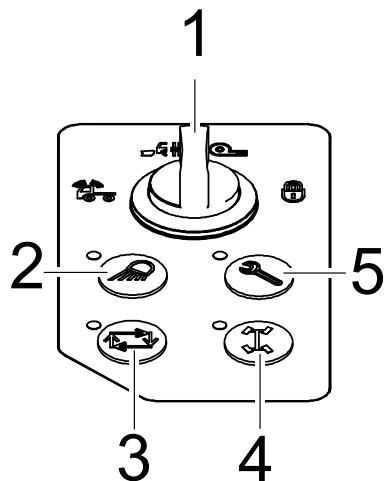
- Reduced cleaning of the air traffic surfaces.
- Shorter snow discharge.
- Reduced drying effect of the air traffic surfaces.
- Less hazard due to loose objects being blown away
- Lower fuel consumption

Turn blower off briefly



- Press button, control lamp is on. Blast nozzle remains in working position.

Control unit in general



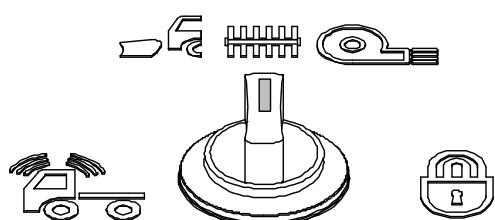
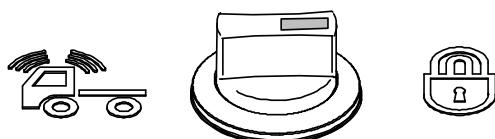
Overview

- Operating mode switch (1).
- Working lighting (2).
- Automatic mode (3).
- Auxiliary steering (4).
- Safety switch / mounting switch (5)

Operating mode switch

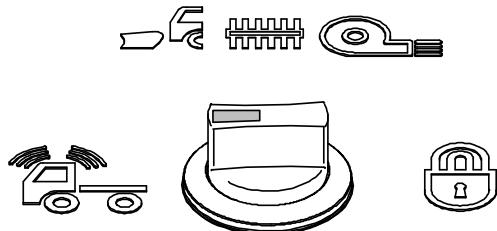
Diesel engine start release

- Menu image with start enable and with additional information on the display.



Machine start release

- When the diesel engine is running
 - All functions that can be performed with the control panel are enabled.



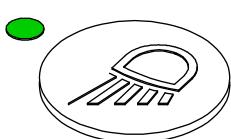
Automatic mode

- When the diesel engine is running
 - All functions that can be performed with the control panel are enabled.
 - Machine functions can be carried out manually by the driving personnel and by an external controller (TJS control).

Working lights

The working lights are located on the frame of the machine and illuminate the working range of the cross brush.

Switch on the working lights.



- Press button, indicator light lights up.

Switch off the working lights.

- Press button, indicator light is off.

Automatic mode

Automatic operation is possible only when the TJS is travelling (> 3 km/h). Absolutely observe the function of the button "0 km/h".

**WARNING!**

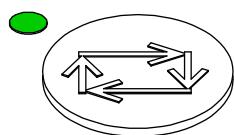
Automatic mode switched on

Functions such as raising, lowering or pivoting, etc. of the attached machines run until the end stop.

The pivoting movements of the cross brush and snow plough are synchronised and are always performed together despite the preselection function being switched off.

Even if the preselection function of the machine is switched off, these movements can still take place. People may be crushed.

- Before commissioning, always ensure that no persons are located in the danger zone around the machine.

Switching on automatic mode

- Press button, indicator light lights up.

Switching off automatic mode

- Press button, indicator light is off.

**NOTE**

Delayed raising of the sweeper

In automatic mode and depending on the programming, time-delayed raising (approx. 5 sec.) is possible between the snow plough and the sweeper and blower.

- This has the advantage that during use the route between the snow plough and sweeper is also swept.

Auxiliary steering



WARNING!

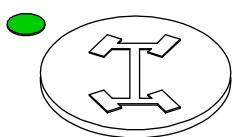
Accidental steering movement of the auxiliary steering.

Depending on the option it is possible that the auxiliary steering is activated automatically when starting the auxiliary engine.

- ▶ Activated auxiliary steering is indicated by the button on the control panel lighting up.
- ▶ The switched-on auxiliary steering changed the steering and driving behaviour.

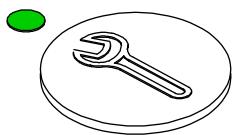
Switching on auxiliary steering

- Start the vehicle engine and stop the vehicle.
- Set front axle steering in the straight-ahead position.
- Press the button; the indicator light comes on and auxiliary steering is switched on.



Switching off auxiliary steering

- Set front axle steering in the straight-ahead position.
- Stop the vehicle.
- Press the button; the indicator light is off and auxiliary steering is switched off.



Safety switch/mounting switch

Necessary for the maintenance personnel during installation work.

Warning and notice symbols



IMPORTANT!

According to engine type and equipment

Warnings and notices may deviate from each other.

- ▶ Warnings are signalled optically and acoustically.
- ▶ Depending on the warnings, suitable measures must be taken.

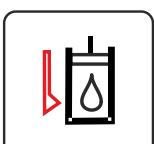
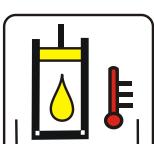
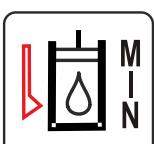


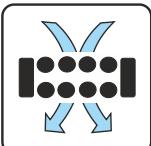
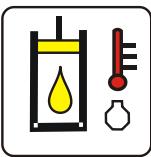
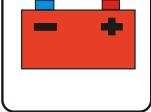
NOTE

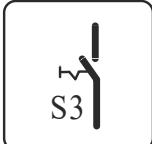
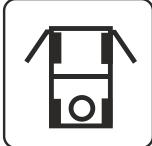
Display of symbols

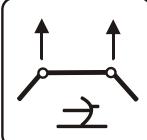
- ▶ The symbols are shown one after the other in rotating form on the display

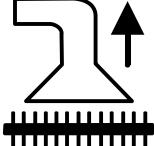
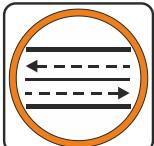
Symbol	Cause/solution
	<p>Symbol white Coolant temperature too high</p> <ul style="list-style-type: none">• Interrupt clearing operation and allow diesel engine coolant to cool down at idle speed.<ul style="list-style-type: none">- With the coolant cooled down, proceed with clearing work at reduced speed. Pay particular attention to the coolant temperature.• Consult with workshop personnel.
	<p>Symbol white Coolant level too low</p> <ul style="list-style-type: none">• Auxiliary engine shuts down.<ul style="list-style-type: none">- Consult with workshop personnel and eliminate the fault; add coolant.

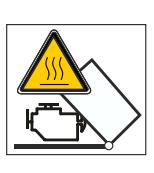
Symbol	Cause/solution
	<p>Symbol white and warning tone Engine oil pressure in diesel engine too low</p> <ul style="list-style-type: none"> • Auxiliary engine shuts down. • Do not start the auxiliary engine; consult with workshop personnel as soon as possible and eliminate faults.
	<p>Symbol white Engine oil level of auxiliary engine too low.</p> <ul style="list-style-type: none"> • Consult with workshop personnel and eliminate the fault; top up with oil.
	<p>Symbol white and warning tone Hydraulic oil level in tank too low</p> <ul style="list-style-type: none"> • Auxiliary engine is set to idle speed. • Consult with workshop personnel and repair any leaks. Refill hydraulic oil.
	<p>Symbol white and warning tone Hydraulic oil temperature in tank too high</p> <ul style="list-style-type: none"> • Auxiliary engine is set to idle speed. • Raise attachments. Interrupt the clearing process. • Consult with workshop personnel and eliminate faults.
	<p>Symbol white The oil level in the hydraulic oil reservoir is in minimum area.</p> <ul style="list-style-type: none"> • Consult with workshop personnel and repair any leaks. Refill hydraulic oil.
	<p>White symbol: Vehicle hydraulic oil level too low.</p> <ul style="list-style-type: none"> • Consult with workshop personnel and repair any leaks. Refill hydraulic oil.
	<p>White symbol: Vehicle hydraulic oil temperature too high.</p> <ul style="list-style-type: none"> • Raise attachments. Interrupt the clearing process. • Consult with workshop personnel and eliminate faults.

Symbol	Cause/solution
 230V	Symbol white Start lock, 230V connection cable plugged into the vehicle.
	Symbol white Dirty air filter <ul style="list-style-type: none"> • Visit a specialised workshop in near future to perform filter maintenance.
	Symbol yellow and warning tone Engine fault <ul style="list-style-type: none"> • Bring the engine to idling speed as quickly as possible and switch off. • Consult with workshop personnel and eliminate faults
	Symbol white Auxiliary engine motor oil temperature too high. <ul style="list-style-type: none"> • Bring the engine to idling speed as quickly as possible. • Raise attachments. Switch off the attachments and allow the engine oil to cool down whilst the engine is running. • Consult with workshop personnel and eliminate faults.
	Symbol white No charge current. <ul style="list-style-type: none"> • Consult with workshop personnel as soon as possible and eliminate faults.
 CAN2 ?	Symbol white <ul style="list-style-type: none"> • CAN1939J faulty. • Power supply for engine controller faulty. • Consult with workshop personnel as soon as possible and eliminate faults.

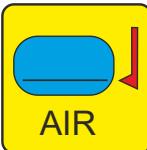
Symbol	Cause/solution
	<p>Symbol white Release switch for programming tasks is switched on in the cabinet (see chapter "Electrical Cabinet").</p> <ul style="list-style-type: none"> The programming switch is to be turned off when operating the machine.
	<p>Symbol white Auxiliary engine is switched off.</p>
	<p>Symbol white The flame start system for the auxiliary engine is switched on.</p> <ul style="list-style-type: none"> Only start the auxiliary engine if the indicator light is dark.
	<p>Symbol white and warning tone No warning tone emits when the EMERGENCY STOP button on the control panel is pressed. EMERGENCY STOP button is actuated.</p> <ul style="list-style-type: none"> Remedy the hazardous situation <p>Acknowledging the emergency shutdown</p> <ul style="list-style-type: none"> Unlock the EMERGENCY STOP button by turning it. Switch off the ignition for 5 seconds and switch on again
	<p>Symbol white Machine is in the warm-up phase</p> <ul style="list-style-type: none"> Remaining warm up time is shown Temperature difference (hydraulic oil, engine oil, coolant) to the set start temperature is shown.
	<p>Symbol white Vehicle door open.</p> <ul style="list-style-type: none"> Snow plough controller is switched off For snow plough control close vehicle doors

Symbol	Cause/solution
	<p>Symbol white Side blades are not pivoted outward.</p> <ul style="list-style-type: none"> • Plough cannot be pivoted into clearing position.
	<p>Symbol white Central lubrication unit</p> <ul style="list-style-type: none"> • Supply hopper for the central lubrication unit is almost empty. <ul style="list-style-type: none"> - Fill hopper with lubricating grease. Observe the manufacturer's operating instructions. - Perform manual lubrication. The warning light goes out.
	<p>Symbol white Faulty connection to the steering computer</p>
	<p>Symbol yellow Fault of the auxiliary steering</p> <ul style="list-style-type: none"> • Consult with maintenance personnel if <ul style="list-style-type: none"> - The fault is still displayed even after several restarts. - The fault is sporadically displayed over and over again.
	<p>Symbol red Major fault of the auxiliary steering</p> <ul style="list-style-type: none"> • Centring of the steering axle is no longer guaranteed. Stop work. If necessary, drive the machine carefully out of the danger zone. • Consult with maintenance personnel and eliminate faults.
	<p>Symbol white</p> <ul style="list-style-type: none"> • Turning radius exceeded. <ul style="list-style-type: none"> - The vehicle collides with the step deck trailer (TJS) and is damaged. • Correct the turning radius

Symbol	Cause/solution
	<p>Symbol flashes green</p> <ul style="list-style-type: none"> The transport position is approached or left. <p>Symbol green</p> <ul style="list-style-type: none"> The cross brush is in the transport position.
	<p>Symbol white</p> <ul style="list-style-type: none"> Blast nozzles for the function "Blowing in front of the brush" are not raised
	<p>Symbol yellow</p> <p>Automatic safety switching is active.</p> <ul style="list-style-type: none"> People must leave the danger zone.
	<p>Symbol white and warning tone</p> <p>No attachment is preselected.</p>
	<p>Symbol white</p> <p>The desired function is not possible in this mode. Switch the automatic function on or off.</p>
	<p>Symbol white</p> <p>Joystick defective.</p> <ul style="list-style-type: none"> Consult with workshop personnel and eliminate faults
	<p>Symbol white</p> <p>Wear limit of the brush has been reached.</p> <ul style="list-style-type: none"> The workshop personnel must change the brush.
	<p>Symbol yellow</p> <p>The auxiliary engine must be serviced.</p> <ul style="list-style-type: none"> Workshop personnel carry out service on the auxiliary engine.

Symbol	Cause/solution
	<p>Symbol red, warning tone sounds Engine fault</p> <ul style="list-style-type: none"> • Switch engine off as quickly as possible. • Consult with workshop personnel and eliminate faults.
	<p>Symbol white Water in fuel</p> <ul style="list-style-type: none"> • Drain water in diesel filter.
	<p>Symbol white Fault in the fire alarm system</p> <ul style="list-style-type: none"> • Consult with workshop personnel and eliminate faults
	<p>Symbol red and warning tone Fire or extreme heat in the engine compartment of the auxiliary engine</p> <ul style="list-style-type: none"> • Drive the machine out of the danger zone immediately. • Do not open the engine cabin. Keep oxygen away from the source of the fire if at all possible. • Exit the vehicle immediately. • Alarm the fire brigade if required.
	<p>Symbol white and warning tone The engine cover is raised</p> <ul style="list-style-type: none"> • Access to the drives is established. • The operator must not climb up to the drive until the drive parts have cooled ($\leq 50^{\circ}\text{C}$).
	<p>Symbol green</p> <ul style="list-style-type: none"> • ECO MODE is switched on • Reduced brush and blower speeds
	<p>Symbol red flashing, warning tone sounds Engine fault</p> <ul style="list-style-type: none"> • Switch engine off as quickly as possible. • Consult with workshop personnel and eliminate faults.

Symbol	Cause/solution
	<p>Display yellow: Fault in the exhaust after-treatment system</p> <ul style="list-style-type: none"> • Torque is limited to stage 1. <ul style="list-style-type: none"> - Correct the fault as quickly as possible. Observe the operating instructions of the engine manufacturer
	<p>Display red: Fault in the exhaust after-treatment system</p> <ul style="list-style-type: none"> • Torque limited, stage 2. <ul style="list-style-type: none"> - Correct the fault as quickly as possible. Observe the operating instructions of the engine manufacturer
	<p>Symbol yellow Fault in the carbamide (AdBlue) system, e.g., insufficient carbamide (AdBlue) tank content.</p> <ul style="list-style-type: none"> • Fill up with carbamide (AdBlue). Observe the operating instructions of the engine manufacturer.
	<p>Symbol red The carbamide (AdBlue) tank is empty.</p> <ul style="list-style-type: none"> • Fill up as soon as possible with carbamide (AdBlue). Observe the operating instructions of the engine manufacturer.
	<p>Symbol yellow Malfunction exhaust system on the auxiliary engine</p> <ul style="list-style-type: none"> • Consult with workshop personnel as soon as possible and eliminate faults; also see the engine manufacturer's operating instructions.

Symbol	Cause/solution
	<p>Symbol yellow and warning tone Compressed air supply from the vehicle is too low</p> <ul style="list-style-type: none"> The function and cleaning of the AdBlue® carbamide system for the auxiliary engine is no longer ensured. Switch off the auxiliary engine as quickly as possible. <p>The following protective measures are adopted:</p> <ul style="list-style-type: none"> After 30 seconds, the auxiliary engine speed is lowered to idle speed. After another 30 seconds, the auxiliary engine switches off.
	<p>Symbol yellow Regeneration of the diesel particle filter is in operation.</p> <ul style="list-style-type: none"> High exhaust gas temperature up to 600°C. The engine speed and noise generated by the engine may change.
	<p>Symbol yellow Diesel particle filter fill level increased</p> <ul style="list-style-type: none"> Automatic or manual regeneration should be initiated immediately.
	<p>Two symbols are in a combination of yellow and white Diesel particle filter fill level full</p> <ul style="list-style-type: none"> Automatic or manual regeneration should be initiated immediately.
	<p>Two symbols are in a combination of red and white Diesel particle filter fill level full</p> <ul style="list-style-type: none"> Initiate automatic or manual regeneration immediately

Symbol	Cause/solution
	<p>Two symbols are in a combination of red, white and red Overload diesel particle filter fill level</p> <ul style="list-style-type: none"> Automatic or manual regeneration is no longer possible. Visit workshop and/or have engine servicing performed.
	<p>Symbol white Operating mode switch</p> <ul style="list-style-type: none"> To start the diesel engine, set the operating mode switch to "I" or 
	<p>Symbol white The operating mode switch is set to "0" or </p> <ul style="list-style-type: none"> Working functions of sweeper unit and blast nozzle locked.
	<p>Symbol white with warning tone Safety function of the machine controller</p> <ul style="list-style-type: none"> Reboot the controller. Switch off the ignition of the vehicle

Symbol	Cause/solution
	<p>Symbol red Error in the emergency shutdown</p> <p>Acknowledge error</p> <ul style="list-style-type: none">• Press emergency stop button and unlock again• Switch off the ignition for 5 seconds and switch on again <p>Emergency shutdown can no longer be acknowledged</p> <ul style="list-style-type: none">• The electrical safety system (relay control) has a fault.<ul style="list-style-type: none">- Consult workshop personnel and rectify faults as quickly as possible

Warning and information symbols in the vehicle dashboard



IMPORTANT!

Depending on vehicle type and equipment

Warnings and notices may deviate from each other.

- ▶ Warnings are displayed visually.
- ▶ Depending on the warnings, suitable measures must be taken.



NOTE

Display of symbols

- ▶ Warning and information symbols that signal errors on the TJS are also displayed on the TJS control panel.

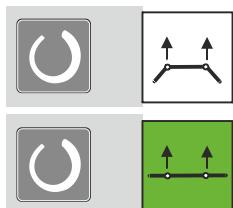
Symbol	Cause/solution
	<p>Symbol Hydraulic oil level in the vehicle hydraulics tank too low</p> <ul style="list-style-type: none">• Interrupt work.• Consult with workshop personnel and repair any leaks. Refill hydraulic oil.
	<p>Symbol Hydraulic oil temperature in the vehicle hydraulic tank too high</p> <ul style="list-style-type: none">• Interrupt work.• Allow hydraulic oil to cool down. After the hydraulic oil has cooled down, continue working at reduced power.• Consult with workshop personnel and eliminate faults.

Symbol	Cause/solution
	<p>Symbol yellow Error on the auxiliary steering of the TJS</p> <ul style="list-style-type: none"> Consult with maintenance personnel if <ul style="list-style-type: none"> The fault is still displayed even after several restarts. The fault is sporadically displayed over and over again.
	<p>Symbol red Serious fault on the auxiliary steering of the TJS</p> <ul style="list-style-type: none"> Centring of the steering axle is no longer guaranteed. Stop work. If necessary, drive the machine carefully out of the danger zone. Consult with maintenance personnel and eliminate faults.
	<p>Symbol red External power supply (house connection) for the cold weather package is still connected to the machine.</p> <ul style="list-style-type: none"> Vehicle cannot be started. <ul style="list-style-type: none"> Disconnect the external power supply from the vehicle.

Controlling the side blades on the snow plough

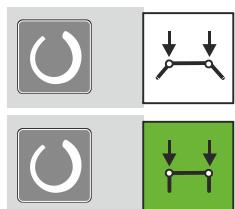
In the case of snow ploughs with folding blades

Open the blades.



- Press the white display button.
 - The side blades on the snow plough fold out.
- Button display green.
 - The plough blades are folded out.

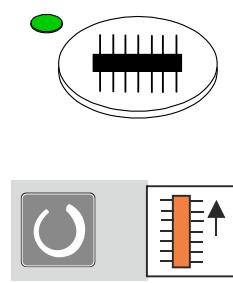
Close the blades.



- Press the white display button.
 - Snow plough pivots from the working position into the middle position.
 - The side blades on the snow plough open.
- Button display green.
 - The plough blades are folded in.

Pivot the sweeper into transport position

When the sweeper is in operation ≥ 3 km/h



- Press the button, and preselect the sweeper.
- Press the white display button.
 - Symbol flashes, sweeper swivels into transport position.
- The symbol lights up green.
 - The transport position is reached.



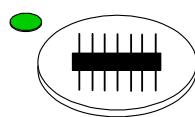
NOTE

Automatic mode activated

- If automatic operation is switched on, the “Pivot sweeper to transport position” button only has to be activated. The function runs automatically to the end position.

**When the sweeper is at a standstill
≤ 3 km/h**

- Press the button, and preselect the sweeper.
- Actuate the "AUTO 0 km/h" button.
 - The "AUTO 0 km/h" symbol extinguishes.
 - "Pivot sweeper into transport position" symbol appears.
- Press the "Swivel sweeper to transport position" button for approx. 2 seconds until the display turns white.
 - Symbol flashes, sweeper swivels into transport position.
- The symbol lights up green.
 - The transport position is reached.

**Brush maximum speed****Use of the maximum brush speed**

- Removal of packed snow and ice.
- If snow has to be thrown far.

**NOTE**

Maximum speed of the sweeping brush

High brush wear.

- Switch on the maximum brush speed only when required.



- Press the button; the display turns white.
 - The cylindrical brush rotates at the automatically or manually set speed.
- Press the button, display green.
 - The cylindrical brush turns at the maximum speed.

Recalibrate the sweeping range



Button display white

- The sweeping range is set

Press the button, display green

- Set sweeping range is deleted
- The next time the sweeper is lowered, the sweeping range is readjusted. Only adjust the sweeping range when the machine is standing still and on a level surface.

Pause button

Briefly park the machine.

The set data remains stored. When starting the machine again, the sweeping range must be recalibrated.

Prerequisite:

- The power supply between the control panel and PLC controller may not be interrupted.
- Ignition from the vehicle or from the control panel may not be switched off.



- Press the button, display green
 - Snow plough is lowered
 - Blast nozzle is raised
 - Sweeping range data are saved
 - Cross brush is raised
 - The diesel engine goes to idling speed and is switched off.

When restarting the machine

- The sweeping range set before the pause is set again when lowering the sweeper. The machine is ready for use immediately.

AUTO 0 km/h button



WARNING!

Control is possible when the TJS is at a standstill.

People may be crushed.

- ▶ Only start manual and automatic operation when you can ensure that there are no persons located in the danger zone.
- ▶ If the danger zone is not visible, a spotter is to be used.

This button makes it possible to carry out checks on the machine functions or movements even when the vehicle is stationary. As a result, automatic functions can be simulated even at a standstill.

When the vehicle is at a standstill (0 km/h) the pivoting, raising and lowering of the machines is possible.

Stop machine movements:

- Automatic operation
 - The machine movements can be stopped only using the EMERGENCY STOP switch.
- Manual operation
 - Release the joystick and/or briefly tap the raising function when lowering.



Enable the joystick function with the "AUTO 0 km/h" button

- Press the button, display white
- Using the joystick, pivot the machine into the desired work position.

If no movements are performed after approx. 5 seconds, the function switches off automatically.

Rear-view monitoring



WARNING!

The rear-view camera does not replace the spotter

People can be run over.

- Always use a spotter when reversing.



Switch on rear view monitoring

- Press the button, display green.
 - The image field of view of the camera is shown on the display.

Switch rear view monitoring off

- Press the button, display white
 - The display switches back to the operating display.

Rotary beacon



Switch off the rotary beacon

- Press the button, display white

Switch on rotary beacon

- Press the button, display green

Opening and closing the engine cover

Open the engine cover



WARNING!

Engine and hydraulic parts are hot

People can burn themselves on hot parts.

- ▶ Do not open the engine cover while the engine and hydraulic parts are hot.

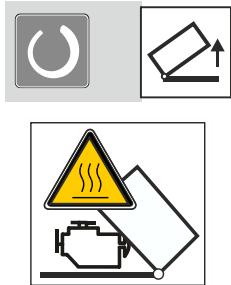
**IMPORTANT!**

At the opening of the engine cover, these parts may collide with the cover.

An open engine cover is unstable.

The engine cover can get damaged.

- ▶ Before opening the engine cover, ensure sufficient clearance height.
- ▶ Never drive with the engine cover open



- Press and hold the button, display white.
 - The engine cover lifts up
 - A warning symbol appears on display
- Attention:
Engine cover open
Risk of burns from hot engine and hydraulic parts
- Warning tone sounds three times.
- If present, engage mechanical support

Closing the engine cover**WARNING!**

Danger of crushing

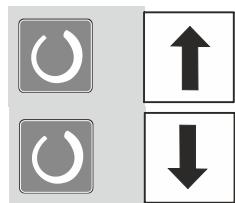
- ▶ Before closing the engine cover, make sure that no persons are occupying the engine platform.
- ▶ If anyone comes near the closing edges, stop lowering the engine cover immediately.



- Fold up / remove the ladder.
- If present, change position of mechanical support.
- Press and hold the button, display white
 - The engine cover lowers
 - Warning symbol goes out

Menu selection button

Select menu



- Select the desired menu by pressing the buttons.

Menu levels



Reset and/or change the menu level

- Select the desired menu level by tapping it. The menu level is displayed on the symbol field.

Vibrator control

The vibrator causes the brush cover to vibrate thus loosening the snow adhering to it.

Manual control



- Press and hold the button, display white
 - The vibrator is active until the button is pressed.

Automatic controller



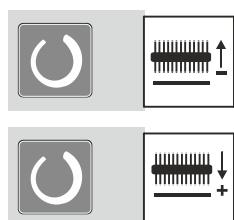
- Press the button, display green
 - Vibrator is switched on.
Pause/switch-on time is programmable. (Factory setting pause/switch-on time 300 sec. / 6 sec.)
- Press and hold the button, display white
 - The vibrator is switched off.

Impulse control



- Press the button, display green
 - The vibrator remains switched on for a certain time.
The switch-on time is programmable. (Factory setting of 6 seconds).
- Press the button, display white
 - Vibrator is switched off

Retract/extend castor wheels



Necessary for the maintenance personnel during installation work.

Switch ECO MODE on/off

The environment is protected by switching on "ECO MODE".

- Reduced noise development
- Reduced fuel consumption
- Reduced pollutant emissions

Switch on ECO MODE



- Press the button
 - The brush and blower speeds are reduced (reduction of factory setting by 10%).
An information symbol appears on the display.

When the machine is started, the ECO MODE function is activated.

Switch off ECO MODE

- Press the button
 - The brush and blower speeds are increased to the set value.
 - The information symbol extinguishes on the display.

By increasing the brush and/or blower speed with the potentiometer, the function is also deactivated.

Blower upstream of the brush



CAUTION!

Blast nozzles can be lowered by leaks in the hydraulic cylinders. When starting up and leaving the transport position of the cylindrical brush, the blast nozzles are lifted briefly. Unexpected lifting of the blast nozzles.

People could be crushed.

- ▶ Keep a safe distance from the blast nozzles.

This blower equipment can only be used in combination with the main blower.

Preselect the "Blowing device upstream of brush" function.



- Press the button; the symbol turns green and blowing upstream of the brush is pre-selected.
- Using the joystick, lower the machine and start the blower.

End the "Blowing device upstream brush" function.

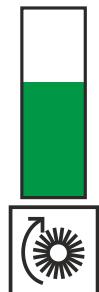
- Press the button; the symbol turns white and blowing upstream of the brush is switched off.

Relief display



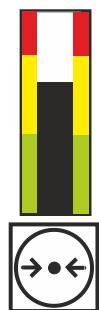
- Flashing symbol
 - The snow plough is the process of being lowered.
- Illuminated symbol:
 - The snow plough is lowered and in the float setting
- The bar diagram shows the amount of relief.

Display of brush adjustment procedure



- Flashing symbol
 - Sweeping brush is in the adjustment process.
- Illuminated symbol:
 - The adjustment procedure is complete; the sweeping brush is in working position.
- The bar diagram shows the brush speed.

Display of hydraulic brush drive



- Flashing symbol
 - Sweeping brush is in the adjustment process.
- Illuminated symbol:
 - The adjustment procedure is complete; the sweeping brush is in working position.
- The bar diagram shows the hydraulic drive power of the sweeping brush. The display should be in between the green and yellow marks when clearing.

Display of blower adjustment procedure



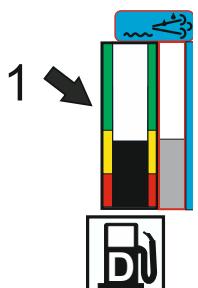
- Flashing symbol
 - The blower is the process of being adjusted.
- Illuminated symbol:
 - The adjustment procedure is complete; the blower is in working position.
- The bar diagram shows the blower speed.

Engine speed display



- Flashing symbol
 - The diesel engine enters working speed.
- Illuminated symbol:
 - The diesel engine has reached working speed.
- The bar diagram shows the engine speed.

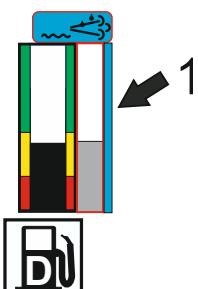
Diesel fuel tank display



Tank display (1), diesel fuel for the auxiliary engine

- If the display is in the red area, 90% of the fuel has been consumed.

Carbamide (AdBlue) tank display



Tank display (1), carbamide (AdBlue) for the auxiliary engine

- Display 0 - 100%

Reading the totalling counter

	584721.534 km 84721:53 h (yac)
	584721.534 km 84721:53 h (yac)
	584721.534 km 84721:53 h (yac)
	584721.534 km 84721:53 h (yac)
	84721:53 h (yac)

Display of driven distance (km) and/or operating hours (h).

- Control panel switched on
- Snow plough in working position
- Sweeper unit in working position
- Blast nozzle in working position
- Auxiliary engine operating hours

Reverse travel

Choose a suitable speed when reversing due to poor visibility. We recommend a maximum speed of 5 km/h.



WARNING!

Poor visibility

People could be run over

- ▶ Before reversing the vehicle, ensure that there are no persons standing behind the machine.
- ▶ If the danger zone is not visible, a spotter is to be used. The rear-view camera does not replace the spotter.



IMPORTANT!

When machines are lowered.

Sweeper: Due to the change in direction, the castor wheels are rotated in the vertical axis and pressed into the brush.

Snow plough: Due to the change in direction, the castor wheels are rotated in the vertical axis and pressed onto the frame.

Observe the operating instructions of the snow plough manufacturer.

Castor wheels can be damaged.

- ▶ Raise the snow plough and sweeper before reversing the machine.

**IMPORTANT!**

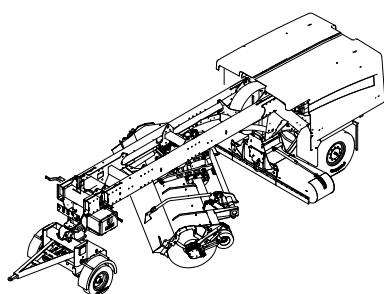
If desired by the customer, the automatic raising of the blast nozzle can be switched off when reverse gear is initiated.

The blast nozzle can be destroyed when it hits an obstacle.

- ▶ Drive in reverse when the blast nozzle is lowered only if no obstacles are in the driving range.

If the machine is equipped with an automatic lift control, the snow plough, cross brush and blast nozzles automatically raise themselves after reverse gear is engaged.

After disengaging the reverse gear, the machines can be lowered into working position again by actuating the joystick.

**TJS with drawbar**

Reversing the TJS with drawbar requires a lot of practice. Switching off the four-wheel steering is recommended. A steering angle of the front axle of more than 70° is not permitted.

Transit travel**WARNING!**

Machine with rear axle steering. Failure of axis centring

Uncontrolled steering movement. The auxiliary steering only works with the auxiliary engine running.

- ▶ It is not permitted to drive without the auxiliary engine running.

**WARNING!**

Large dimensions or unintentional machine movements.

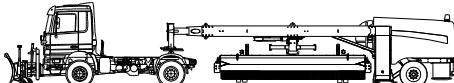
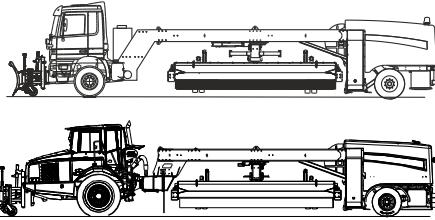
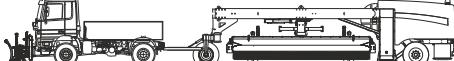
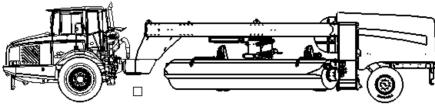
People or road users could be endangered

- ▶ Ensure the TJS may be operated on the intended roadways.
- ▶ Switch off all machines with the programming buttons
- ▶ If necessary, remove the attachments

Transit travel

- Machine with transit lock.
Secure attachments against unintentional movements with a transit lock.
- Transit without rear axle steering
 - Switch the control panel off
 - Switching off the auxiliary engine
- Transit with rear axle steering
 - Start the auxiliary engine
 - Switch all machines using the program buttons
 - Deactivating automatic mode
- The maximum permitted speed must not be exceeded (install signs stating the maximum speed if necessary).
- The travel speed must be adapted to the respective road and traffic conditions, and the effects of the equipment must be taken into account when turning and braking.

- Special care and attention are required when turning into roads due to the cutter-blower protruding at the front.

Maximum speeds:			
	TJS with step deck trailer		62 km/h
	TJS with power head		62 km/h
	TJS with draw-bar		50 km/h
	Tractor unit		50 km/h

After use



WARNING!

Damaged parts can be dangerous.

There is a risk of severe injury to people.

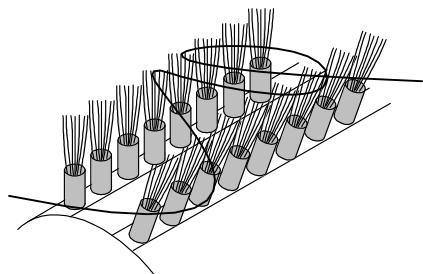
- Defects that have been found are to be repaired by workshop personnel immediately.

- Park the TJS safely
- Clean the TJS thoroughly
- Check the brushes for foreign bodies; remove them if necessary.
- Carry out a visual inspection for leakages
- Check wear-and-tear parts
- Connect the external power supply for the battery charger and/or cold weather package
- Check for loose parts
- Check the warning signs
- Check the lighting
- Check the warning lights

Clean TJS

- If the TJS is cleaned with a pressure cleaner, the operating instructions of the high-pressure cleaner must be observed.
- Wear protective equipment (see "Protective Clothing" chapter).
- Do not direct the water spray at bearings. Water can get into the bearings and irreparably damage them.
- Do not direct the water spray at warning and notice signs. Signs can come off or be damaged. Damaged signs or signs that have come off must be replaced immediately.
- Never direct the water jet towards the exhaust system, for example. Water could get into the engine and destroy it.
- After the machine has been cleaned, check all hydraulic fluid lines for loose connections, abrasion points and damage.
- Check the corrosion protection; improve as required.

Cleaning brushes of foreign bodies



Parking the machine safely.
Foreign bodies trapped in the cross brush can be removed using the supplied chip removal tool. Wear gloves and arm protection when doing so. For example, use side cutters to cut wire that has become entangled in it and then pull out with pliers.

8 Maintenance, extents of wear

8.1 Maintenance

Personnel for maintenance and repair work

Maintenance and repair work may only be performed by personnel with the appropriate training who have been instructed and trained in how to handle the device.

8.1.1 Regeneration of diesel particle filters

Engines with diesel particle filter. Observe the operating instructions of the engine manufacturer.



WARNING!

Danger of fire during manual and automatic regeneration. Exhaust gas temperature at exhaust gas output up to 600°C.

If people or flammable materials (such as liquids, objects or gases) come into contact with hot parts of the exhaust gas system or with exhaust gases, people could be burned or poisoned and materials can ignite.

- ▶ People must stand clear of the exhaust gas opening. People must not be in the exhaust gas flow.
- ▶ Regularly, even after maintenance work, make sure that no flammable foreign matter can be found in the engine compartment or on the exhaust gas system.
- ▶ Do not park the machine on flammable surfaces or surfaces that can become deformed by heat, such as dry fields, asphalt surfaces, etc.
- ▶ Do not perform regeneration in enclosed spaces
- ▶ During regeneration, observe a distance of at least one metre to other objects, such as parked cars, in order to avoid property damage.

Automatic regeneration

Automatic regeneration is started by the engine itself when all operating conditions are met, for example:

- Sufficiently high engine oil temperature
- Sufficiently high exhaust gas temperature

If the operating conditions are no longer fulfilled, regeneration switches off. Once the conditions are met again, it restarts automatically. If regeneration repeatedly interrupts, lock it temporarily and then restart it manually.

The regeneration of the diesel particle filter and high exhaust gas temperatures are displayed using symbols.

Symbol	Cause/remedy
	<p>Symbol yellow</p> <ul style="list-style-type: none">• Regeneration of the diesel particle filter is in operation.• High exhaust gas temperature up to 600°C.• The engine speed and noise generated by the engine may change.

The time remaining for the manual regeneration of the diesel particle filter is displayed in the "Diesel particle filter" submenu.

Manual regeneration

Manual regeneration must be started on the control panel.

**NOTE**

Manual regeneration of the diesel particle filter

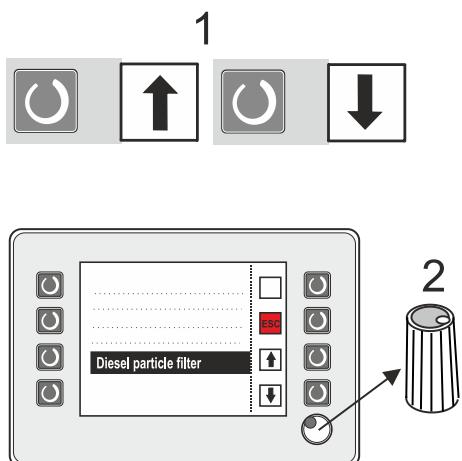
- ▶ Machines (snow plough, sweeper, blower) must not be activated.
- ▶ Engine speed under 900 rpm

**NOTE**

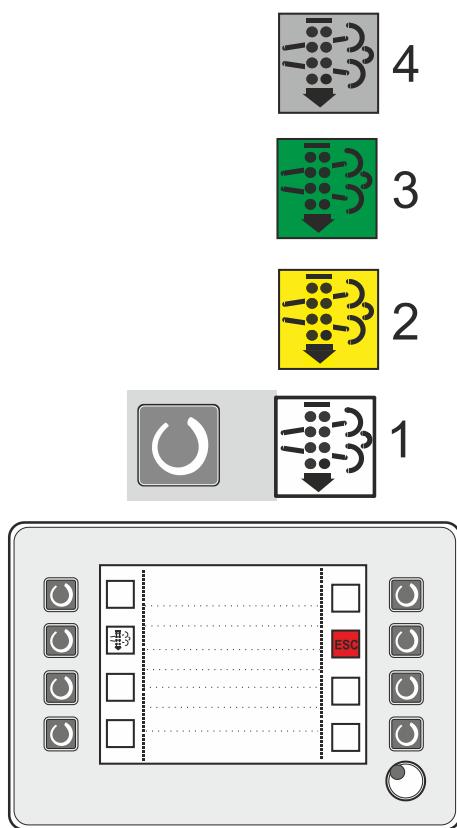
- ▶ It is possible to go back by one menu level using the "ESC" button.



Pressing the menu button switches to the third menu level.
The menu level is displayed on the symbol field.



Select the "Diesel particle filter" menu using the arrow keys (1). Confirm the selection by pressing the rotary switch (2).



The colours of the button symbol indicate the operating state.

Button symbol white (1)

- Manual regeneration of the diesel particle filter has not been started. To start, press the button for longer than 1 second.

Button symbol yellow (2)

- The engine checks the prerequisites for the regeneration of the diesel particle filter. Duration: approx. 10 seconds
 - Engine oil temperature
 - Coolant temperature
 - Carbamide (AdBlue)
- The symbol colour changes.
 - Green: Prerequisites met
 - White: Prerequisites not met

Button symbol green (3)

- Manual regeneration of the diesel particle filter is in operation.
- Warning messages appear in the display
 - Manual regeneration is active
 - High exhaust gas temperatures
- The time remaining for the regeneration of the diesel particle filter is displayed.

Button symbol grey (4)

- Manual regeneration cannot be started. Prerequisites for regeneration are not met.
 - Set an engine speed under 900 rpm
 - Machines (snow plough, sweeper, blower) are activated.
- If the prerequisites are met, the symbol colour changes to white.

Deactivate regeneration



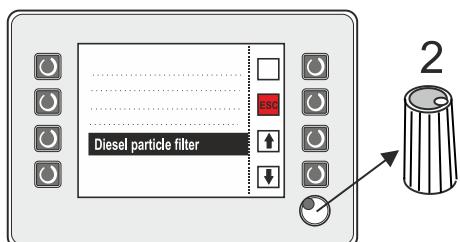
NOTE



- It is possible to go back by one menu level using the "ESC" button.

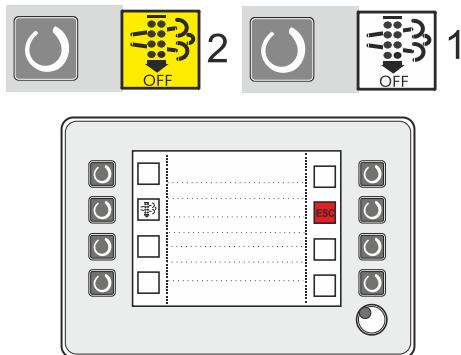


Pressing the menu button (1) switches to the third menu level. The menu level is displayed on the symbol field.



Select the "Diesel particle filter" menu using the arrow keys (1). Confirm the selection by pressing the rotary switch (2).

The colour of the symbol and function change when this button is actuated



Button symbol white (1)

- The regeneration lock is switched off.
 - The regeneration of the diesel particle filter is started automatically or can be started manually depending on the load state.

Button symbol yellow (2)

- The regeneration lock is switched on.
 - Automatic or manual regeneration of the diesel particle filter is not possible. Switch on the regeneration lock only if required by the operating states, for example, in case of a danger of fire due to high exhaust gas temperatures.

Display of the loading zone (soiling) of the diesel particle filter



NOTE

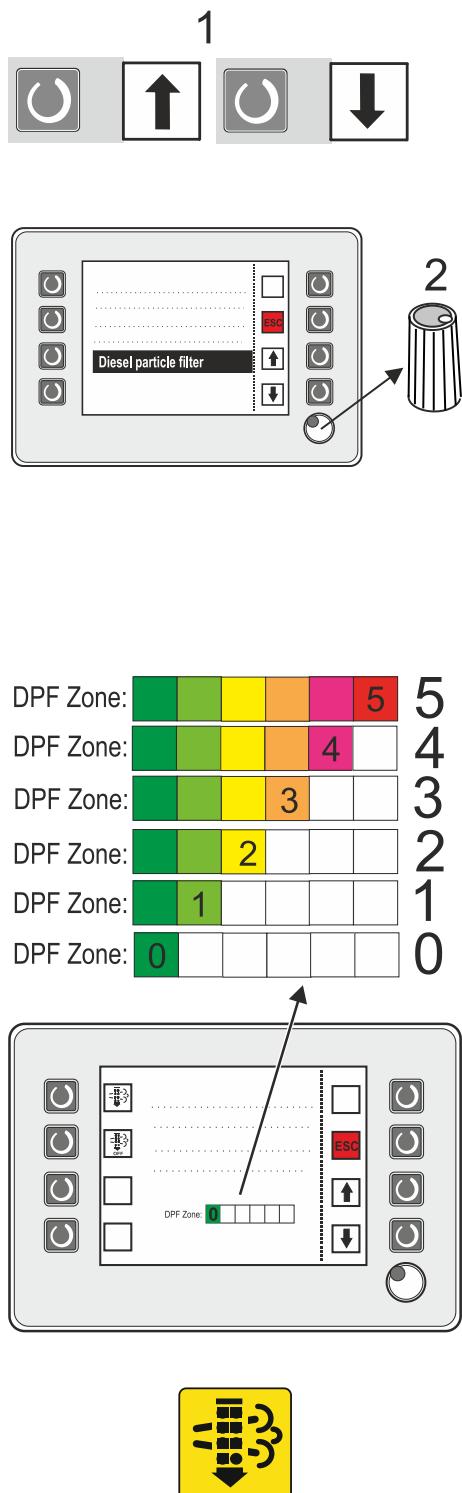


- It is possible to go back by one menu level using the "ESC" button.



Pressing the menu button (1) switches to the third menu level.

The menu level is displayed on the symbol field.



Select the "Diesel particle filter" menu using the arrow keys (1). Confirm the selection by pressing the rotary switch (2).

The display shows six load states of the diesel particle filter.

Load zone "0"

- Diesel particle filter fill level not increased.
- No measures required

Loading zone "1"

- Diesel particle filter fill level low.
- No measures required by the user.
- The engine possibly initiates an automatic regeneration itself in the background if corresponding circumstances are present.

Loading zone "2"

- Diesel particle filter fill level increased.
- A warning message appears on the control panel.
- Automatic or manual regeneration should be initiated immediately.

Loading zone "3"



- Diesel particle filter fill level full.
- Warning messages appear on the control panel.
- Automatic or manual regeneration should be initiated immediately.

Loading zone "4"



- Diesel particle filter fill level full.
- Warning messages appear on the control panel.
- Initiate automatic or manual regeneration immediately.

Loading zone "5"



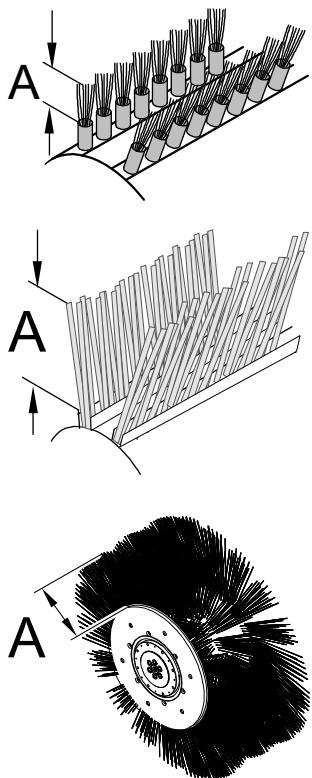
- Overload diesel particle filter fill level.
- Warning messages appear on the control panel.
- Automatic or manual regeneration is no longer possible.
- Visit workshop and/or have engine servicing performed.

8.2 Wear dimensions

Cutting edge – Snow plough

See snow plough operating instructions.

Bristle length – cross brush



Strip brushes

Steel bristles

Strip brushes must be replaced when a bristle length of (A) approx. 30 mm is reached.

Plastic bristles

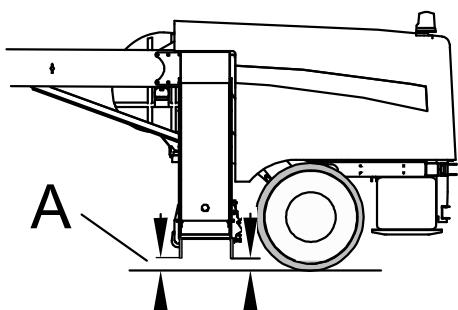
Strip brushes must be replaced when a bristle length of (A) approx. 80 mm is reached.

Ring brushes

Steel bristles

Ring brushes must be replaced when a bristle length of (A) approx. 50 mm is reached.

Rubber bars – blast nozzle

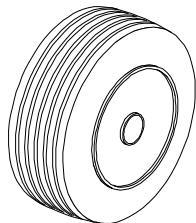


The distance of the rubber bar when used on level ground should be approximately 100 mm on both sides (A).

With uneven ground below, the distance of the rubber bars to the ground is to be increased.

If the setting of the rubber bars is exceeded, it must be reset via the slots. If this is no longer possible, the rubber bars must be replaced.

Castor wheel



Profile depth

The profile depth is crucial for the adhesion of tyres. If the profile depth of the tyre is less than 4 mm, the tyre must be changed.

Ageing

If the tyre shows signs of brittleness (cracks), it must be changed. With the tyres taken off, the inner tube should also be checked for cracks and also replaced if necessary.

Vehicle

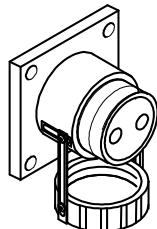
See separate manufacturer's operating instructions.

Auxiliary engine

See separate manufacturer's operating instructions.

9 Malfunctions

Remote start connector 24V



The remote start connector is located in the battery area.

A helping vehicle can jump-start the TJS through the remote start connector.

Jump starting

- Turn off the ignition and all electrical consumers of the TJS.
- Connect the jumper cables on the TJS and the helping vehicle.
- Start the engine of the helping vehicle and let it run at high speed.
- Start the engine of the TJS.
- After a successful start of the engine, remove the jumper cables.

Towing



With regard to the forces that occur during towing, assume the permitted total weight of the TJS to be towed. The tow rope or tow bar must be designed for the respective forces and must be fastened to a suitable location on the vehicle. Towing with a tow rope, without a tow bar is only permitted if the brakes of the vehicle being towed are functioning properly. While towing with the vehicle engine switched off, the steering and brakes will be very sluggish. Turning the steering wheel and using the brakes requires greater force. Tow very care-

fully and drive slowly (max. 5 km/h). Take off and tow smoothly (no jerky movements). Only tow the TJS in a straight line.

10 Taking the snowplough out of service

Only trained personnel working in suitably equipped workshops may perform decommissioning. The maintenance work is described in a separate document.

- Clean thoroughly.
- Carry out a full lubrication (in accordance with the lubrication schedule). An oil and filter change must be performed before the clearing season.
- Protect exposed piston rods of the hydraulic cylinders from corrosion with spray oil.
- Correct paint damage.
- Put the cross brush into transport position.
- De-rust exposed parts and coat with an anti-corrosive substance (paint, spray oil etc.).
- Store the control panel in a cool (room temperature) and dust-protected environment.
- Protect electrical and hydraulic connections from soiling. Electrical contacts are to be lubricated with contact grease.
- Treat rubber components with talcum powder or glycerine.
- Empty the fuel tank completely and fill it with fresh fuel. Measure reduces rust formation.
- Remove the battery, check acid levels and charge every 3 months.
- Perform all preservation tasks for the TJS.

11 Disposal

Consumables must be disposed of properly.

Oils and lubricants

Do not allow oils and lubricants to be released into the environment.

- Collect oils and lubricants in suitable, secure storage containers and dispose of properly.

Plastics

Plastics can cause considerable damage to the environment.

- Plastics must be disposed of appropriately.
- Indicated plastic parts can be recycled.

Snow plough

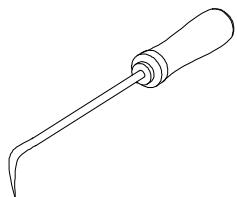
- Worn-out machines should be disposed of correctly by a qualified / certified company.

12 Accessories, special tools

Retrofittable options

Aebi Schmidt Customer Service will gladly provide you with information about retrofittable options.

Special tools



Chip removal tool

The chip removal tool is suitable for removing foreign bodies which have become caught in the cross brush.

13 Declaration of Conformity

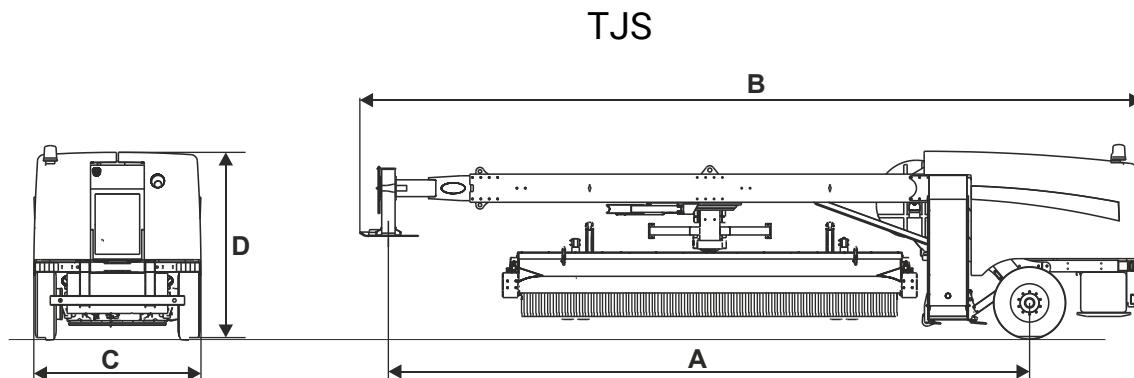
The CE declaration has been enclosed with the document folder as an original with reference to the respective vehicle identification number.

14 Technical data of TJS

TJS type plate

The type plate is on the rear right of the engine frame.

Dimensions



Dimensions (mm)	TJS 420	TJS 560	TJS 630
Length (Dimension B)	Approx. 10,330	Approx. 11,730	Approx. 12,430
Length of king-pin to the centre axle (dimension A)	Approx. 8,160	Approx. 9,560	Approx. 10,260
Transport width (Dimension C)	Approx. 2,550	Approx. 2,550	Approx. 2,550
Height (without rotary beacons) (Dimension D)	Approx. 2,780	Approx. 2,780	Approx. 2,780
Sweeping width at 32°			
	Approx. 3,560	Approx. 4,750	Approx. 5,340
Sweeping width at 36°	Approx. 3,400	Approx. 4,530	Approx. 5,100

Combustion engine

The exact description can be found in the corresponding operating instructions of the engine manufacturer.

Combustion engine Mercedes Benz OM 936 LA

Used with the TJS 420, TJS 560, TJS 630

Manufacturer	Mercedes Benz
Model	OM 936 LA
Design	6-cylinder, inline engine
Engine capacity	7,700 cm ³
Output	260 kW (354 HP) at 1,800 rpm
Emission level	3a

**Combustion engine Mercedes Benz
OM 936 LA**

Used with the TJS 420

Manufacturer	Mercedes Benz
Model	Mercedes Benz OM 936 LA
Design	6-cylinder, inline engine
Engine capacity	7,700 cm ³
Output	260 kW (354 HP) at 1,800 rpm
Emission level	V

**Combustion engine Mercedes Benz
OM 936 LA**

Used with the TJS 560, TJS 630

Manufacturer	Mercedes Benz
Model	OM 936 LA
Design	6-cylinder, inline engine
Engine capacity	7,700 cm ³
Output	280 kW (381 HP) at 1,800 rpm
Emission level	V

**Internal combustion engine VOLVO
D13**

Used with the TJS 560, TJS 630

Manufacturer	VOLVO
Model	TAD1372VE
Design	6-cylinder, inline engine
Engine capacity	12,780 cm ³
Output	315 kW (428 HP) at 1,700 rpm
Emission level	Tier 4f (EU IV)

Internal combustion engine VOLVO D11

Used with the TJS 560, TJS 630

Manufacturer	VOLVO
Model	TAD1183VE
Design	6-cylinder, inline engine
Engine capacity	10,840 cm ³
Output	315 kW (428 HP) at 1,700 rpm
Emission level	V

Electrical system

Components	TJS 420	TJS 560	TJS 630
Generator	28 V, 100 A	28 V, 100 A	28 V, 100 A
Batteries	2 x 12 V / 220 Ah	2 x 12 V / 220 Ah	2 x 12 V / 220 Ah

Brush drive

	TJS 420	TJS 560	TJS 630
Type of drive	Hydrostatic	Hydrostatic	Hydrostatic
Variable displacement pump	Delivery volumes 180 cm ³ /rev.	Delivery volumes 180 cm ³ /rev.	Delivery volumes 180 cm ³ /rev.
Constant motor	Displacement volume 2x160 cm ³ /rev.	Displacement volume 2x160 cm ³ /rev.	Displacement volume 2x160 cm ³ /rev.

	TJS 420	TJS 560	TJS 630
Max. operating pressure	420 bar	420 bar	420 bar

Fan drive

	TJS 420	TJS 560	TJS 630
Type of drive	Hydrostatic	Hydrostatic	Hydrostatic
Variable displacement pump	Delivery volumes 180 cm ³ /rev.	Delivery volumes 180 cm ³ /rev.	Delivery volumes 180 cm ³ /rev.
Constant motor	Displacement volume 90 cm ³ /rev.	Displacement volume 90 cm ³ /rev.	Displacement volume 90 cm ³ /rev.
Max. operating pressure	420 bar	420 bar	420 bar

Sweeper apparatus

	TJS 420	TJS 560	TJS 630
Brush length	4,200 mm	5,600 mm	6,300 mm
Brush diameter	914 mm	914 mm	914 mm
Brush speed max.	Approx. 750 rpm	Approx. 750 rpm	Approx. 750 rpm
Working range (Brush diameter 914 mm)	300 to 750 rpm	300 to 750 rpm	300 to 750 rpm

Brush service life

In automatic mode, it is possible to ensure an optimal combination of good cleaning results and long service life. This mode increases the brush speed at increasing vehicle speed (to ensure constant cleaning performance per surface area). Basically, the service life of a brush is defined in cleaning a certain area before the wear limit of the brush is reached. If a sweeping task is completed at lower speed, a corresponding area

can be cleaned. If the speed is doubled, the wear limit is reached twice as quickly, but the swept area remains approximately the same. The achievable area performance depends decisively on the influencing factors of the surface to be swept (e.g. rough/smooth, dry/damp, etc.), brush speed and sweeping level (contact pressure of the brush on the sweeping surface).

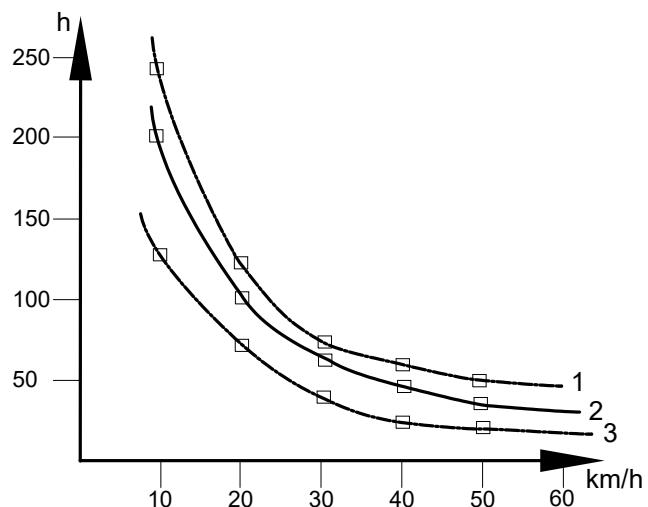
To be able to compare the "Brush service life" in operating hours, Aebi Schmidt always relates it to the operation based on a speed of 10 km/h. This means that at a brush service life of 50-60 operating hours at a speed of approx. 30-40 km/h, an equivalent brush service life will be 150 hours of operation or more at 10 km/h.



NOTE

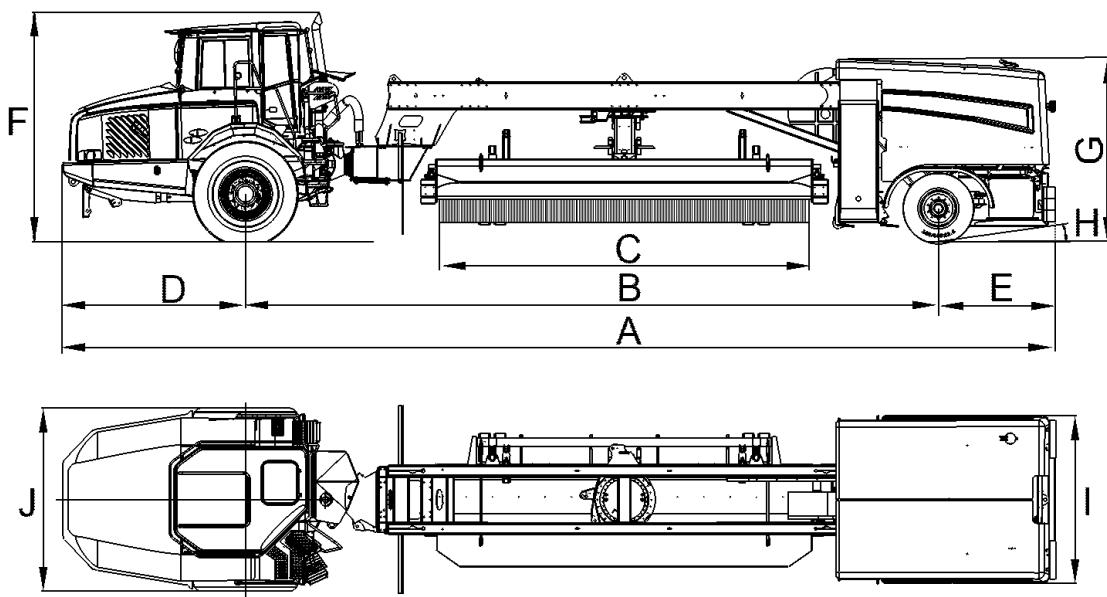
Surface calculation

- ▶ The area calculations are applicable for TJS 630 type jet sweepers.



1. 1. Light conditions (low relative abrasion, little snow and/or wet surface). A brush set had an "expected service life" of approx. 13.0 km².
2. 2. Average conditions (average relative abrasion, snow under dry/cold conditions). A brush set has an "expected service life" of approx. 11.0 km².
3. 3. Abrasive conditions (very abrasive surface, much snow under cold/dry conditions). A brush set has an "expected service life" of approx. 7.5 km².

15 Technical data of TJS- C



Dimensions: (mm)	TJS-C 560	TJS-C 630
Length (dimension A)	Approx. 15,700	Approx. 16,400
Length (dimension B)	Approx. 10,500	Approx. 11,250
Length of cylinder brush (dimension C)	Approx. 5,600	Approx. 6,300
Sweeping width at 32°	Approx. 4,750	Approx. 5,350
Sweeping width at 36°	Approx. 4,530	Approx. 5,100
Length (dimension D)	Approx. 2,850	Approx. 2,850
Length (dimension E)	Approx. 2,300	Approx. 2,300
Height (dimension F)	Approx. 3,475	Approx. 3,475
Height (dimension G)	Approx. 2,760	Approx. 2,760
Slope gradient (dimension H)	Approx. 8°	Approx. 8°
Width (dimension I)	Approx. 2,540	Approx. 2,540
Width (dimension J)	Approx. 2,775	Approx. 2,775

Weight without plough: (kg) depending on equipment	
Total weight with diesel	Approx. 21,300

Weight without plough: (kg) depending on equipment	
Axle load rear	Approx. 9,300
Axle load front	Approx. 12,000

Engine:	Mercedes Benz	VOLVO	VOLVO
Design	6 cylinder, V engine	6 cylinder, inline engine	6 cylinder, inline engine
Type	OM 501 LA	TAD1372VE	TAD1172VE
Output	315 kW (428 HP)	315 kW (428 HP)	285 kW (387 HP)
Max. torque	2,000 Nm at 1,080 rpm	2,175 Nm at 1,200 rpm.	1,938 Nm
Nominal speed	2,000 rpm	1,800 rpm.	1,700 rpm.
Exhaust level	EUROMOT 3a	EUROMOT 4	EU IV / US T4f
Engine capacity	11,950 cm ³	12,780 cm ³	10,800 cm ³
Generator	28 V, 100 A	28 V, 110 A	

Fuel system:	
Fuel tank	600 Litre

Electrical system:	
Starter	24 V
Batteries	2 x 12 V/225 Ah
Lighting	Rear lighting set

Brush drive:	
Type of drive	Hydrostatic
Variable displacement pump	
Mercedes Benz OM 501 LA VOLVO TAD1362VE	Delivery volume, 125 cm ³ /rev Delivery volume, 180 cm ³ /rev

Brush drive:	
Constant-speed motor	Max. pressure 420 bar Displacement volume 2x160 cm ³ /rev. Max. pressure 420 bar

Blower drive:	
Variable displacement pump	Delivery volume 180 cm ³ /rev.
Constant-speed motor	Displacement volume 90 cm ³ /rev.
Max. pressure	420 bar

Sweeper unit:	
Brush diameter	914 mm
Brush speed max.	approx. 750 rpm
Working range (brush diameter 914 mm)	300 to 500 rpm
Brush speed	Variable adjustment

Brush service life

In automatic mode, it is possible to ensure an optimal combination of good cleaning results and long service life. This mode increases the brush speed at increasing vehicle speed (to ensure constant cleaning performance per surface area). Basically, the service life of a brush is defined in cleaning a certain area before the wear limit of the brush is reached. If a sweeping task is completed at lower speed, a corresponding area can be cleaned. If the speed is doubled, the wear limit is reached twice as quickly, but the swept area

remains approximately the same. The achievable area performance depends decisively on the influencing factors of the surface to be swept (e.g. rough/smooth, dry/damp, etc.), brush speed and sweeping level (contact pressure of the brush on the sweeping surface).

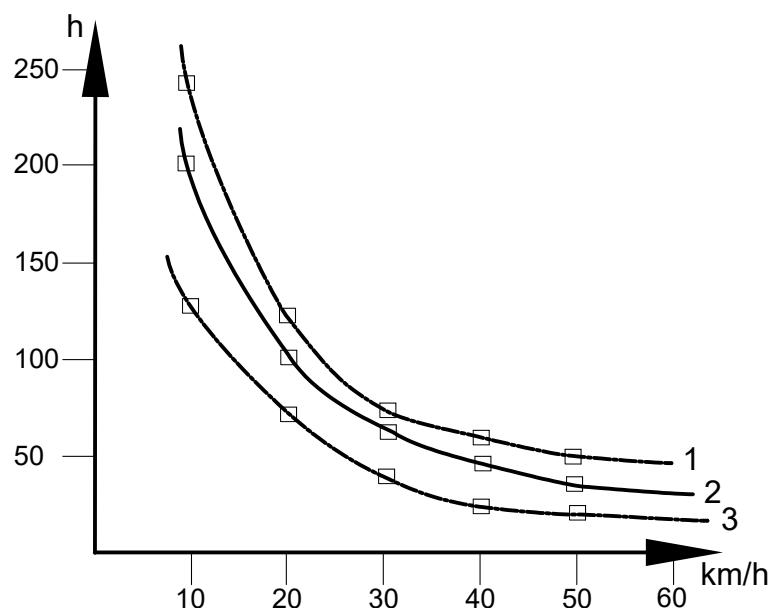
To be able to compare the "Brush service life" in operating hours, Aebi Schmidt always relates it to the operation based on a speed of 10 km/h. This means that at a brush service life of 50-60 operating hours at a speed of approx. 30-40 km/h, an equivalent brush service life will be 150 hours of operation or more at 10 km/h.



NOTE

Surface calculation

- ▶ The area calculations are applicable for TJS-C 630 type jet sweepers.



1. Light conditions (low relative abrasion, little snow and/or wet surface). A brush set had an "expected service life" of approx. 13.0 km².
2. Average conditions (average relative abrasion, snow under dry/cold conditions). A brush set has an "expected service life" of approx. 11.0 km².
3. Abrasive conditions (very abrasive surface, much snow under cold/dry conditions). A brush set has an "expected service life" of approx. 7.5 km².

16 Circuit diagrams

The Aebi Schmidt Group maintains a worldwide sales and service organisation.

If circuit diagrams are required, they should be obtained from your responsible sales and service organisation. You can find your sales and service organisation at:
www.aebi-schmidt.com

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Aebi Schmidt Deutschland GmbH
Albtalstraße 36
DE - 79837 St. Blasien

+49 7672 412 0

+49 7672 412 230

www.aebi-schmidt.com

aebi schmidt
group