

Operating manual

PistenBully 300 POLAR

From WKU 5 825 MA 5 L 012084

For WKU.....

EN



PistenBully®



KÄSSBOHRER GELÄNDEFahrZEUG AG

Kässbohrer Geländefahrzeug AG
Kässbohrerstrasse 11
D-88471 Laupheim

CALIFORNIA _____

Proposition 65 Warning _____

Diesel engine exhaust and some of its constituents are known _____
to the State of California to cause cancer, birth defects, and _____
other reproductive harm. _____

Printed in Germany

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Technical details might not necessarily be exactly as described or illustrated in this operating manual.

Printed on environmentally compatible paper (bleached without chlorine, recyclable).

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OTHER ON-BOARD DOCUMENTS

- Log book
- Operating manual for the diesel engine.
- Customer's workshop information
- Operating manual for Kahlbacher front-mounted rotary plough blower (optional equipment).
- Operating manual for drum winch (optional equipment).

**YOUR OPINION IS
IMPORTANT TO US.**

To ensure that your operating manual is optimum in all ways.

Sender:

.....

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Fax:

To:

Kässbohrer Geländefahrzeug AG

Kässbohrerstraße 11

D-88471 Laupheim

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Quality of translation:

Correctly translated

Mistakes in translation

Comments:

.....

.....

Graphics and photos:

Provide good explanations

More explanatory diagrams required

Comments:

.....

A CD-ROM would be good!

INTRODUCTION TO THE OPERATING MANUAL

This operating manual provides information about:

- how to handle, maintain and care for your PistenBully.
- important instructions concerning correct and economical operation.
- warnings so that you recognise dangers in good time and avoid them.



Make sure that the operating manual is always in the glove box in the driver's cab.

ABBREVIATIONS USED

e.g. = for example

MA = tightening torque

SP no. . . = order number for spare part

min./max. = minimum / maximum

Sec. . . . = Section

8



SYMBOLS USED

 **WARNING!**

Failure to comply with working and operating instructions with this symbol may result in danger to life and limb.

 **CAUTION!**

Failure to comply with working and operating instructions with this symbol may result in damage to machines or property.



Important information and recommendations.



Environmental protection instruction or information on environmentally-friendly operation.

○ Handling information

Technical customer service (TKD)

		Telephone number at work	Mobile number
Director of Service (GS)	Mr. Knab	+49(0)7392/900-101	0171-4338602
Head of department TKD	Mr. Strähle	+49(0)7392/900-103	0171-5769732
Area Manager TKD	Mr. Stockinger	+49(0)7392/900-106	0171-4066984
Area Manager TKD	Mr. Braun	+49(0)7392/900-105	0171-4066982
Area Manager TKD	Mr. Arbogast	+49(0)7392/900-118	0171-4338395
Area Manager TKD	Mr. Bohnet	+49(0)7392/900-116	0171-4439069
		Fax +49(0)7392/900-100	

24-hour service emergency number: Phone. +49 171/7124096

Spare parts department (ET)

Director, ETV, Mr. Kristen +49(0)7392/900-135 Fax +49(0)7392/900-140

Spare parts distribution (ETV) emergency number: Tel. 0171/3732230

Contact at my national office:

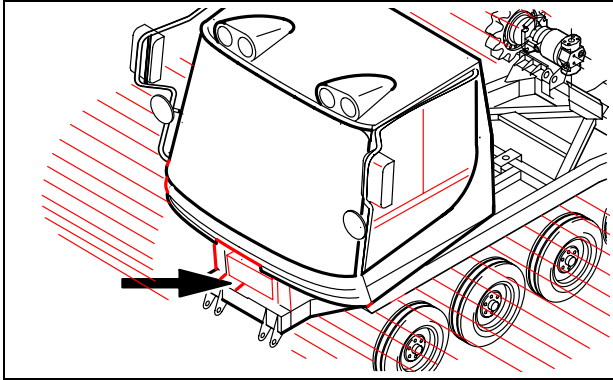
Technical Service Name: Phone number:.....

Spare Parts Department Name: Phone number:.....

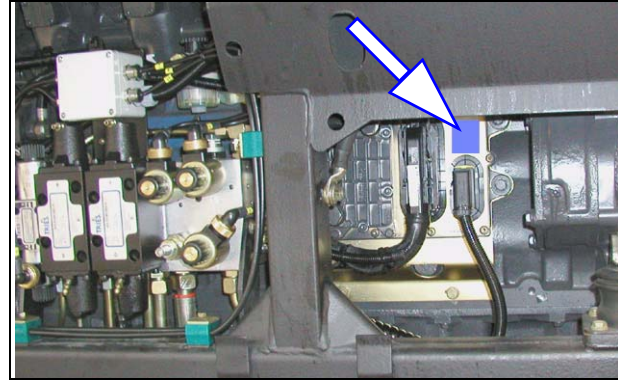
Repair Mechanic Name: Phone number:.....

- Always quote the vehicle number when making enquiries and ordering spare parts.
The deployment of service mechanics is controlled centrally by TKD (Technical Service).

VEHICLE AND ENGINE NUMBERS



The vehicle number is stamped on the front of the vehicle, on the face end of the right hand frame.



The engine number is stamped on the engine type plate.





In your own interests, please note the following:

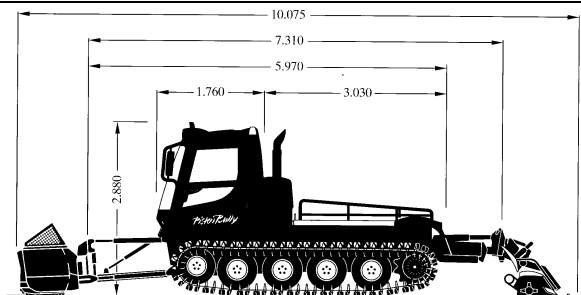
We recommend the use of genuine spare parts from Kässbohrer Geländefahrzeug AG and parts for conversion and accessories expressly approved for your type of vehicle. These parts have been subjected to a special test procedure and they have been proven to be reliable, safe and suitable for Kässbohrer off-road vehicles. Despite continuous observation of the market, we are unable to assess these aspects of other products – even products that have been scrutinized by a technical inspector or for which an official approval has been issued – and consequently, we refuse to accept liability for them.

Genuine parts and approved accessories and parts for conversion are available from your Kässbohrer Geländefahrzeug AG service centre. The experts there will provide in-depth advice – including advice on permissible technical modifications – and install the components using the correct procedures.

The use of parts other than genuine spare parts voids your guarantee. We refuse to accept liability for consequential damage resulting from such use.

Kässbohrer Geländefahrzeug AG

TECHNICAL DATA



Dimensions:

Width:

without tracks..... 2,600 mm

across aluminum tracks 4,260 mm

across steel tracks 4,260 mm

across tiller 2000 4,900 mm

across Multiflex tiller 5,400 mm

Height: 2,930 mm

with cab tilted..... 3,380 mm

Length with tiller and front blade.. 10,075 mm

Load area..... 2,300 x 1,920 mm

Weight:

Dead weight with aluminium tracks 7,300 kg

Dead weight with steel tracks 7,500 kg

Permissible total weight including
auxiliary equipment 11,000 kg

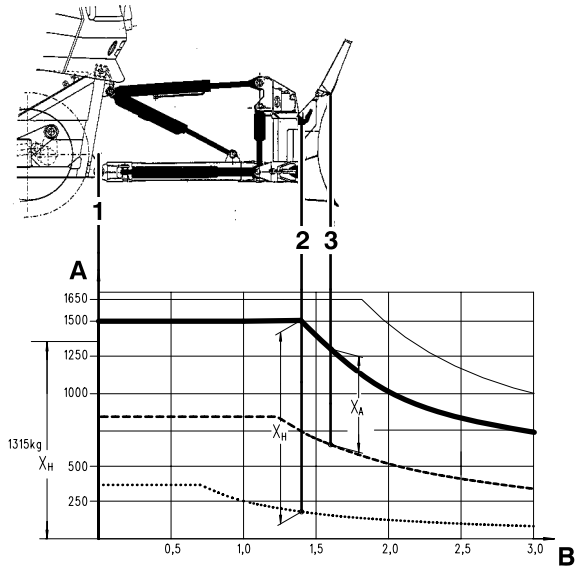
Payload of load area without auxiliary
driven machinery..... 2,500 kg



TECHNICAL DATA

Electrical:		Engine:	
Light-current circuit	24 volts	Type: OM 457LA.....	Mercedes Benz
Generator	28V / 140A	Number of cylinders	6
Batteries	2 x 12V / 135 Ah	Displacement.....	11,970 cc
Cold-start power	600 A	Output, ECE rating.....	315 KW/430 ECE HP
Operating parameters:		Max. torque	2,000 Nm/1200 rpm
Continuously variable speed	0 - 23 km/h	Oil capacity with filter	max. 39 l.
Spec. ground pressure with aluminum tracks	0.053 kg/cm ²	Fuel consumption approx.....	at least 22 l/h
Spec. ground pressure with steel tracks	0.056 kg/cm ²	Tank capacity	210 l
Production rate with tiller	100,000 m ² /h	Brakes:	
		Wear-free (hydrostatic)	
		2 multi-plate brakes	

PERMISSIBLE WEIGHTS OF FRONT-MOUNTED AUXILIARY EQUIPMENT



Key:

A = Counterweight (kg)

B = Projection (m)

1 = Pivot point (main frame, quick-change system).

2 = Hook plane, quick-change system

3 = End face, front blade center

.....

Attachment moment of the quick-change system
($M = 2600 \text{ Nm}$)

Attachment moment of the quick-change system with
front blade ($M = 10350 \text{ Nm}$)

—————

Maximum long-term attachment moment ($M = 21000 \text{ Nm}$)

—————

Maximum short-term attachment moment under re-
stricted operating conditions ($M = 30000 \text{ Nm}$).

Example:

Attachment at hook plane, quick-change system

$X_H = 1315 \text{ kg}$ maximum long-term attachment
weight.

**Attachment to quick-change system with pusher
blade**

$X_A = 665 \text{ kg}$ maximum long-term attachment weight.





Attaching excessively heavy machinery or machinery with an excessively high moment voids the vehicle manufacturer's warranty and excludes liability on the part of the vehicle manufacturer.

The only exceptions to this rule are those items of auxiliary driven machinery for which the vehicle manufacturer has issued approval.

Short-term attachment moment under restricted operating conditions:

- Speed for transport and operation limited to max. 10 km. Set the potentiometer to position 7 on the scale.

WARNING!

The high moment of the auxiliary driven machinery restricts the maneuverability of the vehicle, so the route to the work zone must be through easily accessible terrain.



It is essential to comply with the instructions regarding the transport position of the auxiliary driven machinery (see the operating instructions for the auxiliary driven machinery).

- Operation with an item of auxiliary driven machinery is restricted to the intended purpose and is subject to the limit of the time required for said purpose (short-term).

DIESEL FUEL

- If the engine is run on diesel fuels with a sulphur content of more than 0.5 percent by weight, the scheduled times between oil changes must be divided by two.
- If the engine is run on diesel fuels with a sulphur content of more than 1.0 percent by weight, the scheduled times between oil changes must be divided by three.

Diesel fuels at low temperatures

Select the diesel fuel's resistance to the cold in accordance with the temperature characteristics in the area of use and source the fuel from the fuel supplier (refer to MB Fluids and Lubricants Specifications 137.0 and 137.1)

COOLANT

Water quality:

Free of contaminants (grease, dirt, lime...), because failure to comply with this requirement means: less efficient removal of heat, formation of deposits, and clogging of coolant ducts.

Note: Drinking water often satisfies the water quality requirements.

Changing coolant:

Note: Make sure that container and funnel are free of residues of other fluids and lubricants.

1. Select antifreeze agent

Use only the Antifreez APN-S product with the **SP. No. 0.931.064.000.0.**

The coolant is mixed for the whole year using a mixture containing 50% water + 50 % antifreeze agent. Ensures protection against temperatures down to approx. -40 °C.



CAUTION!

Risk of engine overheating!
Do not permit the proportion of antifreeze to exceed 55 percent by volume.

Antifreeze change interval

At least: every 3 years
by engine operating hours: every 3600 hours

Other antifreeze agents

CAUTION!

Engine overheating!
Risk of coolant foaming and therefore engine overheating.

- The use of other antifreeze agents for topping up and antifreeze changes is prohibited.

Remedy: If foaming occurs in the cooling system

- Completely drain the cooling system. Fill cooling system with drinking water and bring up to operating temperature.

- Drain out coolant (repeat process until coolant no longer foams).
- Fill cooling system with specified antifreeze agent mix.

TABLE OF FLUIDS AND LUBRICANTS

Group	Designation	Grade	Capacity	Interval between changes
01	Mercedes Benz engine OM 457 LA	MB sheet 228.5 SAE 10W40 / 5W40	39 litres	At least: once a year every 600 hours
		MB sheet 228.3		At least: once a year every 400 hours.
		If an engine oil of a different grade is used for topping up, the maintenance interval is the interval for the lower-grade		
02	Fuel tank	Diesel fuel to MB sheet 137.0/137.1	210 litres	At least: once a year drain condensation.
	Fuel filter			every 800 hours
03	Air filter			At least: once a year every 1200 hours
04	Cooling / heating system	50% drinking water + 50% antifreeze (MB sheet 325.2)	36 litres	At least: every 3 years every 3600 hours
06	Transfer box	Poly Alpha Olefin (PAO) - CLP HCVG 150 / VG 220 VG 220 (for summer operation) - API-GL4 SAE 75 W 90	2.6 litres 2,2 litres	At least: once a year every 800 hours at 100 hours (new vehicle)



TABLE OF FLUIDS AND LUBRICANTS

Overview

Technical data

Safety

Use

Checks

Operation

Group	Designation	Grade	Capacity	Interval between changes
06	Planetary gearbox	Poly Alpha Oleofin (PAO) - CLP HCVG 150 / VG 220 VG 220 (for summer operation) - API-GL4 SAE 75 W 90	approx. 2.2 litres 4.5 litres	At least: once a year every 800 hours new vehicle 100 hours
07	Hydraulics Propulsion unit + auxiliary driven machinery see section on hydraulic fluid	HVLP DIN 51524 DEXRON II D / III F ATF Type A Suffix A	approx. 47 litres	At least: once a year every 1200 hours
	Hydraulic oil filter			at 100 hours every 1200 hours
18	Hydrostatic vehicle drive see section on greases	OKS 250		
	Lubricate hubs and swinging arms.	Calcium saponified grease KP2K-20, DIN 51502 e.g. Avialac 2 LD		every 400 hours
	Other lubrication points see section on greases	Calcium saponified grease KP2K-20, DIN 51502 e.g. Avialac 2 LD		every 100 hours
	Rotary plough, spiral-bevel coupling,	Avialith 2 F, OKS 400, Molykote BR 2		every 1200 hours

TABLE OF FLUIDS AND LUBRICANTS

Group	Designation	Grade	Capacity	Interval between changes
	Swing lever seal	Syntogrease 1 KPE 1K-40, DIN 51502 DIN 51825		At least: after 3 years every 3.600 hours
24	Electrical system Battery terminals	Bosch FT 40V1 grease		
	Generator with Stauffer grease cup	Bosch FT 1V34 grease		every 1200 hours
	Servo adjustment device for Moog valves	Insulating oil DIN 57370 / VDE 0370		



Capacities as stated are approximates.
Check level with dipstick or overflow plug.

Correct usage:

Snow groomers may only be operated as specified in the manufacturer's operating manual.

- **The PistenBully may be used for the following purposes only:**
 - preparing slopes for downhill skiing.
 - removing snow from paths and tracks in the countryside. Not on public roads.
 - preparing trails for Nordic skiing.
 - transporting people in the special people-carrier cabin (optional extra).

If you wish to use the vehicle for any other purpose, you must apply for written approval from the manufacturer.

DRIVERS

- Drivers must be specifically appointed to drive snow groomers.
- You may appoint people to drive the snow groomers on their own only when you are certain that they will be able to reliably fulfill the tasks assigned to them.

In particular, they must satisfy the following:

- be at least 18 years old.
- be physically and mentally suitable.
- be trained in how to drive the snow groomer and have proven their driving ability to the operator.
- be familiar with snow conditions and with the peculiarities of operating equipment in facilities for skiers.
- be familiar with the area where the vehicle is to be used, especially with regard to particularly dangerous areas.
- be familiar with first-aid procedures in the event of an accident.

SAFETY INSTRUCTIONS

- if avalanches pose a threat in the area where snow groomers are to be used, in addition to the aforementioned conditions, drivers must also be instructed about how avalanches are started, the consequences of them and how to behave when there is a risk of avalanches.

DANGER ZONE FOR PERSONS

- No-one is permitted to enter the snow groomer's immediate danger zone.
- The driver may only operate and drive the snow groomer provided that there is no-one in the immediate danger zone.
- The driver must issue warnings when in dangerous circumstances.
- Special protection measures must be taken if the snow groomer is being used in an area where the driver does not have a clear view of the surrounding terrain, or the nature of the terrain is such that the machine might not be immediately visible to people in its vicinity. Depending on the circum-

stances of each case, these measures may take the form of warning signs, closed runs or off-limit markers.

DRIVING THE VEHICLE

- Never leave the vehicle unattended with the engine running.
- Risk of poisoning from exhaust gases. Never leave the engine running in enclosed spaces.
- The driver may start and/or move the snow groomer only when seated in the driver's seat, after fastening the seat belt .
- Never try to adjust the driver's seat and steering wheel when driving.
- Snow groomers must be used and operated in a manner which ensures their stability.
- Drivers may drive the snow groomer only at a speed which they maintain control at all times. They must adapt the speed to the snow, terrain



and visibility conditions and to the characteristics of the snow groomer. If necessary, they must take account of the auxiliary equipment used.

- The driver must not exceed a safe speed for prevailing visibility. This does not apply to steep slopes where the vehicle cannot be stopped as a result of the angle of the terrain. Drivers may drive on such steep slopes only when certain that they can do so without putting themselves and others at risk.
- Never drive the PistenBully with open doors.
- Loads must be correctly secured.
- When driving past people, slow down, keep at a safe distance and always bear in mind that the people may behave unexpectedly.
- Always come to a complete stop before reversing the vehicle.
- Ensure that the area behind the machine is clear.
- Avoid crossing slopes at an angle because the PistenBully may slip downhill.
- The traction of a tracked vehicle is so great that the vehicle may be driven well beyond the point at

which it should start to tilt and then suddenly tip over.

- Risk of damage to the electronics of the PistenBully!
The use of mobile phones in the cab while the diesel engine is running is prohibited.

ENTERING / STOPPING / PARKING

- Danger of slipping on the track when entering and exiting the driver's cab.
- When parking on a slope, be particularly careful when opening the door. The door opens suddenly.
- Do not park the vehicle where it cannot be seen.
- Lower the front and rear auxiliary driven implements, switch off the tiller, set the direction of travel switch to "neutral", and apply the parking brake.
- Never leave the engine running unattended or running in an enclosed space. Switch off the engine, take the ignition key with you when you leave the vehicle, and lock the cab.

TERRAIN

- Before using the snow groomer, check that the area can be traversed.

Risk of break-through



- Driving on frozen rivers and lakes is very dangerous. Consequently, you are urgently advised not to do so.

Snowdrifts



Avalanches Rockfalls



- The driver must be accompanied by a co-driver when driving in areas where the vehicle cannot be seen and when the weather is bad, unless several vehicles are working together as a team. This does not apply if the driver uses a radio to remain in constant contact with someone at the base who can send out a rescue team should an accident occur.
- When using snow groomers at night-time, handheld searchlights must also be used.
- When the winch is in use, the driver must wear the seat belt at all times.



DRIVING WITH PASSENGERS

- Only 1 co-driver may sit in the driver's cab.
- The co-driver must be seated in the co-driver's seat at all times when the vehicle is in motion.
- When persons travel in the PB people carrier cabin, they must sit in their seats with their safety belts correctly fastened, and hold tight.
- The retaining screws of the people carrier cabin must be checked every day to ensure that they are tight.

Do not drive the vehicle with people on:

- the load platform
- the auxiliary driven implement
- an attachment

The gallery railing:

Correct usage:

- The gallery railing is an accessory for the Pisten-Bully 300 / 300 Polar.
- The rear deck railing is designed for the transportation of a wide variety of material.
- The commercial transport of persons is prohibited.
- The transport of persons is permitted in Germany (DIN 30770) and Austria (Austrian Standard M9850).
Persons carried in this way must be instructed by the company operating the vehicle with regard to behaviour and risks relating to transportation on a vehicle fitted with a rear deck railing.
- The rear deck railing must be secured at both ends. Both safety chains must be closed and locked.
- Risk of burns caused by the exhaust muffler. Keep clear.
- Always check the security of all threaded fasteners before each use.
- Avoid abrupt changes of direction and angles of inclination.

MAINTENANCE

- Snow groomers must be maintained by trained staff specifically appointed by the operator.
- Do not perform maintenance work under moveable parts in their open or raised positions unless they have been secured to prevent them from slamming closed or dropping.
- Snow groomers and raised equipment must be secured before maintenance work is started to prevent them from accidentally moving.
- Markings, warning signs and information plates on the Pisten Bully and auxiliary equipment must not be removed or covered over or made illegible in any other way.
- Compliance with the manufacturer's maintenance instructions is mandatory.
- Faults which could affect safety levels must be rectified immediately.

MONITORING

- Before starting off, the driver must check the function of the vehicle parts which assure safe operation, e.g. by testing the brakes, switching on the lighting, checking the function of the warning devices. Operation of the controls for auxiliary equipment must also be checked.
- If radios are required to ensure safe operation of the snow groomer, before starting off checks must be performed to ensure that the radio is functioning correctly and that there is a radio connection.
- The driver must immediately report defects to the supervisor and, on vehicle handover, to the replacement driver.
- In the event of damage, defects or changes that endanger operational safety, the driver must immediately cease operation of the vehicle.
- The supervisor must be notified immediately in the event of accidents involving injury to persons or damage to property or to the vehicle.



SAFETY INSTRUCTIONS

- The supervisor must perform random checks in order to ensure that the snow groomer is operated in a safe manner.

INSPECTION

The operator must ensure that the snow groomers are inspected whenever necessary, at least once a year and after maintenance work. This inspection must ensure that the snow groomers are safe and must be performed by a skilled specialist.

Skilled specialists are people who have an extensive knowledge about vehicle technology as a result of their specialist training and experience. They are also sufficiently familiar with the appropriate national safety at work legislation, accident prevention guidelines, directives and generally accepted rules of engineering practice (e.g. DIN publications, VDE regulations or national equivalents) to ensure that they can judge whether snow groomers are in a condition suitable for operation.

The results of the inspection must be recorded in writing and filed.

FIRST-AID KIT

The first-aid kit is secured to the co-driver's door or stowed beneath the co-driver's seat.



Note expiration date.

Always make sure that the first-aid kit is complete.

FIRE EXTINGUISHER

The fire extinguisher is beneath the co-driver's seat.
Note expiry date.

Replace used fire extinguishers immediately.



NOTES

WARNING SIGNS

- Strict compliance with the warning signs on the PistenBully and on auxiliary driven implements is mandatory.
- Make sure that warning signs that are damaged or come loose are replaced immediately.

WARNING SIGN



Location: **Rear bulkhead of driver's cab.**

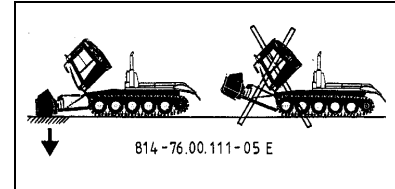
KGG No. 8.762.658.000E

Text:

Attention:

No-one is permitted on the load area while the vehicle is in motion.

WARNING SIGN



Location: **Steering wheel**

KGG No. 814.76.00.111.05E

Text: Lower the blade frame before tilting the cab (risk of collision).

WARNING SIGN



Location: **Driver's cab / parking
brake.**

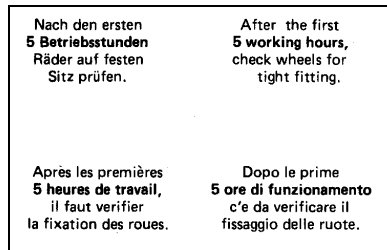
KGG No. 8.765.311.058E

Text:

Attention:

**Apply the parking brake before
leaving the cockpit.**

WARNING SIGN



Location: **Windshield.**

KGG No. 8.762.430.057E

Text:

**Check security of wheels after
the first 5 operating hours.**

WARNING SIGN



Location: **Diesel engine**

KGG No. 8.312.085.064

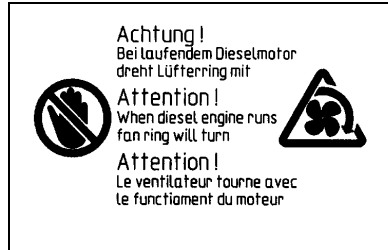
Text:

WARNING!

**Do not use start-assist fluids or
ether to start the diesel engine
(risk of explosion).**



WARNING SIGN



Location: **Fan / engine**
KGG No. 8.762.634.054E

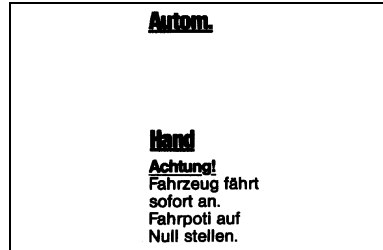
Text:

Attention:
The fan ring rotates when the diesel engine is running.



Protect the fan against damage.

WARNING SIGN

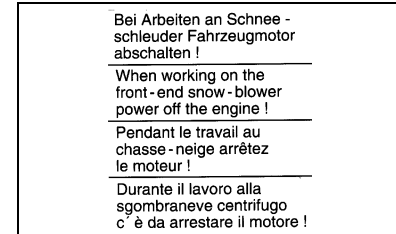


Location: **Console / driver's cab**
KGG No. 8.765.246.000E (**D**)
KGG No. 8.765.246.001E (**F**)
KGG No. 8.765.246.005E (**GB**)
KGG No. 8.765.246.008E (**I**)
KGG No. 8.765.246.011E (**E**)

Text:

Attention:
In manual control mode (digital electronics deactivated), the vehicle drives away immediately.

WARNING SIGN

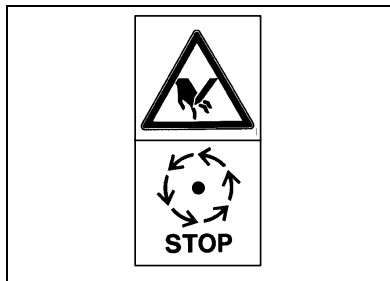


Location: **KFS**
KGG No. 8.762.435.058E

Text:

Switch off the engine of the vehicle before work on the snow blower commences.

WARNING SIGN



Location: **Tiller**
KGG No. 8.762.638.058E

Text:
WARNING!
Wait until all parts have come to a complete standstill before touching.

WARNING SIGN

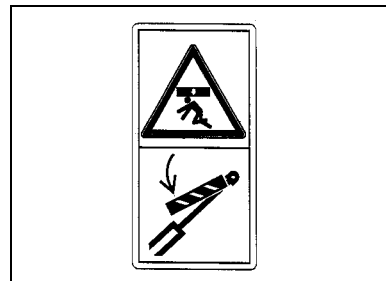


Location with KFS only: **Steering wheel.**

KGG No. 8.765.679.000E (**D**)
KGG No. 8.765.679.001E (**F**)
KGG No. 8.765.679.005E (**GB**)
KGG No. 8.765.679.008E (**I**)
KGG No. 8.765.679.011E (**E**)

Text:
WARNING!
Use of the INCH potentiometer for reversing is prohibited. Always comply with the instructions in the operating manual.

WARNING SIGN



Location: **Engine cover**
KGG No. 8.762.643.000E

Text:
WARNING!
Keep clear of the danger zone (load platform) unless the lock of the lifting cylinder is engaged!



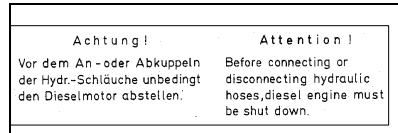
WARNING SIGN



Location: **Auxiliary driven machinery**
KGG No. 8.762.660.000E

Text:
WARNING!
Do not reach into crushing zone while parts there may be moving!

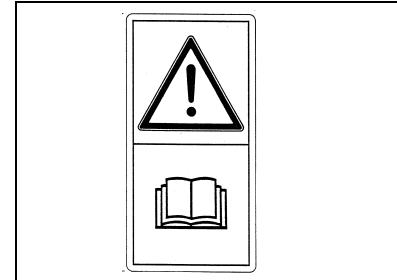
WARNING SIGN



Location: **Tiller**
KGG No. 8.762.271.053C

Text:
Attention:
Before connecting or disconnecting the hydraulic hoses, diesel engine must be shut down.

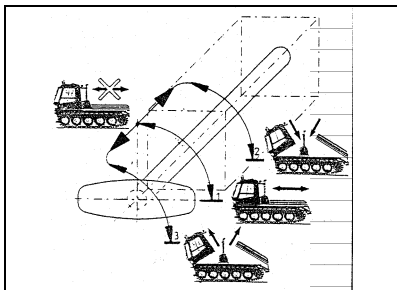
SIGN



Location: **Driver's cab**
KGG No. 8.762.642.000E

Text:
Read operating manual and safety instructions before start-up and comply with both at all times.

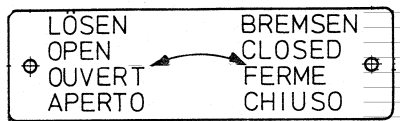
SIGN



Location: **Frame**
KGG No. 8.762.641.000E

Text:
**Lever for raising and lowering
driver's cab and load platform.**

SIGN



Location: **Parking brake**
KGG No. 8.761.994.058E

Text:
**Release parking brake.
Apply parking brake.**

SYMBOL



Location: **Console / co-driver's
side**
KGG No. 8.762.631.000E

Text:
**The CE symbol indicates the
manufacturer's compliance with
all directives, standards and
laws applicable to the product.**



Warning sign:



Location: **Driver's cab**

KGK No. 814.76.00.111.05E

Text:

Risk of burns caused by the exhaust muffler.

Keep clear of hot surfaces.

Warning sign:



Location: **Rear deck railing**

KGK No. 8.762.658.000E

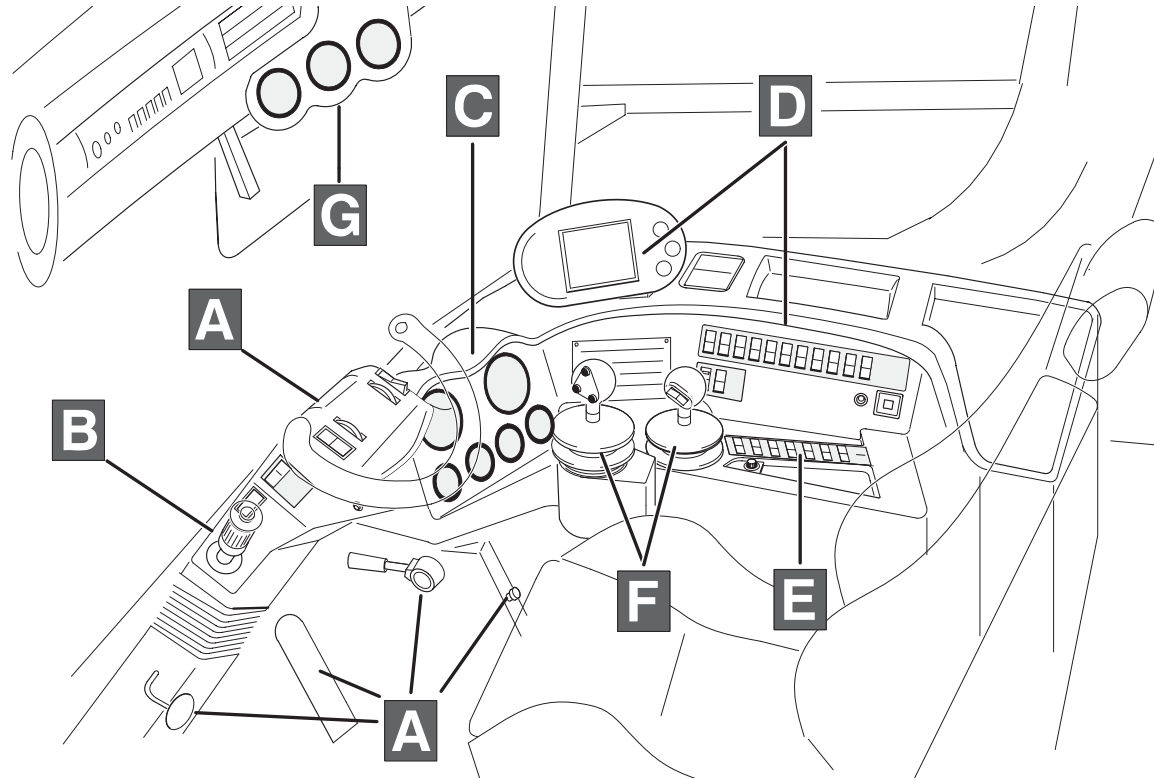
Text: No passengers allowed on load platform.

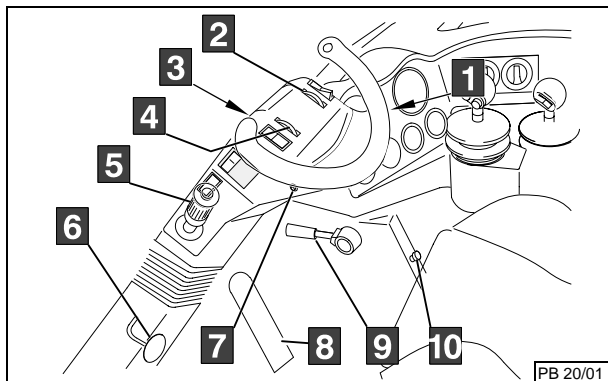
Exception for Germany and Austria:

It is permissible for a maximum of three persons who have received instruction in safety routines to be carried on the load platform, if the safety bar is closed and locked.

Compliant with DIN 30770-5.8.4 and Austrian Standard M 9850-4.8.4

COCKPIT - OVERVIEW





1 Ignition lock

- 0 Inserting and removing ignition key. Switching off engine.
- I Ready for operation/driving
- II Starting

2 Knurled wheel: Adjust tiller shaft speed

Boost function = Increased speed 1250 to 1600 rpm. Scale reading 6.5 - 9 speed with boost function Scale reading 6 no boost function (old version) Scale reading 9.

3 Emergency stop

3 Pushbutton: Implement lift frame center, rear (see Section entitled "Operating auxiliary driven equipment")

4 Knurled wheel:
Reducing driving speed

5 Multifunction switch: (see Section B).

6 Locking device:
For adjustment of steering column.

7 Pushbutton:
Press to have wipers front and rear execute a single stroke.

8 Accelerator

9 Parking brake



Always apply the parking brake before you park or exit the vehicle.
Buzzer sounds as reminder: Door open, but brake not applied.



PUSHBUTTON



Pushbutton for direction of travel
Top section pressed = Forward (indicator light ON).

Neutral position = Press top section again.

Bottom section pressed = Reverse with reversing alarm actuated (indicator light ON).

Neutral position = Press bottom section again.



Engine speed increases when you press the direction-of-travel switch.

- Use the accelerator pedal to increase engine speed.
 The PistenBully moves off.



When the parking brake is engaged, the direction-of-travel switch automatically goes to the neutral position.

PUSHBUTTON:



3rd adjustment pump – tiller drive
Top section pressed = OFF

Bottom section pressed = ON
 Indicator light ON



When the parking brake is engaged, the tiller drive automatically switches off (indicator light flashes). Once the parking brake has been released, the tiller drive remains off. You must operate the pushbutton again in order to reactivate the tiller.

3-position switch:



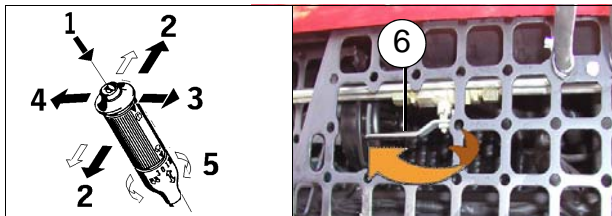
Top section pressed = Floating position, equipment carrier rear / side left-right in operation. Telltale light ON

Centered neutral = Equipment carrier locked in position

Bottom section pressed = Equipment carrier, rear, centred.



Operational only when joystick is in locked position.



1 Horn

Press button

2 Flashing turn indicators

Left or right without automatic cancellation. Move control stalk past stop until it locks in position.

3 Headlight flasher

Push stalk to the right.

4 High beams and low beams

High beams =

Push stalk to left until it locks in position.

Low beams = Push stalk to the right until it locks in position.

5 Wipers

Turn control stalk sleeve:

Position II = fast

Position I = normal

Position 0 = off

Position INT = intermittent wipe

Heated windshield wipers:

- Swivel handle **6** at front in the direction indicated by the arrow.



Programming new intermittent-wipe time:

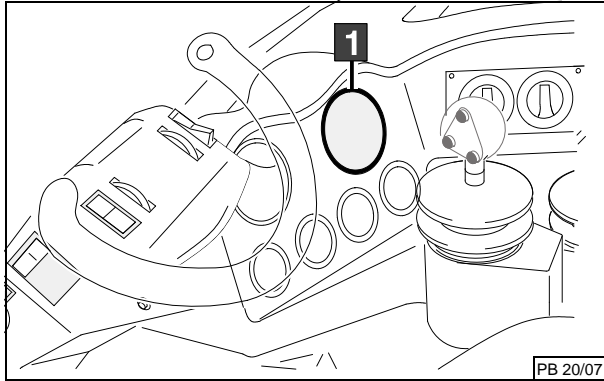
- Move multifunction switch **2** to the 0 position.
- Briefly press button **1**.

Wipers perform one sweep.

- Wait for intermittent-wipe time required and move multipurpose control **2** to the INT position.

The time you waited between pressing the button and moving the switch back to INT is the programmed intermittent-wipe time.





1 Warning lights and indicator lights

WARNING LIGHT



Attention:

Brake - indicator for parking brake
Release pressure has dropped below 120 bar. Indicator light ON to indicate: Parking brake applied.

INDICATOR LIGHT



Emergency operation.

Attention: Control switched from electronic to manual mode (see section entitled "Electrical").

WARNING LIGHT



Attention: Driver's cab tilt-locking device not engaged.

INDICATOR LIGHT



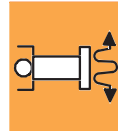
Tiller relief (Up pressure).

INDICATOR LIGHT



Tiller shaft turning.

INDICATOR LIGHT



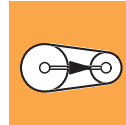
Floating position, rear / side left right (horizontal).

INDICATOR LIGHT



Tiller drive ON.

INDICATOR LIGHT FLASHES.



Track relief actuated.



WARNING!

Do not drive the vehicle.

INDICATOR LIGHT



Floating position, rear raise / lower (vertical)

WARNING LIGHT



Hydraulic fluid is below the minimum level.

Also signalled acoustically by **buzzer**.



WARNING LIGHT



Hydraulic-fluid temperature is above maximum.
Also signaled acoustically by **buzzer**.

INDICATOR LIGHT

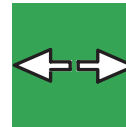


Electric heater for windshield ON.

NOT USED



INDICATOR LIGHT FLASHES



Left / right turn indicator

WARNING LIGHT

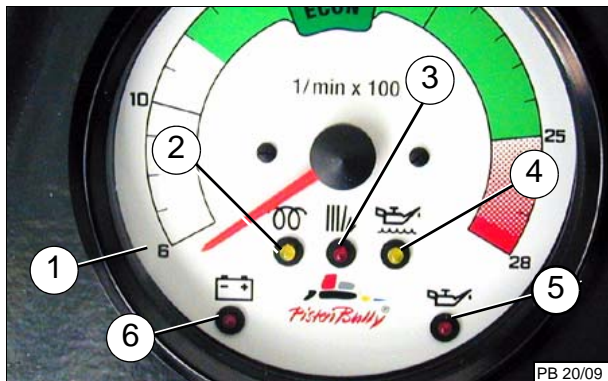


Intake air preheating ON
(see the section entitled "*Diesel engine*")

INDICATOR LIGHT



High-beam headlights ON.



1 Revolution counter

2 Intake-air preheating

(see the section entitled "Diesel engine").

WARNING!

If the acoustic signal (buzzer) sounds, an operating mode has reached its min. or max. permissible value: stop vehicle – engage parking brake – establish cause. Do not drive the vehicle.

3 Indicator light for engine management system

Lights up to indicate faults in the engine management system.

If light is ON, proceed with caution to the nearest workshop.

Only trained specialists are permitted to carry out repair work.

4 Not used

5 Engine oil pressure indicator

If the oil pressure drops to an impermissible level, an acoustic warning is issued by the **buzzer**.

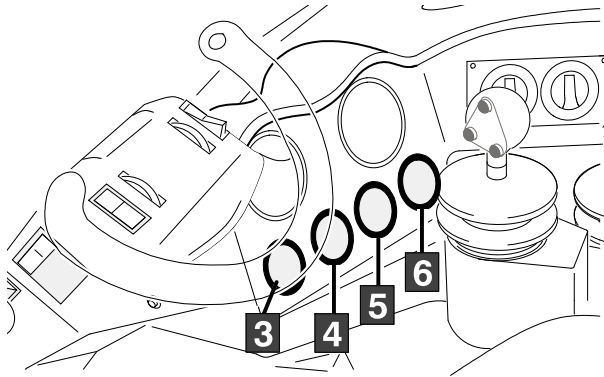
6 Battery charge indicator



If the indicator light comes on while the vehicle is on the move:

- Cease operations
- Ascertain the cause of the problem.





3 Plough-height indicator

0 = min. / 6 = max.

4 Engine-coolant temperature:

Attention: If the operating temperature rises to an impermissible level an acoustic warning is issued by the **buzzer**.

5 Fuel-level gauge

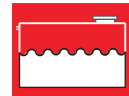
6 Snow-flap indicator

Attention: If the oil pressure drops to an impermissible level an acoustic warning is issued by the **buzzer**.



If the acoustic signal sounds (buzzer).
- Bring the vehicle to a stop.

INDICATOR LIGHT



Coolant level
(optional equipment)
below the minimum level

If the indicator light comes on:

- Cease operation. - Rectify cause.
- Top up coolant level

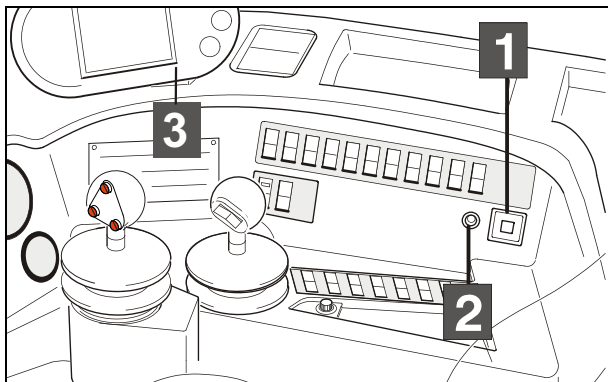


Risk of scalding:
The coolant system is pressurised.
Remedy: Wear protective gloves.

INDICATOR LIGHT



Air-filter monitor
Check the air filter and replace if necessary.



1 Outside-mirror adjuster

2 Socket: 24 volts

3 SnowTronic display
(see the section entitled "Operation")

ROCKER SWITCH

Rotary beacon



ROCKER SWITCH

Driving lights

Top section pressed = OFF

Centred = Side lights

Bottom section pressed = Low-beam headlights ON



KNURLED WHEEL

For adjusting brightness of instrument lighting.



ROCKER SWITCH



Windscreen heating

Indicator light comes on.



ON time is limited to approx. 10 minutes with the engine running. Press the switch again to reactivate the heating if necessary.

- Clear thick coating of ice or snow from the screen by hand before switching on the heater.

Power consumption is relatively high, so the drain on the battery is correspondingly severe. Switch off the screen heater as soon as the screen is demisted or de-iced.

ROCKER SWITCH



Rear window heater

ROCKER SWITCH



Side-window heater and Outside-mirror heater

ROCKER SWITCH



Fog lights



See the enclosed operating instructions for xenon headlights.

ROCKER SWITCH



Rear spotlights

Top section pressed = OFF

Center = Low-beam lights ON

Bottom section pressed = High-beam lights ON

ROCKER SWITCH *(optional equipment)*



Offset front blower to either side.

Set switch to ON position and move joystick to left or right, as appropriate.

ROCKER SWITCH



Rear window wiper

Top section pressed = OFF

Center = Intermittent wipe

Bottom section pressed = ON

PUSHBUTTON



Speed of diesel engine

Top section pressed = Increase speed

Bottom section pressed = Reduce speed

Note: Observe tachometer

LATCHING ROCKER SWITCH



Front blade frame, floating position

ROCKER SWITCH *(optional extra)*



Seat-belt lock



LATCHING ROCKER SWITCH



Track tensioner:

Top section pressed + unlatched = Track tensioner fixed in position. Indicator light flashes.

Centred = Track tensioner operational.

Switch pressed = Relieve tension on tracks
Indicator light flashes.



Before relieving the tension on the tracks, park the vehicle on level ground and secure it so that it cannot roll away. Apply the parking brake. If the PistenBully is to be out of use for a prolonged period of time, always relieve the tension on the tracks to prevent stretching the track belts.

ROCKER SWITCH



Acoustic warning

Top section pressed: Warning alarm for forward movement ON

Bottom section pressed: Warning alarm for forward movement OFF



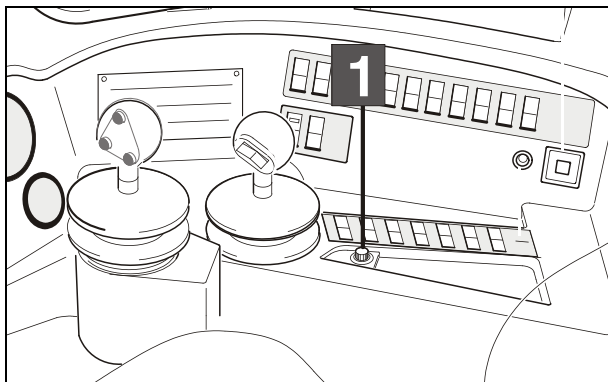
Mobile-phone holder

CAUTION!

Risk of damage to electronic equipment of the PistenBully:

The use of mobile phones in the cab while the diesel engine is running is prohibited.

Press the button (see arrow) to lock the mobile phone into the holder.



1 Potentiometer

Tiller down pressure/up pressure (see the section entitled "Operation").

PUSHBUTTON



Tiller-depth adjustment:
Indicator light comes on.

ROCKER SWITCH



Tiller shaft - forward / reverse-rotating

Top section pressed = Forward shaft operation

Bottom section pressed = Reverse shaft

LATCHING ROCKER SWITCH



Automatic lifting of rear-mounted equipment for reversing (latch engaged).

Automatic lifting deactivated Disengage the latch and press the switch.

PUSHBUTTON



Automatic/emergency operation of rotary plough

Unlatch: bottom section pressed

Pressed = Manual control

Pressed = Automatic control adjustable by SnowTronic potentiometer **P2**.



ROCKER SWITCH (3P) *(optional equipment)*



Drive hydraulics for auxiliary equipment at front or rear.

Top section pressed = Front ON

Centre = OFF

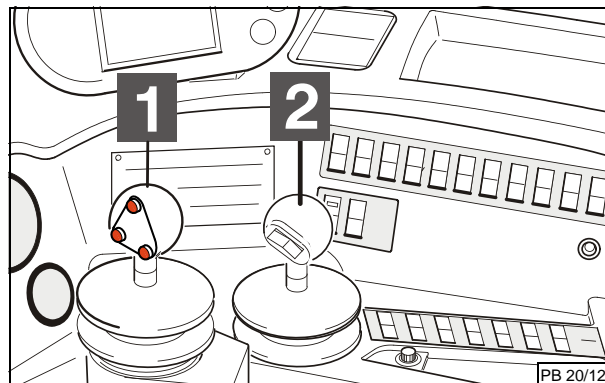
Bottom section pressed = Rear ON

Note:

Drive hydraulics front ON

Direction of travel switch forward and driving speed scale 0 to -3.

When reversing, vehicle's steering direction is reversed.



1 Joystick

for front hydraulics with pushbutton
(see the section entitled "Operation").

2 Joystick

for rear hydraulics with rocker switch
(see the section entitled "Operation").

PUSHBUTTON *(optional equipment)*

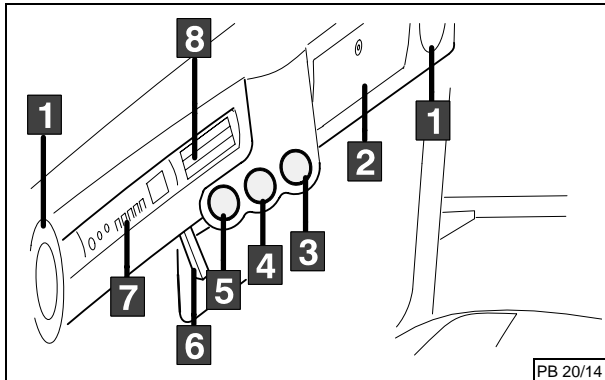


Snow-flap position for tiller

Top section pressed = Retract snow flap

Bottom section pressed = Extend snow flap

((see the section entitled "Multiflex tiller"))



7 Adapter for radio 2-wayAdapter for radio

8 Cab heater

1 Loudspeaker

2 Glove compartment

3 Operating hours

4 Oil-pressure gauge

5 Clock

6 Spotlight

Manually adjusting blower output

- Start the diesel engine.



- Press button.



Blower setting:

OFF - AUTO - 1 - 2 - 3 - 4 - 5 - 6 - 7
Use the pushbuttons to select.



Selecting temperature readout in °C / °F

- Ignition ON.



- Simultaneously press both buttons.

Display shows: CODE



- CODE = Press the button three times.



- Press the button until the display shows 16



- Press the button to confirm.



- Press the button to select °C / °F.



- Simultaneously press both buttons.



The setting for temperature readout is saved.

Interior-temperature gauge



- Press the button until the LED is OFF.

Interior-temperature gauge



- Press the button until the LED is ON.

Reading is displayed automatically when the engine starts.

Blower and heating to maximum



- Press button.
"dEF" appears in the display.

Adjusting automatic heater and blower control

- Start the diesel engine.

Adjusting the target interior temperature



- Press button.
The target interior temperature appears in the display. (interior temperature with blower - AUTO).



- Situational help
The display shows the blower's discharge temperature.
- Briefly press both buttons.
The target interior temperature appears in the display.

Entering the target interior temperature



Increase



Decrease



- Set the blower to AUTO.

Automatic heater and blower control is active.



If the target interior temperature you select is lower than the outdoor temperature the fan will generally run at maximum speed, because there is no air-conditioning system installed.





SnowTronic display

Checking settings:

- Start the diesel engine.
- Select a function button **F1 - F5**.



Press the **ESC** button to cancel



- Average diesel fuel consumption
(Reset F3)
- Engine-oil temperature
- Coolant temperature
- Engine-oil pressure



- Speedometer
- Average speed
- 0 position press **F4**.
- Operating-hours counter



- Tiller height indicator
- Slope-contour diagram
adjustable by means of potentiometer for tiller



- (Optional equipment)
- Show video-camera image

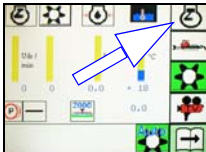
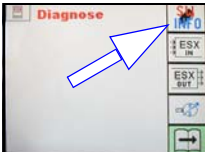



- Proceed to next level

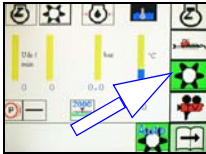
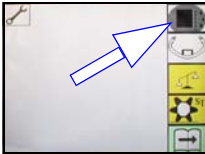



- Step back 1 level at a time to Start page.

Viewing software version


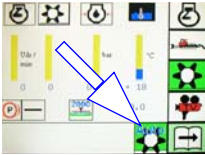



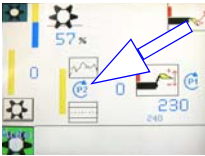


Command	Display	2nd display	Result
<p>← F5 Press F5 twice</p> <p>← F1 Press F1</p> <p>← F1 Press F1</p>			

Setting language / display brightness

Command	Display	2nd display	Result
<p>Selecting the language of your choice</p> <p>← F5 Press F5 twice</p> <p>← F3 Press F3</p> <p>← F1 Press F1</p> <p>Press F3 to select the language</p> <p>Setting display brightness</p> <p>Use P1 to adjust brightness</p> <p>Press ESC to cancel.</p>			



Adjusting slope contour

Command	Display	Before	After
 <p>Setting automatic tiller drive</p> <ul style="list-style-type: none"> ○ Press the pushbutton. The display shows Auto. ○ Press F3. 			
 <p>Activating slope-contour control</p> <ul style="list-style-type: none"> ○ Using potentiometer P2 <p>Setting of P2</p> <ul style="list-style-type: none"> 0 = Flatten slope contour. 50 = Retain slope contour. 100 = Enhance slope contour. 			

Adjusting contact pressure of snow tiller



- Potentiometer for snow tiller

Tilting tiller in raised position

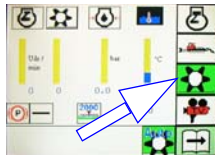
Advantages:

- Better view toward the rear
- Tiller's centre of gravity is closer to the vehicle.
- Useful for bulldozing work

Adjusting:

- Raise the carrier plate.

 ○ Press **F3**



- **P1** Increase value:
Tiller tilts upward.



Range of adjustment:

Machine only: from 5 - 300

Machine with winch: from 230 - 300

Turning tiller frame in raised position

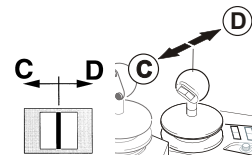
Advantages:

- Minimal overall width
- Passing through narrow gaps
- Use the joystick to raise the tiller.



Raise the carrier plate P1 min. 250. No function otherwise.

- Use the pushbutton or joystick to turn the tiller frame.



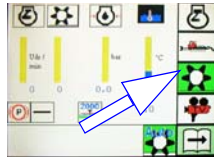
Setting for lift out tiller / tiller rigid

Advantages:

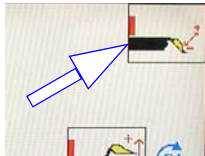
When the control is set to **lift out tiller**, the finisher is the last element to contact the snow when the tiller is lifted. The slope contour tails off smoothly (no wall of snow left behind).

Adjusting

 ○ Press **F3**



Lift out tiller



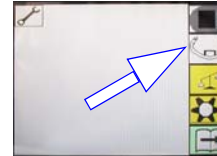
Tiller rigid



Tiller rigid = Tiller and finisher are both lifted at the same time.

Adjusting steering sensitivity

-  Press **F5** twice
-  Press **F3**
-  Press **F2**.

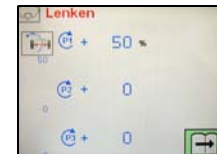


- **P1** Increase value: Slight steering movement has increased steering effect.
- **P2** Change value: Correct straight-line drive forward.
- **P3** Change value: Correct straight-line drive in reverse.



Press **F5** to continue

- **P1** Change value: Track speed for cornering.



Adjusting 0 position of carrier plate

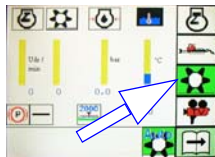
You can set the zero position of the carrier plate by means of the display.

Adjusting 0 position

- Park the PistenBully on level ground.
- Tiller set to float position
- Front blade set to float position

Adjusting




-  ○ Press **F3**

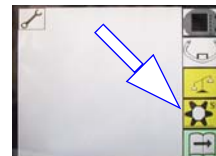


- **P2** set to zero.
- Use the pushbutton to set the tiller depth to zero.

-  ○ Press **ESC**.



-  ○ Press **F5** twice
-  ○ Press **F3**
-  ○ Press **F4**



- Set **P1** to the same value (e.g. 195, see arrow).

This completes the procedure for setting the zero position.



When is it necessary to change the zero position:

- PistenBully is loaded.
- Slope contour is not identical for uphill and downhill operation.

Adjusting:

- **P1** Increase/reduce value.



Emergency mode, propulsion electronics

Activate emergency mode

in the event of a failure of any of the following:



- steering potentiometer
- accelerator pedal
- direction-of-travel switch



If the vehicle is in emergency mode, drive it no further than to the nearest workshop.

- Drive at low speed only. Variations in load can cause the engine to die.

Adjusting

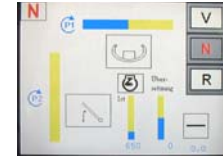
-  ○ Press **F5** twice
-  ○ Press **F4**



Propulsion steering

- Use **P1** to adjust propulsion steering.




Driving straight-ahead = blue and yellow bars of P1 are equal in length.



Propulsion speed

- Use **P2** to increase/reduce propulsion speed.
- Back off propulsion-speed potentiometer P2 when you want to brake.

Direction of travel

-  ○ **F1** forward
-  ○ **F2** neutral
-  ○ **F3** reverse

Emergency tiller control

Switch on emergency tiller control for:

- Attaching / removing tiller
- Raising tiller
- Automatic tiller control fault message

Activating emergency tiller control

- Unlatch and press the button.
The display shows **NOT** (emergency).



- Use the joystick and potentiometer to operate the tiller.



CAUTION!

**Risk of tiller colliding with winch arm.
In emergency mode, upward movement of tiller is not restricted.**

Note that the depth of the tiller is shown on the display even in emergency operation.

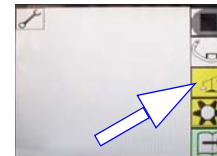
Using teach-in mode

- Switch on the ignition

◀ F5 Press **F5** twice

◀ F3 Press **F3**

◀ F3 Press **F3**



Calibrating accelerator pedal

- Set **P1** to value of 0101

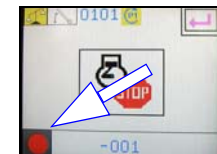
◀ F1 Press **F1** to confirm

- Without operating the accelerator, press **F5** to confirm.

- Applying uniform pressure, slowly depress the accelerator pedal to the limit of its travel.

- Keep the accelerator pedal pressed down and press **F5**.

- Press **F5** to confirm.



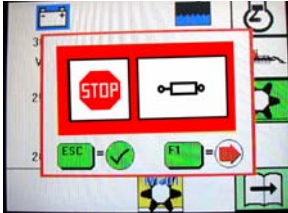
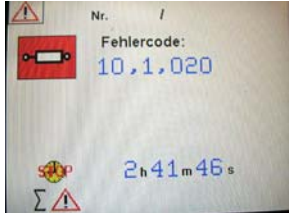


P1 values for calibration



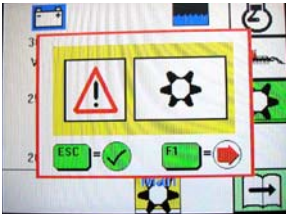
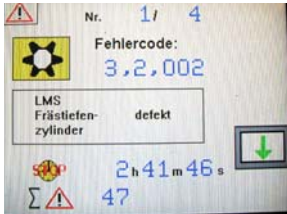
0101 = accelerator pedal / 0102 = steering potentiometer / 0103 = inch potentiometer
0204 = tiller potentiometer



SnowTronic fault message High-priority fault.


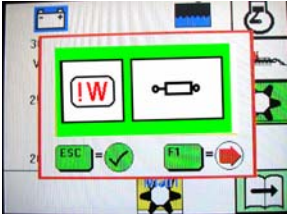

Category	Display	Action
<p>Warning buzzer sounds:<NewLine/>Continuous tone</p> <ul style="list-style-type: none"> - Display shows STOP - Red warning symbol <p> WARNING!</p> <p>Cease operation.</p> <p>Check fault code:</p> <p> Press F1.</p> <p>Fault: Press ESC</p> <p>Repeated message: If you ignore a message indicating a fault that would result in damage to the vehicle.</p>		

Medium-priority fault.

Category	Display	Action
<p>Warning buzzer sounds: 10 sec. ON and 0.5 sec. OFF</p> <ul style="list-style-type: none"> - Display shows ATTENTION - Yellow warning symbol <p> CAUTION!</p> <p>Restriction possible</p> <p>Check fault code:  Press F1.</p> <p>Fault: Press ESC</p> <p>Repeated message: If you ignore a message indicating a fault that would result in damage to the vehicle.</p>		



Low-priority fault

Category	Display	Action
<p>Warning buzzer sounds: 0.5 sec. ON and 1.5 sec. OFF</p> <ul style="list-style-type: none"> - Display shows !W - Green warning symbol <p>Minor restriction possible</p> <p>Check fault code:  Press F1.</p> <p>Fault: Press ESC</p> <p>Repeated message: If you ignore a message indicating a fault that would result in damage to the vehicle.</p>		

Key

3,2,001

Subassembly

1 = Engine

2 = Vehicle control

3 = Tiller

4 = Winch control

5 = ESX

6 = Display

7 = CAN monitoring

10 = Working hydraulics

14 = Rear equipment

3,2,001

1 = Serious fault (red)

2 = Medium fault (yellow)

3 = Slight fault

Fault	Meaning
3,2,001	Length measuring system, lifting cylinder
3,2,002	Length measuring system, tiller-depth cylinder
3,3,003	Tiller-depth indicator defective
1,3,004	No engine data
3,2,005	Tiller-depth sensor for lifting defective
3,2,006	Tiller-depth sensor for lowering defective
3,2,007	Tiller-depth sensor defective
3,3,008	Button for automatic/manual control of tiller defective
10,3,012	Proportional control valve PV9
10,2,013	Proportional control, tiller depth
10,3,014	Proportional control, tiller depth
10,1,015	Valve, tiller depth
10,1,016	Valve regulator, tiller depth
10,1,017	Valve current regulator PV9
10,1,018	Valve A, tiller depth

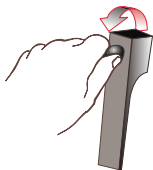


Fault	Meaning
10,1,019	Valve B, tiller depth
10,1,020	No valve data
6,1,021	Buffer fault PSX
6,3,022	No data from display
10,3,023	Switch, tiller joystick
3,2,024	Tiller ON/OFF switch
2,1,030	Steering potentiometer
2,2,031	Steering potentiometer, control tolerance
2,2,032	Inch potentiometer
2,2,033	Inch potentiometer, control tolerance
3,2,034	Tiller speed potentiometer
3,2,035	Tiller potentiometer values, control tolerance
2,1,036	Forward / reverse button
16,3,037	Front-equipment detection
4,2,038	Winch speed-range detection
1,2,040	Pedal value / engine setpoint

Fault	Meaning
14,3,041	Signal, Multiflex tiller
14,3,042	Signal, enable tiller
7,2,043	No engine data available on CAN
1,2,044 to 1,2,068	Engine
4,2,069	Winch detection
2,1,070	Servo output, forward, left
2,1,071	Servo output, reverse, left
10,1,015	Valve, tiller depth
10,1,016	Valve regulator, tiller depth
10,1,017	Valve current regulator PV9
2,1,072	Servo output, reverse, right
2,1,073	Servo output, forward, right
1,2,074	Constant choke
3,2,075	Valve 3rd pump (tiller)

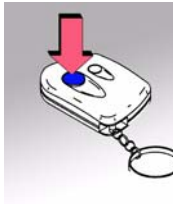
Remote control

Precondition for use



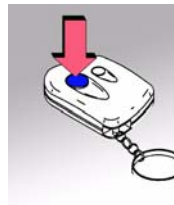
- Manually unlock both doors.
The remote control is ready for use.

Opening the central locking system



- Press the blue button once
The turn indicators flash once and the interior lighting comes on as confirmation.

Closing the central locking system



- Press the blue button again.



The button on the right is not used.





Functional description:

1 Head-restraint cushion

Height and angle are adjustable.

2 Release button

For folding the backrest forward.

3 Knob

For adjusting the side wings for optimum lateral support.

4 Knob

For variable adjustment of backrest rake.

5 -3-stop lever

For limiting float to

- 150 mm travel
- 90 mm travel
- 75 mm travel (no-float position)

6 Knob

For variable adjustment of the seat cushion through 8°.

7 Knob

For variable weight and height adjustment.

8 Horizontal fore-and-aft adjustment

By locking rails on both sides.

DRIVER'S SEAT

9 Knob for adjusting side wings

For optimizing lateral support.

10 Stepless adjustment of seat depth

from 495 to 570 mm with knob.

11 Seatbelt

12 Lumbar support

With height adjustment, electrically operated.

13 Rocker switch for curvature

14 Rocker switch for height

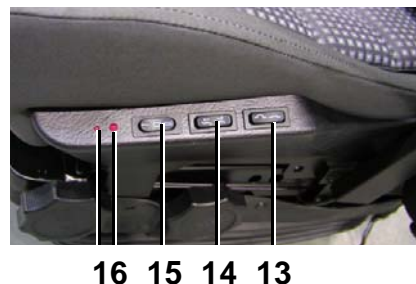
15 Switch for two-stage control

Heating, seat cushion and backrest

16 Indicator light for heater

17 Armrest holder

Armrest, left, heated



Instructions for use:

Turn knob (6) clockwise or counter-clockwise to adjust the angle of the seat cushion variably through 8°.



The angle of seat tilt is correct when the pedals can be operated without the seat applying excessive pressure to the underside of the thighs.

Lumbar support with electrically operated adjustment for curvature and height (12).

Use rocker switch (13) to adjust curvature.

Use rocker switch (14) to adjust height.

Heating for **Seat cushion and backrest** .

Use switch (15) to select either of the two heating stages.

- Both indicator lights ON = Heater at full power
- Only one indicator light ON = Heater at reduced power.

Armrest, left, heated, with holder (17)

The angle of tilt of the armrest can be adjusted by means of a knurled screw on the underside.

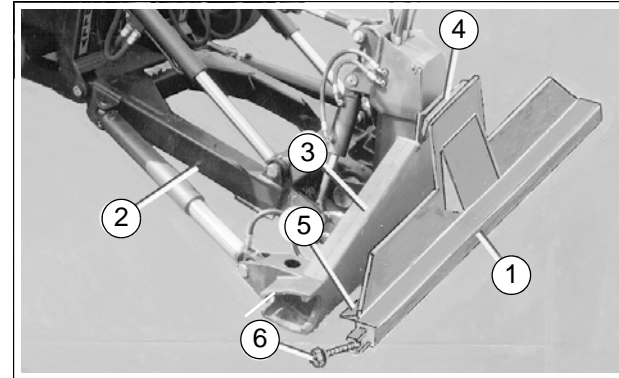
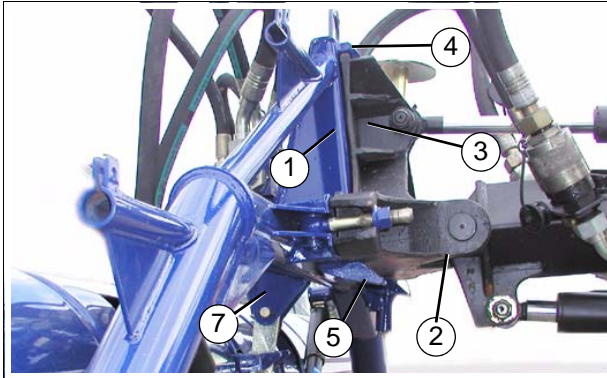
Armrest holder (17) can be moved 30 mm forward or to the rear.



When the vehicle is laid up for the summer, set the seat to the no-float position to take the strain of the spring. The side wings of the seat are adjustable by mechanical elements. Consequently, do not sit on the wings.



NOTES



INSTALLING AUXILIARY DRIVEN IMPLEMENTS

- Clear all ice and snow off the adapter plate and centring head of the auxiliary driven implement.

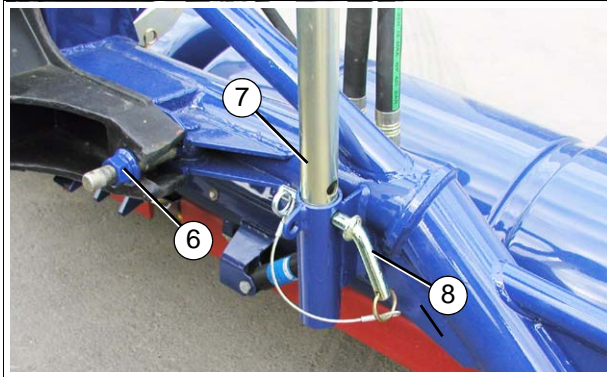
⚠ WARNING!

Do not permit anyone to enter the zone between the vehicle and the auxiliary driven implement while the engine is running.

- Lower carrier plate or blade frame 2.
- Tilt adapter plate 3.
- Drive the PistenBully up to the equipment.
- Apply parking brake.
- Slowly raise carrier plate or blade frame 2.

Adapter plate 3 engages hooks 4, mating plate 1 seats against adapter plate 3 and simultaneously centers itself with the two centering wedges 5 on adapter plate 3.

AUXILIARY DRIVEN MACHINERY



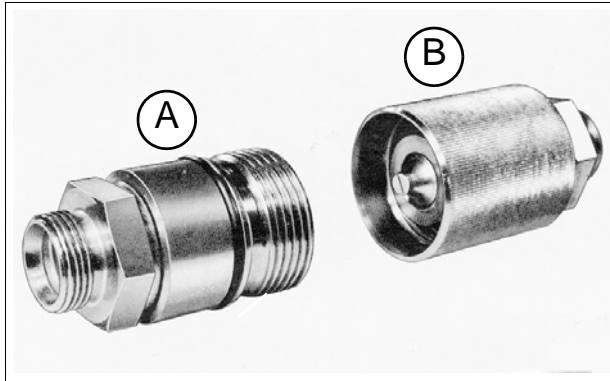
- Raise carrier plate or blade frame 2 just far enough to enable the equipment to seat against adapter plate 3. If centering wedges 5 do not slip under adapter plate 3, a few sharp jerks will wiggle the auxiliary driven implement into the correct position. Switch off the engine.
- Swing eyebolts 6 inward and tighten the nuts (tightening torque 250 Nm).
- After approx. 10 minutes operation, recheck the nuts and make sure they are correctly tightened.

- Unlock the support, raise stand 7 all the way and insert locking pin 8 to secure it in the raised position.
- Lower the auxiliary driven implement.



Remove the rear-mounted auxiliary implement before prolonged periods of dozing work.





Connecting hydraulics

The threaded high-pressure couplings are for connecting and disconnecting hydraulic hoses.

Check valves that enable or disable flow, as applicable, are actuated automatically in the coupling process.

A = Vehicle end

B = Device end

Polar12213.en

- **Before connecting or disconnecting the hoses for auxiliary driven implement, always:**
 - Switch off the engine.
 - Apply the parking brake.
- Actuate the appropriate functions to depressurize the hydraulic lines.



When making the connections, always make sure that both parts of the couplings are perfectly clean.

- Connect the leak-off oil hose first.
- Connect the hydraulic hoses, making sure that the colour codings are correct and that the hydraulic couplings are correctly seated. Use suitable tools to tighten the hydraulic couplings.
- Connect the electrical plug of the auxiliary driven implement to the socket of the PistenBully and make sure it is correctly engaged. The plug completes the electrical circuit, so that the controller can recognize the auxiliary driven implement.
- Function-test the auxiliary driven implement.



Make sure there is no-one in the danger zone.

- Check the driven implement for fluid leaks and, if necessary, have the equipment repaired by trained, qualified persons.

Removing the auxiliary driven implement

- Lower the driven implement, with the stands fully extended and secured, onto firm, smooth ground.
- Removal is the reverse of the installation procedure.
- Disconnect the leak-off oil line last.

Protect the driven implement from the sun if it is to be out of use for a prolonged period of time.

OPERATION OF AUXILIARY DRIVEN IMPLEMENT

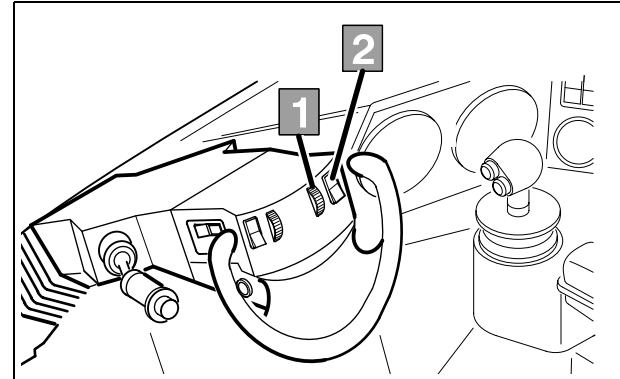
Precondition for operation of the tiller hydraulics:

- The driver's cab must be fully lowered and locked in position.
- The load platform must be fully lowered.
- The rear-mounted tiller must be less than 500 mm clear of the surface of the snow.
- The plug of the auxiliary implement must be in the socket (socket E).



Failure to comply with this precaution will mean that the electronically controlled speed reduction function is not available.

- The diesel engine must be revving at a speed at least equal to the drive-away speed of 1,200 rpm.



1 Knurled wheel: Reducing tiller shaft speed

2 Rocker switch



3. Adjustment pump – tiller drive
Top section pressed = OFF
Bottom section pressed = ON
Indicator light comes on.



As a safety precaution, the tiller hydraulics are deactivated when the rear-mounted driven implement is raised to a height of approx. 50 cm.



If there is a leak in the drive hydraulics always switch off the diesel engine and have the fault rectified

Fräse Gleichlauf- Gegenlauf



Tiller-forward operation / counter-rotating

Top section pressed = Forward operation

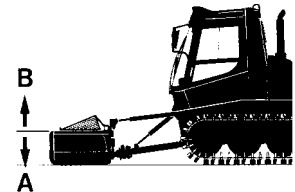
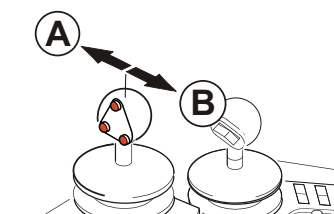

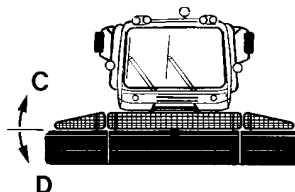
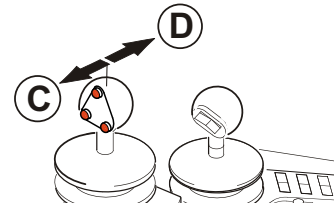
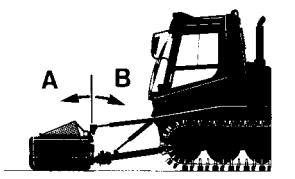
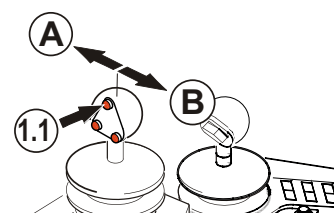
Bottom section pressed = Counter-rotating



On account of the additional draw on engine power it would cause, counter-rotating mode is not advisable while climbing slopes.



FRONT-MOUNTED AUXILIARY DRIVEN IMPLEMENT

Function Front blade	Joystick (1) electric / hydraulic	Joystick position	Pushbutton or rocker switch
RAISE - LOWER 		A - Lower B - Raise	Floating position 
TILT 		C - Left D - Right	
ROLL 		A - Forward B - Back	1.1

Overview

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FRONT-MOUNTED AUXILIARY DRIVEN IMPLEMENT

Function Front blade	Joystick (1) electric / hydraulic	Joystick position	Pushbutton or rocker switch
SWING 		C - Swivel left D - Swivel right	1.1
WING, LEFT 		A - Move wing in B - Move wing out	1.2
WING, RIGHT 		C - Move wing i. D - Move wing out	1.2



REAR-MOUNTED AUXILIARY DRIVEN IMPLEMENT

Overview

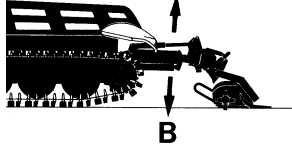
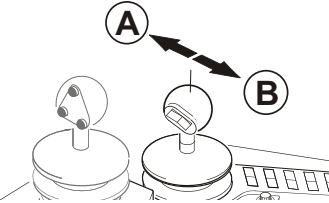
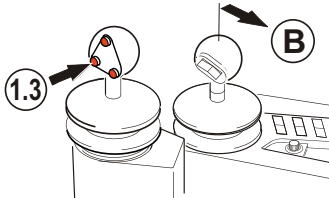

Technical data

Safety

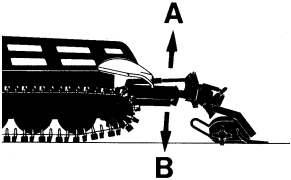

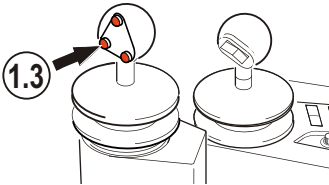
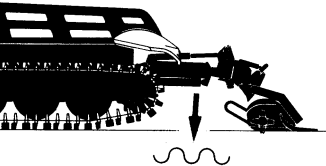
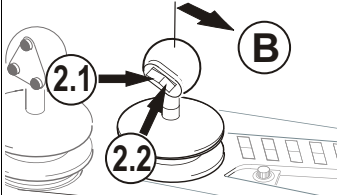
Use

Checks

Operation

Equipment carrier for rear-mounted auxiliary driven machinery	Joystick (2) electric / hydraulic	Joystick position	Pushbutton or Rocker switch
<p>RAISE - LOWER</p>  <p>VARIANT 2 RAISE - LOWER</p> <p>VARIANT 2.1 1.3 pressed for longer than 1 second = Raise rotary plough Release 1.3 = Hold rotary plough in position 1.3 pressed again = Lower rotary plough.</p>	 	<p>A - Raise B - Lower</p> <p>B - Lower</p>	<p>VARIANT 2 1.3 briefly pressed = Raise rotary plough to full 120 cm Press 1.3 again = Lower rotary plough</p>  <p>Press before rotary plough is fully raised = Hold rotary plough in position</p>

REAR-MOUNTED AUXILIARY DRIVEN MACHINERY

Equipment carrier for rear-mounted auxiliary driven machinery	Joystick (2) electric / hydraulic	Joystick position	Pushbutton or Rocker switch
<p>VARIANT 3 RAISE</p>  <p> Lower = Joystick position B.</p>			<p>Briefly press 1.3 = Raise rotary plough Press 1.3 again = Hold rotary plough in position</p> <p>VARIANT 3.1 Press 1.3 for longer than 1 second = Raise rotary plough Release 1.3 = Hold rotary plough in position Press 1.3 again = Raise rotary plough</p>
<p>FLOATING POSITION</p> 		<p>B - Latched position</p>	<p>2.1 pressed = Load relief for equipment carrier can be set by potentiometer E1. Indicator light comes on. Centre = Floating position Indicator light comes on. 2.2 pressed = Downward force on</p>



REAR-MOUNTED AUXILIARY DRIVEN MACHINERY

Overview

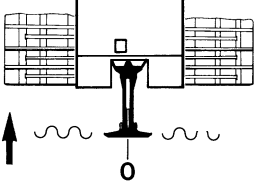
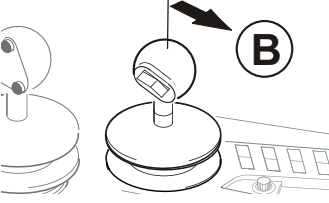

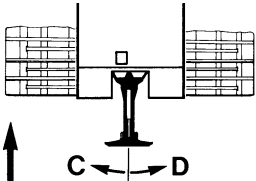
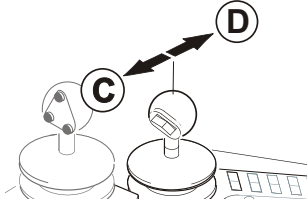

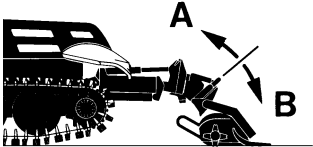

Technical data

Safety

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Checks

Operation

Equipment carrier for rear-mounted auxiliary driven machinery	Joystick (2) electric / hydraulic	Joystick position	Pushbutton or Rocker switch
<p>FLOATING POSITION</p> 		<p>B - Latched position</p>	<p>(see Cockpit, section A).</p>  <p>Top section pressed = Floating position Indicator light comes on. Centred = Neutral Bottom section pressed</p>
<p>SWIVEL HORIZONTALLY</p> 		<p>C - Swivel left (locked) D - Swivel right (locked)</p>	<p>Pushbutton (see steering wheel)</p> 
<p>DEPTH SETTING</p> 			<p>(see Cockpit, section E).</p>  <p>Push button = See push-button indicator</p>

Automatic lifting of auxiliary driven implement for reversing:

Rocker switch (see *Cockpit - section E*).



Automatic lifting of rear-mounted implement for reversing (latch engaged).

Automatic lifting deactivated Disengage the latch and press the switch.

Rocker switch (see *Cockpit - Section A*)



Selector switch for direction of travel

Top section pressed = Forward

Center = Neutral

Bottom section pressed = Reverse with reversing alarm actuated

When the rocker switch is set to "**Automatic lifting**" the hydraulic circuits listed below are automatically actuated when the **direction of travel switch** is moved to the "**Reverse**" position:

- Vertical and horizontal floating position OFF.
- Equipment carrier is centered.

- Equipment carrier lifts the auxiliary driven implement approx. 1.2 m clear of the surface of the slope.
- If the tiller is in operation, the tiller is deactivated when lifted more than 0.5 m clear of the surface of the slope.
- Reversing light is switched on.

When the rocker switch is set to "**Automatic lifting**" the hydraulic circuits listed below are automatically actuated when the **direction of travel switch** is moved to the "**Forward**" position:

- The equipment carrier is automatically lowered.
- If the floating position was selected beforehand, it is automatically reselected.
- If a tiller is installed, it restarts when it is lowered to less than 0.5 m above the surface of the slope.
- The equipment carrier remains locked in the centered position.

If **automatic lifting** of the auxiliary driven implement for reversing is **not wanted**, for example if the machinery is to be removed, the latch of the **rocker switch** can be disengaged and the **automatic lifting** function disabled..



OPENING THE GALLERY RAILING

- Swing the gallery railing up (*Figure 1*)



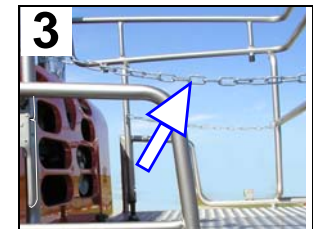
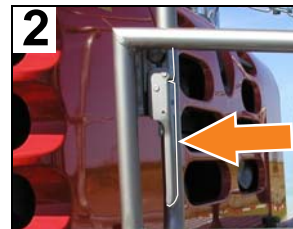
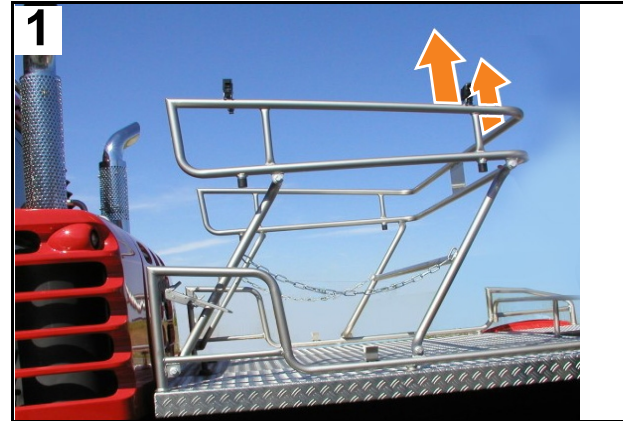
See direction arrows for points to hold for opening.

- Push both locking levers all the way down (*Figure 2*).



The safety catch on the locking lever must engage.

- Close both safety chains (*Figure 3*).



- Install the two spring pins to secure the foot bar (Figure 4).



Always comply with the instructions for carrying passengers in the section entitled "Safety instructions".

CLOSING THE GALLERY RAILING

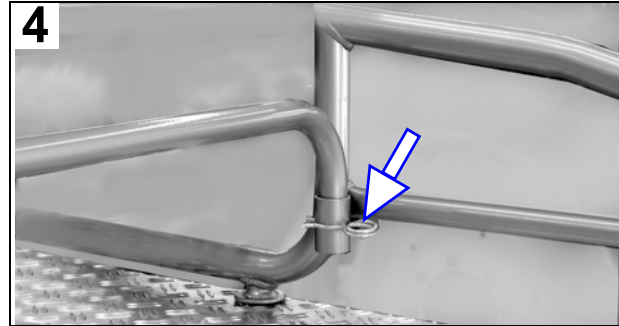
- Press the safety catch and open the locking lever (Figure 5).

WARNING!



Risk of injury by crushing:
When lowering the gallery railing.
Take a firm grip at the designated points (Figure 1) and swing the gallery railing into position.

- Fully lower the gallery railing.



Precondition:

- Always remove all loose objects before tilting the driver's cab or load platform.
- Park the vehicle on a firm surface that is as horizontal as possible.
- Apply the parking brake.



- **Switch off the tiller drive.**

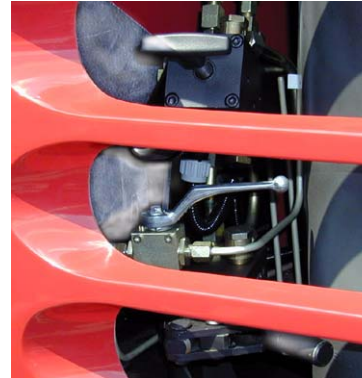


- Direction of travel switch in neutral position.
- Lower the front-mounted and rear-mounted auxiliary driven implements.

CAUTION!

Failure to comply with this precaution will result in the risk of collision between the load platform or the driver's cab and the auxiliary driven implement.

- Exit the driver's cab.



- Close the doors

CAUTION!

Failure to comply with this precaution will result in a risk of accident due to doors slamming closed.

Tilting the driver's cab and load platform

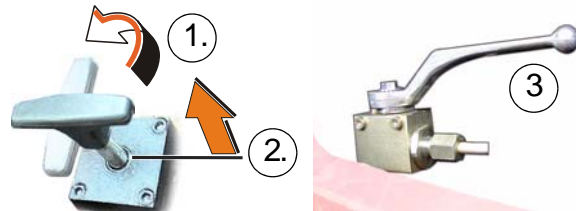
- Remove the toggle screws from the load platform.
- Turn the lever of the valve counter-clockwise.
- Pull the lever of the valve and turn it clockwise until it latches in position.
- Move lever **3** of the block gate valve into position.
- Press the button.
The driver's cab and load platform rise into their tilted positions.



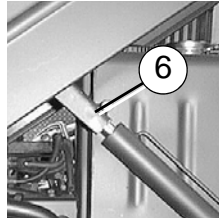
You can interrupt this movement by releasing the button.

The indicator light for the driver's cab locking mechanism lights up.

- Switch off the engine by pressing button **5** for stop.



- Release and pivot down support 6 on the piston rod of the cylinder.
(Locking mechanism to ensure that the load platform cannot move downward).

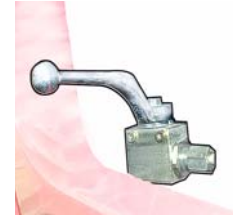


Tilting the driver's cab

The **toggle screws** remain in place, securing the load platform to the middle console. The rest of the procedure is the same as that for tilting the driver's cab and load platform.

Tilting the load platform

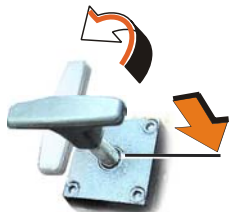
- Move the lever of the block gate valve into position



The rest of the procedure is as described in the section on tilting the driver's cab and load platform.

Lowering the driver's cab and load platform

- Pivot the support for the load platform up until it latches in position in the spring clip.



- Turn the lever of the valve counter-clockwise, press it down, and turn it clockwise until it latches in position.



- Press the button.

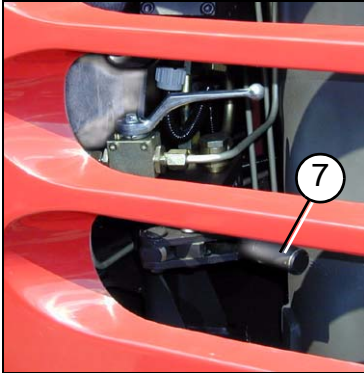
The driver's cab and load platform move down into their normal positions. Indicator light goes out.

- Install the toggle screws in the load platform.



Note that the rear hydraulics will not operate if the driver's cab locking mechanism is not engaged or the load platform is not fully lowered.





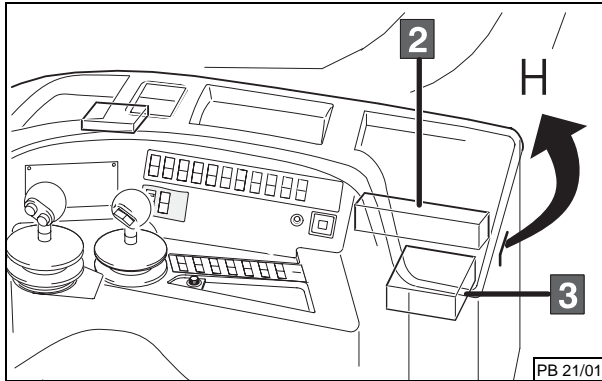
Using manual pump for tilting and lowering

- Diesel engine OFF

The preparatory steps are the same as those for tilting with the engine-operated hydraulics.

- Fit tubular extension (toolkit) on manual pump **7** and operate the pump.

The rest of the procedure is the same as that for tilting and lowering the driver's cab and load platform.



- Take a grip in the handle recess and raise center console H. A gas-filled strut holds the console open.

2 FUSES / MINIATURE RELAYS

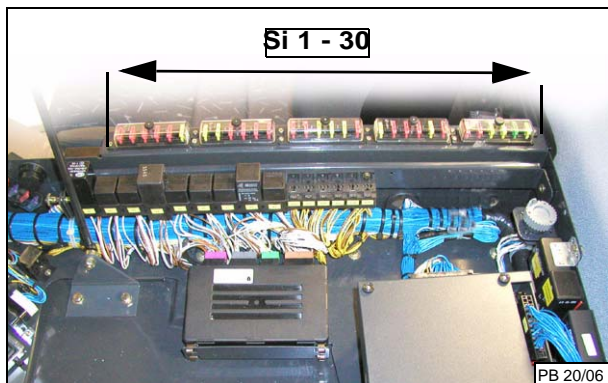
REPLACING FUSES:

Fuses are designed to provide protection against excessively high currents in the electrical system.

WARNING!



Risk of cable fire and short-circuit:
Never attempt to jumper or repair fuses or insert replacement fuses with a higher ampere rating than the originals.

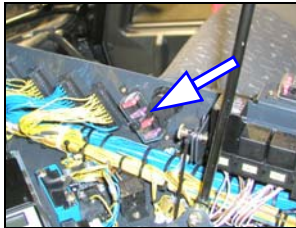


FUSES (Si):

- | | | | | | |
|---|--------|--|----|--------|--|
| 1 | (10 A) | High-beam headlights and telltale | 10 | (10 A) | Steering wheel (power supply) |
| 2 | (10 A) | Low-beam headlights | 11 | (10 A) | Front snow blower |
| 3 | (10 A) | Overhead spotlight, left | 12 | (10 A) | Rear wiper, vario-bar switches |
| 4 | (10 A) | Overhead spotlight, right | 13 | (10 A) | Front wiper, radio |
| 5 | (10 A) | Instrument lighting, parking light/tail light, right | 14 | (10 A) | Instruments, telltales |
| 6 | (10 A) | Dashboard lighting, parking light/tail light, left | 15 | (20 A) | Reversing light, searchlight |
| 7 | (20 A) | Xenon fog lights | 16 | (20 A) | Auxiliary hydraulics |
| 8 | (20 A) | Rear spotlights | 17 | (25 A) | Drum winch |
| 9 | (10 A) | Drive/tiller electronics | 18 | (10 A) | Flashing indicators, horn, headlight flasher, grid heater |
| | | | 19 | (20 A) | Cab heater |
| | | | 20 | (10 A) | Engine electronics |
| | | | 21 | (10 A) | Engine electronics |
| | | | 22 | (10 A) | Engine electronics |
| | | | 23 | (20 A) | Start/stop engine, 24/12 V converter, driver's seat, system. |
| | | | 24 | (10 A) | Engine electronics |
| | | | 25 | (10 A) | Engine electronics |
| | | | 26 | (40 A) | Start/stop |
| | | | 27 | (20 A) | Voltage with engine running, mirror heater, side-window heater |
| | | | 28 | (30 A) | Rear-window heater |
| | | | 29 | (30 A) | Front windscreen heater |



30 (20 A) Rotating beacon, clock

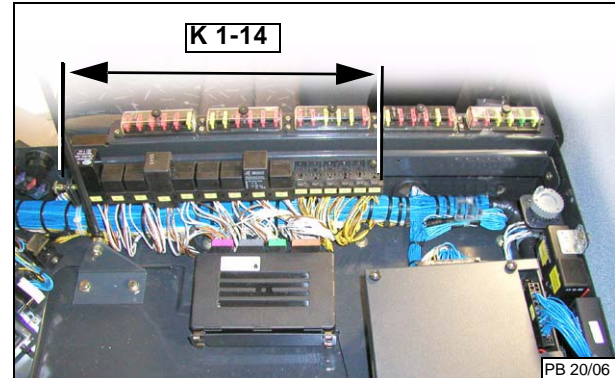


Si 35 - 38
SnowTronic



FV 1
Speed sensor

FV2
Length measurement



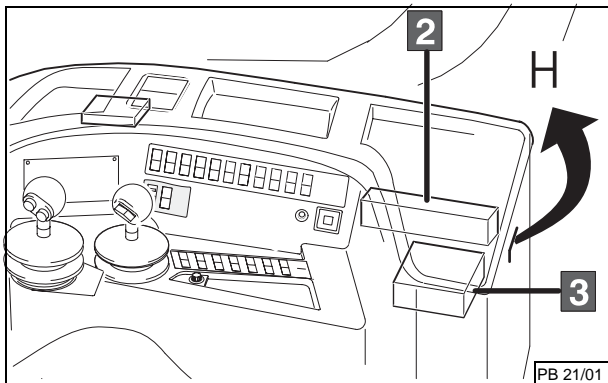
MINIATURE RELAYS (K):

- 1 Flashing indicators
- 2 Horn
- 3 Voltage with engine running.
- 4 Parking lights
- 5 Driving lights
- 6 Reversing light
- 7 Rear-window heater
- 8 Front wiper interval, intermittent wipe
- 9 Drum winch
- 10-14 Front snow blower
- 15 Drive speed II

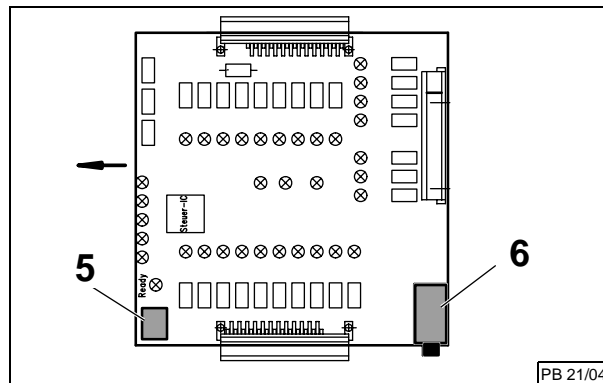


Miniature relays are not interchangeable.

FAULT IN WORKING HYDRAULICS



3 CONTROLLER, AUXILIARY HYDRAULICS



EMERGENCY ACTUATION, AUXILIARY HYDRAULICS:

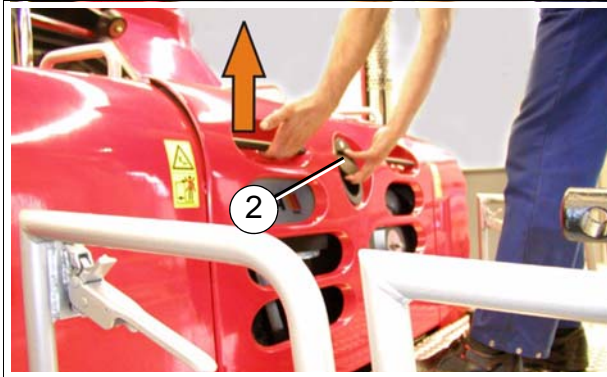
⚠ WARNING!

Switch off the rotary tiller.

If the control system fails, the hydraulics for the auxiliary implement can be raised by means of **emergency pushbutton 5**.

Power is supplied via the 16A **fuse (6)**.





VEHICLE BATTERY

The two 12 V 135 Ah/600 A batteries are mounted on a tray on the upper frame.

Opening the cover on the upper frame:

- Open latch 2.
- Use both hands to raise the cover in the direction indicated by the arrow and engage the cover in the fully opened position on the retainer.
- The battery must be held in place by the retainer.

WARNING!



Risk of explosion of oxyhydrogen gas:
Keep all sources of ignition well away from the battery.
Do not place metal objects on the battery.

TOPPING UP THE ELECTROLYTE:

WARNING!



Take care when handling battery acid
Risk of caustic burns:
Wear protective goggles and protective gloves.

- Remove the screw caps
- Top up the fluid in the cells to the max. mark with distilled water.

CHARGING THE BATTERY:

WARNING!



Make sure that polarity is not reversed.
Do not bring the battery clamps into contact with each other.



Make sure the room in which the battery is charged is well ventilated.
Do not place metal objects on top of the battery.

JUMP-STARTING:

WARNING!



A mistake in the jump-starting procedure could result in fatality or severe burns due to electric shock.



Do not make a connection between the cable terminals.

Do not connect the jump-start leads to the connections between the two batteries.

CONNECTING THE JUMP-START CABLES:

1. From the **+ terminal** of the PB battery to the **+** of the donor battery (24 V).
2. From the **- terminal** of the PB battery to the **- terminal** of the donor battery (24 V).

SWITCH OFF THE BATTERY MASTER SWITCH:

- if the electrical is defective.
- to help prevent the battery from discharging during a prolonged storage.



⚠ CAUTION!

Voltage peaks:

While the engine is running, do not switch off the battery master switch except in an emergency.

⚠ CAUTION!

Data loss in the digital drive and tiller control electronics.

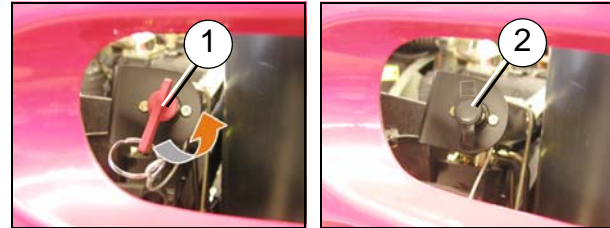
Before switching off the battery master switch:

- Switch off the ignition.
- Wait 30 seconds.
- Then operate the battery master switch.

Switching on the battery master switch

- Switch on the battery master switch.
- Wait 30 seconds.
- And then switch on the ignition.

SWITCHING OFF THE BATTERY MASTER



SWITCH:

- Turn toggle **1** in the direction indicated by the arrow and remove.

The battery is now isolated from the vehicle's on-board electrics.

- Fit protective cap **2**.

LIGHTS



LIGHTS:



Do not touch the glass of halogen bulbs.
(See notes on halogen-xenon bulbs).

1 FLASHING TURN INDICATOR

2 HIGH-BEAM HEADLIGHTS / PARKING LIGHTS

3 LOW-BEAM

4 FOG LIGHTS

5 SPOTLIGHT

6 ROTARY BEACON

7 FLASHING TURN INDICATOR

8 TAIL LIGHT

9 - 10 REAR SPOTLIGHTS



NOTES ON HALOGEN-XENON BULBS

WARNING!

Bright light could injure eyes.

Do not look directly into the bright light.

WARNING!

Health hazard due to gas.

If a xenon bulb breaks in an enclosed space, leave immediately and ventilate the room for at least 20 minutes before re-entering.

CAUTION!

Damage to electronic ballast:

Persistent starting problems indicated by flickering of the gas-discharge light can result in damage to the electronic circuitry in the ballast.

Switch off immediately if the light flickers.

CAUTION!

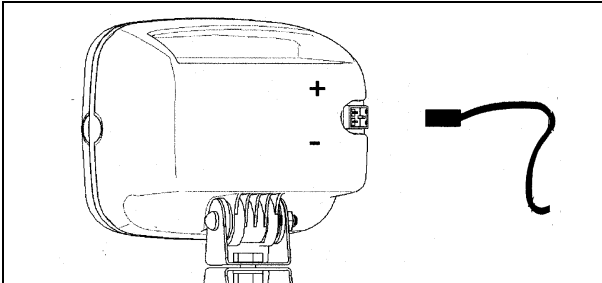
Risk of breaking the lens:

Do not use liquid to clean the lens while hot.

- Clean the glass lens from time to time when cold.
- Do not use aggressive or abrasive cleaning agents.

Safety instructions for changing xenon bulbs:

- Before changing a bulb, always switch off the headlights and isolate them from the power supply.
- Do not probe into the bulb socket.
- The electrical connection between headlight and ballast carries a high voltage: do not break this connection.
- Never operate the ballast without a bulb, as this could cause dangerous arcing at the bulb socket and result in damage.
- Allow the bulb to cool down before you commence work.
- Wear protective goggles and protective gloves when changing bulbs.



Electrical connection:

- Before connecting, always interrupt the circuit by switching off the battery master switch.

Use only the factory-installed wiring harness for electrical connection.

- Danger of flying splinters of glass.
The glass body of a xenon bulb is pressurized and can shatter.
- Always hold the bulb by the base.
- Operate xenon bulbs in closed headlights only.



Dispose of the spent xenon bulb as hazardous waste.



INSTRUCTIONS FOR CHECKS AND MAINTENANCE

WARNING!



Risk of injury by cutting or crushing action

When the engine is running, keep at a safe distance from rotating parts.

- Always perform the specified checks before starting off.
- Perform all checks with the engine off and the vehicle parked on a horizontal surface.
- Make sure that the oil and coolant levels are always to specification (check at oil dipstick, overflow plug, etc.).

TOPPING UP FLUIDS AND LUBRICANTS

Fluids and lubricants:

- Do not permit fluids or lubricants to come into contact with the skin (wear protective gloves, change wet clothing).
- Do not inhale or swallow fluids or lubricants (risk of poisoning).
- Do not mix fluids and lubricants of different types.



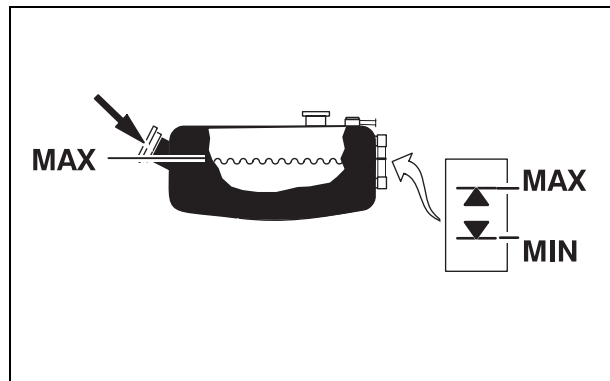
Do not spill fluids or lubricants (they are hazardous to soil and water). Always dispose of these substances in an environmentally compatible manner (comply with local laws).

CHECKING COOLANT LEVEL



Check the coolant level and top up only when the engine is cold.

- Check the coolant level in the sight glass of the expansion tank. The water level must be between the min. and max. marks.
- Check the antifreeze of the coolant, (see the section on fluids and lubricants).
- Check that the hoses in the cooling and heating systems are tight and not leaking.

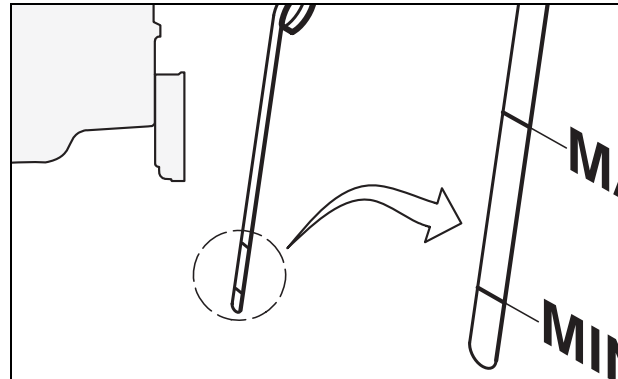


CHECKING ENGINE OIL LEVEL

- Use the dipstick to check the engine oil level.
- Top up oil when engine is not running and the PistenBully is standing on level, horizontal ground. The oil level must be between the min. and max. marks on the oil dipstick.



Use only approved engine oil (see fluids and lubricants specifications).

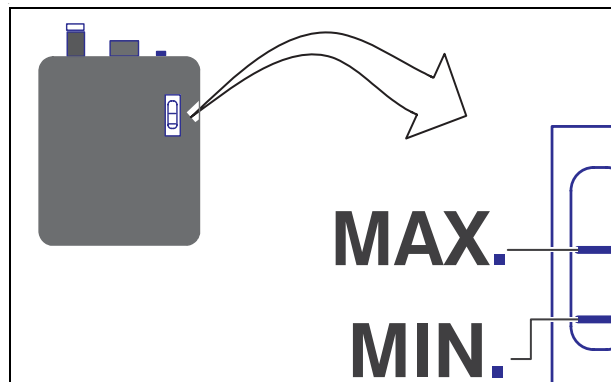


CHECKING HYDRAULIC FLUID LEVEL

- Check the hydraulic-fluid level and top up only when warm.
- The fluid level must be between the min. and max. marks.



Use only approved hydraulic fluid (see fluids and lubricants specification).



ADJUSTING RECIRCULATED-AIR INTAKE

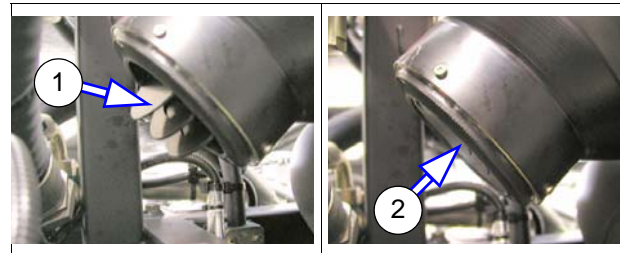
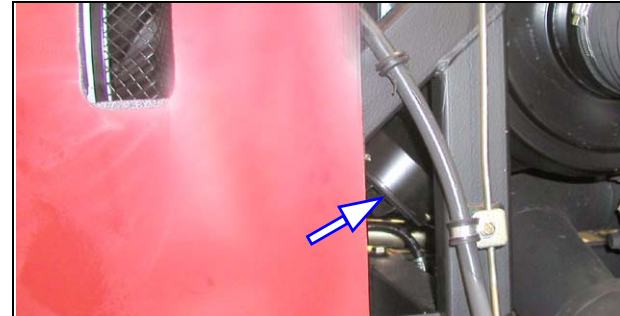
Particles of ice could damage the blades of the turbocharger: this is a danger under the following conditions:

- Temperatures below -10°C
- Powder snow or fine snow dust
- Relative humidity high



At temperatures above 0°C set the air-intake flap to position **2**, otherwise the diesel engine will suffer a loss of power.

- **Setting the recirculated-air flap:**
 - Tilt the driver's cab.
 - The air-intake flap is on the air filter.



Setting the air-intake flap

- Pos. **1** = air intake from engine compartment.
- Pos. **2** = Fresh air (cold air).

DAILY CHECKS

CHECKING ELECTRICAL SYSTEM

- Check the lights and flashing indicators and the rotating beacon system; repair or replace components as necessary. Always comply with the instructions for working on the rotating beacon system (high-voltage system).
- Replace defective bulbs and fuses.
- Check the wipers, horn and back-up alarm.



Never operate the PistenBully if the warning lights and rotating beacon system are not fully functional..

VISUAL INSPECTION

- Visually inspect the tracks and sprockets, check for tire damage.
- Visually inspect the fasteners of the auxiliary driven implements (locking pins, bolts, nuts).
- Visually inspect the hydraulic system (drive hydraulics and hydraulics for auxiliary driven implement), hydraulic lines, connectors, hoses, hydraulic cylinders for leaks and chafing.

CHECKING PARKING BRAKE

- Make sure there is no-one in the danger zone.
- Start the engine and apply the parking brake: Indicator light comes on.
- Set the direction-of-travel switch or the propulsion lever to "Forward" and briefly accelerate the engine to approx. 2000 rpm.
The PistenBully must remain motionless.



Do not operate the vehicle if the parking brake is defective.

- The indicator light in the instrument cluster must go out when the parking brake is released.
- Perform all the daily checks.
- Check the drive belt on the engine (engine fan, alternator); make sure that belt tension is correct and that the belt is free of damage (see the manual supplied by the engine manufacturer).



CHECKING FUEL PREFILTER

- Screw open filter housing 1, remove the filter element and clean it in clean diesel fuel, using a soft brush.

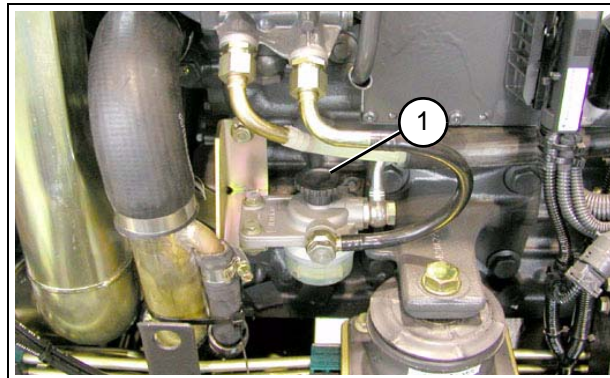


Replace the filter element if it is very dirty or damaged.

- Check the sealing ring for the filter housing; replace if necessary.
- Slip the filter element into the filter housing and re-install the housing. Tightening torque 10 Nm.



Make sure that the sealing ring is correctly seated.



Dispose of used filters and fuel residues in accordance with the locally applicable environmental-protection and safety regulations.

TRACK TENSION

Checking track tension:

- Vehicle parked on horizontal, snow-covered ground.
- No load on vehicle and auxiliary driven implements lowered.
- After equalizing track tension by driving backwards and forwards.

Track tension is correct when the upper section of the track can be lifted **approx. 40 – 50 mm** midway along its run.

- Check the condition of the track cleats, track lacings, tire guides and backing plates, replace damaged components.

TEST DRIVE

- Check operation and test all instruments and indicators.
- Check running gear and engine / transmission unit for abnormal noises.
- Visually inspect for smoke at the exhaust.



Check the air filter element if the exhaust is smoky.



CHECKING WHEELS

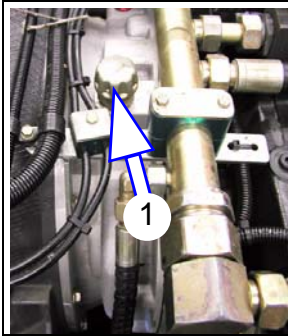
- Check the wheel fasteners and check tire pressures.

Tightening torques

Type	Tensioning axle	Tire pressure Tensioning axle	Drive axle	Tire pressure Drive axle
PistenBully 300 Polar	300 Nm	-----	300 Nm	-----

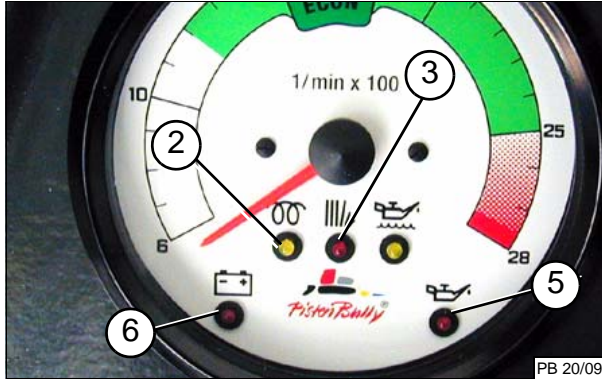
WEEKLY CHECKS

SPLITTER BOX



- Tilt the load platform.
- Use the dipstick to check the engine oil level.
- Brass cap 1 w/f 36; measure with oil dipstick set on (screw threads not engaged).
- The oil level must be between the min. and max. marks on the oil dipstick.
- Use only approved oil for splitter boxes (see fluids and lubricants specifications).





STARTING THE ENGINE:

⚠ WARNING!

The use of proprietary starting agents (such as Startpilot, for example) is prohibited on account of the risk of explosion.

- Apply parking brake.
- Direction of travel switch in neutral position.
- Switch off electrical consumers.

- Turn the ignition key to position I.

The following telltale lamps light up:

- ◆ Battery charge 6
- ◆ Engine oil pressure 5
- ◆ Braking-air indicator
- ◆ Engine fault light 3
- ◆ Air-intake preheating 2
- ◆ Warning light for air-intake preheating

Situational help

The warning light for air-intake preheating may stay lit for up to approx. 3 minutes after the engine starts.

⚠ CAUTION!

Damage to electronics

If the warning light for air-intake preheating lights up during operation:

- Cease operations and proceed to the nearest workshop.
- Switch off the battery master switch.

Start procedure

- Ignition ON



Depending on the ambient temperature, the intake-air preheating light goes out after approx. 2 seconds (no preheating) or within 30 seconds (maximum preheating time).

When the intake-air preheating light goes out:

- Start the engine
- Do not depress the accelerator pedal.
 - Operate the starter until the engine is turning at 700 rpm
 - maximum duration of start attempt 30 seconds

Engine refuses to start:

Immediately repeat the start attempt (do not repeat the preheating procedure).

Duration of start attempt, max. 30 seconds

If it is necessary to repeat the reheating procedure:

- Ignition OFF
- Wait for 5 - 10 seconds
- Ignition ON.

WARMING-UP PHASE

Air temperature above 0° C to -20° C



- Allow the diesel engine to idle for approximately 3 mins.
- Pull away with the engine operating in the partial-load range.
- The engine can be operated at full load as of a coolant temperature of + 80° C.

Air temperature below -20° C



- Allow the diesel engine to idle for approximately 6 minutes.
- Pull away with the engine operating in the part-load range.
- The engine can be operated at full load as of a coolant temperature of + 80° C.



INSTRUCTIONS FOR RUNNING IN

Up to 40 operating hours

- Run in carefully up to max. 3/4 full-load speed

After 40 operating hours

- Gradually work up to full load

ENGINE SPEED RANGE

On steep gradients

- Increase engine speed.

Operating in extremely difficult terrain

- Use the potentiometer to reduce driving speed.



The speed for the auxiliary driven machinery remains unchanged.

Situational help

PistenBully slows down on account of lack of propulsive power

- Switch the auxiliary to forward rotation.
- Use the potentiometer to reduce the speed of the auxiliary.

SWITCHING OFF ENGINE

CAUTION!

Turbocharger - risk of overheating:

Do not immediately switch off the diesel engine after it has been run at full load. Drive for approx. 2 minutes in the part-load range and then switch off.

- Turn the ignition key to the **0** position.

DRIVING



Adjusting speed of diesel engine

- Idle speed 800 - 900 rpm

WARNING!

If the engine's idle speed is above 1000 the vehicle cannot brake to a standstill.

WARNING!

Before driving away, always check that there is no-one in the danger zone, in other words in the immediate vicinity of the vehicle or at or on the tracks.

- Press the direction-of-travel switch to the position corresponding to the direction in which you want to travel. An audible signal (back-up alarm) sounds if you set the direction switch to the position to reverse.



Even though the vehicle is fitted with a back-up alarm, you remain under the obligation to check carefully the area behind the vehicle when reversing.

- Depress the accelerator pedal to increase engine rpm to above drive away speed: The PistenBully drives away.

The PistenBully accelerates steplessly to its maximum speed as engine speed increases.

When the vehicle is moving, the electronics monitor the engine speed set in response to movements of the accelerator pedal and adjust the hydraulic ratio in accordance with load, so that engine speed remains constant and only the speed of the vehicle changes.



When you turn, bear in mind that the left and right propulsion hydraulics switch to counter-rotation just before full lock is applied to the steering wheel. The PistenBully turns in its own length.

- Observe all instruments when driving.



Engine oil pressure

- The warning light for the diesel engine comes on during the start procedure and if oil pressure drops.

Engine operating temperature

If the reading is too high, determine the cause, for example:

- Gauge in correct working order.
- Not enough coolant in system.
- Outside of radiator dirty.
- Check the tension of the Vee-belt.
- Check engine fan.

Fuel supply

Continually monitor the fuel supply and fill up in good time. This precaution will prevent the fuel supply from failing on a gradient, which would mean the engine stopping inopportunistically.

Battery-charge indicator

If the battery charge indicator lights up when the engine is running, the alternator is no longer charging the starter batteries. Determine the cause, for example:

- Loose cable connectors
- Generator dirty
- Drive belt slipping or broken

Hydraulic fluid level warning light

Occasional flashing on descents is not indicative of a fault.

Parking brake indicator

If the indicator lamp lights up, check parking brake.

BRAKING - STOPPING

The hydrostatic drive brakes the vehicle without causing wear. You reduce engine speed by easing the pressure on the accelerator pedal; engine speed lowers and the change in the hydraulic ratio causes the vehicle to slow down.

If engine speed falls below the drive away speed, the electronic drive control system returns both variable displacement pumps to the zero position and the PistenBully comes to a standstill.

A parking brake (spring-loaded brake) operated by a parking-brake lever in the driver's cab acts on the sprockets.



Use the parking brake only to keep the vehicle at a standstill. Do not stop or park the vehicle where it cannot be seen.

WARNING!

Do not actuate the direction of travel switch while the vehicle is in motion, otherwise the PistenBully will brake to a stop.



If the engine comes to a stop for whatever reason, immediately apply the parking brake.

STOPPING AFTER USE

- Lower auxiliary implements, switch off tiller.
- Set the direction-of-travel switch to the neutral position.
- Apply parking brake.
- Before switching off the engine, allow it to idle for approx. 1 – 2 minutes (prevents loss of coolant through the overflow line).

WARNING!

Risk of poisoning from exhaust gases.
Never leave the engine running unattended or running in an enclosed space.

- Before leaving the PistenBully
 - Apply the parking brake
 - Set the direction-of-travel switch to the neutral position
 - Lower auxiliary driven machinery
 - Remove the ignition key and lock the driver's cab.

CAUTION!

Be particularly careful when opening the door if the vehicle is parked on a gradient. The door opens suddenly.

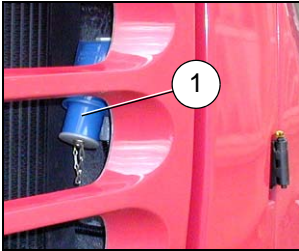
CAUTION!



Danger of slipping on the track when entering and exiting the driver's cab.

- Refuel the PistenBully immediately after operation, in order to prevent condensation forming in the tank.

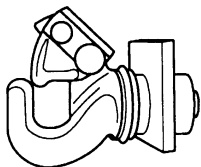




- Then remove as much snow and ice as possible from the tracks, sprockets and wheels to prevent them freezing fast, in order to avoid damage when the machine is re-started.
- Secure raised auxiliary driven implements.
- Connect coolant preheating (optional extra).

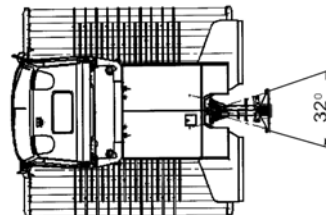


110/220 V adapter 1 provides a means of preheating the coolant system with the thermostatically controlled preheater, or of preheating the hydraulic fluid with a heater available as an optional extra.



Towing the PistenBully

- Only trained, qualified persons are permitted to operate the emergency release of the parking brake.
- Towing a PistenBully is an operation requiring extensive safety measures. Please consult your nearest Service Support Center.



Approved load for towing hitch

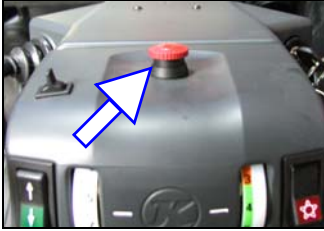
Permissible towed weight

- Max. towed weight 3000 kg.
- Max. off-centre angle for descents 16° to left or right.



The towed load must be secured to ensure that it cannot skew beyond the maximum permissible off-centre angle on descents or when inclines are crossed.





Initiate an emergency stop:

- in dangerous situations.



The vehicle comes to a stop and cannot be steered.

- Immediately engage the parking brake.
- Move the direction of travel switch to the "neutral" position.
- Switch off diesel engine.

Operating after an emergency stop

- Turn emergency stop pushbutton **2** and pull upward.



The PistenBully is again ready for operation.



Quantity is not as important as quality and economy.

LOW FUEL CONSUMPTION

- **Diesel engine rpm** green zone on rev. counter. Max. torque 2000 Nm at 1200 rpm.
- **Adjust tiller shaft speed** to suit snow conditions **by turning the potentiometer.**
- **Adjust tiller shaft speed** to suit snow conditions **by turning the potentiometer.** Set the depth so that the tiller removes only as much snow as is absolutely necessary.
- **Variably adjust the downforce of the tiller comb by means of the joystick and potentiometer. Use the lowest down-force setting** that is compatible with snow conditions.

SNOW TYPES

In the atmosphere, snow forms from water droplets at temperatures of at least -4°C .

Ice crystals in widely varying shapes form:

Hailstones are snow crystals enlarged by the adhesion of ice; they are usually spherical or tapered in shape.

Hoarfrost or rime forms from water vapor or precipitation on chilled objects (fences, bushes, surface of snow).

White frost develops when the wind carries chilled droplets of water onto solid objects.

Fresh-fallen snow initially forms an airy structure of loosely intermeshed snowflakes.

The original shapes soon disappear, however, and the individual flakes are no longer recognizable only a few days after falling.

Over and above these changes, which take place

naturally and cannot be influenced (they are caused by wind pressure, freezing and evaporation producing a loss in volume, whereas differences in the temperature of the trapped close to the ground and the external air tend to produce an increase in volume), it is important to bear the following in mind:



Always work so as to cause as little damage as possible to the snow. The aggressive action of driven implements such as a tiller damages the snow crystals; these damaged crystals have lost their ability to mesh as a loose blanket, tending instead to ball and form gritty snow (often at entrances to garages, approaches to lifts, bottlenecks).



Preparing fresh-fallen snow

Fresh-fallen/powdery snow consists of crystals that are loosely attached to each other and which therefore trap a great deal of air. The process of preparation inevitably expels some of this air and packs the crystals more tightly together. This gives the surface layer of snow the ability to bear weight.

Bumpy runs

The friction of skis over the surface causes some of the crystals to melt and form a film of water, and this produces sheets of ice and the softer spots beside them.

Over a period of time skiers break down the topmost layer – humps and hollows form and the run becomes bumpy.

Preparing slopes like this is a process in which old snow is mixed with relatively fresh-fallen snow (snow crystals) and this produces a durable surface.

If outdoor temperatures are correspondingly low the snow freezes and forms lumps - **when this happens the only way of making a ski run look well is to work with a tiller mounted on the rear of the vehicle.**

The teeth of the tiller break the lumps down into gritty snow, which fills the hollows in the surface of the run; the finisher shapes the surface and a water film forms to hold the grains of gritty snow together. Breaking down the lumpy snow also damages the ice crystals, so they lose a considerable proportion of their ability to cohere. This is the reason why only gritty snow, not powdery snow, can be produced from ice.



A durable ski slope can be formed only by mixing this material with fresh-fallen snow or with unused old snow from deeper levels.

Iced slopes/sheets of ice

Do not break up an iced slope unless the ice is of adequate thickness or fresh snow falls. The gritty snow produced by breaking up the ice needs fresh-fallen snow to cohere, or else it will cohere with water - and this will again cause ice to form. Consequently, it is advisable only to roughen the surface of the ice to make the slope skiable. Sheets of ice on slopes that are otherwise in good condition can be broken up and mixed with crystals from deeper in the snow.



The more frequently the ice is turned and the crystals damaged, the less will be their ability to cohere.

Wet snow/slushy snow

The relatively large amounts of moisture and the formation of a film of water on the finisher can produce a relatively hard surface, which inexperienced skiers in particular find difficult.

In order to counteract this effect, Kässbohrer has developed a bolt mechanism for tilting the rear-mounted tiller comb. In combination with special finishers, this machine can change the uniform surface structure and produce a "powdery-snow" effect.

Extremely slushy snow in spring

It is advisable to use the side wings, because the tiller can produce edge walls as it passes through the snow. Kässbohrer also offers an extra-wide side wing for more efficiency when used in combination with the rear frame steering– this also means that the machine can prepare on one side at a time.

If a satisfactory run cannot be prepared in **slushy snow**, it might be advisable to wait two or three hours to allow the temperatures to change. Work on preparing slopes at higher altitudes can proceed in the interim.



Allow the snow to set-up, so that crystals can form.



CLIMBING ABILITY

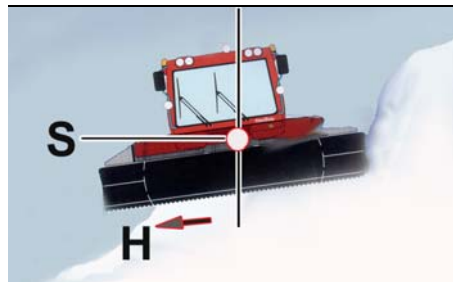
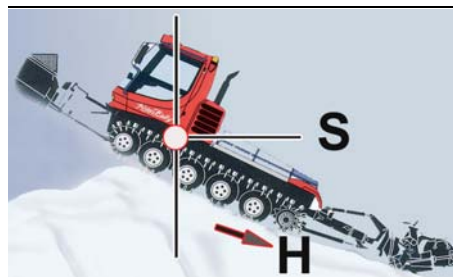
The climbing ability of the PistenBully depends on the limit of adhesion of the snow. The machine's center of gravity is another factor influencing climbing ability. It is important for the driver to ensure that as much of the surface area of the tracks as possible is in contact with the ground, as otherwise there is a risk of the vehicle toppling. The limits are heavily dependent on the way in which the vehicle is used, on load, on the prevailing conditions, and on the skill and ability of the driver.

S = Center of gravity

H = Downgrade force



Each situation must be assessed with care. Never assume that it is safe to operate in a certain area at any given time merely because a vehicle was in the area in question beforehand.



Inexperienced drivers, in particular, should familiarise themselves with the vehicle and equipment before undertaking operations in difficult terrain.

DRIVING WITH THE PISTENBULLY



The basic rule is: Do not use the vehicle until the snow is deep enough to prevent damage to the underlying vegetation.

The objective in preparing a ski-slope is to achieve visually excellent slope quality:

Build up supplies of snow in good time at critical points, so that reserves will be available to make up for the snow removed from the slope.

Holes and snow heaped up by movement and by maneuvering must be smoothed out with as little delay as possible.

If speed is excessive, the tracks will throw snow out sideways and over the auxiliary mounted implement onto the prepared surface.

Regularly remove snow from the load platform. Otherwise, the increase in weight will result in higher fuel consumption.

Always keep the engine revving in the most economical range (indicated by the green zone on the tachometer).

The drive electronics adjust speed to suit engine rpm.

Driving: on upgrades

Always study upgrades and look for the easiest route; do not start at the steepest point. Frequently, it is better to detour to the highest point of a slope via an alternative route and then work from the top down to prepare the first part of the run.

Whenever possible, negotiate slopes by following the line of fall and by keeping steering movements to a minimum.

Do not overrev the engine: use only as much power as is necessary; note the level of traction. Overrevving will cause the tracks to slip, with the result that the vehicle will dig into the snow. If the tracks start to dig in stop immediately and try a different line.



Digging in ruins the ski-slope and destroys the surface beneath the snow.



Turning

In order to avoid damaging the surface of the ski-slope, you must turn at or beyond the edge of the prepared slope. You should, of course, use areas that are free of vegetation (forestry plantations and the like) for this purpose.

- Always keep the front-mounted and rear-mounted auxiliary driven implements raised when turning.

Turning with counter-rotating tracks:

You can turn the vehicle in its own length by counter-rotating the tracks. This causes the vehicle to dig in to some extent, so you should maneuver in this way only when the snow is of adequate depth. It is advisable to employ this method of turning in exceptional situations only. Turning with counter-rotating tracks places very high strains on the rubber belts and the track cleats.

Driving: on downgrades

Always maintain a moderate speed on downgrades. This precaution will enable you to ensure that the engine does not overrev, the vehicle does not drift out of control, and the snow is not dragged downhill by the

action of the tracks. Use the speed potentiometer to reduce the speed of descent.

Restrict your steering movements to a minimum. Make sure that both tracks are turning.

Reduce speed as you crest rises, in order to ensure that you have the vehicle under control as it tips forward. This will prevent the front blade from digging in and the tracks from losing traction.

Invariably, do not negotiate a downgrade unless you are sure that:

- the adhesion of the snow is adequate.
- your run out at the bottom of the slope is adequate and safe.
- there are no skiers in the danger zone.

If the PistenBully starts slipping on a downgrade and drifts at an angle to left or right (vehicle's longitudinal axis is at an angle to the line of fall), you must immediately apply opposite lock (turning the steering wheel to the right or left, as applicable), counter-rotating the tracks if necessary, in order to bring the vehicle's longitudinal axis back onto the line of fall. Briefly increase engine speed in the process.

You can counteract slippage along the line of fall by reversing the tiller shaft's direction of rotation and carefully employing the front blade to re-stabilize the vehicle.

.....

PREPARING THE SKI-SLOPE

When preparing a slope, always make sure that the side finishers overlap onto the prepared surface, in order to ensure a smooth transition from one pass to the next.

Notes on depth of tiller:

The tiller has to be set to the correct depth in order to achieve:

- A visually attractive ski-slope.
- Retain the firmness of the slope's substructure.
- Operate within the most economical range.
- Apply least load to the PistenBully and the tiller.

Effects of incorrectly set tiller depth:

- Tiller shaft depth too high: Tiller quality output is negligible.
- Slope is not contoured in areas of hard snow.
- Tiller shaft depth too low: Insufficient snow processing, so the snow is forced out of the tiller at the side and forms an edge wall.
- The snow crystals' ability to cohere and the quality



- of the slope's substructure are impaired.
- More power input necessary – less economical.

Counter-rotating tiller shaft:

A Pisten Bully with electronic tiller control enables you to set the tiller to rotate either forward (standard direction or counter-rotation) or backward.



It can be helpful to have the tiller counter-rotate, for example as an additional brake in very steep terrain.

Errors in operation and counter measures

Summarized counter measures

Edge walls forming on left and right:

- Speed of rotation too high.
- Tiller depth set too low.
- Downforce setting selected instead of floating setting.
- Cylinder of carrier plate incorrectly adjusted.
- Tiller shafts not rotating.

Visual appearance of prepared slope not satisfactory:

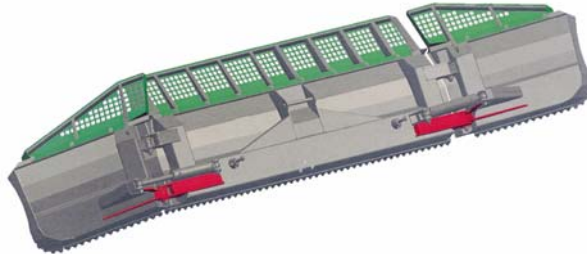
- Tiller depth set too high (adjust height setting).
- Speed of rotation too low.
- Ball handle not locked in position (floating position).
- Vehicle travelling too fast.
- No smooth surface with the front blade (tiller is on a hump).

Vehicle comes almost to a stop:

- Tiller depth too low.
- Speed of shaft rotation too high.
- Cylinder of carrier plate inadvertently out of adjustment.
- Tiller shafts are counter-rotating.
- Tiller shafts stopped – clogged, jammed, frozen.

Severe vibrations perceptible in vehicle when the tiller is switched on:

- Shaft imbalanced, tooth missing – have repairs carried out by specialists.
- Frozen with snow – Remove.
- Imbalance means vibration – screws work loose, bearings are damaged – have the imbalance rectified.



Applications:

- Use of the front blade on steep slopes covered with fresh-fallen snow
- Smoothing heavily worn ski slopes
- Smoothing bumpy ski slopes
- Making a location line

CAUTION!

Material wear due to load.
During dozing work (i.e. when pushing snow with the front blade), fully raise rear carrier plate.

During dozing work (i.e. when pushing snow with the front blade), fully raise rear carrier plate.

A front blade is essential for modern ski-slope upkeep and preparation.

It is ideal for smoothing bumpy runs and dozing snow clear. The front blade is also very useful for working uphill through fresh-fallen snow and it can be used as a brake to prevent the vehicle from slipping. Consequently, it is advisable to leave the front blade installed at all times.

Smoothing bumpy ski slopes

The best method of smoothing low bumps or waves is to use the front blade in what is known as the "floating" position. This means that the front blade applies only its own weight to the surface, without being pushed downward by the hydraulics.

The blade's angle of attack is set by means of the roll cylinder. Exercise great care when setting the roll cylinder, because if the angle of attack is too steep the front blade will tend to dig into the snow.

Approach large bumps with the blade at approximately half height and the float function switched off,

so that the blade will push the snow forward off the bump and into the hollow on the other side. In this case, too, it is best to use the roll cylinder to adjust the depth of cut, instead of raising and lowering the front blade. This is the most dependable way of smoothing out the slope.



The ideal configuration is to have a leader snow roller mounted in front of the blade, as this will enable the equipment to adjust automatically to compensate for surface irregularities.

Making a location line

The best way of doing this is to approach the downslope at an angle from above and, with the pusher blade swivelled to one side, doze a flat location line in the snow.

It is advisable to start with no more than a small amount of snow, picking up more and more snow as you proceed along the line. This should enable you to complete the full length in a single run.

The snow you push out on the downhill side inevitably widens your location line, increasing the margin of safety.

Use of the pusher blade on steep slopes covered with fresh-fallen snow

When you prepare fresh-fallen snow you need the front blade not only to push the snow, but also to distribute the weight and apply pressure to the surface of the snow. You can use the front blade to help the vehicle climb steep slopes by stopping just before the Pisten Bully digs in, and reversing with the front blade lowered. This will smooth out the step. Raise the front blade and drive forward a few meters before repeating the procedure; this is one way of climbing difficult slopes.

Smoothing heavily worn ski slopes

One consequence of modern skiing techniques is that the skiers carry the snow progressively further down the slope, finally depositing it toward the bottom of the slope. The objective, therefore, is to restore the snow to as uniform a depth as possible over the entire length of the slope. This entails pushing the snow back up the slope from the bottom. If necessary, winch the Pisten Bully into position.



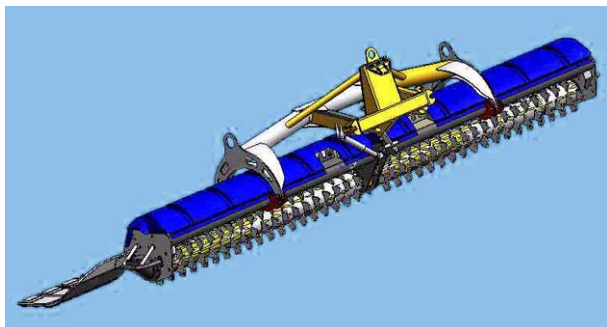
Pivot the front blade to an angle at which the snow can slide along it toward the inside. If you are using a 12-way front blade you can set the wings to an angle that best suits this method of handling the snow. The front blade can be adjusted in a number of ways to the position that best suits the terrain. The end result is efficient transportation of the snow to the parts of the slope where it is needed.

Less experienced drivers in particular should bear in mind that transporting large amounts of snow quickly is not always the way to achieve the best results. The driver has to assess the terrain and decide whether it would be advisable to push snow downhill, or whether this might result in even more snow being lost.

The correct position of the compactor bar also depends on the conditions of the snow.

A well-prepared slope is free of heaps of snow, does not have walls along the edges, and is contoured so as to be attractive to the eye.

MULTIFLEX ROTARY PLOUGH



Evolved from the tried-and-tested model PT2000 tiller, the Multiflex is an even more versatile and practical snow handler.

It can tilt to angles up to 20°, so it adapts to the natural contours of the terrain.

The two-part tiller features separate three-point mounts that enable each section to follow the contours, so the finished pass resembles a naturally formed slope.

The two tiller shafts are driven by a hydraulic motor and are coupled by a synchronizing universal shaft, in order to ensure that both shafts operate at the same speed and the same torque.

The specially designed tiller shafts and finishers ensure optimum snow distribution, with the result that the finished run has attractive, end-to-end contouring irrespective of the operating conditions.

Setting the Multiflex tiller to the rigid position

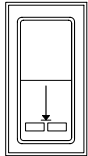
If you want to produce a flat (not following the contours of the terrain), you can set the Multiflex to the rigid position.

Hydraulic actuation for "set to rigid"

(optional equipment):

- Set down the Multiflex tiller on a firm, level surface.
- Press the **Tiller - set to rigid** button (optional equipment) until the hydraulic cylinder is fully extended.





Rocker switch- Tiller- set to rigid

Top section pressed = **Set to rigid "OFF"**

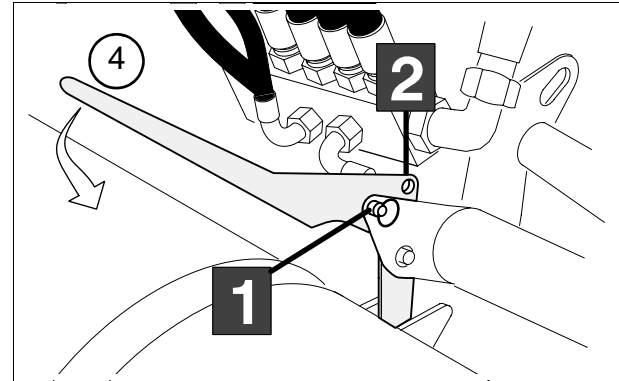
Bottom section pressed = **Set to rigid "ON"**

labelling Cancellling "set to rigid" (unlock)

- Set down the Multiflex tiller on a firm, level surface.
- Press the **Tiller - set to rigid** button until the hydraulic cylinder is fully retracted.

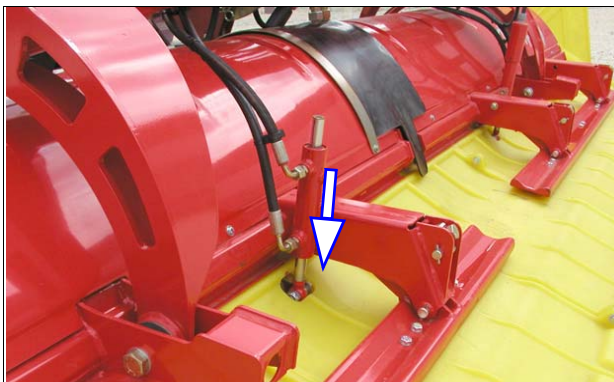
Manual actuation for "set to rigid" (standard):

- Set adjuster lever **4** to position **1**
- Insert the keeper to secure.



Cancellling the "set to rigid" function:

- Set adjuster lever **4** to position **2**
- Insert the keeper to secure.



Snow-flap Adjuster - Tiller

The snow-flap adjuster enables you to vary the snow path through the tiller by means of pushbutton controls.

Snow-flap **retract**

With the snow flap set to this position when the vehicle is used on an ice-covered slope, for example, chunks of ice will be forced to pass the tiller shaft several times and this will help ensure optimum processing.

PUSHBUTTON



Top section pressed = Extend snow flap
Bottom section pressed = Retract snow flap

Situational help

Snow flaps extended to different settings.
Remedy: Press and hold down the button for 1 - 2 minutes. The cylinders are equalised.

- When **ascending**, always set the tiller shaft to forward operation and use a suitable working speed until the ski slope has been prepared to specification.

An attempt to operate the tiller shaft at too high a speed will divert too much output power from the engine, with the result that the engine will not be able to develop enough power to propel the PistenBully.

- When **descending** extremely steep gradients, the tiller shaft can be set to counter-rotate so as to help stabilize the PistenBully.



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