

OPERATING MANUAL



PistenBully
Canyon

WKU 3 854 VW 4 L 010050

WKU 3 854 VW 4 L



EN



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.

INTRODUCTION

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DOCUMENTATION

- Log book
- Maintenance work folder

YOUR OPINION IS IMPORTANT TO US.

To ensure that your operating
manual is perfect.

Sender:

.....

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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!



This operating manual provides information about:

- how to handle, maintain and care for your Pisten-Bully.
- 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 oddments tray 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

pos. . . . = Position

Canyon 1050.en

SYMBOLS USED



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



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.

TECHNICAL CUSTOMER SERVICE (TKD) AND SPARE PARTS DEPARTMENT

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 emergency service 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: Phone +49 171/3732230

Contact at my national office:

Technical customer service	Name:	Telephone number:
Spare parts department	Name:	Telephone number:
Repair mechanic	Name:	Telephone number:

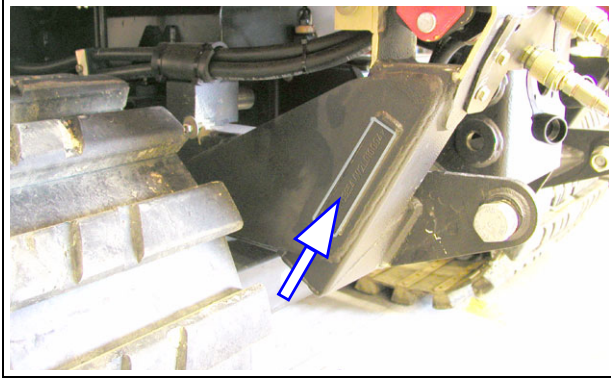


Always quote the vehicle number when making enquiries and ordering spare parts.

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.



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 center**. 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

Overview

Technical data

Safety

Use

Checks

Operation

11

Dimensions:

Width:		Height:	
with 820 mm tracks	2,500 mm	Height (cab tilted)	2390 / 2480 mm
with 710 mm tracks	2,390 mm	Load platform L x W	1130 x 1500 mm
with 800 mm tracks	2,480 mm	Length:	
Ground clearance	320 mm	Length	3,525 mm
Weight:		Engine:	
Dead weight with tracks	2,500 kg	Industrial engine, VW 1.9 I TDI, AVM	4 cylinders
Permissible gross weight with auxiliary driven machinery . .	3,700 kg	Displacement	1,900 cc
Payload of load area without auxiliary driven machinery. .	500 kg	Power in ECE	75 KW / 102 PS
Spec. ground pressure with aluminum tracks	0.0458 kg/cm ²	Max. torque in Nm at engine rpm	255/1900
Brake:		Tank capacity	110 liters
Wear-free (hydrostatic) service brake	2 multi-disk brakes	Continuously variable speed.	0 - 25 km/h

FRONT ATTACHMENT WEIGHT

WARNING!

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).

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.



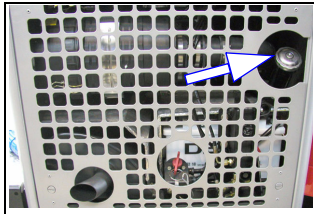
Attaching excessively heavy machinery or machinery with an excessively high moment voids the vehicle manufacturer's warranty and excludes liability on the part of the vehicle manufacturer.

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

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



- Use diesel fuel to DIN EN 590.
- If the engine is run on diesel fuels with a sulfur 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 sulfur 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 information from the fuel supplier.

CHANGING COOLANT

Water quality:

Free of contaminants (grease, dirt, lime...) as otherwise: the results will be diminished thermal conductivity and the formation of deposits that will clog the channels in the cooling system.

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

after 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.



Group	Designation	Grade	Capacity	Interval between changes
01	Industrial engine - AVM 1.9 l TDI diesel engine	VW 50500	4.5 liters	at least: every year every 300 hours
02	Fuel tank	Min. cetane index 51 to EN 590 or biodiesel	110 liters	at least: every year drain condensate.
	Fuel filter			every 300 hours
03	Air filter			at least: every year every 300 hours
04	Cooling / heating system	50% water + 50% antifreeze agent APN-S	9.5 liters	All year round
06	Planetary gearbox Wheel drive	Poly Alpha Oleofin (PAO) - CLP HC VG 150 / VG 220 VG 220 (for summer operation) - API-GL4 SAE 75W 90	0.6 liters	at least: every year every 600 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	26 liters	at least: every year every 900 hours
	Hydraulic oil filter			at 100 hours every 900 hours

FLUIDS AND LUBRICANTS

Group	Designation	Grade	Capacity	Interval between changes
18	Hydrostatic vehicle drive see section on greases	OKS 250		
	Wheel hubs	Calcium saponified grease KP2K-20, DIN 51502 e.g. Aviacal 2 LD		at least: annually every 900 hours
	Other lubrication points see section on greases	Calcium saponified grease KP2K-20, DIN 51502 e.g. Aviacal 2 LD		every 100 hours
24	Electrical system Battery terminals	Bosch FT 40V1 grease		



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 Canyon may be used for the following purposes only:

- travelling in difficult terrain.
- removing snow from paths and tracks in the countryside (not on public roads).
- 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 trained to drive snow groomers.
- You may approve 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 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.
- 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 nobody 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 area and people may unintentionally enter the danger zone. Depending on the circumstances of each case, these measures may take the form of warning signs, closed runs or off-limit markers.

DRIVING THE VEHICLE

- Do not 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 only start and/or move the snow groomer 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.
- Do not drive the PistenBully with open doors.
- Loads must be correctly secured.
- Snow groomers must be used and operated in a manner which ensures their stability.
- Drivers may only drive the snow groomer at a speed which they can continually control. 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 ac-



- count 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 only drive on such steep slopes once certain that they can do so without putting themselves and others at risk.
 - 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.
 - When driving a tracked vehicle, the traction 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 at an angle.
- Do not park the vehicle where it cannot be seen..

OPERATION UNDER UNUSUAL CONDITIONS

- 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. We would therefore advise against this.

SNOWDRIFTS



DANGER OF AVALANCHES DANGER OF FALLING STONES



- 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 search-lights must also be used.



DRIVING WITH PASSENGERS

- Only 1 co-driver may sit in the driver's cab.
- While the vehicle is on the move the co-driver must remain seated at all times, with the seat belt correctly fastened.
- When persons travel in the PB people carrier cabin, they must sit on 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 machinery
- an attachment

MAINTENANCE

- Snow groomers must be maintained by trained staff specifically appointed by the operator.
- Do not perform maintenance work under movable 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 PistenBully 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.
- The supervisor must perform random checks in or-

der 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 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 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 stowed behind the driver's seat.



Note expiration date.
Replace used fire extinguishers immediately.

WARNING SIGNS

Strict compliance with the warning signs on the PistenBully and on auxiliary driven machinery 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:
Warning!
No-one is permitted on the load area while the vehicle is in motion.

WARNING SIGN:

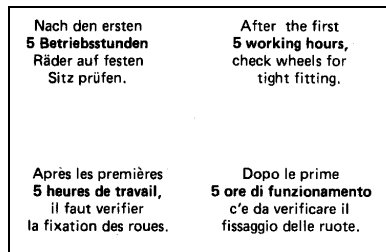


Location: **Driver's cab/parking brake.**
KGG no. 8.765.311.058E

Text:
Caution!
Apply the parking brake before leaving the driver's seat.



WARNING SIGN:



Location: **Windscreen.**
KGG no. 8.762.430.057E

Text:
Warning!
Check torque of wheel nuts after the first 5 operating hours.

WARNING SIGN:



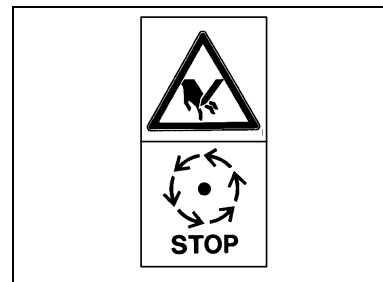
Location: **Fan/engine**
KGG no. 8.762.634.054E

Text:
Caution!
The fan ring rotates when the diesel engine is running.



Protect the fan against damage.

WARNING SIGN:

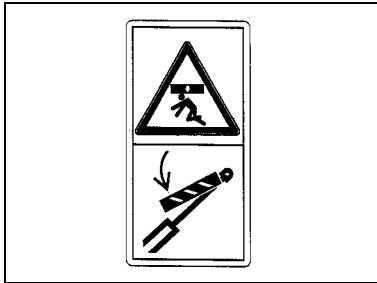


Location: **Tiller**
KGG no. 8.762.638.058E

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

SAFETY INSTRUCTIONS

WARNING SIGN:



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

Text:
Warning!
Keep clear of the danger zone unless the lock of the lifting cylinder is engaged!

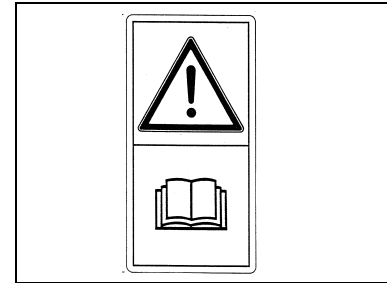
WARNING SIGN



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

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

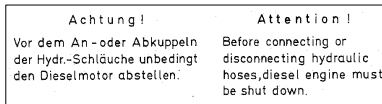
SIGN



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.

WARNING SIGN:



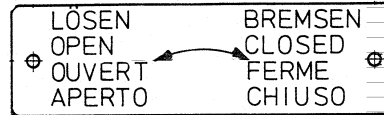
Location: **Tiller**
KGG no. 8.762.271.053C

Text:

Caution!

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

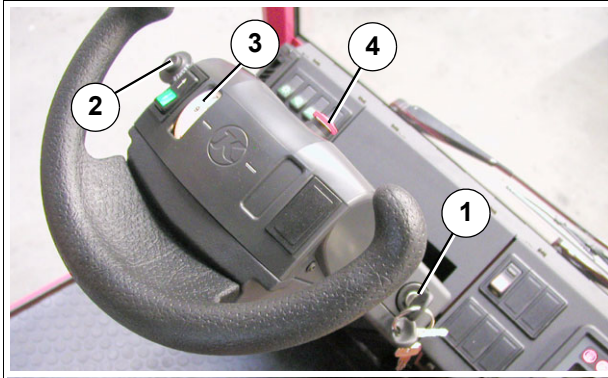
SIGN:



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

Text:

**Release parking brake.
Apply parking brake.**



1 Ignition key switch

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

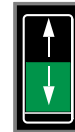
2 Combination switch

3 Knurled wheel

Reducing driving speed

4 Emergency stop see the section entitled Operation

Position switch



SELECTOR SWITCH FOR DIRECTION OF TRAVEL

Top section pressed = forwards

Middle = neutral

Bottom section pressed = reversing with reversing alarm

Rocker switch (*optional extra*)



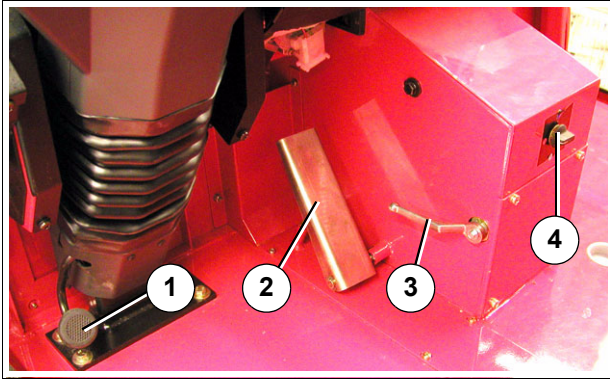
DRIVE FOR FRONT-MOUNTED AUXILIARY DRIVEN MACHINERY

Top section pressed = OFF

Disengage latch.

Bottom section pressed = ON

Telltale light ON.



3 Parking brake

4 Cab heater

ROCKER SWITCH



Acoustic warning

Top section pressed = Acoustic warning for forward movement OFF

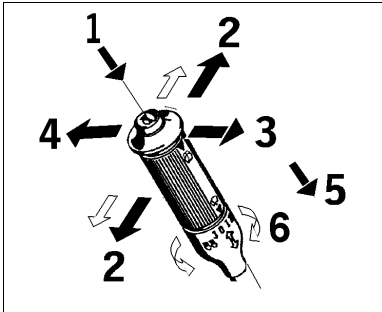
Bottom section pressed = Acoustic warning for forward movement ON

1 Locking device

For adjustment of steering column

2 Accelerator pedal





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

Pull stalk toward driver

4 High-beam / low-beam headlights

High beam– Push stalk away from driver until it locks in position.

Low beam– Push stalk toward driver until it locks in position.

5 Windscreen wash water

Push ring button on stalk down.

6 Wipers

Turn control stalk sleeve:

Position I = normal

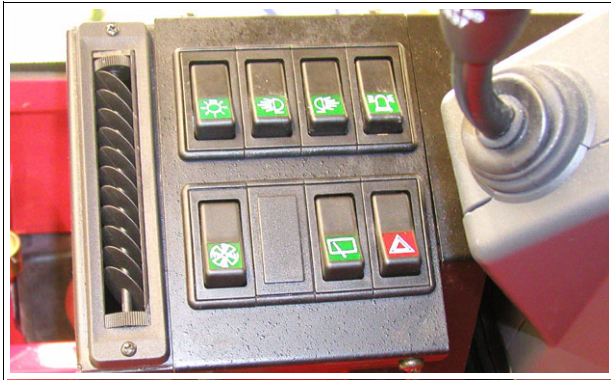
Position 0 = off

Position INT = intermittent wipe

Programming new intermittent-wipe time

- Start the diesel engine.
- Move the control to the INT position (intermittent wipe).
- Move the control to the 0 position.
- Wait for intermittent wipe time required and move the control back to the INT position.

The time you waited before moving the control from 0 back to INT is the programmed intermittent wipe time.



WARNING!

The acoustic warning (buzzer) sounds to indicate that an operating parameter has reached its minimum or maximum permissible value: Stop the vehicle – Apply the parking brake – Ascertain the cause.

Do not move the vehicle!

ROCKER SWITCH, 2-STAGE



Driving lights

Top section pressed = OFF

Centered = parking light ON

Bottom section pressed = low-beam headlights ON

ROCKER SWITCH



Front spotlights

Top section pressed = OFF

Bottom section pressed = low-beam headlights ON

ROCKER SWITCH



Rear spotlight

Top section pressed = OFF

Bottom section pressed = ON



ROCKER SWITCH



Rotating beacon

Top section pressed = OFF
Bottom section pressed = ON

ROCKER SWITCH *(optional extra)*



Outside-mirror heating

Top section pressed = OFF
Bottom section pressed = ON

ROCKER SWITCH, 2-STAGE



Driver's cab blower

Top section pressed = OFF
Bottom section pressed
1st stage: low speed
2nd stage: high speed

- Open the hot-air and recirculating-air outlets.

ROCKER SWITCH



Hazard warning flashers

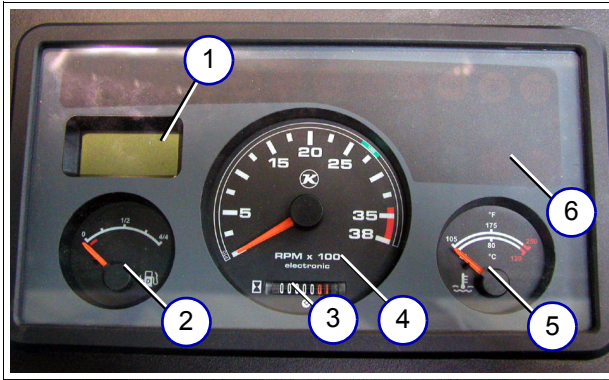
Top section pressed = OFF
Bottom section pressed = ON

ROCKER SWITCH










Windscreen wiper, rear

Top section pressed = OFF
Bottom section pressed = ON



- 1 Speedometer
- 2 Fuel gauge for diesel engine
- 3 Operating-hours counter
- 4 Tachometer
- 5 Coolant-temperature gauge for diesel engine
- 6 Warning lights and telltale lights

Warning light or telltale light ON:

-  Parking brake applied
-  Battery-charge telltale
-  Oil pressure of diesel engine below minimum
-  Coolant temperature too high
-  Diesel engine preheating & engine fault
-  Hydraulic fluid at minimum level
-  Temperature of hydraulic fluid too high
-  Problem with drive electronics
-  Not used





Drive for auxiliary driven machinery ON



Not used



Full-beam headlights ON



Parking lights ON



Turn indicators right/left



Turn indicators for trailer



Front spotlights





Information light for drive electronics

Indicator for fault message, drive electronics

Lit	Flashing	Operation
		<p>Do not move the vehicle! Remedy: Check neutral conditions: - Do not move the steering wheel. - Do not depress the accelerator pedal. - Direction of travel switch in neutral position.</p>
		<p>Driving is conditionally possible. Reduced driving speed.</p>
		<p>Number of flashes of information light for drive electronics is the fault code (see table). Driving is conditionally possible. Reduced driving speed.</p>

Indicator for fault message, drive electronics

Lit	Flashing	Operation
		<p>Do not move the vehicle! Remedy: Check neutral conditions: - Do not move the steering wheel. - Do not depress the accelerator pedal. - Direction of travel switch in neutral position.</p>

Flashing fault code, information light for drive electronics

Flashing	Fault
1 x	Speed sensor, diesel
2 x	Fault in steering potentiometer
3 x	Fault in drive potentiometer
4 x	Fault in inch potentiometer
5 x	Fault in direction-of-travel switch
6 x	Current fault, pump for forward motion. Current too weak, limp-home mode possible. Driving in reverse is possible.
7 x	Current fault, pump for reverse motion. Current too weak, limp-home mode possible. Driving forward is possible.
8 x	Current fault, release valve
9 x	Fault in 5 V supply
10 x	Current fault, left pump Current too high, limp-home mode not possible
11 x	Current fault, right pump Current too high, limp-home mode not possible

Flashing without interruption

Fault in safety controller





1 = 12 V socket

Rocker switch



PUSHER BLADE, FLOATING POSITION

Top section pressed = floating position OFF

Disengage and
Bottom section pressed = floating position ON

PUSHBUTTON *(optional equipment)*



Constant speed of front-mounted auxiliary driven machinery

Pressed once = constant engine speed activated

Pressed once again =
constant engine speed deactivated

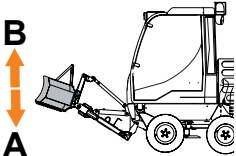

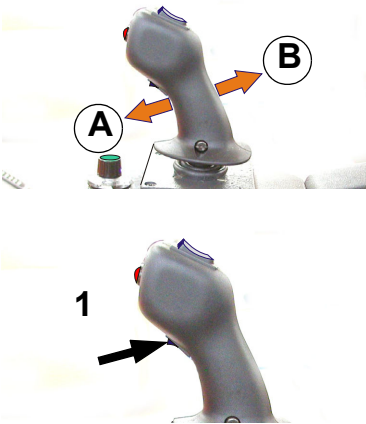
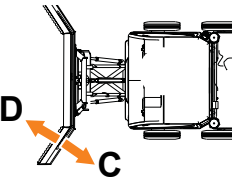
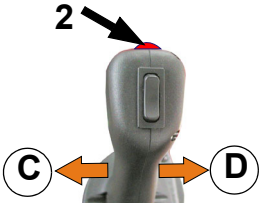
ROCKER SWITCH *(optional extra)*



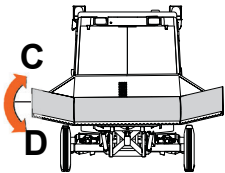

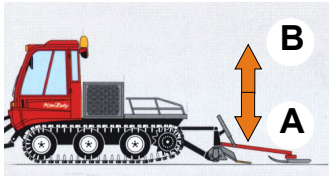
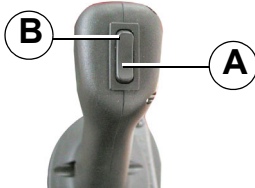

Heating for people-carrier cabin

Top section pressed = OFF

Disengage and
Bottom section pressed = ON

Operation	Command	Activity
<p>Raise - lower pusher blade</p> 	<p>A - Lower + Pushbutton pressed floating position </p> <p>B - Raise</p> <p>Interrupt floating position = press button 1</p>	
<p>Pusher blade, pivot</p> 	<p>○ Press and hold down button 2</p> <p>C - Pivot to left</p> <p>D - Pivot to right</p>	



Operation	Command	Activity
<p>Pusher blade, tilt</p> 	<p>C - Tilt to left</p> <p>D - Tilt to right</p>	
<p>Raise lower tiller / tracker plates</p>  <p>Press tiller / tracker plates into snow</p>	<p>Rocker switch / pushbutton</p> <p>B - press and hold down top section</p> <p>A - bottom section pressed</p> <p>Adjustable by means of potentiometer 2</p>	 

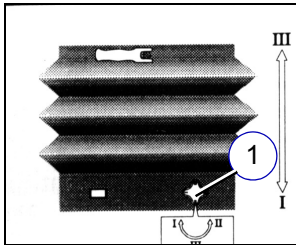
DRIVER'S SEAT

⚠ CAUTION!

Risk of accident:

Do not attempt to adjust the driver's seat while the vehicle is on the move.

Height adjustment



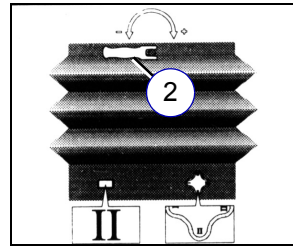
Height can be adjusted in three stages.

- Sit down on the driver's seat.
- Turn height-adjuster knob **1** until the seat is at the most convenient height for you.



Always adjust the weight setting after adjusting the height of the seat.

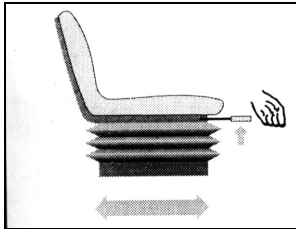
Weight setting



- Sit down on the driver's seat.
- Adjust the weight-adjuster lever **2** until the position shown on the height adjuster at the bottom appears in the window.



Fore-and-aft adjustment



- Move the locking lever (arrow) to release the seat for fore-and-aft adjustment.
- Make sure that the locking lever is re-engaged once you have adjusted the seat to the most convenient position. Make sure that the seat cannot move.

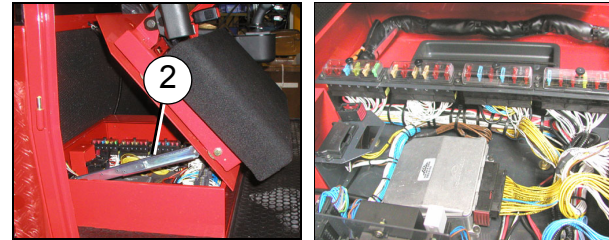
FUSES

The fuses are beneath the co-driver's seat.

⚠ CAUTION!



Risk of crushing:
Make sure that the latch of support 2 is correctly engaged.



- F1** (10 A) High-beam headlights
- F2** (10 A) Low-beam headlights
- F3** (20 A) Overhead spotlights
- F4** (10 A) Parking light, left, tail light, left
- F5** (10 A) Parking light, right, tail light, right, instrument lights
- F6** (15 A) Rear spotlight, rear windscreen wiper
- F7** (10 A) Horn, flashing indicators, hand-held light
- F8** (10 A) Multifunction display, buzzer, speedometer
- F9** (15 A) Heater blower for cab
- F10**(10 A) Electronic propulsion controller
- F11**(15 A) Working hydraulics
- F12**(10 A) Radio
- F13**(10 A) Front wiper, horn

- F14**(10 A) Immobilizer, diagnosis connector
- F15**(5 A) Engine control unit, terminal 15
- F16**(5 A) Engine electronics
- F17**(10 A) Boost-pressure control, EGR, air-flow sensor, injection valve, switchover valve for intake-pipe flap
- F18**(5 A) Engine electronics
- F19**(30A) Fuel-quantity positioner, engine control unit
- F20**(5 A) Immobilizer, diagnosis connector
- F21**(20 A) Rotating beacon, interior light
- F22**(15 A) Radio, socket, hazard warning lights
- F23**(10 A) Mirror heating
- F24**(20 A) People-carrier cabin
- F25**(50 A) Glow plug relay, ignition lock, light
- F24**(50 A) Engine power supply

Replacing fuses:

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

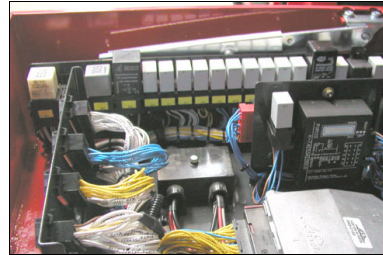
WARNING!



**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.**

MINIATURE RELAY (K)

- K1** Glow-plug relay for EDC
- K2** Voltage, engine running
- K3** Engine electronics (main relay for EDC)
- K4** Wipe-wash interval relay
- K5** Reversing light
- K6** Oil-pressure relay
- K7** Door / brake warning system
- K8** Fault light, drive electronics
- K9-14** Working hydraulics
- K15** Turn indicators



- K16** Voltage supply, drive electronics
- K17** Lights
- K18** Information light for drive electronics
- K19** Working hydraulics (three pinthitch)



Miniature relays are not interchangeable.



Battery

The 1 x 12 V 92 Ah/450 A battery is mounted on the upper frame.

- The battery must be secured by means of the retainer.

WARNING!



**Risk of explosion of oxyhydrogen gas:
Keep all sources of ignition well away from the battery.**

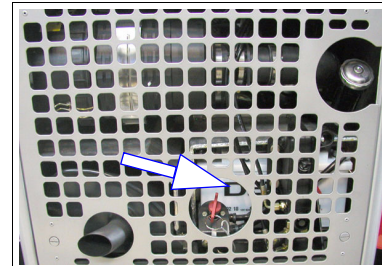
Topping up battery fluid

WARNING!



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

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



Charging the battery:

- The battery is isolated from the vehicle electrical system.

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.

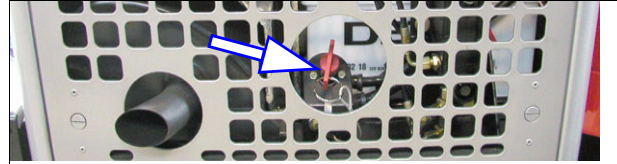
Do not connect the jump leads to the connector between the two batteries.

Connecting jump leads:

- From + pole of discharged battery to + pole of donor battery (12 V).
- From – pole of discharged battery to – pole of donor battery (12 V).

Operate the battery master switch:

- if there is a fault in the electronics/electrical system.?
- to help prevent the battery from discharging during prolonged storage.



CAUTION!

Voltage peaks:

When the engine is running, do not operate the battery master switch except in an emergency.

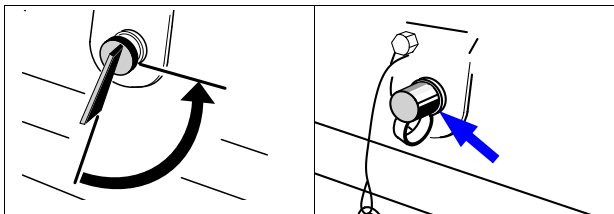
CAUTION!

The engine electronics will lose data.

Remedy:

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



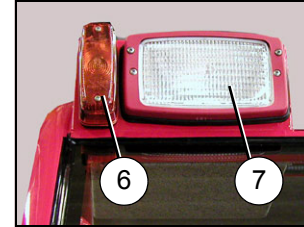
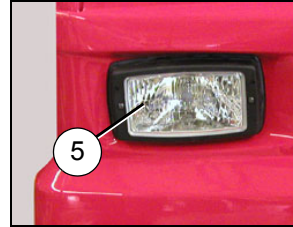
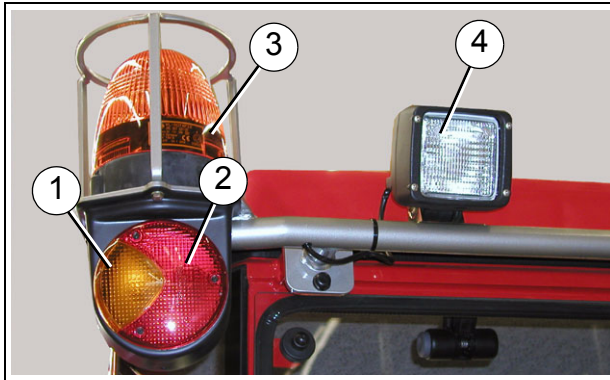


Operating the battery master switch:

- Turn the toggle lever and remove it.
- Fit the protective cap.

The battery is isolated from the on-board electrical system.

ELECTRICAL SYSTEM: LIGHTS



5 Low-beam / high-beam headlights

6 Flashing turn signal lights

7 Spotlights

Lights:



Never touch the glass of a halogen bulb.

1 Flashing turn signal lights

2 Rear light

3 Rotating beacon

4 Rear spotlight

XENON SPOTLIGHTS

(optional extra)

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 flicker-
ing of the gas-discharge light can result in dam-
age 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.**

Canyon 1050.en

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

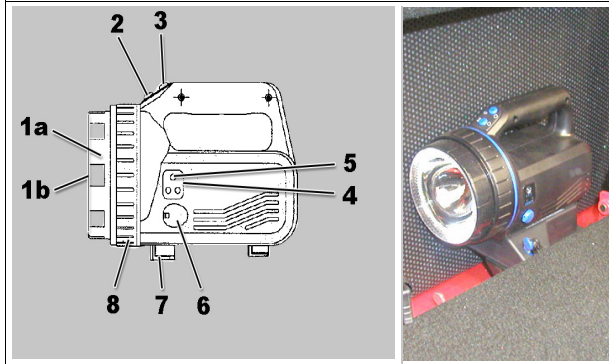
Safety instructions for changing xenon bulbs:

- Before changing a bulb, always switch off the head-
lights 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 cause damage.
- Allow the bulb to cool down before you commence
work.
- Wear protective goggles and protective gloves
when changing bulbs.
- The glass body of a xenon bulb is pressurized (dan-
ger of flying splinters of glass if the bulb shatters).
- Always hold the bulb by the base.
- Operate xenon bulbs in closed headlights only.



Dispose of the spent xenon bulb as hazardous waste.

Canyon 1050.en



Hand-held light: *(optional equipment)*

- The bracket and the charging station for the hand-held light are beneath the co-driver's seat.
- Always remember to reconnect the hand-held light to the charging station after use.



The lead-gel battery in the hand-held light can be recharged approximately 300 - 400 times. Always replace with a battery of the same type.



Spent batteries (rechargeable and non-rechargeable) must be disposed of in accordance with the applicable environmental-protection laws for the disposal of problem waste.

1a Focus adjustment

For focusing the light beam

1b 100 mm lens

2 ON/OFF switch

3 Dimmer

4 Charge indicator light

Red LED: charging in progress
Green LED: battery fully charged

5 Safety valve

6 Charge connection, 12V adapter

7 Charge contacts wall bracket / charging station

8 Threaded ring for 10W halogen bulb



TILTING THE DRIVER'S CAB / LOAD PLATFORM

Precondition:

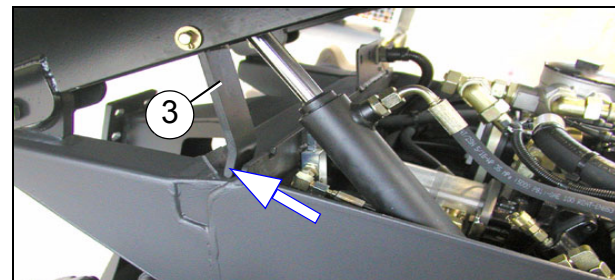
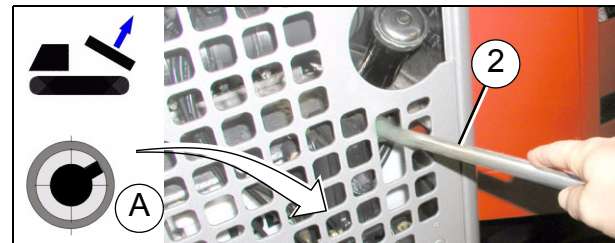
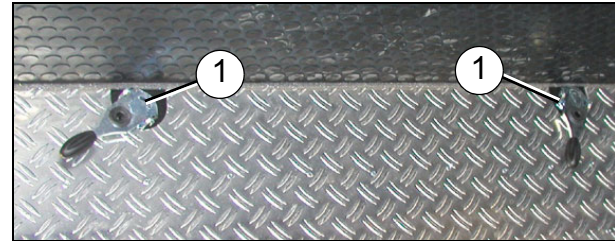
- Park the vehicle safely and securely on a firm, level surface.
- Switch off the diesel engine.
- Apply the parking brake.
- Remove loose items from the cab / platform.
- Close the doors.



Tilt the driver's cab for maintenance work only.

Tilting the load platform with people-carrier cab

- Remove tie down screws **1** on the load platform.
- Turn adjuster valve to position **A** (with tube **2** see *Onboard toolkit*).
- Fit tube **2** and operate the manual pump.
- Secure the load platform in the raised position by means of support **3** (*version 1*).



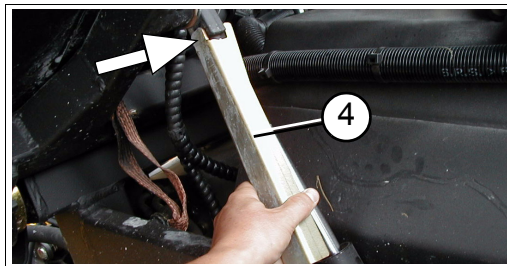
TILTING THE DRIVER'S CAB / LOAD PLATFORM

Securing load platform with people-carrier cabin to prevent it from lowering (*version 2*)

- Fit support **4** (in the onboard toolkit) onto the piston rod.



Install support **4** as shown in the illustration, as otherwise the support or the wiper will damage the cylinder.



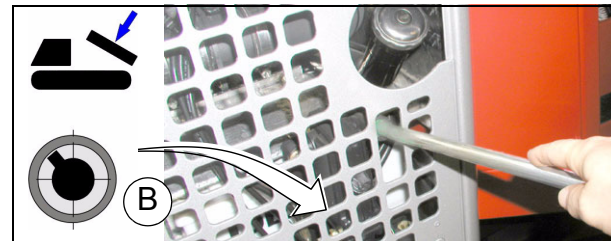
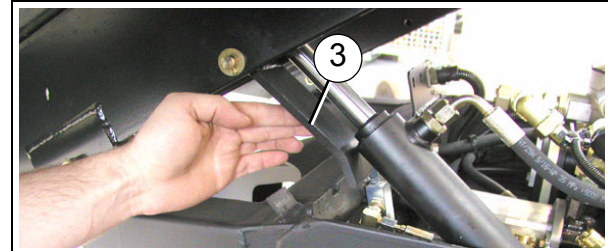
Lowering load platform:

CAUTION!



Risk of crushing:
Lower driver's cab / load platform.
Keep well clear.

- Slightly raise support **3**.
Or *version 2*: remove support.
- Move adjuster valve to position **B**.
- Fit tube on manual pump and operate the pump.
- Secure the tie down screws on the load platform.



INSTALLING AUXILIARY DRIVEN MACHINERY

- Clear all ice and snow off the adapter plate of the auxiliary driven machinery.

WARNING!

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

WARNING!



**Risk of crushing:
When connecting auxiliary driven machinery.**

Mounting the pusher blade on the adapter frame:

- Lower the carrier plate.
- Drive the PistenBully up to the equipment.
- Apply parking brake.

- Slowly raise the carrier plate.
- Raise the carrier plate just far enough to seat the equipment against the adapter frame.
- Secure the pusher frame with connector to the adapter frame.
- Secure the hydraulic frame with stud to the adapter frame.



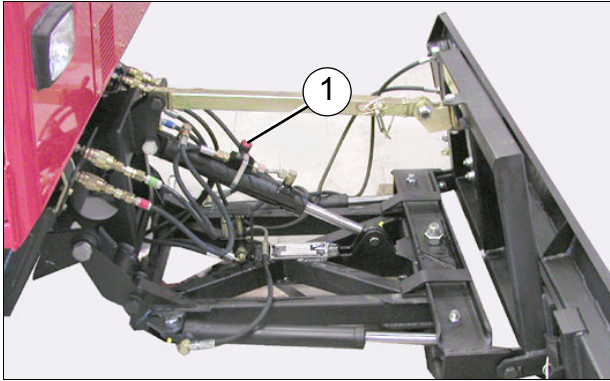
When connecting the hydraulic hoses, always make sure that both parts of the couplings are perfectly clean.

- Connect the leak-off oil hose first.
- Connect the hydraulic hoses.



When connecting the hoses, always make sure that the couplings are correctly color-matched.

- Use suitable tools to tighten the hydraulic couplings.



- Use adjusting screw **1** to set cylinder speed.

Installing a 3-point adapter frame:

- Drive the PistenBully up to the equipment.
- Slowly raise the carrier plate.

Check that the adapter pin is engaged in the coupling.

- Switch off the diesel engine and apply the parking brake.
- Insert the keepers to secure the pins.

- Use the spindle to set the driven machinery to the correct working angle.
- Actuate the appropriate function to depressurize the hydraulic hoses.



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

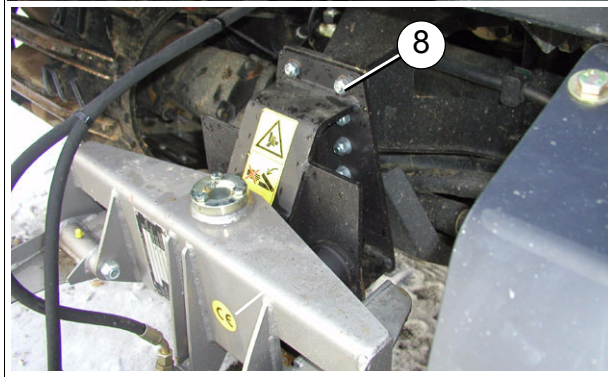
- Connect the leak-off oil hose first.
- Connect the hydraulic hoses.



When connecting the hoses, always make sure that the couplings are correctly color-matched.

Use suitable tools to tighten the hydraulic couplings.





Attaching towed equipment:

- Drive the PistenBully up to the equipment.
- Raise the equipment to bring the adapter plate into position.
- Apply parking brake.
- Switching off engine.
- Install threaded fasteners to secure adapter plate 8.

- Actuate the appropriate function to depressurize the hydraulic hoses.



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.

REMOVING THE AUXILIARY DRIVEN MACHINERY

- Lower the driven machinery onto firm, smooth ground.
- Removal is the reverse of the installation procedure.

SAFETY INSTRUCTIONS

WARNING!



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

- Always perform the specified checks before starting off.
- Perform checks with the engine off and when parked on a level surface



Make sure that the oil and coolant levels are always to specification (check at oil dipstick, overflow plug, etc.).

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.



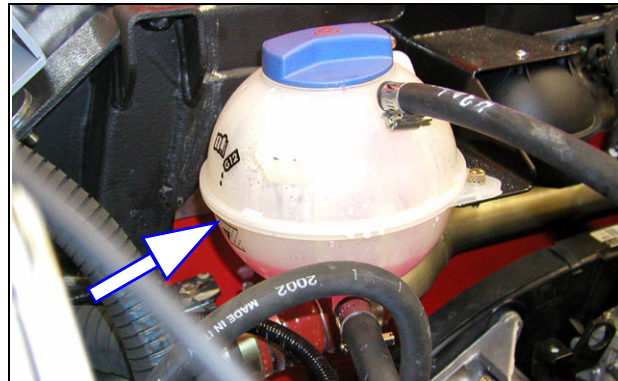
Do not spill fluids or lubricants (they are hazardous to soil and water). Always dispose of these substances in an environmentally compatible manner (comply with national laws).

COOLANT LEVEL



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

- Check coolant level in the expansion tank. The water level must be between the min. and max. marks.
- Check the antifreeze of the coolant, (refer to fluids and lubricants specification).
- Check that the hoses in the cooling and heating systems are not leaking.
- Top up coolant:
Remove cover (see Onboard toolkit).



OIL LEVEL IN DIESEL ENGINE

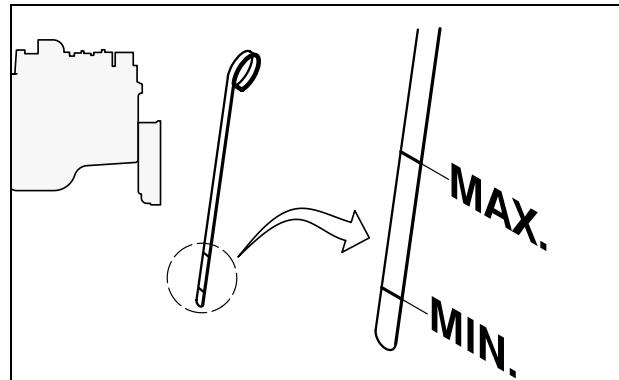
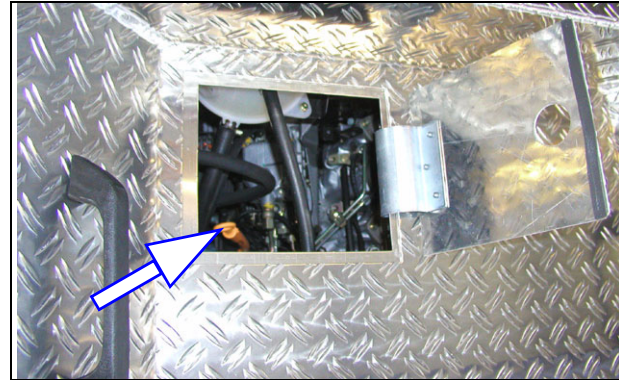


Use the dipstick to check the engine oil level.

- The oil level must be between the min. and max. marks on the oil dipstick.
- Top up oil:
Remove cover (see Onboard toolkit).
- Top up oil when engine is not running and the PistenBully is parked on level ground.



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



HYDRAULIC FLUID LEVEL

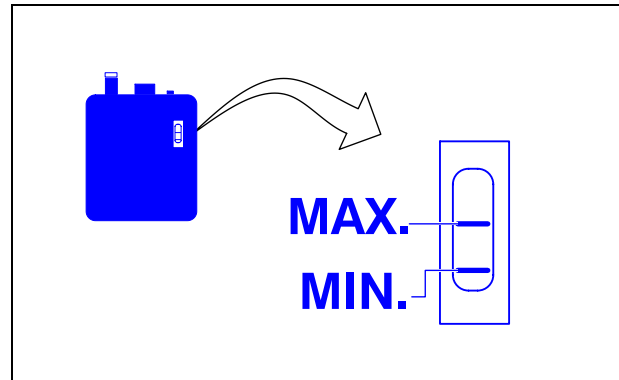
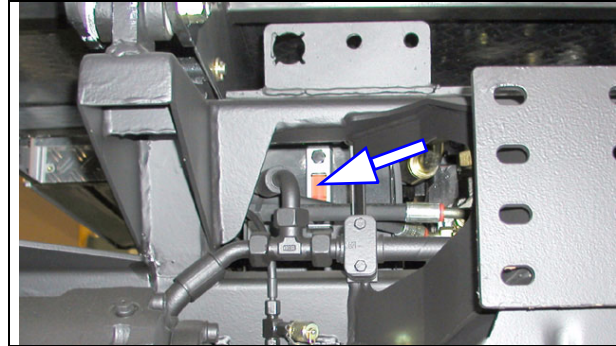


Check the hydraulic-fluid level and top up only when warm.

- Check the fluid level in the sight glass for the hydraulic fluid reservoir.
- Top up oil:
Remove cover (see Onboard toolkit).



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



ELECTRICAL SYSTEM

- Check the lights, flashing indicators and rotating beacon.
- Replace defective bulbs and fuses.
- Check the wipers, horn and back up alarm

VISUAL INSPECTION

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

DIESEL ENGINE

- Check the drive belts on the engine; make sure that belt tension is correct and that the belts are free of damage (see the manual supplied by the engine manufacturer).

DRIVE WHEELS

- Check the wheel fasteners and check tire pressures

Type	Tensioning axle	Tire pressure		
		Tensioning axle	Drive axle	
PistenBully Canyon	140 Nm	-----	140 Nm	6.5 bar



TRACK TENSION

Checking track tension:



Make sure that the PistenBully is unloaded.

- Park the PistenBully on level, snow-covered ground.
- Lower the auxiliary driven machinery, if fitted.
- Equalize 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.

- Check the condition of the track links, connectors, guides and lands, replace damaged components.



Tensioning tracks:

- A spindle winch is used to tension the tracks. The necessary tools are included in the onboard toolkit.

TEST RUN

- 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.

STARTING THE ENGINE:

See the operating manual for the AVM industrial engine.

WARNING!

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

- Set all rocker switches to OFF and do not press the accelerator pedal.
- Apply parking brake.
- Direction of travel switch in neutral position.
- Switch off electrical consumers.
- Center the steering wheel.
- Turn the ignition key to position I.

The following telltale lamps light up:

- ◆ Battery-charge telltale
- ◆ Engine oil pressure indicator
- ◆ Parking brake indicator
- ◆ Drive electronics fault light flashes after safety check.

- Turn the ignition key to the II position.
- Do not depress the accelerator pedal.
Duration of start attempt, max. 30 seconds

The engine starts to fire.

Situational help

Engine refuses to start:

- Repeat the start procedure.
Duration of start attempt, max. 30 seconds

Engine starts but can only idle: The electronics fault light comes on.

- Do not turn the steering wheel.
- Do not depress the accelerator pedal.
- Direction of travel switch in neutral position.



Electronics fault light is on despite these measures:

- Cease operations.
- Ascertain the cause, notify Service.

Engine starts but can only idle: The electronics fault light is off.

- Turn emergency-stop button and pull it up.
- Repeat the start procedure.

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 part-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.

RUNNING-IN SPECIFICATIONS:

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



MOST ECONOMICAL ENGINE SPEED RANGE:



The diesel engine's fuel consumption is lowest in the speed range from 1200 to 1600 rpm.

On steep gradients:

- Select an engine speed outside the speed range for maximum fuel economy.

Operating in extremely difficult terrain:

- Use the potentiometer (optional extra) to reduce the vehicle's speed.



The speed for the auxiliary driven machinery remains unchanged.

SWITCHING OFF THE DIESEL 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.

- Lower the auxiliary driven machinery, if fitted.
- Set the direction switch to the neutral position.
- Apply parking brake.
- Before switching off the engine, let it run at idling speed for approx. 1 – 2 minutes.
- Do not leave the vehicle unattended with the engine running.

WARNING!

Risk of poisoning from exhaust gases.
Do not leave the engine running in an enclosed space.

- Turn the ignition key to switch off the engine.

- Update the logbook.
- Remove ignition key and lock cabin.

WARNING!

Risk of slipping on the track when climbing into and out of driver's cab.

CAUTION!

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

- 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, driven wheels and drive wheels to prevent them freezing fast, in order to avoid damage when the machine is restarted.
- Secure raised auxiliary driven machinery.



- Connect coolant preheating (optional extra).
The 220 V / 110 V adapter 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.



1 - 2 hours of preheating prior to starting does not improve cold starting.
Plug in preheating immediately after parking the vehicle

Driving

WARNING!

Before driving, make sure that there is no-one in the danger zone.



The vehicle is fitted with a reversing alarm, but you must always exercise due care when reversing. The vehicle is fitted with a back up alarm, but you must always exercise due care when reversing.



On full steering lock, the PistenBully executes a counter rotation turn.

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

- Use accelerator to increase engine speed beyond drive away speed: The PistenBully begins to move.

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

When the vehicle is on the move, 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.

- 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.

- If oil pressure drops while the engine is running stop immediately, switch off the engine and determine the cause (not enough oil in the oil pan).

Engine operating temperature: Reading too high:

- Determine the cause (temperature gauge OK? Coolant level low? Foreign matter clogging radiator? V-belt tension? Viscous fan?).

- **Fuel supply:** Continuously check the fuel level and refuel 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 while the engine is running, the alternator is no longer charging the starter battery. Determine the cause and rectify the damage (loose cable connections? Foreign matter on alternator? Belt slipping or broken?).

Hydraulic fluid level warning light:

Occasional flashing on descents is not indicative of a fault.

- **Parking brake indicator:** Check the parking brake if this indicator lights up.

Braking - stopping

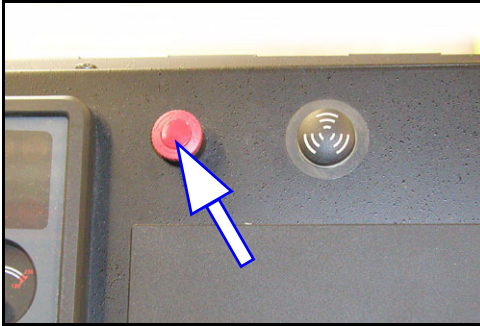
The hydrostatic drive brakes the vehicle without causing wear. You reduce engine speed by easing the pressure on the accelerator pedal; engine speed diminishes and the change in the hydraulic ratio causes the vehicle to slow down.

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



Use the parking brake only to keep the vehicle at a standstill.

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



Operate the emergency stop switch:

- if a dangerous situation arises.
- Press the emergency stop button.

The vehicle slows to a complete stop and cannot be steered.

The diesel engine remains at idle speed. The propulsion electronics fault light comes on.

- Immediately apply the parking brake.
- Set the direction switch to the neutral position.
- Switch off the diesel engine.

Resuming operation after an emergency stop

- Turn emergency-stop button and pull it up. The PistenBully is again ready for operation.

TOWING VEHICLE



Do not exceed the maximum pulling force of 20 kN at the adapter at the rear of the main frame.

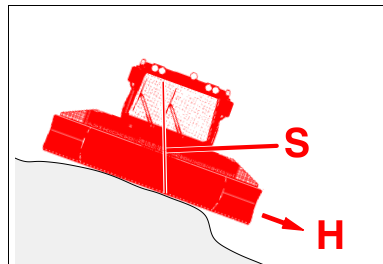
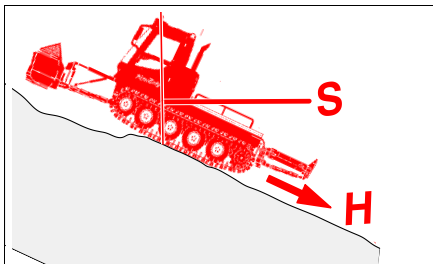
Emergency release of the parking brake:



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 Point.



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.

It is particularly important for inexperienced drivers to familiarize themselves with the vehicle before undertaking operations in difficult terrain.

Driving: on upgrades

CAUTION!

Risk of engine damage:

Oil supply not ensured.

Do not exceed gradient limit of 35°.

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.

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 machinery 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 connectors.



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. If applicable, 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.

