

Operating Manual

Vehicle

PistenBully[®]

400 PARK PRO

From WKU 824 11136.en





Kässbohrer Geländefahrzeug AG

Kässbohrerstraße 11
D-88471 Laupheim

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CONTENTS

INTRODUCTION

Safety symbols used	6
Technical customer service	7

TECHNICAL DATA

Technical data	11
Fluids and lubricants	13

SAFETY INSTRUCTIONS

Safety instructions.	17
Permissible weights of front-mounted auxiliary equipment.	31

USE

Cockpit.	34
Installing auxiliary driven implements . .	78
Tilting the driver's cab / load platform .	83
Electrical	89

CHECKS

Inspections and checks	101
----------------------------------	-----

OPERATION

Starting the diesel engine	112
Entering - driving - exiting	114
Towing vehicle	120
Driving tips and information	121

AUXILIARY DRIVEN MACHINERY

Front blade.	129
AlpinFlex tiller	132

OTHER ON-BOARD DOCUMENTS

- Log book
- Operating manual, diesel engine
- Maintenance instructions
- Operating manual for Kahlbacher front-mounted tiller 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.

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400.11136.1.de

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 PistenBully.
- important instructions concerning correct and economical operation.
- warnings so that you recognise dangers in good time and avoid them.
- Procedural instruction
- Make sure that the operating manual is always in the oddments tray in the driver's cab.

ABBREVIATIONS USED

e.g. = for example

M_A = tightening torque

SP no. = order number for spare part

min./max.= minimum / maximum

SYMBOLS USED

DANGER!

Direct and imminent danger threatening life and limb unless appropriate precautions are taken.

WARNING!

**Potentially highly dangerous situation!
Danger to life and limb unless appropriate precautions are taken.**


CAUTION!

**Dangerous situation!
Could lead to injury unless appropriate precautions are taken**



Important notes!

Possibility of damage to the machine or its immediate surroundings.

 This symbol draws attention to practical tips



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Contact at my national office:

Technical customer service

Name:.....

Telephone number:.....

Spare parts department

Name:.....

Telephone number:.....

Repair mechanic

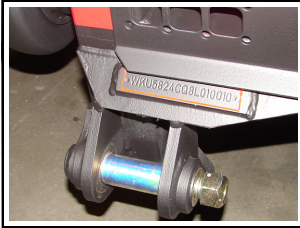
Name:.....

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



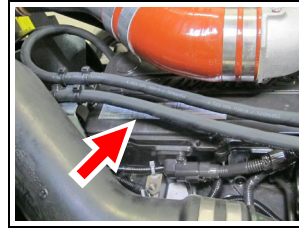
Vehicle number

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

This operating manual is for the vehicle

Please insert the appropriate entries

WKU.....



Engine number

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 scrutinised 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.

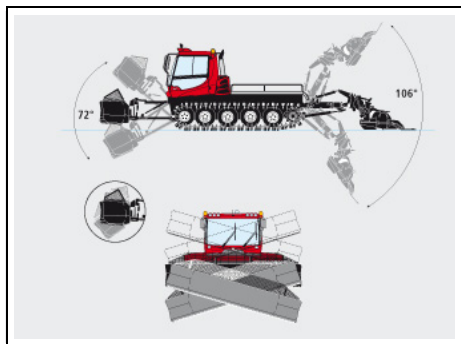
Kässbohrer Geländefahrzeug AG

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NOTES

TECHNICAL DATA



Dimensions

Width

without tracks	2500 mm
across aluminium tracks	4206 mm
across steel tracks	4206 mm
Across AlpinFlex tiller	5500 mm

Height

Height with cab tilted	3250 mm
------------------------	---------

Length

With tiller and pusher blade	9010 mm
Load area	2120 x 1920 mm

Weight

Dead weight with aluminium tracks	7340 kg
Dead weight with steel tracks	8020 kg
Permissible gross weight with auxiliary driven machinery	11,800 kg
Payload of load area without auxiliary driven machinery.	1500 kg

Operating parameters

Continuously variable speed	0 - 23 km/h
Ground pressure with aluminium tracks	0.052 kg/cm ²
Ground pressure with steel tracks	0.057 kg/cm ²
Production rate with tiller	93,000 m ² /h
At maximum	126,000 m ² /h

Engine

Type	Cummins QSL9
Number of cylinders	6
Displacement	8.9 litres / 8900 cc
Output, ECE rating	276 kW (370 hp)
Maximum torque	1519 Nm at 1500 rpm

Overview

Technical data

Safety

Use

Checks

Operation

11/139

TECHNICAL DATA

Oil capacity with filter	24 litres
Fuel consumption	at least 19 l/h
Tank capacity	260 litres
Exhaust-emissions standard	EUROMOT IIIA / EPA TIER 3

Brakes

Wear-free (hydrostatic)
2 multi-plate brakes

Electrical

Light-current circuit	24 V
Generator	28 V /140 amperes
Batteries	2 x 12 V /135 Ah
Cold-start power	900 A

Suggested garage dimensions

Length	11,000 mm
Width	6000 mm
Height	3500 mm

Sound power level and vibrations

Per EN 15059

Measured at rated engine speed and maximum fan speed

Sound pressure level at operator's workplace	79 dB(A)
Radiated sound power level	113,4 dB(A)

Measured during grooming (vector sum)

Vibrations at the steering wheel	$<2.5 \text{ m/s}^2$
Vibration at driver's seat	$<0.5 \text{ m/s}^2$



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 halved.

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.

- See the CD 'Cummins Service Bulletin No. 3379 001-10' supplied with the equipment.

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.

Select the correct antifreeze agent

- See the CD 'Cummins Service Bulletin No. 3666 132-04' supplied with the equipment.

Maintain a coolant mixture of 50% drinking water + 50% by volume of antifreeze in the engine throughout the year.



Risk of engine overheating!

Do not permit the proportion of antifreeze to exceed 55 percent by volume.

Antifreeze change interval

At least: every 2 years

by engine operating hours: every 2000 hours with water filter ET-No. 8.312.105.021.0

TABLE OF FLUIDS AND LUBRICANTS

Designation	Grade	Capacity	Interval between changes
Cummins QSL9	CES 20072 / DHD-1 / ALEA E-5 API-CH 4 SAE 10W40 See the CD 'Cummins Service Bulletin No. 381 0340-06' supplied with the equipment	24 litres	At least: once a year every 500 hours
Fuel tank	Diesel fuel see the CD 'Cummins Service Bulletin No. 3379 001-10' supplied with the equipment	260 litres	At least: once a year drain condensation.
Fuel filter			every 800 hours
Air filter			At least: once a year every 1200 hours
Cooling / heating system	50% water + 50% antifreeze agent see the CD 'Cummins Service Bulletin No. 3666 132-04' supplied with the equipment	30 litres	At least: every 2years every 2000 hours exchange water filter
Transfer box	Poly Alpha Oleofin (PAO) - CLP HC VG 150 / 220 ISO VG 220 (for summer operation) - API GL4, SAE 75 W 90 (PAO)	1,8 litres	At least: once a year every 800 hours at 100 hours (new vehicle)



TABLE OF FLUIDS AND LUBRICANTS

Designation	Grade	Capacity	Interval between changes
Wheel drive (planetary gears)	Poly Alpha Oleofin (PAO) - CLP HC VG 150 / 220 ISO VG 220 (for summer operation) - API GL4, SAE 75 W 90 (PAO)	1.9 litres	At least: once a year every 400 hours new vehicle 100 hours
Hydraulics Propulsion unit + auxiliary driven machinery (see customer's workshop information)	HVLP DIN 51524 DEXRON II D / III F ATF Type A Suffix A < -30°C -AVIA Syntofluid PE-B 30 (PAO)	47 l tank 80 l total	At least: once a year every 1200 hours
Hydraulic oil filter			at 100 hours every 1200 hours
Hydrostatic vehicle drive (see customer's workshop information)	OKS 250		
Lubricate wheel hubs and radius arms	Calcium saponified grease KP2K-30, DIN 51502 Aviacal 2 LDW		every 400 hours
Other lubrication points	Calcium saponified grease KP2K-30, DIN 51502 e.g. Aviacal 2 LD		every 100 hours
Electrical system Battery terminals	Bosch FT 40V1 grease		

Overview

Technical data

Safety

Use

Checks

Operation



NOTES

SAFETY INSTRUCTIONS

Overview

Technical data

Safety

Use

Checks

Operation



INTENDED USE 18

DRIVER 18

DANGER ZONE FOR PERSONS . . 19

OPERATION 19

MAINTENANCE 23

FIRST-AID BOX 25

FIRE EXTINGUISHER 25

WARNING SIGNS 26

ADDITIONAL WEIGHTS 32

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.
 - Tracks in countryside (not public roads).
 - Preparing trails for Nordic skiing.
 - Transporting people in the special people-carrier cabin (optional extra).



If you wish to use the equipment for any other purpose, you must apply for and obtain prior written approval from the manufacturer.



DRIVER

- 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 fulfil 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.
 - 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 to draw attention to potential dangers.
- 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 circumstances of each case, these measures may take the form of warning signs, closed runs or off-limit markers.

ENTERING

- Complete the daily checks and maintenance tasks.
- Walk right round the vehicle and make sure that the danger zone is clear of persons and objects.
- Step onto the track.
Danger of slipping on the track when entering and exiting the driver's cab. Always take a firm grip on the handle of the driver's door when entering the vehicle.
- When parking on a slope, be particularly careful when opening the door. The door opens suddenly.
- Buckle the safety belt.

DRIVING

- 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 .
- Do not attempt to adjust the driver's seat or steering wheel when driving.
- Snow groomers must be used and operated in a manner which ensures their stability.
- Drivers must always restrict the vehicle to a speed at which they can stop within the distance visible. This does not apply to steep slopes where the vehicle cannot be stopped as a result of the angle of the terrain. Drivers

SAFETY INSTRUCTIONS

may drive on such steep slopes only when certain that they can do so without putting themselves and others at risk.

- Drivers may drive the snow groomer only at a speed at 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, with due allowance for the auxiliary equipment fitted.
- Make sure that the doors are closed.
- Check that loads are 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.
- Make sure that the area behind the machine is clear.
The assistance of a second person to give directions is necessary if visibility is poor.
- Avoid crossing slopes at an angle because the PistenBully may slip downhill.
- When a tracked vehicle is being driven, the traction is so great that the vehicle may be driven well beyond the point at which it should start to tilt; if this happens the vehicle might then suddenly tip over.

STOPPING / EXITING

- Park in clearly surveyable spots.
- Apply the parking brake only when the vehicle is at a standstill.
- Risk of poisoning!
Do not leave the engine running in an enclosed space.
- 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 equipment at the front and back, switch off the tiller, and turn the driving direction switch to "neutral."
- Before exiting the driver's cab!
 - Applying parking brake
 - Switch off the engine.
 - Remove the ignition key.



- Swivel up the steering column and left armrest completely.
- Step on to the track!
Danger of slipping on the track when entering and exiting the driver's cab.. Always take a firm grip on the handle of the driver's door when exiting the vehicle.
- Lock the driver's cab.

TERRAIN

- Before using the snow groomer, check that the intended terrain is drivable.

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

SAFETY INSTRUCTIONS

and when the weather is bad, unless several vehicles are working together as a team. This does not apply if the driver uses a two-way 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

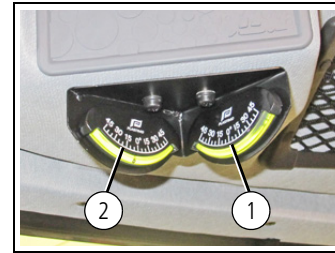
- Only 1 co-driver may sit in the driver's cab.
- The co-driver must be seated in the co-driver's seat at all times when the vehicle is in motion.

- 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 area
 - the auxiliary equipment
 - externally mounted machinery.
- Avoid abrupt changes of direction and angles of inclination.

Auxiliary equipment, rear deck railing *(optional)*

Correct usage

The country-specific regulations must be observed for the transport of people.



Inclinometer

- At the beginning of travel, everyone must stand and have a firm grip on the open rear deck railing.
- If the inclinometer indicates more than 30° degrees in the longitudinal direction **1** or more than 25° degrees in the lateral direction **2**, the operator must refrain from driving any further on the steep terrain for safety reasons when carrying passengers.
- 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.
- Avoid abrupt changes of direction and angles of inclination.
- Danger of slipping on the track and load platform!
When climbing onto and off the rear deck railing, hold onto the load platform railing.
- Risk of injury by crushing action!
When lowering the rear deck railing. Close the rear deck railing using holding points.

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 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.
- Repair welding is an operation that invariably requires extensive safety measures. Please consult your nearest Service Support Centre.

MONITORING

- Before starting off, the driver must check operation of the safety-relevant components, e.g.:
 - by testing the brakes.
 - by switching on the lights,
 - by checking that the warning systems are fully operational.
 - by checking the controls of the working machinery.
- 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 order to ensure that the snow groomer is operated in a safe manner.



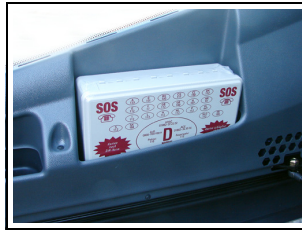
INSPECTION

- 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.

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FIRST-AID BOX

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



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



FIRE EXTINGUISHER

The fire extinguisher is in front of the co-driver's seat. Note expiration date. Replace used fire extinguishers immediately.

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SAFETY INSTRUCTIONS

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**

No. 8.762.658.000E

Text: **Attention:**

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



WARNING SIGN:

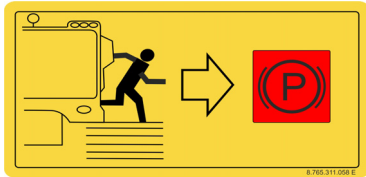
Location: **Rear deck railing**

No. 8.762.750.00 E

Text: **Danger of falling! No transport of people on the load platform.**

Opened rear deck railing is for the transport of materials and people.





WARNING SIGN

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

No. 8.765.311.058E

Text:

Attention:

Apply the parking brake before leaving the cockpit.



WARNING SIGN

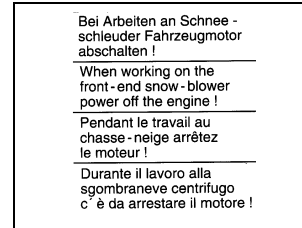
Location: **Fan/engine**

No. 8.762.634.054E

Text:

Attention:

The fan ring rotates when the diesel engine is running.



WARNING SIGN

Location: **KFS (tiller blower)**

No. 8.762.435.058E

Text:

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

SAFETY INSTRUCTIONS



WARNING SIGN

Location: **Tiller**
No. 8.762.638.058E

Text:

WARNING!

Wait until all parts have come to a complete standstill before touching.



WARNING SIGN

Location: **Frame**
No. 8.766.062.000.0

Text:

WARNING!

**Risk of injury by crushing:
Always engage and lock the support
to prevent downward movement of
the load platform.**



WARNING SIGN

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

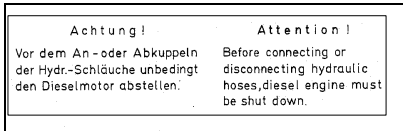
Text:

WARNING!

**Do not reach into crushing zone
while parts there may be moving!**



SAFETY INSTRUCTIONS



WARNING SIGN

Location: **Tiller**
No. 8.762.271.053C

Text:

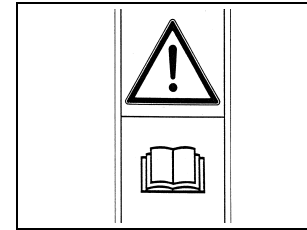
Attention:
Before connecting or disconnecting the hydraulic hoses, diesel engine must be shut down.



WARNING SIGN

Location: **Rear deck railing**
No. 8.762.702.000.0

Text: **Rear deck railing open.**
Make sure that safety catch of locking lever is engaged.



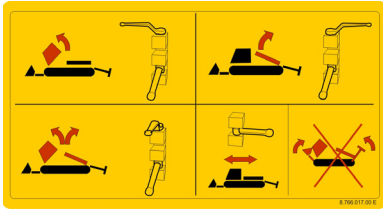
SIGN

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

Text:

Read operating manual and safety instructions before startup and comply with both at all times.

SAFETY INSTRUCTIONS



SIGN

Location: **Frame**

No. 8.766.017.000 E

Text:

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



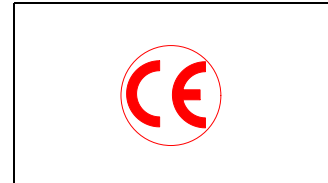
SIGN

Location: **Frame**

No. 8.762.689.000 E

Text:

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



SYMBOL

Location: **Console/co-driver's seat**

No. 8.762.631.000E

Text:

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

PERMISSIBLE WEIGHTS OF FRONT-MOUNTED AUXILIARY EQUIPMENT

Overview

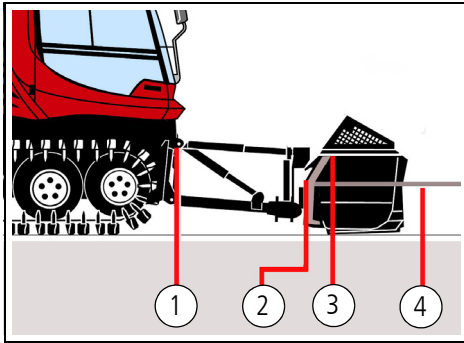
Technical
data

Safety

Use

Checks

Operation



Additional weights

When transporting loads, always bear in mind the maximum attachment weights at the attachment points.

1 Main frame / **2** Quick-change system / **3** Front blade /
4 ParkBlade fork

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

2 = Hook plane, quick-change system

3 = End face, front blade centre

4 = Fork, length 400 mm (ParkBlade)

Attachment at pivot point, main frame (1)

- Maximum long-term attachment weight 1650 kg.

Attachment at hook plane, quick-change system (2)

- Maximum long-term attachment weight 1315 kg.

Attachment at quick-change system with front blade (3)

- Maximum long-term attachment weight 665 kg.

- Maximum short-term attachment weight 1100 kg.

Attachment to fork (4), length 400 mm

- Maximum short-term attachment weight 1000 kg.

Safety instructions

Note: 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.

PERMISSIBLE WEIGHTS OF FRONT-MOUNTED AUXILIARY EQUIPMENT

Safety instructions for long-term and short-term attachment weights

- Operation with the maximum short-term attachment weight is restricted to the intended purpose and is subject to the limit of the time required for said purpose (short-term). Drive at walking speed only.
- The high moment of the attachment restricts the manoeuvrability of the vehicle.
- Risk of toppling.
Check the terrain and make sure it is suitable for driving.
- Do not permit the load to obstruct the driver's field of vision.
- The load must be adequately secured to ensure that it cannot shift.
- The tiller has to be installed as a counterweight.
- Note requirements regarding transport positions of auxiliary equipment.
See the operating instructions issued by the manufacturer of the auxiliary equipment

Safety instructions, ParkBlade

- Risk of injury by crushing:
when extending / retracting the forks.
Make sure there is no-one in the danger zone.
- The transport of persons is prohibited.
- Always retract the forks when they are not needed.
- When the forks are extended, the side section of the front blade must be pivoted all the way out.
- Alterations to the forks are prohibited.
- The load must be suitable for lifting with the forks.
- Make sure that the weight of the load is evenly distributed across both forks.





INSTRUMENT DISPLAYS 35

WARNING SYMBOLS 38

PUSHBUTTONS, STANDARD 40

STICK 47

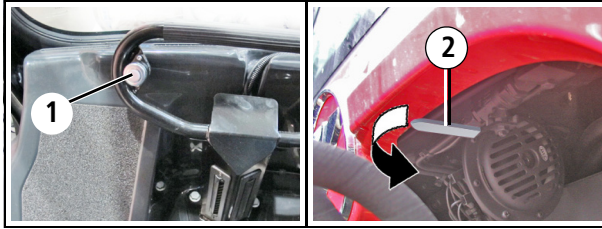
JOYSTICK 48

CHANGE THE KEYBOARD LAYOUT 57

TERMINAL 63

DRIVER'S SEAT 71

TRANSPORT 73

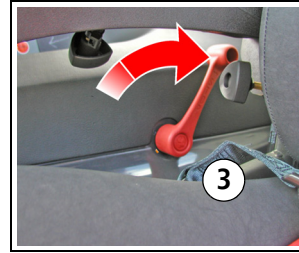


1 Pushbutton for wipers

Press to have front wipers execute a single stroke.

Heated windscreen wipers

Swivel stalk **2** in the direction indicated by the arrow.



3 Parking brake



WARNING!

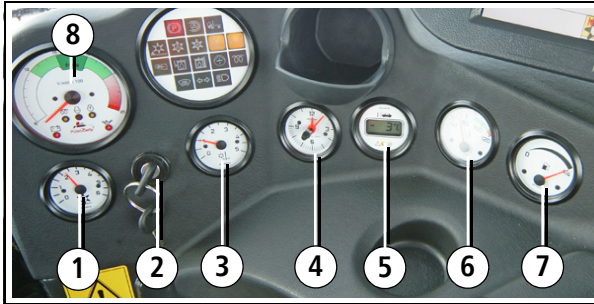
Use the parking brake only to keep the vehicle at a standstill.

The PistenBully will brake sharply to a complete stop if the parking brake is applied while the vehicle is in motion.

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

Applying parking brake

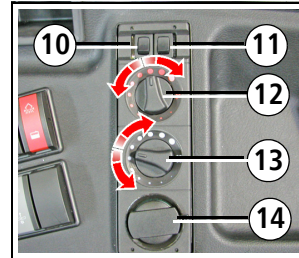
- Only when the PistenBully is at a complete standstill: move the lever in the direction indicated by the arrow.



Instrument displays

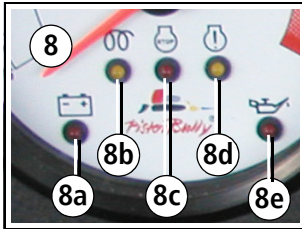
- 1 Snow-flap adjuster for tiller
- 2 Ignition lock
 - 0 Inserting and removing ignition key.
Switching off engine.
 - I Ready for operation / Driving
- II Starting
- 3 Tiller-depth indicator
- 4 Clock
- 5 Outdoor temperature

- 6 Coolant temperature, diesel engine
- 7 Diesel fuel
- 8 Revolution counter



Cab heating

- 10 Blower and heating to maximum
- 11 Pushbutton: Windscreen heating ON
- 12 Temperature control, steplessly adjustable
- 13 Heater blower, steplessly adjustable
- 14 12 V socket



Revolution counter

8a Battery charge indicator

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

- Cease operations
- Ascertain the cause of the problem.

8b Intake-air preheating

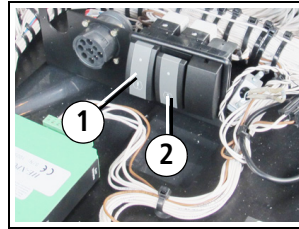
(see the section entitled "Diesel engine").

8c Indicator 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.

8d Flashes yellow = Minor engine fault

For checking see the section on the indicator light for the engine management system



Reading out fault messages

- Switch off the engine.
- Ignition ON
- Rocker switch, engine diagnosis ON



Rocker switch 2

Engine diagnosis ON / OFF

Top section pressed = OFF

Bottom section pressed = Check flashing code

- The indicator light for the engine management system flashes red; the flashes represent a three-digit code.
List of fault codes, see Cummins CD supplied with the equipment.





Situational help

Fault code 131 is represented by the following sequence of flashes:

- **1** flash
- brief pause
- **3** flashes
- short pause
- **1** flash
- long pause

Check for other faults or repeat:



Pushbutton 1

Engine-fault check

Top section pressed = Read out other engine faults.

Bottom section pressed = Read out last engine fault shown.

8e Engine oil pressure indicator

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



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 drive the vehicle.



Warning symbols



Warning light

Attention:

Brake - indicator for parking brake Release pressure has dropped below 120 bar.

Indicator light shows for:
Parking brake applied.



Not used



Warning light

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



Indicator light

Tiller relief (Up pressure).



Indicator light

Tiller shaft turning



Indicator light

Tiller drive ON



Indicator light

Floating position, rear lift / lower (vertical)



Indicator light

Floating position, rear (horizontal)





Indicator light flashes
Track relief actuated
Do not drive the vehicle.



Warning light
Hydraulic fluid is below the minimum level
Also signalled acoustically by buzzer.



Warning light
Hydraulic-fluid temperature is above maximum
Also signalled acoustically by buzzer.



Warning light
Hydraulic-fluid filter indicator
- Rectify the fault



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



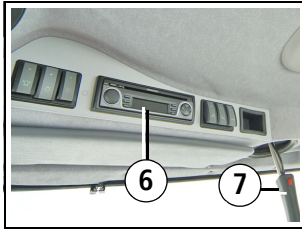
Indicator light
Electric heater for windscreen ON.



Indicator light
Left / right turn indicator repeater



Indicator light
High-beam headlights ON



Overhead console

6 Two-way radio / radio prepared

7 Spotlight



Rocker switch

Rotating beacon

Note:

When the circuit is active, the indicator lights up (see arrow).

A 2-stage switch has indicators top and bottom



Rocker switch

Parking lights / driving lights

Pressed once = Parking light

Pressed again = Low-beam headlights



Rocker switch

Front worklights



Rocker switch

Front worklights



Rocker switch

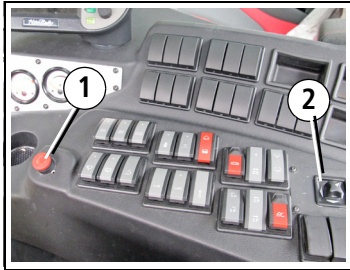
Rear worklights



Rocker switch (optional equipment)

Treeline worklights





1 STOP button

The PistenBully does not have a separate service brake for stopping, it has only a parking brake. The PistenBully does not stop abruptly when you lift your foot off the accelerator pedal or set the direction-of-travel switch to the neutral position.

If you hit the STOP button, the PistenBully brakes sharply to a complete stop.

- Hit the STOP button in the event of sudden danger.

The PistenBully comes to an immediate stop and will not answer to the steering.

- Immediately apply the parking brake.

Restart = Turn the STOP button and pull it up.

The PistenBully is again ready for operation.

2 Control for adjusting exterior mirrors



Pushbutton

Horn ON



Rocker switch, 2-stage

Acoustic warning

Top section pressed = Acoustic warning for reversing

Bottom section pressed = Acoustic warning ON



Rocker switch, 2-stage

Direction indicators

Bottom section pressed = Flash right

Bottom section pressed = Flash left



Rocker switch (*optional*)

Spotlight ON / OFF

Top section pressed = OFF

Bottom section pressed = ON

COCKPIT



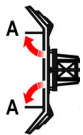
Latching rocker switch
Unlatched and bottom section pressed =
Front equipment carrier in floating position



Rocker switch (*optional*)
Offset Kahlbacher **front blower to either side.**
Bottom section pressed and move joystick to left / right.



Rocker switch
ParkBlade (*FunPark*)
Top section pressed = Extend
Bottom section pressed = Retract



Rocker switch
Retracting side finishers for reversing



Pushbutton
Windscreen heating

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



ON time is limited to approximately 10 minutes with the engine running. Press the switch again if a longer ON time is necessary.

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
Release seat-belt lock, cockpit

Note: Indicator light is ON
Belt monitor is switched off.





Rocker switch, 2-stage

Front wiper

Top section pressed = OFF

Bottom section pressed = Intermittent wipe

Pressed again = Speed 1

Setting interval for intermittent wipe

- Briefly switch on intermittent wipe then switch OFF.
- Wait for desired interval for intermittent wipe.
- Switch on intermittent wipe.
The time you waited is saved as the interval for intermittent wipe.



Rocker switch

Side-window heating / exterior-mirror heating



Rocker switch

Rear window heater



Rocker switch, 2-stage

Rear wiper

Top section pressed = OFF

Bottom section pressed = Intermittent wipe

Pressed again = Speed 1

Setting interval for intermittent wipe

- Briefly switch on intermittent wipe then switch OFF.
- Wait for desired interval for intermittent wipe.
Switch on intermittent wipe.
The time you waited is saved as the interval for intermittent wipe.



Rocker switch

Diesel-fuel heating

- Switch on the heating if outdoor temperature is below -10° Celsius.
- Switch off the heating when operations cease.



Latching rocker switch
Unlatched and bottom section pressed = **Relieve track tension**



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 stringers.

Before relieving track tension:

- Apply the parking brake
- Park the vehicle on a flat, level surface
- Secure the vehicle to prevent it moving



Indicator light, top
Air-filter monitor
Check / replace air filter

Indicator light, bottom
Coolant level below the minimum level

- If the indicator light comes on while the vehicle is on the move:
 - Bring the vehicle to a stop.
 - Determine the cause of the problem.



Pushbutton (*optional*)
Tracker-plate spacing narrow / wide

Top section pressed and held down = Narrow
Centred = Locked

Bottom section pressed and held down = Wide
See the section on the Nordic-trail tracking plates.





Rocker switch

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.



Rocker switch

Drive hydraulics for auxiliary equipment front / rear

Top section pressed = Front

Bottom section pressed = Rear

Preconditions for operation of the drive hydraulics for auxiliary equipment

- The driver's cab must be fully lowered and locked in position.
- The load platform must be fully lowered.
- The plug of the auxiliary implement must be in the socket (socket E).
Note: 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 pullaway speed of 800 rpm.



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!



NOTES

Stick



Forward

Both sticks pushed forward



Reverse

Both sticks pulled back



Potentiometer for driving speed

Note:

To control your speed:

- use the accelerator pedal
- move the stick to the neutral position and swung out as far as it will go.
- adjust the driving speed potentiometer.

The speed at which the vehicle travels depends on engine rpm, on the setting of the potentiometer, and on drag. You bring the engine to the correct rpm by depressing or easing up the accelerator pedal, and set the maximum speed by turning the potentiometer.



Corner left

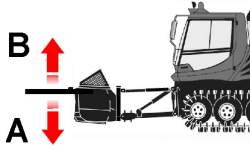
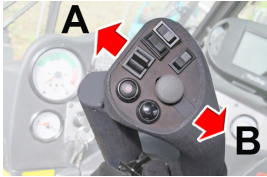

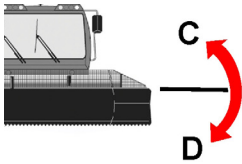

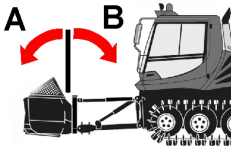
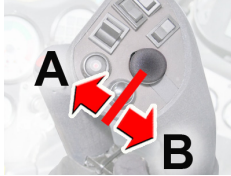
Push right stick forward



Turn right on the spot

Right stick pulled back
left stick pushed forward

USING THE JOYSTICK

Front blade	Joystick	Pushbutton	Position
<p>Raise - lower</p> 		<p>Floating position</p> 	<p>A - Lower</p> <p>B - Raise</p>
<p>Tilt</p> 			<p>C - Left</p> <p>D - Right</p>
<p>Roll /</p> 			<p>A - Forward</p> <p>B - Back</p>



USING THE JOYSTICK

Overview

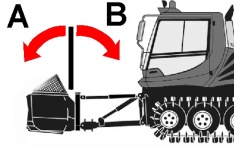


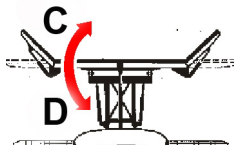


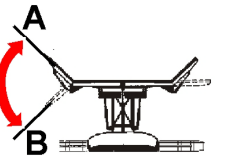
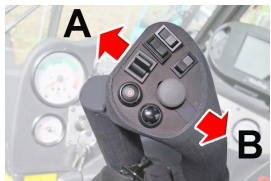

Technical data

Safety

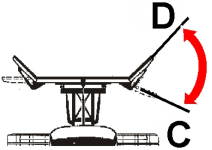


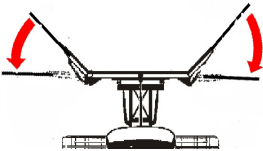

Use

Checks


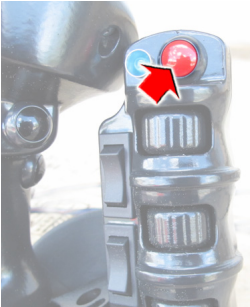

Operation

Front blade	Joystick	Pushbutton	Position
<p>Roll</p> 			<p>Roll, variant - Press and hold down the button</p> <p>A - Forward B - Back</p>
<p>Swivel</p> 			<p>Swivel - Press and hold down the button</p> <p>C - Swivel right D - Swivel left</p>
<p>Wing, left</p> 			<p>Wing, left - Press and hold down the button</p> <p>A - Move wing in B - Move wing out</p>

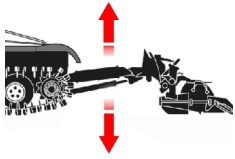

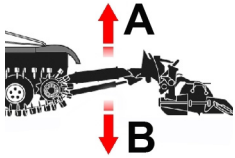


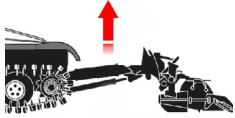


USING THE JOYSTICK

Front blade	Joystick	Pushbutton	Position
<p>Wing, right</p> 			<p>Wing, right</p> <ul style="list-style-type: none"> - Press and hold down the button <p>C - Move wing in</p> <p>D - Move wing out</p>
<p>Wing</p> 			<p>Pivot wings back</p> <p>Press and hold down both buttons</p>



Rear equipment carrier	Joystick	Pushbutton	Position
<p>Switch on tiller</p> 			<p>Tiller drive ON / OFF</p> <p>i When the parking brake is engaged, the tiller drive automatically switches off. Once the parking brake has been released, the tiller drive remains off. (Indicator for tiller flashes). You must operate the push-button again in order to reactivate the tiller.</p> <p>! WARNING!</p> <p>Risk of injury by cutting or crushing action. It is very important to ensure that the danger zone is completely clear.</p> 

USING THE JOYSTICK

Rear equipment carrier	Joystick	Pushbutton	Position
<p>Raise - lower</p> 			<p>Rocker switch 1 Raise / lower Top section pressed = Raise Neutral position = Locked Bottom section pressed = Lower</p>
<p>Raise - lower</p> 			<p>Pushbutton Proportional raising / lowering Press and hold down the button A - Raise B - Lower + bottom 1 section pressed. Attention: Tiller remains ON</p>
<p>Raise - lower</p> 			<p>Pushbutton Raise tiller Press and hold down pushbutton 1 Briefly press pushbutton 2 = Raise tiller up to 120 cm.</p>



USING THE JOYSTICK

Overview

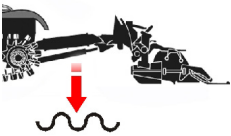
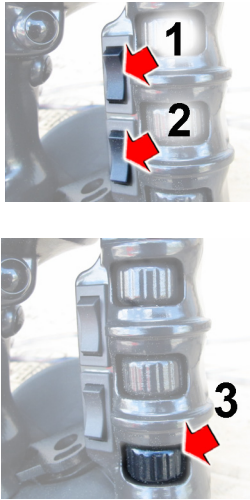



Technical data

Safety

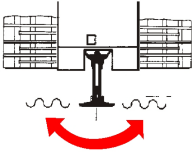
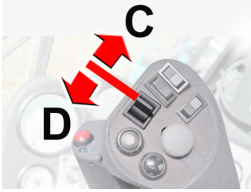
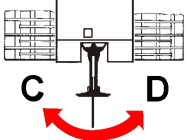

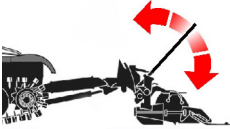


Use

Checks

Operation

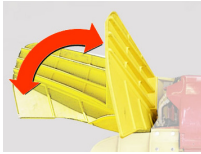






Rear equipment carrier	Joystick	Pushbutton	Position
<p>Floating position / press into snow</p> 			<p>Rocker switch Floating position / press into snow</p> <p>Bottom section of 1 pressed</p> <p>Top section of 2 pressed = Relieve pressure Neutral position = Floating Bottom section pressed = Press into snow</p> <p>3 Potentiometer for adjustment, relieve tiller / press into snow. Turn clockwise = Relieve</p>
<p>Snow flap</p> 			<p>Press and hold down pushbutton 2</p> <p>Rocker switch Top section pressed and held down = Raise Neutral position = Locked Bottom section pressed = Lower Display is shown on terminal</p>

USING THE JOYSTICK

Rear equipment carrier	Joystick	Pushbutton	Position
<p>Horizontal floating position</p> 			<p>Rocker switch / pushbutton Rigid position / floating position C activated = Floating position Neutral position = Locked D pressed = Centring</p>
<p>Swivel horizontally</p> 			<p>Pushbutton</p> <p>C = Push left D = Push right</p>
<p>Depth setting</p> 			<p>Adjusting tiller depth Press and hold down pushbutton 2 Rocker switch Top section pressed and held down = Raise tiller Neutral position = Tiller locked Bottom section pressed and held down = Lower tiller Tiller depth shown on terminal</p>



USING THE JOYSTICK

Rear equipment carrier	Joystick	Pushbutton	Position
Side finishers 	left 	right 	Pushbutton Side finishers Top section pressed = Swing out Bottom section pressed = Swing in
Tiller shaft speed 			Potentiometer for tiller shaft speed Tilling speed is increased / reduced to suit the snow conditions. Turn clockwise = Reduce speed.
Locking tiller 			Pushbutton pressed Lock/unlock tiller

Overview

Technical data




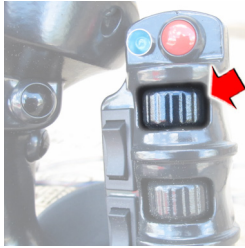
Safety

Use

Checks

Operation

USING THE JOYSTICK

	Joystick	Pushbutton	Position
Wipers 			Pushbutton for wipers Press to have front/rear wipers execute a single stroke.
Engine rpm 			Potentiometer for engine rpm Turn clockwise = Reduce engine rpm



Keyboard layout of the joystick

It is possible to change the keyboard layout of the joystick. This may only be performed by our trained staff.

- If the keyboard layout has been changed, please instruct the driver before operating the machine
- The factory setting „standard 0“ is activated as soon as the diesel motor will be switched “off/on”.



WARNING!

During driver change, operating errors caused by a changed keyboard layout!
Remedy: If the driver changes, the diesel engine must be switched off. When restarting, the factory setting 0 will be activated.

Change the keyboard layout



- Diesel engine „Ignition ON“
- Press both buttons for 5 seconds.

- Select the keyboard layout 1 – 4
- The blue LED blink code 6 indicates the current adjusted keyboard layout.

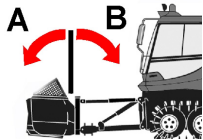
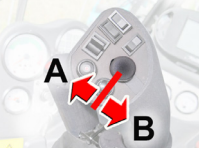






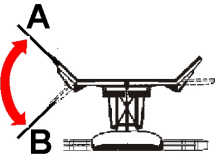




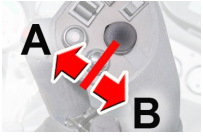


Keyboard layout:

- 0** - Continuous light
- 1** - 1 x flash
- 2** - 2 x / **3** - 3 x / **4** - 4 x

- Start the engine
The adjusted keyboard layout is activated.

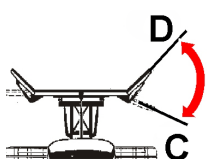
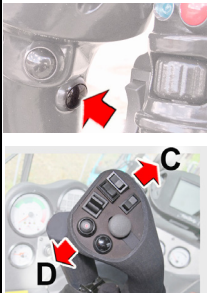

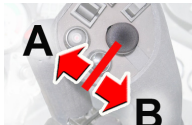



CHANGE THE KEYBOARD LAYOUT

Keyboard layout 0 to 4

Perform	Standard 0	1	2	3	4
<p>Roll</p> 				 	 
<p>Wing, left</p> 	 	 		<p>Standard 0</p>	 

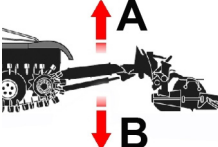
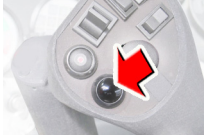

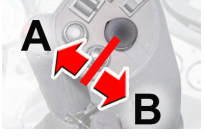
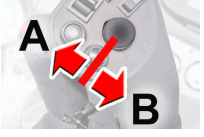









CHANGE THE KEYBOARD LAYOUT

Perform	Standard 0	1	2	3	4
Wing, right 				Standard 0	
Wipers 		Standard 0	Standard 0	Standard 0	Standard 0


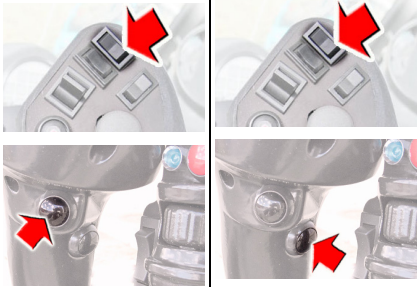


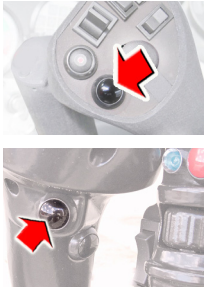
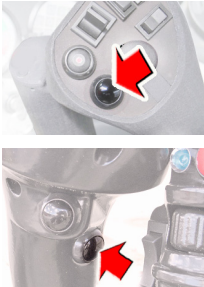

- Overview
- Technical data
- Safety
- Use
- Checks
- Operation

CHANGE THE KEYBOARD LAYOUT

Perform	Standard 0	1	2	3	4
<p>Raise - lower</p> 	 		<p>Standard 0</p>		 
<p>Deep setting</p> 	 	 	<p>Standard 0</p>	<p>Standard 0</p>	<p>Standard 0</p>



CHANGE THE KEYBOARD LAYOUT

Perform	Standard 0	1	2	3	4
Snow flap Raise 			Standard 0	Standard 0	Standard 0
Raise 			Standard 0	Standard 0	

Overview

Technical data

Safety

Use

Checks

Operation



NOTES



Terminal display

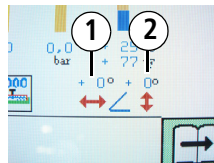
Checking settings:

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



Press the **ESC** button to cancel

- 1 Front blade inclinometer for off-horizontal
- 2 Vehicle inclinometer for off-vertical



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



- Steering setting
- Operating hours today
Press F4 to set to zero
- Operating hours, total
Press F4 to set to zero



- Tiller speed



- Show video-camera image
(optional)

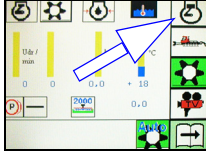
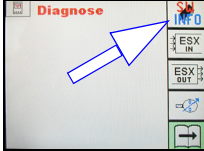



- Proceed to next level

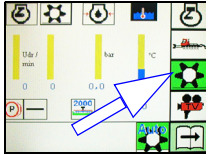
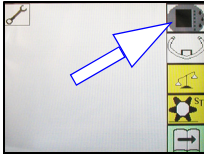
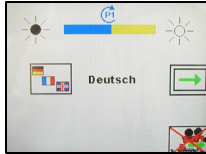


- Step back 1 level at a time to Start page.

Viewing software version

Command	Display	2. screen	Result
<p>⬅️ F5 Press F5 twice</p> <p>⬅️ F1 Press F1</p> <p>⬅️ F1 Press F1</p>			

Setting language / display brightness

Command	Display	2. screen	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>			

Setting display brightness

- Use **P1** to adjust brightness
- Press **ESC** to cancel.



Emergency mode, propulsion electronics

Activate emergency mode in response to failure of

- Steering potentiometer
- Accelerator pedal
- Direction-of-travel switch



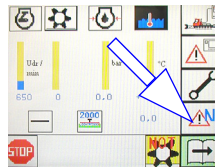
If the vehicle is in emergency mode, drive it no further than to the nearest workshop.

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

Adjusting

◀ **F5** Press **F5** twice

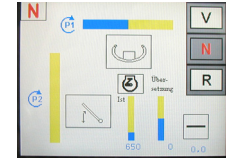
◀ **F4** Press **F4**



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** **F1** forward

◀ **F2** **F2** neutral

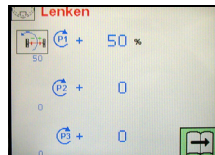
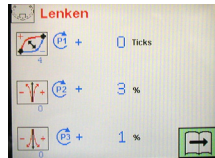
◀ **F3** **F3** reverse

Adjusting steering sensitivity

- ◀ F5 Press **F5** twice
- ◀ F3 Press **F3**
- ◀ F2 Press

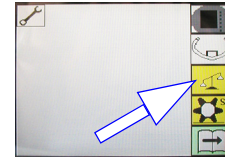


- **P1** Increase value:
Slight steering movement has increased steering effect.
- **P2** Change value:
Correct straight-line drive forward.
- **P3** Change value:
Correct straight-line drive in reverse.
- Press **F5** to continue
- **P1** Change value:
Track speed for cornering.



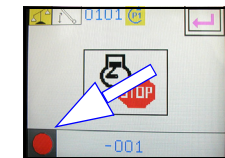
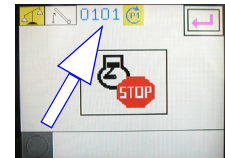
Using teach-in mode for calibration

- Switch on the ignition
- ◀ F5 Press **F5** twice
- ◀ F3 Press **F3** twice



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.



P values for calibration

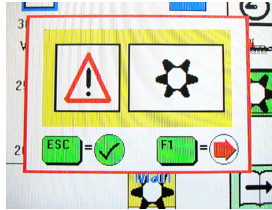
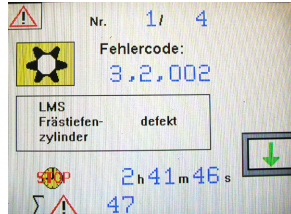
0101 = accelerator pedal / 0102 = steering potentiometer /
0103 = inch potentiometer / 0204 = Tiller potentiometer





Fault-code displays

Category	Display	Action
<p>High-priority fault.</p> <p>Warning buzzer sounds: Continuous tone</p> <ul style="list-style-type: none"> - Display shows STOP - Red warning symbol - Cease operation. <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>		

Category	Display	Action
<p>Medium-priority fault.</p> <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 - Restriction possible 		
<p>Low-priority fault</p> <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 - Minor restriction possible 		



Key to fault codes

3,2,001

Subassembly

- 1 = Engine
- 2 = Vehicle control system
- 3 = Tiller
- 4 = Winch control system
- 5 = ESX
- 6 = Display
- 7 = CAN monitoring
- 10 = Working hydraulics
- 14 = Rear equipment

3,2,001

Fault

- 1 = High-priority fault (red)
- 2 = Medium-priority fault (yellow)
- 3 = Low-priority fault (green)

3,2,001

001 = Serial number, fault code
400.11136.1.de

Fault	Meaning
2,1,030	Steering potentiometer
2,1,036	Forward / reverse button
2,1,070	Servo output, forward, left
2,1,071	Servo output, reverse, left
2,1,072	Servo output, reverse, right
2,1,073	Servo output, forward, right
1,2,040	Pedal value / engine setpoint
1,2,044 to 1,2,068	Engine
1,2,074	Constant choke
2,2,031	Steering potentiometer, control tolerance
2,2,032	Inch potentiometer
2,2,033	Inch potentiometer, control tolerance
3,2,024	Tiller ON/OFF switch
3,2,034	Tiller speed potentiometer
3,2,035	Tiller potentiometer values, control tolerance

TERMINAL

Fault	Meaning
3,2,075	Valve 3rd pump (tiller)
4,2,038	Winch speed-range detection
4,2,069	Winch detection
7,2,043	No engine data available on CAN
1,3,004	No engine data
6,3,022	No data from display
16,3,037	Front-equipment detection

DRIVER'S SEAT



- 1 Head-restraint cushion**
Height and angle are adjustable
- 2 Knob**
for adjusting side wings
- 3 Knob**
for adjusting lumbar support

- 4 Knob**
For stepless 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 stepless adjustment of the seat cushion through 8°.
- 7 Stepless adjustment of seat depth**
- 8 Switch for two-stage control**
Heating for seat cushion and backrest
- 9 Horizontal fore-and-aft adjustment**
by locking rails on both sides

Overview

Technical
data

Safety

Use

Checks

Operation



NOTES



PistenBully transport

- Due to the transport limitations, only use suitable means of transport and lifting gear with a sufficient load capacity. See VDI Guideline 3968 from 2700.
- Comply with all applicable national regulations.
- Switch the PistenBully diesel engine off. Close the cab.
- Retract the external mirrors.

WARNING!

Parking brake not working!

- Put the PistenBully on an even surface.
- Secure the wheels with wheel chocks.

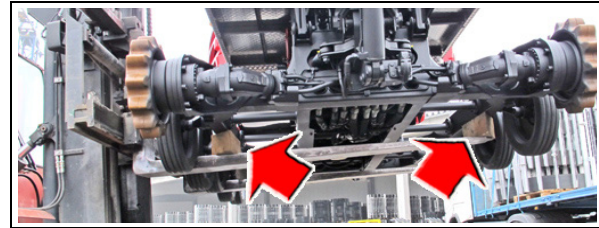
DANGER!

Risk of the load slipping or falling!

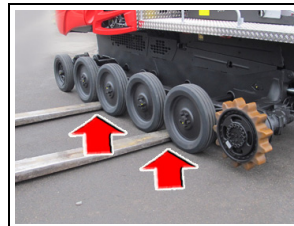
- Secure the PistenBully to prevent it from slipping.
- Use chains or straps.
- Use wooden chocks for the wheels.
- Place anti-slip pads under the wooden chocks.

TRANSPORT

- Remain in eye contact with the banksman when loading/unloading.
- Use wooden planks as a base.
- Place anti-slip pads under the wooden chocks.
- Use of a shackle.
See the rear securing point in the picture.
- Note the PistenBully's net weight.
See the technical data.



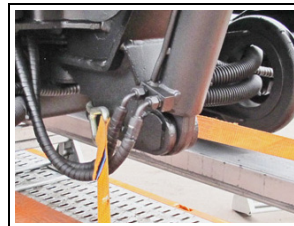
Wooden planks for base



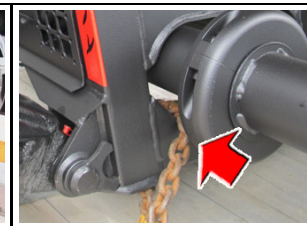
Loading points for forklift truck



Wooden chocking



Rear securing point

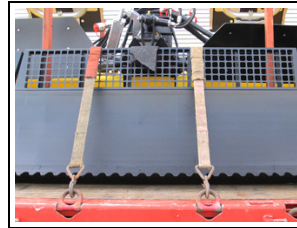


Front securing point



TRANSPORT

- Load the chains standing as shown.
Each chain has a net weight of around 1,000 kg.
- Use edge protectors when loading the chains.



Front blade securing point



Tiller securing point



Chain securing point

Overview

Technical
data

Safety

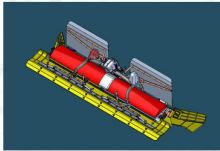
Use

Checks

Operation



NOTES



**INSTALLING AUXILIARY DRIVEN
MACHINERY 78**

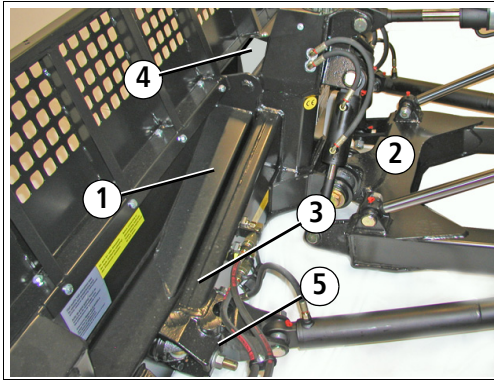


OPENING THE REAR DECK RAILING. 81



**TILTING THE DRIVER'S CAB / LOAD
PLATFORM 83**

AUXILIARY DRIVEN IMPLEMENTS



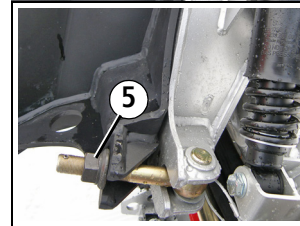
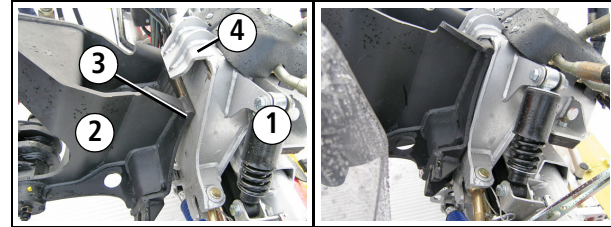
Installing auxiliary driven implements

- Clear all ice and snow off the adapter plate **1** 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 the carrier plate or blade frame.
- Tilt adapter plate **3**.



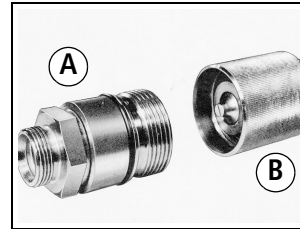
- Drive the PistenBully up to the equipment.
- Apply the parking brake.
- Slowly raise carrier plate or blade frame **2**. Adapter plate **3** engages hooks **4**, mating plate **1** seats against the adapter plate and simultaneously centres itself with the two centring wedges on the adapter plate.

AUXILIARY DRIVEN IMPLEMENTS

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



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



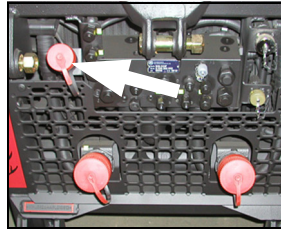
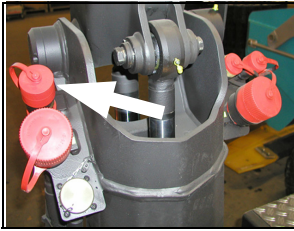
Connecting hydraulics

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

AUXILIARY DRIVEN IMPLEMENTS



Before connecting or disconnecting the hoses for auxiliary driven implement, always:

- Switch off the engine.
- Apply the parking brake.
- Switch the ignition for the diesel engine ON and actuate the appropriate functions to depressurise the hydraulic lines.
- Ignition for diesel engine OFF
- When making the connections, always make sure that both parts of the couplings are perfectly clean.
- Connect the leak-off oil line first *see illustration, arrow*. This will enable excess pressure in the system to escape.
- Connect the hydraulic hoses, making sure that the numbers match 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 recognise the auxiliary driven implement.
- Function-test the auxiliary driven implement.

WARNING!

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.



Opening the rear deck railing *(option)*



CAUTION!



Danger of slipping on the track and on the load platform.

When stepping up to or down from the rear deck railing, always keep a firm grip on the railing of the load platform.

- Raise the hinged rear deck railing.



See direction arrows for points to hold for opening.

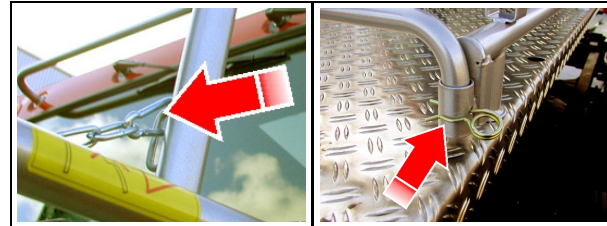
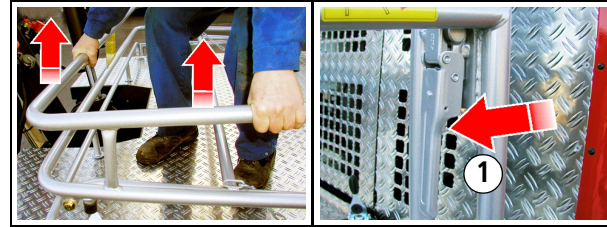
- Push both locking levers all the way down.



The safety catch on the locking lever must engage.

- Close both safety chains.
- Install the two spring pins to secure the foot bar.
- Always comply with the instructions for carrying passengers in the section entitled "Safety instructions".

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Closing the deck railing

- Press safety catch **1** and open the locking lever



**Risk of injury by crushing:
when lowering the rear deck railing.**

Remedy: Hold only at the specified points when lowering the rear deck railing.



Fully lower the rear deck railing.



NOTES



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.



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.



CAUTION!

Close the doors.

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

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

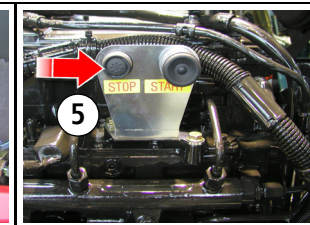
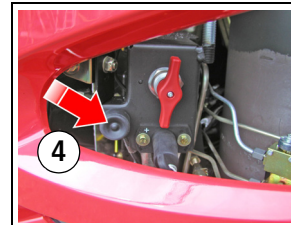
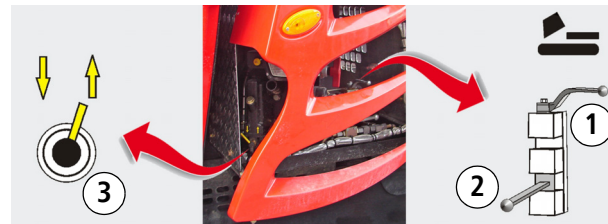
Tilting the driver's cab

- Move the levers of block ball cock **1** and **2** to the appropriate positions.
- Move adjuster valve **3** to the appropriate position.
- Press button **4**.
The driver's cab will tilt.
You can interrupt this movement by releasing the button.
- Switch off the diesel engine by pressing STOP button **5**.

PistenBully 400



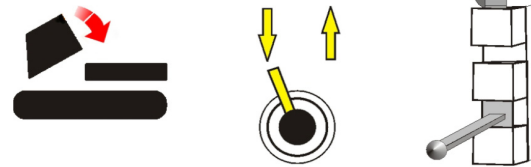
PistenBully 400 W



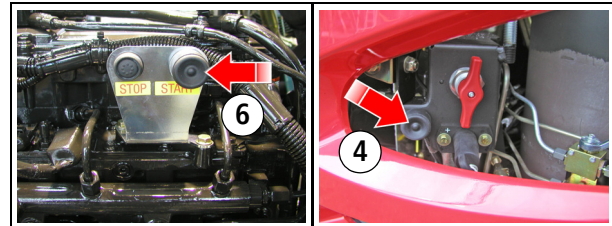
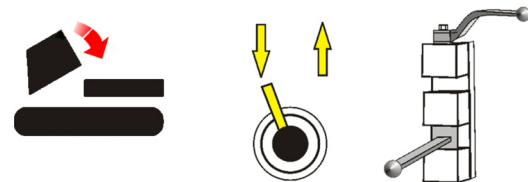
Lowering the driver's cab

- Move the adjuster valve to the appropriate position.
 - Start the diesel engine by pressing button **6**.
 - Press button **4**.
The driver's cab will lower. The warning light for the cab latching mechanism goes out.
- i** You can interrupt this movement by releasing the button.

PistenBully 400



PistenBully 400 W



TILTING THE DRIVER'S CAB / LOAD PLATFORM

Tilting the load platform

- Remove toggle screw **7** from the load platform.
- Move the lever of the block ball cock to the appropriate position.
- Raise the load platform all the way (see *Tilting the driver's cab for details*).



WARNING!



Risk of injury by crushing: If hydraulic pressure is lost the load platform will move downward! Secure support **8** to ensure that the assembly cannot move downward of its own accord.

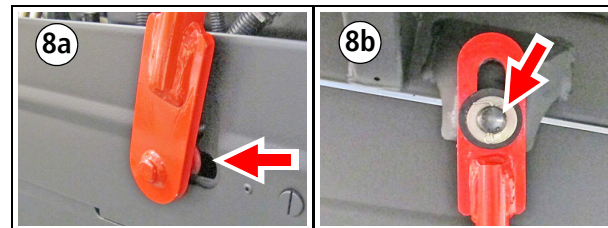
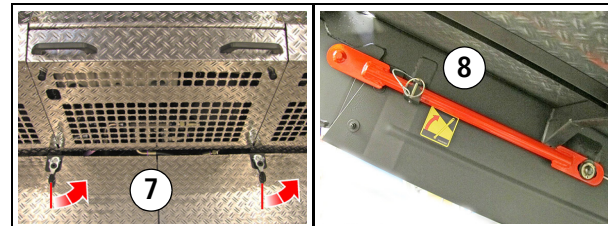
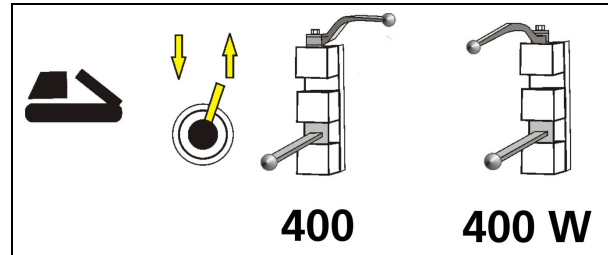
- Raise the load platform all the way and release support **8** and swing it down.
- Engage the support and press it down into the anchorage (see Fig. 8a).



WARNING!

The support can be inadvertently knocked out of its anchorage. Lower the load platform until the stud is seated in the guide slot (see Fig. 8b).

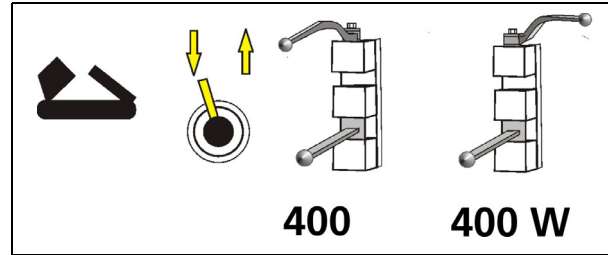
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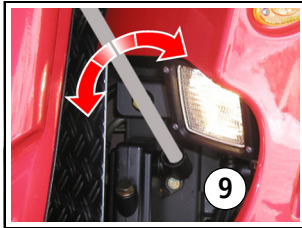
Lowering the load platform

- Tilt the load platform all the way up.
- Disengage the support from its anchorage and secure it in the holder.
- Secure the support with retaining ring **8c**.
- Lower the load platform (see *Lowering the driver's cab for details*).
- Tighten the toggle screw in the load platform.



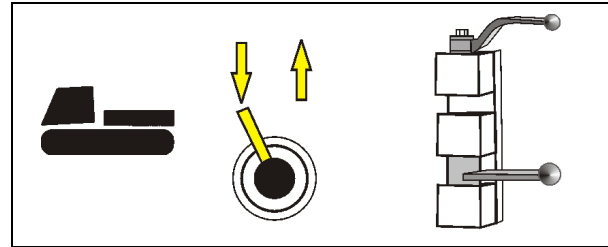
Driver's cab and load platform, lowering / tilting

TILTING THE DRIVER'S CAB / LOAD PLATFORM



Using the manual pump for tilting and lowering

- Switch off the diesel engine.
- Prepare the block ball cock / adjuster valve and the support in the same way as for the corresponding operation with the engine-powered hydraulics.
- Fit tubular extension (toolkit) on manual pump **9** and operate the pump.



Driving the vehicle

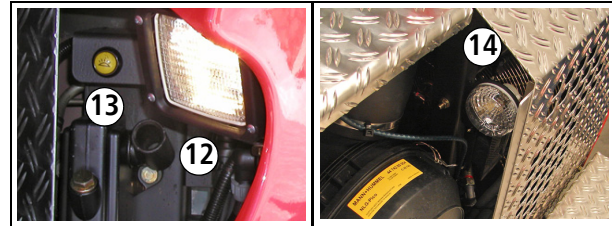
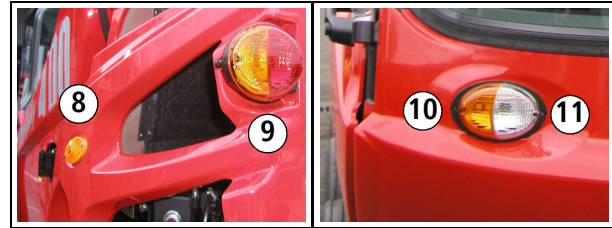
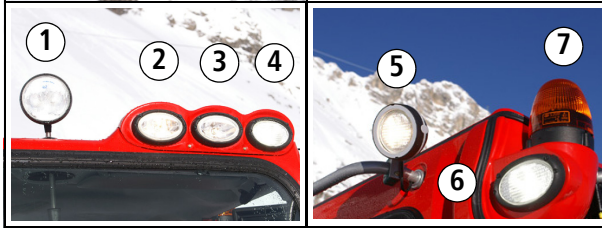
- Move the lever of the block ball cock to the appropriate position.



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. The warning symbol for the cab latching mechanism lights up.



LIGHTS	90
FUSES	93
EMERGENCY ACTUATION, AUXILIARY HYDRAULICS.....	95
BATTERY	96
BATTERY MASTER SWITCH	98



Lights

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

1 Front searchlight

2 High-beam headlight / parking light H7

3 Low-beam headlight H7

4 Worklight, front (*xenon optional*)

5 Treeline light H3 (*optional*)

6 Worklight, rear, H11 (*xenon optional*)

7 Rotating beacon

8 Side-mounted flashing indicators

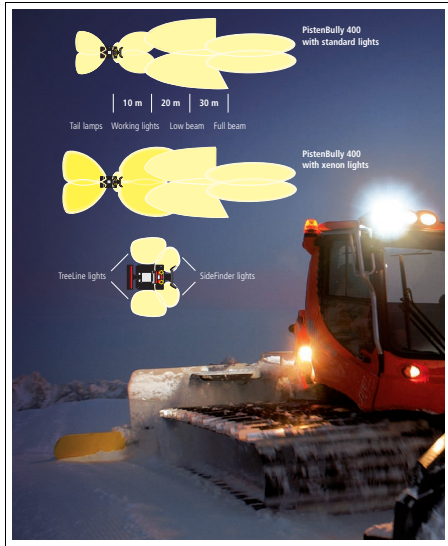
9 Turn indicators / rear light

10 / 11 Turn indicators / rear light

12 Side worklights

13/14 ON/OFF button, engine-compartment lighting





Halogen - Xenon

! 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 reentering.**



Damage to electronic ballast:

Persistent light 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.



Risk of breaking the lens:

Do not use liquid to clean the lens while hot.

- Clean the glass lens if dirty, but only when the lens is 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.
- Danger of flying splinters of glass.
The glass body of a xenon bulb is pressurised and can shatter.
- Always hold the bulb by the base.
- Operate xenon bulbs in closed headlights only.

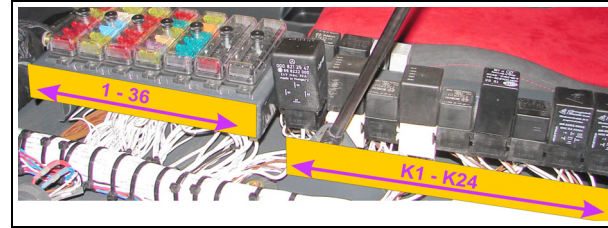


Dispose of the spent xenon bulb as hazardous waste.

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.





Replacing fuses

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

The fuses are underneath the centre console.

Use the grip to lift the centre console until the gas-filled strut latches the console in the fully raised position.



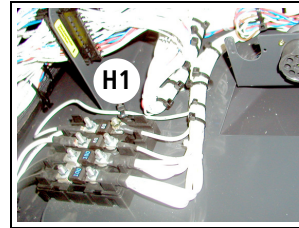
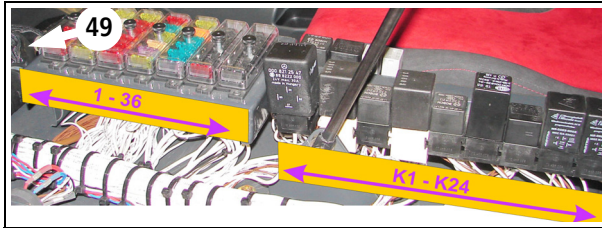
Risk of cable fire and short-circuit.

Never attempt to jumper or repair fuses or insert replacement fuses with a higher ampere rating than the originals.

Fuses

- | | | |
|-----------|--------|--|
| 1 | (10 A) | High-beam headlight, left, and telltale |
| 2 | (10 A) | High-beam headlight, right |
| 3 | (10 A) | Low-beam headlight, sidefinder left |
| 4 | (10 A) | Low-beam headlight, sidefinder right |
| 5 | (20 A) | Dashboard lighting, parking light/rear light, left |
| 6 | (10 A) | Instrument lighting, parking light/rear light, right |
| 7 | (20 A) | Worklight, front |
| 8 | (20 A) | Worklight, rear |
| 9 | (10 A) | Cab heating, left |
| 10 | (15 A) | Cab heating, right |
| 11 | (25 A) | Drum winch |
| 12 | (20 A) | Searchlight, reversing light |
| 13 | (10 A) | Front wiper, radio |

ELECTRICS



- 14 (10 A) Rear wiper / auxiliary hydraulics, rear
- 15 (10 A) Steering wheel, reversing alarm
- 16 (10 A) Front tiller blower, Pipe Magician, reversing camera
- 17 (10 A) Instruments, telltale lights
- 18 (20 A) Flashing indicators, horn
- 19 (20 A) Auxiliary hydraulics
- 20 (3 A) PSX electronics
- 21 (5 A) Engine electronics
- 22 (20 A) 24/12 V converter, driver's seat
- 23 (30 A) Engine electronics
- 24 (10 A) Terminal
- 25 (3 A) PSX electronics
- 26 (30 A) PSX electronics
- 27 (30 A) Voltage with engine running, mirror heater, side-window heater

- 28 (30 A) Rear-window heater
- 29 (10 A) Reserve
- 30 (20 A) Rotating beacon, clock, interior lighting
- 31 (10 A) Cold-start system
- 32-34 (10 A) Reserve
- 35 (10 A) Tracker plates
- 36 (10 A) Tracker plate tiller
- 49 (40 A) Front windscreen heater

H1 Main fuse

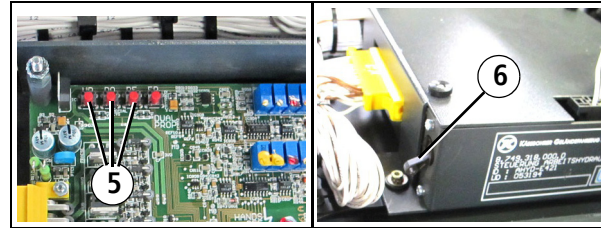
- 100 A 2 x main fuse
- 80 A 2 x Engine start



Miniature relay (K)

Miniature relays are not interchangeable.

- 1 Windscreen heating
- 2 SAT / radio
- 4 Parking lights
- 5 Driving lights
- 6 Flashing indicators
- 7 Voltage with engine running
- 8 Intermittent wipe, front
- 9 Intermittent wipe, rear
- 10 Warning buzzer
- 11 Reserve
- 12 Rear-window heater
- 13 Reversing light
- 14 Cold-start system
- 15 Reversing
- 16 - 24 Drum winch



Emergency actuation work hydraulics

- Switch off the rotary tiller

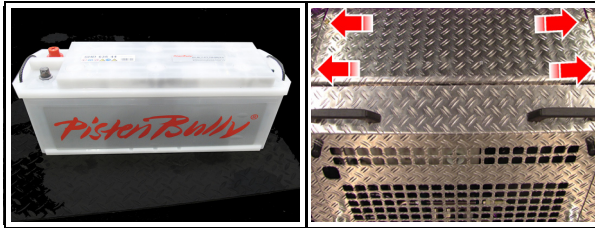
If the control system fails, the rear hydraulics for the auxiliary working equipment can be raised / lowered by means of emergency pushbutton 5.

UP + RE pressed = raising of the implement carrier

DO + RE pressed = lowering of the implement carrier

FR = Reserve

power supply = fuse **6** (20 Ampere)



vehicle battery

The **two 12 V, 135 Ah** batteries are mounted on the upper frame.

- Opening the cover on the carrier frame



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 battery fluid

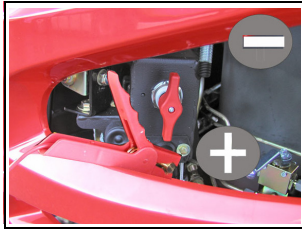


WARNING!



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

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



Charging the battery



WARNING!



Connect the battery clamps to the battery posts.

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.

- Connect the battery to the on-board electrical system by activating the battery master switch.

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.



Voltage peaks when disconnecting the adapter
Risk of damaging the electronic packaging!

Switch on great appliances (e.g. windscreen heating, seat heating) before disconnecting the jumber cable.



Risk of damaging electronic control units!

Do not attempt to start the engine using power boosters or power packs to boost the battery or as a substitute for the battery.

Connecting jump leads

1. From + **pole** clamp PB battery to + **pole** of donor battery (24 V).
 2. From – **pole** clamp PB battery to – **pole** of donor battery (24 V)
- Connect the battery to the on-board electrical system by activating the battery master switch.

Battery master switch

Switch off the battery master switch:

- if the electronics are defective.
- to help prevent the battery from discharging during a prolonged storage.

The battery master switch provides a means of isolating the battery from the vehicle's on-board electrics.



Voltage peaks:

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



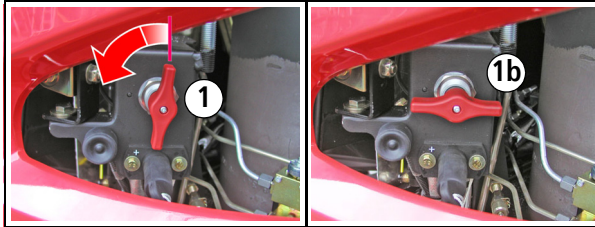
The engine electronics will lose data. Only 75% of rated engine power will be available when the engine is restarted.

Before disconnecting the battery from the vehicle's on-board electrics:

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

Situational help

If you make a mistake in the procedure: Switch off the ignition in the correct way and restart the engine. The engine will operate at full power



Disconnecting battery from on-board electrics

- Turn battery master switch **1** in the direction indicated by the arrow.

The battery is now isolated from the vehicle's on-board electrics (**1b**).

Connecting battery to on-board electrics

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



NOTES

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.).
- **New vehicle:**
Check security of wheels after the first 5 operating hours.
Tightening torque 300 Nm.

TOPPING UP FLUIDS AND LUBRICANTS



WARNING!

**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).**



WARNING!



**Risk of explosion due to build-up of gas in fuel tank.
Keep all possible sources of ignition when clear when the vehicle is being refuelled.**



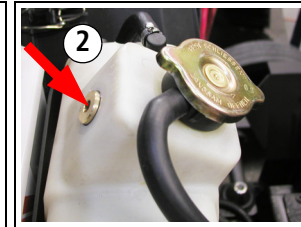
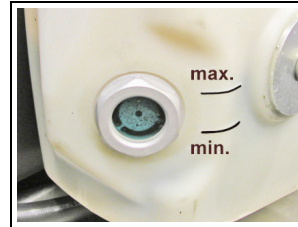
Do not spill fluids or lubricants (they are hazardous to soil and water). Always dispose of these substances in an environmentally compatible manner (comply with local laws).

CHECKING COOLANT LEVEL



Check the coolant level and top up only when the engine is cold. Slacken bleed screw **2** when topping up the coolant. This will enable the system to fill much more rapidly.

- 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.

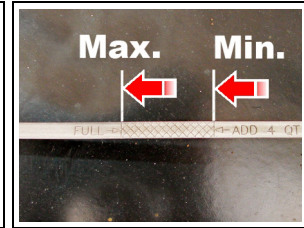
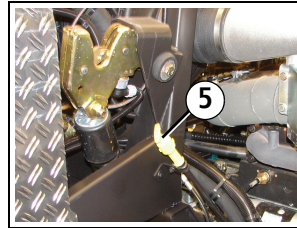


CHECKING ENGINE OIL LEVEL

- Use dipstick **5** to check the engine oil level.
- Top up the oil with the engine stopped and the PistenBully 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).



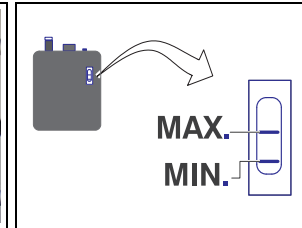
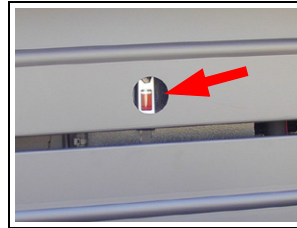
DAILY CHECKS

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

Air-intake flap set to induct air from engine compartment

- For powder snow or fine snow dust



Non-compliance can result in the air filter icing up and particles of ice damaging the blades of the turbocharger.



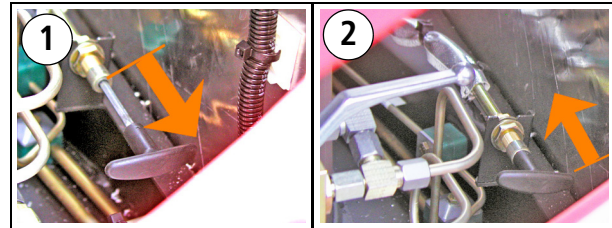
Air-filter symbol lights up as soon as the air filter ices up or requires replacement.

Air-intake flap set to induct fresh air from outside

- At temperatures above 0 °C



Non-compliance can result in the diesel engine losing power.



Adjusting air-intake flap

The control for adjusting the air-intake flap is beside the control for raising/lowering the load platform/cab.

1 = Air intake from engine compartment

- Turn the lever to the left and pull it in the direction indicated by the arrow.
Turn the lever to the right to lock.

2 = Fresh air (cold air)

- Turn the lever to the left and push it in all the way in the direction indicated by the arrow. Turn the lever to the right to lock.

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.

PistenBully with diesel particulate filter

- Check the exhaust pipe for soot deposits.
- Check formation of smoke during operation.
Stop operation during the exhaust of black smoke / Inform the service.



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).

TRACK TENSION

Checking track tension

- Vehicle parked on horizontal, snow-covered ground.
- No load on vehicle and auxiliary driven implements lowered.

Equalise 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

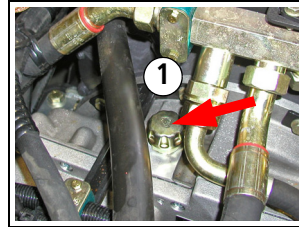
- Check the wheel fasteners and check tyre pressures.

Tightening torques

TYPE	TENSIONING AXLE	DRIVE AXLE	AIR PRESSURE, DRIVE AXLE
PistenBully 400	300 Nm	300 Nm	7.0 bar

TRANSFER CASE

- 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 transfer cases (see fluids and lubricants specifications).



ENTERING

- Before entering the cab, complete the daily checks and maintenance tasks.
- Walk right round the vehicle and make sure that the danger zone is clear of persons and objects.
- Always take a firm grip on grab handle **1** of the driver's door when entering the vehicle.
- Step onto the track.



Risk of slipping on the track when climbing into and out of driver's cab. Always take a firm grip on the handle in order to step onto the track.

In order to help ensure safe operation, operators must wear appropriate footwear with non-slip soles.

- Press the door lock. The driver's door opens.
Note: When parking on a slope, be particularly careful when opening the door. The door opens suddenly.
- Always take a firm grip on grab handle **2** of the driver's door.
 - Fully raise armrest **3**.
 - Take a grip on steering wheel **4** and swing yourself into the driver's seat



- Close the door.
- Adjust the seat and the steering wheel to an ergonomically comfortable position. Total lowering of the armrest (machines with sticks, version USA- out of operation when armrest is not lowered totally).
- Fasten the seat belt.
- Visual check:
Direction-of-travel switch in "Neutral" position, parking brake applied.

STARTING THE DIESEL ENGINE



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



WARNING!

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

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
 - 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 5 - 10 seconds
- Ignition ON



Situational help

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



Damage to electronics

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

- Cease operation
- Proceed with caution to the nearest workshop
- Disconnect the battery from the on-board electrics.

WARMING-UP PHASE

Air temperature above 0⁰ C to –20⁰ C



- Allow the diesel engine to idle for approximately 3 mins.
- Drive with the engine operating in the partial-load range.
- The engine can be operated at full load as of a coolant temperature of + 80⁰ C.

Air temperature below –20⁰ C



- Allow the diesel engine to idle for approximately 6 minutes.
- Drive with the engine operating in the partial-load range.
- The engine can be operated at full load as of a coolant temperature of + 80⁰ C.

INSTRUCTIONS FOR ENGINE BREAK-IN

Up to 40 operating hours

- Operate 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 of the auxiliary driven machinery remains unchanged.



DRIVING

- Switch on the rotating beacon.




WARNING!

Before driving, 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.
The assistance of a second person to give directions is necessary if visibility is poor.
- Release parking brake.
- Depress the accelerator pedal to increase engine rpm to above drive away speed: The PistenBully drives away.
- Observe all instruments when driving.

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.

PistenBully with diesel particulate filter

Optimal cleaning of the diesel particulate filter

- Driving with low diesel engine speed and high service loading.
- Avoid long periods of idle speed.
Maintenance of the diesel particulate filter

Engine oil pressure

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

Engine operating temperature

Gauge showing that temperature is too high?

Determine the cause, for example:

- Gauge in working order
- Not enough coolant in system
- Foreign matter clogging radiator on outside
- Check belt tension
- Check visco 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 inopportunistly.

Diesel tank empty!

The fuel system has drawn in air!

- Refuel the vehicle (*see the section entitled "Exiting"*)
- Switch the ignition ON and wait for approximately 30 sec. The fuel primer pump switches on.

- Switch the ignition OFF and wait for approximately 20 sec.
- Switch the ignition ON and wait for approximately 30 sec.
- Start the engine.

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.

Telltale light for parking brake

If the indicator lamp lights up, check the parking brake.

Situational help

PistenBully slows down on account of lack of propulsive power

- Use the potentiometer to reduce the speed of the auxiliary.



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.

The PistenBully will come to a stop if engine speed drops below pull-away speed.

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



WARNING!

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

The PistenBully will brake sharply to a complete stop if the parking brake is applied while the vehicle is in motion.

STOPPING AFTER USE

- Park the vehicle where it is clearly visible.
- Park the vehicle on a firm, level surface.
- Lower front and rear auxiliary implements,
 - Switch off the tiller.
 - Direction of travel switch in neutral position.
 - Apply the parking brake.
 - Relieve the tension of the track.
- Set engine idle speed to below 800 rpm.



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.

- Switching off engine.
 - Turn the ignition key to the **0** position.
- Remove ignition key and lock the cab.

EXITING

- Fully raise the steering-wheel column and the armrest.
- Be particularly careful when opening the door if the vehicle is parked on a gradient. The door opens suddenly.
- The procedure for exiting the vehicle is the reverse of the entry procedure.



WARNING!



Danger of slipping on the track when entering and exiting the driver's cab. Always take a firm grip on the handle in order to step off the track.



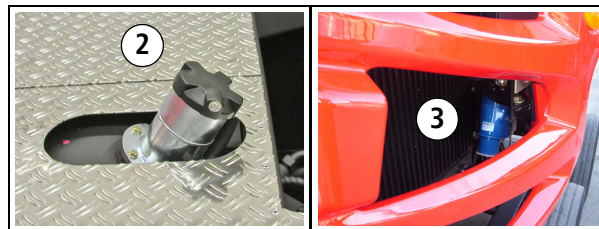
WARNING!



Risk of explosion due to build-up of gas in fuel tank.

Keep all possible sources of ignition when clear when the vehicle is being refuelled.

- Refuel **2** 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 restarted.
- Secure raised auxiliary driven implements.
- Connect coolant preheating (optional extra).



110/220 V adapter **3** 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.

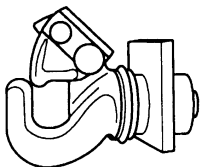


1 - 2 hours of preheating prior to starting does not improve cold starting.

Undertake preheating immediately after parking the vehicle.

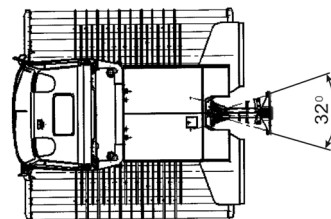
- Use only cables that comply with the applicable regulations in the country of use.

TOWING AWAY / TOWING HITCH



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 Centre.



Attachment weights, 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.



i The section entitled "Driving tips and information" is intended merely as an overview and is not under any circumstances to be considered in itself as providing adequate familiarisation with the driving characteristics of the PistenBully.

i Quantity is not as important as quality and economy.

LOW FUEL CONSUMPTION

- **Diesel engine rpm** green zone on rev. counter. Max. torque 1519 Nm at 1500 rpm.
- **Adjust tiller shaft speed** to suit snow conditions **by turning the potentiometer.**
- **Variably adjust tiller depth** to suit snow conditions **by observing the gauge and using the pushbutton controls.** 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

MEDIUM SNOW

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 vapour 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 recognisable 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 air 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. We also offer 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

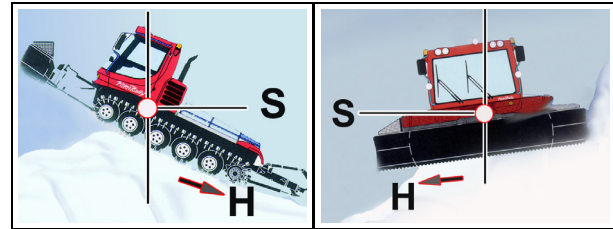
The climbing ability of the PistenBully depends on the limit of adhesion of the snow. The machine's centre of gravity is another factor influencing climbing ability. It is important for the driver to ensure that as much of the surface area of the tracks as possible is in contact with the ground, as otherwise 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 = Centre 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 manoeuvring 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.

126/139



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 manoeuvre 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 drifts off 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-stabilise 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:

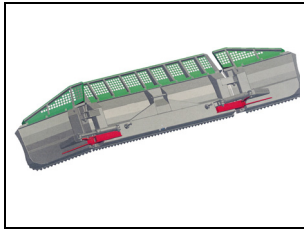
- Tiller shaft depth too high: Tiller quality output is negligible.
- Slope is not contoured in areas of hard snow.
- Tiller shaft depth too low: Insufficient snow processing, so the snow is forced out of the tiller at the side and forms an edge wall.
- The snow crystals' ability to cohere and the quality of the slope's substructure are impaired.
- More power input necessary – less economical.

Counter-rotating tiller shaft:

A PistenBully with electronic tiller control enables you to set the tiller shaft to rotate either forward (standard direction of rotation) or backward.



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



Correct usage:

- 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.



Material wear due to load.

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.

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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 front 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 PistenBully 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 PistenBully 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.

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.





ParkBlade

Fork damage caused by side load!

The forks must not be moved / raised sidewise!

ParkBlade

Correct usage:

- The ParkBlade is designed for constructing and maintaining funparks and boarder crosses.

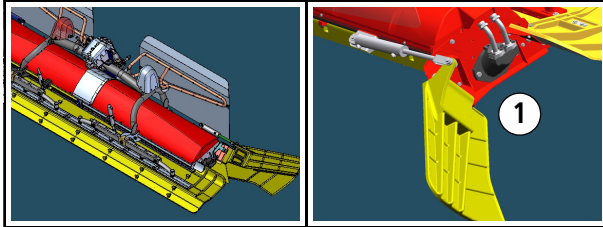
Funpark obstacles such as funboxes and rails can be transported on the forks.



WARNING!

**Risk of injury by crushing:
when extending / retracting the forks.**

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



The AlpinFlex tiller has been evolved as 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 synchronising 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.

Side finishers *(optional)*

Side finisher **1** has hydraulic tilt control, facilitating overlap with the prepared part of the run and helping prevent surface irregularities on the slope.

Setting the Alpinflex tiller to the rigid position

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



Tiller in rigid position

Top section pressed: Tiller unlocked

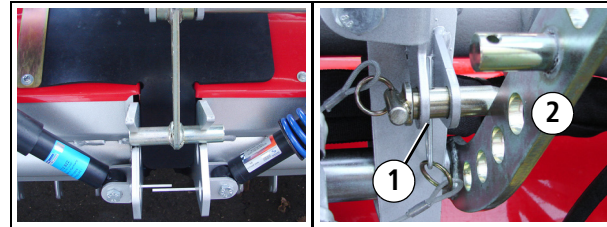
Bottom section pressed: Tiller in rigid position

Hydraulic actuation for "set to rigid"

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

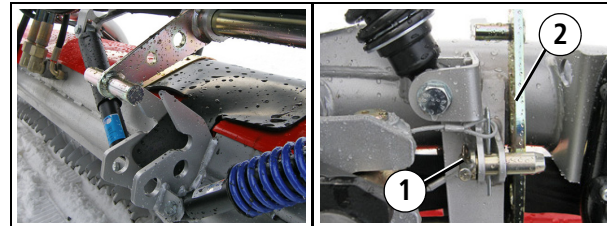
Cancelling "set to rigid" (unlock)

- Set down the Alpinflex tiller on a firm, level surface.
- Press the button until the hydraulic cylinder is fully retracted.



Manual actuation for "set to rigid" (standard)

- Pin **1** and adjusting lever **2** in position.
Insert the retainer to secure the pin.



Cancelling the "set to rigid" function

- Pull the pin and set adjusting lever **2** to position.
Lock pin **1** and install the retainer to secure.



NOTES

A

Additional weights	31
Adjusting recirculated-air intake	105
Adjusting tiller depth	54
Air temperature	113
Air-filter monitor	44
AlpinFlex tiller	132
Attachment weights, towing hitch	120

B

Battery	98
Battery charge indicator	36
Battery master switch	98
Battery-charge indicator	116
Bumpy runs	123

C

Cab heating	17, 35
Cancelling the "set to rigid" function	133
Centre of gravity	125
Change the keyboard layout	57
Charging the battery	96
Checking coolant level	102
Checking electrical system	106
Checking engine oil level	103
Checking hydraulic fluid level	104

Checking parking brake	107
Checking wheels	109
Climbing ability	125
Clock	35
Closing the deck railing	81
Connecting hydraulics	79
Connecting jump leads	98
Coolant level below the minimum level	44
Coolant temperature, diesel engine	35
Counter-rotating tiller shaft	128

D

Daily checks	101
Data loss	98
Diagnostics overview	66
Diesel fuel	35
Diesel tank empty	116
Direction indicators	41
Downgrade force	125
Drive hydraulics for auxiliary equipment front / rear	45
Driving	115
On downgrades	127
On upgrades	126
Driving with the PistenBully	126

E

Emergency mode, propulsion electronics	65
Engine diagnosis ON / OFF	36
Engine oil pressure	116
Engine oil pressure indicator	37
Engine operating temperature	116
Engine speed range	114
Engine-fault check	37
Entering – driving – exiting	111
Exiting	118
Extremely slushy snow	124

F

Fault-code displays	66
Front blade	129
Front equipment carrier in floating position	42
Front spotlight	90
Front worklights	40, 90
Fuel supply	116

H

Halogen-xenon	91
Heated windscreen wipers	34
Heater blower, steplessly adjustable	35
High-beam headlight / parking light H7	90
High-priority fault	67

Horn	41
Hydraulic actuation for "set to rigid"	133
Hydraulic fluid level warning light	116

I

Iced slopes/sheets of ice	123
If it is necessary to repeat the reheating procedure	112
Ignition lock	35
Indicator for engine management system	36
Installing auxiliary driven implements	78
Instructions for checks and maintenance	101
Instructions for engine break-in	114
Instrument displays	35
Intake air preheating	36

J

Jump starting	97
---------------------	----

K

Key to fault codes	69
Keyboard layout 0 to 4	58

L

Lights	90
Low fuel consumption	121
Low-beam headlight H7	90
Low-priority fault	68

M

Making a location line	130
Manual actuation for "set to rigid"	133
Medium-priority fault	68
Miniature relays	95
Most economical engine speed range	114
Multifunction switch	33

O

Offset front blower to either side.	42
Opening the rear deck railing	81
Outdoor temperature	35

P

ParkBlade	42, 131
Parking brake	34
Parking brake indicator	116
Parking lights	90
Parking lights / driving lights	40
Preparing fresh-fallen snow	122
Preparing the ski-slope	128

R

Raise	61
Ready for operation / driving	35
Rear deck railing	81
Rear light	90
Rear window heater	43
Rear worklights	40, 90
Release seat-belt lock, cockpit	42
Relieve track tension	44
Removing the auxiliary driven implement	80
Replacing fuses	93
Retracting side finishers for reversing	42
Revolution counter	35, 36
Rotary beacon	90
Rotating beacon	40, 90

S

Setting the Alpinflex tiller to the rigid position	133
Setting the Multiflex tiller to the rigid position	133
Side finishers	55, 132
Side worklights	90

Side-mounted flashing indicators	90	Tiller forward operation / counter-rotating	45
Side-window heating / exterior-mirror heating	43	Tiller in rigid position	133
Smoothing bumpy ski slopes	129	Tiller snow-flap	53, 61
Snow types	122	Tiller-depth indicator	35
Snow-flap adjuster for tiller	133	Tilting	86
Snow-flap position for tiller	35	Tilting the driver's cab	84
socket 12 V	35	Tilting the driver's cab and load platform	87
Spotlight	40	Tilting the load platform	86
Spotlight ON / OFF	41	Topping up battery fluid	96
Start procedure	112	Topping up fluids and lubricants	101
Starting	35	Towing hitch	120
Starting the diesel engine	112	Towing the PistenBully	120
Starting the engine	112	Towing vehicle	120
Stick	47	Track tension	108
STOP button	41	Tracker-plate spacing	44
Stopping / exiting	20	Transfer case	110
Stopping after use	117	Transport	73
T		Treeline light	90
Temperature control, steplessly adjustable	35	Treeline worklights	40
Terminal display	63, 73	Turn indicators	90
Test drive	108	Turning	126
Tightening torques	109	Turning with counter-rotating tracks	127



U

Using the manual pump for tilting and lowering88

V

Vehicle and engine numbers8

Vehicle battery96

Visual inspection106

Voltage peaks98

W

Warming-up phase113

Warning symbols38

Weekly checks107

Wet snow/slushy snow124

Windscreen heating42

Windscreen wiper, front43



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