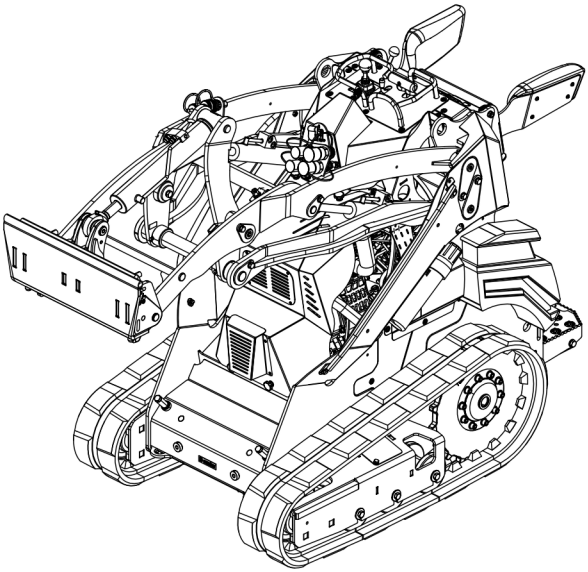
OPERATOR MANUAL

RECON VL2515T
SKID STEER LOADER



EN-US - Translation of the original manual

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TOB-0155419_PN1088-0000-00

WARNING Please carefully read and understand the contents of this manual. Failure to read the manual can result in serious damage, injury or death. Keep this manual with the machine at all times. Make sure that all operators of the machine have read and understood the contents of this manual.

WARNING Preposition 65: diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, or other reproductive harm.

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BAD BOY MOWERS, LLC reserves the right to change specifications and or parts without prior notice. The content of this manual can also be changed without prior notice.

For information about settings, maintenance or repairs not provided for in this manual, please contact the dealer.

BAD BOY MOWERS, LLC accepts no liability for damage and/or problems arising from the use of parts which have not been supplied by BAD BOY MOWERS, LLC.

This manual was created with the utmost care. BAD BOY MOWERS, LLC assumes no responsibility for any errors in this manual and/or the consequences of an erroneous interpretation of the instructions.

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This is the Operator Manual (OPM) of the Bad Boy RECON VL2515T. This document is for trained and authorised operators only. Refer to *Trained and authorised personnel* on page 42 for more information. This document gives the information that is necessary to operate and perform first-line maintenance on the machine.

The OPM provides detailed operating procedures for safe, effective and proper use of the machine. Safe operation is detailed in chapter *Safety* on page 37 Specifications, first-line maintenance and troubleshooting information are also included in this manual.

Improper operation, inspection and maintenance of the machine can result in injury or death. Read and understand the contents of this manual completely and become familiar with the machine before operation. Contact the authorized BAD BOY MOWERS, LLC dealer with any questions about information in this manual, if extra manuals are required, or about availability of manuals in other languages.

Applicable machines

The document is only applicable for these types of Bad Boy Skid Steer Loader variants, from here on in the document referred to as "the machine":

- VL2515T

Language

WARNING

If this machine is located in North America:

- Only use the translation of this manual that is applicable for the region where the machine is used (EN-US, ES-US or FR-CA).
- The original instructions in this document are created in English (EN-GB). All other language versions are translations of the original instructions. In the event of ambiguity and/or disputes, the English (EN-GB) text always takes precedence.
- If the machine is delivered with a manual in an incorrect language, please contact the dealer to receive a correct version of the manual.

Manual storage

This document is a part of the machine. Make sure that the document is kept in a dry and clean location (e.g. in a document holder) on the machine.

Icons and signal words used in the document

DANGER

Warns about a situation that **WILL** cause death, serious physical injury and/or heavy material damage if one does not obey the (safety) instructions.

WARNING

Warns about a situation that **CAN** cause death, serious physical injury and/or heavy material damage if one does not obey the (safety) instructions.

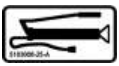
CAUTION

Warns about a situation that can cause material damage if one does not follow the (safety) instructions.

Provides additional information that is helpful to do a task or to avoid problems.

This symbol indicates required tools.

This symbol indicates required parts.

Icon	Meaning
	Indicates that the same part is also present at the opposite side.
	Use a grease gun to lubricate the lubrication points.
	Visual inspection.
	Location of an eyelet to tie down the machine.
	Location of an eyelet to lift the machine.

Illustrations

It is not always possible to show the exact configuration of the machine. The illustrations in this document show a standard set-up. They are for instruction and description purposes only.

Recommissioning

If the machine is resold, include this OPM as part of the sale. If a used machine was purchased, or if the owner's address has changed, please provide the BAD BOY MOWERS, LLC dealer or BAD BOY MOWERS, LLC with the current owner's name and address, along with the machine model and serial numbers. This will allow the registered owner information to be updated, so that the owner can be notified directly in case of important product issues, such as a safety update program.

Version history

Every effort has been made to make this manual as accurate and complete as possible. If any errors or omissions are discovered, please bring this to the attention of BAD BOY MOWERS, LLC, so possible revisions can be made. This will enable the improvement of the documentation.

The instructions in this manual do not take into account different national regulations and laws. When operating the machine, it is the sole responsibility of the operator to make sure that all applicable (local) laws and regulations are obeyed.

During the lifetime of the machine, engineering improvements can result in the need to revise this manual. It is then at the discretion of BAD BOY MOWERS, LLC if a revision or new version of this manual is required.

The following table describes the main changes for each document version of this manual.

Version	2026 changes
R2604	Original release.

Typographical conventions

- SI units of measurement are used. It is possible that the document shows imperial or other units of measurement in round brackets: ( ).
- The steps in procedures have numbers (123) if the sequence is important.
- Lists and steps with bullets (•) are used if the sequence is not important.
- Lists with letters (ABC) are used if the sequence is important.
- A text in round brackets (option) indicates that the section applies to an optional part of the machine.

Contents

Preface.....

Applicable machines.....3
Language.....4
Manual storage.....4
Icons and signal words used in the document.....4
Illustrations.....5
Recommissioning.....6
Version history.....6
Typographical conventions.....7

1 Introduction.....15

1.1 Exclusions.....15

2 Description.....17

2.1 Machine components.....17
2.2 Dashboard.....18
2.2.1 Switch panel.....19
2.3 Ignition switch.....21
2.4 Jump-start connections.....22
2.5 Auxiliary hydraulic connections.....23
2.6 Soft brake.....24

3 Applications.....25

3.1 Road usage.....25
3.2 Working surface.....26
3.3 Attachments.....26

4 Technical data.....29

4.1 General.....29
4.2 Engine.....30
4.3 Tyre specifications.....30
4.4 Tracks specifications.....31
4.5 Tipping loads and work loads.....31
4.5.1 VL2515T.....33
4.6 Dimensions.....34
4.7 Machine width.....35
4.8 Maximum slope angle.....35

5 Safety..... 37
5.1 General safety rules.....40
5.1.1 Liability..... 41
5.1.2 Intended use of the machine.....41
5.1.3 Trained and authorised personnel.....42
5.1.4 Approved attachments.....44
5.1.5 Personal protective equipment (PPE)..... 45
5.2 Provision for stability/Avoiding roll-over accidents..... 46
5.2.1 Instability..... 48
5.3 Work environment..... 54
5.3.1 Terrain..... 54
5.3.2 Slopes..... 55
5.3.2.1 Parking on slopes.....57
5.3.3 Danger zone..... 58
5.3.3.1 Towing the machine out of a danger zone..... 58
5.4 Mandatory safety shutdown procedure.....59
5.5 Before starting the machine.....60
5.6 During operation.....63
5.6.1 Operation with loads.....69
5.6.2 Attachment bracket.....71
5.7 Maintenance and servicing safety practices..... 71
5.8 Safely transporting the machine..... 76
5.8.1 Lifting the machine with a crane..... 77
5.9 Safety hazards..... 78
5.9.1 Hazard and hazard-avoidance symbols..... 78
5.9.2 Fire and burn hazards.....79
5.9.3 Hydraulic system hazards..... 81
5.9.4 Battery hazards.....84
5.9.5 Electrical energy hazards..... 86
5.10 Safety labels.....88
5.10.1 Applying a new (safety) label..... 88
5.10.2 Location of the safety labels.....89
5.10.3 Description of the safety labels..... 90

6 Transport and storage..... 95
6.1 Loading and unloading the machine.....96
6.2 Lifting the machine.....99
6.3 Towing the machine..... 100
6.4 Storing the machine..... 100

7 Commissioning.....101

8 Operation.....103

8.1 Starting the machine.....103
8.1.1 Preparing.....103
8.1.2 Starting the machine.....104
8.2 Switching the machine off.....106
8.3 Locking and unlocking the footplate.....107
8.4 Driving the machine.....108
8.4.1 Driving and turning.....109
8.4.2 Driving with and without load.....113
8.5 Parking the machine.....115
8.6 Using the controls.....116
8.7 Coupling and uncoupling the attachment.....119
8.7.1 Hydraulic attachment lock with switch.....120
8.7.1.1 Coupling.....120
8.7.1.2 Uncoupling.....123
8.7.2 Mechanical attachment lock.....125
8.7.2.1 Coupling.....125
8.7.2.2 Uncoupling.....128
8.8 De-pressurizing the auxiliary hydraulic connections.....129
8.8.1 With mechanical lever.....130
8.9 Fuel.....131
8.9.1 Adding fuel.....131

9 Maintenance.....133

9.1 Installing the safety bracket.....134
9.2 Removing the engine cover.....136
9.3 Accessing the cooler.....137
9.4 Preventive maintenance schedules.....138
9.4.1 Operator maintenance.....138
9.4.1.1 Daily maintenance/Every 10 hours.....138
9.4.1.2 Every 50 hours.....139
9.4.2 Dealer maintenance schedules.....140
9.4.2.1 Maintenance after the first 50 hours.....140
9.4.2.2 Maintenance every 250 hours.....141
9.4.2.3 Maintenance every 500 hours.....142
9.4.2.4 Maintenance every 1000 hours.....143
9.4.2.5 Maintenance every 1500 hours.....144

9.4.2.6 Maintenance every 3000 hours....144
9.4.2.7 Maintenance every year....145
9.4.2.8 Maintenance every 2 years....146
9.4.2.9 Maintenance every 6 years after hydraulic hose production date....147
9.5 Fluid specifications....148
9.5.1 Additional engine oil specifications....148
9.5.2 Additional coolant specifications....148
9.5.3 Additional hydraulic oil specifications....149
9.6 Electricity....150
9.6.1 Overview fuses....150
9.6.1.1 Fuses and relays....150
9.6.2 Jump-starting the machine....151
9.7 Frame maintenance....152
9.7.1 Lubrication points....152
9.7.2 Adjusting footplate height....154
9.8 Engine maintenance....155
9.8.1 Checking the oil level and adding oil....155
9.8.2 Checking and adding coolant....157
9.8.3 Air intake system....160
9.8.3.1 Checking and cleaning the air filter....160
9.8.3.2 Checking intake air lines....164
9.9 Hydraulic system maintenance....165
9.9.1 Checking the hydraulic oil level....166
9.9.2 Checking for leaks, wear, cracks and damage....168
9.9.3 Checking the cylinders....168
9.9.4 Checking the dust-caps on the couplers....168
9.10 Transmission maintenance....168
9.10.1 Correct torque of tracks....168
9.10.2 Cleaning the tracks....170
9.10.3 Checking and adjusting the tracks tension....171

10 Troubleshooting....173
10.1 Troubleshooting procedure....173
10.2 Possible malfunctions....173
10.3 Warning lights....175

11 Environment....177
11.1 Waste disposal....177
11.2 Safe disassembly....177

12 Terms of warranty..... 179

13 Appendix.....181
13.1 Maintenance Log.....181

14 General Purpose Bucket.....185

15 GP Bucket: Preface.....187
Illustrations.....187
Recommissioning.....187
Version history.....188

16 GP Bucket: Introduction.....189
16.1 Exclusions..... 189
16.2 Legal requirements..... 190

17 GP Bucket: Description and technical data.....191
17.1 Description.....191
17.2 Technical data..... 191
17.2.1 General..... 191
17.2.2 Bucket specifications..... 192
17.2.3 Approved machine type.....192
17.2.4 Wear criteria..... 193

18 GP Bucket: Safety.....195
18.1 Safety..... 195
18.1.1 Liability..... 198
18.1.2 Mandatory safety shutdown procedure.....198
18.1.3 Trained and authorised personnel.....199
18.1.4 General safety rules..... 200
18.1.5 Personal protective equipment (PPE).....201
18.1.6 Before using the attachment..... 202
18.1.7 During operation..... 203
18.1.7.1 Operation with loads..... 206
18.1.8 Provision for stability/Avoiding roll-over accidents.....208
18.1.9 Electrical energy hazards..... 209
18.1.10 Maintenance and servicing safety practices.....211
18.1.11 Fire and burn hazards..... 214
18.1.12 Hydraulic system hazards.....215

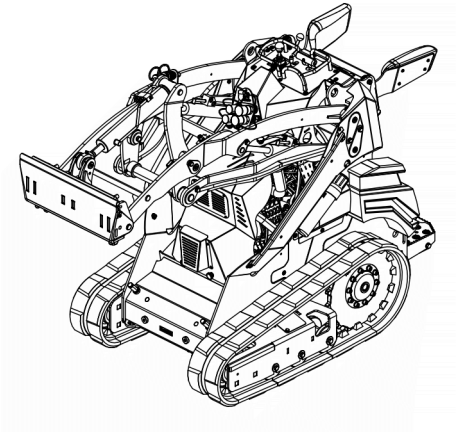
19 GP Bucket: Transport, storage and commissioning.....217
19.1 Transport and storage.....217
19.2 Commissioning.....218

20 GP Bucket: Maintenance.....219
20.1 Maintenance schedule.....219
20.2 Wear parts.....220
20.3 Replacing the wear parts.....220

21 GP Bucket: Environment, decommissioning and waste disposal.....221
21.1 Environment.....221
21.2 Decommissioning and waste disposal.....221

1 Introduction

The Skid Steer Loader is an all-round, versatile, user friendly and durable machine. Depending on the attachment that is used, the machine can lift and move heavy loads such as sand, gravel stones, trees or hay bales. In addition, the machine can be used, for instance, to cut silage, to mix, to distribute straw, to brush or to shovel snow.



1.1 Exclusions

DANGER Hoisting suspended loads using hoisting gear (e.g. lifting slings) is not allowed, unless an attachment is used that is intended for these exact purposes and that is approved by BAD BOY MOWERS, LLC.

CAUTION

- The machine can only be operated in an environment between -15 °C and +40 °C.
- The machine can only be stored in an environment between -15 °C and +50° C.

The machine is not intended for lifting and transporting:

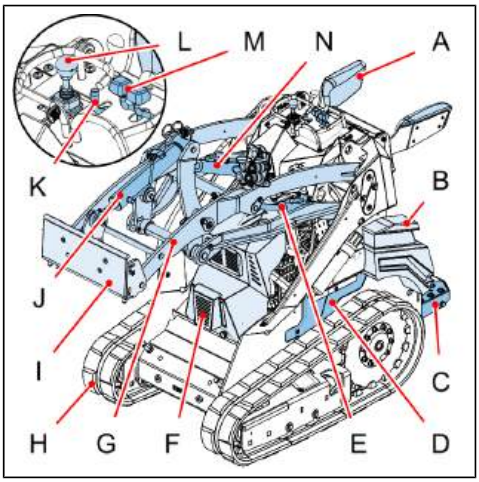
- Persons and animals
- Products that can cause the release of toxic and/or explosive substances during handling
- Products containing hazardous substances
- Tanks with liquids
- Combustibles
- Other liquids and dangerous substances not mentioned above

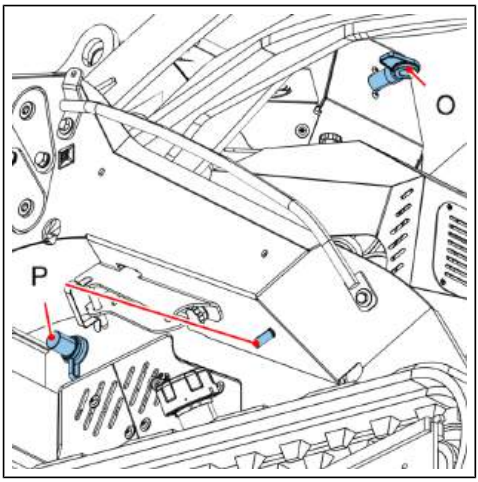
Refer to *Applications* on page 25 for detailed information about the applications.

2 Description

This section provides an overview of the main components and functions.

2.1 Machine components

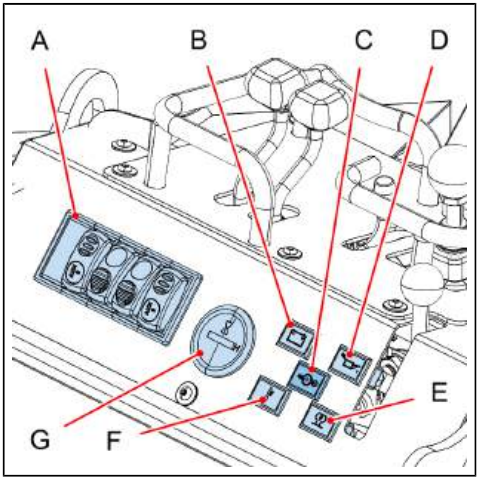




A. Flank protection
B. Fender
C. Footplate
D. Battery cover plate
E. Lift cylinder left
F. Engine cover
G. Lifting arm
H. Tracks
I. Attachment bracket
J. Tilt cylinder
K. Auxiliary hydraulic function lever
L. Joystick
M. Drive direction levers
N. Lift cylinder right
O. Battery switch
P. Jump-start connections

2.2 Dashboard

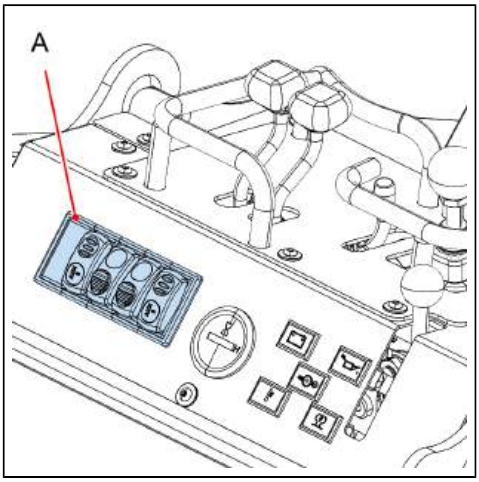
Illustration(s) can differ from the actual configuration.



Symbol	Meaning	Symbol	Meaning
A	Switch panel	E	Glow plug indicator light
B	Alternator warning light	F	Engine temperature warning light
C	Hydraulic oil temperature warning light	G	Hours meter
D	Engine pressure warning light		

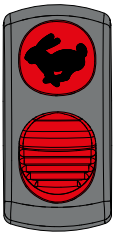
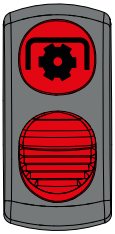
2.2.1 Switch panel

- It is possible that some features and controls in the table below are not present on the machine.
- The exact functionality of the machine depends on its configuration.

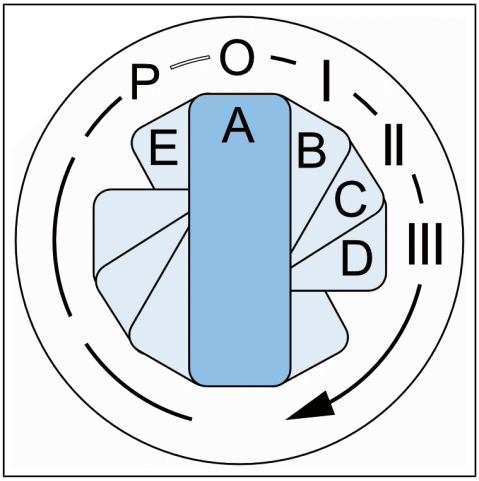


A. [Switches location]

Switch symbol	Meaning	How to use
	Front work lights	Press once to switch the front work lights on or off.
	Unlock attachment	This switch operates the locking pins of the attachment bracket at the front of the lifting arm: • Press and hold this switch to retract the locking pins of the attachment bracket and unlock the attachment from the machine. Refer to *Hydraulic attachment lock with switch* on page 120.

Switch symbol	Meaning	How to use
	Flex Flow®	This switch operates the Flex Flow® functionality. This makes it possible to select the preferred hydraulic oil power for the double gear pump. By default, the high power functionality for the double gear pump is enabled. • Move the slider upwards and press down on the switch to select low power for the double gear pump functionality. As a result, the maximum driving speed will be increased. • Press the switch again to return to the default setting of the double gear pump (high power). As a result, the maximum driving speed will be decreased.
	Double gear pump	• Move the slider upwards and press down on the switch to switch the second gear pump on. • Press the switch again to switch the second gear pump off.
AUX 2	12-V auxiliary connection	Press once to switch the 12-V connection on the lifting arm on or off.

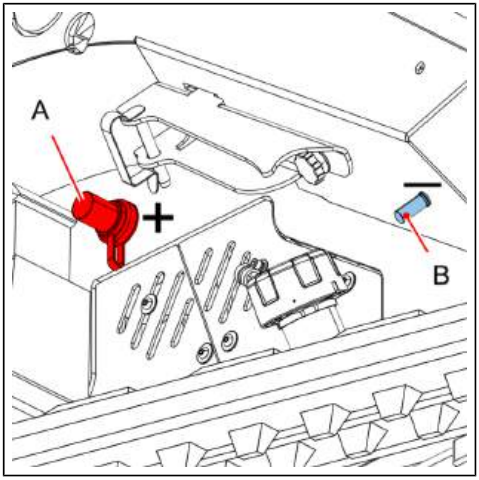
2.3 Ignition switch



A. Stop engine
B. Contact on
C. Glow (pre-heating)
D. Crank engine (spring loaded)
E. [N/A]

2.4 Jump-start connections

WARNING Refer to *Jump-starting the machine* on page 151 for safe jump-start instructions.

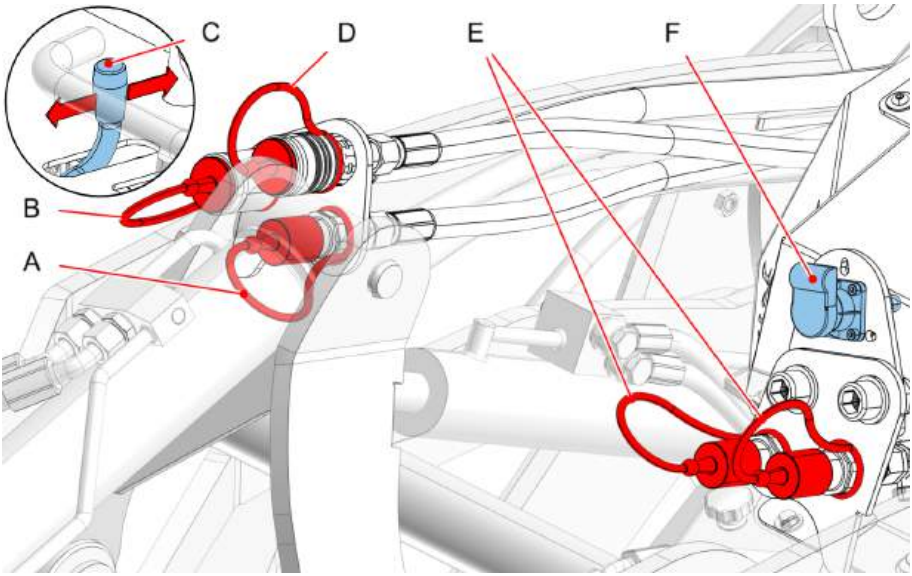


A. Positive terminal
B. Negative terminal

The jump-start connections (A & B) are located on the right-hand side of the machine. Use these jump-start connections (A & B) if the machine does not start because of a dead battery.

2.5 Auxiliary hydraulic connections

- Illustration(s) can differ from the actual configuration.
- The exact functionality of the machine depends on its configuration.



Connection	Function	How to operate
A	Double gear pump pressure	Press the appropriate switch on the switch panel. Refer to *Switch panel* on page 19.
B	Free oil return	[N/A]
D	Case drain	[N/A]
E	Auxiliary function 1	Move lever (C) forwards or backwards.
F	12-V auxiliary connection	Press the appropriate switch on the switch panel. Refer to *Switch panel* on page 19.

2.6 Soft brake

WARNING

- Always make sure that the operator is familiar with the handling of the machine. This type of machine is very responsive. If the control levers are suddenly released while driving the machine, it is possible that the operator falls from the machine, causing serious injury.
- Always observe the instructions found in *Driving the machine* on page 108.

The soft brake functionality will make the machine slightly less responsive when the drive direction lever is abruptly released. The machine will not come to an immediate standstill once the drive direction lever is released, but instead it will keep moving for a short while longer, before it completely stops. This decreases the chances of the operator falling from the machine.

Even with the soft brake installed, the machine is still very responsive. At all times, the operator must be familiar with the handling of the machine.

3 Applications

The machine can be used for lifting and transporting:

- Sand or gravel with closed or open bucket
- Materials and parts on pallets with pallet forks
- Manure with a manure fork
- Kerbs with a kerb clamp
- Stones with a stone clamp
- Trees with a tree harvester
- Hay bales with a bale fork

The machine can also be used, for instance, to:

- Cut and transport silage
- Blow or brush
- Slide snow

3.1 Road usage

WARNING

Depending on the region where the machine is used, different (local) laws and regulations can apply:

- Always obey the relevant (traffic) laws and regulations.
- Make sure that the machine complies with the relevant (local) laws and regulations. This can also imply additional features on the machine.
- (National) laws and regulations can limit the maximum vehicle speed.

Public roads

WARNING

Driving the machine on public roads is **NOT** allowed.

Private terrain

WARNING

- Use additional light(s) where visibility is seriously restricted.
- The maximum (allowable) speed of the machine is 6 km/h.

3.2 Working surface

- The machine is intended for riding on firm and level ground.
- The stability of the machine is dependent on the load and the lifting height. For the maximum load, refer to *Technical data* on page 29.

3.3 Attachments

WARNING

- BAD BOY MOWERS, LLC is excluded from any liability for damage and consequential damage due to the use of non-approved attachments.
- When using non-approved attachments, it is possible that specifications, such as the parallel system, tipping load and lifting capacity cannot be achieved.

WARNING

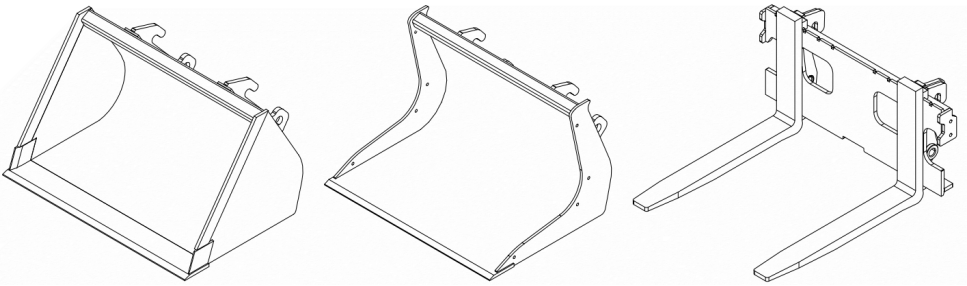
An installed attachment should be suitably shielded and placed in a position that:

- does not block the operator's sight;
- does not block the lighting of the machine (if applicable); and
- does not endanger any other road users.

WARNING

Always read and obey the instructions in the OPM of the attachment.

Below are some examples of attachments. Ask the dealer for a comprehensive list of attachment options for this machine.



4 Technical data

CAUTION

- (Local) laws, regulations and different machine configurations can influence the exact technical data of the machine.
- Refer to the type plate on the machine for the specific technical specifications of the machine. Technical data can vary, depending on the configuration of the machine.

Maximum tractive efforts are measured on moving machines operating at a driving speed of 1 to 4 km/h.

4.1 General

Part	Description
Engine	Diesel
Power train	Hydrostatic track by 2 heavy hydraulic motors
Max. tractive effort*	4.5 kN
Hydraulic pump 1	Displacement 6.5 cm^3
	20 litre/min (18 MPa @3000 rpm)
Hydraulic pump 2	Displacement 14.5 cm^3
	44 litre/min (18 MPa @3000 rpm)
Driving speed*	0-6 km/h (1 mi/h ≈ 1.609 km/h)
Controls	Spring-loaded levers/joystick

* Depending on configuration

Weight category	Weight*
Gross vehicle weight (GVW)	1100 kg
Shipping mass	965 kg
Max. gross mass	1900 kg

* Depending on configuration

4.2 Engine

The data below regarding the engine output represents gross ratings as defined by the SAE J1995 standard.

Part	Description
Make and model	Kubota D902
Power output	18.2 kW/25 hp @ 3600 rpm
No load idle speed	950 rpm
No load max. speed	3870 rpm
Displacement	898 cm^3
Max. torque	55.5 Nm @ 2000 rpm

4.3 Tyre specifications

CAUTION The inflation pressure varies depending on the type of work, drive speed and load capacity of the machine. Do not exceed the specified inflation pressures as indicated on the tyre and the technical data sheet of the tyre manufacturer.

For a comprehensive list of suitable tyres for the machine, please contact the dealer.

4.4 Tracks specifications

Type	Size	Total width
Track 230	230x72x38	1000 mm

4.5 Tipping loads and work loads

WARNING

The tipping load is the amount of weight that will cause the rear end of the tracks of the machine to be lifted from the ground, i.e. before the machine will start to tip over. Tipping loads do **not** equal the maximum work load.

WARNING

The work load is the maximum load that can be safely lifted when the machine is at a complete standstill. The maximum work load depends on the working surface and position of the machine.

WARNING

Maximum work loads, in accordance with ISO 14397-1:

- Level surfaces: tipping load value x 0.8
- Uneven surfaces: tipping load value x 0.6

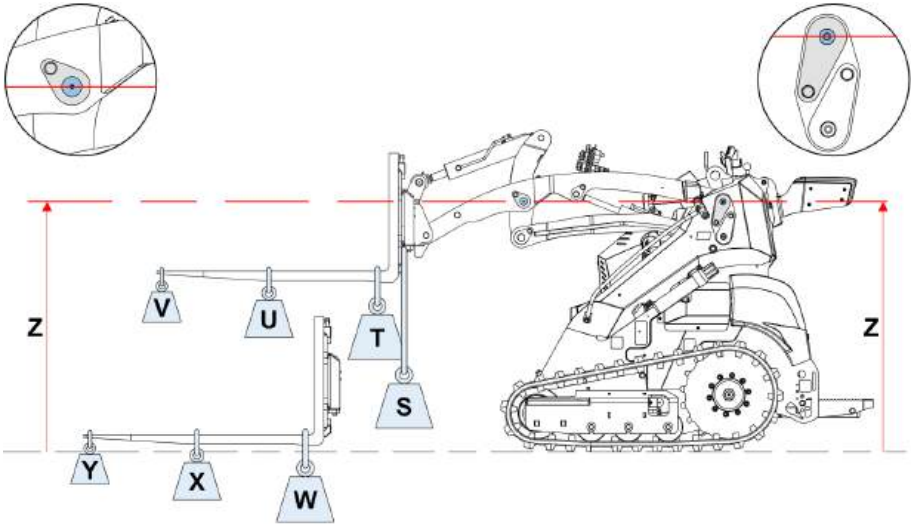
CAUTION

Tipping loads are measured on machines:

- with a *BAD BOY RECON* attachment bracket. Tipping loads can vary if a different type of attachment bracket is used;
- on a firm and level surface;
- with the lifting arm and attachment in horizontal position, as indicated by (Z)
- with the lifting arm in the lowest position and the attachment in horizontal position; and
- with an operator on board (60 kg).

Tipping loads can vary, depending on the configuration of the machine.

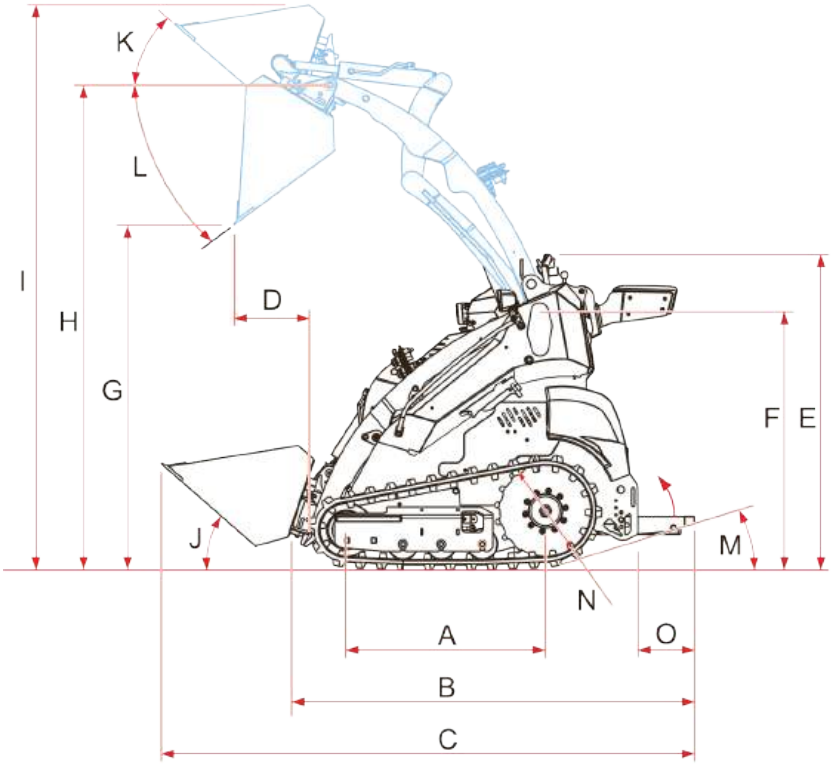
4.5.1 VL2515T



Position	Tipping load (kg [lbs])	
	No counterweight	Counterweight 60 kg
S	1043 (2299)	1168 (530)
T	970 (2138)	1086 (493)
U	525 (1157)	589 (267)
V	360 (794)	403 (183)
W	2267 (4998)	2556 (1159)
X	736 (1623)	829 (376)
Y	439 (968)	495 (225)

4.6 Dimensions

VL2515T

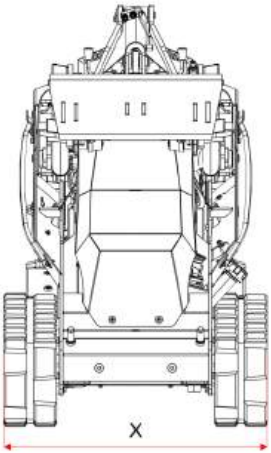


A.	830 mm	**I.**	2350 mm
B.	1680 mm	**J.**	41°
C.	2230 mm	**K.**	33°
D.	320 mm	**L.**	36°
E.	1320 mm	**M.**	18°
F.	1080 mm	**N.**	-
G.	1450 mm	**O.**	240 mm
H.	2030 mm		

4.7 Machine width

Tracks

The total machine width varies, depending on the used tracks and configuration of the machine.



Position	Total machine width
X	900-1000 mm

4.8 Maximum slope angle

WARNING

Whenever possible, operate the machine on a firm and level surface. Refer to *Slopes* on page 55 for more information about operating the machine on slopes.

WARNING

If the machine must be operated on a slope, do not exceed the maximum angles as mentioned in the table below.

Application	Maximum degrees of angle	Requirements for safe operation
Tilting machine sideways	4° (7 %) [per side]	• Lifting arm: in lowest position. • Driving speed: max. 3 km/h
Tilting machine lengthwise	12° (21 %)	• Lifting arm: in lowest position. • Driving speed: max. 6 km/h
Driving machine onto a trailer	20° (36 %)	• Lifting arm: in lowest position. • Driving speed: max. 2 km/h • Load: 20 % of maximum load capacity is allowed.

5 Safety

This chapter is about security and the safe operation of the machine. This manual and the (safety) labels on the machine warn of safety hazards and should always be read and observed closely. Before operating the machine, first read and study the safety information in this manual. Additionally, anyone who operates or works on the machine must be familiar with these safety precautions.



This safety alert symbol indicates:

"Attention! Always be alert! Personal safety is involved!"

This symbol is used throughout this OPM and on the safety labels on the machine.

DANGER “DANGER” indicates an imminently hazardous situation, which, if not avoided, **WILL** result in death, serious injury and/or heavy material damage.

WARNING “WARNING” indicates a potentially hazardous situation, which, if not avoided, **CAN** result in death or serious injury.

CAUTION “CAUTION” indicates a potentially hazardous situation, which, if not avoided, can result in (heavy) material damage. It is also used to alert operators of unsafe practices.

⚠ WARNING

- It is essential that operators are thoroughly trained in the safe operation of the machine and the handling of loads (if applicable).
- It is the owner's responsibility that operators are given a complete instruction on the operation and safety of the machine.
- The owner is responsible for the fact that only trained and authorised personnel is allowed to drive and use the machine.
- All operators must be trained, competent and in a condition to work safely and correctly.
- Do not allow minors, and untrained, unqualified or unauthorised personnel to operate the machine, or to be near the machine, unless they are properly supervised.
- It is recommended that the operator is capable of obtaining a valid motor vehicle operator's license.

⚠ WARNING

- Use of this machine is subject to certain hazards that cannot be eliminated by mechanical means. Likewise, some risks of injuries are not immediately apparent. Always exercise intelligence, care and common sense, and follow the operating and maintenance instructions.
- Such hazards include: hillside operation, overloading, load instability, poor maintenance, and using the machine for a purpose for which it was not intended.

WARNING

- BAD BOY MOWERS, LLC always takes ultimate care for operator's safety during the design process. If applicable, guards and shields are provided, which protect the operator and bystanders from moving parts and other hazards. These guards and shields should be in the correct operating positions before using the machine.
- Operators must remain alert, because some areas cannot be guarded or shielded without preventing or interfering with correct operation of the machine and/or attachment.
- Different applications can require optional or additional safety equipment. Refer to *Personal protective equipment (PPE)* on page 45.

WARNING

- Make sure that the operator knows the worksite hazards. The machine and operator must be equipped as necessary. The information in this OPM does not replace any applicable (local) safety laws and regulations.
- Before operating the machine, the operator must know the (local) laws and regulations applicable to the work environment/area of operation. Make sure that the machine is equipped and used in accordance with these (local) laws and regulations.

WARNING

- Make sure that the operator is aware of additional risks present in the work environment.
- It is possible that e.g. exhaust gases and noise pollution are not visible or noticeable, but these hazards can cause permanent injuries.

WARNING

- Some illustrations in this manual can show doors, guards and shields opened or removed for illustration purposes only.
- If applicable: make sure that any doors, guards or shields are always in the correct operating positions before starting and using the machine.

Some parts and components are sourced from third-party suppliers and can therefore show additional (safety) information that is not included in this OPM.

5.1 General safety rules

WARNING

- Make sure that the operator knows the worksite hazards and the (local) laws and regulations. The information in this document does not replace any applicable (local) safety laws and regulations.
- If local laws or regulations are stricter than national laws, the local laws or regulations will prevail.

WARNING

- Do not make any modifications to the machine without the written consent of BAD BOY MOWERS, LLC.
- Make sure that all maintenance is done correctly and at the correct maintenance intervals. Refer to *Maintenance* on page 133.

WARNING

- Hoisting suspended loads using hoisting gear (e.g. lifting slings) is not allowed, unless an attachment is used that is intended for these exact purposes and that is approved by BAD BOY MOWERS, LLC.
- Keep children away from the machine and/or attachment at all times.
- Make sure that the machine has completely stopped before opening the engine cover.

5.1.1 Liability

WARNING

BAD BOY MOWERS, LLC is not responsible for direct and indirect damage caused by operator error, lack of maintenance or any use other than described in this document.

WARNING

The liability of BAD BOY MOWERS, LLC is also void when modifications or extensions are applied to the machine or to accessories without the written consent of BAD BOY MOWERS, LLC.

WARNING

It is the responsibility of the owner to make sure that:

- only trained and authorised operators operate the machine and perform operator maintenance on the machine; and that
- only trained and authorised service engineers perform other service tasks on the machine.

5.1.2 Intended use of the machine

DANGER

Hoisting suspended loads using hoisting gear (e.g. lifting slings) is not allowed, unless an attachment is used that is intended for these exact purposes and that is approved by BAD BOY MOWERS, LLC.

WARNING

The machine is not intended to tow other vehicles or trailers.

WARNING

Do not use the machine to lift:

- persons and animals;
- products that can cause the release of toxic and/or explosive substances during operation;
- products containing hazardous substances;
- tanks with liquids;
- combustibles; and
- other liquids and dangerous substances that are not mentioned above.

WARNING

- Only use original parts, accessories and consumables on the machine that have been approved by BAD BOY MOWERS, LLC.
- The machine is intended to drive on flat, hard surfaces. Using the machine on softer surface, e.g. mud, is at the operator's discretion.
- The machine is intended to only lift and move loads with approved attachments. Refer to *Attachments* on page 26 and *Approved attachments* on page 44.
- Only use the machine for the above-mentioned work.

5.1.3 Trained and authorised personnel

WARNING

- It is the owner's responsibility that operators are given a complete instruction on the operation and safety of the machine.
- The owner is responsible for the fact that only trained and authorised personnel is allowed to drive and use the machine.
- Only trained and authorised operators are allowed to perform the work shown in this document.

WARNING

All operators of the machine and attachment(s) must:

- be trained, competent and in a condition to work safely and correctly;
- know, understand and obey the instructions described in this document; and
- be over the age of 16.

If the operator is not yet 18 years old, supervision by another trained and authorised operator who is at least 18 years old is required.

WARNING

Do not allow the machine to be controlled by:

- persons without experience with the machine and without supervision present; and
- persons who are to be expected to be unaware of the dangers of the machine, e.g. a temporary workforce.

WARNING

- If necessary: make sure that safety instructions are passed on to other operators of the machine.
- At all times, the operators must know the contents of this OPM before using the machine.

5.1.4 Approved attachments

WARNING

- The machine is intended to only be used with approved attachments and optional equipment. To avoid possible personal injury, equipment damage and performance problems, only use attachments that are approved for use on and within the operating capacity of the machine. Refer to *Technical data* on page 29. A written consent by the dealer is required that allows the use of the attachment on the machine.
- Only use the attachment for its intended use. Refer to the documentation of the attachment for more information.

WARNING

- When using attachments that are not approved with the machine, it is possible that the specifications in this document, such as the tipping load, operating capacity and parallel movement of the attachment bracket, are not valid.
- Always make sure that the used attachment is in compliance with the technical data of the machine. Refer to *Technical data* on page 29.

WARNING

- Do not allow persons below or near the attachment.
- When raising an attachment, make sure that the attachment or the load does not touch overhead wires or other obstacles. Contact with (electrical) wires can cause serious injury.

WARNING

- Make sure that the coupling type on the attachment is compatible with the attachment bracket of the machine.
- Always read and obey the instructions in the OPM of the attachment.
- Attachments should be suitably shielded. Refer to the OPM of the attachment for more information.

WARNING

Put the attachment in a position that:

- does not block the operator's sight;
- does not block the lighting of the machine; and
- does not endanger other road users.

5.1.5 Personal protective equipment (PPE)

WARNING

(Local) laws and regulations or worksite guidelines can demand additional or alternative requirements.

WARNING

Always use approved protective equipment. Operators and all other persons in the work area must wear protective equipment, including, at a minimum:

- Protective helmet (also, tie back long hair)
- Hearing protection
- Impact-resistant eye protection with side protection
- Respiratory protection, when appropriate
- Protective gloves
- Protective boots
- Appropriate work overall or similar (not loose-fitting) clothing that covers arms and legs

WARNING

Even with the use of personal protective equipment, it is still possible that residual risks are present when using the machine. The operator can still be exposed to:

- Work environment risks, e.g. heat, noise, fuel and fuel fumes, exhaust fumes, or carbon monoxide
- Fire hazards from flammable liquids
- Operator errors, e.g. incorrect lifting of the machine, incorrect operation of the machine

5.2 Provision for stability/Avoiding roll-over accidents

DANGER

Disregarding any of these safety instructions can cause the machine to tip over, and throw the operator from the machine, resulting in death or serious injury. This can also lead to (heavy) material damage to the machine and/or attachment.

DANGER

- The operator is **NOT** protected in case the machine tips over, therefore always prevent the machine from tipping over.
- The operator must be able to leave the machine in the event that it tips over.
- The operator must wear clothing that cannot get caught in the machine if the machine tips over.
- The operator should not fix themselves to the machine with, e.g. straps. They should be able to jump of the machine if it tips over.

WARNING

Machine stability is affected by:

- the weight, height and reach of the load that is carried. Reach is the distance that the load extends outside the machine's ground contact;
- the height of the load;
- the machine speed;
- the turning angle;
- the size and profile of the tracks;
- the width of the machine across the tracks;
- abrupt control movements; and
- driving over uneven and/or soft terrain, or unstable surfaces.

WARNING

- Do not exceed the machine's specified operating capacity, especially when turning. This will reduce the maximum load capacity at which the machine will not tip over. Refer to *Technical data* on page 29.
- Carry the load low and operate the machine at speeds appropriate for the operating conditions.
- Operate the controls smoothly and gradually to prevent jerking or bouncing.
- Whenever possible, use the machine on level and stable surfaces. Load, unload and turn on solid and level ground.
- Reduce the machine speed on rough and/or uneven terrain and when taking (sharp) turns.

WARNING

When operation on slopes or inclines is necessary or cannot be avoided, obey the instructions in *Slopes* on page 55.

WARNING

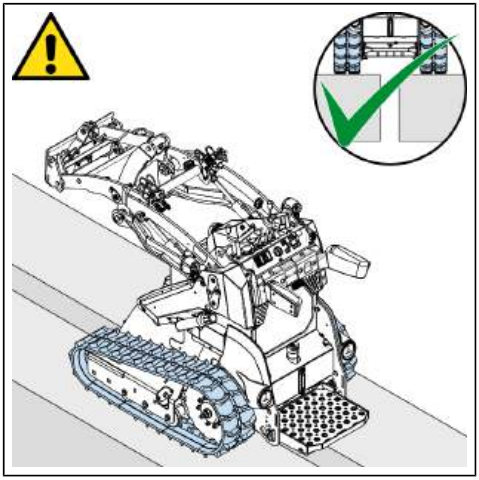
Keep the tracks correctly tensioned. Refer to *Transmission maintenance* on page 168.

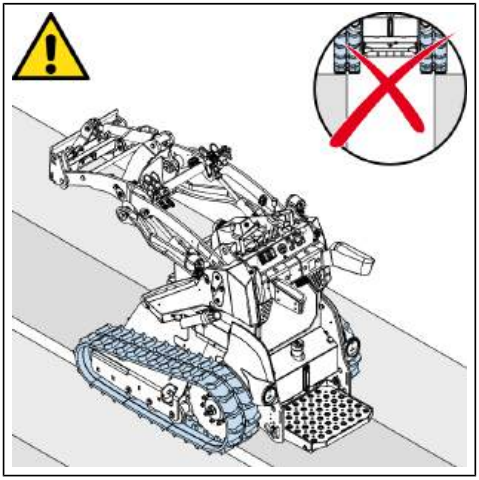
5.2.1 Instability

WARNING

- Do not perform any work at high driving speed as this can decrease the stability of the machine.
- Stay away from steep edges on loading docks, retraining walls and trenches.

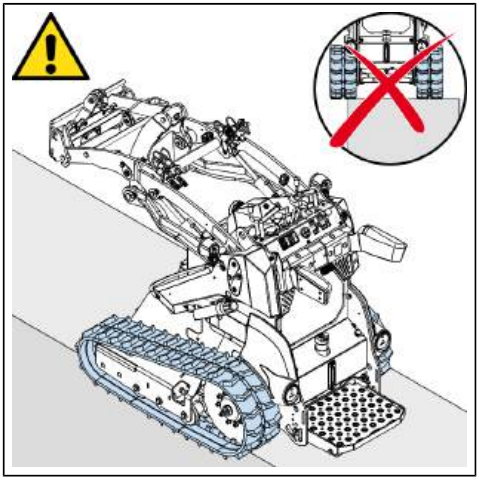
Trenches





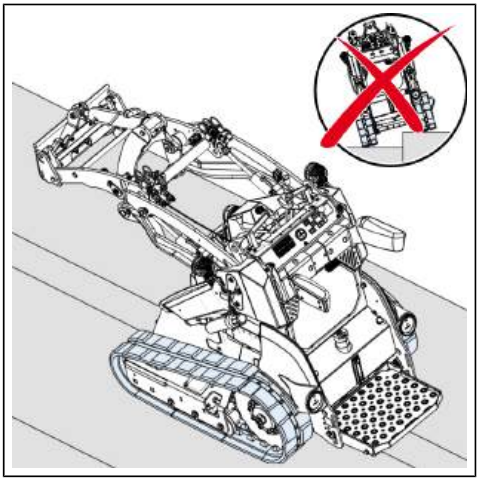
WARNING

When operating the machine in trenches, always make sure that the tracks are evenly placed on the borders and that the tracks touch the ground. If this is not the case, the machine can tip over and cause serious injury, or damage to the machine. This can also damage components of the tracks.



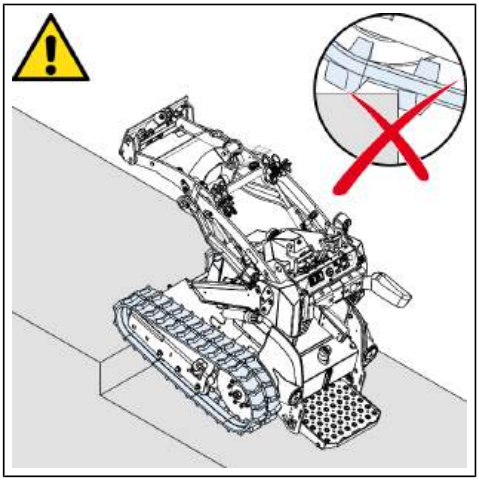
⚠ WARNING Make sure that the tracks do not protrude over the edge of the trench. Otherwise, the machine can tip over and cause serious injury, or damage to the machine. This can also damage components of the tracks.

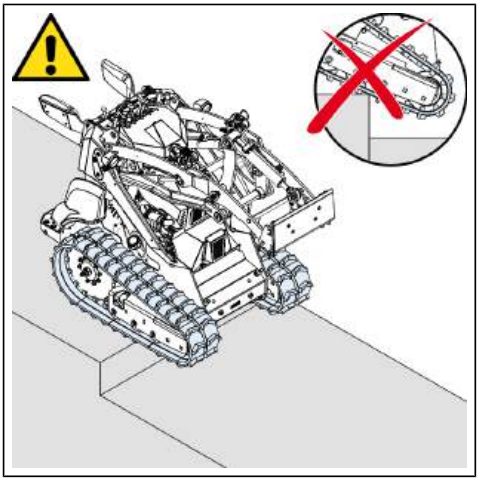
Height differences



WARNING Make sure that the tracks on the left and right side of the machine are always at the same height. If this is not the case, the machine can tip over and cause serious injury, or damage to the machine. This can also damage components of the tracks.

Pavements

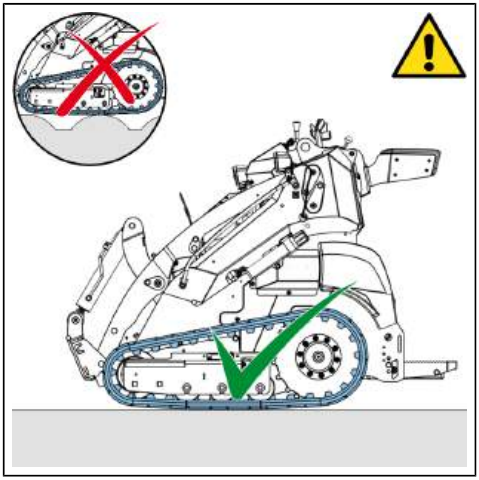




⚠ WARNING

Do **NOT** drive into the kerb, or drive off the side of the kerb. This can cause the operator to fall from the machine, causing serious injury. This can also damage the tracks. Use a ramp.

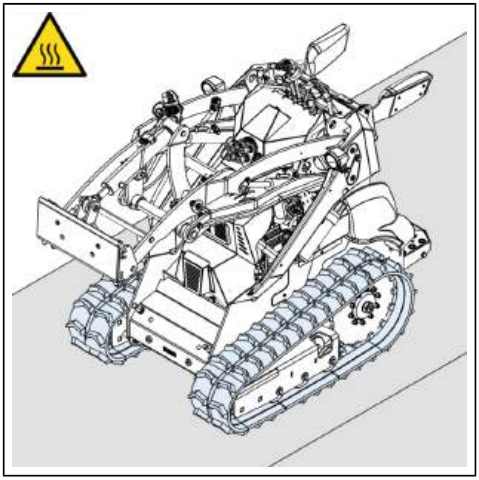
Uneven surfaces



WARNING

- To prevent the machine from tipping over and to avoid serious injury and/or damage to the machine, drive the machine across firm and level surfaces. Make sure that the tracks of the machine touch the ground.
- Driving across loose, hard underground (e.g. sharp stone) can damage components of the tracks.

Hot surfaces



⚠ CAUTION

- Avoid driving the machine across hot surfaces (e.g. fresh asphalt).
- Do **NOT** park the machine on hot surfaces. This can seriously damage the tracks.

5.3 Work environment

5.3.1 Terrain

WARNING

Make sure that the terrain is firm and can hold the weight of the machine and, if applicable, the attachment and its load.

WARNING

Do not operate the machine on dangerous terrain. This can cause the machine to slip or tip over.

Dangerous terrains include:

- Close to the edges of ditches or banks, which can collapse under the weight of the machine, especially when the ground is loose or wet.
- Terrain of which the conditions are unknown.
- Soft terrain, such as landfills.

WARNING

- Loose, soft ground or uneven, broken terrain can cause dangerous side-load conditions and can lead to tipping over of the machine or serious injuries.
- Reduce the driving speed on uneven and/or rough terrain and when turning the machine.

5.3.2 Slopes

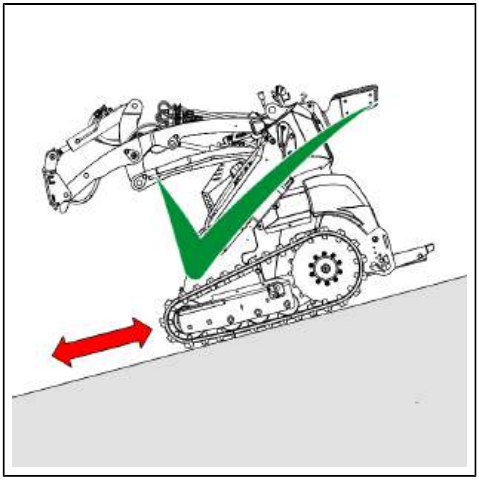
⚠ WARNING

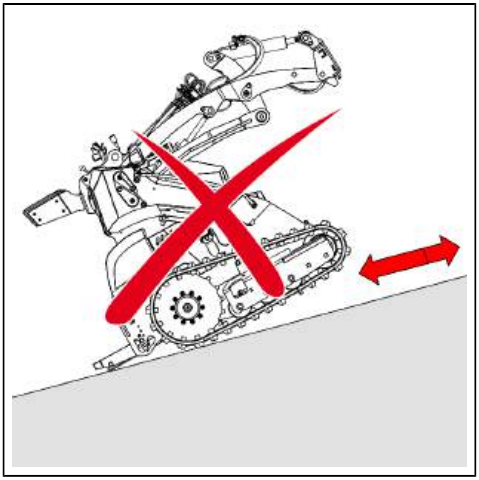
- When possible, do **NOT** drive on slopes.
- **NEVER** drive across slopes.

⚠ WARNING

When driving on slopes, there is a risk of injury and/or damage:

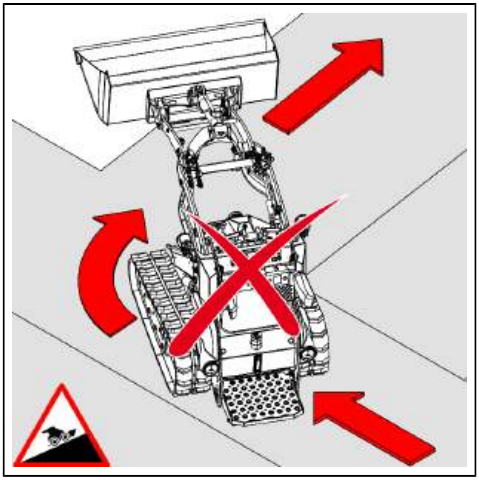
- The machine can tip over.
- There is less traction and braking force of the tracks, which can cause unexpected movement of the machine.
- The maximum construction speed of the machine can unexpectedly increase when driving downhill. This can lead to unexpected driving behaviour of the machine. Refer to *Technical data* on page 29 for the machine's driving speed.





⚠ WARNING The machine should always be driven up and down the slope with the heaviest end of the machine facing uphill. If this is not the case, the machine can tip over.

Slopes at right angles



⚠ WARNING

- Do **NOT** turn onto slopes at an immediate 90-degrees angle. The machine can tip over and can cause serious injury and damage to the machine.
- Gradually turn the machine if driving onto a slope is unavoidable.

⚠ WARNING Only drive on slopes under these conditions:

- There is no load present on the attachment.
- The lifting arm is in the lowest possible position.
- The maximum slope angle is within the machine specifications. Refer to *Maximum slope angle* on page 35.
- The machine is driven straight up and down the slope. Do not make sharp turns.
- Always drive slowly.

WARNING

When using the machine, including loads, the maximum slope angle at maximum load at the lowest speed is limited to 3° (5.3 %).

Steeper slopes are possible with smaller loads, at the operator's discretion and responsibility.

The maximum angle of the slope depends on these factors:

- The loading, weight, positioning and balance of the load.
- The applied driving style and speed.
- Circumstances and the capacity of the surface, such as loose sand, and humidity of the surface.

WARNING

- Stay at the "high" side of the slope during transport.
- When loading or unloading the machine from a trailer obey the instructions shown in *Transport and storage* on page 95.

5.3.2.1 Parking on slopes

DANGER

- Do **NOT** park the machine on a slope. The machine can move unintentionally.
- If parking on a slope is unavoidable, always block the tracks of the machine with, e.g. wedges.

1. Place the wedge firmly under the tracks, so that the machine cannot unintentionally move down the slope.
2. Remove the wedge from the tracks of the machine before driving the machine again.

CAUTION

Do not forget to remove the wedge before driving the machine again.

5.3.3 Danger zone

WARNING

- When using the Skid Steer Loader in the vicinity of other machines: keep the other operators informed about the activities of the Skid Steer Loader at all times.
- Keep bystanders away from the danger zone. Make sure that bystanders are kept at the minimum distance (10 m [11 yd]) from the travel path of the machine.
- The operator must have a clear overview of the entire danger zone. If this is not the case, ask another trained and authorised operator to assist. Make sure that the assisting trained and authorised operator can be seen at all times and that this person is clearly recognisable as such.

WARNING

- Be careful and avoid obstacles, uneven terrain and crowded areas.
- Do no take any risks.
- Always look to the rear, over both shoulders, before driving the machine in reverse.
- Keep a safe distance when near electrical power lines and other electrical conductors such as pylons and lamps.

5.3.3.1 Towing the machine out of a danger zone

CAUTION

Towing the machine is **NOT** allowed. Towing the machine will seriously damage the hydrostatic motors of the tracks.

5.4 Mandatory safety shutdown procedure

DANGER

- Follow these instructions **BEFORE** cleaning, adjusting, lubricating, fuelling or servicing the machine, or leaving it unattended.
- **ONLY** after these precautions have been taken can the operator be sure that it is safe to proceed.
- Failure to follow this procedure can result in death or serious injury.

DANGER

Avoid parking on an incline or hillside. Refer to *Slopes* on page 55.

If this is no possible, refer to *Parking on slopes* on page 57.

- Park along the slope, never across the slope.
- Prevent the machine from moving: block the tracks with, e.g. wedges.

1. Bring the machine to a complete standstill on a level surface.
2. Make sure that al work equipment and/or attachments have completely stopped.
3. If applicable: make sure that the control levers are in the neutral position.
4. Completely lower the lifting arm and attachment.
5. Make sure that the drive direction lever is in the neutral position.
6. Move the throttle lever to the low idle position and switch off the machine.
7. Wait for all movement to stop.
8. De-pressurize the hydraulic system. Refer to *De-pressurizing the auxiliary hydraulic connections* on page 129.
9. Switch off the machine.
10. Remove the ignition key. The operator must take the key with them.
11. Carefully step from the machine.

5.5 Before starting the machine

DANGER

Never start the machine if there is any indication that maintenance or service work is in progress, or if a warning tag is attached to the controls.

WARNING

- Always replace damaged or worn-out parts with genuine service parts before using the machine.
- The machine is intended to be used with approved attachments only. To avoid possible personal injury, equipment damage and performance problems, only use attachments that are approved for use on and within the operating capacity of the machine. Refer to *Technical data* on page 29 and *Approved attachments* on page 44.

WARNING

- Walk around the machine and inspect it before using it. Look for damage, loose or missing parts, leaks, etc.
- If applicable: always keep lights clean. Poor visibility can cause accidents.
- To minimize the risk of fire: daily remove all trash and debris from the machine, especially from the engine compartment.
- Replace any damaged or missing safety labels.
- Replace a lost or damaged OPM.
- If applicable: read the OPM of the connected attachment before starting the machine.

WARNING

If applicable: make sure that the tracks tension is correct:

- Correct the tracks tension, if necessary. Incorrectly tensioned tracks adversely affect the machine's stability.
- Regularly check the track tension. Refer to *Maintenance* on page 133.

WARNING

Before working on or with the machine:

- Remove jewellery, tie back long hair, and do not wear loose-fitting garments, such as, scarves, ties, unzipped jackets, etc., which can get caught in moving parts of the machine and/or attachment, and cause injury;
- Warn all nearby personnel to keep a safe distance before starting the machine.

WARNING

- Always face the machine and hold on to the flank protection to safely step on or off the machine.
- Do not jump from the machine.

WARNING

Before using the machine:

- Make sure that the operator's shoes are free of contaminants.
- Make sure that the operator's area, footplate, controls and flank protection are free of oil, dirt, ice and unsecured objects. If this is not the case, the operator can fall.
- Do not start the machine or operate the controls from a location other than the operator's area.

⚠ WARNING

- Make sure that all safety provisions on the machine are present and function correctly.
- Make sure that the drive direction lever is in the neutral position and the attachment is lowered to the ground.
- If applicable: make sure that the control levers are in the neutral position.
- If applicable: make sure that all lighting systems of the machine function correctly, before working in darkness or areas of poor visibility.

⚠ WARNING

- Do not use any starting aids other than the engine pre-heating. Engine pre-heating can cause ether or other starting fluids to detonate, causing injury or damage.
- Do not short-circuit a starter terminal to start the machine. Obey the instructions in *Starting the machine* on page 103. If these instructions are not followed, this can cause unwanted and sudden movement of the machine. This can cause injury.

⚠ WARNING

Contact the local authorities for utility line locations **BEFORE** starting to dig.

- Below-ground hazards also include water mains, tunnels and buried foundations. Know what is underneath the worksite before starting to dig.
- Before working near power lines (either above-ground or buried cable type), always contact the power utility and establish a safety plan with them.

WARNING

- If temperatures are changing, be cautious of dark and wet patches when working on or travelling over frozen ground. Stay away from ditches, overhangs and other weak support surfaces.
- Terrain and soil conditions at the worksite, approaching traffic, weather-related hazards and any above- or below-ground obstacles and hazards should be observed and monitored by all work crew members.

5.6 During operation

DANGER

Disregarding any of these safety instructions can cause the machine to tip over, throwing the operator from the machine, resulting in death, serious injury, or damage to the machine and/or attachment.

DANGER

If the machine is damaged, malfunctions or the operator hears an unusual noise:

1. Immediately stop and switch off the machine and lock and tag it. This will make sure that no person can use it, or can get hurt by components of the machine, such as the lifting arm.
2. Inspect the machine and hydraulic system for leaks.
3. Inspect the lifting and tilting components for damage, cracks and bends.
4. If applicable: inspect the attachment.
5. Repair the damage or malfunction, or solve the problem, before using the machine again.

DANGER

- Exhaust fumes can kill. Do not operate the machine in an enclosed area without adequate ventilation. Make sure that there is sufficient fresh air flow around the machine to remove the exhaust gases.
- Internal combustion engines deplete the oxygen supply within enclosed spaces and can create a serious hazard unless the oxygen is replaced.
- Risk of carbon monoxide (CO) suffocation. CO is present in exhaust gases and is odourless and lethal. Do not start or operate the machines indoors.

WARNING

Preposition 65: diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, or other reproductive harm.

WARNING

Machine stability is affected by:

- the weight, height and reach of the load that is carried. Reach is the distance that the load extends outside the machine's ground contact;
- the height of the load;
- the machine speed;
- the turning angle;
- the size and profile of the tracks;
- the width of the machine across the tracks;
- abrupt control movements; and
- driving over uneven and/or soft terrain, or unstable surfaces.

⚠ WARNING

- Only the operator is allowed on the machine during operation. Keep bystanders away from the machine.
- Never allow anyone below or near a raised lifting arm. Lowering the lifting arm or a falling load can result in death or serious personal injury.
- Do not use the machine to lift or transport people. Do not allow others to ride on the machine and/or attachment, because they can fall off or cause an accident.

⚠ WARNING

- Be aware of overhead obstacles. Any object near the lifting arm can represent a potential hazard, or cause the operator to react suddenly and cause an accident. Use a spotter or signal person when working near bridges, phone lines, worksite scaffolds, or other obstructions.
- Use a signal person if the operator cannot see the entire work area clearly, if the operator is in high traffic areas and whenever the operator's view is obstructed.
- Do not drive too close to an excavation or ditch. Make sure that the surrounding ground has adequate strength to support the weight of the machine, the attachment and the load.

⚠ WARNING

- Do not overload the machine. Do not exceed the machine's specified operating capacity. Refer to *Technical data* on page 29. The effective operating capacity is reduced when the machine turns.
- Machine stability is reduced when turning the machine or while driving on uneven or rough terrain. Adjust the driving speed accordingly.
- Hoisting suspended loads using hoisting gear (e.g. lifting slings) is not allowed, unless an attachment is used that is intended for these exact purposes and that is approved by BAD BOY MOWERS, LLC.

⚠ WARNING

- Make sure that attachments are securely fastened to the attachment bracket of the machine before they are used.
- When coupling or uncoupling attachments, always obey the instructions in *Coupling and uncoupling the attachment* on page 119. If these instructions are not obeyed, the attachment can fall off the machine and cause injuries or damage.
- Attachments affect the handling and balance of the machine. When using attachments, adjust the operation of the machine as necessary.

⚠ WARNING

- Do not suddenly raise or drop a load. Overloading and tipping of the machine can also be caused by abrupt movements.
- Avoid suddenly slowing down the machine while carrying a load. Suddenly slowing down can cause the load to drop from the attachment, or cause the machine to tip over.
- Carry the load low. Move the controls smoothly and gradually, and operate the machine and attachment at speeds appropriate for the operating conditions.
- If applicable: never activate the Float-function on the machine with a loaded or raised attachment, because this will cause the lifting arm of the machine to lower rapidly or the attachment to rapidly dump its load.

⚠ WARNING

- While using the machine, wear safety goggles, ear and head protection as needed. The operator must wear protective clothing when appropriate. Refer to *Personal protective equipment (PPE)* on page 45.
- Keep lights clean. Poor visibility can cause accidents.
- The operator must have a clear overview of the entire work area. If this is not the case, ask another trained and authorised operator to assist. Make sure that the assisting trained and authorised operator can be seen at all times and that this person is clearly recognizable as such.
- New operators must first operate the machine in an open area away from bystanders. Practice with the controls until the machine can be operated safely and efficiently.
- Make sure that the operator has full control of the machine at all times.

⚠ WARNING

Do not start the machine and/or operate the controls from a location other than the operator's area.

⚠ WARNING

- Always look to the rear, over both shoulders, before driving the machine in reverse.
- Always keep hands, head and feet inside the operator's area while operating the machine.
- Never put body parts near moving parts. This can result in the severing of body parts.

⚠ WARNING

- Never jump from the machine.
- Never get on or off a moving machine. Always step on or off the machine when it is at a complete standstill.
- The operator must face the machine and hold on to the flank protection while stepping on or off the machine.

⚠ WARNING

- Check the indicators and displays for normal conditions after starting the machine.
- Listen for unusual sounds and remain alert for other potentially hazardous conditions while using the machine.
- Control the machine cautiously and gradually until fully familiar with all the controls and handling.

⚠ WARNING

- Do not drive into materials at high speeds. This can cause the operator to be thrown from the machine.
- Do not switch off the machine while driving. This will cause sudden hydrostatic braking, which can result in loss of control of the machine. This can cause the operator to be thrown from the machine and/or tipping over of the machine.
- Never open the engine cover while the engine is running.

⚠ WARNING

- Slow down the work cycle and use slower travel speeds in congested or populated areas. Use commonly understood signals so that other members of the work crew can warn the operator to slow down or stop operation in a potentially hazardous situation.
- Stay alert for people moving through the work area. When loading a truck, the operator should always know where the other people are.

⚠ WARNING

- In cold weather, avoid sudden drive movements and stay away from slopes. The machine can slide sideways on icy slopes.
- Snow accumulation can hide potential hazards. Use care while operating the machine in snowy weather and/or while using the machine to clear snow.

5.6.1 Operation with loads

DANGER

When using the machine with loads, additional risks are possible. The load affects the driving characteristics and responsiveness of the machine and can cause the machine to tip over.

WARNING

- Attachments are also loads. Always take the weight of an attachment into consideration.
- The load on the machine must not exceed the maximum operating capacity of the machine. Refer to *Technical data* on page 29.
- Make sure that the load carried by the attachment is evenly balanced.
- Do not stack and lift (multiple) objects or loose cargo above the height of the attachment.
- When necessary, correctly secure (loose/unstable) loads, to prevent these from shifting or falling from the attachment.

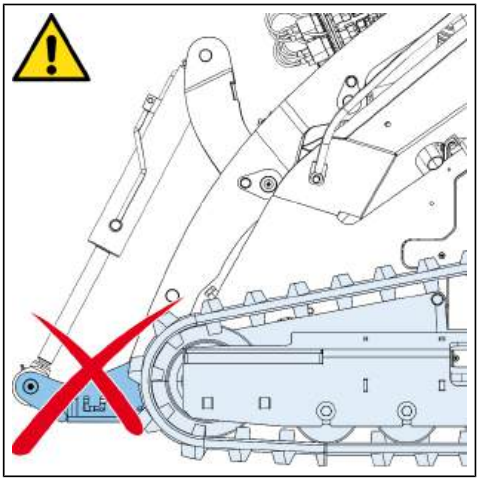
WARNING

- Make sure that full control of the machine is maintained at all times.
- Adjust the driving speed according to road and environmental conditions. Avoid high driving speeds.
- There is a risk of injury from involuntary movement due to a lack of traction and braking force of the machine.
- Make sure that the machine has completely stopped before releasing a load. When the load is reduced, the machine speed will automatically increase and can cause unwanted movement and injury.

⚠ WARNING

- Do not turn the machine while raising or lowering a load or operating an attachment. A sudden shift in stability can occur, which increases the possibility of the machine tipping over. Lower the load to the lowest possible transport position, before turning the machine.
- Avoid sharp turns while transporting a load. The load can shift and cause the machine to tip over.
- When raising or lowering a load to and from an elevated surface, approach the load straight ahead and back away with the load in a straight line.
- Do not suddenly slow down when carrying a load. This can cause the load to drop from the attachment and/or can cause the machine to tip over.
- Always carry the load low and as close to the machine as possible. Keep the attachment approximately 30 cm above the ground. A falling load can result in death or serious personal injury.

5.6.2 Attachment bracket



WARNING Never tilt the attachment bracket when driving without attachment and with a fully retracted lifting arm. This can severely damage the tracks.

5.7 Maintenance and servicing safety practices

WARNING

- Do not use the machine when maintenance is scheduled to be performed.
- Postponing maintenance can result in a serious reduction of the service life of the machine, more serious and costly equipment failures, and can contribute to unsafe operating conditions.

⚠ WARNING

- Use warning tags/lock-out procedures during maintenance or servicing of the machine.
- Alert others that maintenance or servicing is being performed by tagging the operator's controls -and, if required, other machine areas- with a warning notice.

⚠ WARNING

- Only trained and authorized personnel, with a full awareness of the safety procedures, should be allowed to operate or perform maintenance or servicing on the machine.
- Always wear safety goggles with side protection when striking metal against metal. In addition, it is recommended that a softer (chip-resistant) material is used to cushion the blow. Otherwise, this can result in serious injury to the eyes or other parts of the body.
- Do not smoke or have any spark- or flame-producing equipment or materials in the area while filling the fuel tank or working on the fuel or hydraulic systems.

⚠ WARNING

Work environment risks:

- Exhaust fumes can kill. Do not operate the machine in an enclosed area unless there is adequate ventilation. Always be aware of possible exhaust fumes in the work environment.
- Operators should also be aware of any open windows, doors or ductwork into which (exhaust) gases can be carried, exposing others to danger.

⚠ WARNING

- Do not start the machine if repairs are being performed by one person alone.
- There should always be at least 2 people working together if the machine must be in operation during maintenance or servicing of the machine.

⚠ WARNING

- Do not work on hot engines, cooling systems or hydraulic systems. Wait for the machine to cool down. When lubricants or other fluids require changing, wait for fluid temperatures to decrease to a moderate level before removing any drain plugs.
- When handling oil, grease and other chemical substances, carefully follow the product-related safety requirements Material Safety Data Sheet (MSDS) to prevent burning or scalding.

⚠ WARNING

Safety-critical parts must be periodically replaced. Replace the following potentially fire-related components as soon as they begin to show signs of deterioration:

- The fuel system flexible hoses, fuel tank overflow drain hose and fuel tank filler cap.
- The hydraulic system hoses, especially the pump outlet lines. Replace hydraulic hoses every 6 years from the production date (month or quarter, and year), as indicated on the hydraulic hoses.

⚠ WARNING

- All safety equipment must be correctly maintained so it is always in good condition.
- Always use adequate tools while working on the machine. Unsuitable tools can break or slip and cause injury, or they cannot adequately perform their intended functions.
- Use solid support blocking. Never rely on jacks or other inadequate supports when maintenance or servicing is performed. Never work under any equipment supported only by jacks.

⚠ WARNING

- Do not use the machine in an environment where hot components (e.g. a hot muffler) can present a fire hazard, such as near hay, straw or other flammable materials.
- Never attempt to bypass the ignition switch to start the machine.
- Towing the machine is **NOT** allowed.

⚠ WARNING

- Keep the fuel cap and other fluid reservoir caps locked tight. Do not start the machine until these caps have been secured.
- Do not attempt to remove the radiator cap after the engine has reached operating temperature or if it is overheated. At operating temperatures, engine coolant is extremely hot and under pressure. Always wait for the engine to cool down before attempting to relieve pressure and remove the radiator cap. Failure to heed this warning can result in severe burns.

⚠ WARNING

- Always lower the lifting arm or elevated items, or suitably support/secure them, before performing any maintenance or servicing on the machine.
- Always make sure that the operator's area is anchored to the chassis with anchor bolts, nuts and washers before driving and using the machine.
- Unless necessary for servicing the engine, do not open the engine cover while the machine is in operation.

WARNING

- Prior to servicing or maintenance, make sure that the hydraulic system of the machine is correctly de-pressurized as required.
- The hydraulic system operates under high pressure. A leaky hose, pipe or coupling can cause serious injuries.
- A high pressure jet (up to 400 bar [5802 psi]) easily penetrates gloves, clothing and skin, which causes serious injury and poisoning.

WARNING

- Keep mounting brackets and hose and cable routing straps tight. Hose routing should have gradual bends.
- After cleaning the machine, examine all fuel, lubricant and hydraulic oil lines for leaks, chafe marks and damage. Tighten any loose connections and repair or replace parts, as necessary.

WARNING

- Refer to the PAM for information about the assembly of components.
- Always use the correct parts and the correct torques.
- Incorrect fastener connections can dangerously weaken assemblies.

WARNING

Periodically tighten the nuts and bolts of the machine as necessary. Refer to *Maintenance* on page 133 for the correct intervals.

Daily inspect the following:

- The fixings and hinges of the lifting and tilting parts of the machine;
- The attachment bracket, for any damage and bends;
- The lift and tilt cylinders; and
- The hydraulic system, for any damage or leaks.

WARNING

Welding activities should only be performed by trained and authorised personnel. Make sure that there is supervision by trained and authorised personnel when welding on or nearby containers that contain flammable materials. Contact the dealer for more information.

If welding activities must be performed:

1. Disconnect the positive terminal from the alternator before starting any welding activities on the machine.
2. Switch off the battery switch.
3. Attach the welding clamp as close to the welding area as possible.
4. The welding current should **NOT** pass through any bolt, joint, gear or hydraulic cylinder.
5. After welding, reconnect all the electrical connections and make sure that they function correctly.

5.8 Safely transporting the machine

WARNING

When transporting the machine, obey the instructions in *Transport and storage* on page 95.

- Obey federal, state and local over-the-road laws and regulations.
- Check restrictions regarding the weight, height, width and length of a load.
- The hauling vehicle, trailer and load must all be in compliance with applicable (local) laws and regulations.

5.8.1 Lifting the machine with a crane

DANGER

Only lift the machine in accordance with the following guidelines:

WARNING

- Lift the machine according to the lifting instructions. Refer to *Transport and storage* on page 95.
- The crane and rigging equipment must have sufficient capacity. Refer to *Technical data* on page 29.
- Secure the machine against unintentional movement. Use taglines as required.
- Fasten the rigging equipment so the machine is horizontal when it is lifted.
- Lift the machine only without an attachment installed.

WARNING

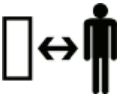
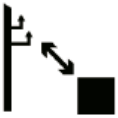
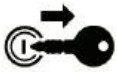
Attach the rigging equipment only at the lifting points marked by the -symbol.

WARNING

- Do not lift the machine while persons are located on the machine.
- Any persons guiding the crane operator must be within sight or sound of the crane operator.
- Persons must stay clear of the machine when it is lifted.
- No persons are allowed underneath the machine when it is lifted.

5.9 Safety hazards

5.9.1 Hazard and hazard-avoidance symbols

 Safety hazard	 Fire hazard	 Crush hazard	 Injected fluid hazard	 Hot liquid hazard
 Poisonous vapour hazard	 No smoking	 No open flame	 Read the OPM	 Safety lock
 Keep distance	 Wear eye protection	 Avoid power lines	 Remove key	 Rotating fan: keep away
 Read maintenance/ service information	 Crush hazard	 Hot surface hazard		

5.9.2 Fire and burn hazards

⚠ WARNING

Before adding fuel, antifreeze or hydraulic oil to the machine:

- Only add fluids in well-ventilated areas, preferably in the open air.
- Make sure that the machine is correctly parked, with the controls, switches, and, if applicable, lights switched off.
- The machine must be completely switched off.

⚠ WARNING

- Static electricity can produce dangerous sparks at the fuel-filling nozzle.
- In very cold, dry weather or other conditions that can produce static discharge, keep the tip of the fuel nozzle in constant contact with the fuel tank filler neck. This provides a ground connection.
- Make sure that a ground wire is connected from the machine to the service truck before fuelling begins.

⚠ WARNING

Observe the following conditions when adding fuel, antifreeze or hydraulic oil to the machine:

- Do not smoke while filling fuel tanks, while working on the fuel or hydraulic system, or while working on or near the battery.
- Keep the machine away from combustible substances. Hot exhaust gases and possible sparks from the exhaust can cause those substances to catch fire.
- Avoid spilling combustible or flammable fluids, such as oil or fuel, on a hot engine.
- Keep fuel and other fluid reservoir caps locked tight and do not start the machine until these caps have been secured.

⚠ WARNING

- The machine must be cleaned on a regular basis to avoid the build-up of flammable debris, such as leaves, straw, etc. Accumulated debris, particularly in the engine compartment, creates a fire hazard. Keep the machine free of combustible substances.
- Oil leaks can ignite on hot components. Repair any damaged or leaking components before using the machine.
- It is recommended to mount a 2.27 kg (5 lbs) or larger, multi-purpose "A/B/C" fire extinguisher within reach of the operator. Periodically check the fire extinguisher and make sure that worksite crew members are trained in its use.

⚠ WARNING

These conditions make it extremely important to avoid circumstances where explosive dust or gases can be ignited by arcs, sparks or heat:

- The machine has several components that operate at high temperatures under normal operating conditions, primarily the engine and exhaust systems.
- Also, the electrical system, if not properly maintained or if damaged, can arc or produce sparks.

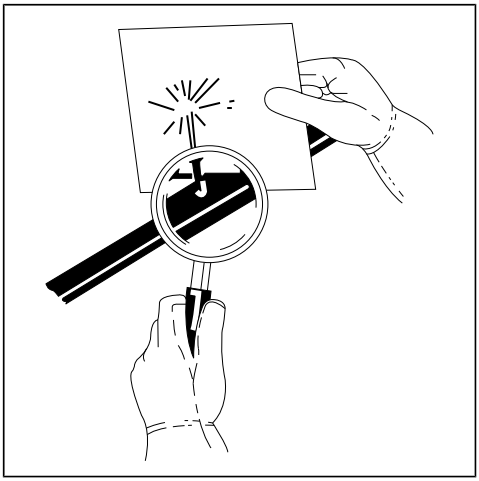
⚠ WARNING

- Make sure that there are no flammable objects near the machine when starting the engine.
- Keep sparks or open fire away from tanks that contain flammable liquids.
- Do not touch the hydraulic components, hoses, piping, radiator, engine and exhaust while the machine is in operation and immediately after operation has stopped. These parts are very hot at operating temperature.

5.9.3 Hydraulic system hazards

WARNING

The machine uses hydraulic items that operate with a very high pressure. The operator must be aware of the risks of working with or on the machine's hydraulic system.



WARNING

The operator must wear safety goggles and protective clothing and use a piece of cardboard, paper or wood when searching for hydraulic leaks. Refer to the illustration above. **NEVER** feel for leaks by hand.

WARNING

Escaping pressurized fluid can be invisible and can penetrate the skin and cause serious injury. If any fluid penetrates the skin, immediately seek medical attention. Injected fluid must be surgically removed by a doctor or this can result in gangrene. If the doctor is not familiar with this type of injury, ask him or her to research it immediately to determine proper treatment.

⚠ WARNING

- Completely de-pressurize the hydraulic system of the machine prior to servicing or maintenance. Do not attempt to loosen or disconnect any hydraulic connections, hoses, fittings, covers or caps without first relieving the pressure from the hydraulic system. First follow the instructions in *Mandatory safety shutdown procedure* on page 59. Then, slowly loosen the hydraulic reservoir filler cap.
- Be careful not to touch any hydraulic components that have been in recent operation, because they can be hot and cause burns. Wait for parts of the hydraulic system to cool down.
- When fluids require changing, wait for fluid temperatures to decrease to a moderate level before removing any drain plugs.

⚠ WARNING

- Safety-critical parts must be replaced periodically.
- Replace hydraulic hoses as soon as they show signs of deterioration, especially the pump outlet connections.
- Replace a hydraulic hose every 6 years after the production date (month or quarter, and year) as indicated on the hydraulic hoses.

⚠ WARNING

If a hydraulic hose, pipe or other part of the hydraulic system is damaged, or the operator suspects damage, always obey the following additional safety instructions:

- Do **NOT** operate the machine when a damaged hydraulic hose or pipe is found. Ask an trained and authorised service engineer to replace the damaged hose.
- Exposed hydraulic hoses could react with explosive force if struck by falling or overhead items. **NEVER** allow hydraulic hoses or piping to be hit, bent, touched or interfered with. Replace any hoses that are damaged.
- Keep unprotected body parts, such as the face, eyes and arms as far away as possible from a suspected leak in the hydraulic system.
- Do not smoke or have any spark- or flame-producing equipment or materials in the area while working on the hydraulic system.
- Only add hydraulic fluid to the machine in well-ventilated areas.
- If applicable: after cleaning the machine and/or attachment, inspect all hydraulic connections for leaks, chafe marks and damage. Tighten any loose connections and repair or replace parts, if necessary.

5.9.4 Battery hazards

WARNING

- Battery fluids are highly corrosive acids. Avoid contact with skin at all times. Wear the correct protective clothing, such as safety goggles and gloves. Upon contact, immediately thoroughly wash the skin with soap and water.
- If battery acid is splashed in the face and/or eyes, immediately thoroughly flush the eyes with running water for 10-15 minutes. Consult a medical doctor immediately.
- Anyone swallowing battery acid must have immediate medical aid.
- Provide sufficient water and soap, and make sure that there is assistance in vocal range when performing work on the battery.

WARNING

- When disconnecting the battery terminals, first remove the negative terminal cable, then the positive terminal cable.
- When installing a battery, first connect the positive terminal cable, then the negative terminal cable.
- Keep battery terminals tight. Contact between a loose terminal and post can create an explosive spark.
- Do not short-circuit the positive and negative battery terminals.
- If applicable: use the battery switch, or disconnect the battery cable from the negative battery terminal, before performing electrical service or electrical welding on the machine.

⚠ WARNING

- Make sure that no electrical connection is made between the battery terminals. Make sure that no metal objects touch the battery. This can cause a short-circuit and sparks and result in an explosion of the battery.
- Flammable fumes are released when charging the battery. Only charge a battery in well-ventilated areas.
- Any conductor that comes into contact with both battery terminals will get extremely hot. Remove conductive personal items, such as e.g. rings, bracelets, necklaces and watches when in the vicinity of a battery.

⚠ WARNING

- Incidental contact or static discharge from sparks and open flames can set off explosive battery gas.
- Completely switch off the machine when working on batteries.

⚠ WARNING

- When jump-starting from another machine, do not allow the machines to touch. Wear safety goggles while battery connections are made.
- Never jump-start the machine if it has a frozen battery. The battery could explode. Thaw a frozen battery before charging it or attaching jumper cables.

⚠ WARNING

Before replacing a fuse, first disconnect the battery to avoid the risk of electrical shock.

5.9.5 Electrical energy hazards

WARNING

Stay away from high voltage power lines. Contact with, or proximity to, high voltage electric lines can result in death or serious injury.

The machine does not have to make physical contact with power lines for any current to be transmitted.

Use a spotter and hand signals to keep away from power lines that are not clearly visible to the operator.

WARNING

Depending upon the voltage in the power line and atmospheric conditions, strong current shocks can occur if the attachment (or its load) is within 3 m (10 ft) from the power line.

Very high voltage and rainy weather can further increase the safe operating distance.

WARNING

Risk of serious injury from electrical power lines and other conductors. Keep a safe distance from electrically conductive objects such as power lines, pylons and lamps.

Nominal voltage safety distances:

- 0-1000 V: 1.0 m (1.1 yd)
- 1-110 kV: 3.0 m (3.3 yd)
- 110-220 kV: 4.0 m (4.4 yd)
- 220-380 kV: 5.0 m (5.5 yd)
- When unknown: 5.0 m (5.5 yd)

WARNING

If the machine comes into contact with a live wire:

- Do not leave the machine.
- If it is possible, drive the machine out of the danger zone.
- Warn others not to approach and/or touch the machine.
- Have somebody de-energize the live wire.
- Do not leave the machine until the wire has been safely de-energized.

WARNING

- Only licensed technicians are allowed to perform work on the machine's electrical system, if present.
- Inspect and check the machine's electrical equipment at regular intervals. Problems that are found, e.g. loose connections or scorched cables, must be repaired before the machine can be used.
- Only use correct, original equipment fuses/circuit breakers with the specified current rating. Immediately switch off the machine, if there is any indication of a problem with the electrical system.
- Before replacing a fuse, first disconnect the battery to avoid the risk of electrical shock.

WARNING

If the cable diameter or the electrical connection of the rectifier, fuses, ground connection, etc. has not been carried out correctly, this can cause personal injury.

5.10 Safety labels

WARNING

All around the machine, labels are attached that provide safety information and precautions. These labels must be kept legible at all times.

- If a label is missing or illegible, immediately replace it. Replacement labels can be obtained from the dealer.
- Refer to the applicable PAM for the part numbers of these labels and ordering information.
- Make sure that new equipment, components and replacement parts include the correct safety labels.

To work safely with the machine, or to perform maintenance safely, it is essential that the operator follows all instructions about the safety labels in this manual.

5.10.1 Applying a new (safety) label

WARNING

When replacing a machine part that has a (safety) label on it, make sure that the replacement part also has the same (safety) label on it.

1. If necessary: remove the old (safety) label from the surface of the machine.

   Take note of the correct (safety) label position before removing it.

2. Clean the applicable surface of the machine until it is free of dirt, dust, grease and/or foreign material(s).
3. Remove the smaller portion of the backing paper of the new (safety) label.
4. Apply the exposed adhesive to the cleaned surface of the machine.

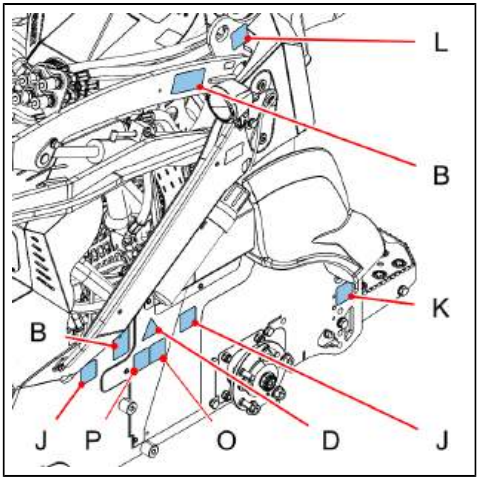
   Maintain correct positioning and alignment of the (safety) label.

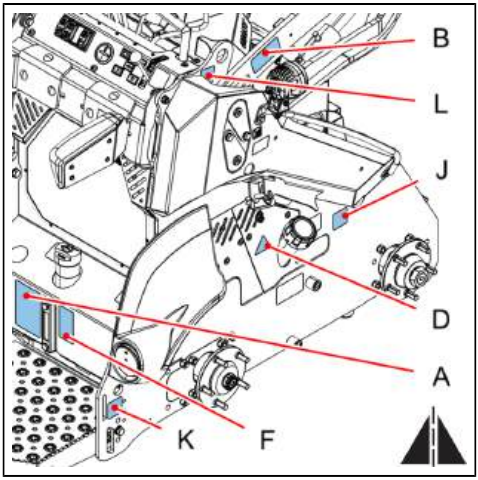
5. Peel off the remainder of the backing paper and apply pressure by hand to smooth out the surface of the new (safety) label.

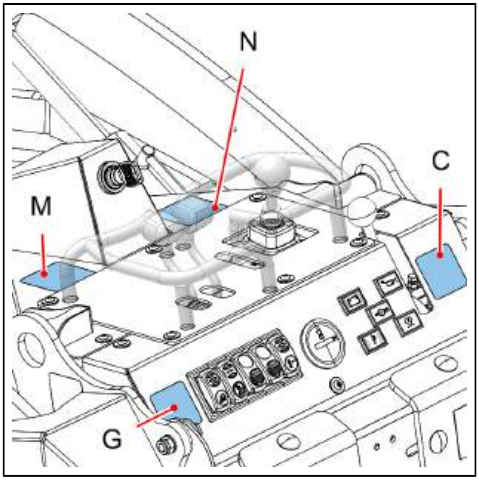
5.10.2 Location of the safety labels

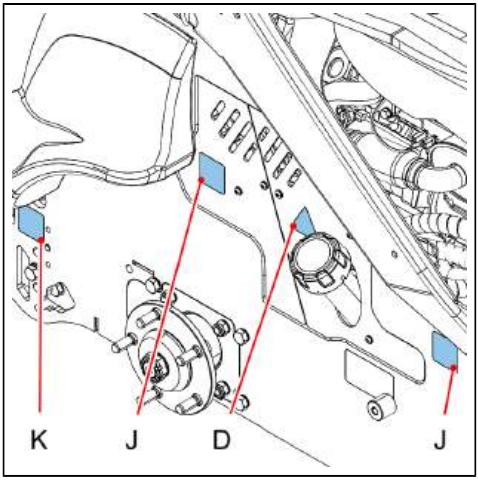
Illustration(s) can differ from the actual configuration.

⚠ WARNING If the safety labels are not clearly visible or legible, immediately attach new safety labels.









5.10.3 Description of the safety labels

- It is possible that some of the safety labels in the table below are not present on the machine.
- The location of the safety labels depends on the configuration of the machine.

#	Label	Description
A		Thoroughly read the OPM of the machine before using the machine. The operator must know how to operate the machine safely.
		Use safety boots.
		Risk of hearing damage. Use hearing protective equipment. The machine generates noise beyond 80 dB(A).
		Thoroughly read the OPM of the machine before using the machine. The operator must know how to operate the machine safely.
		When driving the machine, hold the attachment approximately 30 cm (11.8 in) above the surface.
		Risk of tipping over. Only drive straight up and down a slope. Never drive across a slope. When driving on an uneven or damaged surface, the machine can tip over.

#	Label	Description
		Always keep the **heaviest** end of the machine (both loaded or unloaded machine) facing the higher end of the slope, otherwise the machine can tip over.
		For maintenance work: **1.** Stop the machine. **2.** Safely park the machine. **3.** Remove the ignition key. Refer to the OPM of the machine for instructions. This prevents dangerous situations that can arise if the machine suddenly moves or when the lifting arm suddenly lowers. Also, consider unforeseen actions by others.
B		Risk of injury due to getting stuck between moving parts. Keep body parts away from moving parts of the machine. Operate the controls only from the operator's area. Make sure that bystanders keep clear within a radius of 4 m (4.4 yd) of the machine.
C		This is the slow rotational speed indicator. This is the fast rotational speed indicator.
D		Always keep a safe distance (4 m [4.4]) from the machine. Be aware of persons or objects in the immediate vicinity of the machine.

#	Label	Description
E		Risk of burns. The hydraulic components, hoses, piping, engine and exhaust are very hot at operating temperatures.
F		This indicates the maximum sound power level. Always use suitable protective gear when operating the machine.
G		Always make sure that the attachment is correctly locked before it is used.
H		Use this lever to operate the auxiliary function.
		Use this lever to raise or lower the lifting arm.
		Use these levers to drive the machine in the desired direction.
		Use this lever to tilt the attachment forwards or backwards.
I		Always observe the fuel specifications.
J		Always check the wheel nuts after every 50 operating hours.
K		Location of an eyelet to tie down the machine.
L		Location of an eyelet to lift the machine.

#	Label	Description
M		Use the lever(s) to drive the machine in the desired direction.
N		Use this lever to operate the raise and lower the lifting arm, to tilt the attachment, or to use the Float-function on the machine.
O		Location of the negative battery terminal.
P		Location of the positive battery terminal.

6 Transport and storage

WARNING

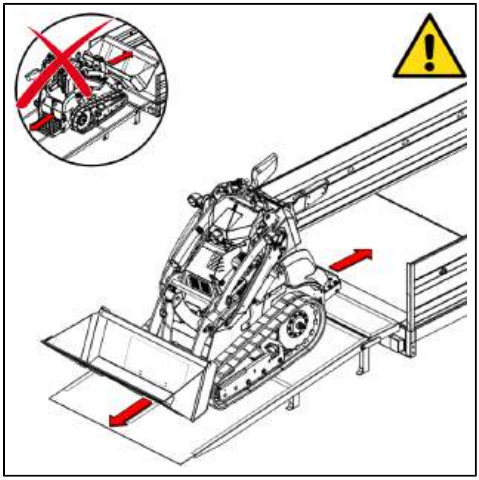
Always observe the following to prevent collisions and/or the machine slipping or tipping over:

If it is necessary to transport and/or store the machine:

- Make sure that the driving surface provides sufficient traction for the machine.
- If the machine must be loaded onto a trailer, make sure that the trailer ramp is correctly secured.

6.1 Loading and unloading the machine

Illustration(s) can differ from the actual configuration.



1. Transport the machine on a trailer.

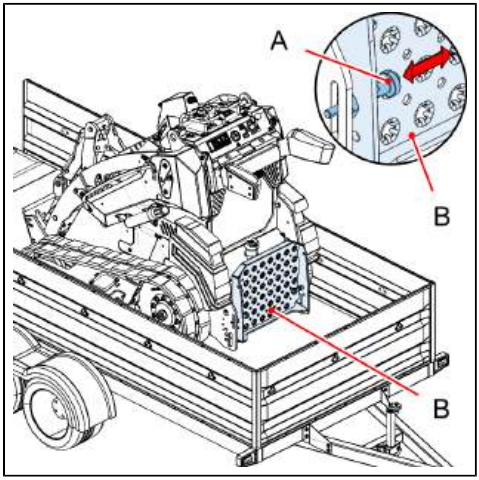
a. Place the machine backwards and in a straight position behind the trailer.

b. Drive the machine backwards onto the trailer.

CAUTION Always lower the lifting arm for transport.

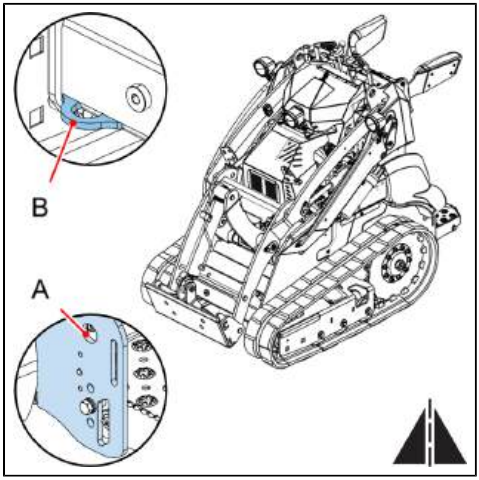
2. Switch off the machine.

WARNING Make sure that the machine cannot move unintentionally. Use, for examples, wedges to block a wheel.



3. If applicable: fold the footplate (B) upwards with the locking pins (A) in the extended position. Refer to *Locking and unlocking the footplate* on page 107.

Only possible when no optional counterweight is installed.



4. Tie down the machine at the front and the rear, using the appropriate eyelets (A & B).

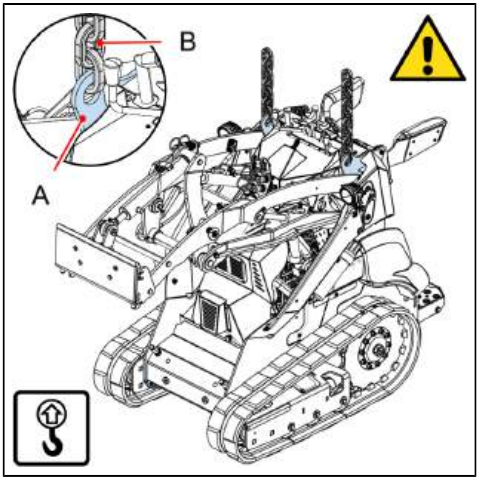
> **⚠ CAUTION** The appropriate eyelets are marked with the -symbol.

5. To unload the machine, follow the above steps in reverse order.

6.2 Lifting the machine

Illustration(s) can differ from the actual configuration.

WARNING Only trained and authorised personnel is allowed to lift the machine.



WARNING The machine must be lifted evenly (horizontally) by using both the right and left lifting points (A). The lifting points are marked with the -symbol.

⚠ WARNING

Lifting of the machine is only permitted if the following conditions are met:

- The lifting points (A) are used correctly. Refer to the image above.
- The machine is completely switched off.
- The suitable lifting gear (B) has sufficient lifting capacity (at a minimum: shipping mass + 50 %, considering potentially mounted counterweights).
- All attachments are removed from the machine.
- There are no loose objects on the machine (danger of falling objects during lifting).
- Bystanders should stay clear from the machine when it is lifted.

6.3 Towing the machine

⚠ CAUTION

Towing the machine is **NOT** allowed. Towing the machine will seriously damage the hydrostatic motors.

6.4 Storing the machine

⚠ CAUTION

If the machine is not used for a long time, it is best to store it in a dry and frost-free place. Follow these instructions if the machine needs to be stored.

1. Clean the machine with a high-pressure cleaner. Use a safety distance of 50 cm between water nozzle and machine.
2. Check the machine for defects, leaks and damage.
3. Repair any defects, leaks and damage.
4. Lubricate all lubrication points and guides.
5. Cover hydraulic and electrical couplings.
6. Make sure that the machine is completely switched off.
7. Switch off the battery switch.

7 Commissioning

Commissioning is the controlled, verifiable handover of the machine from “delivered” to “safe for operation”. During commissioning, all safety and functional systems are checked to make sure that the machine operates correctly.

The dealer must inform the operator of all operating instructions and explain them. The dealer records that the machine is ready for use and free of damage, leaks, or faults.

⚠ CAUTION

- Commissioning must only be performed by the authorised dealer/service technician or a person appointed by the manufacturer.
- If the machine is damaged or incomplete upon commissioning, contact the dealer immediately.

The dealer must document the commissioning on the PDI form ("PDI Pre-Delivery Inspection Dealer") and provides this to the manufacturer.

The PDI form includes a sign-off checklist. It confirms completion of the required inspections, functional checks and any applicable calibrations. It also confirms that the systems and hoses have been inspected and that no leaks are present.

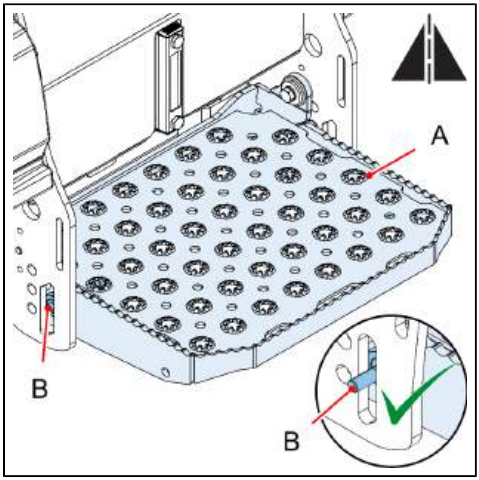
The dealer or service technician must enter their name and sign the PDI form.

8 Operation

8.1 Starting the machine

8.1.1 Preparing

1. Make sure that all necessary maintenance is done correctly and check the engine oil level. Refer to *Engine maintenance* on page 155.\
2. If applicable: make sure that the tracks tension is correct. Refer to *Checking and adjusting the tracks tension* on page 171.
3. Check the fuel level gauge. Add fuel, if necessary. Refer to *Adding fuel* on page 131.



4. Make sure that the footplate (A) is folded downwards with the locking pins (B) completely extended. Refer to *Locking and unlocking the footplate* on page 107.

⚠ WARNING Incorrect positioning of the locking pins (B) can cause the footplate to move unexpectedly.

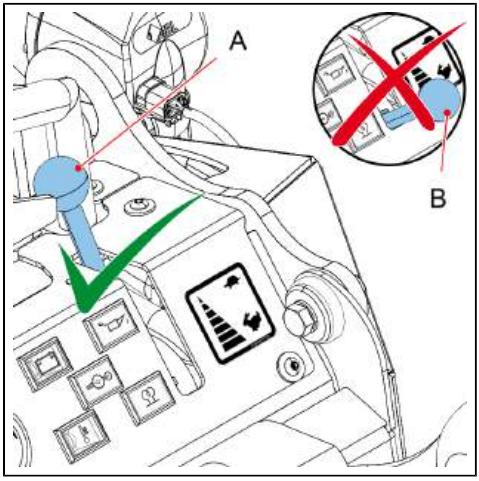
5. Make sure that the centre of gravity of the load is in the middle of the attachment.

> **WARNING** The machine is top heavy and tilt sensitive, especially with the load or attachment in the upper position.

6. Make sure that the terrain is sufficiently load-bearing and flat.
7. Check the correct functioning of the attachment lock.

8.1.2 Starting the machine

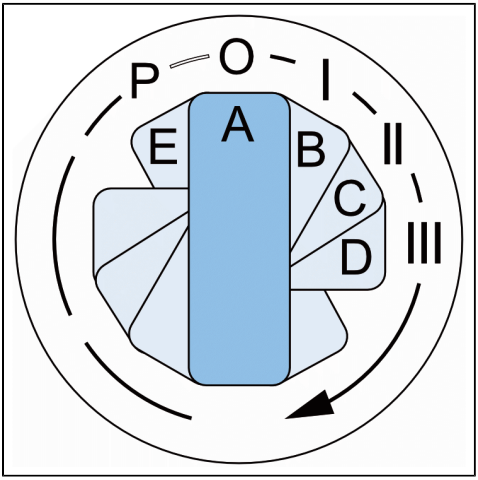
1. If applicable: switch on the battery switch.



2. Step onto the footplate.
3. Completely push the throttle lever forwards in the [LOW/MIN]-position (A).

> **CAUTION** Make sure that the throttle lever is not pulled backwards in the [HIGH/MAX]-position (B). This can cause damage to the engine.

4. Insert the key into the ignition switch.



5. Turn and hold the key into the [II]-position (C) and wait for a few seconds.

   This will activate the glow plugs of the engine.

6. Turn and hold the key into the [III]-position (D) until the engine has started.
7. Release the key.

   The key will return to the [I]-position (B).

8.2 Switching the machine off

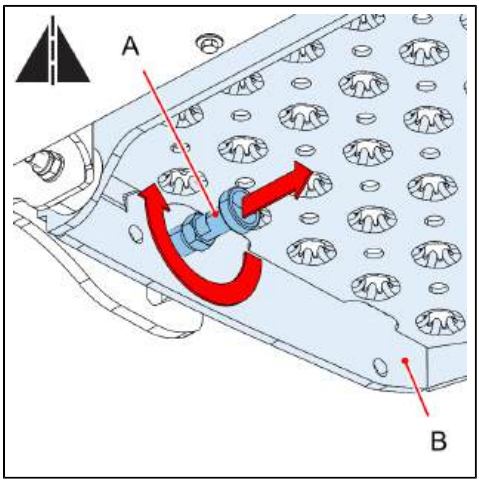
1. Make sure that the lifting arm is in the lowest position.
2. If applicable: make sure that the attachment is in the lowest possible position.
3. Make sure that the machine does not move.
4. If applicable: switch off the double gear pump. Refer to *Switch panel* on page 19.
5. If applicable: make sure that the control levers are in the neutral position.
6. Completely push the throttle lever forwards in the [LOW/MIN]-position.
7. Switch off the machine.

> **WARNING** Never parking the machine on a slope without blocking the tracks of the machine with, for example wedges. If this is not done, the machine can move unintentionally.

8. Remove the key from the ignition switch.
9. Switch off the battery switch after a full work cycle.

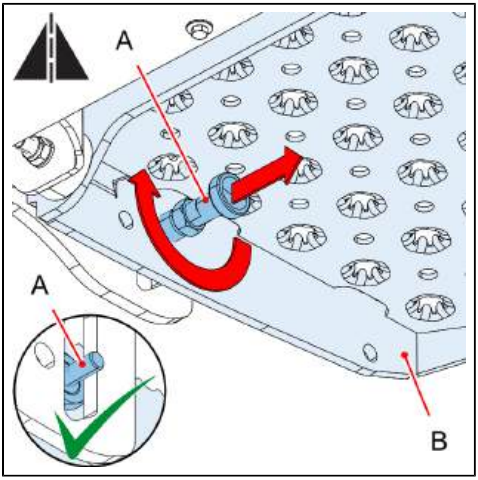
8.3 Locking and unlocking the footplate

The following is only applicable if the machine is **NOT** equipped with the optional counterweight under the footplate.



1. Hold the footplate (B) with one hand when it is folded upwards.
2. Retract and turn the locking pins (A) until they hold in position.

The footplate (B) is now correctly unlocked and can be folded into the desired position.



3. Retract and turn the locking pins (A) until the pin falls into the slot of the frame.

The footplate (B) is now correctly locked.

8.4 Driving the machine

WARNING

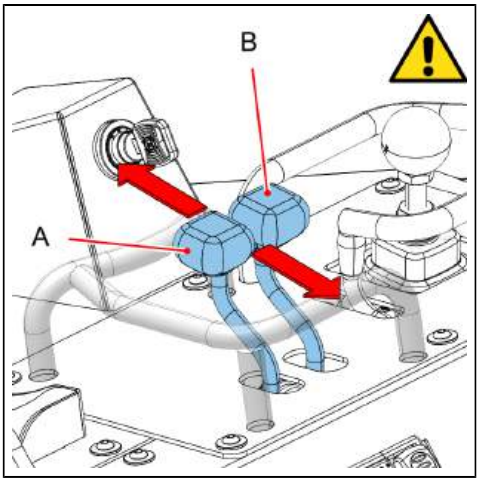
- Make sure that the operator is aware of all hazards and operating instructions concerning the machine before driving the machine.
- Always make sure that the operator is familiar with the handling of the machine. This type of machine is very responsive. If the control levers are suddenly released while driving the machine, it is possible that the operator falls off the machine, causing serious injury.
- Refer to *Terrain* on page 54 for the rules regarding the working surfaces.

8.4.1 Driving and turning

⚠ WARNING

Always grab and hold onto the support on the right-hand side of the machine when driving it. This will improve the overall stability during driving and turning.

Accelerating and braking

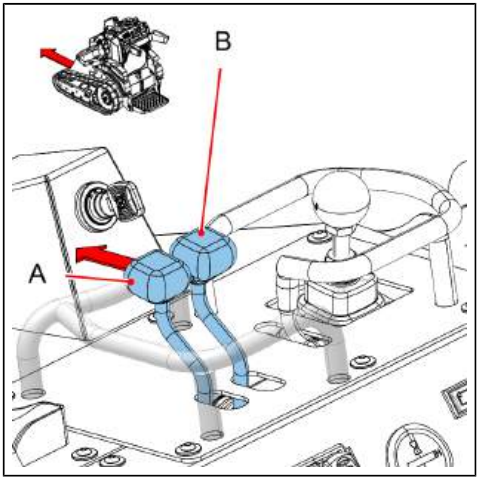


- **Accelerating:**To accelerate the machine forwards or backwards, push the drive direction lever (A & B) forwards or pull them backwards. The further the levers are pushed or pulled, the higher the machine speed.
- **Braking:** While moving, gently push or pull the drive direction levers (A & B) into the neutral position.

⚠ WARNING

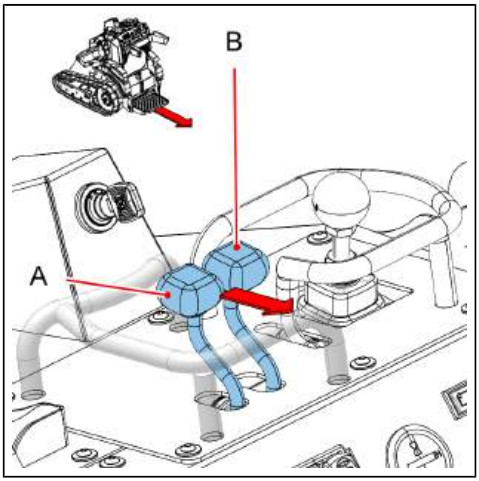
Too abruptly releasing the drive direction levers (A & B) (braking) can result in unexpected behaviour that can cause injuries or damage to the machine.

Driving forwards (straight)



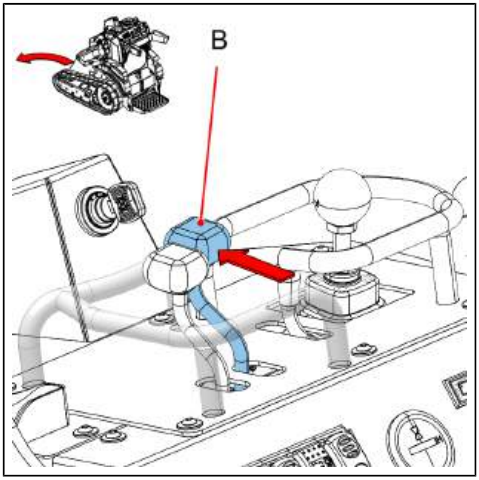
To drive the machine forwards in a straight line, gently push both drive direction levers (A & B) forwards.

Driving backwards (straight)



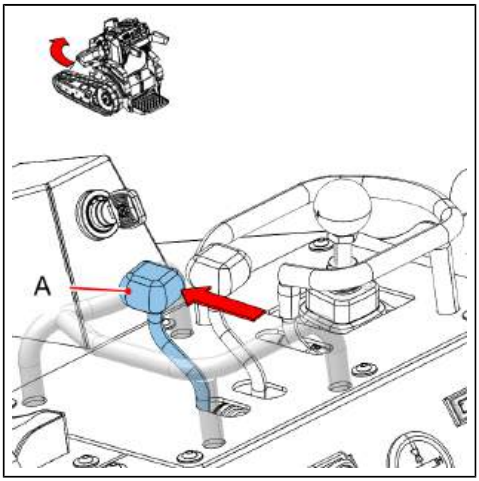
To drive the machine backwards in a straight line, gently pull both drive direction levers (A & B) backwards.

Turning left forwards



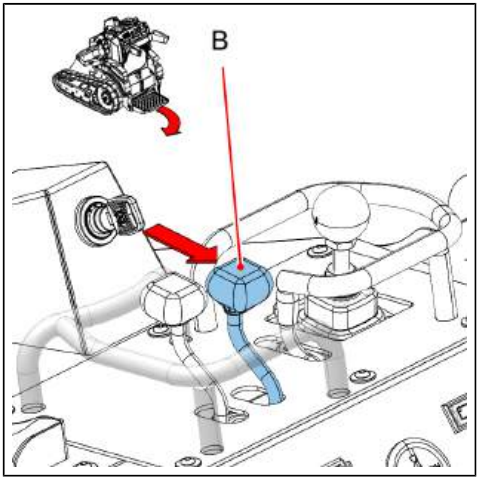
To turn the machine left in a forwards direction, gently push the right drive direction lever (B) forwards.

Turning right forwards



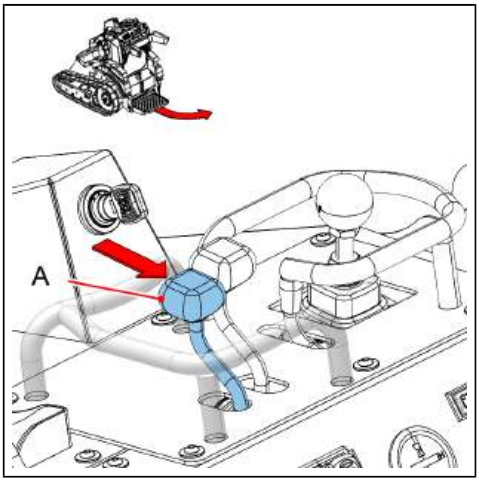
To turn the machine right in a forwards direction, gently push the left drive direction lever (A) forwards.

Turning left backwards



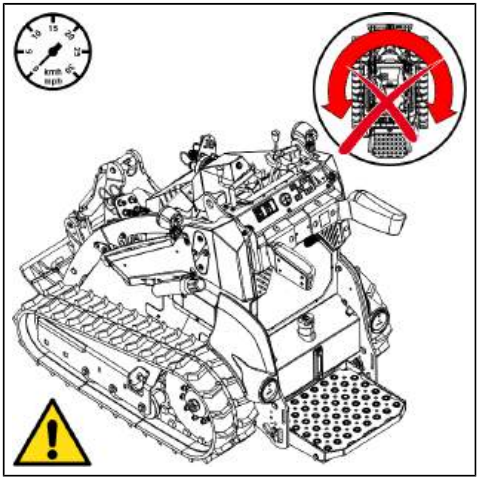
To turn the machine left in a backwards direction, gently pull the right drive direction lever (B) backwards.

Turning right backwards



To turn the machine right in a backwards direction, gently pull the left drive direction lever (A) backwards.

Turning on axis



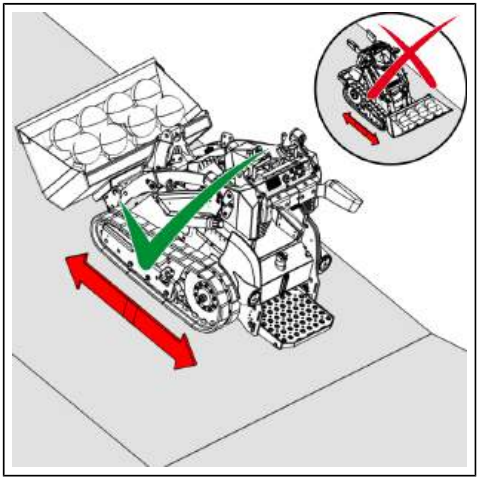
CAUTION Do **NOT** turn the machine on its axis without driving. This can damage the tracks. Always make sure that the machine is in motion at a considerate speed.

8.4.2 Driving with and without load

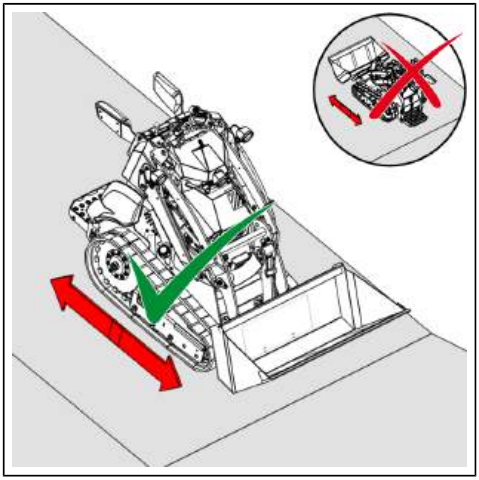
Illustration(s) can differ from the actual configuration.

WARNING Always keep the **heaviest** end of the machine (both loaded or unloaded machine) facing the higher end of the slope.

CAUTION Always observe the maximum slope angles. Refer to *Maximum slope angle* on page 35.



The correct way to drive with load on a slope.

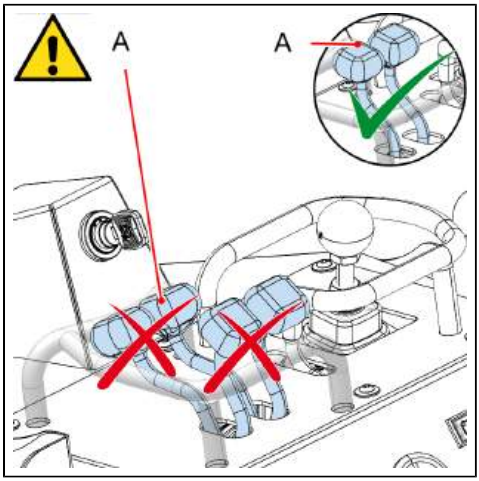


The correct way to drive without load on a slope.

8.5 Parking the machine

WARNING

The drive direction levers (A) should always be in the neutral position when parking the machine. If this is not the case, the machine can start to move and can cause injury or damage.



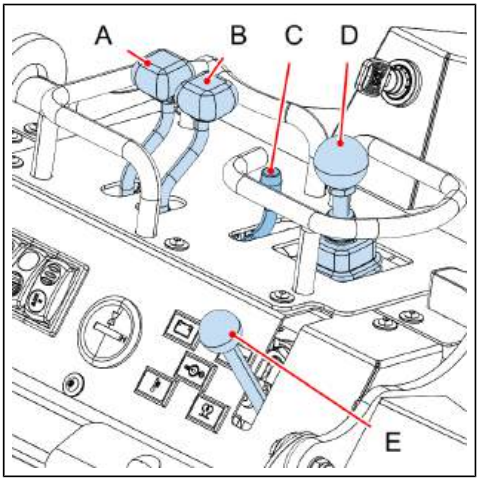
1. Stop the machine at the desired location on a firm and level surface.
2. Put the drive direction levers (A) in the neutral position.
3. Put the lifting arm in the lowest position.
4. If applicable: switch off the double gear pump. Refer to *Switch panel* on page 19.
5. Completely switch off the ignition and wait until the engine has stopped.
6. Make sure that the machine cannot move unintentionally.

WARNING

When possible, do not park the machine on a slope. If parking on a slope is unavoidable, obey the instructions in *Parking on slopes* on page 57.

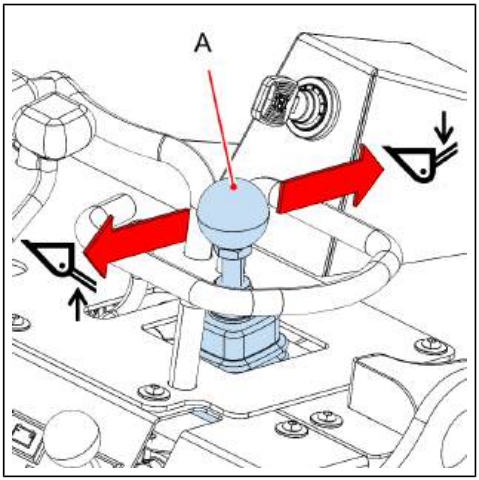
8.6 Using the controls

Overview of controls



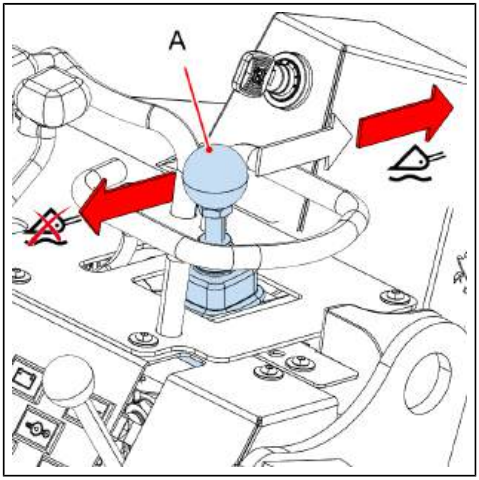
A. Drive direction lever (left side of the machine)
B. Drive direction lever (right side of the machine)
C. Auxiliary hydraulic function/ Attachment lock
D. Joystick
E. Throttle lever

Raising and lowering the lifting arm



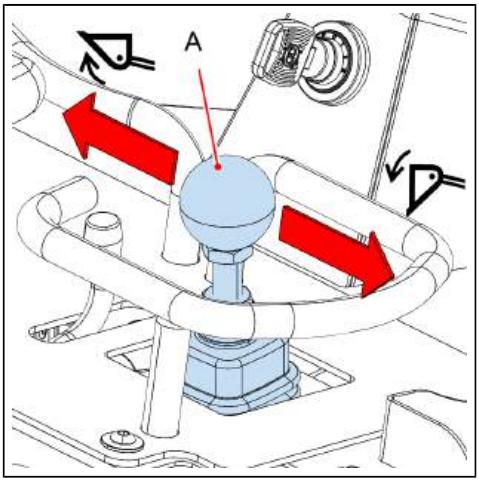
- Push the joystick (A) forwards to lower the lifting arm.
- Pull the joystick (A) backwards to raise the lifting arm.

Using the Float-function on the lifting arm



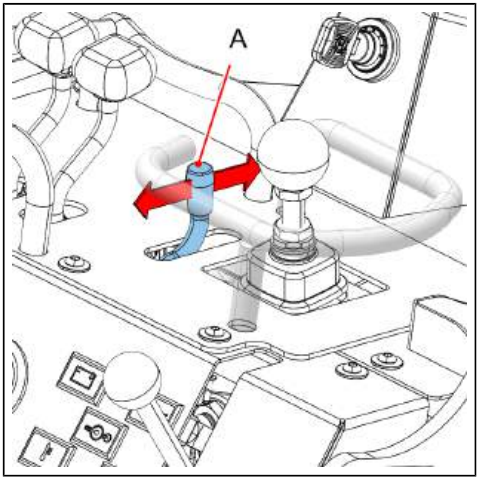
- Push the joystick (A) completely forwards, until it passes through the resistance. This will engage the Float-function on the lifting arm.
- Pull the joystick (A) backwards to disengage the Float-function on the lifting arm.

Tilting the attachment



- Push the joystick (A) to the left to tilt the attachment backwards.
- Push the joystick (A) to the right to tilt the attachment forwards.

Using the auxiliary hydraulic function

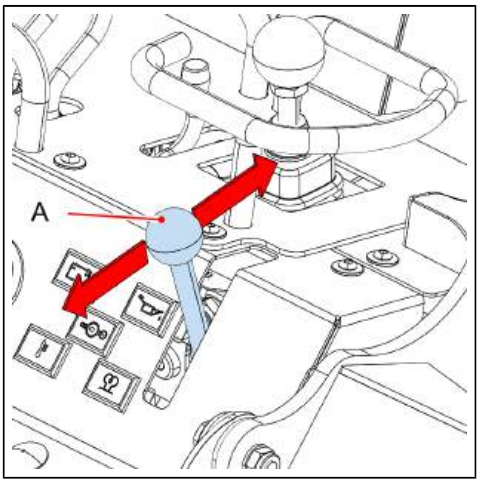


- Push or pull the auxiliary hydraulic function lever (A) forwards or backwards to operate the auxiliary hydraulic function.

Using the throttle lever

WARNING Adjusting the engine speed effects the current driving speed and attachment operation.

CAUTION Always push the throttle lever (A) completely forwards into the [LOW/MIN]-position when switching the machine off.



- Gradually push the throttle lever (A) forwards to decrease the engine speed.
- Gradually pull the throttle lever (A) backwards to increase the engine speed.

8.7 Coupling and uncoupling the attachment

Refer to the OPM of the attachment for more information about its operation.

8.7.1 Hydraulic attachment lock with switch

The exact coupling method depends on the configuration of the machine.

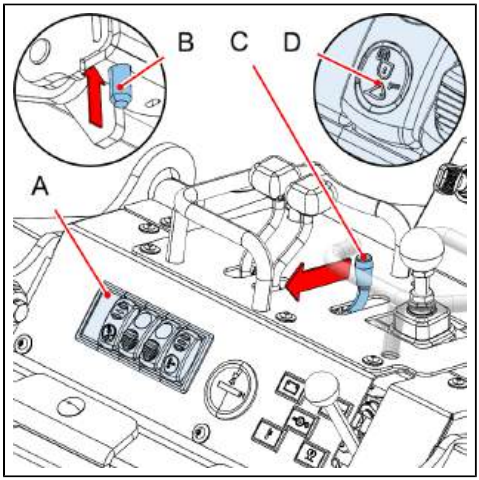
WARNING

- While coupling and uncoupling, keep bystanders at a safe distance.
- Always make sure that the attachment is not placed at a location where it can cause injuries and/or damage.

8.7.1.1 Coupling

Illustration(s) can differ from the actual configuration.

Perform these steps if the machine is equipped with the hydraulic attachment lock.

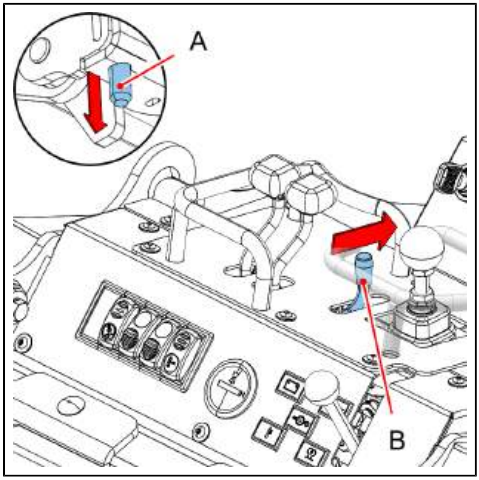


1. Lower the lifting arm as far as possible.

2. Make sure that the locking pins (B) of the attachment bracket are unlocked on both sides of the machine:
   a. Press and hold the [Unlock attachment]-switch (D) on the switch panel (A).
   b. Pull the lever (C) backwards to completely retract the locking pins (B).
   c. Release the [Unlock attachment]-switch (D) on the switch panel (A).
3. Move the machine towards the attachment.
4. Tilt the attachment bracket forwards to position it under the quick-hitch of the attachment.

> **⚠ CAUTION** Make sure not to damage the hydraulic connections on the attachment bracket when tilting it forwards.

5. Connect the attachment bracket to the attachment.
6. Tilt the attachment bracket backwards and lift the attachment until the attachment bracket completely fits into the attachment.



7. Push the lever (B) forwards to completely extend the locking pins (A).

> **WARNING** Make sure that the locking pins (A) slide in place correctly. Incorrect positioning of the locking pins (A) can damage the quick-hitch as well as the locking pins (A).

8. If applicable: de-pressurize the hydraulic connections. Refer to *De-pressurizing the auxiliary hydraulic connections* on page 129.
9. If applicable: remove the dust caps from the hydraulic connections.
10. If applicable: connect the hydraulic and electrical connections.
11. If applicable: remove the attachment support.

> **CAUTION** During operation, make sure that the load is distributed evenly in the middle of the attachment. If only one of the corners is loaded, this can cause serious damage to the attachment and the connected machine.

8.7.1.2 Uncoupling

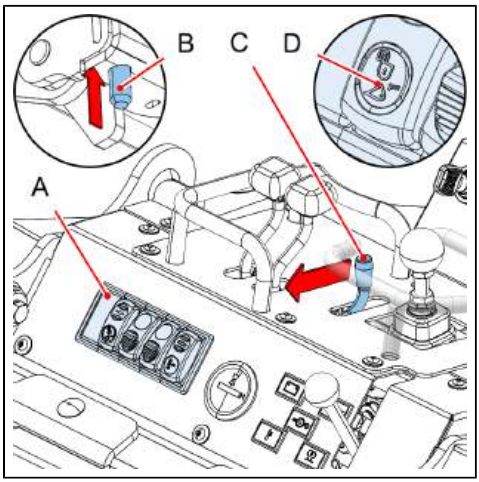
Illustration(s) can differ from the actual configuration.

Perform these steps if the machine is equipped with the hydraulic attachment lock.

1. If applicable: install the attachment support.
2. Lower the lifting arm and place the attachment on the ground or (if applicable) the attachment support.

> **CAUTION** Make sure that the attachment is in the closed position (if applicable).

3. If applicable: de-pressurize the hydraulic connections. Refer to *De-pressurizing the auxiliary hydraulic connections* on page 129.
4. If applicable: disconnect the hydraulic and electrical connections.
5. If applicable: install the dust caps on the hydraulic connections.



6. Unlock the locking pins (B) of the attachment bracket on both sides of the machine:
   a. Press and hold the [Unlock attachment]-switch (D) on the switch panel (A).
   b. Pull the lever (C) backwards to completely retract the locking pins (B).
   c. Release the [Unlock attachment]-switch (D).
7. Slightly tilt the attachment bracket forwards.
8. Disconnect the attachment from the attachment bracket.

⚠ CAUTION	Make sure that the attachment is completely disconnected from the attachment bracket, before driving the machine away.

⚠ WARNING	Place and store the attachment safely and correctly.

8.7.2 Mechanical attachment lock

WARNING

This version of the attachment bracket is equipped with a mechanical locking pin on both sides of the attachment bracket. Always use both locking pins to prevent serious injuries or damage to the machine.

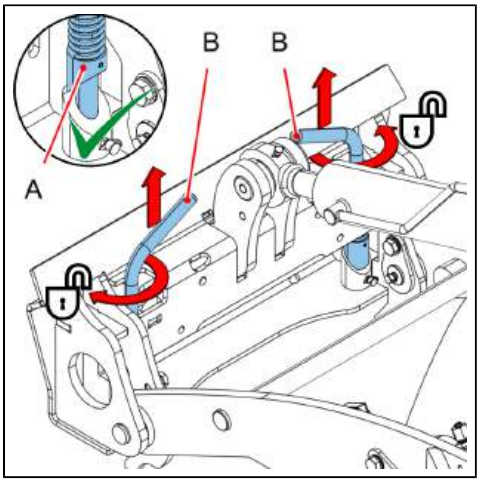
WARNING

- While coupling and uncoupling, keep bystanders at a safe distance.
- Always make sure that the attachment is not placed at a location where it can cause injuries and/or damage.

8.7.2.1 Coupling

Illustration(s) can differ from the actual configuration.

Perform these steps if the machine is equipped with the mechanical attachment lock.

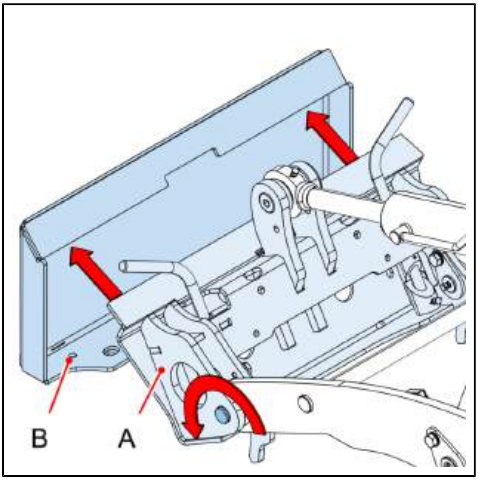


1. Lower the lifting arm as far as possible.

2. Make sure that the locking pins (B) of the attachment bracket are unlocked on both sides of the machine:
   a. Lift the locking pins (B) and turn them completely outwards.

   The springs (A) at the lower end of the locking pins (B) are now retracted into the attachment bracket.

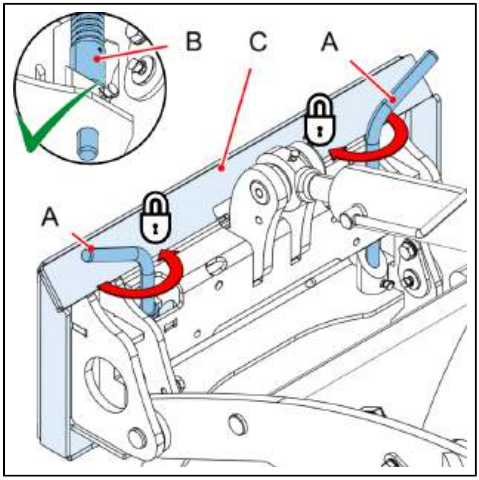
3. Move the machine towards the attachment.



4. Tilt the attachment bracket (A) forwards to position it under the quick-hitch of the attachment (B).

CAUTION Make sure not to damage the hydraulic connections on the attachment bracket (A) when tilting it forwards.

5. Connect the attachment bracket (A) to the attachment (B).
6. Tilt the attachment bracket (A) backwards and lift the attachment (B) until the attachment bracket (A) completely fits into the attachment (B).



7. Turn the locking pins (A) completely inwards.

- The springs (B) at the lower end of the locking pins (A) will be extended.
- The locking pins (A) will protrude from the bottom of the attachment bracket.
- The attachment (C) is now locked to the attachment bracket.

WARNING

Make sure that the locking pins (A) slide in place correctly. Incorrect positioning of the locking pins (A) can damage the quick-hitch as well as the locking pins (A).

8. If applicable: de-pressurize the hydraulic connections. Refer to *De-pressurizing the auxiliary hydraulic connections* on page 129.

9. If applicable: remove the dust caps from the hydraulic connections.

10. If applicable: connect the hydraulic and electrical connections.

11. If applicable: remove the attachment support.

> **CAUTION** During operation, make sure that the load is distributed evenly in the middle of the attachment. If only one of the corners is loaded, this can cause serious damage to the connected attachment and machine.

8.7.2.2 Uncoupling

Illustration(s) can differ from the actual configuration.

Perform these steps if the machine is equipped with the mechanical attachment lock.

1. If applicable: install the attachment support.

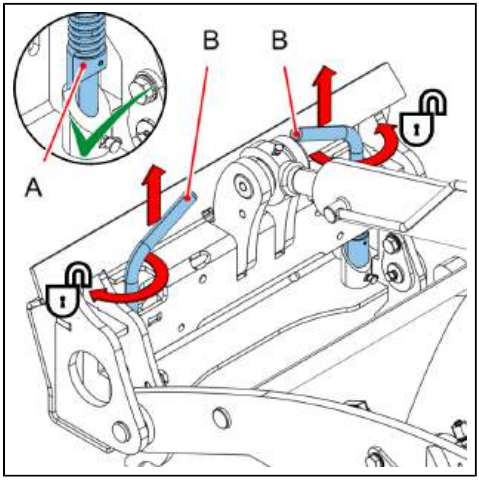
2. Lower the lifting arm and place the attachment on the ground or (if applicable) the attachment support.

> **CAUTION** Make sure that the attachment is in the closed position (if applicable).

3. If applicable: de-pressurize the hydraulic connections. Refer to *De-pressurizing the auxiliary hydraulic connections* on page 129.

4. If applicable: disconnect the hydraulic and electrical connections.

5. If applicable: install the dust caps on the hydraulic connections.



6. Lift the locking pins (B) and turn them completely outwards.

The springs (A) at the lower end of the locking pins (B) will be retracted.

7. Slightly tilt the attachment bracket forwards.
8. Carefully move the machine away from the attachment.

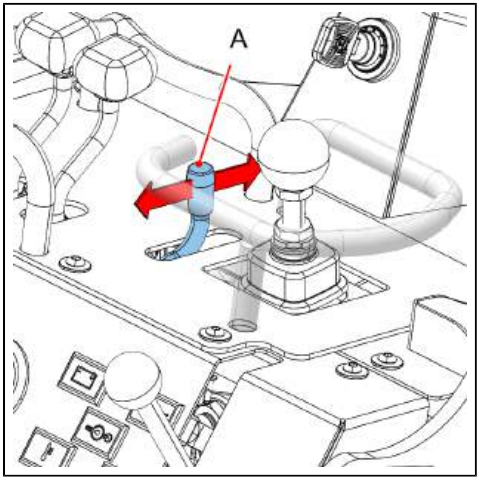
CAUTION Make sure that the attachment is completely disconnected from the attachment bracket, before driving the machine away.

WARNING Place and store the attachment safely and correctly.

8.8 De-pressurizing the auxiliary hydraulic connections

- The method of de-pressurization depends on the configuration of the machine.
- Illustration(s) can differ from the actual configuration.

8.8.1 With mechanical lever



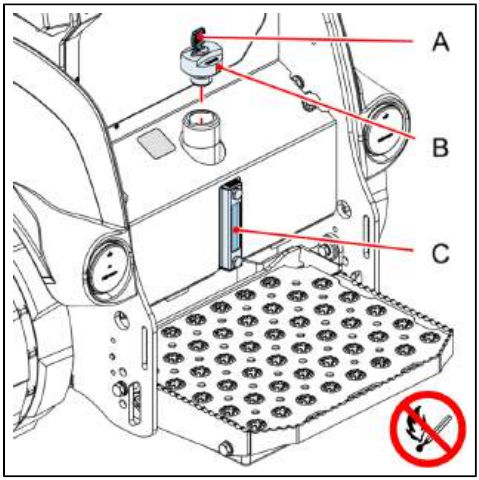
1. Switch off the machine.
2. Move the lever (A) in both directions.

The hydraulic connections are now de-pressurized.

8.9 Fuel

8.9.1 Adding fuel

> **⚠ CAUTION** Use only clean, high quality fuel for the machine. It is recommended to use an additional standard filter when refuelling. For the fuel type, refer to *Fluid specifications* on page 148.



1. Completely stop the machine.
2. Use the appropriate key (A) to unlock and remove the fuel cap (B).
3. Turn the fuel cap (B) counterclockwise and remove it.
4. Add fuel to the fuel tank.

> **⚠ CAUTION** Use the fuel level indicator glass (C) to determine the correct fuel level.

5. Re-install the fuel cap (B) on the fuel tank and lock it with the key.

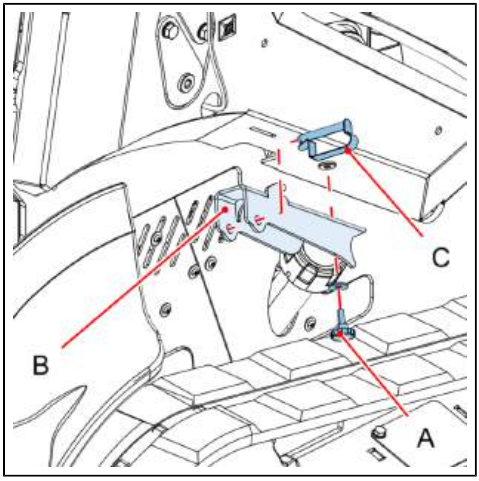
9 Maintenance

WARNING

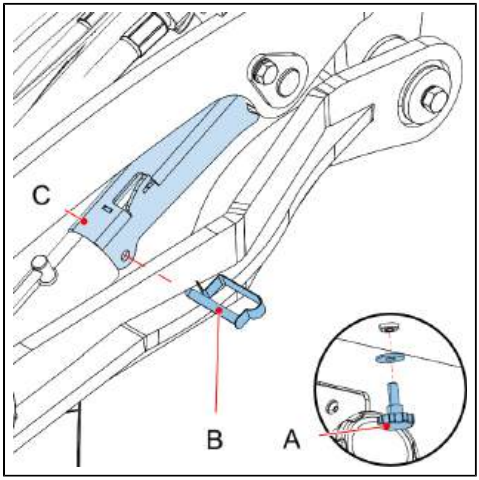
When carrying out maintenance work, always observe the following safety rules:

- Completely stop the machine.
- Support the machine fully and correctly so it cannot move unexpectedly.
- If available: apply the parking brake.
- Perform the maintenance tasks as shown in the preventive maintenance schedules.
- Only perform the maintenance tasks for the procedures that are shown in this manual.
- Perform the operator maintenance tasks before each interval is reached.
- If more than one interval is shown, obey the limit that is reached first.
- When in doubt, contact the dealer.
- Each time maintenance is performed, make a copy of the maintenance log form and fill it out.
- Only perform the operator maintenance tasks included in this document.
- Only a trained and authorised service engineer is approved to perform other maintenance tasks. An overview of all approved BAD BOY MOWERS, LLC dealers can be found at www.badboycountry.com.
- Make sure that the trained and authorised service engineer performs the other maintenance tasks.

9.1 Installing the safety bracket

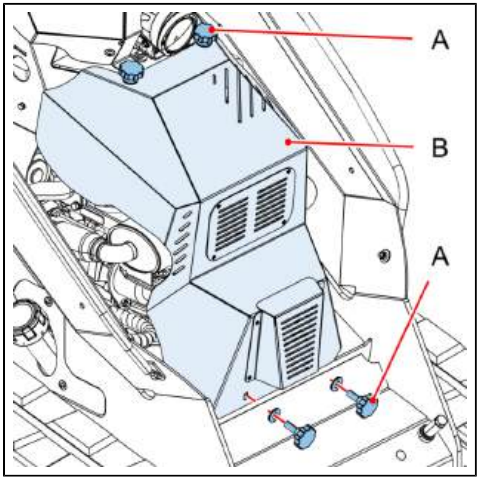


1. Remove the safety bracket (B) from the frame of the machine:
   a. Remove the safety pin (C).
   b. Remove the thumb screw and washer (A).
   c. Remove the safety bracket (B) from the frame of the machine.
2. Completely raise the lifting arm.
3. Completely stop the engine and wait for it to cool down.



4. Install the safety bracket (C) onto the lifting arm:
   a. Install the safety bracket (C) onto the lifting arm.
   b. Install and secure the locking pin (B).
   c. Install and fasten the washer and thumb screw (A) on the original position.
5. Make sure that the safety bracket (C) is correctly installed before proceeding.
6. Repeat the above steps in reverse order to remove the safety bracket (C) from the lifting arm.

9.2 Removing the engine cover



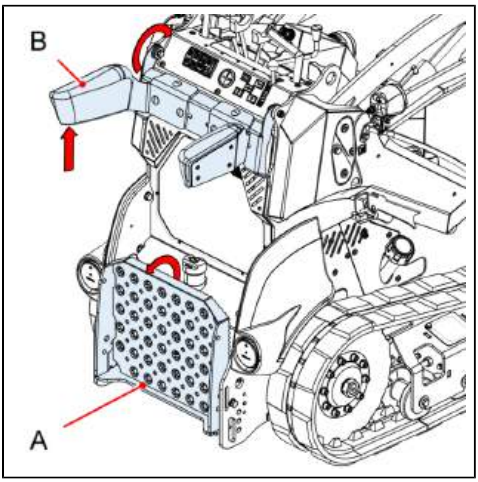
1. Install the safety bracket on the lifting arm of the machine. Refer to *Installing the safety bracket* on page 134.

> **⚠ WARNING** Always install the safety bracket on the lift cylinder, when working near or underneath the lifting arm.

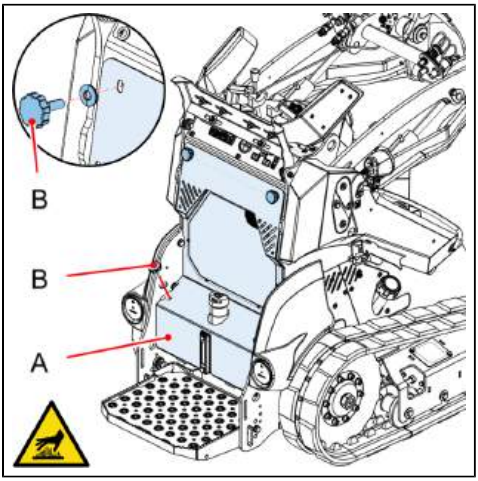
2. Remove the engine cover (B):
   a. Remove the bolts and washers (A).
   b. Remove the engine cover (B).
3. Repeat the above steps in reverse order to install the engine cover (B) again.

9.3 Accessing the cooler

WARNING Do not remove the cooler filler cap when the engine is hot.



1. If applicable: fold the footplate (A) down.
2. Fold the flank protection (B) upwards.



3. Remove the 4 bolts and washers (B).

4. Remove the cover plate of the cooler (A).

9.4 Preventive maintenance schedules

CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

9.4.1 Operator maintenance

The operator of this machine must perform these instructions at the indicated intervals to make sure that the machine is in correct working order.

All hours as indicated in the following tables are the operation hours.

Instructions that only apply to certain versions of the machine are indicated by an asterisk (*) in the following maintenance overviews.

9.4.1.1 Daily maintenance/Every 10 hours

Main part	Part	Task	Procedure, refer to
Frame	Lubrication points	Lubricate.	*Frame maintenance* on page 152.
	Frame	Check for wear or damage.	Perform a visual check.
Hydraulic system	Hydraulic oil	Check the oil level.	*Checking the hydraulic oil level* on page 166.
	Hydraulic connections	Check for leaks, cracks, wear and damage.	*Checking for leaks, wear, cracks and damage* on page 168.

Main part	Part	Task	Procedure, refer to
	Cylinders	Check.	*Checking the cylinders* on page 168.
	Dust caps couplers	Check.	*Checking the dust-caps on the couplers* on page 168.
Controls	Switch panel	Check.	Perform a functional test.
	Control levers	Check.	Perform a functional test.
	Work lights*	Check.	Perform a functional test.
Transmission	Tracks	Clean.	*Cleaning the tracks* on page 170.
		Check the tension.	*Checking and adjusting the tracks tension* on page 171.

9.4.1.2 Every 50 hours

Main part	Part	Task	Procedure, refer to
Transmission	Tracks	Tighten the rollers and sprocket wheel.	*Correct torque of tracks* on page 168.

9.4.2 Dealer maintenance schedules

This chapter contains overviews of preventive maintenance schedules that the dealer must perform to make sure that the machine is in correct working order.

All hours as indicated in the following tables are the operation hours, except for the yearly interval(s).

Instructions that only apply to certain versions of the machine are indicated by an asterisk (*) in the following maintenance overviews.

9.4.2.1 Maintenance after the first 50 hours

Main part	Part	Task	Procedure, refer to
Controls	Complete machine	Perform a test drive.	Contact the dealer.
		Perform a functional test.	
Engine	Engine oil	Replace.	Contact the dealer.
	Engine oil filter	Replace.	Contact the dealer.
	Air intake line	Check.	Contact the dealer.
	V-belt	Check.	Contact the dealer.
Hydraulic system	Hydraulic oil	Check.	Contact the dealer.
	Hydraulic oil filter	Replace.	Contact the dealer.
	Hydraulic connections	Check.	Contact the dealer.
Transmission	Tracks	Check and adjust the tension.	Contact the dealer.
		Tighten the rollers and sprocket wheel.	Contact the dealer.

Main part	Part	Task	Procedure, refer to
Electrical system	Battery	Measure the voltage.	Contact the dealer.
	Alternator	Measure the voltage.	Contact the dealer.
	Fuses	Check.	Contact the dealer.

9.4.2.2 Maintenance every 250 hours

CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

Main part	Part	Task	Procedure, refer to
Controls	Complete machine	Perform a test drive.	Contact the dealer.
		Perform a functional test.	
Engine	Engine oil	Replace.	Contact the dealer.
	Engine oil filter	Replace.	Contact the dealer.
	Air intake lines	Check.	Contact the dealer.
	V-belt	Check.	Contact the dealer.
Fuel system	Fuel pre-filter	Replace.	Contact the dealer.
	Fuel lines/hoses and clamps	Check.	Contact the dealer.
Hydraulic system	Hydraulic oil filter	Replace.	Contact the dealer.
	Hydraulic oil	Check.	Contact the dealer.
Transmission	Tracks	Check and adjust the tension.	Contact the dealer.

9.4.2.3 Maintenance every 500 hours

CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

The dealer must also perform all tasks mentioned in *Maintenance every 250 hours* on page 141.

Main part	Part	Task	Procedure, refer to
Engine	V-belt	Replace.	Contact the dealer.
	Engine vibration dampers	Check.	Contact the dealer.
	Main air filter	Replace.	Contact the dealer.
	Safety air filter	Replace.	Contact the dealer.
Cooling system	Radiator tubes and fins (core)	Check and clean.	Contact the dealer.
	Radiator hoses and clamps	Check.	Contact the dealer.
Fuel system	Main fuel filter	Replace.	Contact the dealer.
	Water from fuel tank	Drain.	Contact the dealer.
	Fuel tank interior	Check and clean.	Contact the dealer.
Hydraulic system	Oil cooler tubes and fins (core)	Check and clean.	Contact the dealer.
	Hydraulic connections	Check.	Contact the dealer.
Electrical system	Battery	Measure the voltage.	Contact the dealer.
	Alternator	Measure the voltage.	Contact the dealer.

Main part	Part	Task	Procedure, refer to
	Fuses	Check.	Contact the dealer.
Frame	Bushings and bolts of the hinge pins	Check for wear. Tighten, if necessary.	Contact the dealer.
	End stops of lifting arm	Check.	Contact the dealer.
	Safety labels	Check for presence.	Contact the dealer.

9.4.2.4 Maintenance every 1000 hours

⚠ CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

The dealer must also perform all tasks mentioned in *Maintenance every 500 hours* on page 142.

Main part	Part	Task	Procedure, refer to
Engine	Valves	Measure the clearance.	Contact the dealer.
	Thermostat	Measure the temperature at which the thermostat valve opens.	Contact the dealer.
Hydraulic system	Hydraulic oil	Replace.	Contact the dealer.
	Suction screens	Replace.	Contact the dealer.
	Filler cap	Replace.	Contact the dealer.

Main part	Part	Task	Procedure, refer to
	All hydraulic cylinders	Check for damage on the scraper.	Contact the dealer.

9.4.2.5 Maintenance every 1500 hours

CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

The dealer must also perform all tasks mentioned in *Maintenance every 500 hours* on page 142.

Main part	Part	Task	Procedure, refer to
Engine	Valve nozzle pressure	Check.	Contact the dealer.

9.4.2.6 Maintenance every 3000 hours

CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

The dealer must also perform all tasks mentioned in *Maintenance every 500 hours* on page 142, *Maintenance every 1000 hours* on page 143 and *Maintenance every 1500 hours* on page 144.

Main part	Part	Task	Procedure, refer to
Engine	Turbocharger	Check.	Contact the dealer.
	Injection pump	Check.	Contact the dealer.
	Injection timing	Check.	Contact the dealer.

9.4.2.7 Maintenance every year

CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

Main part	Part	Task	Procedure, refer to
Controls	Complete machine	Perform a test drive.	Contact the dealer.
		Perform a functional test.	
Engine	Engine oil	Replace.	Contact the dealer.
	Engine oil filter	Replace.	Contact the dealer.
	Main air filter	Replace.	Contact the dealer.
	Safety air filter	Replace.	Contact the dealer.
	Exhaust manifold	Check for cracks + leakage.	Contact the dealer.
	Vibration dampers	Check for damage.	Contact the dealer.
Cooling system	Coolant	Measure the freezing point.	Contact the dealer.
Fuel system	Main fuel filter	Replace.	Contact the dealer.
	Fuel tank	Drain.	Contact the dealer.
	Fuel tank interior	Check and clean.	Contact the dealer.
	Fuel pre-filter	Replace.	Contact the dealer.
Hydraulic system	Hydraulic oil	Replace.	Contact the dealer.
	Hydraulic oil filter	Replace.	Contact the dealer.
	Suction screens	Replace.	Contact the dealer.

Main part	Part	Task	Procedure, refer to
	Filler cap	Replace.	Contact the dealer.
	Hydraulic connections	Check.	Contact the dealer.
	All hydraulic cylinders	Check for damage on the scraper.	Contact the dealer.
	Oil cooler tubes and fins (core)	Check and clean.	Contact the dealer.
Transmission	Tracks	Check and adjust the tension.	Contact the dealer.
Electrical system	Battery	Measure the voltage.	Contact the dealer.
	Alternator	Measure.	Contact the dealer.
	Fuses	Check.	Contact the dealer.
Frame	Bushings and bolts of the hinge pins	Check for wear. Tighten, if necessary.	Contact the dealer.
	End stops of lifting arm	Check.	Contact the dealer.
	Safety labels	Check for presence.	Contact the dealer.

9.4.2.8 Maintenance every 2 years

⚠ CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

Main part	Part	Task	Procedure, refer to
Engine	Air intake line	Replace.	Contact the dealer.

Main part	Part	Task	Procedure, refer to
	V-belt	Replace.	Contact the dealer.
Cooling system	Coolant	Replace.	Contact the dealer.
	Radiator hoses and clamps	Replace.	Contact the dealer.
Fuel system	Fuel lines/hoses and clamps	Replace.	Contact the dealer.
Electrical system	Battery	Replace.	Contact the dealer.

9.4.2.9 Maintenance every 6 years after hydraulic hose production date

⚠ CAUTION Intensive use and/or use in extreme conditions require shorter maintenance intervals.

Main part	Part	Task	Procedure, refer to
Hydraulic system	Hydraulic hoses	Replace.	Contact the dealer.

9.5 Fluid specifications

The below-mentioned volumes are indications.

Fluid	Volume (litre)	Classification requirements
Engine oil	3.7	SAE 10W-40 API CF // MIL-L-2104C // ACEA A2/B2, A3/B3
Fuel	23	Diesel EN 590 // GB 252 // ASTM D975 2-D // JIS K 2204
Hydraulic oil	30	VG 46 DIN 51524: part 3 // ISO 11158: type 2204 HV
Coolant	3.3	Standard engine coolant (-38 °C)

9.5.1 Additional engine oil specifications

The engine oil should have properties of API classification “CF” or ACEA A3/B3 grades or higher. Change the type of engine oil according to the ambient temperature:

Above 25°C (77°F)	SAE30 or SAE10W-30/SAE 15W-40
0°C to 25°C (32°F to 77°F)	SAE20 or SAE10W-30/SAE 15W-40
Below 0°C (32°F)	SAE10 or SAE10W-30/SAE 15W-40

9.5.2 Additional coolant specifications

Standard used coolant gives protection up to -38°C (-37°F). There are 2 types of antifreeze available; use the permanent type (PT) for this engine. When the antifreeze is mixed with water, the antifreeze mixing ratio must be less than 50 %.

Freezing Point		Boiling Point		Vol % Antifreeze
-24 °C	-12 °F	106 °C	222 °F	40
-38 °C	-37 °F	108 °C	226 °F	50

9.5.3 Additional hydraulic oil specifications

The standard hydraulic oil used has viscosity class “VG 46”. Change the type of hydraulic oil according to the (average) ambient temperature:

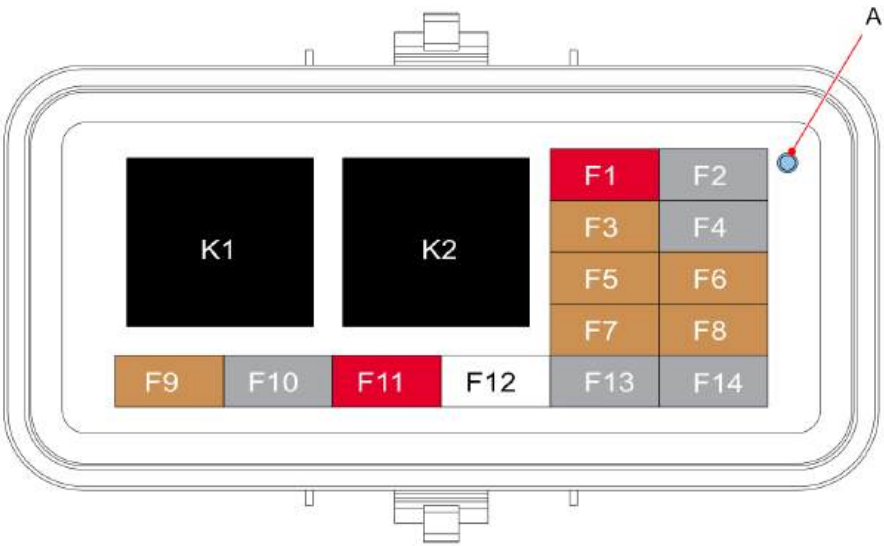
Above 25°C (77°F)	VG 68
0°C to 25°C (32°F to 77°F)	VG 46
Below 0°C (32°F)	VG 32

9.6 Electricity

9.6.1 Overview fuses

9.6.1.1 Fuses and relays

The same fuse box (A) applies to all versions of the machine.



Fuse	Function	Value (A)
F1	Ignition switch	10 A
F2	Fuel pump	2 A
F3	Timer relay	5 A
F4	Warning lights	2 A
F5	Work lights	5 A
F6	Unlock attachment	5 A

Fuse	Function	Value (A)
F7	Alternator	5 A
F8	Double gear pump	5 A
F9	Rotating beacon	5 A
F10	DPF	2 A
F11	12-V auxiliary connection	10 A
F12	[Optional]	[N/A]
F13	FMS + 30	2 A
F14	FMS + 15	2 A

Relay	Function
K1	Pre-heat relay
K2	Contact relay

9.6.2 Jump-starting the machine

WARNING

- Make sure that no electrical connection is made between the jump-start terminals. This can cause a short-circuit and sparks and result in an explosion of the battery.
- Make sure that the jumper cables and the jump-start terminals are clean and in good condition.
- **NEVER** use damaged jumper cables.
- Perform these instructions with 2 persons.

- External power supply (e.g. another machine or booster battery)
- Heavy-duty jumper cables
- Safety goggles and gloves

1. Make sure that the battery switch of the machine is switched off.
2. Connect the positive jumper cable first to the positive jump-start terminal on the machine, then to the positive terminal of the external power supply.

3. Connect the negative jumper cable first to the negative terminal of the external power supply, then to the negative jump-start terminal on the machine.
4. Switch on the battery switch.
5. Wait several minutes before starting the machine.
6. Start the machine.
7. Switch off the external power supply when the machine is correctly running.
8. Disconnect the negative jumper cable first from the machine, then from the external power supply.
9. Disconnect the positive jumper cable first from the external power supply, then from the machine.
10. Drive the machine for approximately 30 minutes.

CAUTION A dead battery can require a prolonged period of time to fully charge the battery.

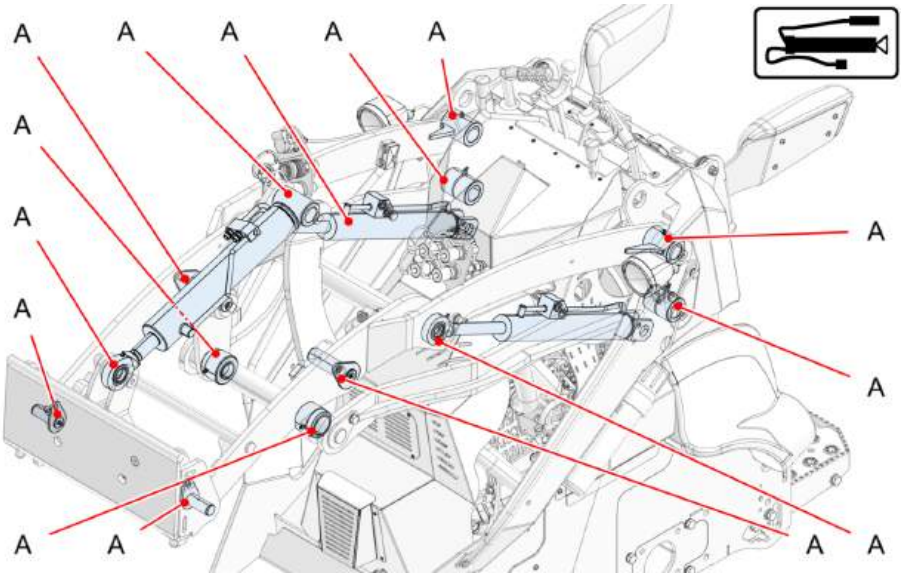
9.7 Frame maintenance

9.7.1 Lubrication points

- The following applies to all versions of the machine.
- Lubricate all lubrication points (A) of the lifting arm after every 10 hours of operation.

Use the following items to lubricate the lubrication points (A).

- Grease gun
- EP-2 grease
- Cloth



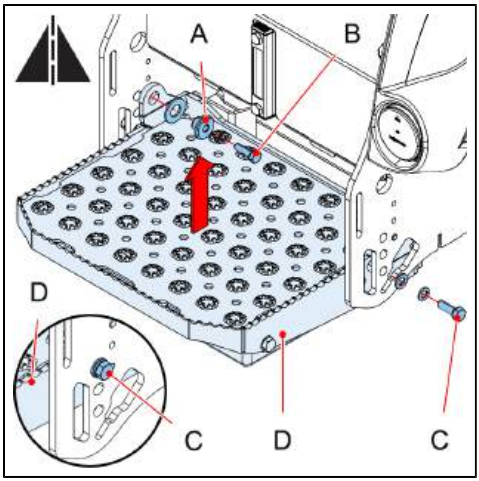
1. Add the applicable grease with a grease gun through the grease nipples of the lubrication points (A) until grease comes out of the bearing.
2. Remove excessive grease with a cloth.

After lubrication, grease can come out of the part for an extended period of time. This is normal.

9.7.2 Adjusting footplate height

WARNING Pay close attention when removing the footplate. The footplate is extra heavy if it is equipped with the optional counterweight and can cause serious injury to the operator.

It is possible to adjust the gradient of the footplate in 3 positions.



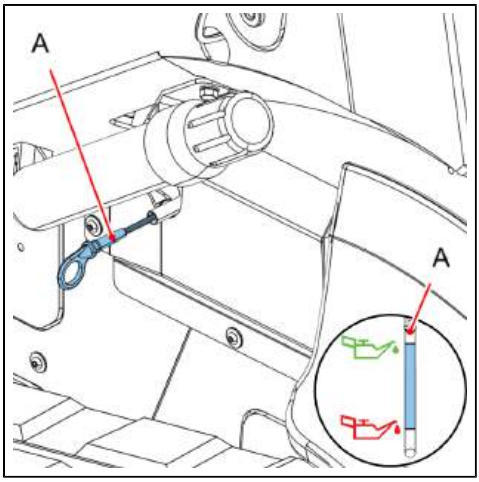
1. Remove the bolts and washers (A & B) from the inside of the frame.
2. Remove the bolts and washers (C) from the outside of the frame.
3. Position the footplate (D) at the desired height.
4. Install the bolts and washers (C) in the corresponding holes at the outside of the frame.
5. Install the bolts and washers (A & B) in the corresponding holes at the inside of the frame.

9.8 Engine maintenance

9.8.1 Checking the oil level and adding oil

Clean and lint-free cloth

Engine oil. Refer to *Fluid specifications* on page 148.

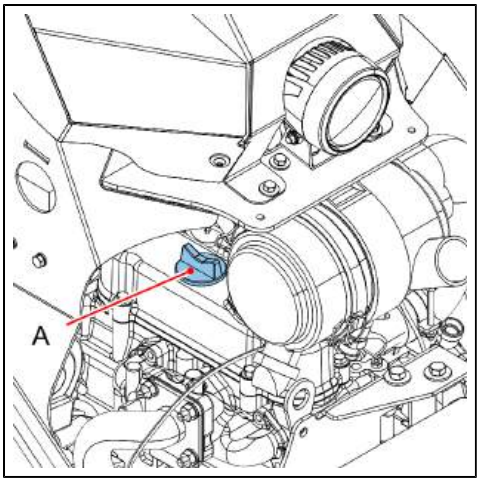


1. Make sure that the machine is level.
2. Make sure that the engine has been switched off for at least 3 minutes.
3. Remove the dipstick (A).
4. Clean the dipstick (A) with a clean and lint-free cloth.
5. Install the dipstick (A) again.
6. Remove the dipstick (A) again.
7. Check if the oil level on the dipstick (A) is between the [MIN]- and [MAX]-indicators.

> **CAUTION** If the oil level is below the [MIN]-indicator, add engine oil:

8. Remove the engine cover. Refer to *Removing the engine cover* on page 136.

> **WARNING** Always install the safety bracket onto the lifting arm when working near or underneath the lifting arm. Refer to *Installing the safety bracket* on page 134.



9. Remove the oil tank filler cap (A).
10. Add engine oil.

> Refer to *Fluid specifications* on page 148 for the oil classification specifications.

11. Wait for 5 minutes.

> It takes some time for the engine oil to move down to the sump.

12. Check if the engine oil level is just below the [MAX]-indicator.

13. Repeat the above steps if the engine oil level is not just below the [MAX]-indicator.

> **CAUTION** Do not overfill. This can damage the engine.

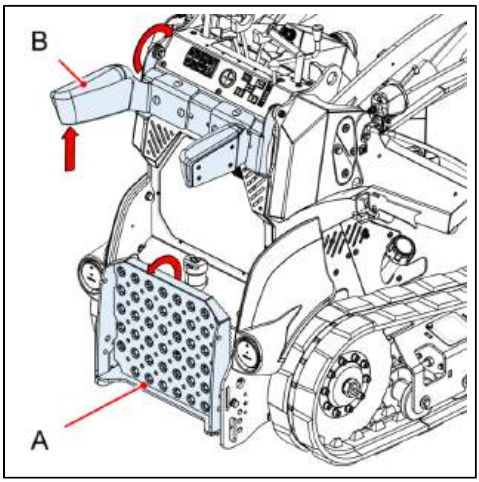
14. Install the oil tank filler cap (A) again.
15. Install the engine cover again. Refer to *Removing the engine cover* on page 136.

9.8.2 Checking and adding coolant

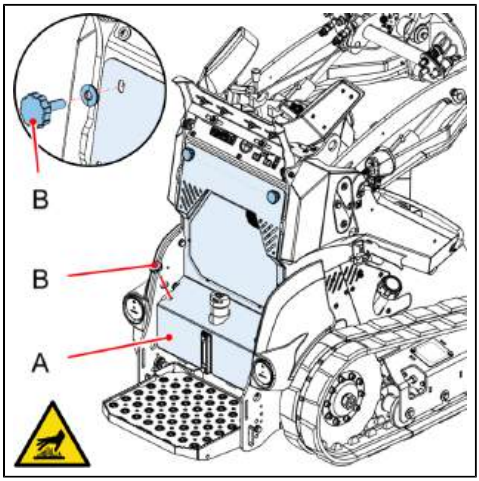
Illustration(s) can differ from the actual configuration.

> **WARNING** Hot coolant is hazardous. Make sure that the coolant is below its boiling point, when adding new coolant. Wear safety gloves and safety goggles.

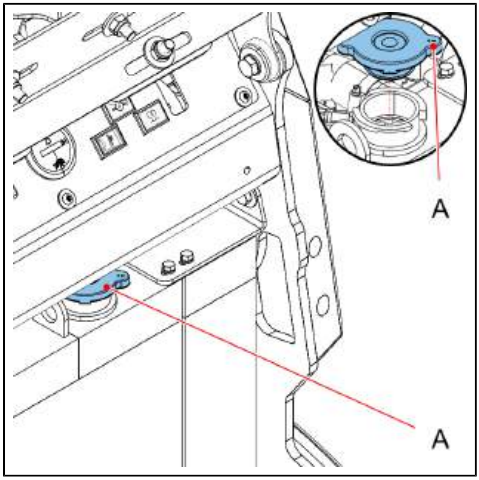
> **CAUTION** Always check the coolant level when the engine is cold.



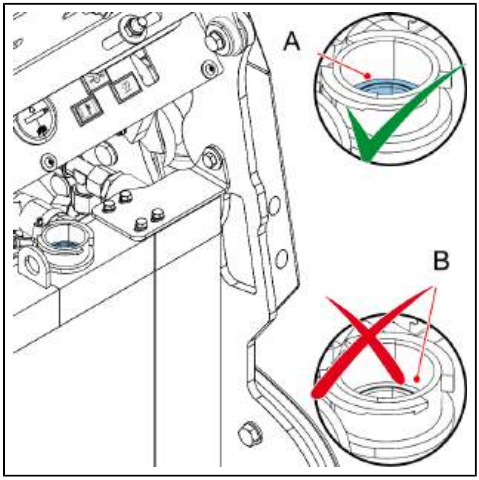
1. If applicable: fold the footplate (A) down.
2. Fold the flank protection (B) upwards.



3. Remove the 4 bolts and washers (B).
4. Remove the cover plate of the cooler (A).



5. Unscrew and remove the filler cap (A).

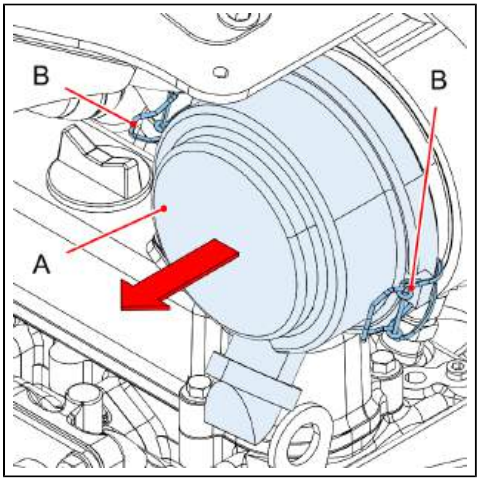


6. Check the coolant level.

The coolant should reach the top of the coolant tank (A). If the coolant level is incorrect (B), add coolant to the correct level. Refer to *Fluid specifications* on page 148.

9.8.3 Air intake system

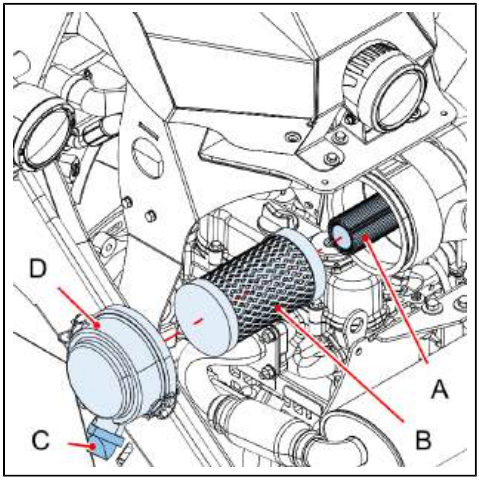
9.8.3.1 Checking and cleaning the air filter



1. Remove the engine cover. Refer to *Removing the engine cover* on page 136.

> **WARNING** Always install the safety bracket onto the lifting arm when working near or underneath the lifting arm.

2. Unlatch the clamps (B) and remove the housing service cover (A).



3. Pull the main air filter (B) out of the air filter housing.

WARNING

- When the main air filter (B) is removed, the safety air filter (A) is exposed. Do not blow the safety air filter (A) clean. This filter needs to be replaced every 1000 operating hours, or when it is damaged or too dirty. Have the filter replaced by the dealer.
- When replacing the safety air filter (A), always replace the main air filter (B) as well. This must be replaced by a service technician.

CAUTION

Extremely dusty conditions require shorter maintenance intervals. The service indicator sensor detects when the main air filter (B) must be replaced.

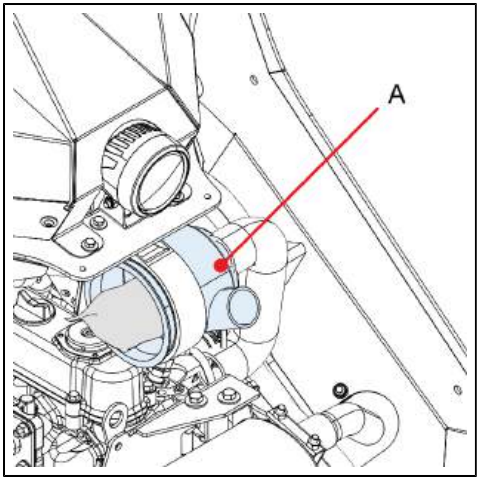
4. Squeeze the vacuator valve (C).

It must be able to open to drain dirt.

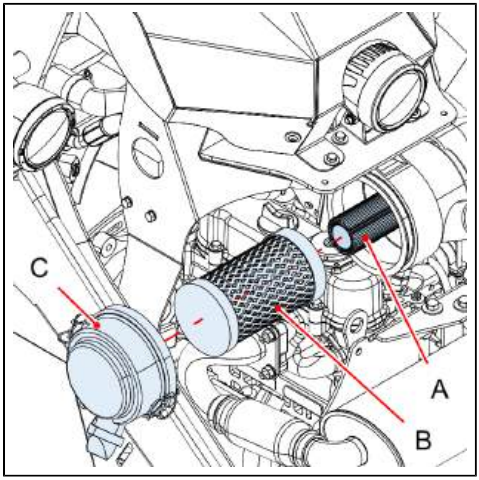
5. Blow the main air filter (B) clean.

> **⚠ CAUTION** Use max. 2 bar of air pressure to blow the main air filter (B) clean and keep a blowing distance of min. 30 cm. Always blow from the inside of the filter outwards.

6. Perform a visual inspection of the main air filter (B) for cuts, tears or indentations on the sealing surfaces before installation. If any damage is visible, do not install the filter, but contact the dealer.
7. Clean the service cover (D) with a clean, moist cloth.



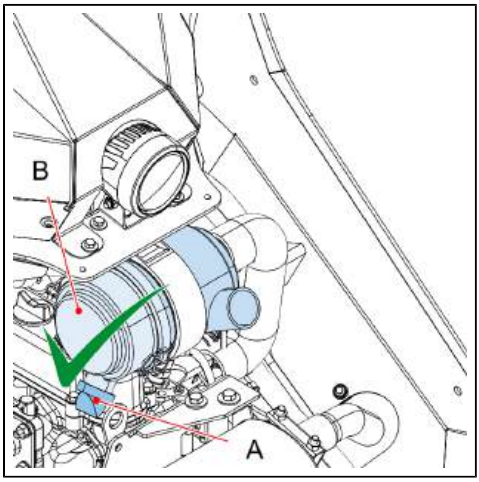
8. Clean the housing (A) with a clean, moist cloth.



9. Place the main air filter (B) onto the safety air filter (A).

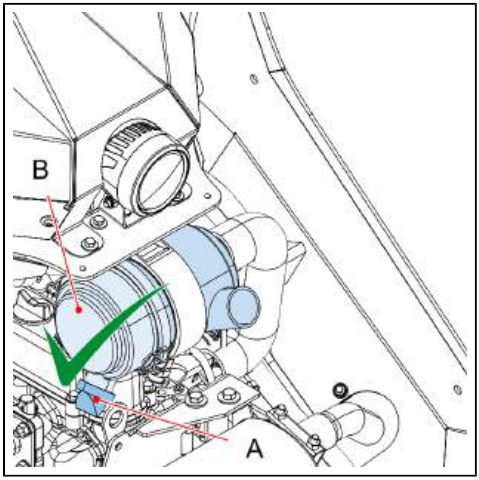
10. Push the main air filter (B) back into the housing until the gasket seals against the housing.

11. Install the housing service cover (D) again.



12. Make sure that the vacuator valve (A) is at the bottom position of the housing service cover (D).

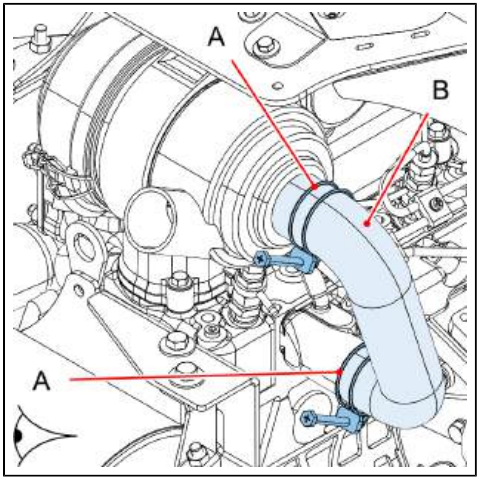
9.8.3.2 Checking intake air lines



1. Remove the engine cover. Refer to *Removing the engine cover* on page 136.

> **WARNING** Always install the safety bracket onto the lifting arm when working near or underneath the lifting arm.

2. Make sure that the clamps of the main air filter housing (B) are firmly installed.
3. Make sure that the vacuator valve (A) of the main air filter housing (B) is at the bottom of the housing service cover.



4. Check all intake air lines for wear, cracks and damage.
5. Make sure that all hose clamps (A) are tightened.
6. Make sure that there are no loose hoses (B), in order to prevent them from getting stuck between rotating components.

9.9 Hydraulic system maintenance

WARNING The hydraulic system operates at high pressure. A defective hose, pipe or fitting can cause serious damage or injury. Always make sure that the system is de-pressurized before doing maintenance.

9.9.1 Checking the hydraulic oil level

Illustration(s) can differ from the actual configuration.

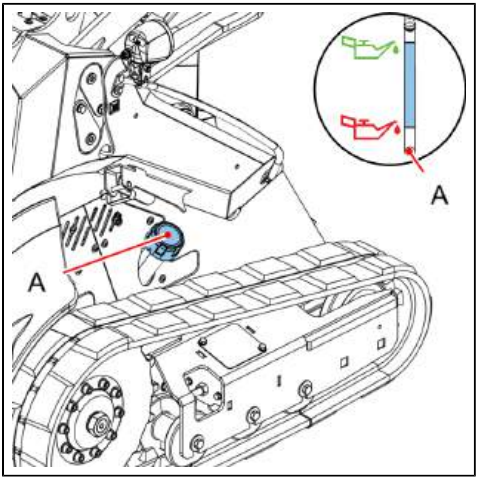
WARNING There is possibly pressure on the tank. Slowly and carefully loosen the filler cap to gradually decrease the pressure. If the filler cap is loosened too quickly, hot air can spill out. This can cause serious injury.

Make sure that:

- the machine is level;
- no attachment with hydraulic functions is installed;
- the lifting arm is in the lowest position and all cylinders are retracted; and
- the machine has been completely switched off for at least 3 minutes. This makes sure that all the hydraulic oil has flowed to the hydraulic oil tank.

Clean and lint-free cloth

Hydraulic oil. Refer to *Fluid specifications* on page 148.



1. Remove the filler cap (A) and clean the dipstick with a clean, lint-free cloth.
2. Install the filler cap (A) again.
3. Remove the filler cap (A) again.
4. Check if the oil level is between the [MIN]- and [MAX]-indicators.

> **⚠ CAUTION** The oil level must always between the [MIN]- and [MAX]-indicators.

5. If necessary: top up to the [MAX]-indicator.

> Refer to *Fluid specifications* on page 148 for the oil classification requirements.

9.9.2 Checking for leaks, wear, cracks and damage

DANGER Always wear suitable personal protective equipment. Never touch pressurized hoses with bare hands.

1. Check all hoses, pipes and fittings for leaks, wear, cracks and damage.
2. Make sure that all hoses and pipe couplers are tightened.
3. Make sure that there are no loose hoses to prevent unnecessary wear.
4. Repair or replace, if necessary.

9.9.3 Checking the cylinders

1. Check all hydraulic cylinders for excessive wear, corrosion and damage.
2. Check the scraper in the cylinder head for correct operation.

CAUTION A worn scraper allows contamination to get into the hydraulic system.

3. Repair or replace, if necessary.

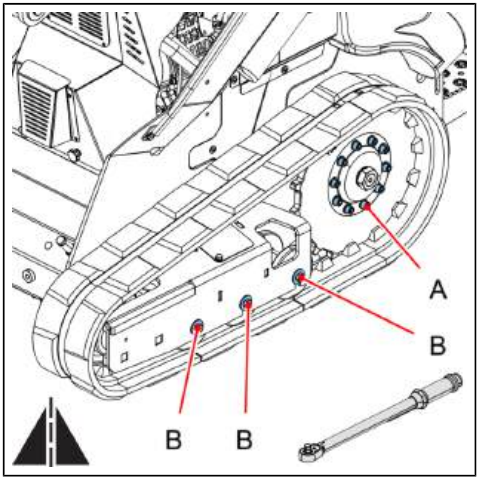
9.9.4 Checking the dust-caps on the couplers

1. Check the dust-cap of the couplers on the lifting arm for wear, cracks or damage.
2. Repair or replace, if necessary.

9.10 Transmission maintenance

9.10.1 Correct torque of tracks

CAUTION Always observe the maintenance intervals for the machine. Refer to *Preventive maintenance schedules* on page 138.



-

- Tighten the bolts of the rollers (B) and sprocket wheel (A) to the correct torque (93 Nm).
- Tighten the bolts of the sprocket wheel (A) crosswise.
- Tighten the bolts of the rollers (B) and sprocket wheel (A) again after every 50 hours.

9.10.2 Cleaning the tracks

CAUTION

Always clean the tracks:

- when storing the machine;
- before maintenance is performed on the machine; and
- if accumulated dirt hinders correct functioning of the tracks.

CAUTION

- When cleaning the tracks, make sure that water cannot penetrate the machine. This can cause heavy damage to the machine.
- If the machine is driven over a surface that is too loose, this can block the tracks. If this is the case, first clean the tracks with a high-pressure cleaner before continuing.

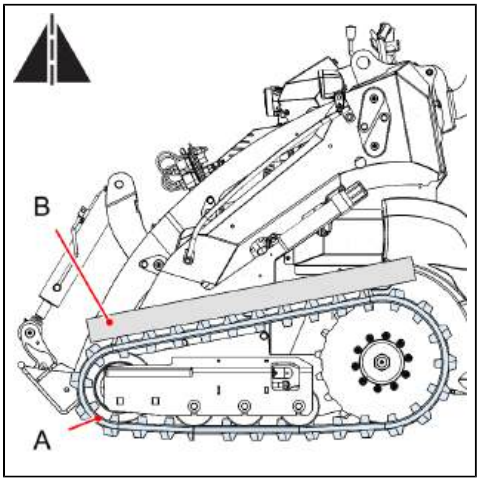
The tracks can be cleaned with a high-pressure cleaner. Use a safety distance of 50 cm between water nozzle and the tracks.

9.10.3 Checking and adjusting the tracks tension

WARNING

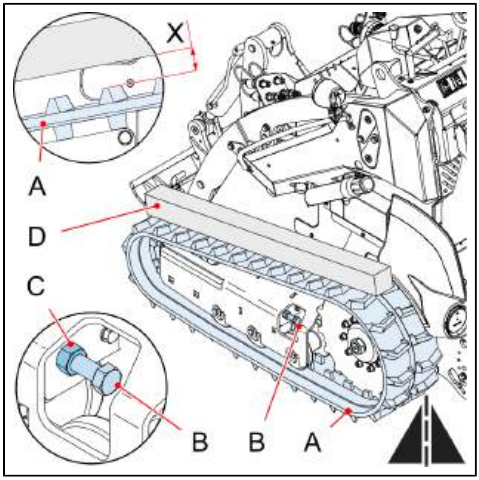
Check the tracks tension:

- prior to each use;
- after every 10 operating hours.



1. Park the machine on a smooth and level surface.
2. Place a straight bar (B) onto the tracks (A).

The straight bar (B) should be placed from the sprocket wheel to the front idler wheel.



3. Measure the distance (X) between the top of the ridges on the tracks (A) and the bottom of the straight bar (D).

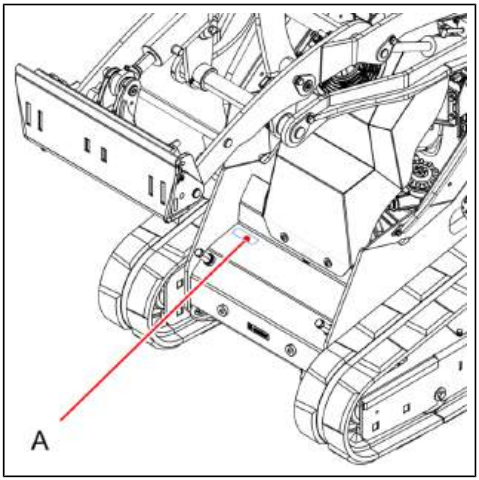
> **CAUTION** Do not put too much tension on the tracks (A). This can damage the tracks (A) and/or cause unwanted wear of the tracks (A).

The distance (X) should be 13 mm.

4. If necessary: adjust the track tension:
   a. Loosen the lock nut (C).
   b. Adjust the tensioner bolt (B).
   c. Measure the distance (X) between the top of the ridges on the tracks (A) and the bottom of the straight bar (D) again.
   d. Repeat the above steps, if the distance (X) is not 13 mm.
   e. Fasten the lock nut (C) again.
5. Drive the machine one track length forwards.
6. Measure the distance (X) between the top of the ridges on the tracks (A) and the bottom of the straight bar (D) again.
7. If necessary: adjust the track tension again, until the distance (X) is 13 mm.

10 Troubleshooting

10.1 Troubleshooting procedure



- Illustration(s) can differ from the actual configuration.
- The serial number of the machine (A) is located on the front frame at the right-hand side of the machine.

1. If the operator cannot find a solution to the problem, collect the necessary data, such as:

- Machine type
- Serial numbers
- Error description
- Photos
- Procedures that have already been performed

2. Contact the dealer.

10.2 Possible malfunctions

Problem	Possible cause	Possible solution
Engine does not start.	No fuel in the tank.	Fill the tank with fuel.

Problem	Possible cause	Possible solution
	Coarse filter is blocked.	Replace the coarse filter.
	Water in the fuel tank.	Drain the fuel tank.
	Electric feed pump is clogged.	Clean or replace the electric feed pump.
	Ventilation opening of the fuel tank filler cap is partially clogged.	Clean or replace the fuel tank filler cap.
	Battery is dead.	Charge or change the battery. Contact the dealer if the battery is still dead.
Engine does not have enough power.	Clogged air filter.	Change the air filter.
	Old or outdated fuel.	Replace the fuel with fresh fuel.
	Fuel filters are (partially) blocked.	Replace the fuel filters.
	Ventilation opening of the fuel tank filler cap is partially clogged.	Clean or replace the fuel tank filler cap.
Machine does not drive.	Hydraulic oil level is too low.	Add oil to correct the oil level. Refer to *Checking the hydraulic oil level* on page 166.
	Broken hydraulic hose between the hydraulic motor and the hydraulic pump.	Replace the hydraulic hose and refill the hydraulic oil.
	Defective control valve.	Contact the dealer.

10.3 Warning lights

CAUTION If a red indicator light appears in the dashboard, always immediately stop the machine. In case of doubt, please contact the dealer.

Refer to *Dashboard* on page 18 for the locations of the warning lights.

Alternator warning light

This warning light indicates that the alternator is malfunctioning.

1. Stop the engine.
2. Check the V-belt.

Engine temperature warning light

This warning light indicates that the engine is too hot.

1. Stop the engine.
2. Check the coolant level and V-belt.
3. Check the cooling system for leaks. Add coolant, if necessary. Refer to *Maintenance* on page 133.
4. Clean the engine cooler.

Engine oil pressure warning light

This warning light indicates that there is insufficient oil pressure.

1. Immediately stop the engine.
2. Daily check the oil level with the dipstick. Add oil, if necessary. Refer to *Maintenance* on page 133.
3. Clean the engine cooler.

11 Environment

11.1 Waste disposal

Sort dismantled materials based on material properties and pollution. Separate all materials that can be categorized as chemical waste, such as batteries, oil, lubricants and some electrical components. Dispose of these materials as chemical waste. Bring waste materials to approved waste disposal companies which have the required permits.



Materials with the recycling sign and the sign showing a crossed rubbish bin must not be thrown out with the household waste.

11.2 Safe disassembly

When the machine has reached the end of its useful life, the operator/owner is responsible for the safe disassembly of the machine and for the disposal of the components, in accordance with (local) laws and regulations.

12 Terms of warranty

The warranty is subject to the following limitations. The warranty period for products supplied by BAD BOY MOWERS, LLC starts on the date shown on the purchase document.

The warranty conditions can depend on the agreement made with the BAD BOY MOWERS, LLC dealer.

For more information, ask the BAD BOY MOWERS, LLC dealer about the applicable warranty duration and conditions.

13 Appendix

13.1 Maintenance Log

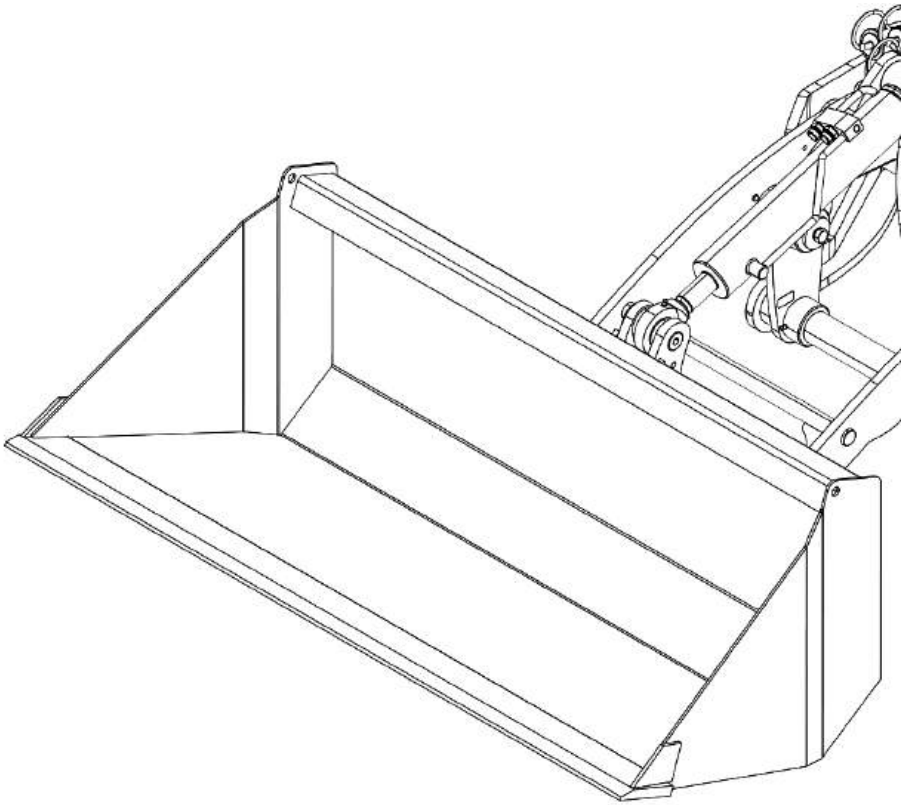
Model: ……..... **Serial number:** ……...

Date	Maintenance provided by	Hours	Service procedure

Date	Maintenance provided by	Hours	Service procedure

Date	Maintenance provided by	Hours	Service procedure

14 General Purpose Bucket



15 GP Bucket: Preface

This is the Operator Manual (OPM) of the General Purpose Bucket, hereafter referred to as "attachment". The document is for trained and authorised personnel only. Refer to *Trained and authorised personnel* on page 199 for more information. This document gives the information that is necessary to operate the attachment and perform first-line maintenance.

The OPM provides detailed operating procedures for safe, effective and proper use of the attachment. Safe operation is detailed in chapter *Safety* on page 195. Specifications, first-line maintenance and troubleshooting information are also included in this manual.

Improper operation, inspection and maintenance of the attachment can result in injury or death. Read and understand the contents of this manual completely and become familiar with the attachment before operation. Contact the dealer with any questions about information in this manual, if extra manuals are required, or about availability of manuals in other languages.

Illustrations

It is not always possible to show the exact configuration of the attachment. The illustrations in this document show a standard set-up. They are for instruction and description purposes only.

Recommissioning

If the attachment is resold, include this OPM as part of the sale. If a used attachment was purchased, or if the owner's address has changed, please provide the BAD BOY MOWERS, LLC dealer or BAD BOY MOWERS, LLC with the current owner's name and address, along with the attachment model and serial numbers. This will allow the registered owner information to be updated, so that the owner can be notified directly in case of important product issues, such as a safety update program.

Version history

Every effort has been made to make this manual as accurate and complete as possible. If any errors or omissions are discovered, please bring this to the attention of BAD BOY MOWERS, LLC, so possible revisions can be made. This will enable the improvement of the documentation.

The instructions in this manual do not take into account different national regulations and laws. When operating the attachment, it is the sole responsibility of the operator to make sure that all applicable (local) laws and regulations are obeyed.

During the lifetime of the attachment, engineering improvements can result in the need to revise this manual. It is then at the discretion of BAD BOY MOWERS, LLC if a revision or new version of this manual is required.

The following table describes the main changes for each document version of this manual.

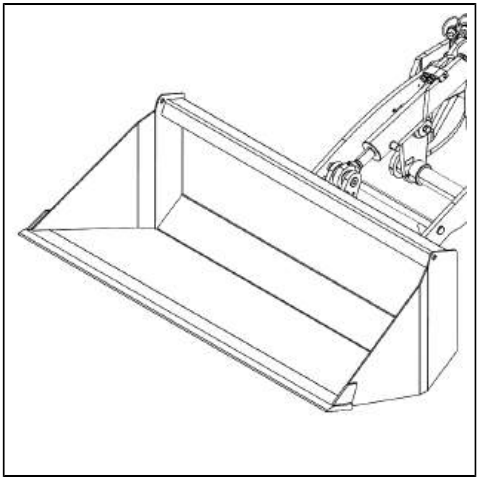
Version	2026 changes
R2602	Safety revised.

16 GP Bucket: Introduction

The attachment is intended to be used to lift, transport and unload materials such as sand or gravel.

The attachment has to be coupled to an approved machine. Refer to *Approved machine type* on page 192.

WARNING Use the attachment only for the above-mentioned work. The attachment is not applicable for other activities.



16.1 Exclusions

The attachment is not intended for lifting and transporting:

- persons and animals;
- products where toxic and/or explosive substances can be released during handling;
- products containing hazardous substances;
- tanks with liquid;
- combustibles; and
- other liquids and dangerous substances not mentioned above.

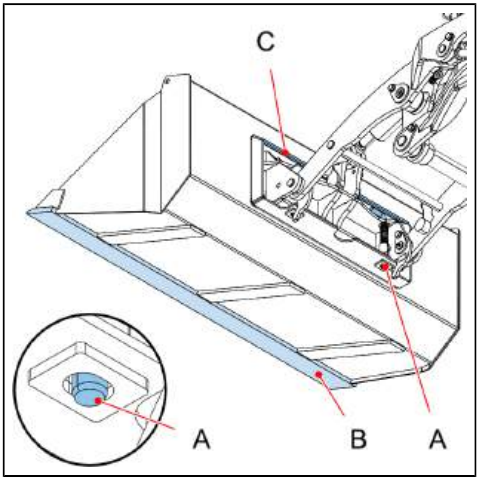
16.2 Legal requirements

WARNING

- Always observe (local) laws and regulations when using the attachment, this can include third party inspections or certifications of the attachment.
- At all times, it is the owner's as well as the operator's responsibility to obey these (local) laws and regulations.
- (Local) laws and regulations that are more restrictive take precedence over the instructions in this manual.

17 GP Bucket: Description and technical data

17.1 Description



A. Locking pins
B. Front blade
C. Quick-hitch

17.2 Technical data

17.2.1 General

Refer to the type plate on the attachment for the specific technical specifications of the attachment. Technical data can vary, depending on the configuration of the attachment.

17.2.2 Bucket specifications

- Refer to the type plate on the attachment for the exact technical specifications of the attachment.
- Technical data can vary, depending on the configuration of the attachment.

Model name	Width (mm)	Capacity (litres)	Weight (kg)
GA200	1100	165	71

CAUTION Maximum density of the load: 2100 kg/m³ (3540 lb/yd³).

17.2.3 Approved machine type

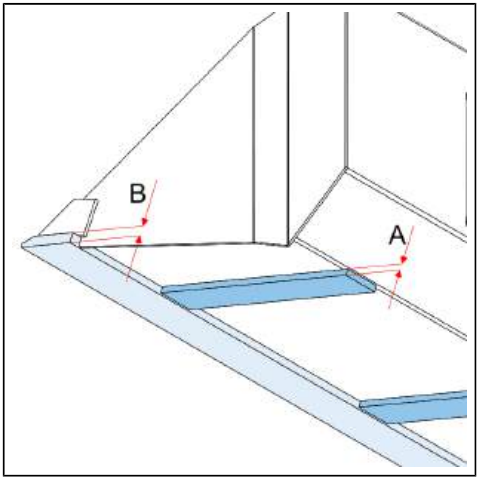
WARNING Never exceed the tipping load of the connected machine when using the attachment. Refer to the OPM of the connected machine for its maximum tipping load. Failure to obey the correct tipping load can result in serious injuries or damage.

WARNING The attachment bracket of the connected machine must be compatible with the attachment. An incompatible attachment bracket can result in the attachment falling from the connected machine. This can cause serious injuries or damage.

BAD BOY MOWERS, LLC machines and other machines with the following specifications can be used with the attachment:

Ask the dealer for more information about suitable machine types for the attachment.

17.2.4 Wear criteria



Original thickness (A) (mm)	Replace (A) if thickness is less than (mm)	Original thickness (B) (mm)	Replace (B) if thickness is less than (mm)
10	3	16	8

18 GP Bucket: Safety

18.1 Safety

This chapter is about security and the safe operation of the attachment. This manual and the labels on the attachment warn of safety hazards and should always be read and observed closely. Before operating the attachment, first read and study the safety information in this manual. Additionally, anyone who operates or works on the attachment must be familiar with these safety precautions.

⚠ WARNING The safe use of an attachment is closely related to the safe use of the approved machine to which it is connected. Always read and obey the safety instructions located in the OPM of the connected machine.



This safety alert symbol indicates:

"Attention! Always be alert! Personal safety is involved!"

This symbol is used throughout this OPM and on the labels on the attachment.

⚠ DANGER “DANGER” indicates an imminently hazardous situation, which, if not avoided, **WILL** result in death, serious personal injury and/or heavy material damage.

⚠ WARNING “WARNING” indicates a potentially hazardous situation, which, if not avoided, **CAN** result in death, serious personal injury and/or heavy material damage.

⚠ CAUTION “CAUTION” indicates a potentially hazardous situation, which, if not avoided, can result in material damage. It is also used to alert operators of unsafe practices.

WARNING

- It is essential that operators are thoroughly trained in the safe operation of the attachment and the handling of loads (if applicable).
- It is the owner's responsibility that operators are given a complete instruction on the operation and safety of the attachment.
- The owner is responsible for the fact that only trained and authorised personnel is allowed to use the attachment.
- All operators must be trained, competent and in a condition to work safely and correctly.
- Do not allow minors, and untrained, unqualified or unauthorised personnel to operate the machine, or to be near the attachment, unless they are properly supervised.

WARNING

- Use of this attachment is subject to certain hazards that cannot be eliminated by mechanical means. Likewise, some risks of injuries are not immediately apparent. Always exercise intelligence, care and common sense, and follow the operating and maintenance instructions.
- Such hazards include: hillside operation, overloading, load instability, poor maintenance, and using the attachment for a purpose for which it was not intended.

WARNING

- BAD BOY MOWERS, LLC always takes ultimate care for operator's safety during the design process. If applicable, guards and shields are provided, which protect the operator and bystanders from moving parts and other hazards. These guards and shields should be in the correct operating positions before using the attachment.
- Never modify or disable any safety devices that are installed on the attachment. This can lead to serious injury, or damage to the attachment.
- Operators must remain alert, because some areas cannot be guarded or shielded without preventing or interfering with correct operation of the attachment.
- Different applications can require optional or additional safety equipment. Refer to *Personal protective equipment (PPE)* on page 201 for more information.

WARNING

- Make sure that the operator knows the worksite hazards. The attachment and operator must be equipped as necessary. The information in this OPM does not replace any applicable (local) safety rules and laws.
- Before operating the attachment, the operator must know the (local) laws and regulations applicable to the work environment/area of operation. Make sure that the attachment is equipped and used in accordance with these (local) laws and regulations.

Some parts and components are sourced from third-party suppliers and can therefore show additional safety information that is not included in this OPM.

18.1.1 Liability

WARNING

BAD BOY MOWERS, LLC is not responsible for direct and indirect damage caused by operator error, lack of maintenance or any other use other than described in this document.

WARNING

The liability of BAD BOY MOWERS, LLC is also void when modifications or extensions are applied to the attachment or to accessories without the written consent of BAD BOY MOWERS, LLC.

WARNING

It is the responsibility of the owner to make sure that:

- only trained and authorised operators use the attachment and perform maintenance on the attachment; and that
- only trained and authorised service engineers perform other service tasks on the attachment.

18.1.2 Mandatory safety shutdown procedure

DANGER

BEFORE cleaning, adjusting, lubricating or servicing the attachment, or leaving it unattended:

- Obey the mandatory safety shutdown procedure located in the OPM of the connected machine.

Only after these precautions have been taken can the operator be sure that it is safe to proceed. Failure to follow this procedure can result in death or serious injury.

18.1.3 Trained and authorised personnel

WARNING

- It is the owner's responsibility that operators are given a complete instruction on the operation and safety of the attachment.
- The owner is responsible for the fact that only trained and authorised personnel is allowed to use the attachment.
- Only trained and authorised operators are allowed to perform the work shown in this document.

WARNING

All operators of the attachment and the connected machine must:

- be mentally and physically capable to perform the tasks described in this document;
- know, understand and obey the instructions described in this document; and
- be over the age of 16.

If the operator is not yet 18 years old, supervision by another trained and authorised operator who is at least 18 years old is required.

WARNING

Do not allow the attachment to be controlled by:

- persons without experience with the attachment and without supervision present; and
- persons who are to be expected to be unaware of the dangers of the attachment, e.g. a temporary workforce.

WARNING

- If necessary: make sure that safety instructions are passed on to other operators of the attachment.
- At all times, the operators must know the contents of this OPM before using the attachment.

18.1.4 General safety rules

WARNING

- Make sure that the operator knows the worksite hazards and the (local) laws and regulations. The information in this document does not replace any applicable (local) safety laws or regulations.
- If local laws or regulations are stricter than national laws, the local laws or regulations will prevail.

WARNING

- Do not make any modifications to the attachment without the written consent of BAD BOY MOWERS, LLC.
- Make sure that all maintenance is done correctly and at the correct maintenance intervals.
- If applicable: do not remove any safety features from the attachment when using the attachment.
- Keep children away from the attachment and/or connected machine at all times.

18.1.5 Personal protective equipment (PPE)

WARNING

(Local) laws and regulations or worksite guidelines can demand additional or alternative requirements.

WARNING

Always use approved protective equipment. Operators and all other persons in the work area must wear protective equipment, including at a minimum:

- Protective helmet (also, tie back long hair).
- Hearing protection
- Impact-resistant eye protection with side protection
- Respiratory protection, when appropriate
- Protective gloves
- Protective boots
- Appropriate work overall or similar (not loose-fitting) clothing that covers arms and legs

WARNING

Even with the use of personal protective equipment, it is still possible that residual risks are present when using the attachment and/or connected machine. The operator can still be exposed to:

- Work environment risks, e.g. heat, noise, fuel and fuel fumes, exhaust fumes, or carbon monoxide
- Fire hazards from flammable liquids
- Operator errors, e.g. incorrect lifting of the attachment or connected machine, incorrect operation of the attachment or connected machine

18.1.6 Before using the attachment

DANGER

- NEVER use the attachment if there is any indication that maintenance or service work is in progress, or if a warning tag is attached to the controls.
- Make sure that the connected machine cannot start unintentionally.

WARNING

- Always replace damaged or worn-out parts with genuine service parts before using the attachment.
- The attachment is intended to be used with approved machines only. To avoid possible personal injury, equipment damage and performance problems, only use machines that are approved for use within the operating capacity of the attachment. Refer to *Technical data* on page 191.
- Contact the dealer for information on attachment approval and compatibility with specific machine models.
- BAD BOY MOWERS, LLC cannot be held responsible if the attachment is used with a non-approved connected machine.

WARNING

- Walk around the attachment and inspect it before using it. Look for damage, loose or missing parts, leaks, etc.
- To minimize the risk of fire: daily remove all trash and debris from the attachment.
- Replace any damaged or missing safety labels.
- Replace a lost or damaged OPM.
- Before starting the connected machine, read the OPM provided with the connected machine. Obey the instructions in the OPM of both the attachment and the connected machine.

WARNING

Before working on or with the attachment:

- Remove jewellery, tie back long hair, and do not wear loose fitting garments, such as, scarves, ties, unzipped jackets, etc., which can get caught in the moving parts of the attachment and can cause injury.
- Warn all nearby personnel to keep a safe distance before using the attachment.

WARNING

- Before working near power lines (either above-ground or buried cable type), always contact the power utility and establish a safety plan with them.
- Terrain and soil conditions at the worksite, especially traffic, weather-related hazards and any above- or below-ground obstacles and hazards should be observed and monitored by all work crew members.

18.1.7 During operation

WARNING

Disregarding any of these safety instructions can cause the connected machine to tip over, throwing the operator from the connected machine, resulting in death, serious injury, or damage to the connected machine or attachment.

WARNING

If the attachment becomes damaged or malfunctions, immediately stop using the attachment and lock and tag it. Repair the damage or malfunction before using the attachment again.

⚠ WARNING

- New operators must first operate the attachment in an open area away from bystanders. Practice with the controls until the attachment can be operated safely and efficiently. Operate the attachment cautiously and gradually until fully familiar with all of the controls and handling.
- Wear safety goggles, ear and head protection as required during the operation of the attachment. The operator must wear protective clothing when appropriate. Refer to *Personal protective equipment (PPE)* on page 201.
- The operator should keep their limbs away from moving parts. Moving parts of the attachment or connected machine can result in the severing of body parts.

⚠ WARNING

- Be aware of overhead obstacles. Any object near the lifting arm of the connected machine can represent a potential hazard, or cause the operator to react suddenly and cause an accident.
- Use a signal person if the operator cannot see the entire work area clearly, if the operator is in high traffic areas and whenever the operator's view is obstructed.

WARNING

- Make sure that the attachment is securely fastened to the attachment bracket of the connected machine before using it. Refer to *Coupling and uncoupling the attachment* on page 119.
- Be aware that attachments affect the handling and balance of the connected machine. When using an attachment, adjust the operation of the connected machine as required.
- If applicable: never activate the Float-function on the connected machine with a loaded or raised attachment. This will cause the lifting arm of the connected machine to lower rapidly, or the attachment to rapidly dump its load.

WARNING

- Do not overload the attachment. For capacities, refer to *Technical data* on page 191.
- Do not suddenly raise or lower a load. Overloading and tipping of the machine can also be caused by abrupt movements.
- Carry the load low. Move the controls smoothly and gradually, and operate the connected machine and attachment at speeds appropriate for the operating conditions.
- Avoid suddenly slowing down the connected machine while carrying a load. Suddenly slowing down can cause the load to drop from the attachment, or the connected machine to tip over.

WARNING

- Avoid driving on slopes with the machine and a loaded attachment.
- Make sure that the terrain is firm and can hold the weight of the connected machine, the attachment and, if applicable, the load. Avoid dangerous terrain of which the conditions are unknown.

WARNING

- Do not use the attachment to lift or transport people. Do not allow others to ride on the attachment, because they can fall off or cause an accident. This can cause serious injury or damage.
- Never allow anyone under the raised lifting arm of the connected machine. Lowering the lifting arm or a falling load can result in death, serious personal injury or damage.
- Stay alert for people moving through the work area. When (un)loading vehicles or lifting loads to or from elevated surfaces, the operator should always know where the other people are.

18.1.7.1 Operation with loads

DANGER

When using the attachment with loads, additional risks are possible. The load affects the driving characteristics and responsiveness of the connected machine and can cause the connected machine to tip over.

WARNING

- The attachment itself is also a load. Always take the weight of the attachment into consideration.
- The load on the attachment must not exceed the maximum operating capacity of the connected machine and the attachment. Refer to *Technical data* on page 191 and the OPM of the connected machine.
- Make sure that the load carried by the attachment is evenly balanced.
- Do not stack and lift (multiple) objects or loose cargo above the height of the attachment.
- When necessary, correctly secure (loose/unstable) loads, to prevent these from shifting or falling from the attachment.

WARNING

- Make sure that full control of the connected machine and attachment is maintained at all times.
- There is a risk of injury from involuntary movement due to a lack of traction and braking force of the connected machine.
- Make sure that the connected machine has completely stopped before releasing a load.

WARNING

- Do not turn the connected machine while raising or lowering a load or operating the attachment. A sudden shift in stability can occur, which increases the possibility of the connected machine tipping over. Lower the load to the lowest possible transport position, before turning the connected machine.
- Avoid sharp turns while transporting a load. The load can shift and cause the connected machine to tip over.
- When raising or lowering a load to and from an elevated surface, approach the load straight ahead and back away with the load in a straight line.
- Do not suddenly slow down when carrying a load. This can cause the load to drop from the attachment and/or can cause the connected machine to tip over.
- Always carry the load low and as close to the connected machine as possible. Keep the attachment approximately 30 cm above the ground. A falling load can result in death or serious personal injury.

18.1.8 Provision for stability/Avoiding roll-over accidents

DANGER

Disregarding any of these safety instructions can cause the connected machine to tip over, throwing the operator from the connected machine, resulting in death or serious injury. This can also lead to (heavy) material damage to the connected machine and/or attachment.

WARNING

The stability of the connected machine is affected by:

- the weight, height and reach of the load that is carried. Reach is the distance that the load extends outside the connected machine's ground contact;
- the height of the load;
- the (driving) speed of the connected machine;
- the turning angle of the connected machine or attachment;
- the width of the connected machine across the tyres, or, if applicable, tracks;
- the size and profile of the tyres/tracks of the connected machine;
- abrupt control movements; and
- driving over uneven and/or soft terrain, or unstable surfaces.

WARNING

Do not exceed the connected machine's specified operating capacity, especially when turning. This will reduce the maximum load capacity at which the connected machine remains stable and will not tip over:

- Carry the load low and operate the attachment and connected machine at speeds appropriate for the operating conditions.
- Operate the controls smoothly and gradually to prevent jerking or bouncing.
- Whenever possible, load, unload and turn the attachment on level and stable surfaces.

Refer to the OPM of the connected machine for more information.

18.1.9 Electrical energy hazards

WARNING

Stay away from high-voltage power lines. Contact with, or proximity to, high voltage power lines can result in death or serious injury.

The attachment or connected machine does not have to make physical contact with power lines for any current to be transmitted.

Use a spotter and hand signals to keep away from power lines that are not clearly visible to the operator.

WARNING

Depending upon the voltage in the power line and atmospheric conditions, strong current shocks can occur if the attachment (or its load) is within 3 m (10 ft) from the power line.

Very high voltage and rainy weather can further increase the safe operating distance.

WARNING

Risk of injury from electrical power lines and other conductors. Keep a safe distance from electrically conductive objects such as power lines, pylons and lamps.

Nominal voltage safety distances:

- 0-1000 V: 1.0 m (1.1 yd)
- 1-110 kV: 3.0 m (3.3 yd)
- 110-220 kV: 4.0 m (4.4 yd)
- 220-380 kV: 5.0 m (5.5 yd)
- When unknown: 5.0 m (5.5 yd)

WARNING

If the attachment or connected machine comes into contact with a live wire, this can result in serious injuries:

- Do not leave the connected machine.
- If it is possible, drive the connected machine out of the danger area.
- Warn others not to approach and/or touch the attachment or the connected machine.
- Have somebody de-energize the live wire.
- Do not leave the connected machine until the wire has been safely de-energized.

WARNING

- Only licensed technicians are allowed to perform work on the attachment's electrical system, if present.
- If present, inspect and check the attachment's electrical equipment at regular intervals. Problems that are found, e.g. loose connections or scorched cables, must be repaired before the attachment can be used.
- Only use correct, original equipment fuses/circuit breakers with the specified current rating. Immediately switch off the attachment and the connected machine, if there is any indication of a problem with the electrical system.

18.1.10 Maintenance and servicing safety practices

WARNING

- Do not use the attachment when maintenance is scheduled to be performed.
- Postponing maintenance can result in a serious reduction of the service life of the attachment, more serious and costly equipment failures, and can contribute to unsafe operating conditions.

WARNING

- Use warning tags/lock-out procedures during maintenance or servicing of the attachment and/or connected machine.
- Alert others that maintenance or servicing is being performed by tagging the operator's controls -and, if required, other attachment and/or machine areas- with a warning notice.

WARNING

- Only trained and authorised personnel, with a full awareness of the safety procedures, is allowed to operate or perform maintenance or servicing on the attachment.
- The operator must always wear the correct personal protective equipment as required for operation of the attachment.
- If applicable: do not smoke or have any spark- or flame-producing equipment or materials in the area while working on the attachment's hydraulic system.

WARNING

Work environment risks:

- Exhaust fumes can kill. Do not operate the connected machine in an enclosed area unless there is adequate ventilation. Always be aware of possible exhaust fumes in the work environment.
- Operators should also be aware of any open windows, doors or ductwork into which (exhaust) gases can be carried, exposing others to danger.

WARNING

- Do not work on hot parts of the attachment. Wait for the attachment to cool down. When lubricants or other fluids require changing, wait for fluid temperatures to decrease to a moderate level before removing any drain plugs.
- When handling oil, grease and other chemical substances, carefully follow the product-related safety requirements Material Safety Data Sheet (MSDS) to prevent burning or scalding.

WARNING

- All safety equipment must be correctly maintained so it is always in good condition.
- Always use adequate tools while working on the attachment. Unsuitable tools can break or slip and cause injury, or they cannot adequately perform their intended functions.

WARNING

Keep any fluid reservoir caps locked tight. Do not start the connected machine until these caps have been secured.

WARNING

- Prior to servicing or maintenance, make sure that the hydraulic system of the connected machine is correctly de-pressurized as required.
- A hydraulic system operates under high pressure. A leaky hose, pipe or coupling can cause serious injuries.
- A high pressure jet (up to 400 bar [5802 psi] easily penetrates gloves, clothing and skin, which causes serious injury and poisoning.

WARNING

- If applicable: keep mounting brackets and hose and cable routing straps tight. Hose routing should have gradual bends.
- After cleaning the attachment, examine all hoses and connections for leaks, chafe marks and damage. Tighter any loose connections and repair or replace parts, as necessary.

WARNING

- Refer to the PAM for information about the assembly of components.
- Always use the correct parts and the correct torques.
- Incorrect fastener connections can dangerously weaken assemblies.

⚠ WARNING

Welding activities should only be performed by trained and authorised personnel. Make sure that there is supervision by trained and authorised personnel when welding on or nearby containers that contain flammable materials. Contact the dealer for more information.

If welding activities must be performed:

1. Make sure that the attachment is not coupled to a machine.
2. Make sure that the attachment is placed on a flat and stable surface.
3. Disconnect any electrical connections.
4. Attach the welding clamp as close to the welding area as possible.
5. The welding current should **NOT** pass through any bolt, joint, gear or hydraulic cylinder.
6. After welding, reconnect all the electrical connections and make sure that they function correctly.

18.1.11 Fire and burn hazards

⚠ WARNING

- The attachment must be cleaned on a regular basis to avoid the build-up of flammable debris, such as leaves, straw, etc. Accumulated debris creates a fire hazard. Keep the attachment free of combustible substances.
- It is recommended to mount a 2.27 kg (5 lbs) or larger multi-purpose "A/B/C" fire extinguisher within reach of the operator. Periodically check the fire extinguisher and make sure that worksite crew members are trained in its use.
- If applicable: do not smoke while working on the attachment's hydraulic system.
- Keep the attachment away from combustible substances, which can catch fire.

18.1.12 Hydraulic system hazards

⚠ WARNING

- Hydraulic fluid that is under pressure can penetrate the skin or eyes. This can cause serious personal injury, blindness or even death. It is possible that fluid leaks under pressure are not visible.
- The operator must wear safety goggles and protective clothing and use a piece of cardboard, paper or wood when searching for hydraulic leaks. **NEVER** feel for leaks by hand.
- If exposed to penetrated fluid, immediate seek medical attention. Injected fluid must be surgically removed by a doctor or this can result in gangrene. If the doctor is not familiar with this type of injury, ask him or her to research it immediately to determine proper treatment.

⚠ WARNING

Always obey any instructions about the hydraulic system of the connected machine that are found in the OPM of the connected machine.

⚠ WARNING

- If applicable: replace hydraulic parts as soon as they show signs of deterioration.
- If applicable: replace a hydraulic hose every 6 years after the production date (month or quarter, and year) as indicated on the hydraulic hoses.

⚠ WARNING

If applicable: if a part of the attachment's hydraulic system is damaged, or the operator suspects damage, always obey the following additional safety instructions:

- Do **NOT** use the attachment with a damaged part of the hydraulic system. Ask a trained and authorised service engineer to replace the damaged part.
- Exposed hydraulic hoses could react with explosive force if struck by falling or overhead items. **NEVER** allow hydraulic hoses of piping to be hit, bent, touched or interfered with. Replace any hoses that are damaged.
- Keep unprotected body parts, such as the face, eyes and arms as far away from a suspected leak in the hydraulic system.
- Do not smoke or have any spark- or flame-producing equipment or materials in the area while working on the hydraulic system.
- After cleaning the attachment, inspect all hydraulic parts for leaks, chafe marks and damage. Tighten any loose connections and repair or replace parts, if necessary.

19 GP Bucket: Transport, storage and commissioning

19.1 Transport and storage

⚠ WARNING

- When the attachment is not coupled to a machine, transport it on a trailer.
- Fixate the attachment with straps to prevent movement.
- Obey federal, state and local over-the-road regulations.
- Prior to transport, the operator must always check the applicable restrictions regarding the weight, height, width and length of a load.
- The towing vehicle, trailer and load must all be in compliance with applicable (local) laws and regulations. Refer to *Technical data* on page 191 for more information.

⚠ WARNING

When storing the attachment, make sure that:

- protruding parts cannot cause danger or injuries;
- the attachment is placed on a flat surface in a safe location;
- the attachment is stored in a dry place;
- the attachment is cleaned with suitable cleaning agents and equipment;
- the attachment is inspected for damages or wear. If necessary repair or replace the part;
- all nuts, cap screws and hydraulic connections are correctly installed (if applicable); and
- the hydraulic system is sealed and all hydraulic hoses are off the ground.

19.2 Commissioning

CAUTION Before using the attachment, the operator must always perform a few checks.

1. Make sure that the attachment is not damaged.

If the attachment is damaged upon delivery contact the dealer immediately.

2. Make sure that all parts of the attachment are present.

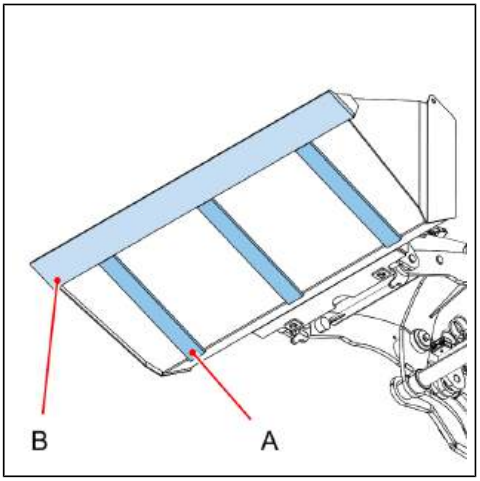
If the attachment is missing parts upon delivery contact the dealer immediately.

20 GP Bucket: Maintenance

20.1 Maintenance schedule

Procedure	Daily	Weekly	Notes
Remove debris from the attachment.	X		
Check for cracked, bent or broken components and distressed welds.	X		Attachment should be cleaned thoroughly before inspection. If a crack is found in either the steel structure or welds, the attachment must be replaced immediately.
Check the front blade for wear.		X	Refer to *Wear parts* on page 220.
Check the wear strips for wear.		X	

20.2 Wear parts



A. Wear strips
B. Front blade

For the wear criteria, refer to *Wear criteria* on page 193.

20.3 Replacing the wear parts

WARNING Do **NOT** use the attachment if the thickness of the wear parts is less than allowed.

1. Measure the thickness of the wear parts before using the attachment.
2. Replace the wear parts if the thickness is less than allowed.

For the replacement criteria, refer to *Wear criteria* on page 193.

21 GP Bucket: Environment, decommissioning and waste disposal

21.1 Environment

The life cycle of the RECON VL2515T depends on maintenance, operating hours and use, and environmental conditions, such as dust, pollution, humidity or temperature. Good maintenance will keep the RECON VL2515T in a good and reliable condition for a long time.

21.2 Decommissioning and waste disposal

Let a qualified company with the required permits dismantle the RECON VL2515T at the end of its life cycle. This makes sure that the dismantling and waste disposal are done according to the applicable (local) laws and regulations.



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