

Instructions manual

Operating & Maintenance

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**High capacity planer
PL2000F (IIIAT3)
PL2000F (IVT4f)**

**Diesel engine
CumminsQSX15-600
IIIA T3: 10000905J0C005866 -
IV T4f: 10000906A0C005587 -**



Original instructions.

*Reservation for changes
Printed in China*

Contents

Instruction	1
The machine.....	1
Intended use	1
Warning symbols	2
General	2
CE marking and Declaration of conformity	3
Safety – General instructions.....	5
Safety – when operating	7
Risk zones on the machine	7
Slopes (Tip over risk).....	8
Safety devices	9
Conveyor	9
Roof (Option)	9
Emergency stop button	10
Horn.....	11
Headlights, Indicators rotary beacons	12
Hazard warning lights on side panels (O)	13
Reverse lights and folding warning signs, reverse warning device	13
Traction unit supports	14
Steel retaining cables	15
Transport and parking lock for discharge conveyor	15
Retaining hook of scraper flap	16
Limit switch of scraper flap.....	16
Scraper flap safeguard	16
Exit ladders, grab bars and guardrails.....	17
Side shield	17
Special instructions	19
Special instructions.....	19

Contents

Standard lubricants and other recommended oil and fluids	19
High ambient temperatures, above +40°C (104°F)	19
Lower ambient temperature – Freeze risk	19
Temperatures	19
High pressure cleaning	20
Fire fighting	20
Battery handling	20
Jumping starting (24V)	21
Technical specifications	23
Vibrations – Operator station	23
Noise level	23
Dimensions	24
Weights	26
Performance data	26
Loading system	27
Engine (T3)	27
Engine (T4)	27
Travel drive	27
Hydraulic system	28
Water system	28
Compressed air system	28
Electrical system	28
Tightening torques	29
Machine description	31
Descriptions of assemblies and functions	31
Machine description	44
Identification	44
Machine plate	44
Explanation of 17PIN serial number	45
Decals	46

Safety decals	49
Info decals	53
Instruments/Controls	54
Control panel	54
Switch panel	57
Main console - right	57
Main console - left	58
RH – Joystick panel	57
LH – Joystick panel	57
RH/LH – Ergo control	66
Front remote control	69
Rear remote control	71
Screen structure for setting and display options	74
Description of error codes, dialog boxes	91
Electrical system	109
Fuses, boxes	109
Relay, machine	110
Driver's seat on left/right	111
Battery's main switch	112
Batteries	112
Tilt display	113
Folding ladder	114
Guardrail	115
Transport position for ladder and guardrails	116
Hydraulic folding roof operation	117
Hydraulic hood operations	118
Throttle valves for deployment speed of hood and roof	119
Manual pump, hood and roof	119
Water system	120
High pressure cleaner	121

Contents

Filling pump for water tank	122
Water filling (pressure fill) connection for water tank	123
Changeover for separate circuits of rear strut towers	124
Grading depth display	125
Milling drum operation check.....	125
Interlock on scraper flap	126
Retaining hook of scraper flap	126
Limit switch of scraper flap	127
Traction unit supports	128
Support brackets	128
“Scraper flap function changeover” valve	129
“Discharge conveyor function changeover” valve	129
Transport and parking lock for discharge conveyor	130
Monitoring camera (O)	131
Compressed air system	132
Storage area and protective flaps.....	133
Plumb fixture	134
Swivel-mounted warning sign	135
Tool holder	135
Typical wear marks on tool holder	136
Typical wear marks on bits	137
Dismantling the bits	138
Mounting the bits	138
Removing the quick-charge tops (model 1)	138
Removing the quick-charge tops (model 2)	139
Mounting the quick-charge tops (model 1)	139
Mounting the quick-charge tops (model 2)	139
Replacing the bit box	140
Replacing the holder box.....	141
Leveling unit	142

Matric type	142
Operating the Atlas Copco Dynapac Leveling System	143
Setting the contrast.....	143
Symbols and displays in the working window	144
Sensor selection	145
Operating with the Cross-Slope sensor.....	147
Zero adjustment	151
Sensitivity setting	153
Changing the measurement units	155
System languages.....	156
Operation	157
Before starting	157
Preparing for operation	157
Devices and aids	157
Before starting work.....	158
Starting the machine	159
External starting (starting aid)	161
Allowing engine to “warm up”	162
Driving the machine	163
Milling (preparation)	164
Milling operations using set-up button.....	167
Parking the machine.....	169
Preserving the water spraying system	170
Long-term parking	171
Long-term parking	171
Battery	171
Engine	171
Watering system	171
Hoods, tarpaulin	171
Fuel tank	172

Contents

Hydraulic reservoir	172
Miscellaneous	173
Transport	173
Safety regulations for transport	173
Fix points	175
Transport on trailers	177
Transport and parking lock for discharge conveyor	181
Normal on-road travel	182
Hydraulically foldable discharge conveyor	183
Folding in discharge conveyor	183
Folding out discharge conveyor	184
Load by crane	185
Towing procedure	186
Securing before parking up	187
Operating instructions – Summary	189
Preventive maintenance	191
Maintenance – Lubricants and symbols	193
Maintenance – Lubricants and symbols	193
Fluid volumes	194
Maintenance	195
Notes regarding safety for maintenance	195
Liability exclusion in case of use of non-original spare or wear parts as well as incorrect operating materials	196
Maintenance intervals	196
Engine drive unit	209
Fuel tank	209
Cleaning tank and system	210
Diesel engine	210
Engine oil drainage point	211
Oil filter	212

Fuel filter	212
Fuel filter water separator	213
Air filter	213
Cooler	214
Coolant filter	214
Cooler	215
Drive belt	215
Valve clearance	216
Engine brackets, left/right	216
Connecting screws, pump distribution transmission/engine	217
Hydraulic system	218
Hydraulic oil tank	218
Hydraulic oil drainage valve	218
High-pressure hydraulic filter	219
Return hydraulic filter	220
Pump distribution transmission	221
Oil level check	221
Oil cooler	222
Bleeder	223
Oil cooler	223
Hydraulic hoses	224
Hydraulic unit for roof and hood activation	224
Oil level check	224
Traction units	225
Planetary gear – oil level check	225
Oil change	225
Chain tension	226
Bottom plate	227
Rubber pad	227
Steering system sliding parts, steering arms, stop ring and scraper	228

Contents

Retaining device for track rod and steering cylinder bolts	229
Belt drive.....	229
Clutch “DESCH” Type	230
Clutch “STROMAG” Type	231
Milling drum gear box	232
Oil level check	232
Oil change	233
Milling drum	234
Draining coolant	234
Checking fluid level/adding fluid	235
Scrapers and supporting wear bar (moldboard).....	235
Runners on the side boards	236
Sliding shoe runners	237
Drum flap limit switch	238
Milling drum housing fastening bolts	238
Loading equipment.....	239
Drum holder	241
Steel cords	241
Funnel rubber of transfer point and sealing rubbers/guides.....	242
Water system	243
Water tank	243
Feed pump	245
Water filter	246
Water pump.....	247
Spray nozzles.....	247
Power supply	248
Batteries	248
Compressed air system	249
Maintenance unit and compressed air system	249
Leveling system	250

Sensor, controllers, connection cables	250
Emergency stop button	250
Lubrication points	251
Traction unit.....	251
Chassis legs.....	251
Steering cylinder	251
Floating pin	251
Milling section	252
Belt tensioner	252
Clutch bearing type “DESCH”	252
Clutch bearing type “STROMAG”	253
Steering hydraulic cylinder	253
Milling drum bearing	254
Upper/lower conveyor	255
Drive roller tension bearing	255
Upper conveyor (foldable model)	256
Tail roller pedestal bearing	256
Drive roller tension bearing	256
Springs, joints and bolts	256
Flange bolts	257
Lower conveyor.....	257
Drive roller tension bearing	257
Inspection	258
Disposal	259
Appendix.....	1
Appendix 1: Engine Fault Code	1
Appendix 2: Check list for machine operator	34

Introduction

The machine

Dynapac Cold Planer PL2000F is a compact, efficient large planer, hydraulically driven by four steerable crawler units, used to remove asphalt and cement layers, it has a front loading system (also called discharge conveyor) designed for convenient trailer loading. The milling drums are driven mechanically by a high efficient power-transmission belts.

As a result of its high planing performance, we would recommend that this cold planer is used in particular when carrying out extensive redevelopment work on large and spacious roads, such as motorways, urban and country roads, car parks, airports etc.

The PL2000F corresponds to the European safety standard and satisfies very stringent requirements in terms of its reliability, economic viability and environmental responsibility.

Technical modifications, attachments and conversions: The machine may only be operated with the extension parts, optional equipment and accessories, protection and safety devices authorized by the manufacturer as well as the setting values specified by the manufacturer. The manufacturer is not liable for damage resulting from unauthorized changes to the assemblies, their removal or their replacement with other, non-intended components or taking them completely or partially out of operation.

The attachment or installation of additional devices, which are used to intervene in the function of the cold planer or with which its function are supplemented, is only permitted with the written approval of the manufacturer. If necessary, approval should be sought from the local authorities.

Intended use

PL2000F is mainly intended to be used for roadworks:

- to partially or completely remove asphalt, asphalt based and/or cement layers
- to remove distortions in the forms of track grooves, lateral bulges, lateral warps
- to recreate a proper surface
- to implement roughing up and striping work

For this, the underlying base layer must be robust enough to withstand movement of the cold planer.

The transport of outsiders is **expressly forbidden**, as using the cold planer as a traction mechanism or lifting device.

The intended usage also includes compliance with operating, transport, maintenance and repair conditions specified in the operating instructions.

The machine is not designed for any type of usage not described in the intended usage section. The manufacturer is not liable for such instances of use. The operator alone bears all risks for such usage. When in doubt, contact the manufacturer.

Warning symbols



WARNING ! Marks a danger or a hazardous procedure that can result in life threatening or serious injury if the warning is ignored



CAUTION ! Marks a danger or hazardous procedure that can result in damage to the machine or property if the warning is ignored

General

This manual contains instructions for machine safety, operation, transport and maintenance.

The machine must be correctly maintained for top performance level.

The machine should be kept clean so that any leakages, loose bolts and loose connections are discovered at as early as possible.

Inspect the machine every day, before starting. Inspect the entire machine so that any leakages or other faults are detected.

Check the ground under the machine. Leakages are more easily detected on the ground than on the machine itself.



THINK ENVIRONMENT ! Do not release oil, fuel and other environmentally hazardous substances into the environment. Always send used filters, drain oil and fuel remnants to environmentally correct disposal.

This manual contains instructions for periodic maintenance normally carried out by the operator.

Additional instructions for the engine can be found in the manufacturer's engine manual.

CE marking and Declaration of conformity

(Applies to machines marketed in EU/EEC)

This machine is CE marked. This shows that on delivery it complies with the basic health and safety directives applicable for the machine in with machinery directive 2006/42/EC and that it also complies with other directives applicable for this machine.

A "Declaration of conformity" is supplied with this machine, which specifies the applicable directives and supplements, as well as the harmonized standards and other regulations that are applied.

Safety - General instructions

(Also read the safety manual)



1. Read the entire manual before starting the machine and before carrying out any maintenance. Do not remove the manual from the machine. Replace the instruction manual if lost, damaged or unreadable.
2. The safety manual supplied with the machine must be read by planer operators. Always follow the safety instructions. Do not remove the manual from the machine.
3. Only trained and/or experienced operators should be allowed to drive the planer. It is prohibited to take passengers on the planer.
4. Never use the planer if it is in need of adjustment or repair.
5. Only climb up or down from the planer when it is stationary. Use the intended grips and rails. Always use the three-point grip (both feet and one hand, or one foot and both hands) when mounting or dismounting from the machine. Never jump down from the machine.
6. Drive carefully on sharp bends.
7. Avoid driving across slopes. Drive straight up or straight down the slope.
8. Make sure that the underlying surface is sufficiently stable.
9. Make sure that there are no obstacles in the direction of travel, on the ground, in front of or behind the planer, or overhead.
10. Drive particularly carefully on uneven ground.
11. Use the safety equipment provided.
12. Keep the planer clean. Immediately remove any dirt or grease from the operator platform. Keep all signs and labels clean and fully legible. Replace damaged plates and labels.
13. Safety measures before refueling:
 - Shut off the engine
 - Do not smoke
 - No naked flame in the vicinity of the machine
 - Ground the filling device nozzle to the tank to avoid sparks

14. Before carrying out repairs or service:
 - Place chocks at the wheels
15. Hearing protection is recommended if the noise level exceeds 80 dB(A). The noise level can vary depending on the equipment on the machine and the surface the machine is being used on.
16. Do not make any changes or modifications to the planer, this could put safety at risk. Changes may only be made following the written approval of Dynapac.
17. Avoid using the planer before the hydraulic fluid has reached its normal working temperature. Braking distances can be longer than normal when the fluid is cold. See instructions in the STOP section.
18. For your own safety, always wear:
 - a helmet
 - work shoes with steel toecaps
 - hearing protection
 - breathing protection while milling, if necessary
 - reflective clothing/high visibility vest
 - work gloves
 - eye protection, if necessary
19. Ensure sufficient ventilation (extraction of air by fan) where the engine is run poorly ventilated spaces.

Safety - when operating



Prevent persons from entering or remaining in the danger area, i.e. a distance of at least 7m (23 ft) in all directions from operating machines.

The operator may allow a person to remain in the danger area, but should then observe caution and operate the machine only when the person is visible or has given clear indications of where he or she is.

Risk zones on the machine

Within these areas there is a risk of being retracted or crushed as a result of rotating, feeding or moving parts

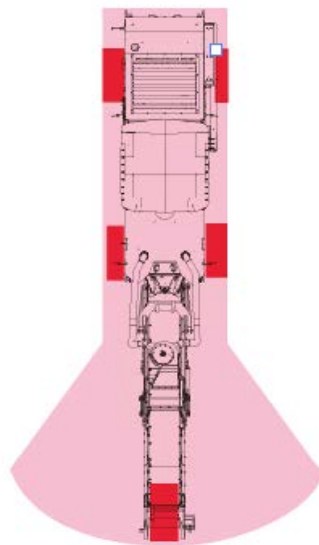
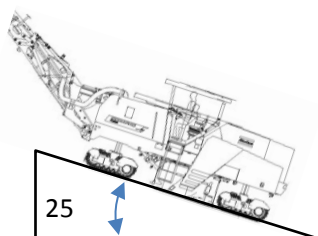


Fig. Risk zone

Slopes (Tip over risk)

Bear in mind that loose ground, and conveyor movements changes the center of gravity and can cause the machine to tip over on slopes lower than specified.

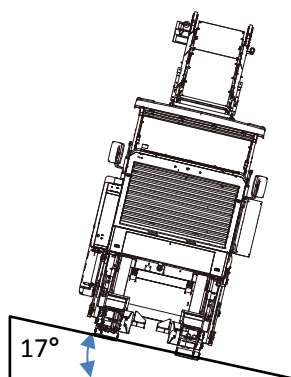


Follow the stated recommendations for maximum permitted angle in the picture.



Safety cannot be guaranteed when the max. permitted angle of inclination is exceeded.

Maximum permitted angle of inclination 46% (25°)



Maximum permitted angle of inclination 17% (10°)

Fig. Operating on slopes



Where possible, avoid driving across slopes. Drive instead straight up and down sloping ground

Safety devices

The machine can only be safely operated if the control and safety devices are functioning perfectly and if the protective equipment is fitted correctly.

Conveyor



! *The machine must not be transported with material on the conveyor. The weight for the conveyor is specified on the unit rating plate. This weight is not included in the machine weight specified on the machine plate.*

! *The operator must make sure that nobody is in the working area while the machine is in use.*

! *Risk of body and crush injuries. The conveyor has rotating parts.*

! *Risk of being retracted. Rotating conveyor*

The conveyor must be returned to its transport position after it has been used.

The overall length of the machine is changed when the conveyor is fitted.

Roof (Option)



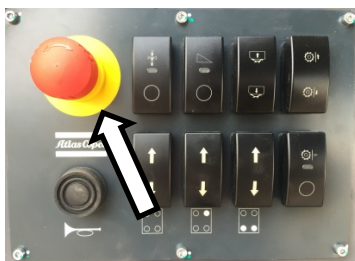
! *Risk of squeeze risk and crush injuries.*

Emergency stop button

- On the left/right console
- One the left/right ergo box
- On the four remote control boxes

! The engine, drives and steering system are shut down when the emergency stop button is pressed.
Any counter measures required (Diverting, lifting the discharge conveyor etc.) are then no longer available! Risk of accident!

! The emergency stop button must not usually be used to shut down the engine and should only be pressed in an emergency or for test purposes.



Safety - General instructions

Horn

- On the left/right console
- One the left/right ergo box
- On the four remote control boxes

! Before starting to operate the machine and moving the conveyor units, the horn knob and/or the horn button should be pressed to issue a warning signal.





Headlights, indicators rotary beacons

Lights for illuminating different operating areas and for indicating danger areas and/or dangerous situations are located at various machine positions.

Several contacts, to which headlights can be connected, can be found around the machine.

The headlights, indicators and rotary beacons can be activated using the appropriate switches on the upper control panel.

- ❗ The function of the headlights and warning lamps should be checked on a daily basis before starting work.

The headlights can be simply removed and should be taken off from easily accessible points and safely stored once work is complete.

- ❗ Headlight contacts which are not used should be protected using rubber caps.



Hazard warning lights on side panels (O)

One hazard warning light can be found above the side panel on both the left and right-hand sides of machine.

The hazard warning lights are operated as soon as the side panels are raised.

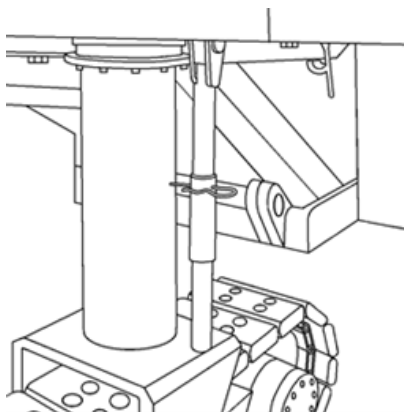


Reverse lights and folding warning signs, reverse warning device

The reverse lights illuminate the danger area behind the machine.

A warning sign can be folded out on the right-hand side of the machine and is used e.g. to warn any traffic behind the machine. A reflective film is fitted to the other side of the back of the machine.

The machine is also fitted with an acoustic reverse warning device which sounds as soon as the machine starts to reverse



Traction unit supports

One separable traction unit support can be found on every traction unit as a safety measure.

The complete traction unit support is used for retaining purposes during maintenance and repair work.

In order to achieve a lower transport height, the upper section of the separable support is used on the trailer during transport.



The full length of traction unit supports should be inserted during all maintenance and repair work.

Under vehicle as well as when parking for long periods of time.

If the machine is lowered unintentionally, wedge-shaped supports advance automatically into the recesses provided in the locating plates and therefore prevent the machine from being lowered further.



Fig. Steel retaining cables

Steel retaining cables

The steel cables hold the discharge conveyor and should be regularly checked for damage.



If damage is found, the steel cables should be replaced immediately.



Fig. Transport and parking lock

Transport and parking lock for discharge conveyor

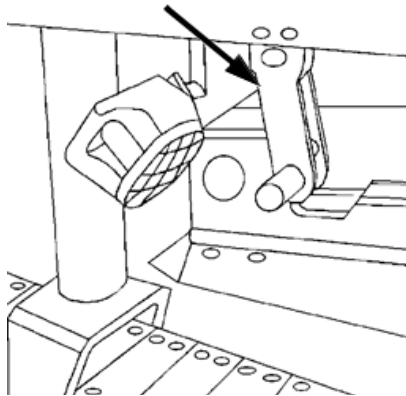
In order to prevent the discharge conveyor from accidentally swiveling during transport on the trailer or when parking for long periods, the groove of the lock (1) should be inserted in the associated support of the discharge conveyor bracket for this purpose.



Only apply the lock when parking and for transport purposes during which the discharge conveyor is rigidly placed on the trailer or has to be held.

In other words, when the unit is not subject to swivel movements.

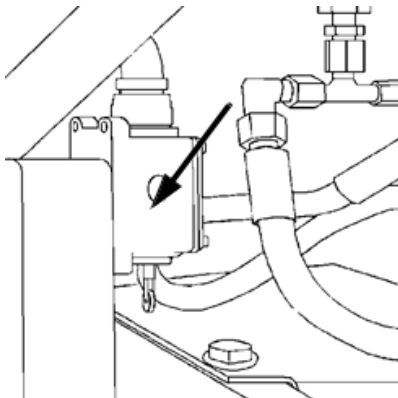
Never apply the lock for transport purposes in which the discharge conveyor is flexibly mounted, e.g. placed on a support fixture on the tractor machine of the trailer.



Retaining hook of scraper flap

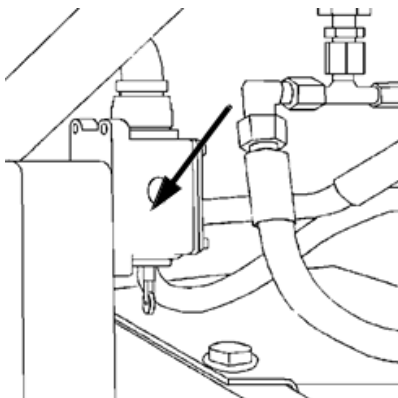


When the scraper flap is open, the retaining hook must be inserted before work may begin.



Limit switch of scraper flap

The switch is pressed when raising the scraper flap and ensures that the milling drum drive cannot be started.



Scraper flap safeguard

One safeguard for the scraper flap is located on either side of the rear of the drum box.

The safeguard must be released before the scraper flap can be opened.



Fig. Exit ladders, grab bars, guardrails

Exit ladders, grab bars and guardrails

The ladders on both sides of the machines are fitted with slip-free covers.

Grab bars and guardrails are also provided.

Climbing up and down the ladders during travel and travelling on the ladders themselves is prohibited.



Fig. Side shield

Side shield

A side shield is fitted to both sides of the milling drum housing on the machine. These shields can be lifted by pressing the appropriate buttons on the controls.

Special instructions

Standard lubricants and other recommended oils and fluids

Before leaving the factory, the systems and components are filled with the oils and fluids specified in the lubricant specification. These are suitable for ambient temperatures in the range -15°C to +40°C (5°F - 105°F).



The maximum temperature for biological hydraulic fluid is +35°C (95°F).

Higher ambient temperatures, above +40°C (104°F)

For operation of the machine at higher ambient temperatures, however maximum +50°C (122°F), the following recommendations apply:

The diesel engine can be run at this temperature using normal oil. However, the following fluids must be used for other components:

Hydraulic system - mineral oil Shell Tellus T100 or similar.

Lower ambient temperature - Freeze risk

Make sure that the watering system is empty/drained of water (sprinkler, hoses, tank/s) or that anti-freeze has been added, to prevent the system freezing.

Temperatures

The temperature limits apply to standard versions of planers.

Planers equipped with additional equipment, such as noise suppression, may need to be more carefully monitored in the higher temperature ranges.

High pressure cleaning

Do not spray directly onto electrical components.



Do not use high pressure cleaning for dashboard/display.



The Electrical Drive Control and the computer box may not be washed with high pressure cleaning and not at all with water. Clean them with a dry wiper.



Detergent that can destroy electrical parts, or which is conductive, must not be used.

Place a plastic bag over the fuel filler cap and secure with a rubber band. This is to avoid high pressure water entering the vent hole in the filler cap. This could cause malfunctions, such as the blocking of filters.



Never aim the water jet directly at the fuel tank cap. This is particularly important when using a high-pressure cleaner.

Fire fighting

If the machine catches fire, use an ABC-class powder fire extinguisher.

A BE-class carbon dioxide fire extinguisher can also be used.

Battery handling



When removing batteries, always disconnect the negative cable first.



When fitting batteries, always connect the positive cable first.



Dispose of old batteries in an environmentally friendly way. Batteries contain toxic lead.



Do not use a quick-charger for charging the battery. This may shorten battery life.

Jump starting (24V)



Do not connect the negative cable to the negative terminal on the dead battery. A spark can ignite the oxy-hydrogen gas formed around the battery.



Check that the battery used for jump starting has the same voltage as the dead battery.

Turn the ignition and all power consuming equipment off. Switch off the engine on the machine which is providing jump start power.

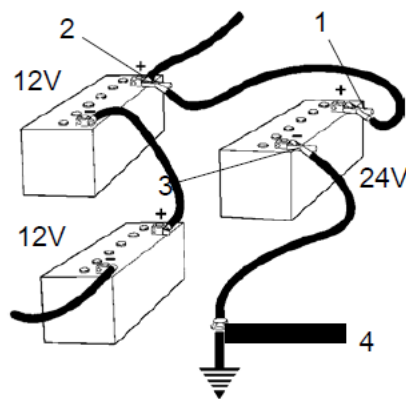


Fig. Jump starting

Jump leads must have 24V.

First connect the jump start battery's positive terminal (1) to the flat battery's positive terminal (2). Then connect the jump start battery's negative terminal (3) to, for example, a bolt (4) or the lifting eye on the machine with the flat battery.

Start the engine on the power providing machine. Let it run for a while. Now try to start the other machine.

Disconnect the cables in the reverse order.



Starting gas is not to be used!

Technical specifications

Vibrations - Operator station

(ISO 2631)

The vibration levels are measured in accordance with the operational cycle described in EU directive 2000/14/EC on machines equipped for the EU market, nominal speed of diesel engine and milling and transport devices in operation and with vibration switched on, on soft polymer material and with the operator's seat in the transport position.

Measured whole-body vibrations are below the action value of 0.5 m/s² specified in directive 2002/44/EC. (The limit is 1.15 m/s².)

Measured hand/arm vibrations also were below the action level of 2.5 m/s² specified in the same directive. (Limit is 5 m/s²)

Noise level

The noise levels are measured in accordance with the operational cycle described in EU Directive 2000/14/EC on machines equipped for the EU market; nominal speed of diesel engine and milling and transport devices in operation.

Guaranteed sound power level, L_{WA} 447kW 107dB(A)

PL2000F

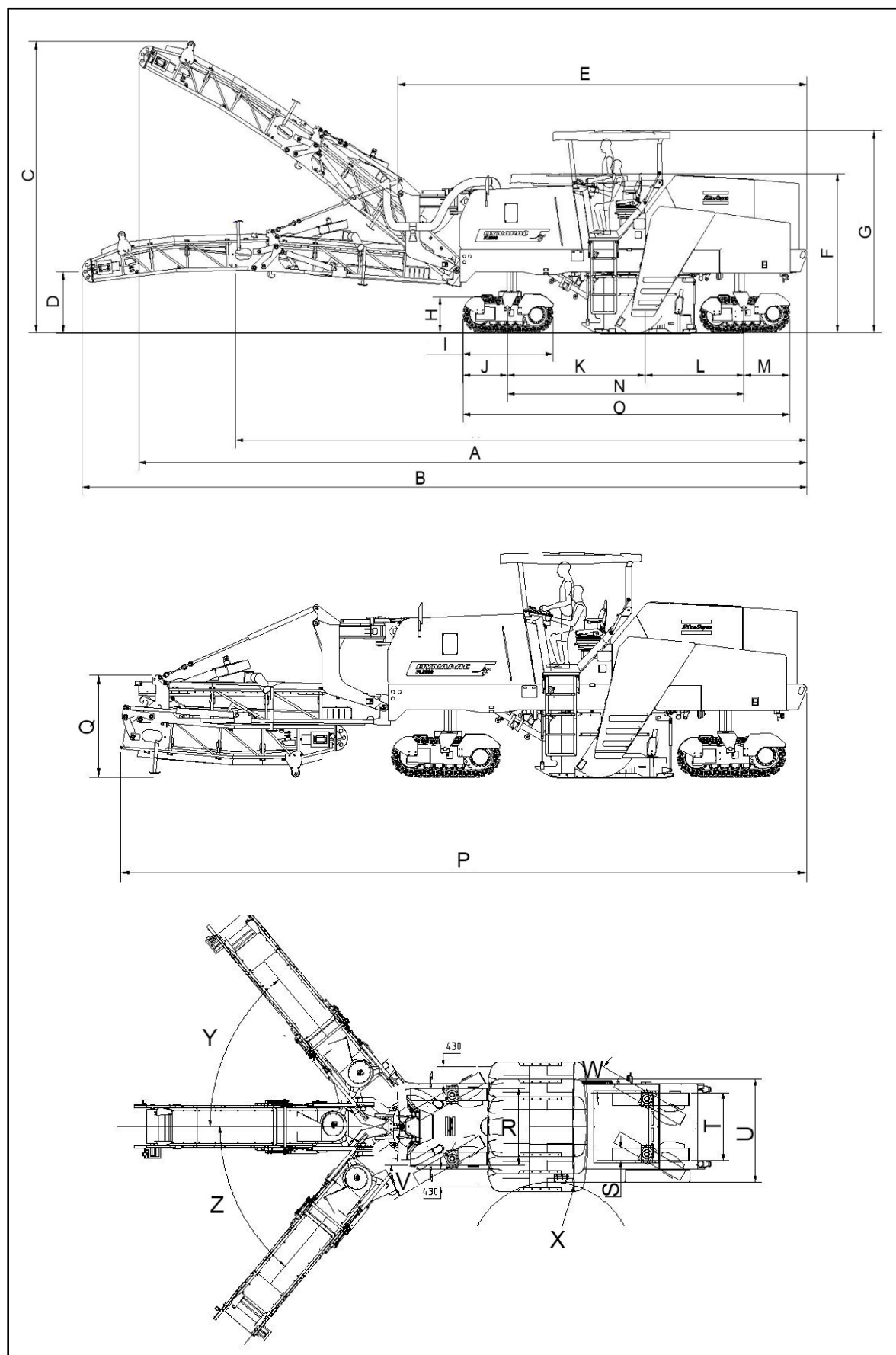
Sound pressure level at the operator's ear (platform), L_{pA} 96dB(A)
PL2000F

During operation the above values may differ because of the actual operational conditions.

Electrical system

Machines are EMC tested in accordance with EN 13309:2000 'Construction machinery'.

Dimensions



Technical specifications

	Designation	PL2000F Standard	
A	Machine length with max. paving height	14113	mm
B	Machine length with discharge conveyor at transport height	15310	mm
C	Max. paving height	5673	mm
D	Transport height of discharge conveyor	any	mm
E	Machine length without discharge conveyor	8643	mm
F	Height without (with lowered) weather protecting sun roof	3100	mm
G	Height with weather protecting sun roof	3938	mm
H	Drive unit height	690	mm
I	Drive unit length	1902	mm
J	Length of drive unit suspension to start of drive unit	934	mm
K	Distance between suspension of front drive unit - milling drum	2900	mm
L	Distance between suspension of rear drive unit - milling drum	2100	mm
M	Length of drive unit suspension to end of drive unit	955	mm
N	Distance between suspension of front drive unit - rear drive unit	5000	mm
O	Total distance between the drive units (incl. drive units)	6890	mm
P	Machine length with discharge conveyor folded in	12011	mm
Q	Transport height with discharge conveyor folded in	1657-3865	mm
R	Track width, outer front drive units	1890	mm
S	Chain width	310	m
T	Track width, outer rear drive units	1680	mm
U	Machine width	2546	mm
V	Max. steering lock turn, front drive units	30	degr.
W	Max. steering lock turn, rear drive units	30	degr.
X	Turning radius	2065	mm
Y	Max. swash angle, discharge conveyor to the right	55	degr.
Z	Max. swash angle, discharge conveyor to the left	55	degr.

Weights

	PL2000F (Hydraulic Foldable discharge conveyor)	PL2000F (Hydraulic Foldable discharge conveyor option weight)	
Operating weight CE*	31	34	t
Weight when empty	29	31	t
Operating weight (with full tank)	34	37	t
Discharge conveyor	1.7	1.7	t
Axle load, front	20	21	t
Axle load, rear	14	15	t

*CE weight: water and fuel tank half filled, driver and tools on board

Performance data

	PL2000F	
Transportation speed	0 - 5	km/h
Operating speed	0 - 40	m/min
Cutting width	2010	mm
Grading depth	0 - 320	mm
Max. slope	10 (O 13)	degr.
Line spacing	15	mm
Cutting diameter	1100	mm
Cutting speed	4.7 - 8.8	m/s
Number of milling tools	162	items

Technical specifications

Loading system

Belt width, lower conveyor	850	mm
Belt width, discharge conveyor	800	mm
Belt speed, lower conveyor	0-4	m/s
Belt speed, discharge conveyor	0-5	m/s
Loading capacity (theoretical)	470	m ³ /h

Engine (T3)

Make/type	Cummins QSX 15-600
Version	6-cylinder diesel engine (water-cooled)
Power (in accordance with DIN 6270)	447 kW / 607 PS / 600 hp (at 2100 rpm)
Capacity	15000 cm ³
Fuel consumption, full load Fuel consumption, 2/3 load	120 l/h 80 l/h
Fuel tank filling volume	approx. 1100 l

Engine (T4f)

Make/type	Cummins QSX 15-600
Version	6-cylinder diesel engine (water-cooled)
Power (in accordance with DIN 6270)	447 kW / 607 PS / 600 hp (at 2100 rpm)
Capacity	15000 cm ³
Fuel consumption, full load Fuel consumption, 2/3 load	116 l/h 77 l/h
Fuel tank filling volume	approx. 1100 l

Travel drive

Input	Hydrostatic input, continuously variable
Drive units	4 individually driven crawlers, each with 26 plastic bottom plates
Steering system	- Hydraulic fully-tracked steering

Steering variants	<ul style="list-style-type: none"> - only at front - only at rear - front and rear - crab steering
-------------------	--

Hydraulic system

Pressure creation	Hydro pumps via transfer box (directly flange-mounted on engine)
Pressure distribution	Separate hydraulic circuits, e.g. for: <ul style="list-style-type: none"> - loading and discharge conveyor, - cylinder functions - clutch, belt tensioner - fan, filling equipment, water system
Hydraulic oil tank - filling volume	approx. 300 l

Water system

Filling pump	1.7	m ³ /h
High pressure cleaner	170	bar
Cleaner	6	bar
Lower conveyor	1 8	items
- Spray nozzles		
- Milling drum box		
Water tank - filling volume	approx. 3400	l
Water contents (min.)	3	h

Compressed air system

Performance	529	l/min
Compressed air reservoir	20	l
Permissible working pressure	6.5	bar

Electrical system

On-board voltage	24V
Batteries	2x12V, 950AMPS
Generator	24V / 100 A

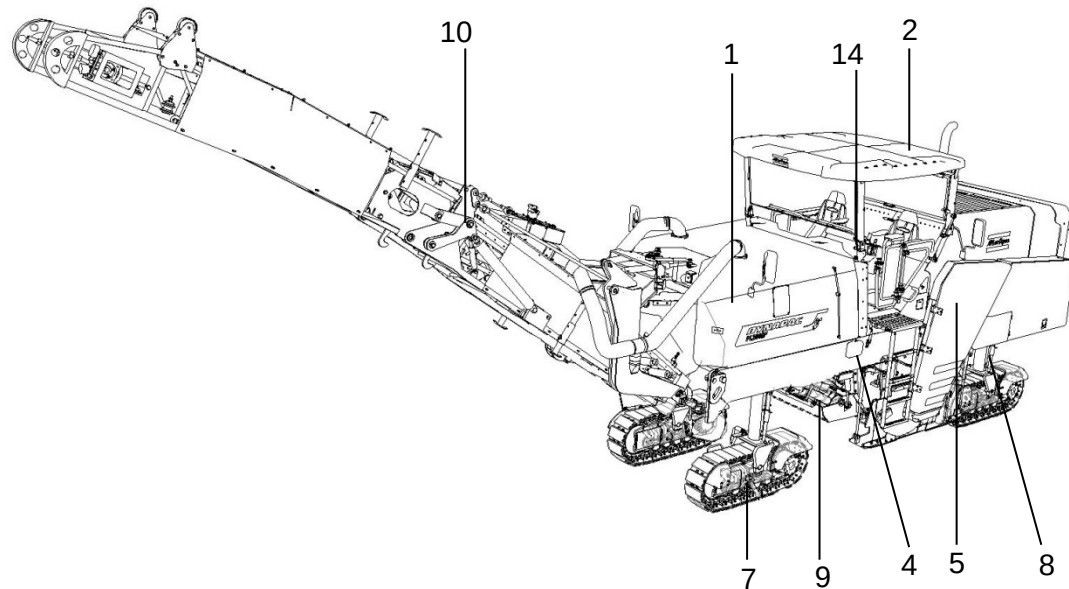
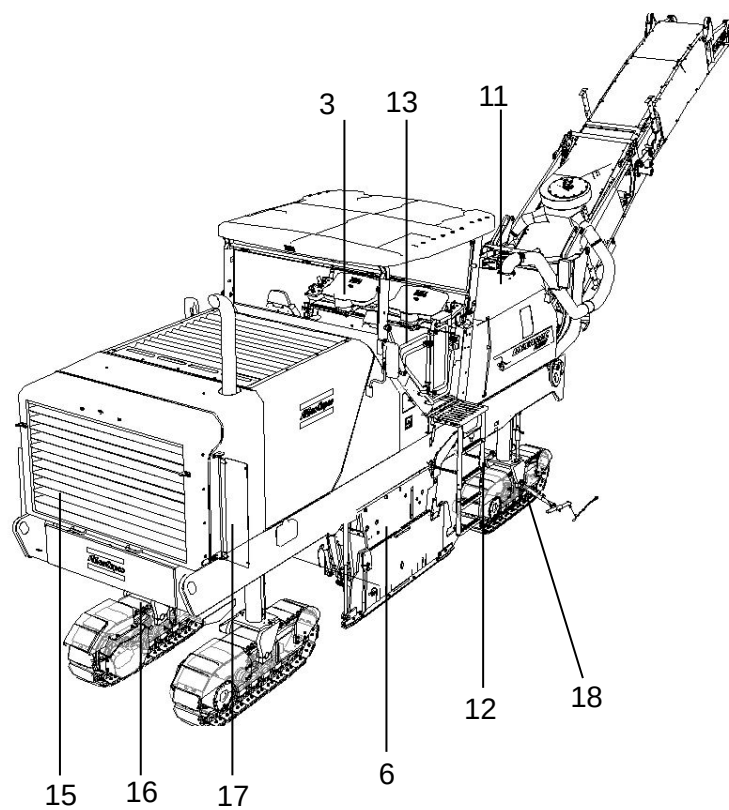
Tightening torque

Tightening torque in Nm (lbf.ft) for oiled or dry bolts tightened with a torque wrench.

Maximum torque for shaft screws with metric ISO coarse-pitch thread

	8.8		10.9		12.9	
	Bias force	Torque	Bias force	Torque	Bias force	Torque
M3	2250	1.3	3150	1.9	3800	2.
M4	3900	2.9	5450	4.1	6550	4.
M5	6350	6.0	8950	8.5	10700	1
M6	9000	10	12600	14	15100	1
M8	16500	25	23200	35	27900	4
M10	26200	49	36900	69	44300	8
M12	38300	86	54000	120	64500	145
M14	52500	135	74000	190	88500	230
M16	73000	210	102000	295	123000	355
M18	88000	290	124000	405	148000	485
M20	114000	410	160000	580	192000	690
M22	141000	550	199000	780	239000	930
M24	164000	710	230000	1000	276000	1200
M27	215000	1050	302000	1500	363000	1800
M30	262000	1450	368000	2000	442000	2400

Descriptions of assemblies and functions



Item Designation

- | | |
|----|--|
| 1 | Frame |
| 2 | Weather protecting sun roof |
| 3 | Control panel |
| 4 | Lower control panels |
| 5 | Belt drive (milling drum drive) |
| 6 | Cutting section |
| 7 | Traction systems |
| 8 | Strut towers |
| 9 | Lower conveyor |
| 10 | Discharge conveyor |
| 11 | Water tank |
| 12 | Folding ladder |
| 13 | Guardrails (on both sides) |
| 14 | Storage area |
| 15 | Swivel-mounted radiator grille |
| 16 | Connection for external water filling (filling under pressure) |
| 17 | Swivel-mounted warning sign |
| 18 | Plumbline fixture |

Frame and assembly: Robust, distortion-resistant steel welded design with useful brackets for supporting the assemblies, units, attachments and tanks. All parts can be easily accessed for maintenance and repair work.

Operator's control station: The continuous length of accessible operator's control station is located in the central part of the machine and can be reached via two ladders. Two ergonomic seats ensure that the planer can be conveniently operated from both sides and that the operator has a good overview of and can monitor the milling process. The control station has an innovative sliding system that enhances the visibility of the operator. The full station can slide 400mm on both sides of the frame.

The cold planer can be fitted with a weather protecting sun roof (can be folded in) and all-round panels as an option. During transport, the roof can be folded forwards hydraulically and secured on the water tank.

Controls at operator's control station: An operating panel, the position and height of which can be easily adjusted, can be locked on the right and left and contains all operating and control elements required. If necessary, the machine operator can move this into any other position required, even beyond the edge of the machine. The securely arranged controls are obviously marked for all applications.

Steering and feed are simultaneously controlled using a drive lever, designed as a joystick. A second joystick controls the position of the discharge conveyor and its speed (controlled in a gradual manner).

A LC display integrated in the operating panel rapidly and comprehensively informs the

machinist of the present operating modes as well as any setting and maintenance work required on the machine.

All machine settings, including the grading depth and slope control, can be simply programmed and modified by means of a perforated keypad with internationally comprehensible symbols.

Space has been left for the installation of a monitor for observing the planer track and the dead space. This equipment is optionally available and can be installed with four video cameras.

The main control panel, the lower control panels and access to all important switching and connection points can be sealed off.

Lower control panels: The operating panels housed here are located on both sides of the planer, in front of and behind the milling drum box. They contain duplicates of the main controls of the operator's control station with override functions so that the milling process can be monitored, corrected and interrupted from this point.

One digital controller for the grading depth and one for the slope position are attached next to the rear operating panels on the left and right sides.

Atlas Copco Dynapac CAN-BUS data communication system: The tried and tested state-of-the-art electronic PLC (Programmable Logic Control) monitors all control functions of the cold planer. Signals processed by microprocessors are safely transferred by an efficient CAN-BUS system (Data Information System) and displayed as information on the LC display. Possible function deviations

and errors are noted and can be corrected immediately.

Engine: The machine is fitted with a powerful 6-cylinder Cummins turbo diesel engine which effortlessly covers the power requirements of the large planer. This engine has electronic engine management which also automatically adapts it to the extreme operating and environmental conditions and therefore keeps its torque stable. The engine cover is noise-insulated as standard so that operating staff and the surrounding area are subjected to minimum levels of noise. The engine is available in two versions, first version complying with US EPA T3, EU stage IIIA and China stage III exhaust standard, second version complying with the latest exhaust regulations US EPA T4f and EU stage IV.

Cutting section: The cutting section consists of the mechanical milling drum drive, the milling drum housing, the milling drum, the moldboard, the sliding shoe and the side boards.

All these elements are precisely tuned to one another and their designs adapted so that high performance milling is assured with low levels of cutting tool wear, as is very good retrieval, granulation and transport of the milled product, an exact milling pattern with cleaner milling edges is produced and the processed area is kept clean and free of milling product which has not been retrieved.

- The mechanical milling drum is driven by the diesel engine via a hydraulic separating clutch, belt pulleys and a high efficient poly-V belt on a planetary gear directly connected with the drum body. This guarantees a low-loss transfer of power intercepts load impact and has a long service life. The drive is fitted with an automatic belt tensioning fixture. The hydraulically selectable 3-pulley dry-plate clutch and the two-stage planetary

gear are configured specially for the milling drum drives and finely tuned to the engine rating of the machine.

- The milling drum rotates in the opposite direction to the machine forward drive. The professional cutting tool arrangement and equipping with the best cutting tools ensures rapid and clean cutting as well as high cutting tool downtimes

A good, tried and tested, new type of changeable fixing system is used on the standard drum. Thanks to the manner in which it is able to rapidly and simply replace upper fixing parts, it makes minimum change times possible and does not therefore cause long downtimes during replacement.

The milling drum housing seals off the milling drums to the left and right through the side boards, the sliding shoe to the front, the moldboard to the rear, in all grading depths and therefore ensures optimum material pickup and a clean cutting surface.

The side plates are fitted with replaceable, zero-wear hard metal plates to increase their service life.

Traction system, steering system, brakes

- Traction system

Four large crawler units, suspended in floating manner on the strut towers, hydrostatically driven and fitted with sensor-monitored anti-slip control are equipped with slip-free plastic pads. They provide excellent traction when cornering and in all usage positions.

The speed limits required can be set beforehand using the button provided or can be changed during operations. The control lever of the travel drive then

allows the speed to be gradually adjusted in this driving range from zero to the maximum for both forwards and reverse travel.

When overloaded, the machine feed is automatically reduced using limit load control.

- **Steering system**

The machine has fully-tracked steering and therefore has high maneuverability. When used in conjunction with a pre-selection button, the control lever allows the machine to be driven in four different steering variations and the speed to be changed at the same time:

- "only front steered"
- "only rear steered"
- "coordinated front and rear-steered"
- "driving in crab steering"

- **Brakes:** The machine brake consists of:

- the auto-inhibit of the hydrostatic drive
- the hydraulic spring accumulator brakes integrated in the gears of all four drive units.

The machine brakes when the control lever is swiveled back from the maximum position to neutral. The accumulator or spring brakes are activated both in the neutral position (during machine "stop") and when the engine is shut down and they act as parking brakes.

During a towing procedure, the spring accumulator brakes can be hydraulically disengaged by a manual pump.

- **Strut tower:** The strut towers are secured to the vehicle frame. The cold planer is lowered and raised in a controlled manner into the position required via these towers. The milling drum is therefore moved into the required cutting position and compliance can be maintained with the grading depth and slope required during milling. The height

of the strut tower is adjusted using an integrated hydraulic cylinder which is activated by proportional valves.

The grading depth and slope are set by means of the two front columns. The height of each of the front strut towers can be adjusted individually. The two rear columns operate in tandem and therefore adapt themselves to the appropriate machine position. For service purposes, the rear strut towers can also be changed over to individual adjustment mode.

The strut tower make a large lifting height possible so that the space required between the machine and ground is always provided during difficult manoeuvres such as loading.

Levelling equipment: The cold planer is fitted with electronic leveling equipment as standard. The leveling equipment consists of two digital controllers and LC display which can be connected with combination of a tilt sensor and various height or distance sensors.

The leveling equipment controls the cylinders of the front drive unit legs.

The grading depth and lateral slope required are pre-selected and compliance is automatically maintained with them during milling as the distance defined to a reference surface is continually compared and corrected.

The automatic operation can be briefly bridged and replaced by manual control,

The leveling equipment cannot respond when not intended during a period of down-time because a safety cutout is engaged when the machine is stopped.

In its standard version, the cold planer is fitted with two digital controllers and optionally either two cable tension sensors acting on the side boards or two ultrasonic sensors for zero-contact sensing of the surface.

As an option, the machine can be fitted with an additional tilt sensor, either with ultrasonic sensors or laser receivers for zero-contact sensing or also with rotary sensors for contact sensing of tensioning cables and side panels.

Water system: The water system consists of the water spraying and cooling system and the water high pressure cleaner.

- Water spraying system and cooling system:

The water spray and cooling system (operating in the average pressure range) is used to cool and freely spray the cutting tools, of the milling drum, lower and discharge conveyor.

The spray nozzles can be easily replaced,

- Water high pressure cleaner (optional):

The cold planer can optionally be fitted with a water lance and a tube reeling device for such purposes. An appropriate high-pressure connection is provided for these.

Water refilling system: The cold planer is fitted with two front and rear C-shaped pipe connections and a large filling aperture as standard for rapid water filling.

As an option, a hydraulically driven recirculating pump which significantly reduces the filling time can also be used.

Loading unit: The cold planer is designed as a front loader and has a dual-section, wide-belt loading system. The lower conveyor located under the machine receives the material released and ejected by the milling drum and conveys it to the front discharge conveyor.

Wide gravel funnels ensure a clean transfer. Via the discharge conveyor, the milled product is finally loaded onto a means of transport or its support outside the cutting track. Both conveyors are wide and have conveyance speeds which can be set in both forward and reversing mode. Their maximum values can be pre-selected depending on the material in question. Here, the speed of the discharge conveyor can be gradually adjusted from zero to maximum when in operation. The speed of the lower conveyor automatically changes in proportion to the speed adjustment of the discharge conveyor.

All belt changes can be simply and rapidly performed.

The lower conveyor is positioned on a sliding shoe to protect it from wear. This shoe also serves as a compression device and prevents lumps from breaking up on the cutting surface. Spraying the inside of the belt with water prevents it from sticking to the asphalt granulate.

The hydraulically adjustable discharge conveyor has a large loading height and can be swiveled a long way to each side. The level of dust contamination is noticeably reduced through the use of the complete cover available.

As an option, the discharge conveyor can be folded in for simpler transport.

Hydraulic system: The various operating functions of the cold planer are conducted using several, independent hydraulic circuits with a clear pipework system, predominantly permanently installed piping and short sections of hose connection.

All hydraulic pumps are driven centrally by a pump drive in turn driven by the diesel engine.

The following ensure that the entire hydraulic system is kept perfectly clean:

- a large return suction filter, fitted in the hydraulic oil tank, for the drive circuits of the traction unit, loading belt, fan and water system as well as for the drives of the cylinder adjustment functions;
- two pressure filters, fitted in front of the milling drum housing, on the right under the machine and easily accessible from the outside. In the drive circuit for height adjustment and steering, these are switched between the load-sensing adjustment pump and the hydraulic control blocks.

Electrical system: 24 volt system with two cold start high power batteries engaged sequentially and a 3-phase generator.

The power supply can be interrupted to ground/earth by the battery's main switch.

Air pressure system: Compressor driven directly by the engine with compressed air reservoir of 20l/6.3 bar. There is a commissioning point with a rapid release clutch for external consumers (e.g. pneumatic cutting tool driver or rotary screwdriver) in the rear section under the machine.

Optional equipment:

- Extended levelling equipment: a transverse slope sensor, a digital rotary arm sensor, the ultrasound Sonic-Ski and laser receivers are contained in this package. In addition to this, a Road scanner System can be used in conjunction with a transverse slope sensor.
- Fine spaced milling drum: cutting width 2010 mm, with welded on lug boxes which can be positioned, line spacing 7.5 mm
- Cutting section for 2100 mm cutting width with normal or fine spaced milling drum,
- Weather protecting sun roof: can be mechanically or hydraulically lowered, with all-round weather protecting panel (can be folded in) and electrical windscreen wiper.
- Additional operating panel: for the machine to be operated from both sides of the operator's control station at the same time.
- Video control system: monitor and four video cameras for observing the cutting track area in front of the front drive unit, the sliding shoe area in front of the milling drum housing, the scraper flap area behind the milling drum housing and the area of the rear operating track during reverse travel. If necessary, the cameras can be swiveled and fitted differently so that the cold planer can also be steered by the machine operator by means of this video system if necessary.
- Dust suction system: extraction and filtering of dusts and harmful vapors in the following areas: cutting section, material transfer point between the lower and discharge conveyor and discharge area on discharge conveyor
- Water refilling pump by means of auto-suction recirculating pump driven by hydraulic motor, displacement quantity approx. 18m³/h.

Machine description

- High pressure cleaner: water lance with approx. 13 m hosing, tube reeling device, operating pressure 170 bar, water consumption approx. 16 l/min
- Pneumatic cutting tool driver: cutting tool set in toolbox, working pressure 6.3 bar, air consumption approx. 460 l/min, number of impacts 3000 p/min.
- Pneumatic pile driver: socket wrench set and extension in toolbox, working pressure 6.3 bar, air consumption approx. 580 l/min, torque 640 Nm.
- Compressed air pistol: for precision cleaning of areas difficult to access, working pressure can be adjusted between 2-10 bar.
- Pneumatic grease press: with flexible compressed air hose, working pressure max.8 bar, compression 480 bar (60:1)
- Spiral compressed air line: 10m in length for connecting compressed air tools.

Other useful extensions and attachments are available on request.

Machine description

Identification

The machine PIN (1) is punched on the front right side of the frame.



Fig. 1. PIN

2. Machine plate

Machine plate

The machine plate (2) is fixed to the right hand inner front side of the machine.

The plate gives the name and address of the manufacturer, type of machine, PIN (serial number), operating weight, engine power, axle weight front/rear, and year of manufacture.

		Dynapac (China) Compaction & Paving Equipment Co., Ltd. 38, Quanyang Rd, Wuqing High Tech Ind. Park, Tianjin, China 301700		
Product Identification Number				
Designation	Type	Rated Power	Max axle load front / rear	
		kW	kg	
Gross machinery mass	Operating mass	Max ballast	Month Year of Mfg	
kg	kg	kg		
Made in China				4812 1251 11

Please state the machine's PIN when ordering spares.

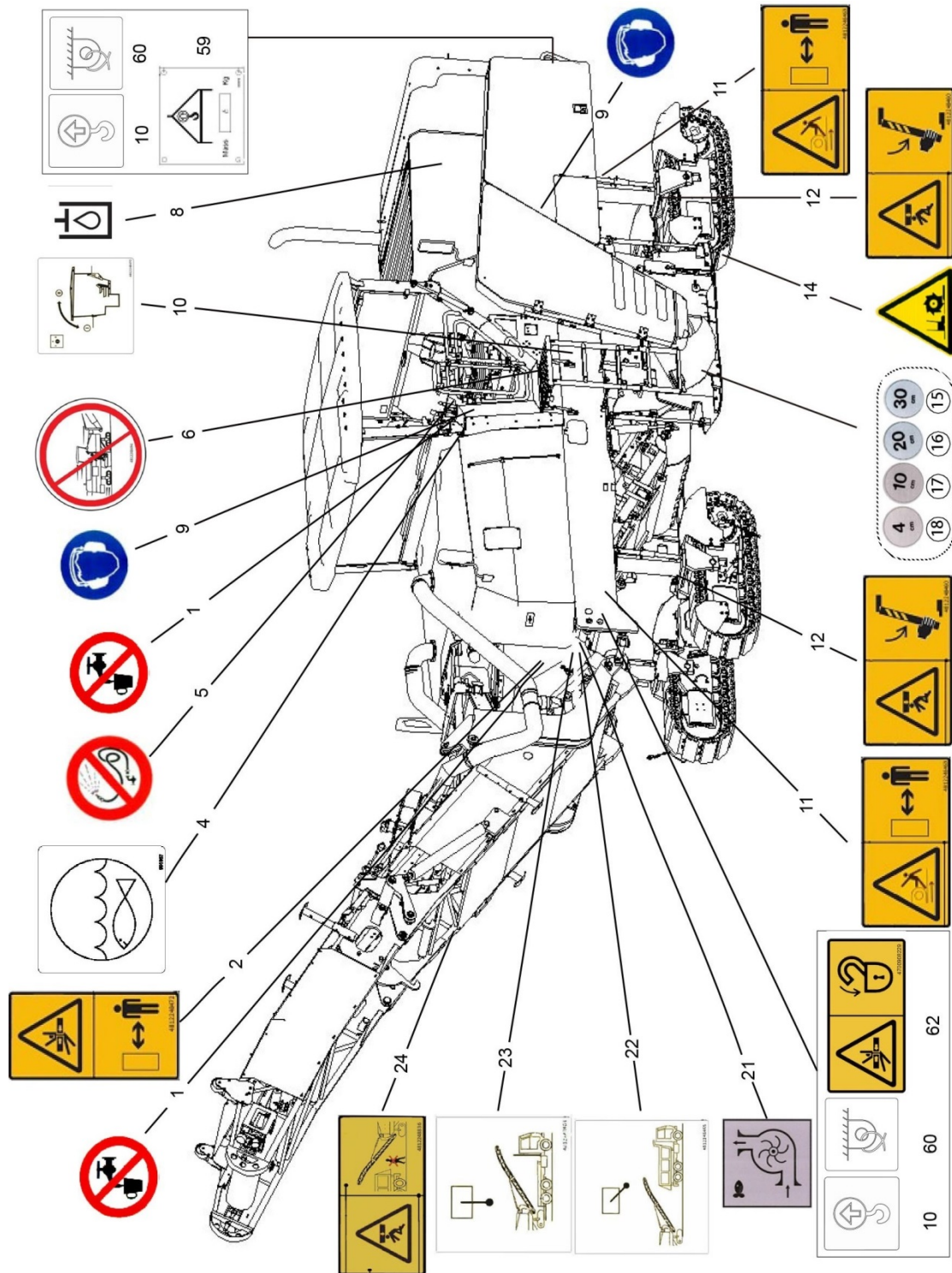
Machine description

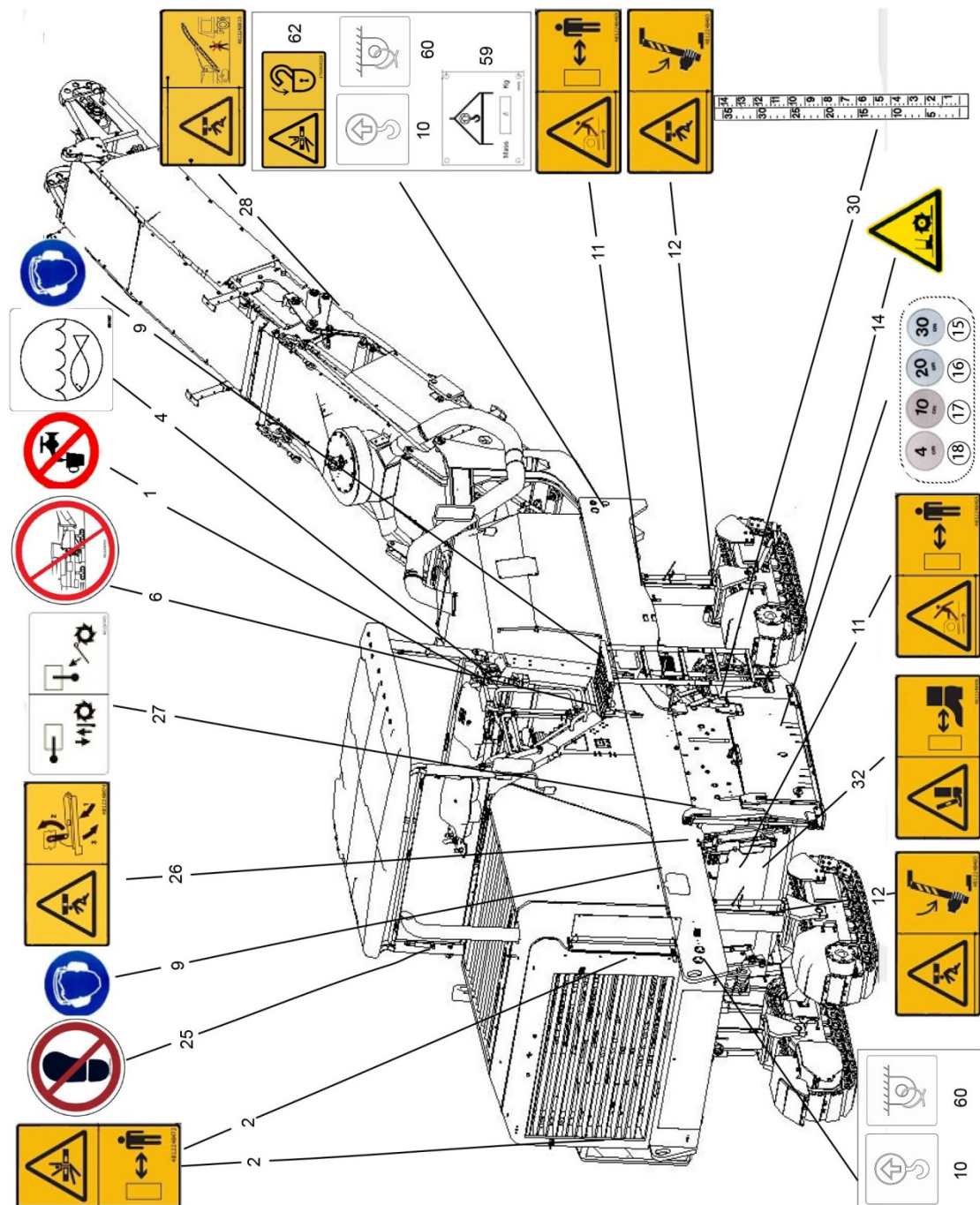
Explanation of 17PIN serial number

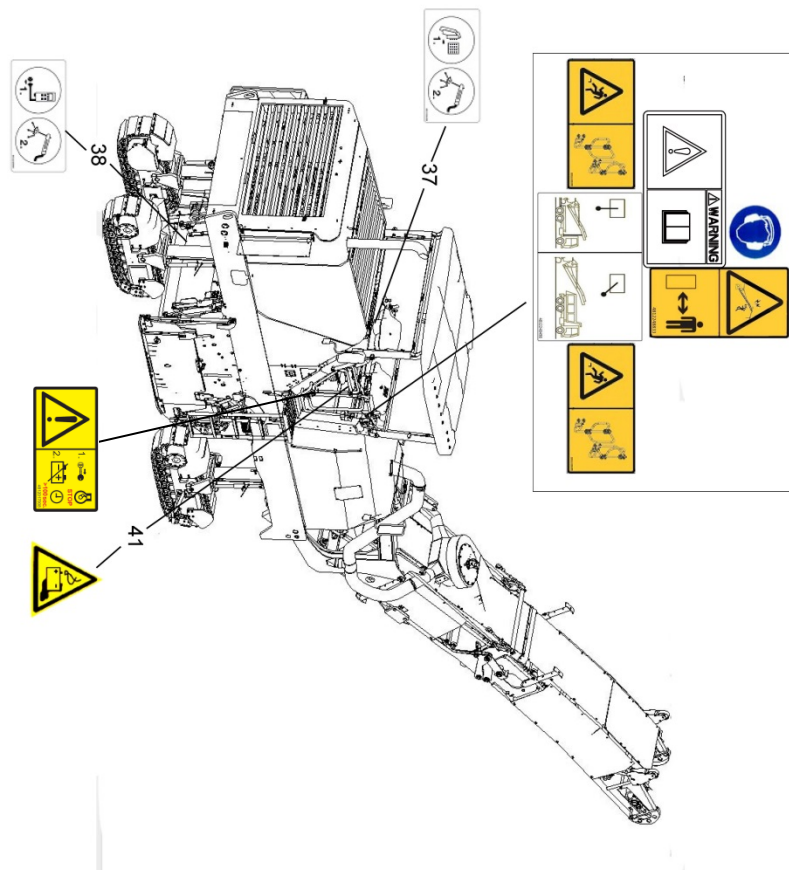
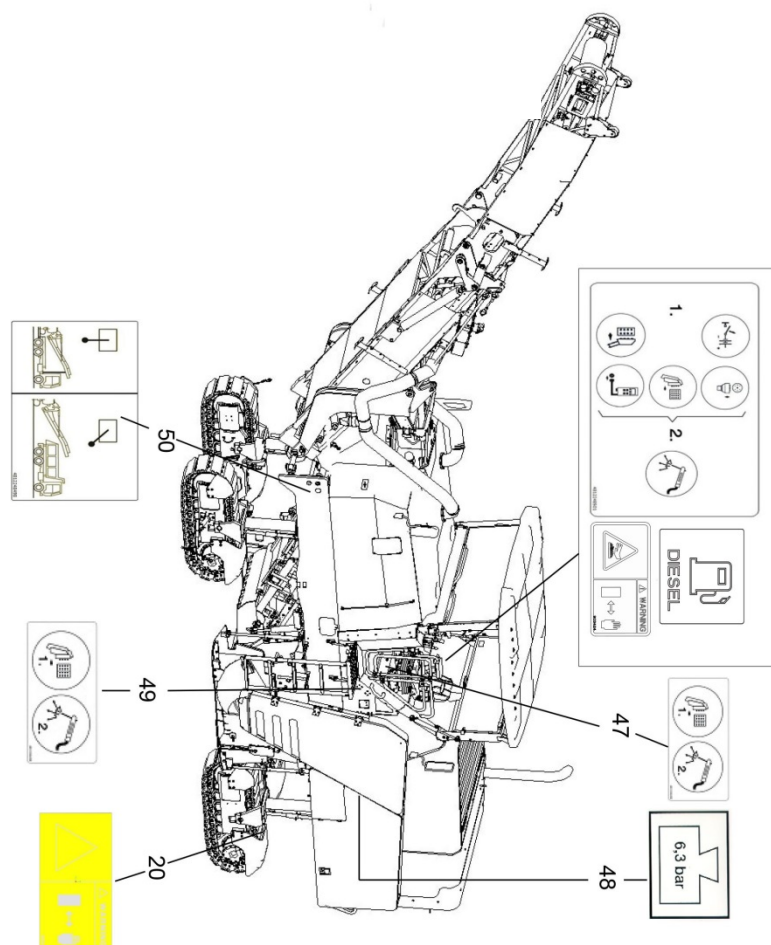
100	00123	V	0	A	123456
A	B	C	D	E	F

A= Manufacturer
B= Family/Model
C= Check letter
D= No coding
E= Production unit
F= Serial number

Decals







Safety decals

Always make sure that all safety decals are completely legible, and remove dirt or order new decals if they have become illegible. Use the part number specified on each decal.



4700903832

Warning - Rotating engine components.

Keep your hands at a safe distance from the danger zone.



4700903424

Warning - Hot surfaces in the engine compartment.

Keep your hands at a safe distance from the danger zone.



4700903459

Warning - Instruction manual

The operator must read the safety, operation and maintenance instructions before operating the machine.



4812248523

Warning – Risk of crushing of the whole body.

Maintain a safe distance from the crush zone.



4812248460

Warning – Risk of crushing of whole body-attach support

Maintain a safe distance from the crush zone.



D956052009

Warning – “Battery charging”

Maintain a safe distance.



D956052003

Warning – “Battery charging”

Prohibit to spray with water.



4812248496

Warning – Risk of hitting of feet

Maintain a safe distance from the danger zone.

Machine description



4812248833

Warning – Electrical hazard decal

Danger of electric shock. Maintain a safety distance.



4812248835

Warning – Crush of whole body conveyor

Maintain a safe distance from the crush zone.



4812248836

Warning – Crush of whole body conveyor

Maintain a safe distance from the crush zone.



4812248469

Warning – Crawler

Maintain a safe distance from the crush zone.



4812248472

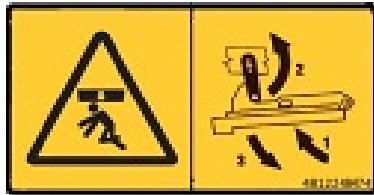
Warning – Crush of whole body

Maintain a safe distance from the crush zone.

4812248474

Warning – Crush of whole body

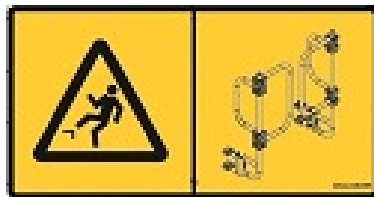
Maintain a safe distance from the crush zone.



4812248495

Caution – Close the guard

Maintain a safe distance from the crush zone.



4812248494

Caution – Do not climb

Do not climb when the vehicle is moving.



4812248466

Caution – Do not step

Do not step decal. Maintain a safe distance from the danger zone.



4812017008

Warning – Engine ECU protection

Do not disconnect battery switch before 100 seconds after stopping the machine.



Machine description

Info labels

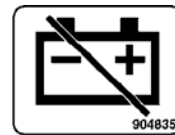
Handbook compartment



Battery voltage



Master switch



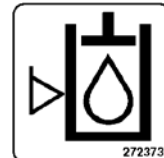
Diesel fuel



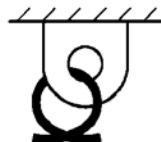
Water



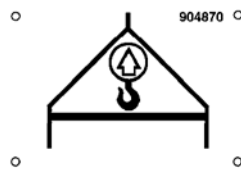
Hydraulic fluid level



Fixing point



Lifting plate



Lift point



Hearing protection



Milling depth



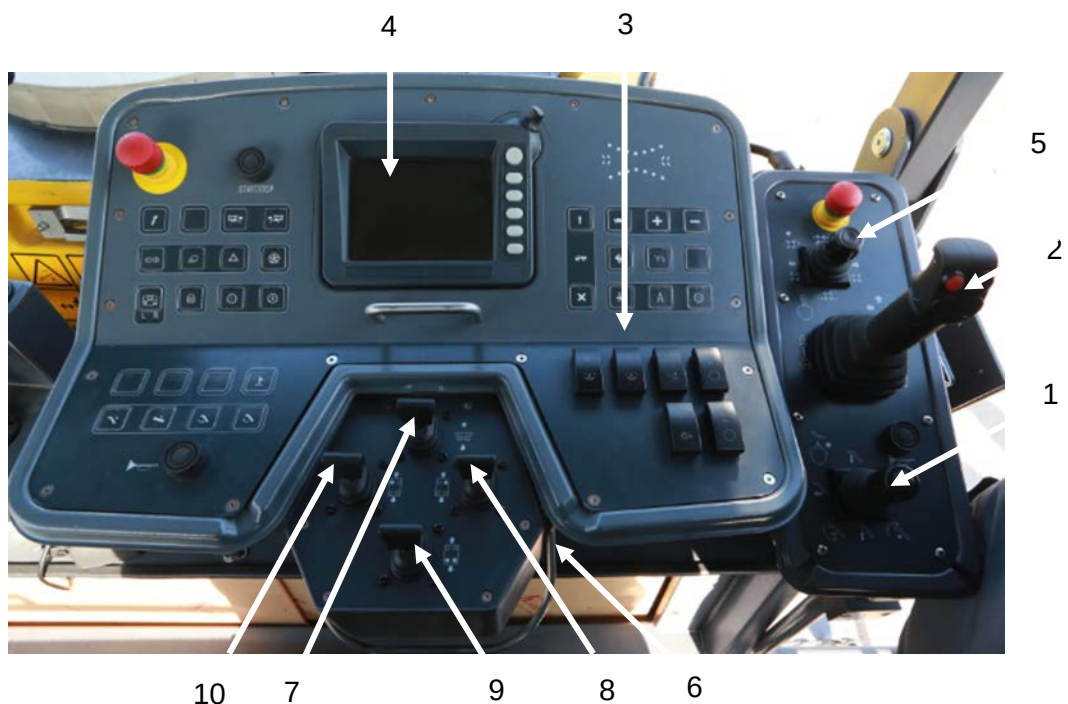
Coolant



Sound effect level



Instruments/Controls Control panel



The second optional control system (including control panel and control box) is a mirror of the first control system. It means the position of all the buttons, levers and switches are mirrored.

In this case, only commands from the activated control panel are carried out.

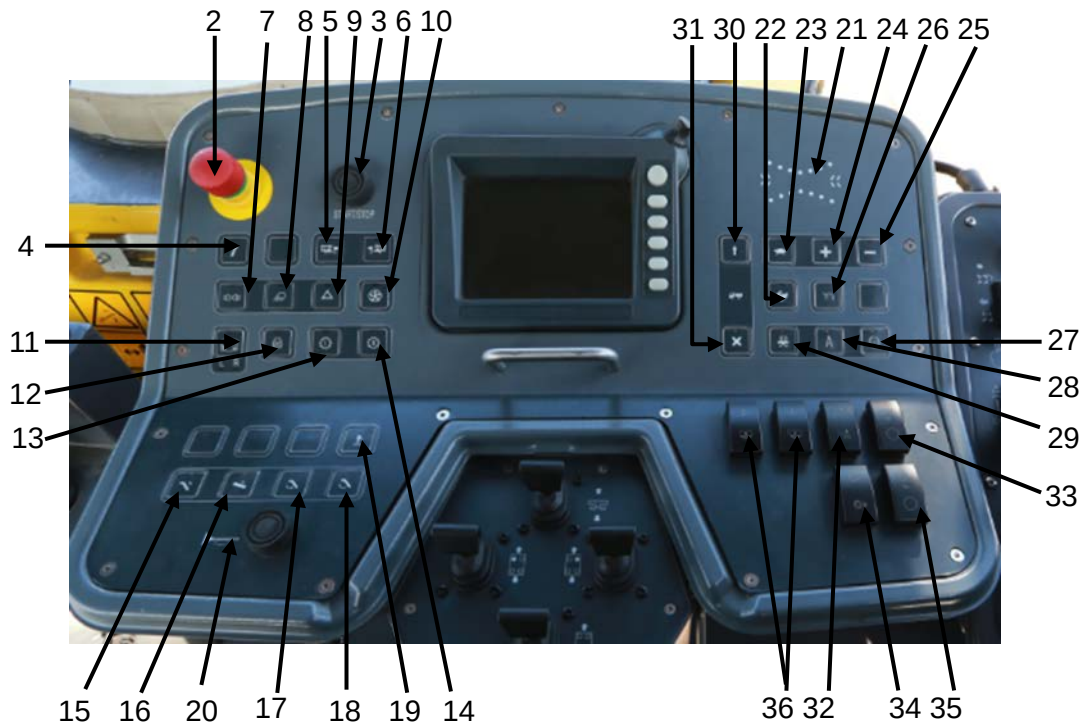
If overlaps occur, functions such as travel drive, steering, forwards travel and discharge conveyor control are deactivated for safety reason. (Error message on display).

Machine description

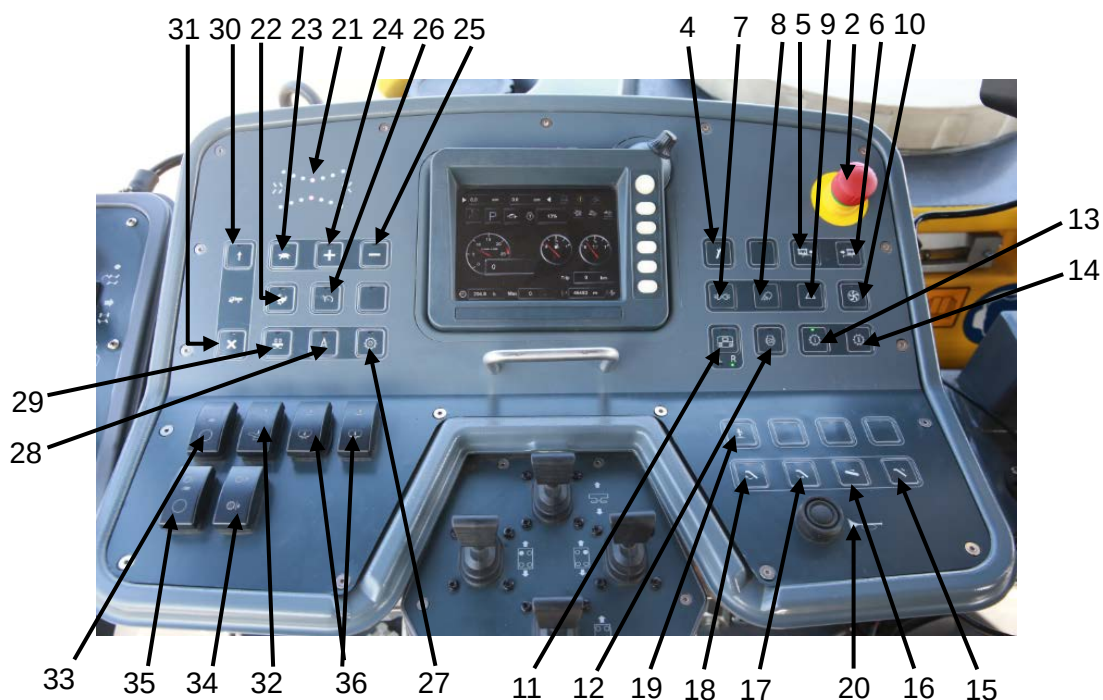
Pos.	Designation	Short description
1	Control lever discharge conveyor	Controls the following functions of the discharge conveyor „Swivel“, „Raise“, „Lower“. It also provides infinitely variable control for the conveyor speed.
2	Control lever for travel drive	Is used after system is unlocked for the purposes of driving, steering and braking. In conjunction with the appropriate activated automatic function, when the lever is swiveled out, the leveling unit, water spray and cooling system and the appropriate loading belt is activated or de-activated in neutral position.
3	Switching table	Consists of an appropriately labeled keypad with pre-defined push buttons for all work and inspection functions. The operating status of the main functions is displayed by means of LEDs. The system also includes: <ul style="list-style-type: none"> - ignition lock - rotary switch for work lighting and warning lamps - EMERGENCY STOP impact switch
4	Display indicator	Used in conjunction with the menu bar to display actual statuses, changes in setting values and to provide information about malfunctions
5	Steer mode selector	Steering mode is controlled by the dual-axis control lever. <ul style="list-style-type: none"> - Push the control lever forward, the front drive units are swiveled to the straight-forward position. - Pull it backward, the rear drive units are swiveled to the straight-forward position. - Turn it to the left, the rear drive units are swiveled to the right and the planer turns to the left. - Turn it to the right, the rear drive units are swiveled to the left and the planer turns to the right.

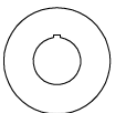
Pos.	Designation	Short description
6	Securing handle	<p>To release and secure the operating panel when moving the operating panel beyond the outer edge of the machine.</p> <p> The operating panel can only be adjusted if the machine is stationary.</p>
7	Raising/lowering the vehicle	While the joystick is being pulled upward/downward, all four strut tower cylinders are extended/retracted and the vehicle is raised/lowered continuously until they reach their upper/lower limit position.
8	Raising/lowering front right side of vehicle	While the joystick is being pulled upward/downward, the front right strut tower cylinder is extended/retracted and the body of vehicle is raised/lowered continuously until it reaches its upper/lower limit position.
9	Raising/lowering rear of vehicle	While the joystick is being pulled upward/downward, the rear strut towers are extended/retracted and the rear of the vehicle is raised/lowered continuously until they/it reaches its upper/lower limit position.
10	Raising/lowering front left side of vehicle	While the joystick is being pulled upward/downward, the front left strut tower is extended/retracted and the body of vehicle is raised/lowered continuously until it reaches its upper/lower limit position.

Switch panel Main console – right



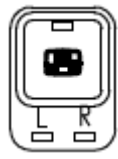
Main console – Left



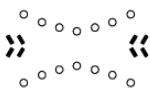
Pos.	Designation	Symbol	Short description
1	Ignition lock		Insert the key and turn it to the right, the vehicle is supplied with power. When resetting, the vehicle is powered off and the engine stop working.
2	Emergency stop		<p>Press in emergencies (people in danger, risk of collision etc.)!</p> <ul style="list-style-type: none"> - The engine, drive units and steering are disengaged whenever the EMERGENCY STOP button is pressed. <p>No movement, e.g. of the lower conveyor, is then possible! Risk of accident!</p> <ul style="list-style-type: none"> - Seven emergency stops are located on the left/right console, ergo box and four remote control boxes respectively. Any of it being pressed shall be indicated in the display. - To restart the engine, all EMERGENCY STOP buttons must be in the upright position.

Machine description

3	Engine start/stop engine		<p>Start engine by pressing the switch when the ignition lock is switched on (Safety condition is required, refer to the module description). LED indicates activation.</p> <p>The display will show the reason for unsuccessful start of engine. Press the switch to stop engine when it is in operation.</p>
4	Service mode		<p>At the touch of the button, the system enters into the service mode, LED lights up, exits by pressing it again. The button/mode function is activated only when the engine is started and the planer is in stationary.</p> <p>In service mode:</p> <ul style="list-style-type: none"> - The engine speed can be raised to the rated value directly. - The planer stays in braking mode, and the travelling function is deactivated. - Both of the side boards can stay in any position. <p>The folding function of conveyor is activated.</p>
5	Moving to the left-platform		At the touch of the button, the platform moves to the left, and the indicating light is switched on.
6	Moving to the right-platform		At the touch of the button, the platform moves to the right, and the indicating light is switched on.
7	Driving light		For switching on the driving lighting (driving light, rear lights, control panel lighting and width lamp).
8	Working light		<p>For switching on the working lighting (working lights, rear lights, control panel light).</p> <p>The activated function is confirmed by LED.</p>
9	Warning lights switch		<p>For switching on the warning lights (hazard warning flashers).</p> <p>The activated function is confirmed by LED.</p>

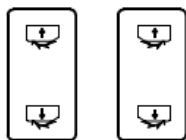
10	Dust extraction		For actuating the function of dust extraction. LED indicates activation.
11	Console selector		The switch is located on the left and right console respectively. When pressed, the LED lights up, and the corresponding console enters into controlling mode, all switches in it are available, while the others are unavailable. The LED lighted below indicates which console is activated. And only one can be worked at a time.
12	ECO mode		At the touch of the button, the planer enters into ECO mode, and LED lights on. Exit and enter into normal mode by pressing it again. The activation of this mode will be indicated in the display. The engine speed can be set in the display in ECO mode. The engine speed will be reached to set value in ECO mode instead of rated value in normal mode by pushing the joystick.
13	Milling drum speed set 1		The speed is set at a value that is equals to or greater than 1400rpm by pressing the button, meanwhile the indicating light is switched on. The speed can be set in the display or by the manufacture when leaving factory.
14	Milling drum speed set 2		The speed is set at a value that is equals to or greater than 1400rpm by pressing the button, meanwhile the indicating light is switched on. The speed can be set in the display or by the manufacture when leaving factory.
15	Reversing mode discharger conveyor		At the touch of the button, the direction of the discharge conveyor is switched over to the reversing mode, And it stops when released. The engaged function is confirmed by LED. This button function is available only when the conveyor is stopped. The reversing speed is 40% of the

Machine description

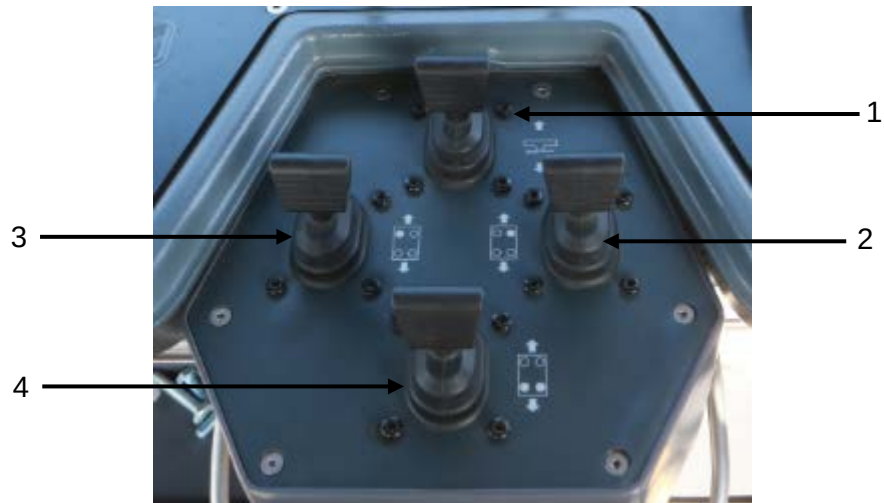
			Max. speed of conveyor.
16	Reversing mode lower conveyor switch		<p>At the touch of the button, the direction of the lower conveyor is switched over to the reversing mode, And it stops when released. The engaged function is confirmed by LED.</p> <p>This button function is available only when the conveyor is stopped.</p> <p>The reversing speed is 40% of the Max. speed of conveyor.</p>
17	Folding conveyor		<p>The switch function can only be activated in service mode.</p> <p>While the button is being pressed, the conveyor continues being folded (there will be a logic to control this in the controller) LED flashes during this process.</p> <p>Release the button to stop folding.</p> <p>The horn works every two second to remind remaining people.</p>
18	Unfolding conveyor		<p>The switch function can only be activated in service mode.</p> <p>While the button is being pressed, the conveyor continues being unfolded (there will be a logic to control this in the controller) LED flashes during this process.</p> <p>Release the button to stop unfolding.</p> <p>The horn works every two second to remind remaining people.</p>
19	Water pump switch		<p>For switching on the water pump.</p> <p>LED indicates activation.</p>
20	Horn		<p>For switching on the horn.</p>
21	Position diodes		<p>Indicate the present position of the front and rear drive units.</p>
22	Transporting mode-Hare		<p>At the touch of the button, the system enters into transporting mode. The engaged function is confirmed by LED.</p> <p>The milling drum function is deactivated.</p>

23	Working mode Tortoise		At the touch of the button, the system enters into the working mode, and the engaged function is confirmed by LED. The system defaults to working mode (tortoise) when it is powered on.
24	Working speed adjustment(+)		Increase the preselected nominal speed in the working mode, which will be indicated in the display in m/min.
25	Working speed adjustment(1)		Decrease the preselected nominal speed in the working mode, which will be indicated in the display in m/min.
26	Automatic cruise control		At the touch of the button, the current operating speed of milling drum is recorded and the indicating light is activated.
27	Milling drum		At the touch of the button, the milling drum starts working, and stops when it is released. The activated function is confirmed by LED. The milling drum drive can only be engaged at idle speed
28	Automatic mode		At the touch of the button, the system enters into automatic control mode, and the activated function is confirmed by LED. Exit from this mode by pressing again. The conveyor, water pump and leveling system are in auto state in this mode.
29	Set-up button		As an aid for start of milling. When stationary, lowers the machine to the preselected grading depth at the touch of the button. The activated function is confirmed by LED. Press the button again to exit from this mode and stops lowering.
30	Moving forward indication of loader		At the touch of the button, the forward indicating light of loader is switched on.
31	Stop indication of loader		At the touch of the button, the stop indicating light of loader is switched on.

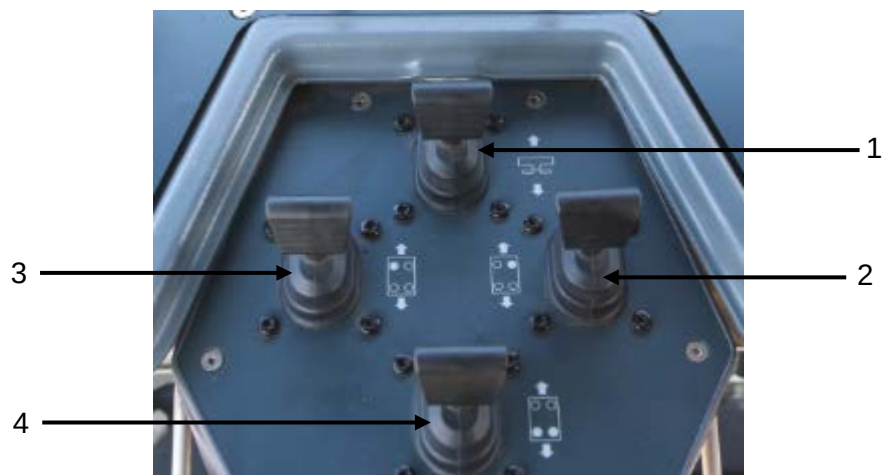
Machine description

32	Raising/lowering the sliding shoe		<p>The lower conveyor is raised/lowered by pressing the upper/lower position of the switch.</p> <p>Activated function is confirmed by LED.</p>
33	Floating switch for sliding shoe		<p>The lower conveyor is in floating state by pressing the upper position of the switch. And it is locked by pressing the lower position.</p> <p>It defaults to locking state when the system is powered on.</p>
34	Raising/lowering scraper blade		<p>While the upper position of the button is being pressed, the scraper blade continues being raised until it reaches to its upper limit position.</p> <p>While the lower position of the button is being pressed, the scraper blade continues being lowered until it reaches to its lower limit position.</p>
35	Floating switch for scraper blade		<p>The scraper blade is in floating position by pressing the upper position of the switch, while it is locked by pressing the lower position.</p> <p>It defaults to locking state when the system is supplied with power.</p>
36	Raising left/right side board		<p>While the button is being pressed, the side board continues being raised until it reaches its upper limit position. The upper LED is activated.</p> <p>The side boards will be lowered automatically to its lowest position by releasing the button and the lower LED is activated.</p> <p>When this function is active, the leveling system is disengaged.</p> <p>The side board can remain in position desired under service mode, in which the automatic lowering function is deactivated. And the lower LED is off.</p>

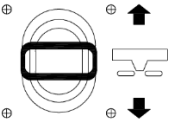
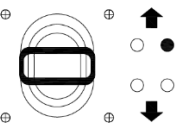
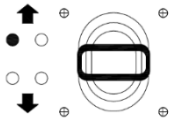
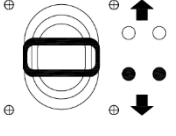
RH – Joystick panel



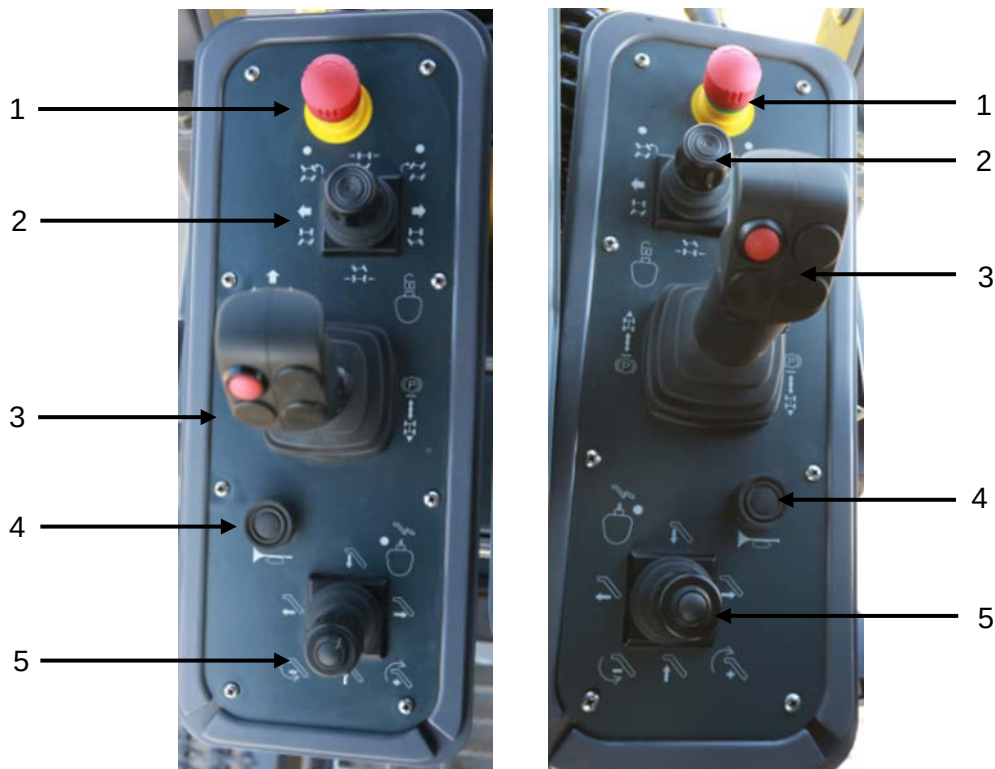
LH – Joystick panel



Machine description

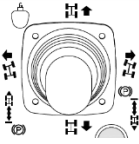
1	Raising/lowering the vehicle		While the joystick is being pulled upward/downward, all four strut tower cylinders are extended/retracted and the vehicle is raised/lowered continuously until they reach their upper/lower limit position.
2	Raising/lowering front right side of vehicle		While the joystick is being pulled upward/downward, the front right strut tower cylinder is extended/retracted and the body of vehicle is raised/lowered continuously until it reaches its upper/lower limit position. This function is related to the leveling control system. When the leveling system of planer is in auto mode, operate the joystick, it will be switched to manual mode in which the cylinder is controlled by the operator. When the joystick is released (in the neutral position), it will be automatically shifted to auto mode again.
3	Raising/lowering front left side of vehicle		While the joystick is being pulled upward/downward, the front left strut tower is extended/retracted and the body of vehicle is raised/lowered continuously until it reaches its upper/lower limit position. This function is related to the leveling control system. When the leveling system of planer is in auto mode, operate the joystick, it will be switched to manual mode in which the cylinder is controlled by the operator. When the joystick is released (in the neutral position), it will be automatically shifted to auto mode again.
4	Raising/lowering rear of vehicle		While the joystick is being pulled upward/downward, the rear strut towers are extended/retracted and the rear of the vehicle is raised/lowered continuously until they/it reaches its upper/lower limit position.

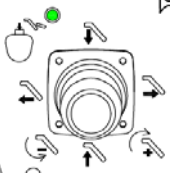
RH / LH – Ergo control



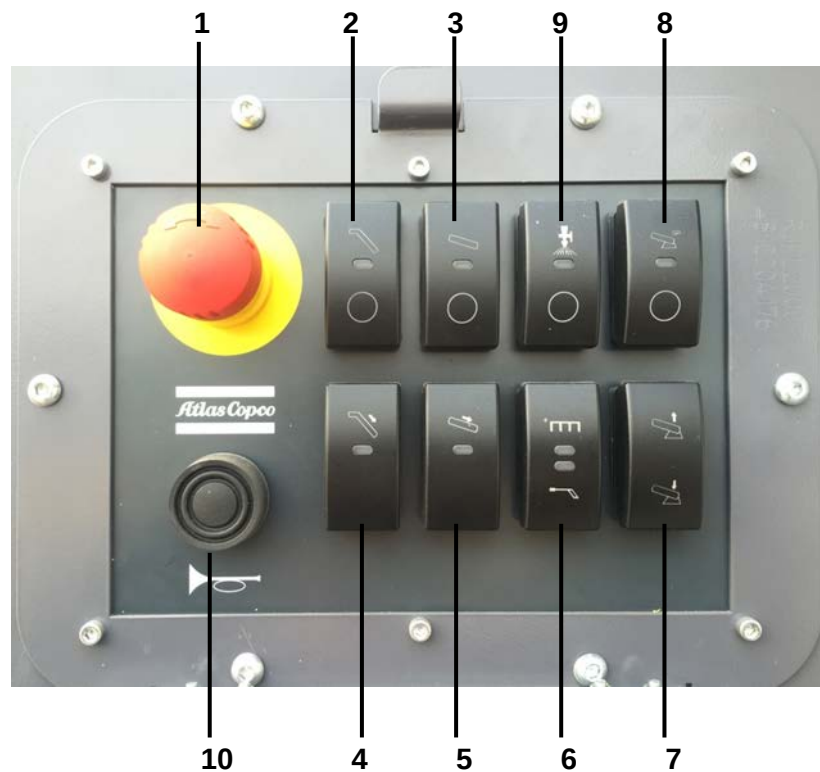
1	Emergency stop		<p>Press in emergencies (people in danger, risk of collision etc.)!</p> <ul style="list-style-type: none"> - The engine, drive units and steering are disengaged whenever the EMERGENCY STOP button is pressed. No movement, e.g. of the lower conveyor, is then possible! Risk of accident! - Seven emergency stops are located on the left/right console, ergo box and four remote control boxes respectively. Any of it being pressed shall be indicated in the display. - To restart the engine, all EMERGENCY STOP buttons must be in the upright position.
2	Control lever for steering		<p>Steering mode is controlled by the dual-axis control lever.</p> <ul style="list-style-type: none"> - Push the control lever forward, the front drive units are swiveled to the straight-forward position.

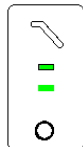
Machine description

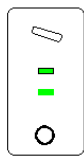
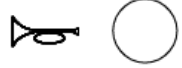
			<ul style="list-style-type: none"> - Pull it backward, the rear drive units are swiveled to the straight-forward position. - Turn it to the left, the rear drive units are swiveled to the right and the planer turns to the left. - Turn it to the right, the rear drive units are swiveled to the left and the planer turns to the right. - Rotate the knob clockwise, the planer is switched to crab steering mode, the steering angle of rear drive will follow the front ones in positive direction. LED on the right is activated. Any movement of control lever will make the planer exit from this mode. - Rotate the knob anticlockwise, the planer is switched to all steering mode, the steering angle of the rear units will follow the front one in negative direction, LED on the left is activated. Any movement of the control lever will make the planer exit from this mode.
3	Control lever for travel drive and steering		<p>The driving and steering direction are controlled by the dual-axis control lever.</p> <ul style="list-style-type: none"> - Turn the control lever to the left, the vehicle is swiveled to the left (the selection of steering mode is required, and it defaults to front drive units steering. The rear drive units are required to follow in positive and negative directive when it is in crab steering or all steering mode.) - Turn it to the right, the planer is swiveled to the right. - Push it forward, the planer moves forward. - Pull it backward, the planer moves backward. If this function is engaged, the milling drum is deactivated. - The top button is used for electrically locking/unlocking the drive units.
4	Horn		For switching on the horn.

5	Control lever for discharge conveyor		<p>The direction of the discharge conveyor is controlled by the dual-axis control lever.</p> <ul style="list-style-type: none"> - Turn the control lever to the left, the discharge conveyor is swiveled to the left. - Turn it to the right, the conveyor is swiveled to the right. - Push it forward, the conveyor is lowered. - Pull it backward, the conveyor is raised. - Rotate the knob clockwise, the speed of discharge conveyor is increased. - Rotate the knob anticlockwise, the speed is decreased. - Press the button on the control lever, the conveyor starts to work.
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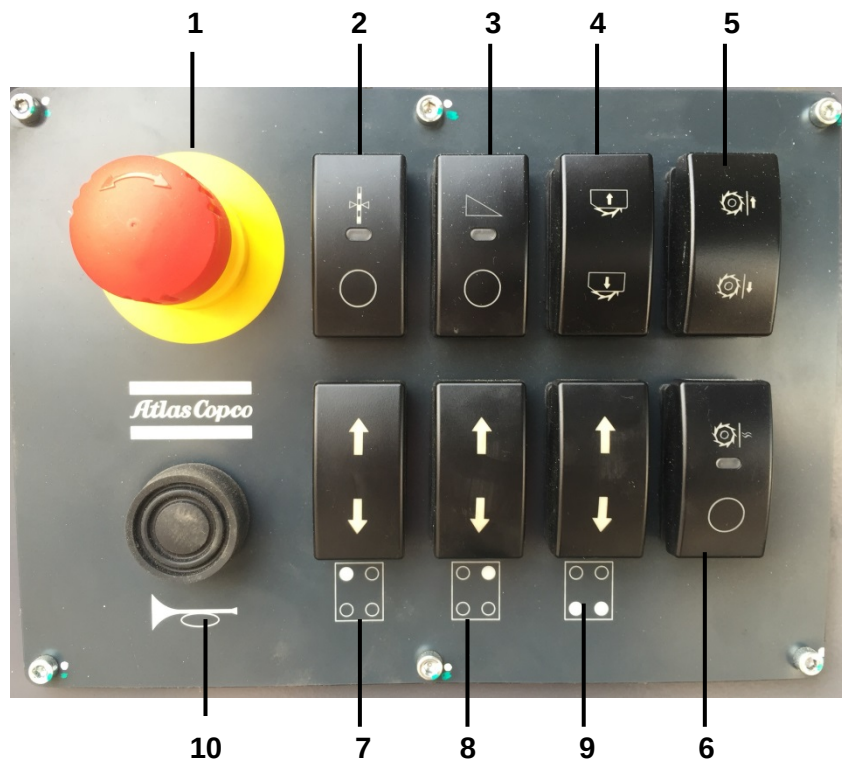
Front remote control

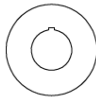
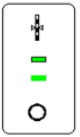


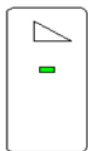
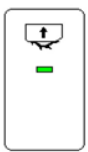
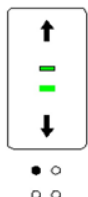
1	Emergency stop		<p>Press in emergencies (people in danger, risk of collision etc.)!</p> <ul style="list-style-type: none"> - The engine, drive units and steering are disengaged whenever the EMERGENCY STOP button is pressed. <p>No movement, e.g. of the lower conveyor, is then possible! Risk of accident!</p> <ul style="list-style-type: none"> - Seven emergency stops are located on the left/right console, ergo box and four remote control boxes respectively. Any of it being pressed shall be indicated in the display. - To restart the engine, all EMERGENCY STOP buttons must be in the upright position.
2	Discharge conveyor		<p>For actuating the discharge conveyor.</p>

3	Lower conveyor		For actuating the lower conveyor.
4	Reversing mode-discharge conveyor		At the touch of the button, the direction of the discharge conveyor is switched over to the reversing mode, And it stops when released. The engaged function is confirmed by LED. This button function is available only when the conveyor is stopped. The reversing speed is 40% of the Max. speed of conveyor.
5	Reversing mode-lower conveyor		At the touch of the button, the direction of the lower conveyor is switched over to the reversing mode, And it stops when released. The engaged function is confirmed by LED. This button function is available only when the conveyor is stopped. The reversing speed is 40% of the Max. speed of conveyor.
6	Water system		The function of water sprinkling or high pressure cleaner is activated by holding down the upper/lower position of switch. The engaged function is confirmed by LED.
7	Raising/lowering sliding shoe		The lower conveyor is raised/lowered by pressing the upper/lower position of the switch. Activated function is confirmed by LED.
8	Floating switch for sliding shoe		The lower conveyor is in floating state by pressing the upper position of the switch. And it is locked by pressing the lower position. It defaults to locking state when the system is powered on.
9	Water pump		For switching on the water pump.
10	Horn		For switching on the horn.

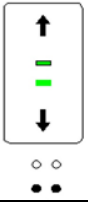
Rear remote control



1	Emergency stop		<p>Press in emergencies (people in danger, risk of collision etc)!</p> <ul style="list-style-type: none"> - The engine, drive units and steering are disengaged whenever the EMERGENCY STOP button is pressed. <p>No movement, e.g. of the lower conveyor, is then possible! Risk of accident!</p> <ul style="list-style-type: none"> - Seven emergency stops are located on the left/right console, ergo box and four remote control boxes respectively. Any of it being pressed shall be indicated in the display. - To restart the engine, all EMERGENCY STOP buttons must be in the upright position.
2	Leveling function		<p>Leveling engages automatically by pressing the upper position of switch; And the function is deactivated by holding down the lower position.</p> <p>Activation is confirmed by LED.</p>

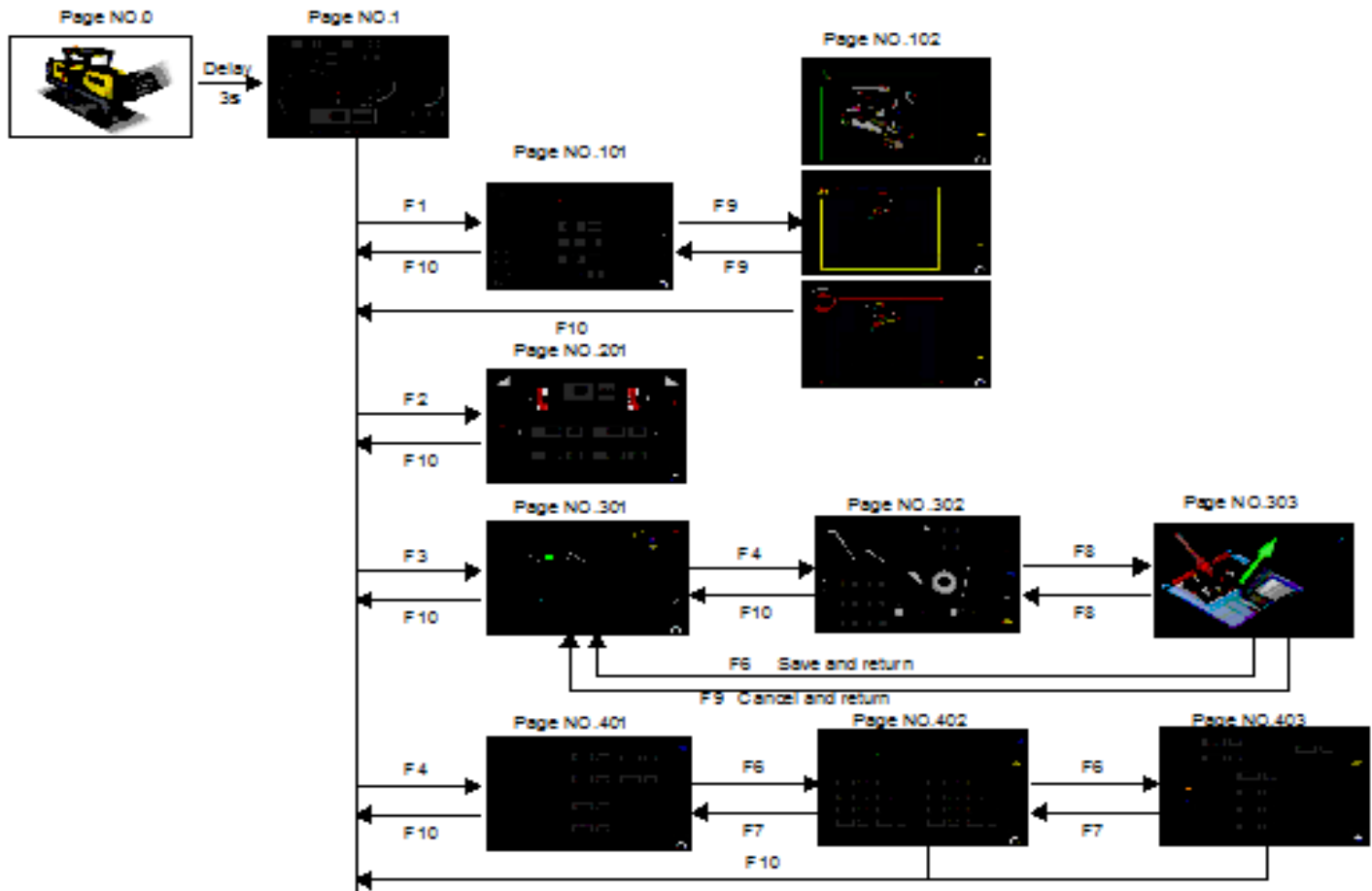
3	Remote control		At the touch of the button, automatic leveling is controlled by the remote control sensor at the corresponding side. Activation is controlled by LED.
4	Raising left side board		While the button is being pressed, the left side board is being raised.
5	Raising/lowering scraper blade		While the upper position of the button is being pressed, the scraper blade continues being raised until it reaches to its upper limit position. While the lower position of the button is being pressed, the scraper blade continues being lowered until it reaches to its lower limit position.
6	Floating switch for scraper blade		The scraper blade is in floating position by pressing the upper position of the switch, while it is locked by pressing the lower position. It is defaults to locking state when the system is supplied with power.
7	Raising/lowering front left side of vehicle		While the joystick is being pulled upward/downward, the front left strut tower is extended/retracted and the body of vehicle is raised/lowered continuously until it reaches its upper/lower limit position. This function is related to the leveling control system. When the leveling system of planer is in auto mode, operate the joystick, it will be switched to manual mode in which the cylinder is controlled by the operator. When the joystick is released (in the neutral position), it will be automatically shifted to auto mode again.
8	Raising/lowering front right side of vehicle		While the joystick is being pulled upward/downward, the front right strut tower cylinder is extended/retracted and the body of vehicle is raised/lowered continuously until it reaches its upper/lower limit position. This function is related to the leveling control system. When the leveling system of planer is in auto mode, operate the joystick, it will be switched to manual mode in which the

Machine description

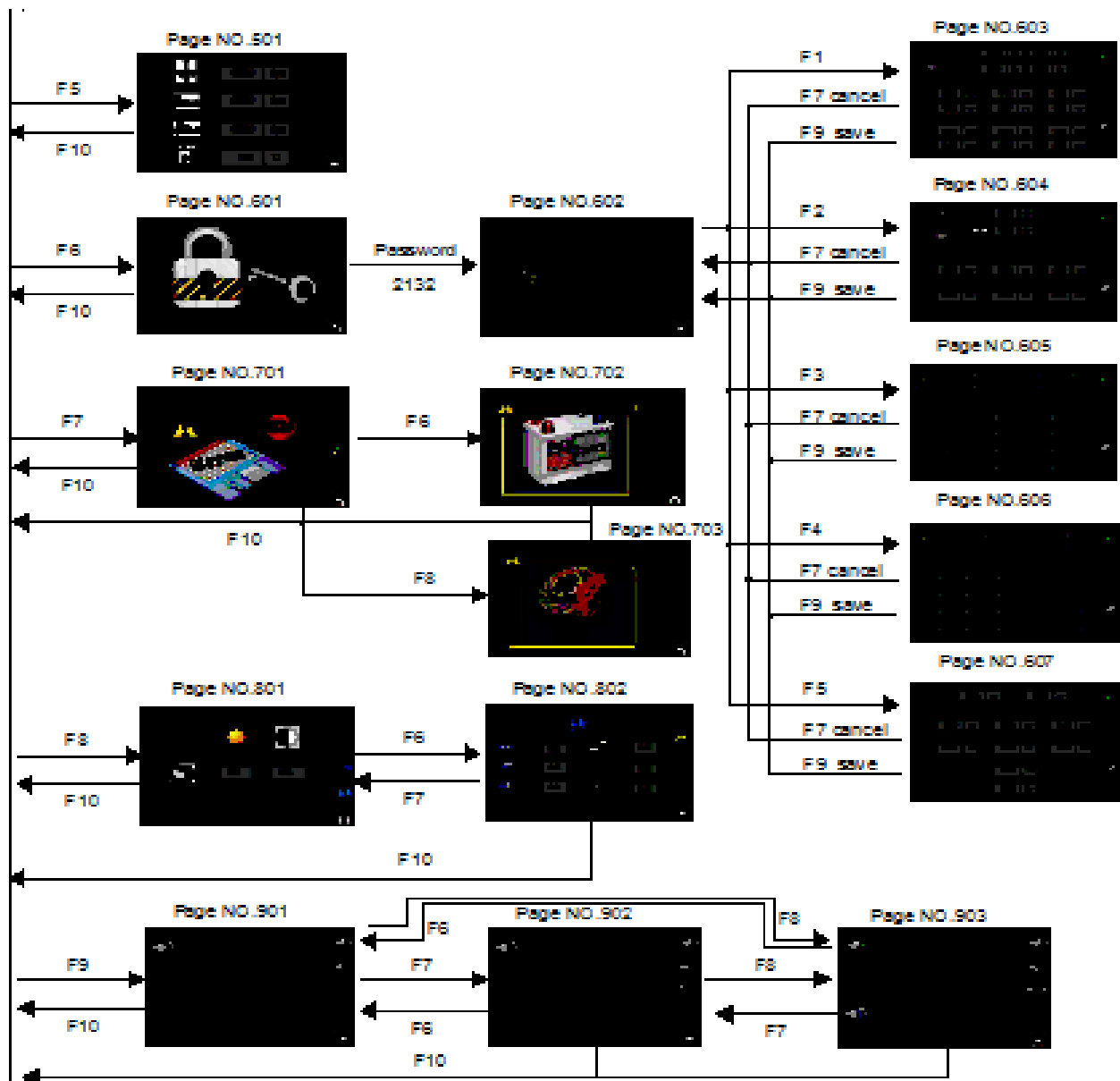
			cylinder is controlled by the operator. When the joystick is released (in the neutral position), it will be automatically shifted to auto mode again.
9	Raising/lowering rear of vehicle		While the joystick is being pulled upward/downward, the rear strut towers are extended/retracted and the rear of the vehicle is raised/lowered continuously until they/it reaches its upper/lower limit position.
10	Horn		For switching on the horn.

Screen structure for setting and display options

The following graphics can be used to clarify the setup of the screen structure and to simplify operation or the procedure to be following during various setting and display operations (see the CAD drawing attached.)



Machine description

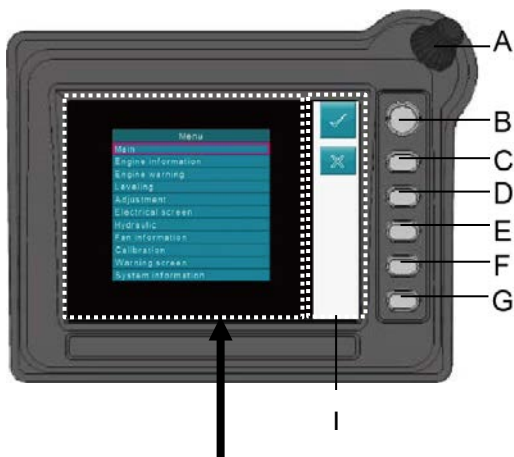


Operation, displays and setting options in the menu



Welcome Screen

The system gets electricity once the key switch is turned on. Welcome screen appears in the display, and then the main screen is showed 3 seconds later , meanwhile, all LEDs on the control table are lighted for 3 seconds, the state of vehicle is indicated normally.



Rotate encoder A to switch different menu screen, the focus change in proper order that is the same as the rotation direction of encoder A. The chosen item from **Action menu "I"** will be highlighted, while the remaining is in dark color. Press button B for entering.

Display: Show the information details of the selected "Action" through **Action Menu** by pressing **button B**

Action menu is including the following items:

- Main
- Engine information
- Engine warning
- Leveling
- Adjustment
- Electrical screen
- Hydraulic
- Fan information
- Calibration
- Warning screen
- System information

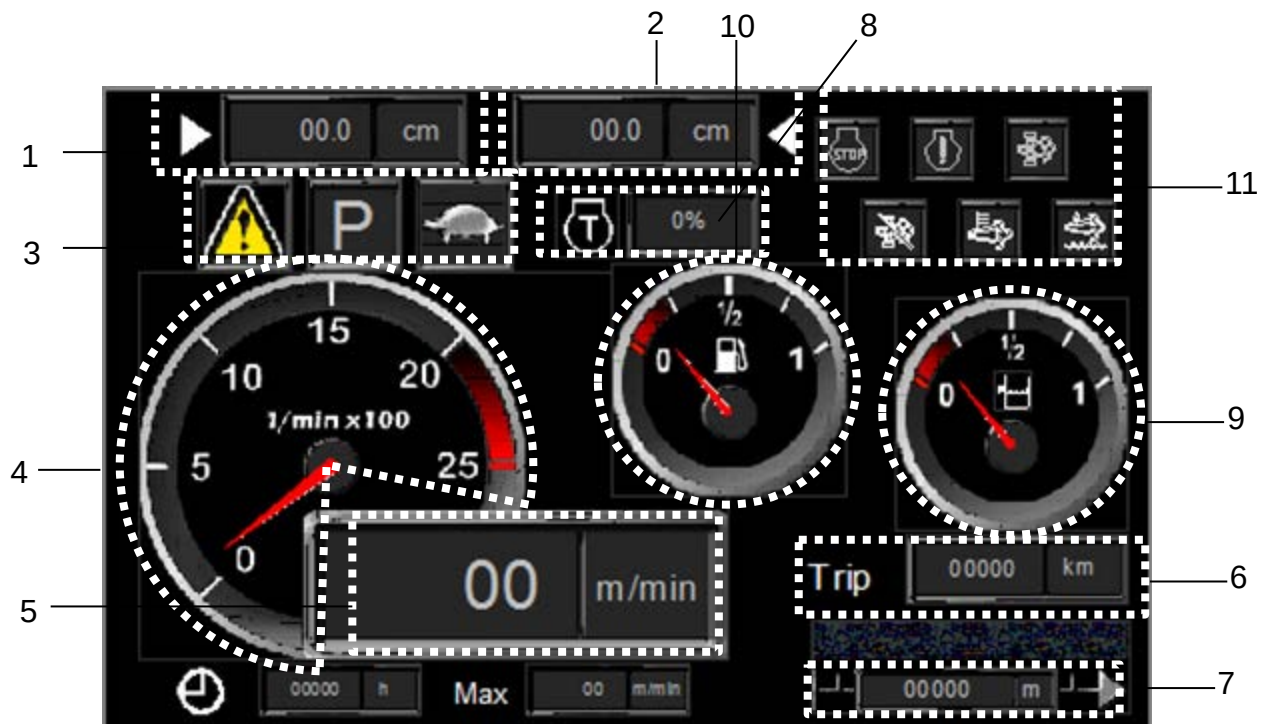
Press button C-G to execute corresponding function that shown from **Action menu**.

Machine description



Main screen - information and warning messages

Following the welcome screen, the system enters into the main screen automatically in three seconds later.



The following main parameters are indicated in the **main screen**:

1. The actual milling depth of the left hand side in cm (inch in British system), resolution ratio of 0.1cm and measuring range of 99.9cm.
2. The actual milling depth of the right hand side in cm (inch in British system), resolution ratio of 0.1cm and measuring range of 99.9cm.
3. The system alarm, driving direction and high/low speed are displayed respectively in three indication box:

1st BOX: Display status: Alarm display  OR Normal display 

2nd BOX: Drive Forward mode  OR Neutral position  OR Reverse

mode 

3rd BOX: Low speed working mode  OR High speed driving mode



4. The engine speed in rpm is shown on the left side of display (instrument graph).
5. The actual driving speed is shown on the right side of tachometer, with the measuring range of 99, and unit of m/min (feet in British system). The maximum setting speed is displayed under the meter of actual travelling speed, with the unit of m/min (feet in British system). During the transport runs, the display shows actual road speed in km/h (mile in British system). The maximum achievable road speed goes out at this time.
6. The total distance travelled by the machine since delivery is indicated at bottom right of the display (the value, with the unit of km, cannot be reset to zero), and the measuring range is 99999, recalculate from 0 when it overflows.
7. The total distance travelled in milling mode is shown below the total mileage (recalculate when it is cleared to zero). Callout the main screen, press button G for more than three seconds and then reset mileage. And it is recorded only when the plan is in low speed working mode (turtle), the milling drum is turned on and the automatic state is valid. The measuring range is 99999, and recalculates from zero after it overflows.
8. The actual torque load of engine is shown in percentage.
9. The level of water tank is indicated by instrument graphics.
10. The level of diesel oil is indicated by instrument graphics.

Machine description

11. Engine alarm display, when an alarm appears the right symbol will light.

Engine fault alarm 

Engine warning alarm 

Engine regeneration 

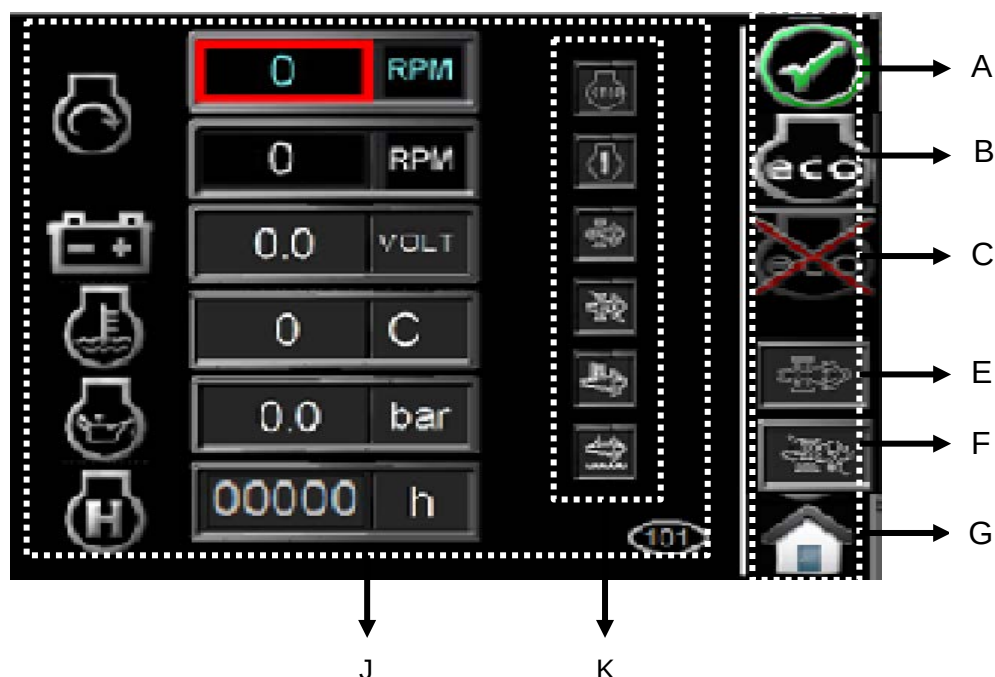
Engine regeneration prohibition 

High post-processing temperature of engine 

Low DEF liquid level of engine 

Engine screen (Page 101)

This screen is used to set the engine speed in ECO mode and indicates whether the machine is in ECO mode or not.



A: Action selection (Button B)



B: Activate ECO (Select through Button C on the display)

The engine speed in ECO mode is increased/decreased by rotating knob A clockwise/anticlockwise. The information is readable through **display page J** (See display page J information in below) The step pitch is 50rpm. Press button B to enter and save, the focus frame turns into green.

The range of engine speed in ECO mode is from 1700rpm to 2200rpm.



C: Deactivate ECO (Select through Button D on the display)

E: Enforce engine regenerate, For T4f engine ONLY (Select through Button E on the display)

F: Forbid engine regenerate, For T4f engine ONLY (Select through Button F on the display)

G: Back to Home Page (Main interface)

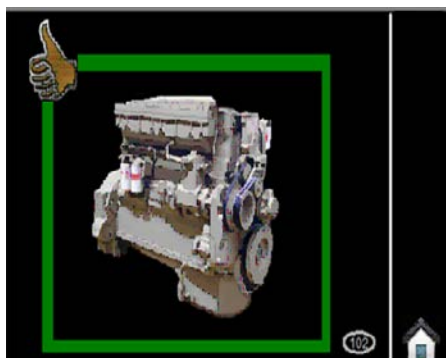
J: Information that appear on the screen, including:

- Real time engine speed (rpm)
- Power voltage (v)
- Water temperature (° C)

Machine description

- Oil pressure (bar)
- Working hours (h)
- The engine's value and parameters displayed in this screen are come from J939.

K: Alarm → Symbol message refer to main screen. Six alarm light signals are displayed in this screen, with the same state as home page.



Engine warning screen (Page 102)

This screen is used for displaying the engine SPN fault code.

This screen has 3 different states:

1st state: Green interface – The display shows “ENGINE OK”, which indicates no fault code.



2nd state: Yellow interface - The display shows “ENGINE WARNING!”, which indicates that the engine goes wrong. The temporary operation function of the machine can be executed. This issue is required to be addressed as soon as possible to prevent further damage.



3rd state: Red interface - The display shows “STOP ENGINE”, which indicates that the malfunction of the guide engine has reached to the extent of automatically shutting down, or stop engine to prevent from further damage.

Fig. Engine warning screen

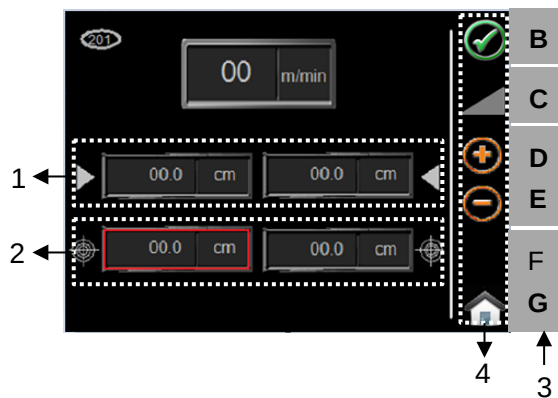
- **SPN+FMI: Fault code**
- **OC: Frequency**

Press button B to see the next fault code.
Press button G to return to the main screen.

The fault conditions can be determined by explanation of a number of alarm codes contained in the alarm information screen

See appendix 1 for specific SPN fault code.

Machine description



Leveling, setting leveling value

The setting value and actual measured value of leveling system are displayed in this screen.

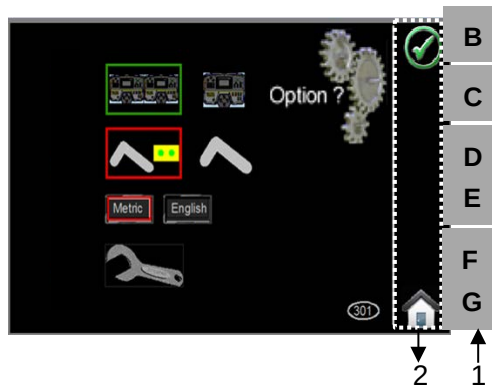
The actual travelling speed of planer displayed at the upper position of the screen.

1.  Indicates actual measured value of leveling system.
2.  Indicates the setting value of leveling system.
3. Button on the display. Select corresponding button for each specific action.
4. Action menu, corresponding button on the display (3) which controls selecting each action.

Press Button B  to change the value from left to right.
 The setting depth of left side is increased by 0.1 cm at each press of button D , and it is decreased by 0.1cm at each press of button E . Press and hold for continuous change.
 Inputting focus (red frame) switches from left to right in turn at each press of button B .

Press button C  to switch remote control mode with the same side of inputting point (in red frame), **gray means turn off**, and **green means activation**. The display of depth is shown in percentage when the remote control mode is activated.

Press button G  to return to the main interface.



Adjustment screen (Page 301)

The number of console (the machine is standard-equipped with two consoles, and only choosing the right side one is available); the adjustment of discharge conveyor (mechanical folding or hydraulic folding); unit of display data (metric or British system) and parameters of conveyor, water pump and other working devices. Red frame indicates the current setting.

1. Button on the display. Select corresponding button for each specific action.
2. Action menu, corresponding button on the display (1) which controls selecting each action.

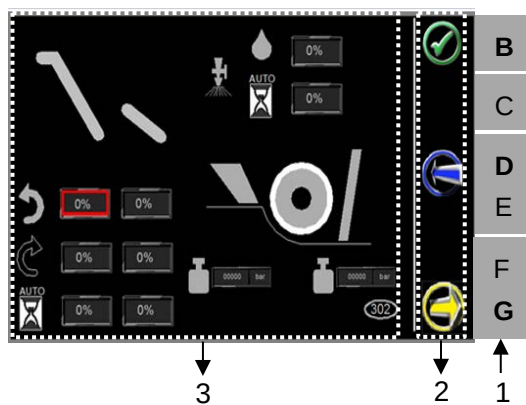
Press button C  to set the number of consoles, rotate knob A (see Knob A location from Welcome screen description) to select single or double one, press B  to enter and save, the focus frame changes from red to green.

Press button D  to set up the fold of conveyor, Rotate knob A to select mechanical or hydraulic mode, press button B  to enter and save and the focus frame change from red to green.

Press button E  to set display unit, rotate knob A to select metric or British system, press button B  to enter and save, the focus frame changes from red to green.

Press button F  to enter into page 302 to set parameter of working devices.

Press button G  to return to the main screen.



(Page 302)

Press button D  to set parameters of working device in page 301. It is required to select parameters needed to be changed first. The red frame indicates the focus point, press button D  to move to the next parameter box.

1. Button on the display. Select corresponding button for each specific action.
2. Action menu, corresponding button on the display (1) which controls selecting each action.

And then rotate knob A (see Knob A location from Welcome screen description) to change the corresponding parameters, the step pitch is 1%.

Press button B  to enter and save, and the focus frame changes from red into green.

The parameters in the conveyor from top to bottom are in the following order:

- forward speed percentage;
- reverse speed percentage;
- delay time percentage of control handle back to neutral position.

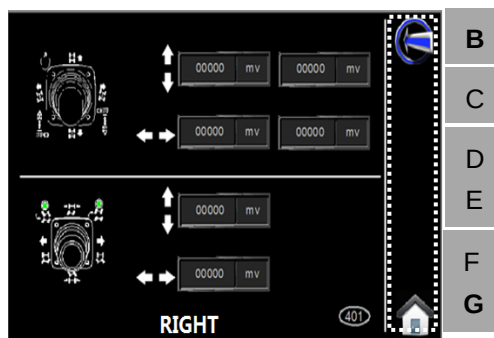
The parameter of water pump:

- water volume control percentage;
- delay time percentage of control handle back to neutral position.

The pressures are of sliding shoe and scraper respectively.

Press button G  to return to page 301.

3. Information screen, show action selection result from the information screen.

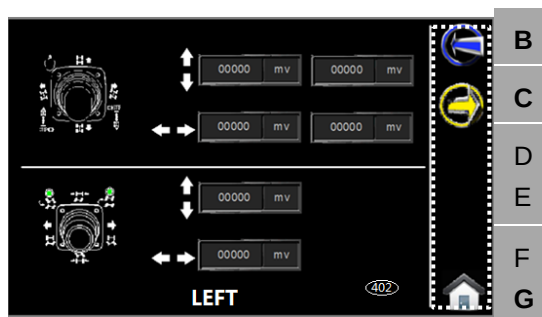


Electrical screen (Page 401)

The upper part of screen displays the double circuit voltage of potentiometer in X-axis and Y-axis of control handle on the right arm control box of the machine.

The lower part of screen displays the potentiometer voltage in X-axis and Y-axis of steering handle of right drive unit on the right control box of the machine.

Press button B  to enter into the next electrical screen in page 401, and press button G  to return to the main screen.



(Page 402)

The left side of this screen displays the dual-circuit voltage of potentiometer of the strut tower lifting lever on the left control box.

The right side of this screen displays the dual-circuit voltage of the strut tower lifting lever on the right control box.

Press button B  to enter into the next electrical screen in page 403, pre button C  to switch back to the previous one and press button G  to return to the main interface.



(Page 403)

The left side of this screen displays the dual-circuit voltage of potentiometer of the strut tower lifting lever on the left control box.

The right side of this screen displays the dual-circuit voltage of the strut tower lifting lever on the right control box.

Press button B  to enter into the next electrical screen in page 403, pre button C  to switch back to the previous one and press button G  to return to the main interface.



(Page 404)

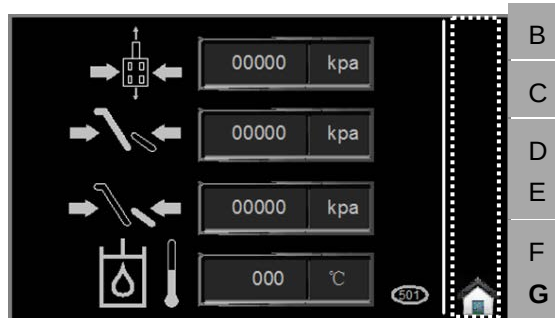
The left upper part of this screen displays voltage of steering angle sensor of rear and front units in sequence.

The right upper part displays rollover prevention horizon sensor signal voltage.

Machine description

This screen displays the speed of four hydraulic motors of the driving system in rpm.

Press button C  to switch back to the previous electrical page and press button G  to return to the main interface.



Hydraulic screen (Page 501)

The signal value of each pressure sensor of the hydraulic system is displayed in sequence in this screen, which is not for changing but for monitoring.

The value is displayed as the following order:

- Pressure of driving system
- Pressure of discharge conveyor
- Lower conveyor pressure.
- Oil temperature of hydraulic system

Press button G  to return to the main interface.

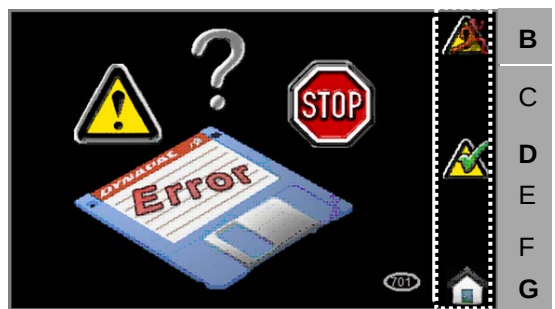


(Page 601)

Input password to enter this screen.

No change in the page if the password is not correct, press button G  to return to the main screen.

Shift into the calibration screen (BODAS Service) if the password is correct.

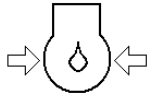
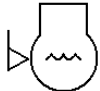
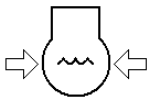


Warning Screen (page 701)

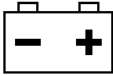
Press button B  to check current fault.

Press button D  to check non-current fault, and press button G  to return to the main screen.

Key to component and status symbols

Warning	Symbol	Action
Oil temperature		Allow engine to heat up at slightly raised idle speed.
Oil pressure		<p>⚠ Switch off engine immediately!</p> <p>Check engine oil level. If necessary, carry out a visual inspection for signs of leakage.</p>
Coolant water level		<p>⚠ Switch off engine immediately!</p> <p>Top up coolant. If necessary, carry out a visual inspection for signs of leakage.</p> <p>⚠ When hot, the system is pressurized!</p> <p>Risk of scalding!</p>
Coolant temperature		<p>⚠ Switch off engine immediately!</p> <p>Check coolant water level.</p> <p>If necessary, carry out a visual inspection for signs of leakage.</p> <p>⚠ When hot, the system is pressurized!</p> <p>Risk of scalding!</p>
Coolant pressure		<p>⚠ Switch off engine immediately!</p> <p>Check coolant water level.</p> <p>If necessary, carry out a visual inspection for signs of leakage.</p> <p>⚠ When hot, the system is pressurized!</p> <p>Risk of scalding!</p>
Air temperature		Check inlet air line
Air pressure		Check air outlet line

Machine description

Designation	Symbol	Action
Engine speed		Reduce engine speed (possible coasting mode)
Engine stop solenoid		Check wiring on stop solenoid. If necessary, call Service.
Fuel temperature		If necessary, top up fuel tank or carry out visual inspection for signs of leakage. Check fuel return line.
Injector nozzles		 Call Service!
Battery (under voltage)		Check generator, drive belts. If necessary, call Service.



Press button B  under page 701 to enter into the current fault warning screen **(page 702)**.

The current system alarm is showed in sequence automatically after entering this interface.

Press button B , the next alarm is displayed automatically, press button G  to return to the main screen.
See appendix for specific warning information.



Press button D  under page 701 to enter into the non-current fault warning screen **(Page 703)**.

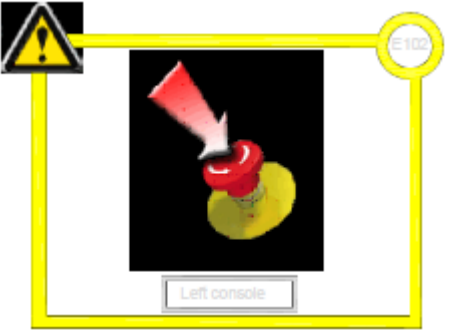
The previously appeared and stored warning information shows in sequence automatically after entering this interface.

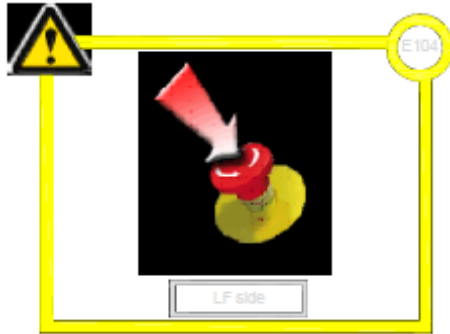
Press button B , the next alarm appears automatically; press button D  to clear all stored warning information.

Press button G  to return to the main screen.

Description of error codes (of page 703), dialog boxes

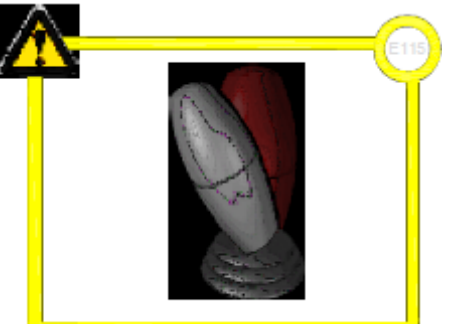
Every fault message has its own error code number. When contacting technical service, specify the error code number and other information from the fault message.

Indication	Error code	Significance
	E101	Right main console E-stop is activated.
	E102	Left main console E-stop is activated.
	E103	Ergo box E-stop is activated.

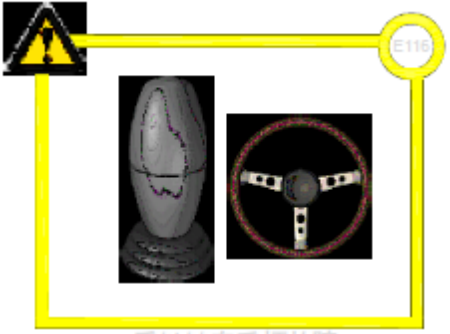
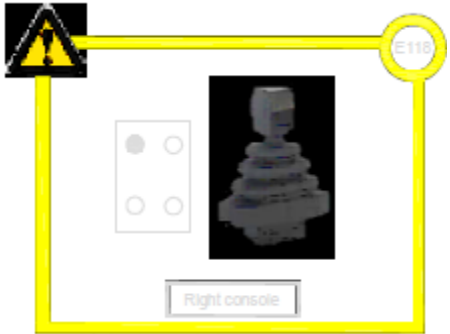
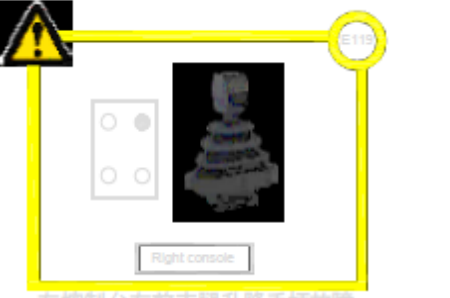
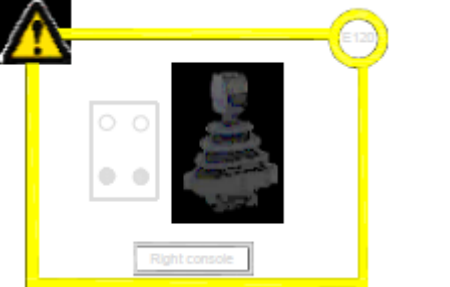
	E104	Left front ground box E-stop is activated.
	E105	Right front ground box E-stop is activated.
	E106	Left rear ground box E-stop is activated.
	E107	Right rear ground box E-stop is activated.

Machine description

 <p>A warning icon (yellow triangle with exclamation mark) is connected by a yellow line to a circular label 'E108'. Below the icon is a photograph of a battery with the word 'LOW' printed on it.</p>	E108	Low voltage.
 <p>A warning icon (yellow triangle with exclamation mark) is connected by a yellow line to a circular label 'E109'. Below the icon is a photograph showing a CAN BUS connection between a main controller and an engine.</p>	E109	CAN connection error between main controller and the engine.
 <p>A warning icon (yellow triangle with exclamation mark) is connected by a yellow line to a circular label 'E110'. Below the icon is a photograph showing a CAN BUS connection between a main controller and a console.</p>	E110	CAN connection error between main controller and the consoles.
 <p>A warning icon (yellow triangle with exclamation mark) is connected by a yellow line to a circular label 'E111'. Below the icon is a photograph showing a CAN BUS connection between a main controller and a display.</p>	E111	CAN connection error between the main controller and the display.

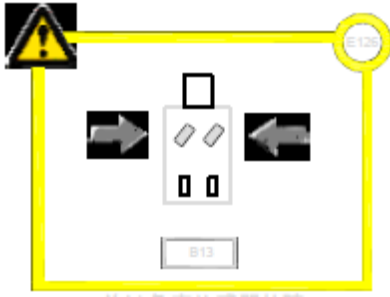
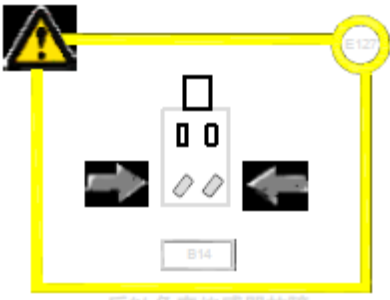
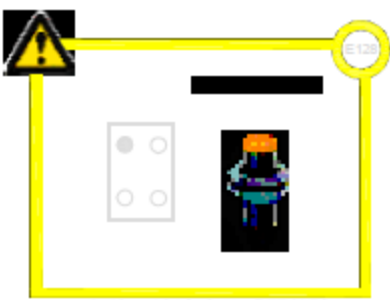
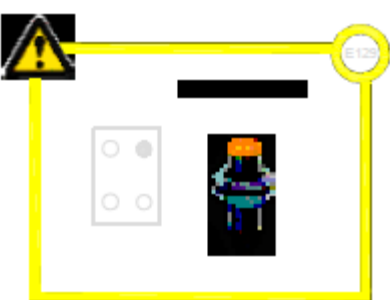
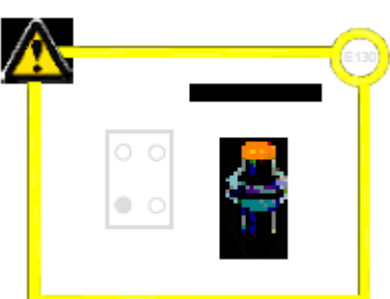
	E112	CAN connection error between A3 and A4.
	E113	CAN connection error between A3 and A8.
	E114	Leveling system error
	E115	Propelling joystick error

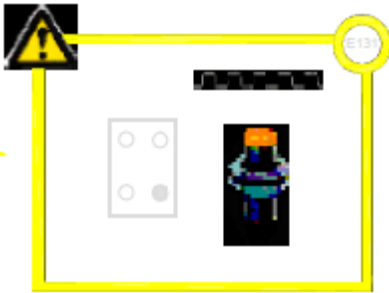
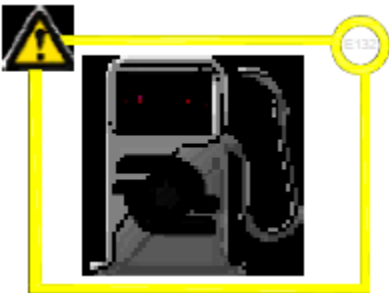
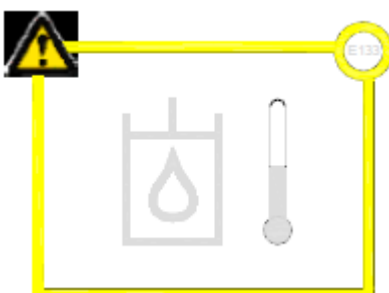
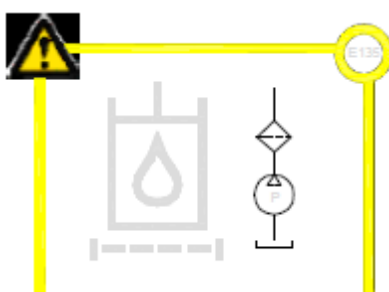
Machine description

	E116	Rear steering joystick error
	E117	Four strut towers joystick error- Right side
	E118	Left front strut tower joystick error- Right side
	E119	Right front strut tower joystick error- Right side
	E120	Rear strut towers joystick error- Right side

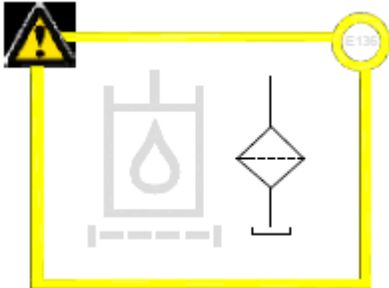
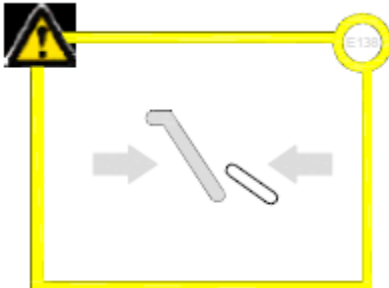
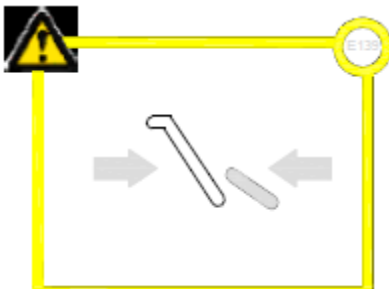
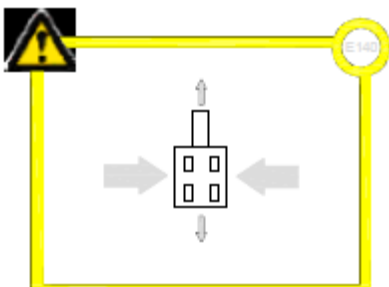
	E121	Four strut towers joystick error- Left side
	E122	Left front strut tower joystick error- Left side
	E123	Right front strut tower joystick error- Left side
	E124	Rear strut towers joystick error- Left side
	E125	Slop sensor error

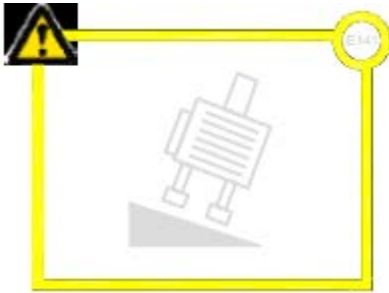
Machine description

	E126	Front steering sensor error
	E127	Rear steering sensor error
	E128	Left front motor speed sensor error
	E129	Right front motor speed sensor error
	E130	Left rear motor speed sensor error

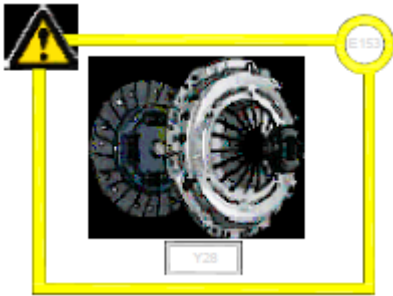
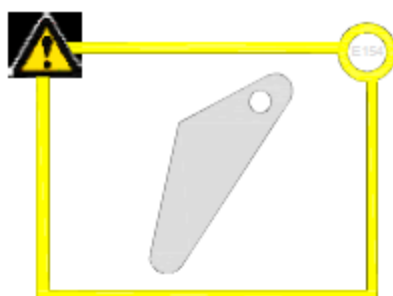
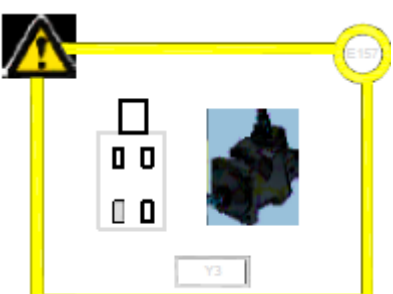
	E131	Right rear motor speed sensor error
	E132	Fuel level sensor error
	E133	Hydraulic oil temperature high
	E134	Hydraulic oil level low
	E135	High pressures hydraulic oil filter block

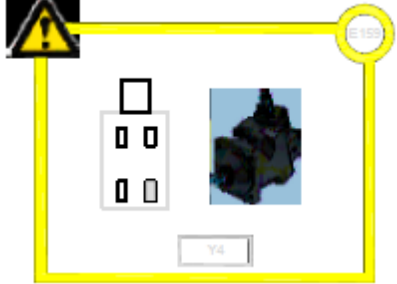
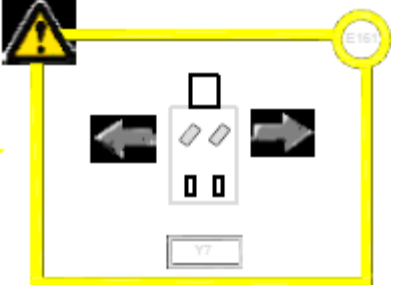
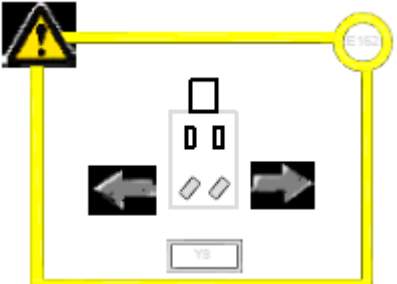
Machine description

	E136	Low pressures hydraulic oil filter block
	E137	Water level low
	E138	Discharge conveyor pressures high (Option)
	E139	Lower conveyor pressure high (Option)
	E140	Propelling system pressure high

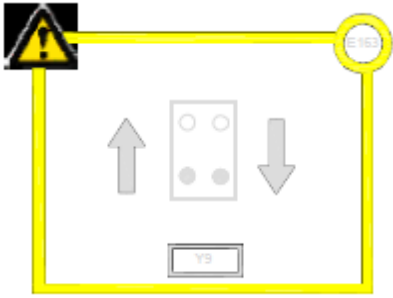
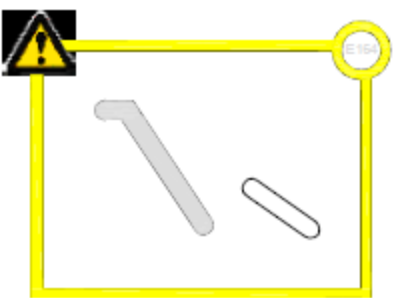
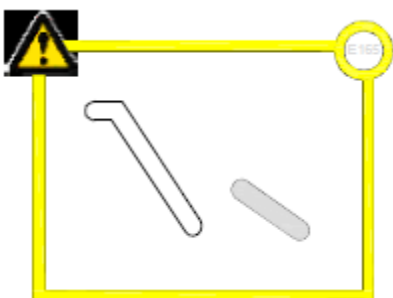
	E141	Tilt too much
	E149	Calibration values error
	E150	A3 controller error
	E151	A4 controller error
	E152	A8 controller error

Machine description

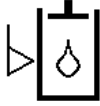
	E153	Milling drum clutch error
	E154	Milling drum belt tension error
	E155	Parking valve error
	E156	Propelling pump error
	E157	Left rear motor error

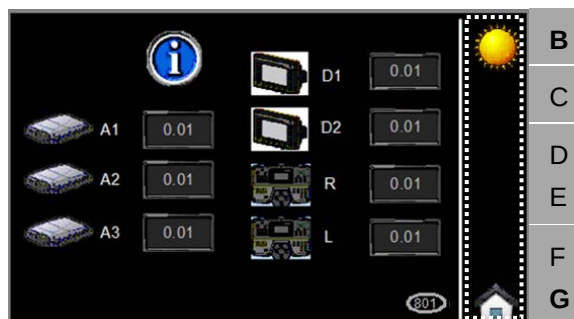
 <p>左前支腿行走马达故障</p>	E158	Left front motor erro
	E159	Right rear motor error
	E160	Right front motor error
	E161	Front steering valve error
	E162	Rear steering valve error

Machine description

	E163	Rear strut tower valve error
	E164	Discharge conveyor error
	E165	Lower conveyor error

Key to component and status symbols

Designation	Symbol	Action
Hydraulic oil temperature		Allow the hydraulic oil to cool down. Check the hydraulic oil level. Check radiator for signs of contamination.
Hydraulic oil level		Top up hydraulic oil. If necessary, carry out a visual inspection for signs of leakage.
Hydraulic filter (pressure filter)	 	Replacing filter elements
Hydraulic filter (return flow filter)	 	Replacing filter element



Display set-up and system information screen (Page 801)

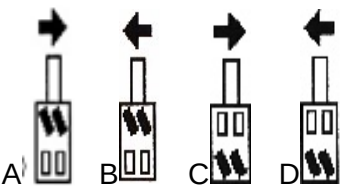
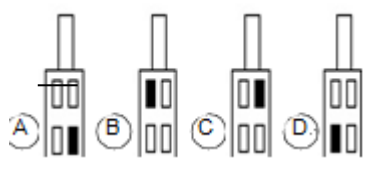
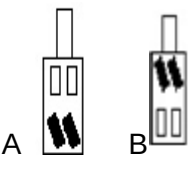
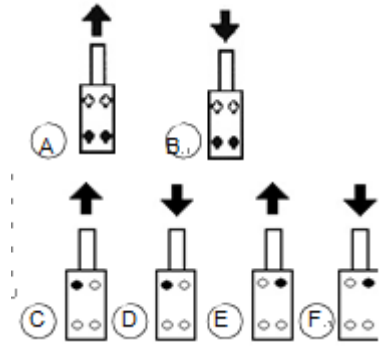
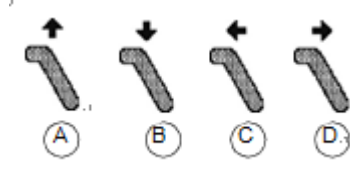
This screen indicates the version number of the three controllers, two displays and left and right consoles in the electrical system.

Press button B  to set brightness and contrast of display (D13 system graphics is applied).

Press button G  to return to the main screen.

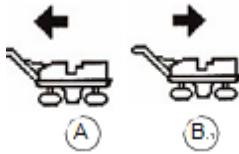
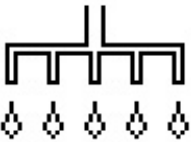
Machine description

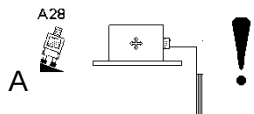
Key to function and component symbols

Meaning	Display mode
<ul style="list-style-type: none"> - A: Front traction units, right steering movement - B: Front traction units, left steering movement - C: Rear traction units, right steering movement - D: Rear traction units, left steering movement 	
<ul style="list-style-type: none"> - A: Traction unit / rear right travel drive - B: Traction unit / front left travel drive - C: Traction unit / front right travel drive - D: Traction unit / rear left travel drive 	
<ul style="list-style-type: none"> - A: Rear drive unit steering angle recording - B: Front drive unit steering angle recording 	
<ul style="list-style-type: none"> - A: Raising rear traction units - B: Lowering rear traction units - C: Raising front left traction unit - D: Lowering front left traction unit - E: Raising front right traction unit - F: Lowering front right traction unit 	
<ul style="list-style-type: none"> - A: Raising discharge conveyor - B: Lowering discharge conveyor - C: Swivel discharge conveyor to left - D: Swivel discharge conveyor to right 	
Hydraulically folding discharge conveyor (O) <ul style="list-style-type: none"> - A: Belt tensioner - B: Locking mechanism - C: Folding-in function - D: Folding-out function 	

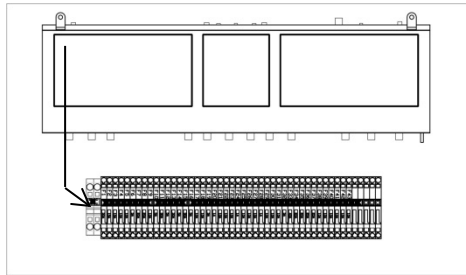
Meaning	Display
<ul style="list-style-type: none"> - A: Forwards drive for discharge conveyor - B: Reverse drive for discharge conveyor - C: Forwards drive for lower conveyor - D: Reverse drive for lower conveyor 	
<ul style="list-style-type: none"> - A: Raising left side board - B: Lowering right side board 	
<ul style="list-style-type: none"> - A: Raising sliding shoe - B: Lowering sliding shoe - C: Applying load to sliding shoes - D: Sliding shoe floating position - E: Sliding shoe stop valve 	
<ul style="list-style-type: none"> - A: Raising scraper blade - B: Lowering scraper blade - C: Applying load to scraper blade - D: Scraper blade floating position - E: Scraper blade stop valve 	
<ul style="list-style-type: none"> - A: Travel drive, right-hand operating panel - drive axle - B: Travel drive, right-hand operating panel - steering axle - C: Travel drive, left-hand operating panel - drive axle - D: Travel drive, left-hand operating panel - steering axle 	
<ul style="list-style-type: none"> - A: Control lever for discharge conveyor, right-hand operating panel: Swivel discharge conveyor - B: Control lever for discharge conveyor, right-hand operating panel: Raise/lower discharge conveyor - A: Control lever for discharge conveyor, left-hand operating panel: Swivel discharge conveyor - B: Control lever for discharge conveyor, left-hand operating panel: Raise/lower discharge conveyor 	

Machine description

Meaning	Symbol
<ul style="list-style-type: none"> - A: Travel drive, forwards - B: Travel drive, reverse 	
<ul style="list-style-type: none"> - A: Travel drive brake function 	 A
<ul style="list-style-type: none"> - A: Starter relay 	 A
<ul style="list-style-type: none"> - A: Engine-stop-relay 	 A
<ul style="list-style-type: none"> - A: High-pressure cleaner 	 A
<ul style="list-style-type: none"> - A: Spraying system high-pressure pump proportioning valve 	 A
<ul style="list-style-type: none"> - A: Fuel pump 	 A
<ul style="list-style-type: none"> - A: Spray valve 	 A

<ul style="list-style-type: none"> - A: Clutch for milling drum drive 	 <p>A</p>
<ul style="list-style-type: none"> - A: Belt tensioner 	 <p>A</p>
<ul style="list-style-type: none"> - A: Tilt sensor - Tilt outside range or measurements or - Sensor defective 	 <p>A</p>

Machine description



Electrical system

Fuses, machine

The figure shows the different positions of the fuses. The table below gives the amperage and function of the fuses. All fuses are flat pin fuses.

Fuses boxes

FB1	Intake Air Heater Fuse=150A	Fuse box
FB2	Charging Fuse=100A	Fuse box
FB3	Main Fuse=100A	Fuse box
FB4	Electrical motor=60A	Fuse box
F1	Engine ECM Fuse=30A	Junction Box
F2	DEF Supply Heater Fuse=15A	Junction Box
F3	Line Heater Fuse=15A	Junction Box
F4	E-stop to relay=10A	Junction Box
F5	Engine Diagnost Plug Fuse=10A	Junction Box
F6	E-stop to controller=3A	Junction Box
F7	Right console=20A	Junction Box
F8	Left console=20A	Junction Box
F9	Roof switch=10A	Junction Box
F10	A3 controller power1=5A	Junction Box
F11	A3 controller power2=30A	Junction Box
F12	A4 controller power1=5A	Junction Box
F13	A4 controller power2=30A	Junction Box
F14	A8 controller power1=5A	Junction Box
F15	A8 controller power2=30A	Junction Box
F16	Engine ECN key switch =5A	Junction Box
F17	After treatment=20A	Junction Box
F18	Slop CAN sensor=10A	Junction Box
F19	Travel motor sensors=3A	Junction Box
F20	A3 controller enable=1A	Junction Box
F21	Left rear control panel=10A	Junction Box
F22	Scraper switch=1A	Junction Box
F23	Right rear control panel=10A	Junction Box
F24	A4 controller enable=1A	Junction Box
F25	Horn relay=10A	Junction Box
F26	Left front control panel=10A	Junction Box
F27	Right front control panel=10A	Junction Box

F28	A8 controller enable=1A	Junction Box
F29	Pressure sensors=10A	Junction Box
F30	Null	Junction Box
F31	Conveyor position switches=10A	Junction Box
F32	Fan motor speed sensor=3A	Junction Box
F33	Lightings=40A	Junction Box
F34	Traffic lights=20A	Junction Box
F35	Rotation beacon=10A	Junction Box
F36	Hrons=20A	Junction Box
F37	Back lights=20A	Junction Box
F38	Levelling control power1=10A	Junction Box
F39	Levelling control power2=10A	Junction Box
F40	Left cable sensor=10A	Junction Box
F41	Slope sensor=10A	Junction Box
F42	Rightt cable sensor=10A	Junction Box
F43	12 VDC output=20A	Junction Box
F44	Null	Junction Box
F45	Levelling display=10A	Junction Box
F46	T3 Engine ECM power1=10A	Junction Box
F47	T3 Engine ECM power2=10A	Junction Box

Relav. machine

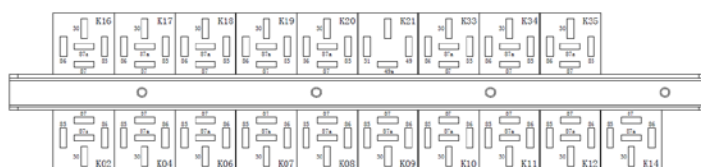


Fig. Relays

Relays

K0	Starter relay	K14	E-stop relay for electrical pump
K2	DEF supply module heater relay	K15	Electrical pump relay
K4	Engine protection relay	K16	E-stop relay for controllers
K5	Intake air heater relay	K17	Backward realy
K6	E-stop relay for engine	K18	Walter high pressure relay
K7	Left leveling relay 1	K19	Traffic lights relay
K8	Left leveling relay 2	K20	Working lamps relay
K9	Right leveling relay 1	K21	Flashing relay
K10	Right leveling relay 2	K33	DEF heater relay 1
K11	Fuel relay (engine power switch)	K34	DEF heater relay 2
K12	Horn relay	K35	DEF heater relay 3
K13	Power switch relay		



Fig. 1. Hand wheel

2. Lever

3. Grip recess

4. Locking lever

Driver's seat on left/ right

A driver's seat can be found on both the left and right. The seat should be set to the driver's requirements before work is started.

- To set the correct seat hardness, fold the crank on the hand wheel (1) forwards.
- To set the correct distance from the operating panel, pull lever (2) upwards and side the seat forwards or backwards as required.
- Pull up the grip recess (3) on the back of the seat and set the height of the backrest.
- Should the driver's seat have to be moved beyond the outer edge of the machine, the locking lever (4) must be applied and complete seat bracket moved in the corresponding direction.
Then move the lever back to lock.

⚠ Risk of accident! If possible, always select the operator's control station on the nearside, i.e. further away from oncoming traffic.

⚠ Always ensure that the operating panel and driver's seat are correctly locked into place.

Battery's main switch

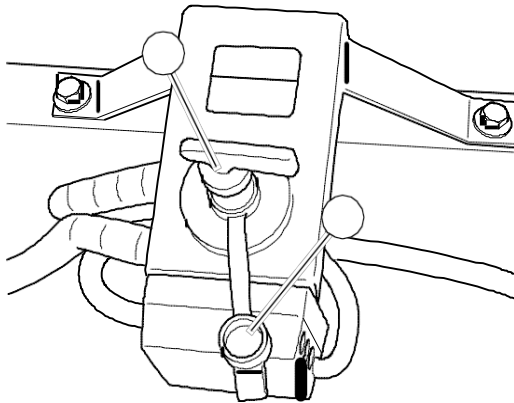


Fig. 1. Main switch

2. Cap

The battery's main switch can be found under the right-hand bottom lid. It separates the power supply from the battery for main fuse. The safeguard of the bottom lid can be opened using a square wrench.

To deactivate the master switch, turn to the left and remove.

Cover aperture with protective cap (2).

Do not lose the removed master switch because otherwise you will not be able to start the machine.

For the specifications governing all fuses, refer to Chapter "Maintenance".

Batteries

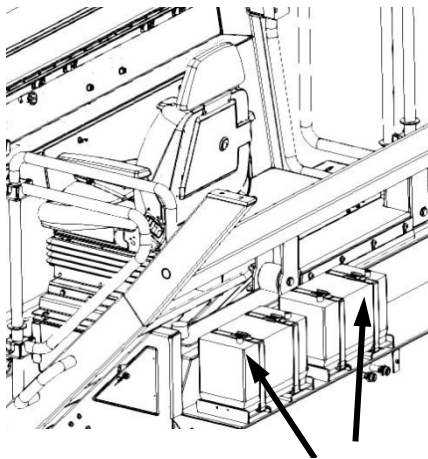


Fig. Batteries

Behind the maintenance flap, two batteries of the 24 volt system can be found on both the left and right behind the driver's seat.

For the specification, refer to "Technical data.".

For maintenance, refer to Chapter "Maintenance".



Only undertake external starting in accordance with the instructions (refer to section "Starting machine, external starting" (starting aid)).

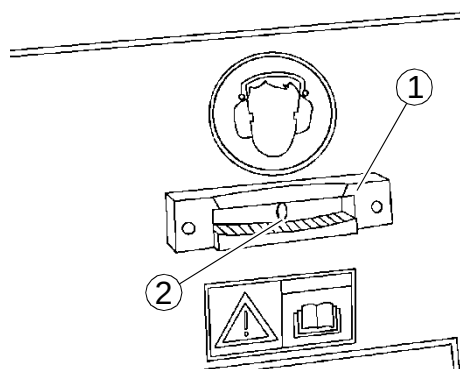


Fig. 1. Tilt display
2. Indicator

Tilt display

A tilt display (1) can be found in the center of the front panel in the operator's control station.

The tilt display is used to provide a visual estimate of the size of the machine's present tilt.

- The indicator ball in the sight glass shows the machine tilt on the scale fitted below the sight glass.

A warning message is displayed on the operating panel once the tilt exceeds 10% (O 13 %).

⚠ In certain situations, when the machine tilt exceeds 10%, there is a risk of tipping! Risk of accident!

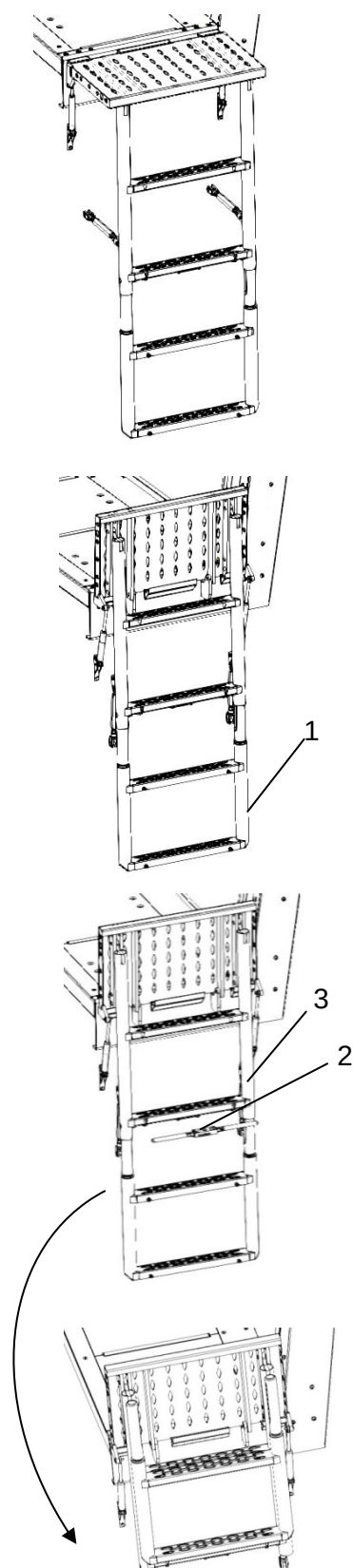


Fig. 1. Lower segment

2. Lock

3. Upper segment

Folding ladder

A robust ladder with slip-free steps can be found on both the left and right.

The ladder can be folded up on both sides of the machine.

- By gripping a rung or the slip-free step, push the ladder upwards- the ladder will fold in as moving up.
 - To fold out, pull the ladder down- the ladder will fold out as moving down.
- The lower segment (1) of the ladder can be taken off for safekeeping.

- Use a square wrench to open lock (2) under the third rung.
- Pull out the lower segment (1) and attach in holes of upper segment (3).
- Close lock (2) and secure the segment attached in this way in this position.

Danger of crushing! Do not reach into the joint area during the folding process as there is a risk that fingers and hands will be crushed.

⚠ Never climb up/down ladders on the machine during travel. Hold tight when climbing up and down ladders.

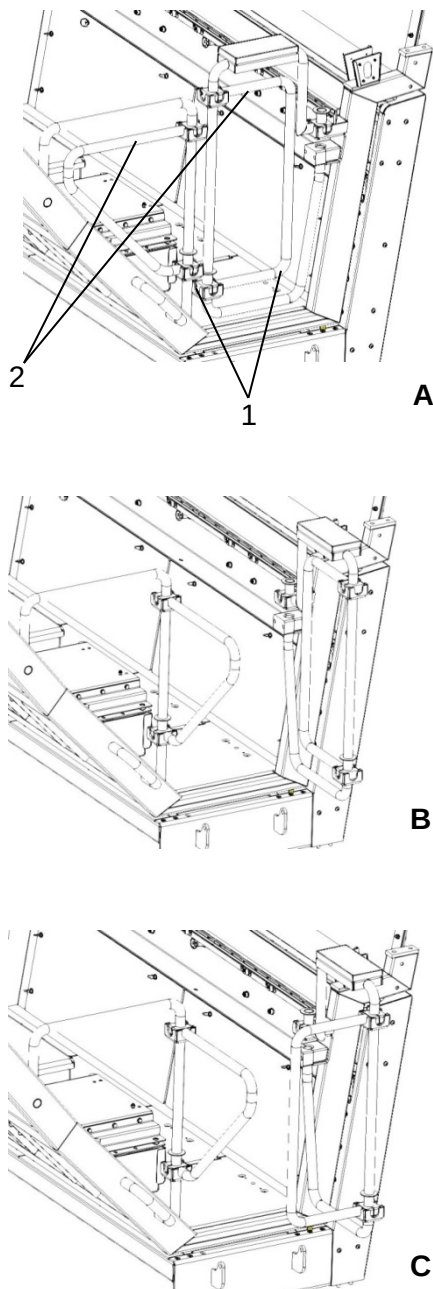


Fig. 1. Outer section
2. Inner section

Guardrail

There is one guardrail on both the left and right between the ladders and operator's control stations.

The guardrails must be set up as required and once the operator's control station has been entered.

Each of the guardrails consists of two outer sections (1) and two inner sections (2).

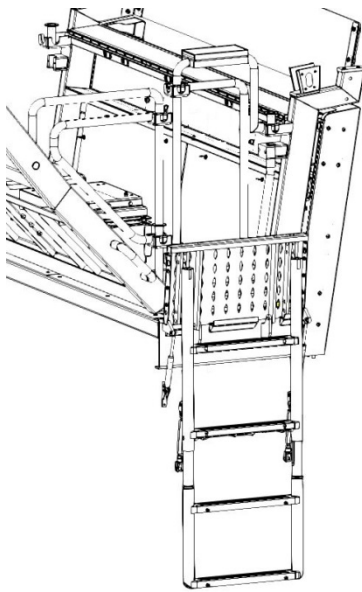
- Regarding the front guardrail, both outer section and inner section can be adjusted; regarding the rear guardrail, only the inner section can be adjusted.

The diagram shown here indicates the different situations in which the guardrail should be set up.

- (A) Close guardrail
- (B) Open guardrail to enter and exit from the operator's control station.
- (C) Inner section of front guardrail fold out – the operator stand out of the operator platform when the platform is in the middle position.



Danger of crushing! Do not reach into the joint area during the folding process as there is a risk that fingers and hands will be crushed.



Transport position for ladder and guardrails

To reduce the machine width for transport and as an additional safety measure when parking in public places

- Swivel the guardrails in front of the slip-free step.
- Fold up the ladder on both sides of the machine.

Fig. Ladder and guardrail

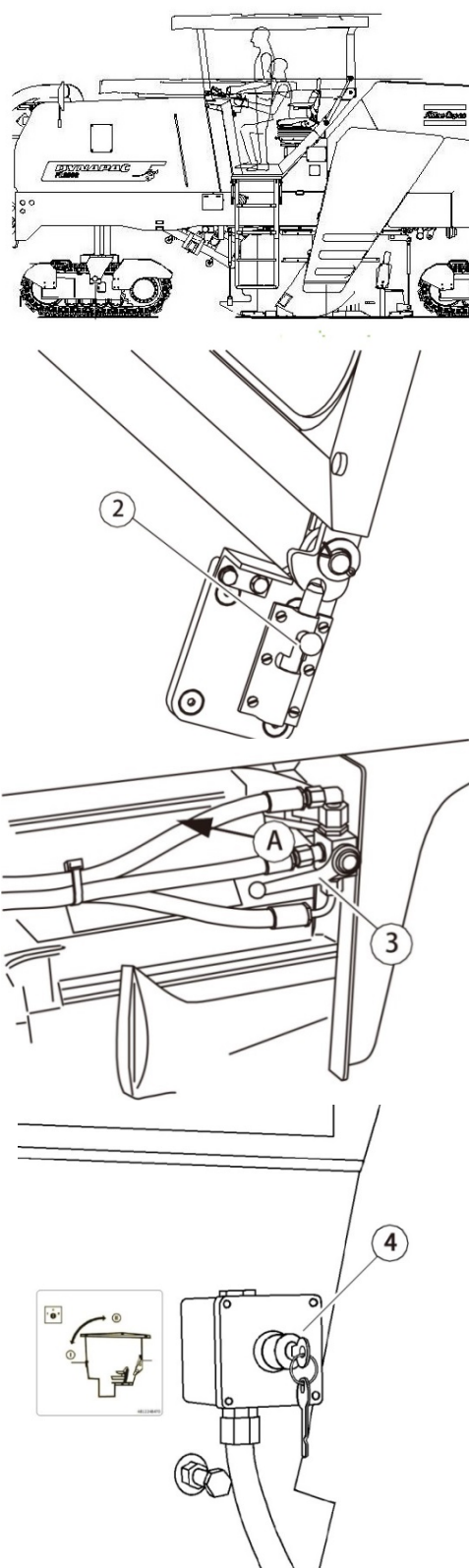


Fig. 1. Retaining bracket

2. Pin

3. Valve

4. Switch

Hydraulic folding roof operation

The hydraulically folded roof is locked to the front suspension of the left and right-hand side of the machine by a retaining bracket (1). The key-operated switch (4) for actuating the folding roof and hood hydraulics can be found to the left of the belt drive's protective box.

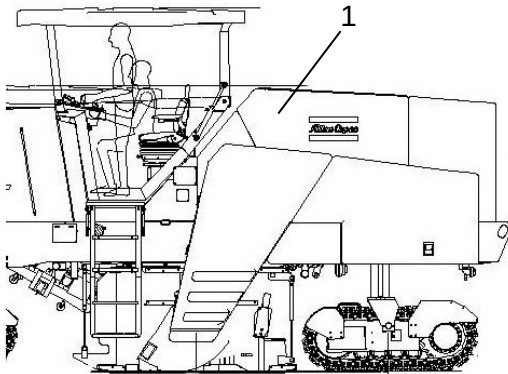
The roof can be raised and lowered without the drive engine having to be started.

- Slide down the spring-loaded detent pins (2) on both sides of the machine.
- Check that the changeover valve (3) (under the compensation tank behind the maintenance flap) is in position (A).
- To lower the roof, turn the key-operated switch (4) to the left until the roof has lowered to its minimum level.

Risk of crushing! Ensure that no one reaches into the joint areas or the areas into which the roof is to be lowered during the folding process as there is a risk that fingers and hands will be crushed.

- To raise the roof again, turn the key-operated switch (4) to the right until the roof has risen to its maximum height.
- Allow detent pins (2) on both sides of the machine to engage.

Hydraulic hood operations

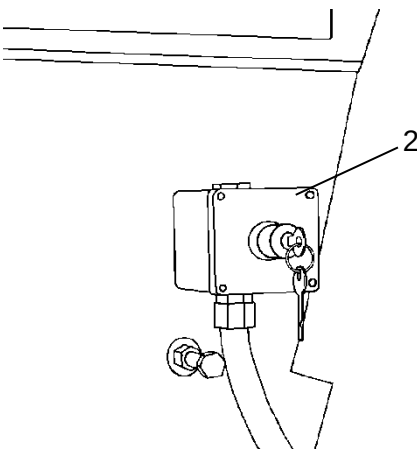


The machine's engine hood (1) can be opened and closed hydraulically and provides good access to the various monitoring and maintenance points.

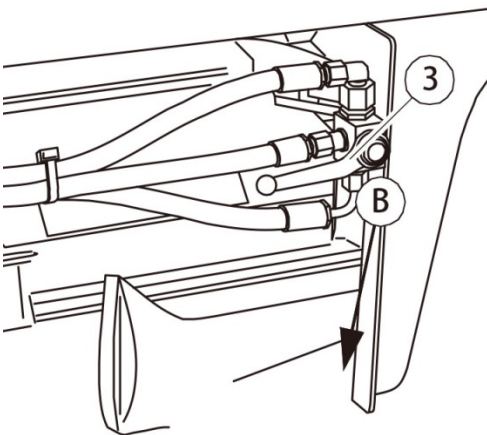
The key-operated switch (4) for actuating the folding roof and hood hydraulics can be found to the left of the belt drive's protective box.

The hood can be raised and lowered without the drive engine having to be started.

- Check that the changeover valve (3) (under the compensation tank behind the maintenance flap) is in position (B),
- Turn key-operated switch (2) to the left until the hood is opened to its maximum level.
- To lock in this open position, slide the slotted detent sleeves (4) on both sides over the joint.



⚠ Risk of crushing! Ensure that no one reaches into the joint areas or the areas into which the roof is to be lowered during the folding process as there is a risk that fingers and hands will be crushed.



- In order to close the hood again, the two detent sleeves (4) have first to be slid away from the joints.
- Turn key-operated switch (2) to the right until the hood is fully closed.

Fig. 1. Engine hood

2. Switch

3. Valve

4. Sleeve

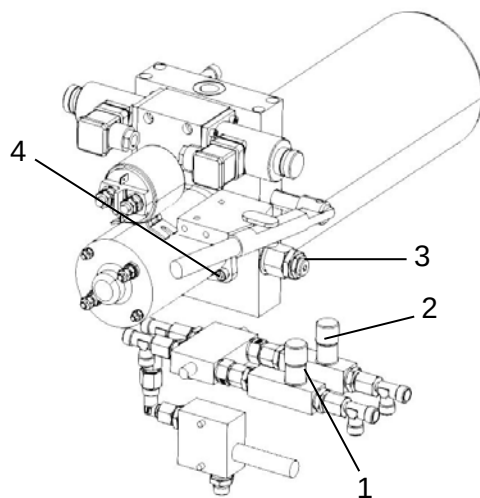


Fig. 1. Upper throttle valve
2. Lower throttle valve
3. Screw threading dowel
4. Pump lever

Throttle valves for deployment speed of hood and roof

The hydraulic unit for hood and roof operation can be found behind the maintenance flap of the operator's control station.

The unit has two throttle valves for setting the speed for raising and lowering the roof.

Upper throttle valve (1):

Turn adjustment button clockwise = slower speed for raising roof

Turn adjustment button anticlockwise = faster speed for raising roof

Lower throttle valve (2):

Turn adjustment button clockwise = slower speed for lowering roof

Turn adjustment button anticlockwise = faster speed for lowering roof

Manual pump, hood and roof

A manual pump is fitted on the hydraulic unit should the roof or hood have to be raised when the battery is flat.

- On both sides of the unit:
Once the lock nut has been loosened, screw threading dowel (3) in as far as possible and secure with lock nut.
- Press the pump lever (4) until the roof or hood is open.

Observe the information provided in the hood and roof operating instructions!

The threading dowel (3) must be unscrewed again for regular operations and locked using the lock nut.

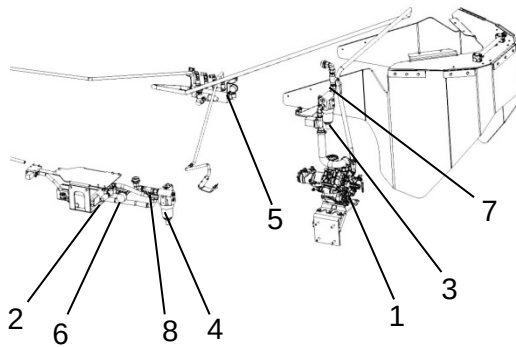


Fig. Water system

- 1. Water pump**
- 2. High pressure pump**
- 3. Water filter**
- 4. Water filter**
- 5. Pressure gauge**
- 6. Pressure gauge**
- 7. Shut-off valve**

Water system

The water system on the machine comprises the following elements:

- Diaphragm water pump (1): used in the water spraying system to produce pressure, 8 bar
- High pressure pump (2): used in the high pressure cleaner system to produce pressure, 80 bar
- Water filter (3): used in the water spray system
- Water filter (4): used in the high pressure cleaner system
- Pressure gauge (5) for water spray system
- Pressure gauge (6) for high pressure cleaner system

Tank water supply shut-off valve (7) and (8): used to shut off the water from the water tank, e.g. for maintenance work

Machine description

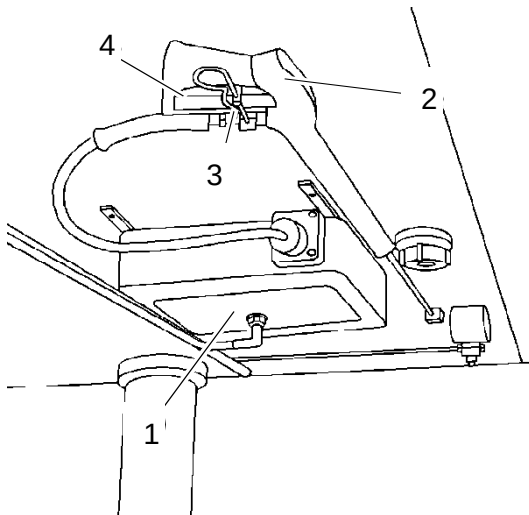


Fig. High pressure cleaner

- 1. Hose package**
- 2. Spray pistol**
- 3. Cotter pin**
- 4. Trigger**

High pressure cleaner

The hose package (1) of the high pressure cleaner can be found on the underside of the vehicle frame at the rear of the machine.

The spray pistol (2) is locked in its detent by a cotter pin (3).

- Remove cotter pin.
- Remove spray pistol from bracket.
- Pull hose out of fixture until you hear a click.

When released, the hose automatically engages here.

- The hose will automatically roll back up again if pulled and released again.
- The high-pressure jet is started by pressing the trigger (4).
(Only if the high pressure cleaner function is activated.)



When cleaning heavily contaminated areas, note that particles of dirt may be flung in all directions. Danger of accidents.



When cleaning, never direct water jet of high pressure cleaner towards electrical components such as sensors, connection boxes, operating panels, electric distributors etc.!

Filling pump for water tank

The filling pump for the water tank is located at the front left of the machine.

To fill the water tank:

- Unscrew seal cap (1) (if necessary use wrench)
- Attach suction line and tighten
- Start filling process by pressing switch (2).
- Switch off filling pump as soon as the level water required is reached in the water tank (monitor using the LCD display on the operating panel.)



1

Fig. 1. Seal cap

2. Spray pistol

An overflow can be found on the underside of the machine. Excess water flows out through this if overfilled.



Ensure that the water is not too heavily contaminated because this may result in lengthy filter changes and cleaning work in the tank.

Machine description

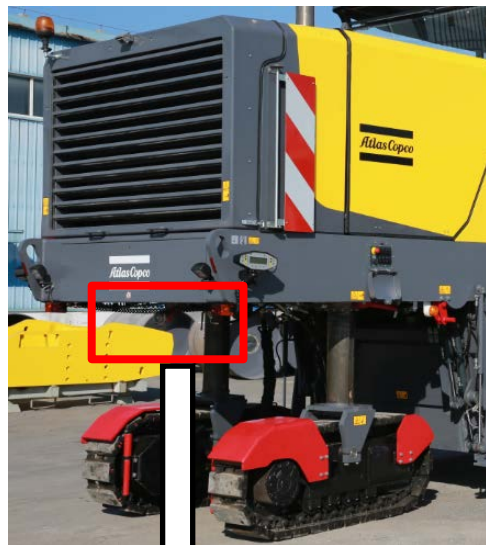


Fig. Connection

Water filling (pressure fill) connection for water tank

The connection for the water tank's pressure fill can be found on the rear underside of the machine.

To fill the water tank:

- Open lock cock.
- Unscrew seal cap (if necessary use wrench)
- Attach pressure pipe and tighten
- Signal to the operator of the external filling pump that the filling process can be started.

Switch the filling pump as soon as the level of water required in the water tank is reached (monitor using LCD display on the operating panel).

- Close the lock cock again before removing the filling hose.
- An overflow can be found on the underside of the machine. Excess water flows out through this if overfilled.

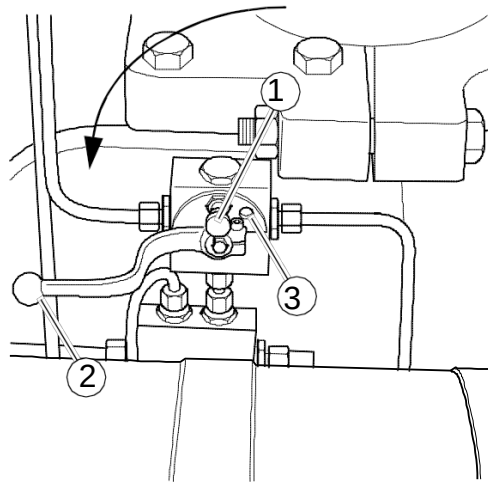


Fig. 1. Retaining pin
2. Lever
3. Detent bore

Changeover for separate circuits of rear strut towers

For some maintenance and repair work, the rear strut towers will have to be individually operated.

The joint hydraulic circuit will have to be separated in such instances.

The changeover equipment is located in front of the right strut tower under the engine hood.

To separately operate the strut towers:

- Raise machine to the height required and support.
- Remove retaining pin (1) and grip.
- Turn changeover lever (2) anticlockwise until the second detent bore (3) is under the retaining pin (1).
- Allow retaining pin to engage.
- The traction unit legs can now move separately using the traction unit buttons on the rear side control panels.

Once maintenance and/or repair work is complete, turn the changeover valve back to its original position so that the traction unit legs are moved together again.

Machine description

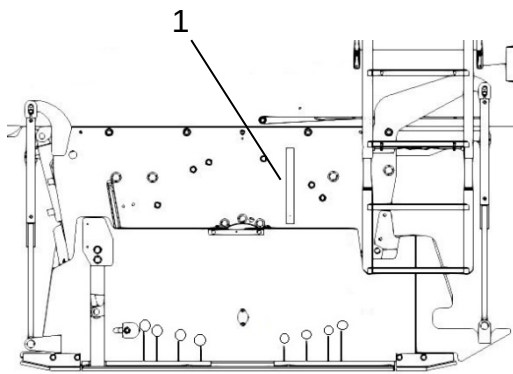


Fig. 1. Grading depth display

Grading depth display

One grading depth display, indicating cm and/or inches, is located on both sides of the milling housing. This provides additional visual assistance in addition to the leveling equipment.

- The upper edge of the side shield serves as a reference and indicates the depth of the engaged milling drum on the display (1).

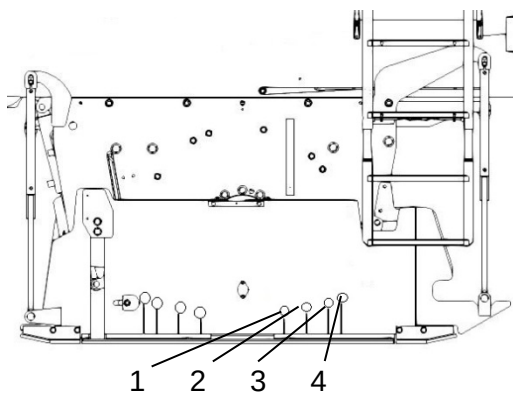


Fig. Depth

1. 4 cm
2. 10 cm
3. 20 cm
4. 30 cm

Milling drum operational check

Several control marks can be found on both side shields and, depending on the grading depth, indicate the extent to which the milling drum is engaged.

The control marks are used as assistance, e.g. if milling is to be conducted as close as possible to an obstacle (e.g. drain cover).

- Control marks are available for the following grading depths: 4 cm (1), 10 cm (2), 20 cm (3), 30 cm (4).
- The slots in the side shield under the marks are used as a reference line and indicate the minimum possible distance between the milling drum and obstacle at which no damage will be caused.

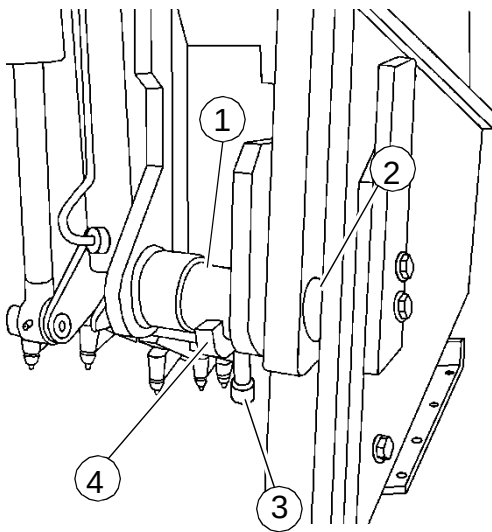


Fig. 1. Bolt
2. Detent bore
3. Handle
4. Interlock

Interlock on scraper flap

One interlock for the scraper flap can be found on either side of the back of the drum box.

The interlock must be released before the scraper flap can be opened.

When interlocked, the bolt (1) is in the detent bore (2).

Unlocking procedure:

- Use handle (3) to rotate interlock bolt upwards and slide towards the center of the vehicle, via the sliding interlock (4).
- Rotate the bolt downwards so that the handle lies on the inner side of the sliding interlock (4).

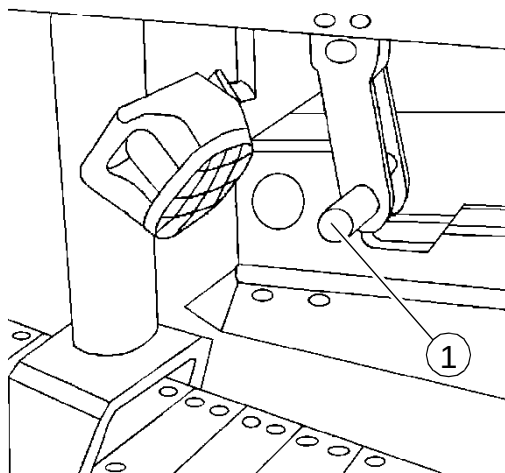


Fig. 1. Collar

Retaining hook of scraper flap

The retaining hook for the scraper flap can be found on the right-hand side of the machine.

When the scraper flap is opened, this automatically engages in the retaining hook.

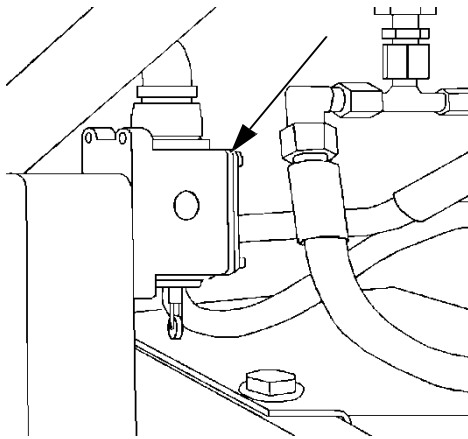
The limit switch is also activated.

! Only open the scraper flap once the milling drum drive and the travel drive have been switched off.

Refer to limit switch of scraper flap.

Unlocking procedure:

- Use the appropriate controls to open the scraper flap so wide that the retaining hook is disengaged.
- Swivel retaining hook upwards on collar (1) and grip.
- Use appropriate controls to close the scraper flap completely.



Limit switch of scraper flap

The limit switch can be found behind the milling drum housing on the frame of the left-hand side of the machine.

The limit switch serves as a safety measure and is actuated as soon as the scraper flap is opened.

Once the switch has been actuated, as an additional safety measure, the clutch and belt tensioner of the milling drum drive cannot be actuated and the machine cannot be operated.



For safety purposes, always ensure that the limit switch is functioning correctly.

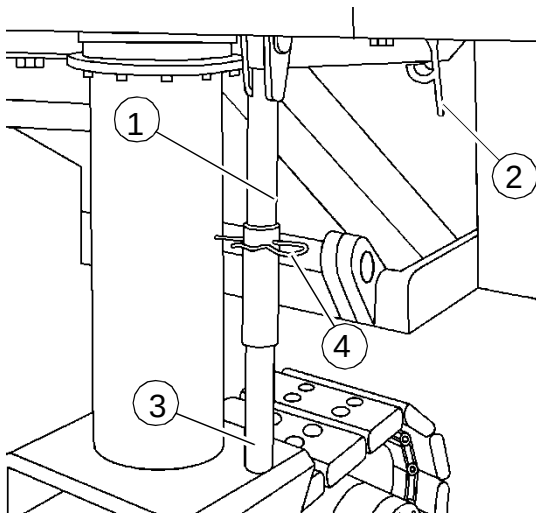


Fig. 1. Supports
2. Retaining tabs
3. Lower section
4. Cotter pin

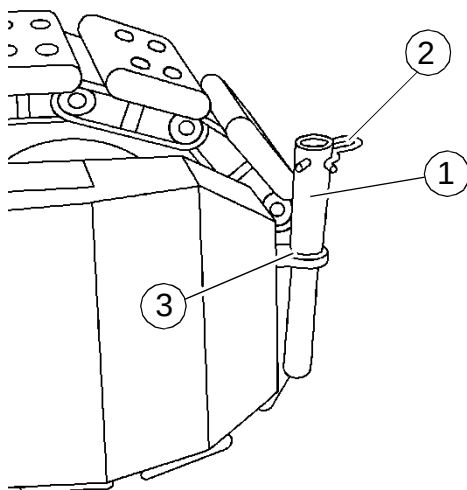


Fig. 1. Traction unit support
2. Spring pin
3. Support bracket

Traction unit supports

One separable traction unit support can be found as a safety measure on every traction unit.

The complete traction unit support is used for retaining purposes during maintenance and repair work.

In order to achieve a lower transport height, the upper section of the separable support is used on the trailer during transport.

! The full length of the traction unit supports should be placed under the machine during all maintenance and repair work.

If the machine is lowered unintentionally, wedge-shaped supports advance automatically into the recesses provided in the locating plates and therefore prevent the machine from being lowered further.

- Extend traction units to their maximum limit position.
- Remove complete supports (1) from the retaining tabs (2) and swivel down.
- If necessary, dismantle lower section (3) of support. Remove spring cotter pin (4) for this purpose.
- Ensure that the support is above the hollow of the support plate.
- For transport purposes and before starting work, return the supports to the retaining tabs.

Support brackets

If the lower sections of the traction unit support have to be dismantled, there is a storage space inside traction units for them.

To prevent loss, always place the dismantled lower sections of the traction unit support (1) and corresponding cotter spring pins (2) in the support brackets (3) provided for this purpose.

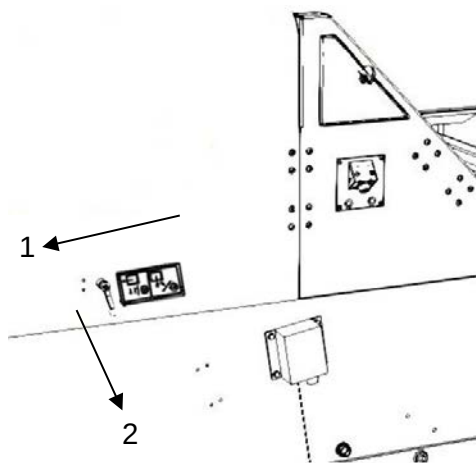


Fig. Switch position 1, 2

“Scraper flap function changeover” valve

The valve for the raise and lower scraper flap / swivel scraper flap function changeover (1) can be found above the frame on the right-hand side of the machine behind the milling drum box.

- Switch position (1): raise/lower scraper flap.
- Switch position (2): swivel scraper flap (open / close).

Switch position (1) should only be selected for the working site, switch position (2) is used for maintenance and repair work.

 Observe safety precautions when the scraper flap is open.

“Discharge conveyor function changeover” valve

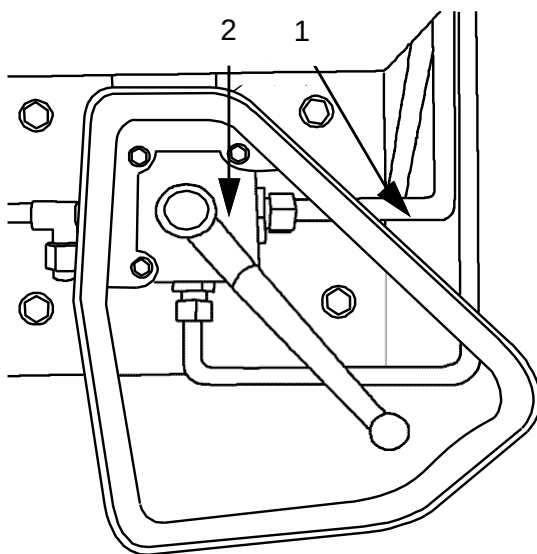


Fig. Switch position 1, 2

The valve for changing over between discharge conveyor in operating position/discharge conveyor in floating position function can be found on the left-hand side of the machine, in the front section of the inside of the frame.

- Switch position (1): discharge conveyor in operating position.
- Switch position (2): discharge conveyor or in floating position (transport position).
- Switch position (1) is for the working site and should be selected for transport tasks during which the discharge conveyor is rigidly placed on the trailer, ie. No swivel movement.
- Switch position (2) should be selected for transport tasks during which the discharge conveyor is flexible mounted, e.g. placed on a support fixture on the tractor machine of the trailer.



Fig. 1. Lock

Transport and parking lock for discharge conveyor

In order to prevent the discharge conveyor from accidentally swiveling during transport on the trailer or when parking for long periods, the groove of the lock (1) should be inserted in the associated support of the discharge conveyor bracket for this purpose.

Only apply the lock when parking and for transport purposes during which the discharge conveyor is rigidly placed on the trailer or has to be held, in other words, when the unit is not subject to swivel movements.



Never apply the lock for transport purposes in which the discharge conveyor is flexibly mounted, e.g. placed on a support fixture on the tractor machine of the trailer.

Monitoring camera (O)

Six video cameras are fitted to the machine to observe the area of the milling track in front of the front drive unit, the area of the sliding shoe in front of the milling drum housing, the area of the scraper flap behind the milling drum housing, the area of the rear track during reverse, the area of the top of discharge conveyor and the area of the top of the rear hood.



Fig. Camera

Compressed air system

The compressed air tank and connected maintenance unit can be found behind the storage room flap on the left-hand side of the machine.

There is a maintenance unit on the compressed air tank. This unit separates water from the air and enriches the airflow with a fine veil of oil and therefore ensures that the components connected have a longer service life. The air pressure required can be set on the pressure reducer (1).

- The pressure level set is indicated on the pressure gauge (2).
- Various compressed air tools (e.g. the pneumatic cutting tool driver) can be connected to the clutch (3).

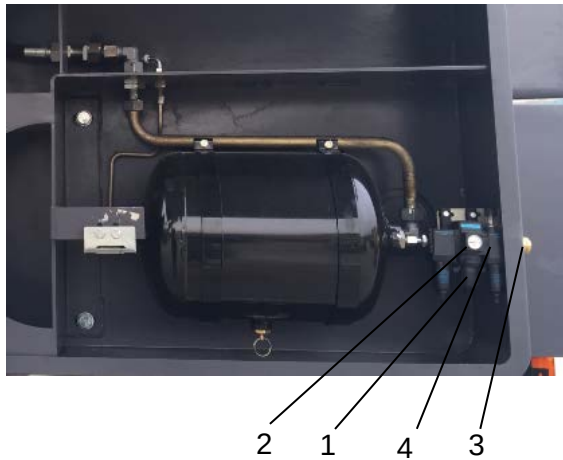


Fig. 1. Pressure reducer

2. Pressure gauge

3. Clutch

4. Oiler

The compressed air coupling is accessible from outside and can be found on the rear of the storage area cabinet.



When using the compressed air tools, ensure that the oiler (4) is filled with oil under pressure.

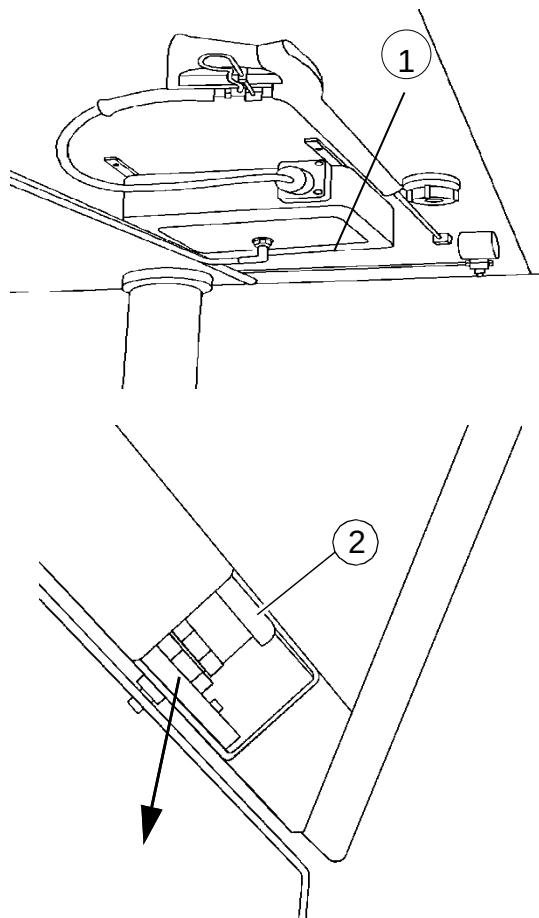


Fig. 1. Leveling device

2. Latch

3. Detent

Storage area and protective flaps

The section of storage area and protective flap which covers the operating side panels and the levelling device (1) can be folded for operations.

- Open latch (2) and raise flap
- Pull detent (3) and now move the foldable section inwards.
- Press the two flap sections together so that both bracket sections are pressed into one another.

To close the flap, proceed in reverse order.

⚠ Risk of crushing! Ensure that no one reaches into the joint areas during the folding process as there is a risk that fingers and hands will be crushed.

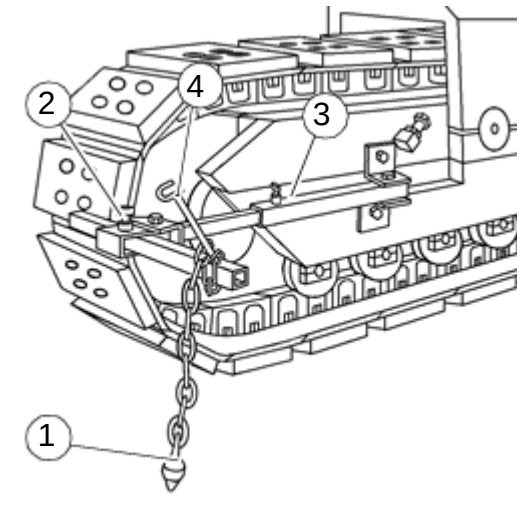


Fig. 1. Plumb line

2. Screw

3. Screw

Plumb fixture

The part of the lockable storage area and protective flap which covers the operating side panels and leveling device (1) can be turned down for operations.

The plumb line fixture can be used to work along one particular longitudinal mark which is at a specified distance from the machine.

The machine should then be controlled ensuring that the suspended plumb line (1) is above the mark.

- To set the handle to the mark, unfasten wing screw (2), move the pipe into the position required and re-tighten the wing screw correctly.
- To remove the plumb line fixtures, unfasten wing screw (3) and pull the fixture out of the bracket.
- If the plumb line fixture is not used for some time, the chain can be used to hang the plumb line in the bracket.



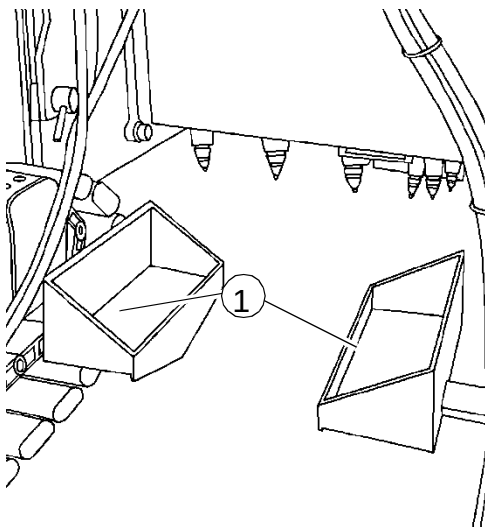
Swivel-mounted warning sign

The swivel-mounted warning sign is located on the rear of the machine, on the right. The sign should be swiveled out if this side of the machine is on the offside, closest to passing traffic or if the machine is driven on public highways.

- Slightly raise the warning sign so that the detent pin no longer reaches into the bore.
- Swivel the sign through 90° and lower into the detent bore.



To transport the machine, fold in the warning sign. Danger of accidents, very wide vehicle.



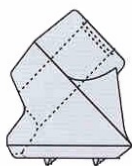
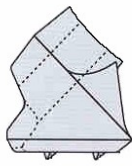
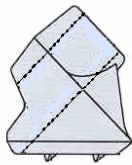
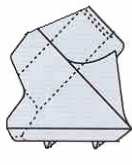
Tool holder

A console (1) is fitted on each of the inner sides of the rear traction units. These can be used to store bit boxes or tool boxes.

During operation, the parts needed can be safely transported in this location.

During maintenance work, these areas provide better access to tools.

Fig. 1. Console

Typical wear marks on tool holder		
		New bit box
		Strong wear of contact surfaces of bit - replace as soon as possible
		Strong wear of hole for bit - replace as soon as possible
		Strong wear of flank - replace immediately

! To check and replace bits and bit boxes, the following safety measures are to be met and enforced:

- Apply traction unit supports.
- Open and secure the drum flap.
- Lift the side boards and secure them.
- Ensure that the drive engine cannot be started.

! If a pneumatic driver is used, heed the required safety measurement!

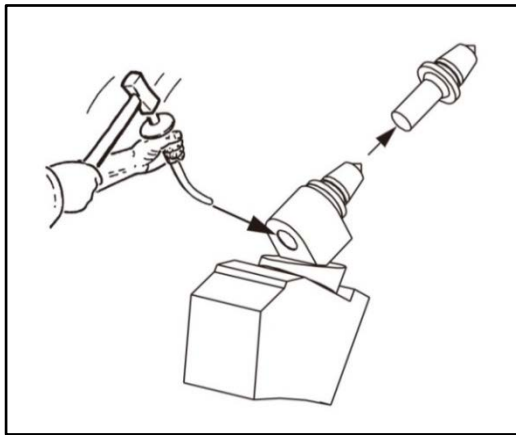
Machine description



The condition of the milling bits and bit boxes is to be checked several times a day. Worn or damaged bits and boxes must be replaced immediately.

The machine capacity can be fully exploited only with perfect milling tools.

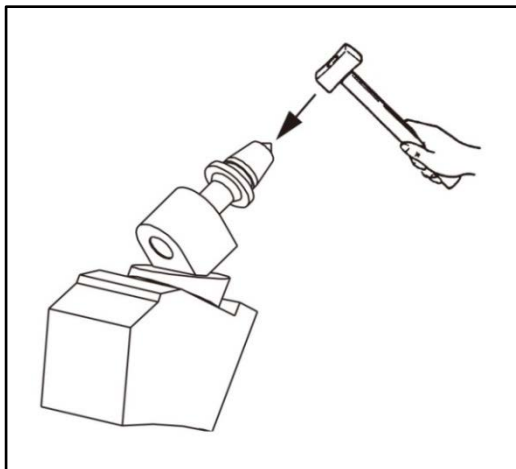
Typical wear marks on bits	
	New bit
	Worn bit - replace as soon as possible
	Washed-out bit - replace as soon as possible
	Asymmetrically worn bit - replace immediately
	Worn bit - replace immediately
	Broken-off bit - replace immediately
	Broken-off bit - replace immediately



Dismantling the bits

- Position the bit extractor in the hole at the rear of the bit box, and drive out worn and damaged bit by hitting with a hammer.

Optionally, a pneumatically operated hammer that can be driven using the compressed air system of the machine is available.



Mounting the bits

- Drive the new bit into the bit box with a copper, brass or hard plastic hammer.



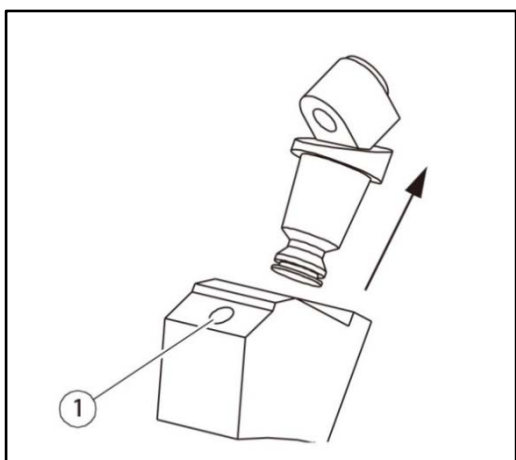
Do not use a steel hammer to drive the bits into the holders, this can lead to the destruction of the top of the bit.



Danger of injury from flaking-off pieces of metal.



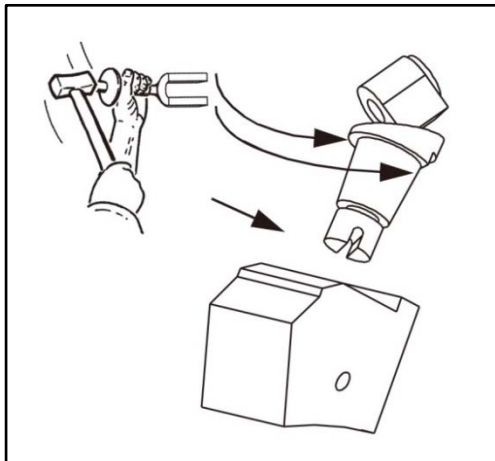
After mounting the bit ensure that the milling bit can be turned. Stuck bits wear out asymmetrically and quickly.



Removing the quick-change tops (model 1)

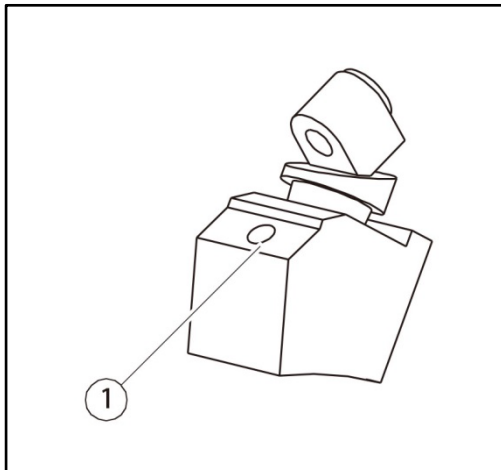
- Sufficiently loosen the threaded pin (1).
- If necessary, loosen the top by lightly hitting it with a plastic hammer.
- Remove the top from the bit holder.

Removing the quick-change tops (model 2)



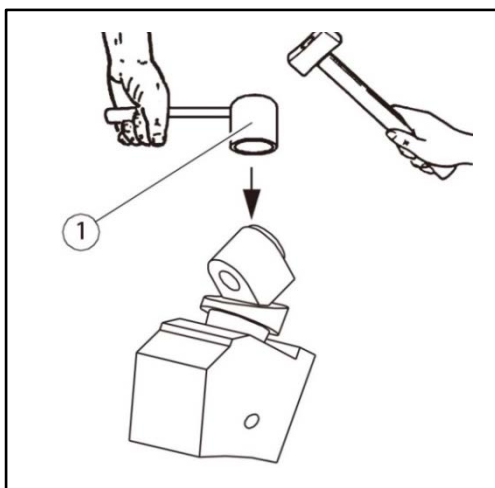
- Drive the extractor for the quick-change tops by hand or with hammer hits into the notch between the bit holder and the top.
- Remove the loosened top from the bit holder.

Mounting the quick-change tops (model 1)



- Set the top in the correct position into the bit holder
- If necessary, lightly hit the top with a plastic hammer to drive it into the bit holder.
- Properly tighten the threaded pin.

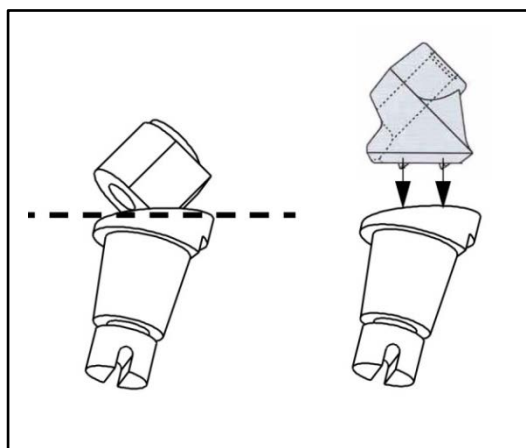
Mounting the quick-change tops (model 2)



- Set the top in the correct position into the bit holder (defined by pin and nut).
- Position the impact tool (1) on the top.
- By hitting the impact tool with a hammer, drive the top into the bit holder.



Lightly grease the shaft and hole. Ensure that there is no dirt in the hole.



Replacing the bit box

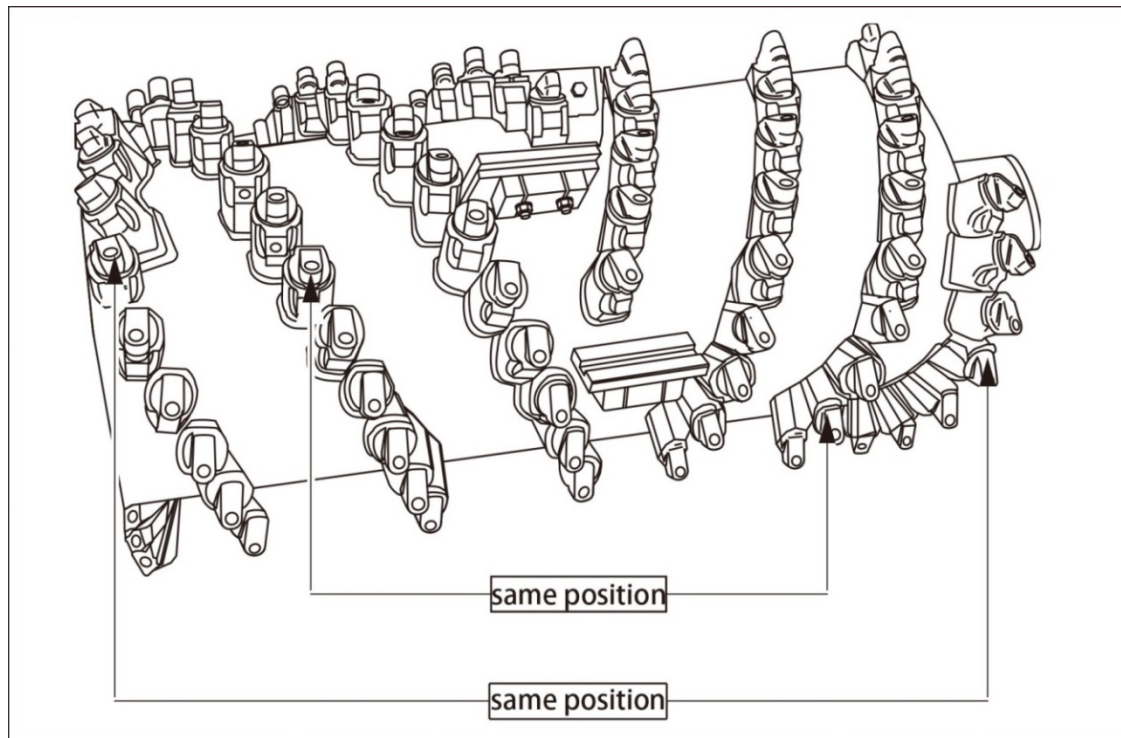
- Remove the quick-change top from the bit holder.
- Separate the worn bit box from the shaft; ensure that the contact surface is level.
- Position the new bit box (with inserted bit!) on the shaft (the stop nipples of the box must be inserted into the stop holes of the shaft.)
- Attach the new bit box to the shaft and then weld it on.

⚠ Observe the required safety measures during dismantling and welding!

Machine description

Replacing the holder box

The bit holders, which are arranged on the milling drum in a spiral shape, are welded so solidly and reliably with the drum that they are torn off extremely rarely and in extreme situations (for example, forgotten steel rails in the milling surface).



Each bit on one side of the milling drum (the right or left spiral, as seen from the middle of the drum) has a counterpart bit on the other side that is in the same position, but shifted by a few centimeters.

Use this bit to determine the specifications:

- height to bit tip
- distance between bit tip and drum edge.
- Smooth the break point.
- Position, attach, align and weld the bit holder.

The process always occurs with an inserted milling bit!

Ensure that you distinguish between the left and the right bit holder.

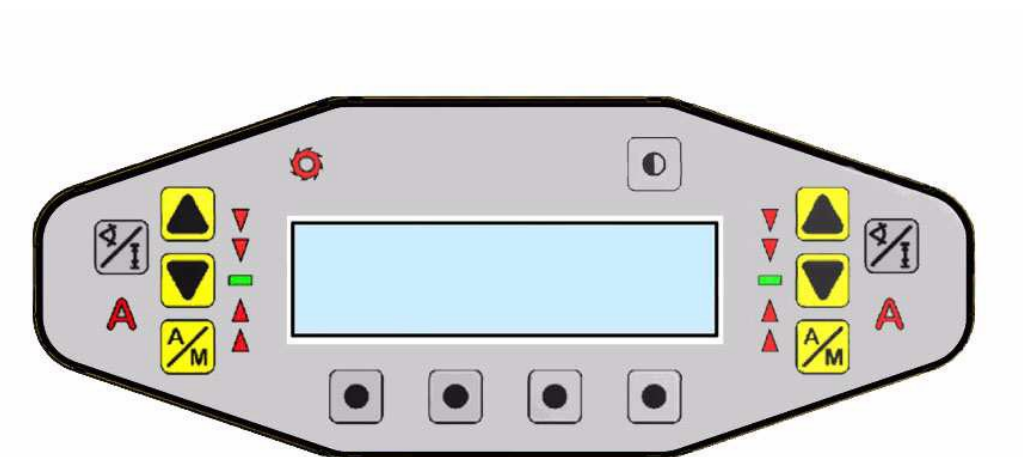
Observe the required safety measures during dismantling and welding!

The lateral cutters are normally not welded directly to the milling drum body, but rather to a distance piece welded to the milling drum. The place where the break should occur lies between the cutter and the distance piece so that the distance piece remaining on the cylinder serves as a positioning guide for the new weld if a tear does occur.

Levelling unit

Matic type

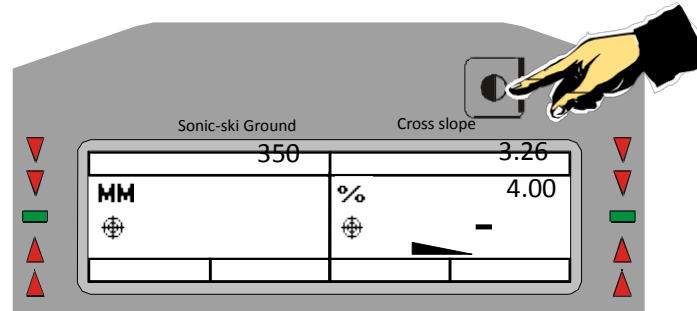
leveling system provides automatic control of the milling drum in the vertical plane. The system is optional, and its operation is described in the following chapter.



Operating the Atlas Copco Dynapac Levelling System Setting the contrast

The contrast of the graphic display can be adjusted at the control panel to achieve easy viewing, also in poor lighting conditions.

- 1) To do so press the contrast key  in the right hand corner above the display.



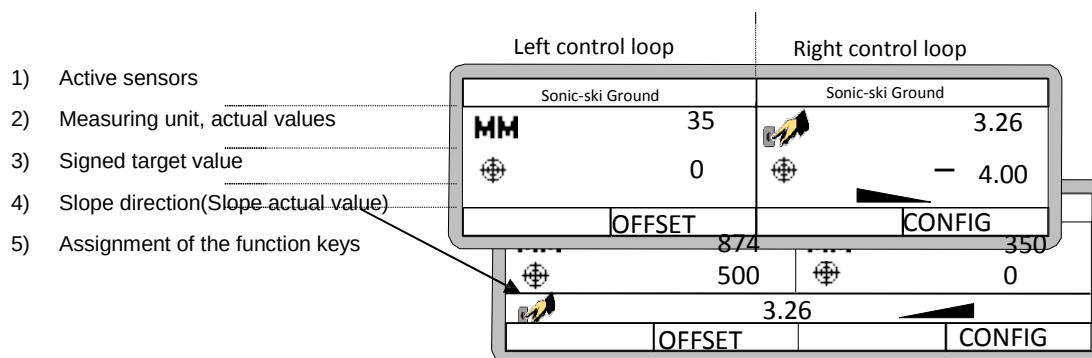
As long as the key is held down, the contrast is increased starting from the previously set value.

When the maximum value is reached, the process reverses and the contrast values start to reduce automatically.

When the minimum value is reached, the process reverses again and the contrast values start to increase again.

When the key is released, the contrast value at the point of release is saved.

Symbols and displays in the working window



1) Designation of the sensor selected from the sensor selection menu for the corresponding control loop (also see “6.6 Sensor selection”)

1) The actual values; i.e. the current values measured by the two active sensors of the left and right control loop are displayed with signs as well as their physical measuring unit.

2) The set points for the two active sensors of the left and right control loop with signs.

3) The set points for the two active sensors of the left and right control loop with signs.

4) The cross-slope arrows only are displayed if the cross-slope sensor has been selected as active sensor for one of the two control loops. The cross-slope direction indicated by the arrow is the sign for the value measured by the cross-slope sensor (left slope or right slope).

In case a slope sensor is connected but not selected the slope's actual value and the symbols for the slope direction appear in an own window.

The resolution and the physical measuring unit of the displayed values are settable in the configuration menu separately for grade and slope sensors (also see “8.2.2 Changing the units of measurement”).

5) At any time, the 4 fields at the bottom of the graphic display show the current function of the keys situated below the display.

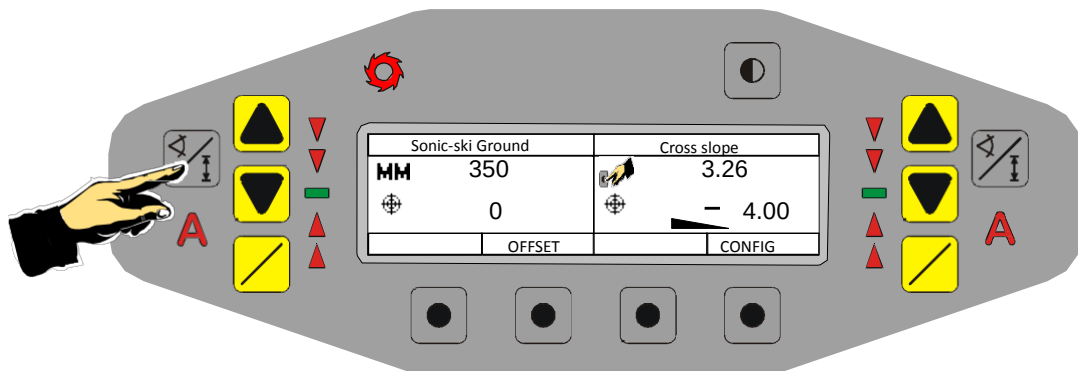
Machine description

Sensor selection

If several sensors are connected to the MLS 508 CAN-bus network at the same time, the desired sensor can be selected by using the sensor selection menu. Please note that the sensor has to be connected to and mounted on the side of the machine corresponding to the respective control loop. Control operations are then carried out with the selected sensor.

Sensor selection for the control loops left and right

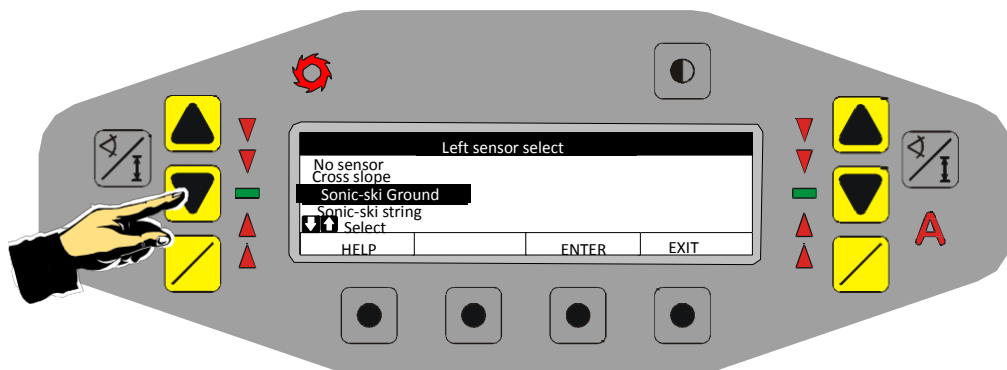
1) Press the sensor change key  of the control loop (left or right) for the sensor to be changed.



Calling up the sensor selection menu for the left control loop

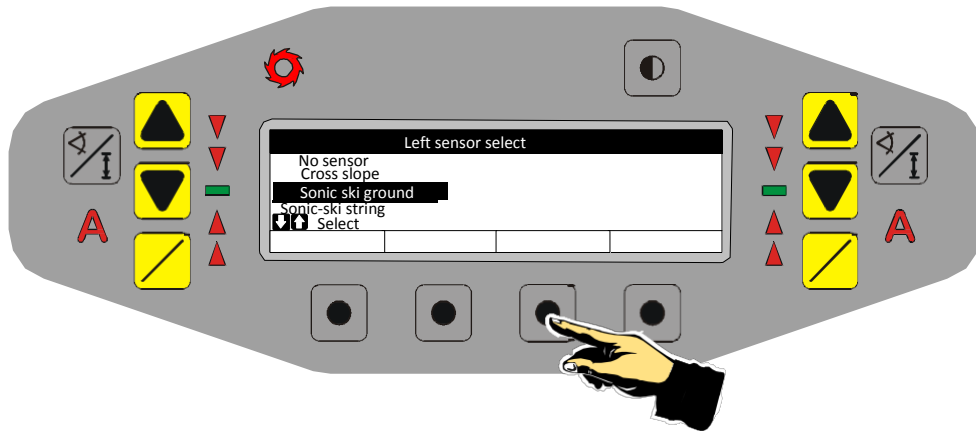
A list of all sensors connected to the respective machine side is displayed.

2) Select the desired sensor by using the UP/DOWN keys   (the selected line is highlighted).



Selecting the active sensor for the left control loop

- 4) Press the function key F3  (Enter) to save the selection or press the function key F4  (Exit) to exit without making any changes. After either key is pressed, the software returns to the working window.



Saving the selection and returning to the working window

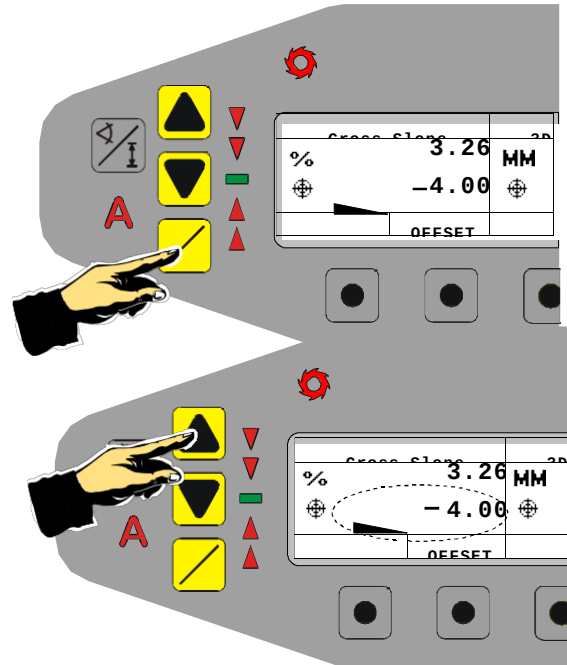
Proceed in analogy with the above explanations when changing the sensor for the right machine side.

Machine description

Operating with the Cross-Slope sensor

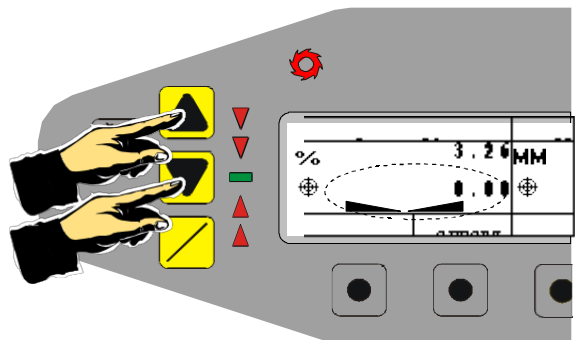
The Cross-Slope sensor has been selected for one of the two sides with the help of the sensor change key (also see “6.6 Sensor selection”). The other side is controlled manually or by means of a grade sensor.

1) If the automatic light of the side selected for cross-slope operation lights up, switch this control loop to manual mode by pressing the corresponding A/M key (manual = automatic light off).

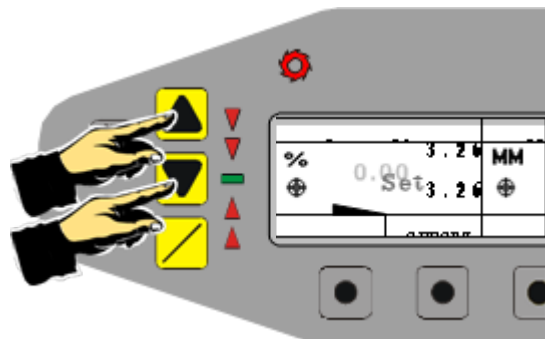


2) Enter the desired set point for the milling drum's slope angle taking account of the sign by using the UP/DOWN keys of the corresponding loop.

i By briefly and simultaneously pressing the UP and DOWN keys 0.0% is set as set point.

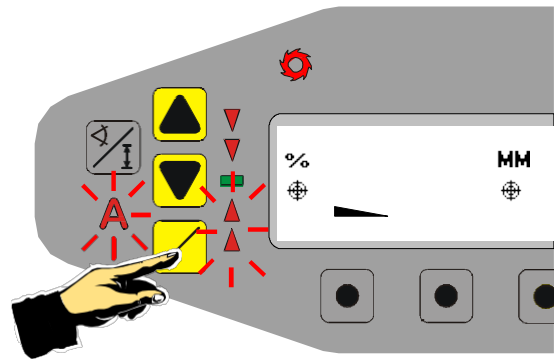


i If you hold down both keys until the display jumps from 0.0% to “Set”, the current milling drum's slope will be adopted as set point.



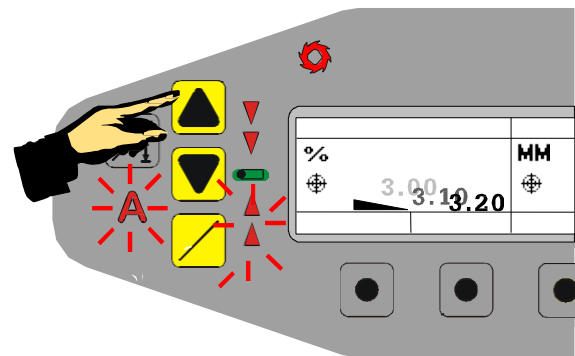
3) Now switch the controller to automatic mode (automatic = automatic light on) by pressing the corresponding A/M key.

The “RAISE” or “LOWER” valve light first indicates that an existing deviation is being controlled out. The controller of the MLS508 then automatically holds the milling drum at the set slope, even if it is moved in height (manually or by the other side’s control loop).



With the UP/DOWN keys the set point for the milling drum’s slope angle can also be adjusted in automatic mode.

The controller of the MLS 508 automatically moves the milling drum to the new value and holds it in that position.



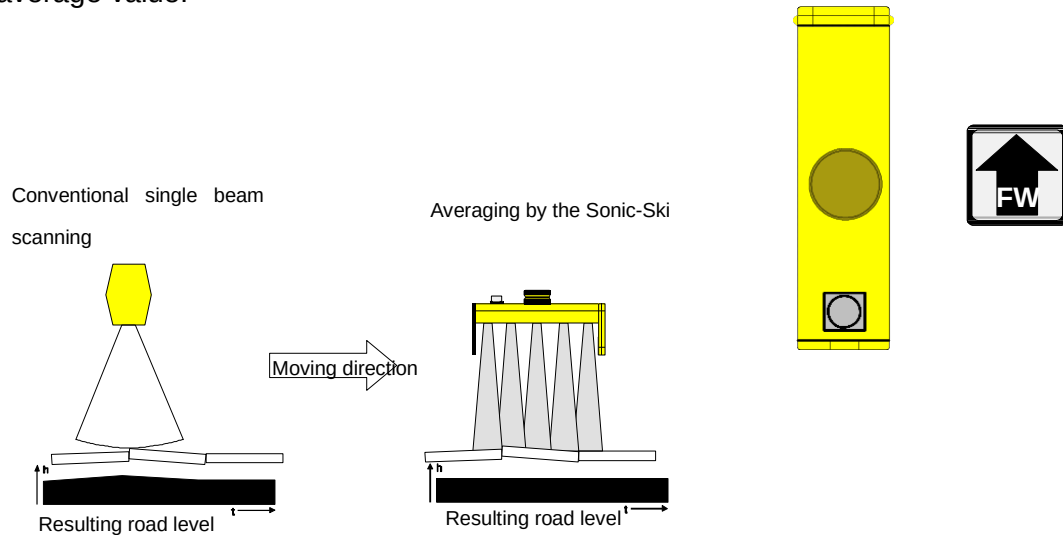
If the control in automatic mode works too sluggishly or is too unstable, the sensitivity settings of the Cross-Slope sensor should be changed accordingly.

See section “1.6 Sensitivity settings” in the configuration menu.

Machine description

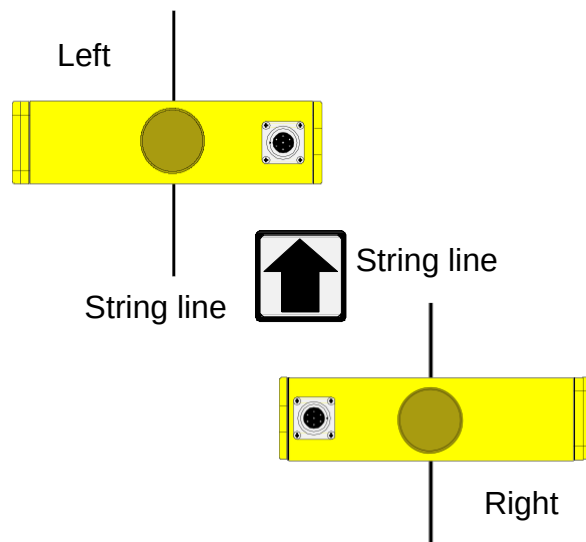
The moving direction of the Sonic-Ski sensor:

When Ground sensing the Sonic-ski should work in a longitudinal direction the Sonic-Ski calculates an average value.



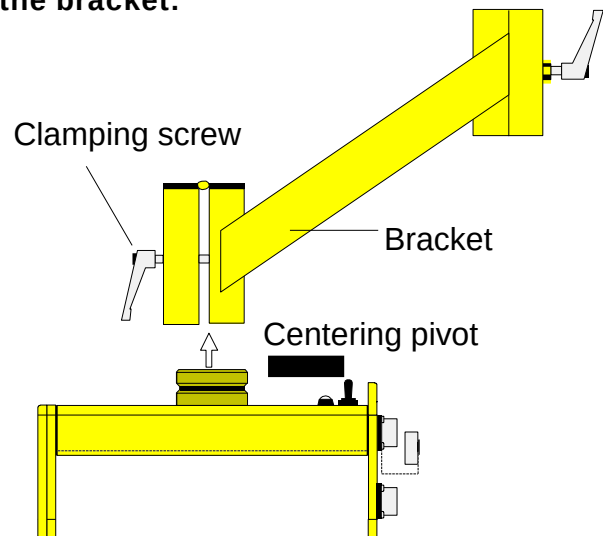
When **string line** sensing the Sonic-Ski[®] has to work crosswise in order to use the full working width of 25 cm.

The connecting plug should always be positioned on the sensor side facing the machine.



Mounting the Sonic-Ski ☐ Sensors at the bracket:

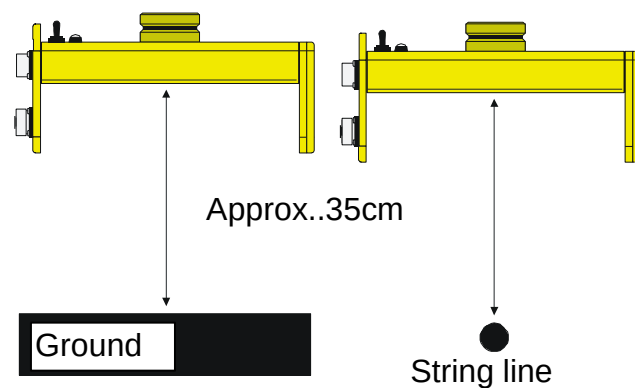
- 1) Loosen the clamping screw on the bracket.
- 2) Insert the round centering pivot on the top side of the sensor case vertically into the bracket.
- 3) Turn the sensor case according to the moving direction.
- 4) Fix the sensor's centering pivot with the clamping screw.



Working range of the Sonic-Ski ☐

The Sonic-Ski covers a measuring range from 25 cm to about 100 cm. Its optimal working range lies between 30 cm and 40 cm.

Therefore, the Sonic-Ski should be fixed at a distance of approx. 35 cm away from the reference.



Machine description

Zero adjustment

Before describing operations with the various grade sensors, the term “zero adjustment” has to be defined.

For every new application or after mounting or remounting a grade sensor, the current value measured by the sensor has to be adjusted to zero.

In doing so, the current mounting level of the grade sensor above the reference is saved in the system and a clear reference value is provided for all future set points at the same time.

We call this procedure **zero adjustment**.

Procedure:

1) Move the milling drum’s bottom edge manually to the adjustment level; i.e. to the level relevant to your day’s work (scratching).

2) Position the grade sensor(s) above the reference. Please consider the individual specifications of the various sensors when doing so.

If you are working with laser receivers, move them with the help of the integrated positioning aid so that the laser beam hits the middle of the receiver.

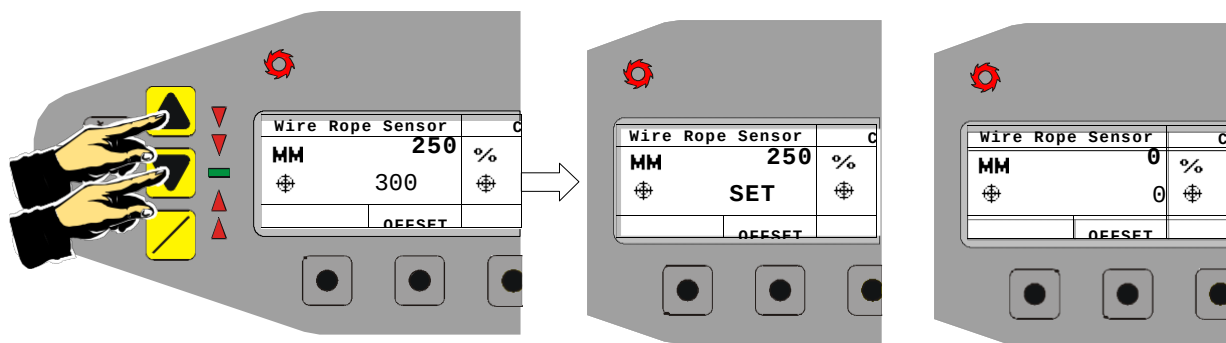


The zero adjustment only is effective if the respective control loop is in manual mode.

When the milling drum and the sensor(s) are set at the adjustment level, proceed as follows in order to carry out the zero adjustment:

3) From the sensor selection menu, select the grade sensor to be adjusted for the respective control loop.

4) Simultaneously press the UP key and the DOW N key of the respective control loop and hold both keys down until the display first shows “Set” and then, after approx. another two seconds, “0.0”.



The current value measured by the grade sensor (actual value) is taken over as set point and both values are assigned the value 0.0. There is no deviation.
All measurements after the zero adjustment refer to this height.

Sensitivity settings

The most varied influences (e.g. the machine size and motorization, the size of the hydraulics, the subsoil condition or the sensing reference or, simply, just the selection of a different type of sensor) may require adjusting the sensitivity settings of the MLS 508 control system in manual and automatic mode.

The control sensitivity is an indicator for how quickly and drastically the system reacts to a control deviation.

The operator can set the sensitivity of each sensor type individually by assigning values between 1 and 100.

Meaning of the values:

1 = very insensitive;

100 = very sensitive;

If the MLS 508 works too unstable on one side in automatic mode, the sensitivity of the corresponding control loop should be reduced.

If the system operates too slowly, however, the sensitivity of the corresponding control loop should be increased.

The sensitivity settings are stored separately for each sensor type and each control loop.

This means that two different sensor types (e.g. a Sonic-Ski in ground sensing mode and a Cross-Slope sensor) on the left control loop may have or will have different sensitivity settings. In case the operator switches back and forth between those two sensor types during operation, the stored sensitivity setting belonging to each sensor will automatically be reloaded.

However, this also means that the same sensor (e.g. a Sonic-Ski in ground sensing mode) may have different sensitivity settings when it is selected for both, the left and the right control loop.

Setting the sensor sensitivity:

- 1) From the working window switch to the menu item Configuration menu and then to the parameter Sensitivity.
- 2) Call up the parameter Sensitivity and set the desired values for the active sensors.

Sensitivity			
86		79	
Change value		change value	
HELP		SAVE	CANCEL

- 3) Save the set value(s) and return to the working window.

Please note: If the same type of sensor is chosen for both the left and the right control loop of the MLS 508 (e.g. the system operates with Sonic-Ski ☐ sensors in gr sensing mode on the left side as well as on the right side), you will be asked during the storing process whether a change in the sensitivity settings of one sensor shall automatically bring about the same change in the sensitivity settings of the identical sensor on the other side.

SENSITIVI			
Set Sensitivity for both side?			
Change value YES			
HELP		ENTER	CANCEL

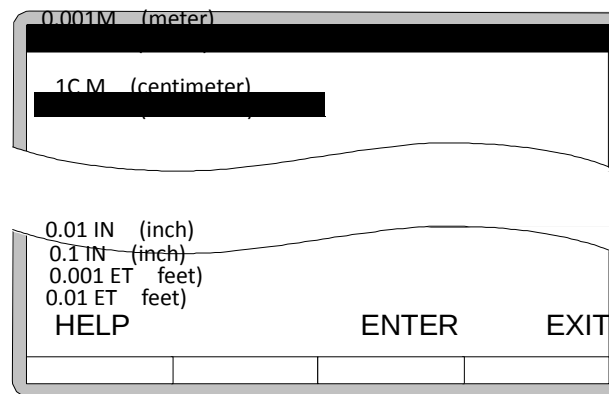
Machine description

Changing the measurement units

In this menu item, the country-specific physical measurement unit and the resolution of the displayed sensor values for grade and slope can be preset.

Setting the measurement unit of the grade sensors:

- 1) From the working window switch to the parameter *Change grade units* via the menu items *Configuration menu*, *User settings* and *Change units*.
- 2) Call up the parameter *Change Grade Units* and select the desired measurement units as well as the resolution for all measured values of the grade sensors.



- 3) Save the selection and return to the working window.

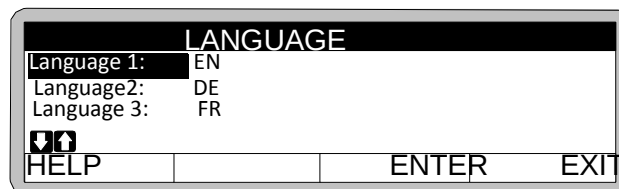
System languages

To enable the operator to also take full advantage of the graphic navigation menu with comprehensible texts and symbols in other languages the system language can be set for universal use.

English, French and German have already been installed ex works and can be selected immediately. Please contact your dealer referring the implementation of other languages.

Setting the language:

- 1) From the working window switch to the parameter Language via the menu items Configuration menu and Special functions.
- 2) Call up the parameter Language and set the desired system language.



- 3) Save the selection and return to the working window.

Operation

Before starting

Preparing for operation

To protect the water system from corrosion and frost, it is filled with around 5-7litres of antifreeze in the factory.

Before first starting up the machine, this must be drained off, collected and disposed of in an environmentally sound way under due consideration of local rulings.

- Close shut-off valve (1).
- Unscrew filter housing (2) and drain.
- Open hoses on pumps (3) and run empty.

Observe safety measures (gloves, protective goggles etc.)

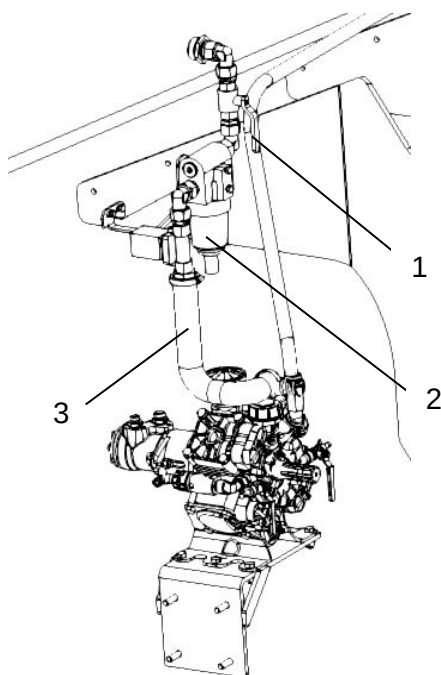


Fig. 1. Shut-off valve
2. Filter housing
3. Hose

Devices and aids

To prevent delays and to ensure a problem-free flow of work, before starting work, operators should check whether all the devices and aids required for smooth operation are available.

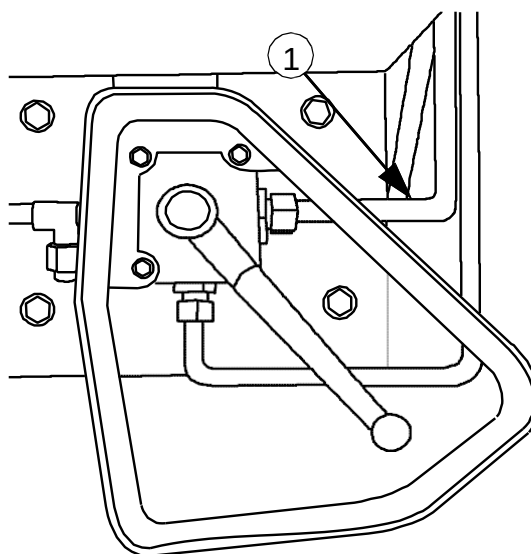
A sufficient quantity of lubrication agents and fuel substances, tools, spare cutting tools and other spare parts required as well as items of clothing for personal safety (protective clothing, reflective jackets, gloves, ear protection) should be available.

Before starting work

- Read safety instructions.
- Check personal protective equipment.
- The parts and equipment removed for safe keeping should be fitted again in accordance with the appropriate instructions.
- Walk around the machine to check for damage and leaks to ensure that the machine can be safely started.

Conduct checks in accordance with "Checklist for machine operator"

See the check list for machine operator from Appendix II.



Starting the machine

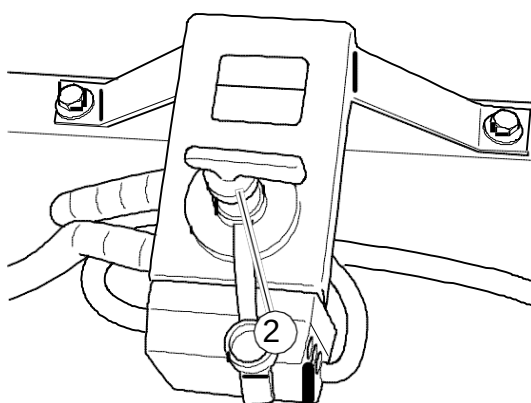
The following should be done before the diesel engine can be started and the machine can be operated.

- Daily machine maintenance

Check the operating hours counter to determine whether further maintenance work should be conducted.

- Check the safety and protection equipment.

Check the position of the lever for changing over the discharge conveyor.



If necessary, move the lever into the operation position (1).

If necessary:

- Align and secure folding roof.
- Fold up ladder and secure,
- Set up control panel (driver's seat, operating panel, guardrails).
- Switch on battery's main switch.(2)

Fig. 1. Operation position

2. Main switch



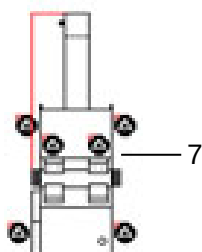
6



4



5



7

- Insert ignition key lock in position "0".
 - Switch ignition on (pos.1).
- Start screen appears on the display, position indicator of main operating panel light up.

- The start screen (4) is displayed while, the on-board computer is booting up.
- Once the booting procedure is complete, the main screen (5) appears on the display.
- Press the start button (6).

See button function description from "Machine description" chapter.

 Press the horn button before starting.

The machine cannot be started if the control lever and function keys are not in position 0 or if one of the emergency stop button is pressed. ((7) shown on display).

 If the engine does not start straightway, continue starting for a maximum of 20 seconds without a break, then wait 1 minute.

- Once the diesel engine has started, release the start button
- Use the display to check the operating and setting values, correct if necessary.
- Allow the machine to warm up if necessary.

**Fig. 4. Start screen;
5. Main screen; 6. Start/stop button;**



6



4



5

**Fig. 4. Start screen;
5. Main screen;
6. Start/stop button;**

External starting (starting aid)

If the batteries are flat and the starter is not running, the engine can be started using an external source of power.

The following are suitable as sources of power.

- Another vehicle with a 24V system;
- Additional 24V battery;
- Starting aid, 20V/100A.



Normal charge devices and rapid charge.

Devices are not suitable as starting aids.

To externally start the engine;

- Use appropriate to connect up source of power.



Check correct polarity! Always connect the negative cable last and remove it first.

- Insert ignition lock in position "0".
- Switch on ignition (pos.1).

Start screen (4) appears on display.

Position diodes of main operating panel light up.

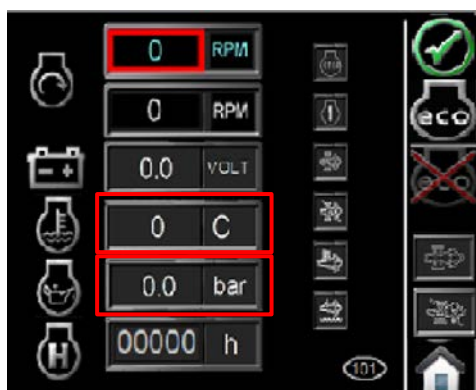
- The start screen (4) is displayed while the on-board computers is booting up.
- Once the booting procedure is complete the main screen (5) appear on the display.
- Press the start button (6).
- Once the diesel engine has started, release the start button.

Once the engine is running:

- Disconnect external source of power.

When using starter aid spray, note the engine's Operating instructions.

See main screen information from "Machine description" section.

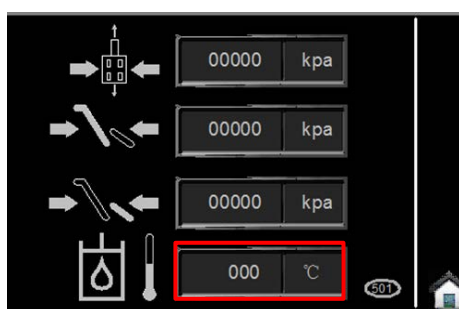


Allowing engine to “warm up”

To keep excessive wear and increased load of individual assemblies to a minimum, the engine should always, but especially at low outside temperatures ($<10^{\circ}\text{C}$), warm up for approx. 5 minutes at idle speed and without any load.

The optimum operating values of a warm machine are:

- engine: $60 - 110^{\circ}\text{C}$ coolant temperature, $2.4 - 2.8$ bar oil pressure at idle speed.
- hydraulic system: $45 - 85^{\circ}\text{C}$ hydraulic oil temperature.



The temperatures and pressure levels can be called up from the info screen 2 and 3.

Before the milling procedure is started, all hydraulic function elements on the machine should be moved several times.

See main screen information from “Machine description” section.

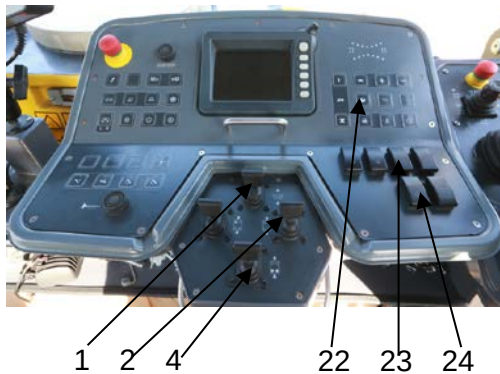


Fig. Switch panel, ergo control panel

Driving the machine

- Smoothly raise the machine by pressing button (1) or buttons (2), (4) until the distance required between the machine and ground has been reached.



- Never fully raise the machine for driving purposes!

- Risk of tipping!
- Slightly raise sliding shoe by pressing button (32).
- Slightly raised scraper board by pressing button (34).
- Engage driving gear by pressing button (22) (position indicator next to hare symbol activated).
- Check whether all other position diodes of the main operating panel are switched to „0“, if necessary, press button to change over.



- Always engage the warning lights (rotary beacons and hazard flasher) and unfold the warning sign when moving the machine!

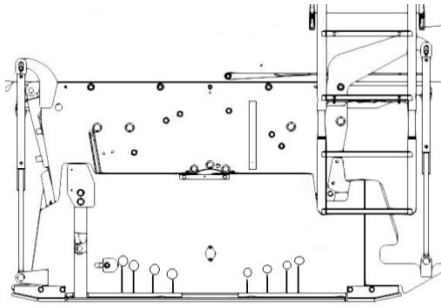
- Slide unlocking switch (17) of right-hand control lever (16) forwards and at the same time side the control lever in the direction of travel required until the machine starts to move.
- The unlocking switch can be released as soon as the machine moves.



In an emergency, press the emergency stop button (5) or one of the emergency stop buttons on the side operating units.

See button function description from “Machine description” chapter.

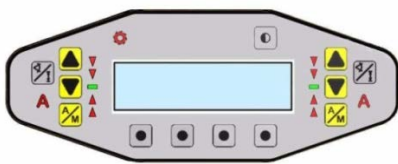
Milling (preparation)



- Drive the machine to the milling section and lower manually as far as possible (side boards are lowered, milling drum does not quite touch the ground)
- - Correct start position with the help of the reference points on sideboards for various grading depth (4,10,20,30cm)

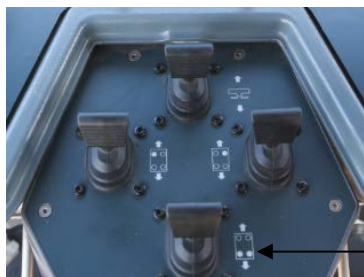
Example: Grading starts

Once the milling drum has been inserted to the grading depth of cm required, exactly on the rear 4 cm mark.



- Switch the A/M button of the digital controller of the levelling system to semi-automatic („AUTO“ function lamp flashing).
- Set grading depth and/or slope on both controllers. (Precondition: the zero and/or actual value calibration has already been conducted)

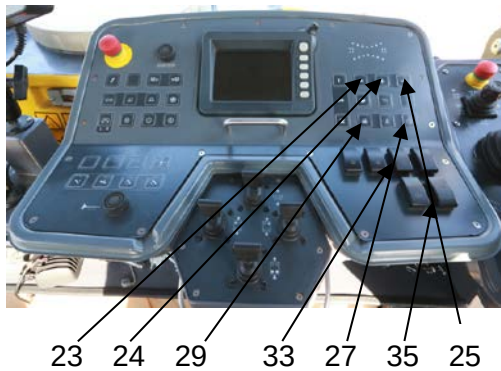
Please refer to the description of levelling system from “**Machine description**” Chapter.



4

- Lower the machine, by pressing the button (4) of the joystick panel, via the rear strut towers until the base-plates of the side boards touch the ground in the rear area.

Operation



Activate the function from the main operation panel.

See more instructions from chapter “Machine description – Switch panel, Main console, left & right, RH/LH ergo control, Front/Rear remote control”

The automatic function of the scraper, sliding shoe, upper and lower conveyor, water spray equipment can also be activated or deactivated from the lower control panels.

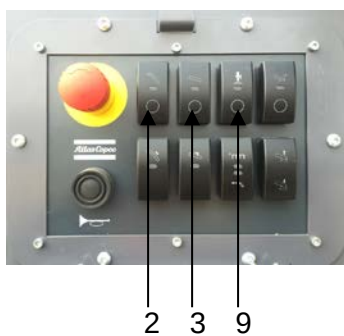


Fig. Switch panel, ergo control panel



Fig. Switch panel, ergo control panel

Once all the preparations for milling are complete, the machine is ready for milling, the automatic levelling device is activated from the main control panel and the machine is lowered to the depth required while at a standstill.

- Release control lever (3) by pressing slide switch and gently slide forwards out of central point (within dead band range).
- At the same time, use the function key (4) of the joystick panel control down so that the machine dips into a horizontal position and in its final position is tilted slightly more at the rear than at the front.

This milling position should be retained during the entire milling process, even if the grading depth is changed via the digital controller.

- Set the milling speed required by pressing button (24) or (25).

The machine starts to move:

- Depending on the setting, the speed display lights up.

The speed reached is shown on the display.

Other settings can also be made on the leveling equipment.

Milling operations using set-up button

If the machine is fitted with two operating panels and equipped for simultaneous operation, the set-up button (27) then assigned the function task can be used to simply lower the machine when stationary.

Milling drum, automatic leveling device and all other automatic functions needed for milling operations must be activated in advance.

The simultaneous control lever need not be used to lower the machine in this function so that the risk of forward motion can be ruled out.

Once the grading depth and position required has been reached in this way by activating the set-up button (LED active), release one of the two control levers and slide forwards (LED of set-up button (27) is deactivated).

The machine begins to move forwards and all preset automatic functions are activated.

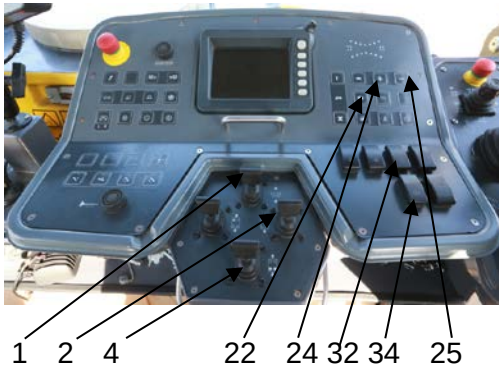
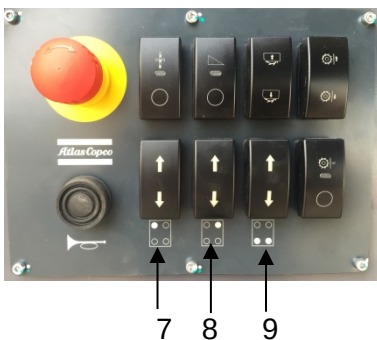


Fig. Switch panel, remote control

Stop the machine and raise at the end of the milling track:

Depending on the cutting depth, the end of the cut will be at the height of the reference point marked on the side boards:

-To remove the milled product from the conveyor belts, let the lower and discharge conveyors run on as is necessary.

The run-on times can be set in the lower and discharge conveyor menu.

- Smoothly raise the machine by pressing button (1) or button (2), (4) of the main control panel.

-  Pressing button (7), (8), (9) of the rear side control unit until the distance required between the machine and ground is reached.

Never fully raise the machine for driving purposes!
Risk of tipping!

- Slightly raise sliding shoe by pressing button (32).
- Slightly raise scraper board by pressing button (34).
- Change all other position diodes of the main control panel over to "0".
- Changing driving gear back to transport speed by pressing button (22) (position diode next to hare symbol activated).

The driving speed cannot be controlled in transport gear by pressing button (24) or (25)!

See button function description from "Machine description" chapter.

Parking the machine



Before parking the machine, read the operating hours counter and check whether any maintenance work is to be conducted.

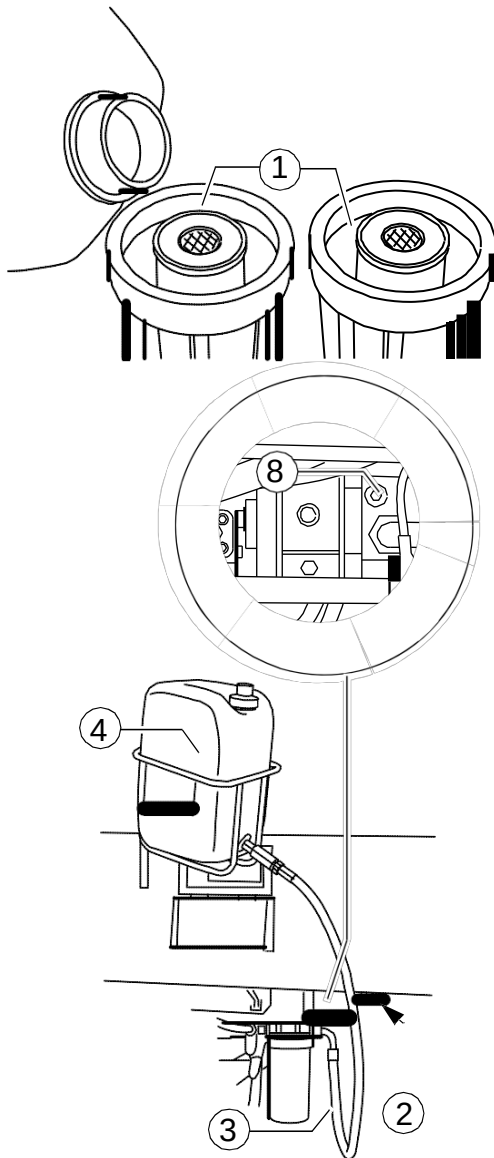
When parking the machine on publicly accessible land, secure it to ensure that unauthorized persons and children cannot do any damage to the machine.

The machine should be parked on level ground; the discharge conveyor lowered and, if possible, swiveled into a safe area.

- Lower scraper, sliding shoe and side boards.
- Remove ignition key and master switch and take them with you – do not leave them, hidden “in the machine”
- Fit cover to operating panel and lock.
- Close protective covers of the side control elements and lock.
- Fold up ladder on the right-hand side of the machine.
- Close guardrail.
- Safely store loose components and accessories such as removable spotlights or parts of the levelling equipment.
- Deploy folding roof, remove key.
- Close all bottom lids, hoods and storage rooms.
- Fold out full length of traction unit supports so that the vehicle cannot be lowered should attempts be made to do so.

See main screen information from “Machine description” section.

Preserving the water spraying system



To avoid damage caused by frost and corrosion when parking the machine for long periods of time, not only should the tank be drained and the filters, pumps and hoses emptied, but the water system should also be preserved.

An appropriate anticorrosion and antifreeze mix should be used for this purpose.

- Unscrew filter housing (1), fill with the mix and refit as usual.
- Close shut-off valve (2), remove intake hose (3) and connect with the filter tank (4).
- Fill filter tank with the mix and suspend or hang at a point higher than the pump.
- Start the engine.
- Press button (5) and (6) at the same time, then use button (7) to activate the pump, vent the high pressure pump (O).
- Switch off pump as soon as the drawn in mix exits the spray nozzles.
- Switch off engine.
- Refit filter tank screw connection on shut-off valve.

Observe safety instructions relating to working with the solution!

A suitable preservative/antifreeze can be ordered under item number 956.99.58.15.

Around 7 liters of the mix is needed for preservation.

When mixed at ratio of 1:1 with water, this provides frost protection down to around -30°C.

See button function description from “Machine description” chapter.

**Fig. 1. Filter housing;
2. Shut-off valve; 3. Intake hose;
4. Filter tank; 5,6. Remote control**

Long-term parking

 The following instructions should be followed when long term parking (more than one month).

Before using the planer again attend to the items marked with a “below”.

Wash the machine and touch up the paint finish to avoid rusting.

Treat exposed parts with anti-rust agent, lubricate the machine thoroughly and apply grease to unpainted surfaces.

Battery

*Remove the battery from the machine, clean, grease the cable connectors (terminals) and trickle charge the battery once a month. The battery is otherwise maintenance free.

Engine

*See the manufacturer’s instructions in the engine manual.

Watering system

*Empty the water tank and all hoses of water. Empty the filter housing and the water pump. Undo all sprinkler nozzles.

See maintenance sections for “Watering system - draining”.

Hoods, tarpaulin

*Lower the instrument cover over the instrument panel.

*Cover the entire planer with a tarpaulin. A gap must be left between the tarpaulin and the ground.

*If possible, store the planer indoors and ideally in a building where the temperature is constant.

If the machine is stationary for over 6 months to 1 year the following items must also be attended to.

*Drain off the engine oil and fill the diesel engine with an approved conservation oil.

Fuel tank

Fill the fuel tank completely full to prevent condensation.

Hydraulic reservoir

Fill the hydraulic reservoir to the uppermost level mark.
(see under the heading 'Every 10 hours of operation.')

Transport

Safety regulations for transport



There is a risk of accident if the machine is prepared incorrectly and transportation is conducted incorrectly.

Prepare the machine ensuring that all components are secured and cannot come loose. Dismantle all protruding and removable components and/or fit them so that they do not represent a hazard!

The weather protecting sun roof should be deployed and appropriately fastened during transport.

Lower all of the machine down to the upper section of the separated traction unit supports. When in this position, the cutting tool tips of the milling drum are approx. 1 cm above the ground. If a wooden support is fitted, the milling drum can rest gently on this.

The discharge conveyor should also be moved into its floating position if necessary.

The machine should be fastened onto the attachment points provided for this purpose and fixed to the transporter in accordance with the relevant regulations.

Ensure that the transport vehicle is authorized for transport of this type and that the maximum transport load is not exceeded.

Store all components which are not permanently connected to the machine in the boxes and storage areas provided.

Close all panels and check that they are securely fastened.

Use the cover to secure the main control panel, close the side operating units.



When loading via ramps, there is a risk that the machine will slip, tilt or overturn.



Drive carefully! Keep people away from the danger area!

The following applies in addition to the above during transport on public roads:

The machine driver must have a valid driving license for this type of vehicle.

The operating panel must be on the side facing oncoming traffic and be secured in place.

The headlights must be set in accordance with the relevant regulations.

When driving on public roads, if necessary, another person must guide the machine driver especially at crossroads and side-road junctions.

Note the load bearing capacity of vaults and bridges as well as the permissible transport height and width.

Miscellaneous

Fix points

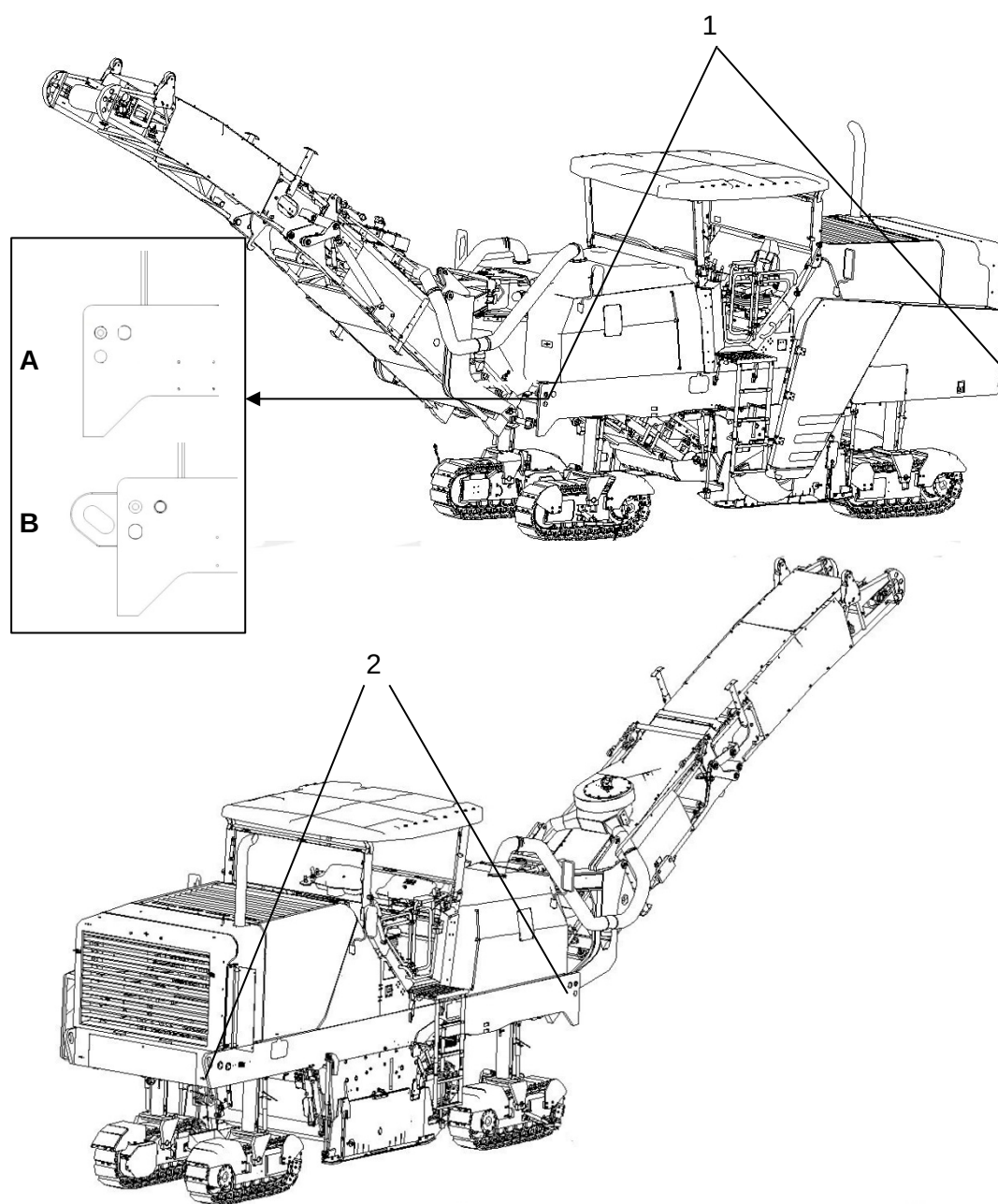


Fig. Fix points

There are two fix points (1) on each side of the machine frame, at the front and back.

The machine should be fastened to these points during transport on the transport vehicle.

The machine is to be fixed to the transporter using sufficiently sized shackles (chains) and secured so that it cannot tilt, slide or fall off.

Note: please follow below instruction before/after lifting machine:

- a. Before lifting, manually adjust the front lifting point from state A to state B;
- b. Start lifting.
- c. After lifting, manually adjust front lifting point from state B to state A.



Attention: when working, be sure that the front lifting point is as state A.



***Stand well clear of the hoisted machine!
Make sure that the lifting hooks are properly secured.***



The machine must be held in a horizontal position when lifted!

Transport on trailers

When transporting the machine on trailers, the load dimensions and weights should be taken into account when selecting and using appropriate tractor vehicles and transporters in accordance with the road traffic and registration authorities.

Approach ramps and tracks of the trailer should be coated with a slip-free material. There must be sufficient possible attachment points on the trailer.

Approach ramps and trailers must be upright during loading to prevent the machine from sliding or tilting sideways.

Always keep approach and transport areas free of contaminations, such as clay, grease or oil.

Only drive onto the trailer and manoeuvre in working gear.

If necessary, use winches to secure the machine when driving on.

The machine should be cleaned before being loaded.

The machine should be parked and secured as follows:

Position the machine on the transporter ensuring that the transport height, width and loaded distribution correspond to the relevant regulations

Activities and preventive measures:

- In order to achieve a lower transport height, the machine is evenly lowered down to the upper section of the separated traction unit supports. When in this position, the cutting tool tips of the milling drums are just (approx.1cm) above the ground and can if necessary be gently rested on a wooden supporting if fitted.
- Sliding shoe and scraper plate are raised slightly,
- Weather protecting sun roofs, ladders, operating equipment should be folded in or removed.
- The front loading belt is placed on its support and if fitted, the parking brake is engaged and the engine switched off.
- do not leave any insecure components on the machine or the load surface.

When transporting machines with a foldable discharge conveyor, this is placed on the front locating surface of the transporter and if necessary secured separately.

- Securely fix the machine to the four fix points provided on the transporter.

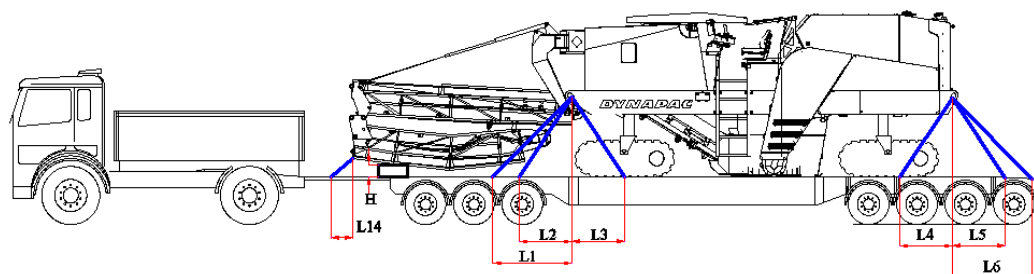
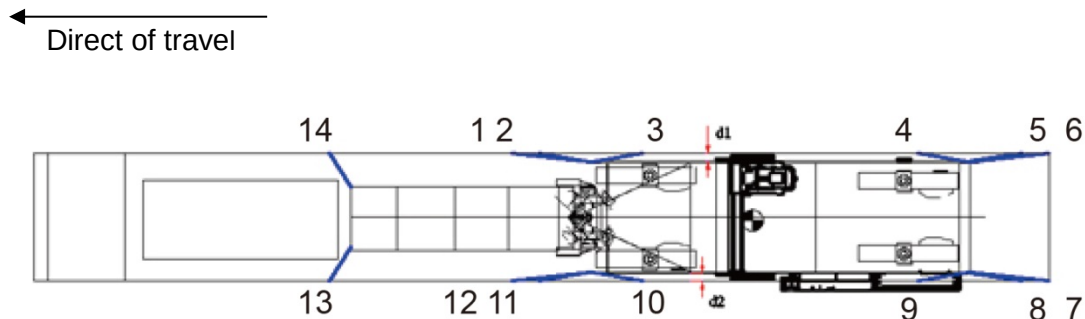


Fig. Transport with a foldable conveyor

Miscellaneous

Secure PL 2000 F for transporting.
(The instructions also apply to machine without conveyor.)



1-14 = single lashings, i.e. one lashing with two parts, one head on the machine, another head on the platform.

The lashings' permitted distance interval in meters				
1, 6,7,12: Single lashings, LC at least 6 tonnes (60 KN)				
2-5, 8-11: Single lashings, LC at least 8 tonnes (80 KN)				
13, 14: Single lashings, LC at least 1 tonnes (10 KN)				
L1/L6	L2	L3	L4	L14
1.0-1.5	1.0-1.5	1.0-1.5	1.0-1.5	0.5-1.5

Load carrier-The machine must always be reversed up the ramp with the rear end pointing in the direction of travel of the transport vehicle.

- When loaded, the planer is not centered laterally on the platform, refer fig 1 dimension, $d1=d2=145\text{mm}+50\text{mm}$
- The steering angle of the front wheels must be zero.
- The drive motor of wheel/track should be locked.
- Lower the machine until the milling drum is just above the ground (approx. 5 cm), or if wooden supports are used the drum should rest lightly against them.
- Lower the rear scraper, front guard and left/right shields to the lowest position.
- Lower the roof to its lowest position. Extruding control equipment must be retracted, or removed.
- The parking brake is applied and in good working condition and stop the engine.
- If the conveyor belt is mounted, place it on its support and lash it as per fig. 1
- Chock all machine wheels/tracks, strongly recommend non-slip mat under wheel/track to increase the friction factor.
- The contact surfaces must be clean, wet or dry, and free from frost, ice and snow.
- The lashing mounts on the load carrier have LC/MSL at least 10 tonnes.

Lashings

- The lashings 1-14 comprise a lashing strap or chain with a permitted load (LC/MSL) of at least in table 1.
- The lashings are re-tightened as required, the lashing preload should follow the lashing supplier instruction.
- Each of lashings 1-14 is a single lashing. One end on the machine, another end on the platform.
- Lashings in the same direction are placed in different lashing mounts on the trailer.
- The lashing hooks must not lose grip if the lashings become slack.
- The lashings are protected against sharp edges and corners.
- The lashings are located symmetrically in pairs on the right and left sides.



Make sure that the lashing equipment, e.g. chains, blocks and attachments in the transport vehicle, are approved and have the requisite breaking strain for the mode of transport. The lashing must be held tensioned during the entire transport.

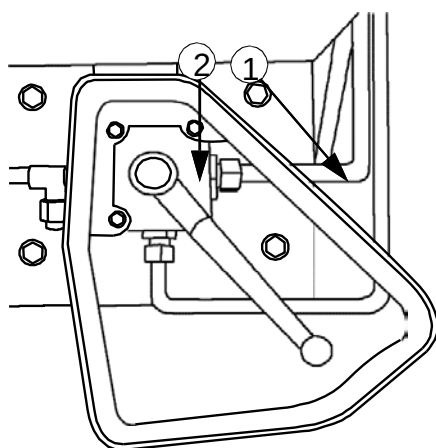


Fig. Transport position



If the support for the discharge conveyor or the locating surface for the folded in discharge conveyor is placed on the frame of the towing machine, the swivel hydraulic of the discharge conveyor must be changed over to the floating position once parts have been placed on this frame.

In order to do this, the lever provided for this purpose must be moved out of its operating position (1) into the transport position (2)!



Risk of accident! If the locating surface is not on the towing machine, but on the trailer, the swivel hydraulics must always be shifted into the operating position!

When transporting the machine on different forms of transport, such as by rail or ship, proceed as described in the appropriate valid transport and loading system.

Transport and parking lock for discharge conveyor



Fig. 1. Lock

In order to prevent the discharge conveyor from accidentally swiveling during transport on the trailer or when parking for long periods, the groove of the lock (1) should be inserted in the associated support of the discharge conveyor bracket for this purpose.

Only apply the lock when parking and for transport purposes during which the discharge conveyor is rigidly placed on the trailer or has to be held. In other words, when the unit is not subject to swivel movement. Never apply the lock for transport purposes in which the discharge conveyor is flexibly mounted, e.g. placed on a support fixture on the tractor machine of the trailer!

Normal on-road travel

The machine is not intended for normal on-road travel and is not equipped for such circumstances. It should be used within enclosed building sites.

If the machine's loading or unloading area is outside an enclosed building site or if the machine has to propel itself from one section of the roadworks to another, the machine must be dual-manned for safety reasons. All safety measures (cordoning off) required for this should be implemented.

If a machine has to be parked on a public highway, it should be cordoned off in accordance with the relevant regulations and secured to prevent the machine from rolling away, tilting or swiveling.

If the machine components protrude into another lane of traffic during milling or maneuvering, this should be briefly cordoned off until the hazard has passed.

The rotary beacons and hazard flasher are permanently activated during milling and transport, the warning signs on the machine are permanently folded down.

If necessary, the machine should always be used on the nearside, away from oncoming traffic.

For relocation or during journeys required over a long distance (distance>1km), the machine should be transported on its transporter for technical and safety reasons

Hydraulically foldable discharge conveyor

Folding in the discharge conveyor

The machine's transport length can be significantly reduced in a few simple steps by using hydraulic foldable discharge conveyor.

To fold the discharge conveyor, various preconditions must be checked and/or satisfied. Machine has been moved out of its milling track and is therefore on as level a base as possible. Discharge conveyor is in its working position. Milling drum is not activated.

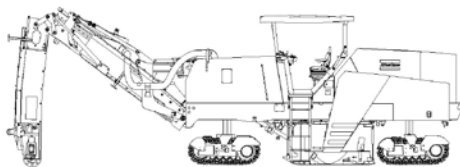


**Fig. Switch panel;
Foldable conveyor**

- Loading and discharge conveyors are not being operated.

Steps required for folding process:

1. Firstly raise machine as far forward as possible over traction unit legs then lower as far as possible to the rear.
2. Ensure that the distance between the bit of milling drum and the ground is more than 150mm.
3. Activate service Button 1 on the operating panel to enter into the service mode.
4. While the Button 2 is being pressed, the conveyor continues being folded in until the button is released.
5. Once the discharge conveyor is folded in completely, release Button 2 to finish this process.

See button function description from “Machine description” chapter.

Folding out the discharge conveyor

To fold out, proceed as for the folding in process but in reverse.

The following should be noted:

1. Firstly raise machine as far forward as possible over traction unit legs then lower as far as possible to the rear.
2. Ensure that the distance between the bit of milling drum and the ground is more than 150mm.
3. Activate service Button 1 to enter into the service mode.
4. While the Button 3 is being pressed, the conveyor continues being folded out until the button is released.
5. Once the discharge conveyor is folded out completely, release Button 3 to finish this process.



1 2 3

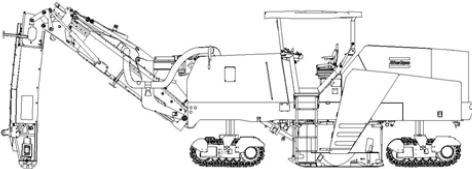


**Fig. Switch panel;
Foldable conveyor**

When pushbutton is pressed, a warning sound can be heard and the discharge conveyor begins to fold. The pushbutton must be held down during the entire folding process.



Ensure that there is no one in the machine's danger area.

The folding process is complete once the belt is correctly re-tensioned (visual inspection).

See button function description from “Machine description” chapter.

Load by crane

In the event of break down, should it no longer be possible for the machine to be towed or if it cannot be loaded in any other way, there is also the possibility of raising it by crane.



Use lifting tackle with sufficient load bearing capacity.

(For weights and dimensions, refer to Chapter B). Ensure that the steel cables, shackles and crosshead are large enough.

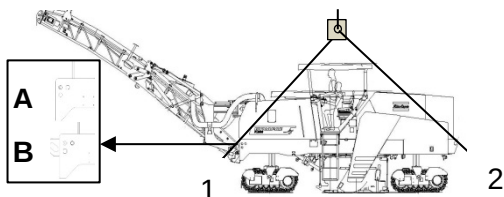


Fig. Load by crane

For attachment points (1,2) are provided on the machine frame for loading the vehicle using lifting gear.

- Secure vehicle wherever it is parked up.
- Move discharge conveyor into operating position.
- Weather protecting sun roof may be deployed.
- Safely store loose components and accessories, such as removable spotlights or leveling equipment parts.
- Change state A to state B, attach lifting gear to four attachment points (1,2).



During transport, ensure that the machine is always horizontal! Ensure that there is nobody in the danger area.



Risk of accident! When loading by crane, the swivel hydraulics of the discharge conveyor must always be moved into their operating position (1) because otherwise the machine may e.g. swivel outwards accident tally if on a slight incline.

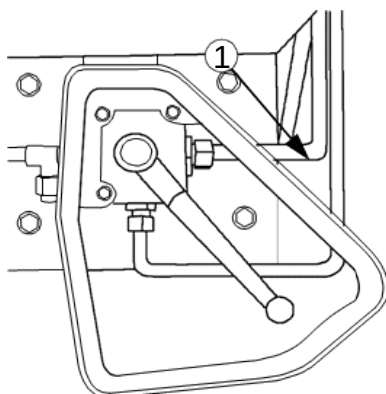


Fig. 1. Position of discharge conveyor swivel hydraulics

Towing procedure

Observe all regulations and undertake all necessary cautionary measures which apply to the towing of heavy construction machinery.



The tractor vehicle must be such that it can still hold the machine when travelling downhill. Only use authorized tow bars!



Only disengage travel drive and only release traction unit brakes once machine is sufficiently secured to prevent it from accidentally rolling away or once it has already been correctly connected to the towing vehicle.

A valve and manual pump are located under the main frame of left side. These must be actuated if the machine is to be towed.

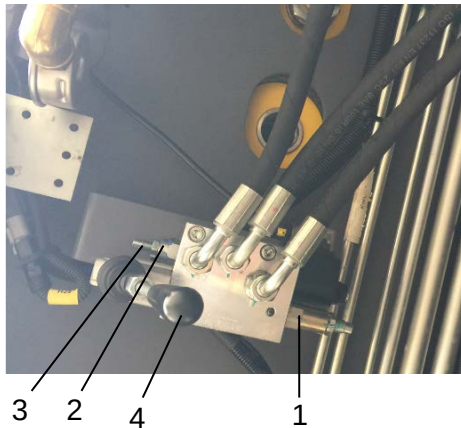


Fig. 1. Valve
2. Lock nut
3. Thread dowel
4. Lever

- In order to disengage the hydraulic circuit for towing, the valve (1) under the manual pump must first be changed over.

- Then the lock nut (2) on the manual pump must be released and the thread dowel (3) screwed as far as possible into the pump. Re-tighten the lock nut for safety.

- Now the lever of the manual pump (4) must be pressed until sufficient pressure has built up and the traction unit brakes have released themselves.

The brake will release them at a pressure of approx.30bar.

The machine can now be carefully and slowly towed out of the construction site area.



Always tow the shortest possible distance to transport equipment or to the nearest state parking area.

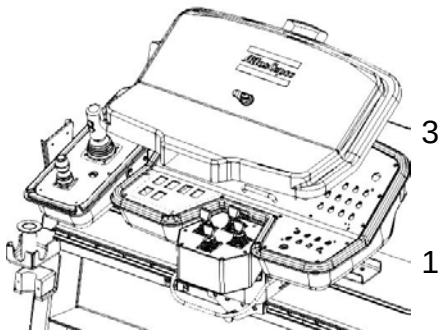
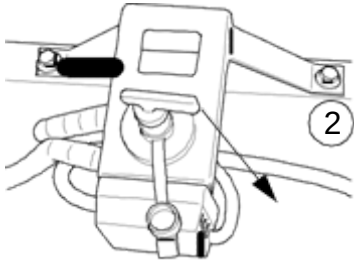
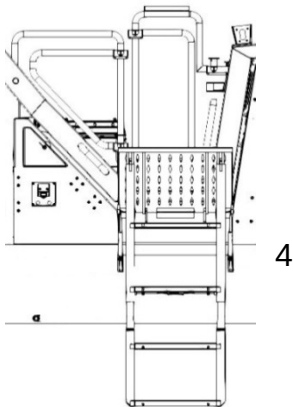
Once towing is complete, change back the valve (1), unscrew the threading dowel (3) again (several turns) and use the lock nut to secure.

The traction unit brakes are now active again and the machine is secured to prevent it from rolling away.

Secure before parking up

When parking on publicly accessible areas, the machine should be secured to ensure that unauthorized persons and children cannot cause any damage to it.

The machine should be parked on level ground; the discharge conveyor lowered and, if possible, swiveled into a safe area.



- Lower scraper, sliding shoe and side boards.
- Remove ignition key (1) and master switch (2) and take them with you- do not leave them "hidden" in the machine.
- Fit cover (3) onto operating panel and lock.
- Fold up the ladder on both sides of the machine and swivel the guardrails in front of the slip-free step (4).
- Safety store loose components and accessories such as removable spotlights or leveling equipment parts.
- Deploy folding roof, remove key.
- Lock all bottom lids, hoods and storage rooms.
- Fold out full length of traction unit supports so that the vehicle cannot be lowered should attempts be made to do so.

Fig. 1. Ignition key
2. Master switch
3. Cover
4. Slip-free step

Operating instructions – Summary



1. Follow the **SAFET INSTRUCTIONS** specified in the Safety Manual.
2. Make sure that all instructions in the MAINTENANCE are followed.
3. Turn the master switch to the ON position.
4. Check that all switches are in position 0 and the Forward/Reverse control is in neutral.
5. Start the engine and allow it to warm up.
6. Set the gear position switch in the required position.
7. Adjust the engine RPM to the desired position.
8. Set the travel speed to the desired position.
9. Check that the milling drum clears the ground, at least 10cm. Raise the machine if necessary.



10. Drive the planer. Operate the forward/reverse lever with care.



11. Check the brakes. Remember that the braking distance will be longer if the hydraulic fluid is cold.



12. **IN AN EMERGENCY:**
 - Press the emergency stop
 - Hold the steering wheel firmly
 - Brace yourself for a sudden stop
13. When parking:
 - Set the forward/reverse control in NEUTRAL.
 - Chock the wheels.
14. When lifting: - Refer to the relevant section in the Instruction Manual
15. When towing: - Refer to the relevant section in the Instruction Manual.
16. When transporting: - Refer to the relevant section in the Instruction Manual.
17. Retrieval: - Refer to the relevant section in the Instruction Manual.

Preventive maintenance

Complete maintenance is necessary for the machine to function satisfactorily and at the lowest possible cost.

The maintenance section includes the periodic maintenance that must be carried out on the machine.

The recommended maintenance intervals assume that the machine is used in a normal environment and working conditions.

Acceptance and delivery inspection

The machine is tested and adjusted before it leaves the factory.

On arrival, before delivery to the customer, delivery inspection must be conducted as per the check list in the warranty document.

Any transport damage must be immediately reported to the transport company.

Warranty

The warranty is only valid if the stipulated delivery inspection and the separate service inspection have been completed as per the warranty document, and when the machine has been registered for starting under the warranty.

The warranty is not valid if damage has been caused by inadequate service, incorrect use of the machine, the use of lubricants and hydraulic fluids other than those specified in the manual, or if any other adjustments have been made without the requisite authorization.

Maintenance – Lubricants and symbols

DYNAPAC/ATLAS COPCO

Only the listed lubricants or commercial products with corresponding qualities may be used.

Use only containers that are clean on both the inside and the outside to add oil or fuel.

Observe the filling amounts!

 Using the incorrect oil/lubricant leads to increased wear and machine breakdowns

Hydraulic oil



Always use high-quality lubricants and the amounts recommended. Too much grease or oil can cause overheating, resulting in rapid wear.

Fluid volumes

PL2000F

Fuel tank	1100L
Engine oil	53L
Hydraulic fluid tank	300L
Water tank	3400L
Pump distribution transmission	12L
Planetary gear, milling drum	20L
Coolant, engine	To Max. of filling level display
Coolant, milling drum	420L
Urea	L
Grease	Kg

Maintenance

1 Notes regarding safety for maintenance

During all maintenance work, the regulations regarding health, work and fire protection are to be heeded. The necessary protective equipment is to be worn continuously.

If not described otherwise, maintenance work must only be carried out with the engine stopped (heed the notes regarding checking and replacing milling bits and milling bit holders!).

Maintenance work must only be carried out on even and stable surfaces. When working in closed areas, exhaust fumes must be vented to the outside. Provide sufficient ventilation.

Before beginning maintenance work, secure the machine against inadvertent starting, rolling away or lowering by:

- putting the drive lever into the neutral central position and putting the machine feed into the “zero” position using the selection switch.
- removing the ignition key and the main switch
- positioning the sign “DO NOT START” on the control panel so that it is clearly visible.
- when working under the machine, position all traction unit supports and wear a hardhat.
- If required, use chocks to prevent the drive units from rolling away.

In addition, pay attention to the following when replacing the milling bit and the milling bit holder.

- if the pneumatic bit extractor is used, the drive engine must only run at idling speed. The milling drum drive must be switched off.
- The drum flap is locked in the open position.
- The limit switch of the drum flap is functioning.
- The belt tightened must be retracted and the clutch must be deactivated.

If safety and protective devices must be removed for maintenance, they must be properly reinstalled again before putting the machine back into operation.

Do not use easily flammable materials during cleaning.

Always keep steps and other areas where persons can stand free of lubricants and slip-proof.

When using the installed high-pressure clearer or a stem sprayer to hose down electric parts, do not expose any electronic modules, insulators or ventilators to the direct water jet; cover these items if possible.

Avoid electrical soldering work on the machine; this can lead to damage of the electronic and hydraulic modules!

However, if exceptional electrical soldering work on the machine should become necessary, the following is to be heeded before beginning work:

- the ignition is turned off
- the power circuit is interrupted
- the electrical devices are disconnected from the power supply
- the ground terminal of the solderer is placed as closely as possible to the point to be soldered.

During all work on the electrical installation, always remove the mass cable from the battery.

Only use fuse inserts of the stipulated amperage.

2 Liability exclusion in case of use of non-original spare or wear parts as well as incorrect operating materials.

For maintenance and repair work, only the wear and spare parts allowed by the manufacturer are permitted to be used and are to be installed by experts.

Consult the manufacturer in case of doubt.

Only those materials that are described in these operating instructions are to be used as lubricating and operating materials.

In the case of non-compliance with these regulations, liability of the manufacturer for resulting damage is excluded.

3 Maintenance intervals

The manufacturer is adding more and more maintenance-free modules to the machine construction. The number of lubrication points described in the following can therefore deviate from the number of lubrication points that actually exist on the machine.

The maintenance intervals and the degree of maintenance for the drive engine are not completely presented in the following. They are to be executed according to the engine manufacturer following the enclosed operating and maintenance instructions.

Maintenance schedule

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.1) Engine drive unit									
Fuel tank	Check level	■							
	Add fuel								■
	Clean tank and system							■	
Engine	Check oil level	■							
	Add oil								■
	Replace oil				▼	■			
	Replace oil filter				▼	■			
	Clean fuel pre-filter						■		■
	Replace fuel filter				▼		■		
	Drain fuel filter water separator	■							■
	Check air filter		■						
	Clean/replace air filter insert						■		
	Check radiators	■							
	Clean radiators								■
	Check coolant level		■						
	Add coolant								■
	Replace coolant						■		■
	Replace coolant filter						■		
	Check drive belt	■							
	Tighten drive belt		▼					■	■
	Check valve clearance							■	

Maintenance	■
Maintenance during run-in period	▼

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.1) Engine drive unit									
Engine	Check engine brackets	■							
	Tighten engine brackets			■					■
	Check screw connections between pump distribution transmission and engine	■							
	Tighten screw connections between pump distribution transmission and engine			■					■
Clutch	Replace clutch element								■

Maintenance	■
Maintenance during run-in period	▼

Maintenance schedule

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.2) Hydraulic system									
Hydraulic oil tank	Check oil level	■							
	Add oil								■
	Replace oil						■		
High-pressure hydraulic filter	Check maintenance display	■							■
	Replace filter element					■			■
Suction/return hydraulic filter	Check maintenance display	■							
	Replace filter element						■		■
Pump distribution transmission	Check oil level		■						
	Add oil								■
	Replace oil				▼		■		
	Check aerator		■						
Oil cooler	Carry out visual check	■							
	Clean radiators								■
Hydraulic hoses	Carry out visual check					■			
	Replace hoses							■	■
Hydraulic unit for roof and hood activation	Check oil level					■			
	Add oil								■
	Replace oil						■		

Maintenance	■
Maintenance during run-in period	▼

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.3) Traction units, chassis legs and steering system									
Planetary gear	Check oil level		■						
	Add oil								■
	Replace oil				▼		■		
	Check visible, nonglued nuts and screws;tighten if necessary				▼		■		
Traction unit	Check chain tension	■							
	Adjust chain tension								■
	Check condition of bottom plates	■							
	Replace bottom plates								■
Retaining device for track rod and steering cylinder bolts	Check attachment		■						
Steering system sliding parts, steering arms, stop ring and scraper	Undertake visual check (attachment, wear)	■							
	Secure / replace components								■
	Replace steering system sliding parts						■		

Maintenance	■
Maintenance during run-in period	▼

Maintenance schedule

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.4) Milling section									
Milling bit, bit boxes	Check condition	■							
	Replace bits / bit boxes								■
Belt drive	Check condition	■							
	Replace belt								■
Clutch "DESCH" TYPE	Check friction lining wear						■		■
	Replace friction lining								■
Drum transmission	Check oil level		■						
	Add oil								■
	Replace oil					▼	■		
	Check visible, nonglued nuts and screws; tighten if necessary					▼	■		
Milling drum	Check fluid level						■		■
	Add coolant								■

Maintenance	■
Maintenance during run-in period	▼

Please note the different maintenance instructions for the different clutch types!

You can refer to the type plate on the clutch to determine which type is appropriate for your machine!

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.4) Milling section									
Scraper and supporting skids	Check scraper and supporting skid		■						
	Replace scraper or supporting skids								■
Runners side board	Check skids	■							
	Replace skids								■
Skid sliding shoe	Check skids	■							
	Adjust/replace skids								■
Limit switch drum flap	Check function			■					
	Adjust/replace limit switch								■
Rubber seal of side boards	Check rubber seal		■						
	Replace rubber seal								■
Fastening bolts of milling drum housing	Check that fastening bolts are secure					■			
	Tighten fastening bolts								■

Maintenance	■
Maintenance during run-in period	▼

Maintenance schedule

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.5) Loading equipment									
Conveyor belt	Check tension/sag	■							
	Set tension/sag								■
	Check for damage	■							
	Replace conveyor belt								■
Loading belt rolls	Check condition	■							
	Replace rolls								■
Drum holder	Check condition				■				
	Re-weld shaft ends								■
Retaining ropes, catch ropes and shackles	Check condition	■							
	Replace ropes/shackles								■
Funnel rubber of transfer points and sealing rubber	Check for damage		■						
	Replace funnel rubber / sealing rubber								■

Maintenance	■
Maintenance during run-in period	▼

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.6) Water system									
Water tank	Check level	■							
	Add water								■
	Replace water						■		
	Clean tank					■			
Filling pump	Replace oil						■		
	Drain water								■
Water filter	Check water filter	■							
	Replace both filter elements	■							
	Drain water								■
Water pump	Aerate pump								■
	Drain water								■
Lower conveyor	Check function								■
	Drain water								■

Maintenance	■
Maintenance during run-in period	▼

Maintenance schedule

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(3.7) Power supply									
Batteries	Maintenance-free								☒
(3.8) Pneumatic system									
Maintenance unit	Check oil level		☒						
	Add oil								☒
	Drain water								☒
(3.9) Levelling device									
Sensors, controllers, connecting cable	Check condition	☒							
	Clean or replace								☒
(3.10) Miscellaneous									
Emergency-stop button	Check function	☒							☒
	Replace button								☒

Maintenance	☒
Maintenance during run-in period	☒

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(4.0) Lubrication points									
Drive unit	Lubricate support legs (grease nipple))/ Check lubrication of sliding surfaces	■							■
	Lubricate steering cylinder (grease nipple)		■						
	Lubricate floating pin (grease nipple)		■						
Milling section	Lubricate belt tightener (grease nipple)		■						
	Lubricate hydraulic cylinder drum flap (grease nipple)		■						
	Milling drum bearing								■
	Lubricate "DESCH TYPE" clutch bearing (grease nipple)						■		
	Lubricate clutch "STROMAG" TYPE bearing (grease nipple)			■					
	Clutch bearing "STROMAG TYPE" Replace bearing's grease fill							■	

Maintenance	■
Maintenance during run-in period	▼



Please note the different maintenance instructions for the different clutch types!

You can refer to the type plate on the clutch to determine which type is appropriate for your machine!

Maintenance schedule

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(4.0) Lubrication points									
Upper conveyor, standard (fixed)	Lubricate pedestal bearing for tail roller (grease nipple)		■						
	Lubricate tension bearing for drive roller (grease nipple)		■						
Upper conveyor, optional (foldable)	Lubricate pedestal bearing for tail roller (grease nipple)		■						
	Lubricate tension bearing for drive roller (grease nipple)		■						
	Lubricate flange bolts		■						
	Lubricate springs, joints and bolts in joint area		■						
Spray nozzles	Lubricate pedestal bearing for tail roller (grease nipple)		■						
	Lubricate tension bearing for drive roller (grease nipple)		■						

Maintenance	■
Maintenance during run-in period	▼

Service point	Task	Operating hours							
		10	50	100	250	500	1000 / annually	2000 / biannually	when required
(5.0) Inspections									
General visual inspection			■						
Inspection by an expert							■		

Maintenance	■
Maintenance during run-in period	▼

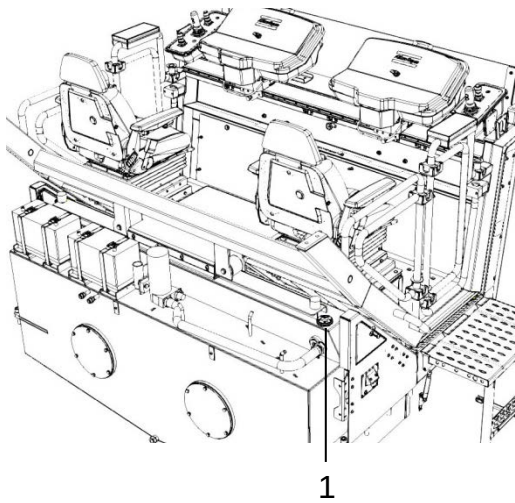


Fig. 1. Sensor

Engine drive unit

Fuel tank

The fuel tank should be filled before every work session so that the fuel system is not "run dry", which would require time-consuming aeration.

The fuel level can be found in the display through the sensor (1), check it during daily operation.

The tank neck is located below the operator's control station on both sides of the vehicle.



When filling the tank, ensure that no fuel reaches into the soil. Stop the engine and do not smoke. Do not fill the tank in enclosed area: health danger! Supply fire extinguishers.



Do not fill up the machine with contaminated fuel!

Contaminations in the fuel may result in serious defects and engine failure!

Follow Engine operating instructions!!

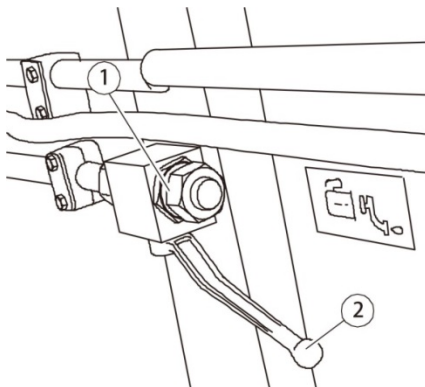


Fig. 1. Seal cap

2. Lever

Cleaning tank and system

For maintenance and repair work, it may be necessary for the fuel to be drained off.

The drainage point for this diesel tank is in the rear section of the machine underside.

- Unscrew seal cap (1).
- Move lever (2) and drain off the volume of fuel required into a suitable container.
- Use lever (2) to close drain and correctly refit seal cap (1).



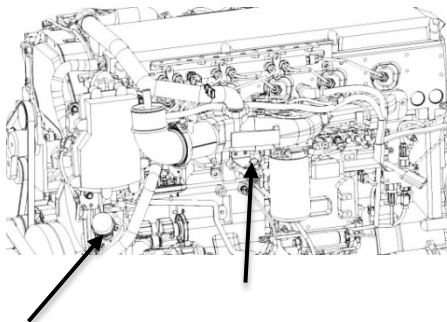
Dispose of the fuel drained off properly.

Diesel engine



The oil level in the engine should be tested before each start with the dipstick.

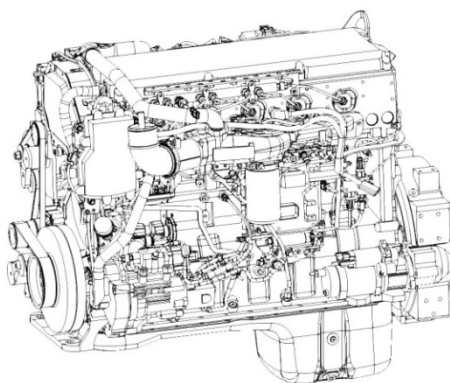
Check the oil only when the machine is at a standstill!



The dipstick can be found behind the maintenance flap of the operator's control panel.



Too much oil in the engine damages the seals; too little oil leads to overheating and destruction of the engine.



The filler neck for engine oil can be found behind the maintenance flap of the operator's control panel.

Follow Engine operating instructions!

Fig. Diesel engine

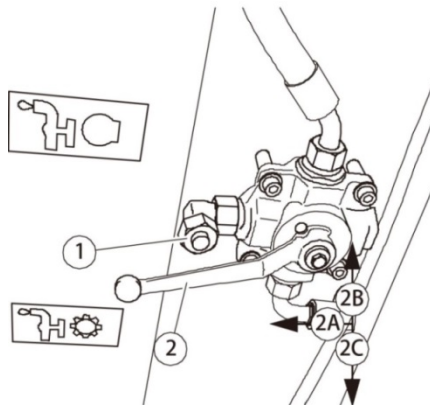


Fig. 1. Seal cap

2. Stopcock

Engine oil drainage point

The drainage point for the engine and gear oil is in the rear section of the machine underside.

The stopcock (2) has three switch positions:

- Closed (2A)
- Drain for engine oil (2B)
- Drain for pump distribution transmission (2C)



Danger of scalding due to hot oil.



Collect used oil in a suitable container and dispose of property.

Leave engine to warm up slightly for oil change. Unscrew seal cap (1) and open stop cock (2) in position (2B). After draining, close the stopcock in position (2A), fit the seal cap (1) with a new seal and screw back on.

Add new oil using the filler (behind the left maintenance hatch of the driver's platform). Check the level using the dipstick (behind the middle hatch of the driver's platform).

Before checking with the dipstick, wait a moment; the added oil must first flow into the oil pan.

Follow Engine operating instructions!

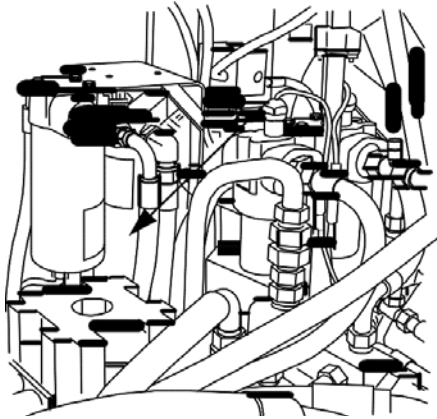


Fig. Oil filter

Oil filter

The oil filter can be found in the rear section of the engine compartment and is accessible once the engine hood has been opened.

Loosen the filter and clean the contact surface. Slightly lubricate the seal of the new filter and fill the filter with oil before installing it. Tighten by hand.



Dispose of used filters properly.



After replacing the oil filter, keep an eye on the seals and the oil pressure display.

Follow Engine operating instructions!

Fuel filter

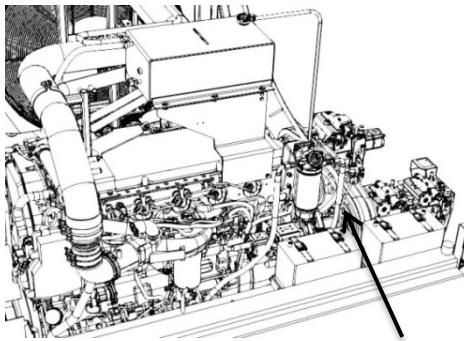


Fig. Fuel filter

The fuel filter can be found behind the maintenance flap of the operator's control panel.

Dismantle the connection on the underside of the filter, loosen the filter and clean the contact surfaces.

Add fuel to the new filter with the new seal and tighten by hand.

Install the connection on the underside of the filter with new seals.



Dispose of used filters properly.



After replacing the filter, keep an eye on the seals.

Follow engine operating instructions!!

Fuel filter water separator

Drain the water separator every day or when engine electronics error messages appear.

Collect fuel-water mixture in a suitable container and dispose of properly.

There is a drain valve (1) on the underside of the filter cartridge.

Disconnect engine electrics plug (2) and screw on drain valve (1) until the neck can be pulled out. Drain off fluid until only clear fuel runs out. Then slide the neck back again and close drain valve until hand tight.

Follow Engine operating instructions!!

Air filter

The oil filter can be found in the rear section of the engine compartment and is accessible once the engine hood has been opened.

In order to reach the filter element, the wing bolt (2) must be loosened and the locking lid of the filter casing removed.

After removal, replace the outer filter element by a new one or clean it with compressed air.

The inner filter element must be replaced if it is dirty. It cannot be cleaned.

Follow Engine operating instructions!!

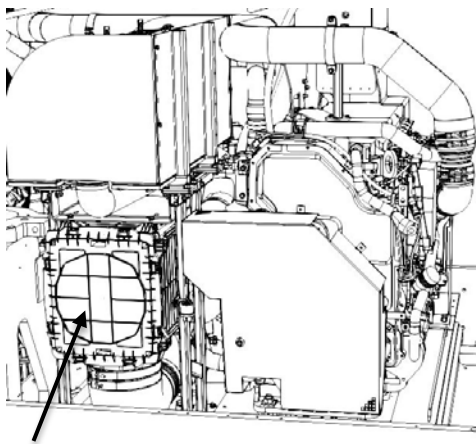


Fig. Air filter

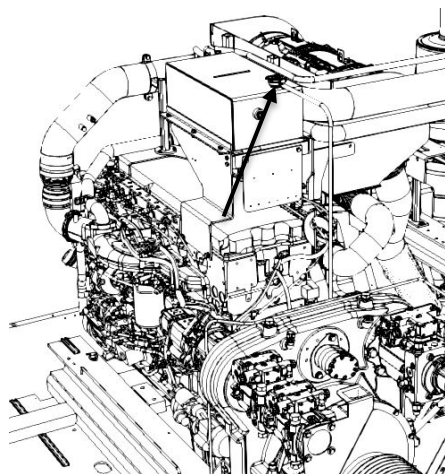


Fig. Cooler

Cooler



Check the coolant level daily before starting work.

Replace the coolant at least once per year.

The filler neck of the coolant compensation tank can be found behind the maintenance flap of the operator's control panel.



The system is under pressure when it is hot. When it is opened, there is danger of scalding!

Also check the radiators daily for dirt; if necessary, clean with suitable methods.



Collect used coolant in a suitable container and dispose of properly.

Follow engine operating instructions!!

Coolant filter

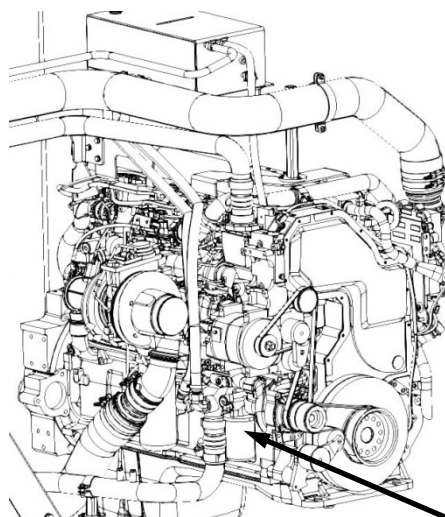


Fig. Coolant filter



The system is under pressure when it is hot. When it is opened, there is danger of scalding! Let the engine cool before replacing the filter.

Close the locking valve (1) of the coolant filter, loosen the filter and clean the contact surface. Slightly lubricate the seal of the new filter before installing it. Tighten by hand. Open the locking valve again.



After replacing the filter, keep an eye on the seals.



Dispose of used filters properly.

Follow Engine operating instructions!!

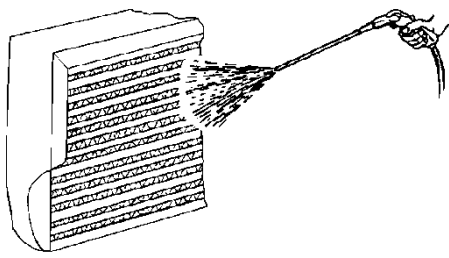


Fig. Cooler

Cooler



Check the radiators of the cooler daily for soiling and leakage.

The water cooler is located at the rear of the machine, behind the cooler grill.

The cooler grill can be swiveled upward after opening the lock using a square key.

In case of especially strong soiling, it is good idea to first spray the cooler with a suitable dirt solvent and to then sprays the dirt off with a water jet

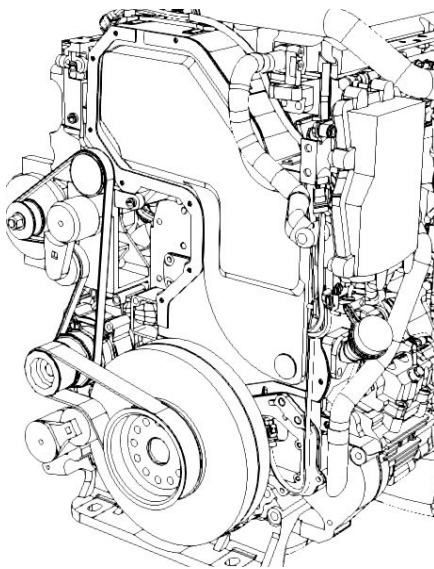


Fig. Drive belt

Drive belt



Visually check the drive belt daily for damage.

For maintenance of the drive belt:
See Engine operating instructions.

The protective grid must be removed before undertaking maintenance work on the drive belt!.

Valve clearance

To check and adjust the valve clearance: see Engine operating instructions.

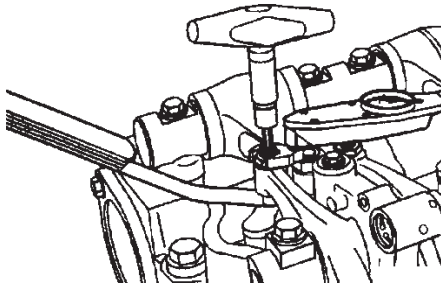


Fig. Valve

Engine brackets, left/right



The connecting screws of the engine brackets (on the left (1) and on the right (2), (3)) should be checked regularly to ensure that they are secure. Switch off engine when checking.

If the screws have come loose, these must be tightened immediately to the torque required.

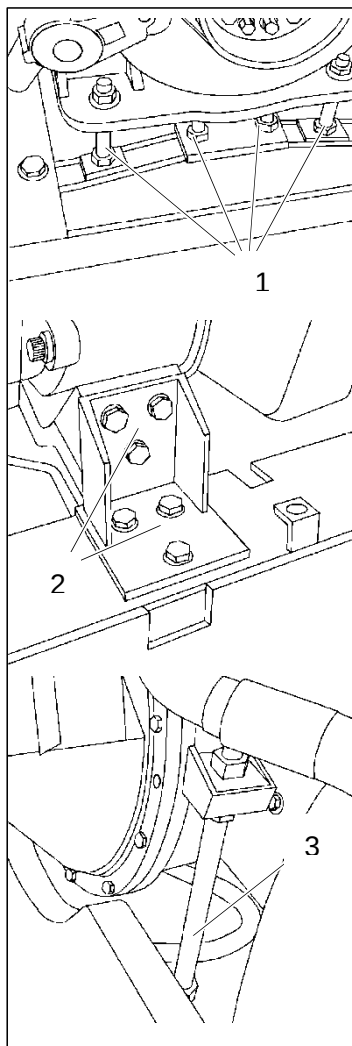


Fig. Engine bracket

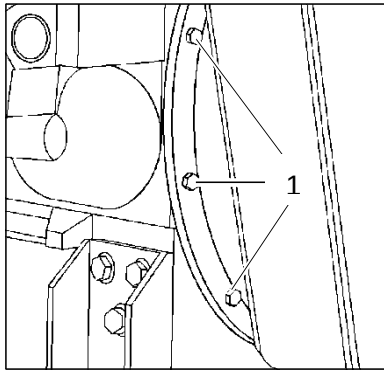


Fig. Connecting screws

Connecting screws, pump distribution transmission/ engine



All connecting screws (1) around the clutch bell housing between the engine and pump distribution transmission should be checked regularly to ensure that they are secure. Switch off engine when checking.

If the screws have come loose, these must immediately be individually dis- mantled, secured with screw cement and re-inserted using the torque required.

Centa coupling



If you have to replace the Centa coupling fitted between the engine and pump distribution transmission, you **MUST** note that these parts are fitted without the use of oil and grease!



When replacing the Centa coupling, please contact the Atlas Copco service team. They will discuss the process with you.

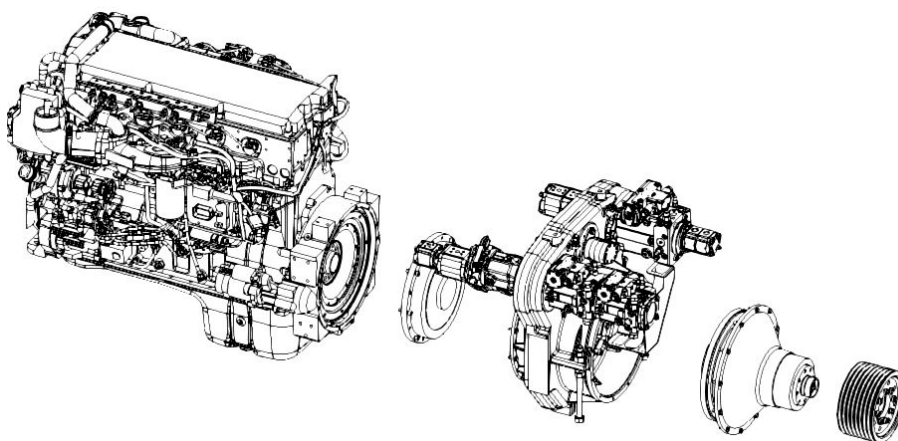


Fig. Coupling

Hydraulic system

Hydraulic oil tank

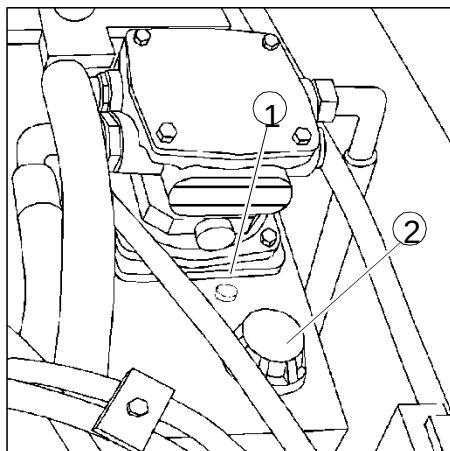


Fig. 1. Dipstick
2. Protective cap



Use a dipstick (1) to check the oil level every day. Dust and dirt should be regularly removed from the oil tank vent. Change the hydraulic oil every 1000 operating hours, but at least every year.

The hydraulic tank can be found in the left section of the engine compartment and is accessible once the engine hood has been opened.

To top up hydraulic oil, open protective cap (2) and fill with new oil using a funnel.



Ensure that no impurities enter the tank.



Avoid skin contact with hydraulic oil.



Use only recommended hydraulic oils.

Hydraulic oil drainage valve

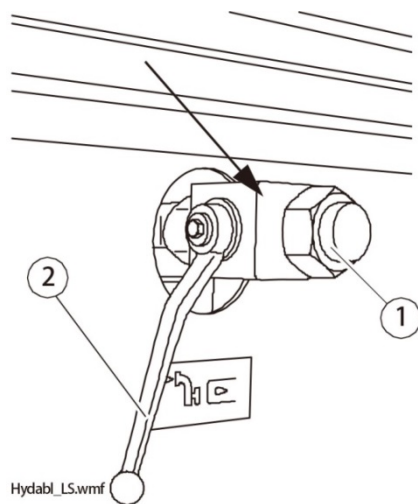


Fig. 1. Cap
2. Lever

The drainage point for hydraulic oil is in the rear section of the machine underside.

In order to empty the hydraulic oil, first remove the cap (1) of the drainage valve and then install the drainage hose.

By switching lever (2), drain the oil and collect it in a suitable container.

After draining, screw the cap back onto the drainage valve.

Add new oil using the filling opening of the hydraulic oil tank.

Check the oil level using the display.



Collect used oil in a suitable container and dispose of property.



Wear protective clothing when draining hot oil. Danger to health if oil contacts skin.

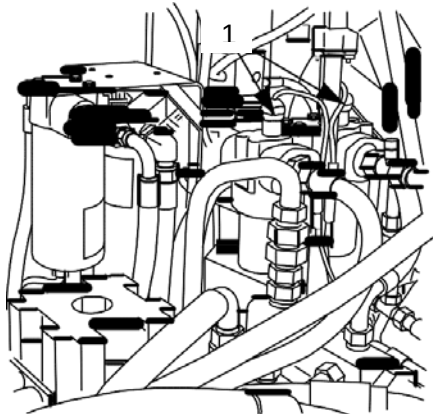


Fig. High-pressure hydraulic filter

1. Indicator

High-pressure hydraulic filter

Replace filter cartridges once the maintenance indicator (1) is red.

The filters should be checked 10 operating hours after repairs on the hydraulic system and replaced if necessary!



Always replace the filter elements in pairs!

The filter can be found in the rear section of the engine compartment and are accessible once the engine hood has been opened.

Loosen the filter pot with a hexagonal key and unscrew it by hand.

After unscrewing the filter pot, empty the separated dirt into a used oil container. Remove the filter element and put it into a container for recycling (danger of pollution!). Wash out the casing, replace the O-rings and apply lubrication. Screw the filter casing with the new filter element back on and tighten securely.

The red mark on the maintenance indicator (1) is reset automatically.

Wear protective clothing when working with hot oil.



Danger to health if oil contacts skin.



Never clean a filter and then re-use it!
Always use new filters.

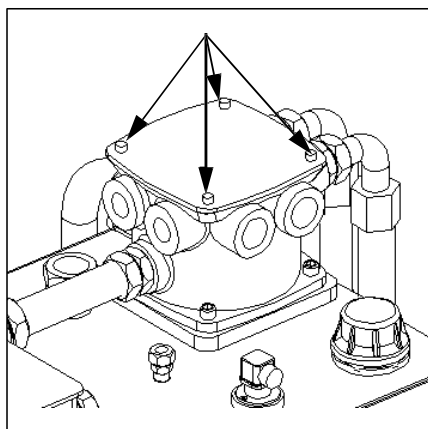
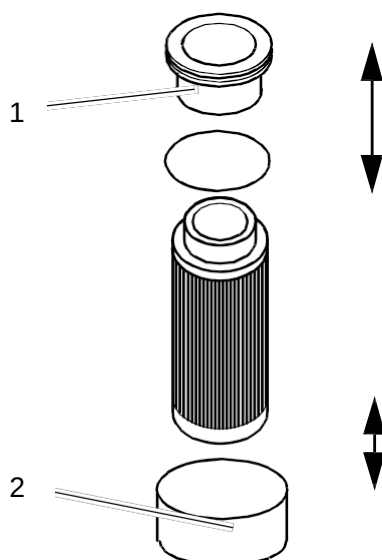


Fig. 1. Intermediate plate
2. Dirt collection dish

Return hydraulic filter



Replace the filter element according to the soiling display, but at least once a year!

The return hydraulic filter can be found on the hydraulic oil tank in the left section of the engine compartment and is accessible once the engine hood has been opened.

- Remove the fastening screws of the filter top and remove the lid of the filter casing.
- Pull the entire filter insert from the casing.
- Pull the intermediate plate (1) and the dirt collection dish (2) from the used filter element.
- Clean the dirt collection dish.
- Insert the intermediate plate and the dirt collection dish on to the new filter element and insert it into the filter casing.
- Slightly lubricate the O-ring of the casing cover and install using the four fastening screws.



Wear protective clothing when working with hot oil. Danger to health if oil contacts skin..



Never clean a filter and then re-use it! Always use new filters.



Dispose of used filters properly.

Pump distribution transmission

Oil level check

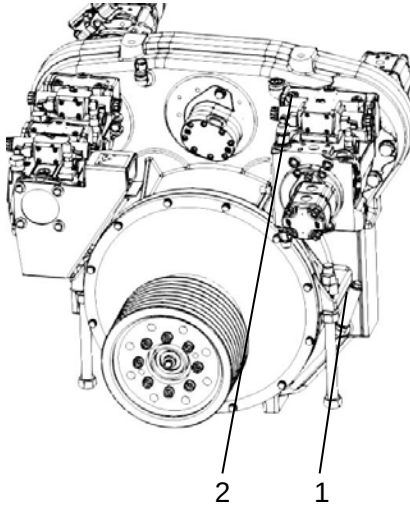


Fig. 1. Dipstick
2. Oil filling screw

The pump distribution transmission can be found in the left section of the engine compartment and is accessible once the engine hood has been opened. The dipstick (1) can be found on the left on the transmission housing.

The oil level should be between the "MAX" and "MIN" marks.

Top up oil if necessary.



The oil filling screw (2) is located on the upper side of the transmission.

- Unscrew the screw; use a funnel to fill with the appropriate oil.
- Use dipstick (1) to check that the oil level is correct.
- Close the inspection screw again correctly.

Ensure cleanliness!

Oil cooler

The drainage point for the gear and engine oil is in the rear section of the machine underside.

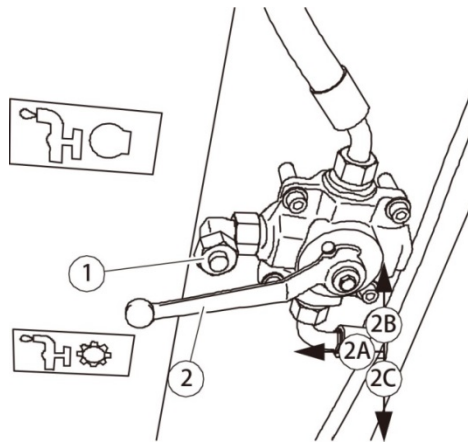


Fig. 1. Seal cap

2. Stopcock

The stopcock (2) has three switch positions:

- Closed (2A)
- Drain for engine oil(2B)
- Drain for pump distribution transmission(2C)

Collect used oil in a suitable container and dispose of properly.

- Unscrew seal cap (1) and open stopcock (2) in position (2C). After draining, close the stopcock in position (2A), fit the seal cap (1) with a new seal and screw back on.
- Add new oil via the unscrewed filling screw. Continue to do so until the oil level reaches the bottom edge of the opening and some oil runs out.

-  Reseal inspection screw and oil fill screw correctly.

 Ensure cleanliness!

 **Check the oil lever again after running for 15 minutes, top up oil if necessary.**

Wear protective clothing when working with hot oil. Danger to health if oil contacts skin

Bleeder

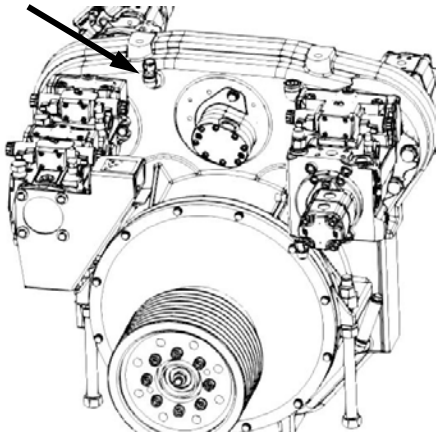


Fig. Bleeder

The bleeder can be found on the housing of the pump distribution transmission.

The functioning of the bleeder must be ensured. If soiling has occurred, the ventilator should be cleaned.

Oil cooler

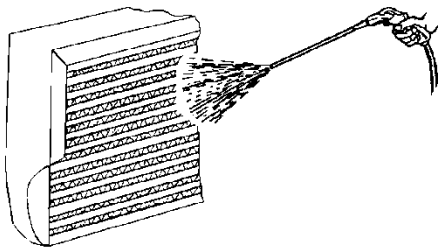


Fig. Oil cooler

Check the radiators of the cooler daily for soiling and leakage.

The oil cooler is located at the rear of the machine, behind the cooler grill (to the left of the water cooler). The cooler grill can be swiveled upward after opening the lock using a square key.

In the case of especially strong soiling, it is a good idea to first spray the cooler with a suitable dirt solvent and to then sprays the dirt off with a water jet.

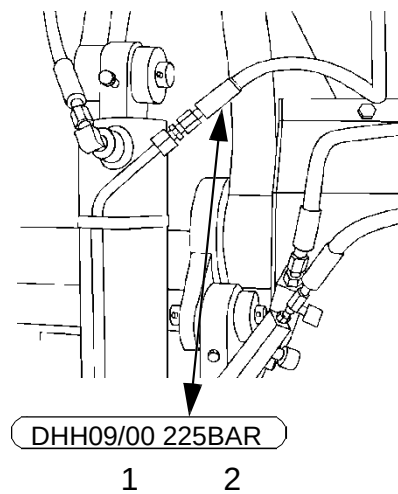


Fig. Hydraulic hoses

Hydraulic hoses

All hydraulic hoses on the machine should also be replaced by the interval specified!

⚠ Old hoses become porous and can burst!
Risk of accident!

A number punched into the connection provides information about the date of manufacture (1) and the highest permitted pressure for this hose (2).

Never install aged hoses; observe the permitted pressure.

Hydraulic unit for roof and hood activation

Oil level check

The hydraulic unit can be found in the engine compartment on the right.

There is a dipstick (1) on the oil reservoir for the oil level check.

Hydraulic oil is topped up through the dipstick opening using a funnel until the necessary height is reached. Screw the dipstick back in to seal the oil reservoir.

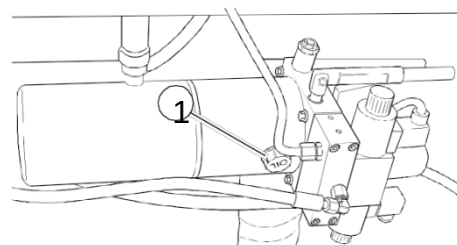


Fig. Dipstick

⚠ Maintain cleanliness when filling with oil!

Avoid contact with skin!

Traction units

Planetary gear – oil level check

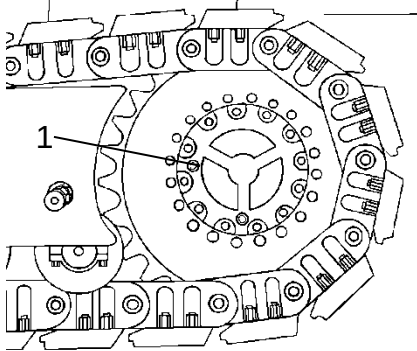


Fig. 1. Oil level check

To check the oil level and while adding oil, the locking screw for the oil level check (1) must be in the 9 o'clock position.

The oil level should reach the lower edge of the hole for the locking screw.

Add oil using the opened filling screw until some oil exits the hole of the locking screw.



When adding oil, ensure cleanliness.

Oil Change

To drain oil, the drainage screw (2) should be in the 6 o'clock position and the filling screw (1) should be in the 9 o'clock position.



Do not change oil when the engine is cold, but rather directly after the transmission has stopped.

This ensures that solid particles do not settle.



Wear protective clothing when working with hot oil. Danger to health if oil contacts skin.

- Unscrew the oil drainage screw (2), collect draining oil.
- Remove the filling screw (1).
- After the oil is completely drained, properly screw in the drainage screw (2) again.
- Add oil using the opened filling screw until some oil exits the hole of the locking screw.
- Properly screw the filling screw (2) back in.



Collect used oil in a suitable container and dispose of properly.



When adding oil, ensure cleanliness.

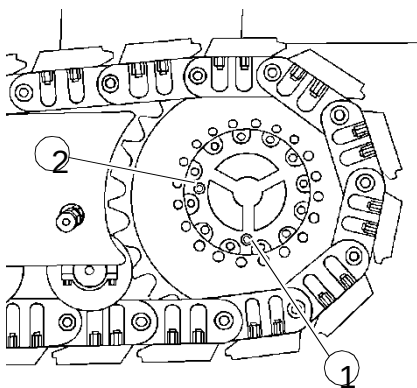


**Fig. 1. Filling screw
2. Draining screw**

Chain tension



The chain tension of the drives is to be tested daily and adapted to the given use and roadway conditions.

The chain sag should be 0-7mm (depending on the use conditions) between the chain and the framework of the drive, measured in the drive middle.

The chain tensioner for the drive chain is driven by hydraulic cylinder.

After adjusting the chain tension, drive the machine a few meters and check the sag again.



Elevated wear on chain parts and supports due to chain tension that is too low or too high.

Note: special settings are available; pressure range is 28-80bar.

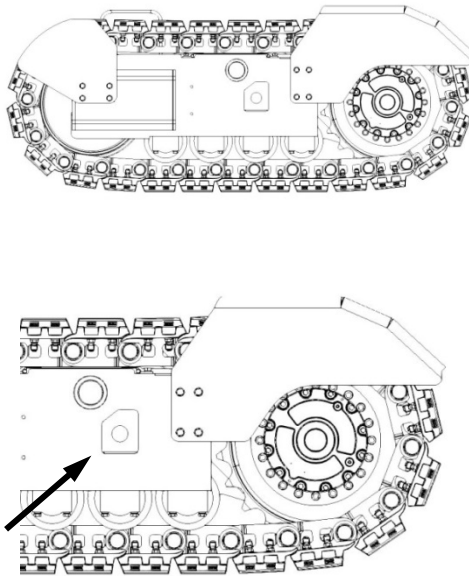


Fig. Chain tension

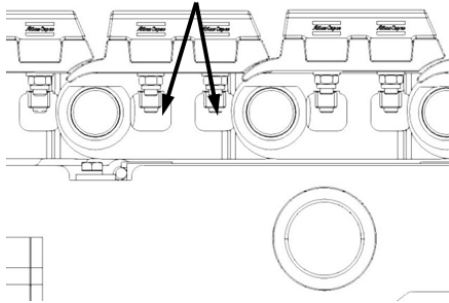


Fig. Bottom plate

Bottom plate



The condition of the bottom plates of the drives is to be tested daily.

Damaged and worn bottom plates should be replaced immediately.

Each bottom plate is connected with the contact surface of the chain link by four fastening screws.

- Hold the square nut with a fork wrench fork wrench, loosen the fastening bolts in the trough of the bottom plate using a socket wrench and dismantle.

The bottom plates and fastening bolts should always be replaced together.

- Install the new bottom plate in the same manner; tighten the bolts with the required torque.

Problem-free bottom plates also ensure that the machine will drive straight ahead with no problems.

Rubber pad

Each rubber pad is connected with bottom plates by four fastening screws.

Damaged and worn rubber pads should be replaced immediately.

Install the new rubber pad in the same manner, tighten the bolts with the required torque.

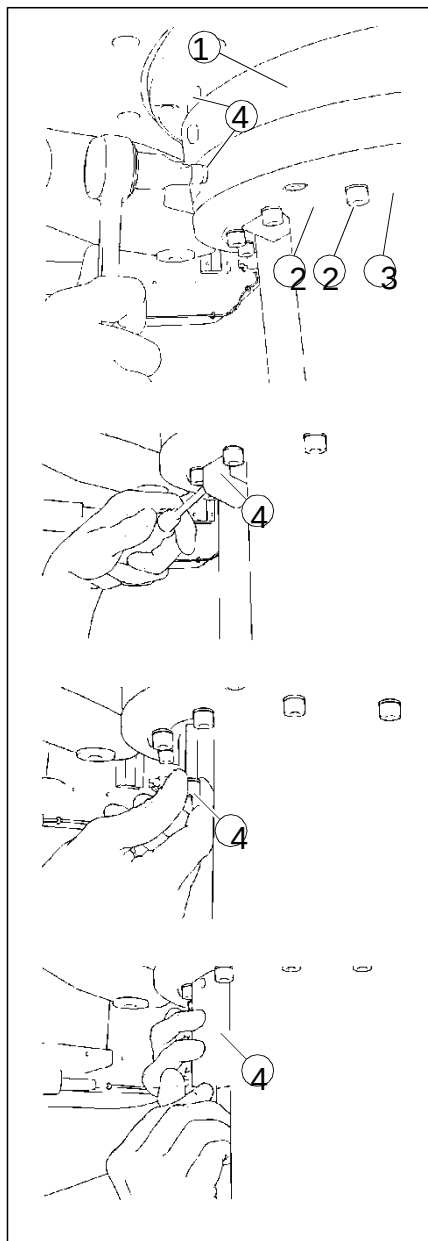


Fig. 1. Steering arm

2. Stop ring

3. Scraper

4. Screw

Steering system sliding parts, steering arms, stop ring and scraper

Check steering arms (1), two-section stop ring (2) and scraper (3) for correct function, clearance, perfect attachment and excess wear.



If these components are attached or function insufficiently, subsequent excess wear will allow dirt to penetrate and will result in possible failure and/or deterioration of straight-ahead travel!

- Two-section stop ring (2) of steering arms (1) is joined to vehicle frame by means of 10 cemented in screws (2a). If this screw connection has come loose, the entire screw connection should be cemented back in and tightened to the specified tightening torque.
- Worn or loosened pipe scraper (3) should be replaced or tightened immediately.

Replacing sliding shoes

- Remove both cylindrical screws (4) (2 screws per sliding parts!).

The screws are cemented in!

- Use an appropriate object to extract loosened outer grooved scraper (4a) out of groove.
- Screw one of the two previously released cylindrical screws (4) from below into the sliding piece in the groove.
- Use the screw to pull sliding piece (4b) out of groove.

Replace scraper from outer groove, sliding piece, springs and scraper from inner groove.

Parts are installed in reverse order. Ensure correct installation position.



Cement in screws and note tightening torques!

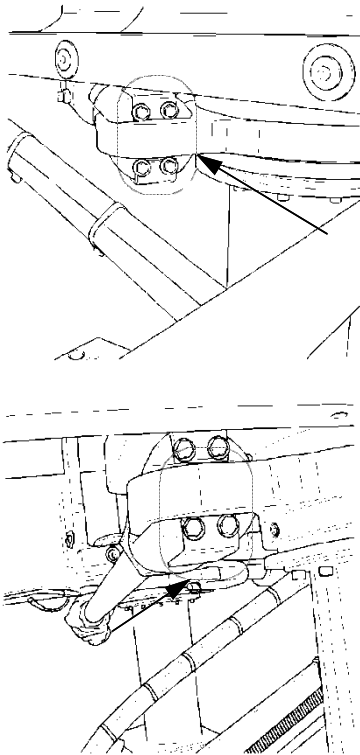


Fig. Retaining device for track rod and steering cylinder bolts

Retaining device for track rod and steering cylinder bolts

Check that retaining bolts of retaining plates on track rods and on cylinder bolts are secured correctly.

If necessary, retighten screws.

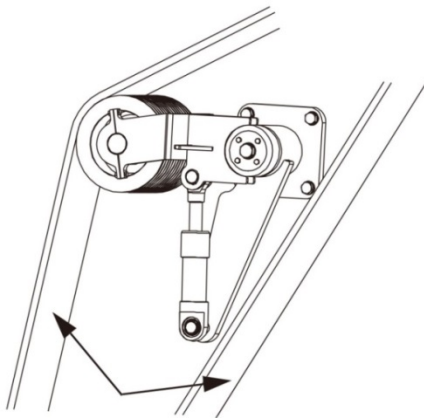


Fig. Belt drive

Belt drive



The condition of the belts of the milling drive is to be tested daily.

Damaged and worn belts should be replaced immediately.

Material particles are to be removed from the grooves of the V-belt!

The belts are always to be replaced in pairs.

The belt drive is located in the protective box on the left side of the machine.



Ensure that the drive engine cannot be started!

If the belt tensioner is relaxed, the belts can easily be taken from the belt discs.

The belts are arranged in the following order:
5-fold belt, 4-fold belt, 5-fold belt.



The condition of the belt discs is also to be tested. If the flank wear on the belt discs is too high, they must be replaced immediately.

Clutch "DESCH" Type

Worn friction lining should be replaced immediately.

The clutch is located behind the belt disc in the protective box on the left side of the machine.

⚠ Ensure that the drive engine cannot be started!

The inspection cover (1) of the clutch casing must be removed to carry out the inspection.

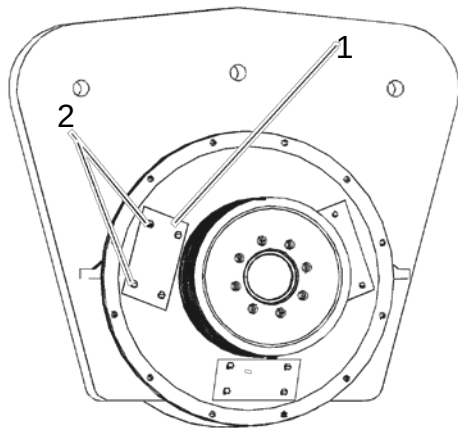


Fig. 1. Inspection cover
2. Locking screws

- Remove the four locking screws (2) of an accessible inspection cover (1).
- Remove the inspection cover.
- Through the open inspection opening, check the distance between pistons and cylinders with a measuring instrument.

A distance (X) between pistons and cylinders with the clutch activated amounts to 6 mm in new condition; the wear limit is 12 mm (Y).

- After the inspection, lock the inspection cover again properly.

Clutch "STROMAG" Type

Worn friction lining should be replaced immediately.

The clutch is located behind the belt disc in the protective box on the left side of the machine.

⚠ Ensure that the drive engine cannot be started!

- For inspection purposes, loosen the hex screws (1) and take the three covers (2) and their seals off the bell.
- The shift unit can be seen through the resultant aperture.
- Pressurize the clutch so that the position is pressed against the pack of discs.



The distance between piston and cylinder must not exceed 3 mm.



If the level of wear is greater than 3 mm, please contact the Atlas Copco service team. They will discuss the process with you!

- After the inspection, lock the inspection cover again properly.

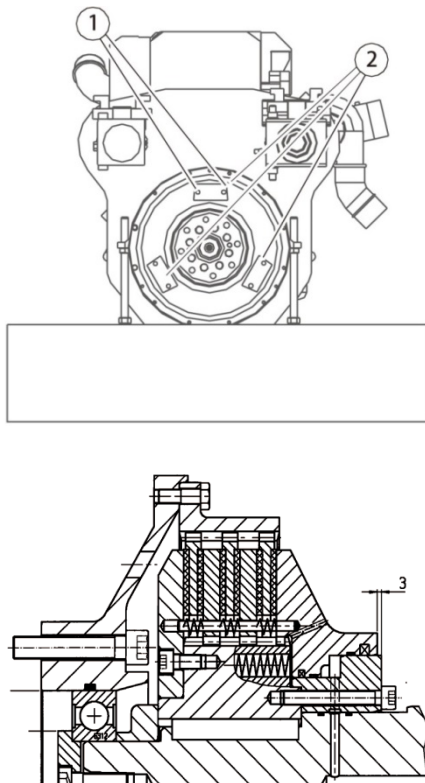


**Fig. 1. Hex. screw
2. Cover**

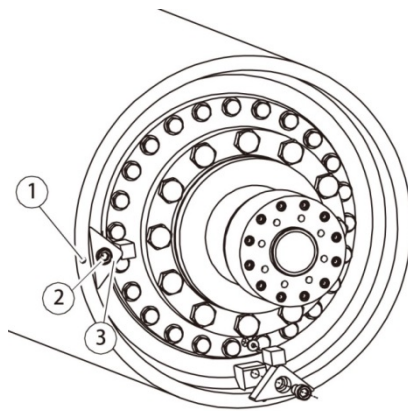


Fig. 1. Drum
2. Allen screw
3. Screw protection

Milling drum gear box **Oil level check**

To check the oil level and while adding oil, the lock screw for the oil check (1) must be in the 9 o'clock position.

- Lower the machine on to the service supports.
- Lift the side board and secure it.
- Ensure that the drive engine cannot be started.
- Turn the milling drum until the mark (1) on the drum is in the 9 o'clock position
- Remove the Allen screw (2) and the screw protection (3).
- Remove the inspection screw.

The oil level should reach the lower edge of the hole for the locking screw.

- Fill oil using the open filling screw until some oil exits the hole of the locking screw.

-  Properly reinstall the inspection screw, screw protection (3) and Allen screw.
- When adding oil, ensure cleanliness.

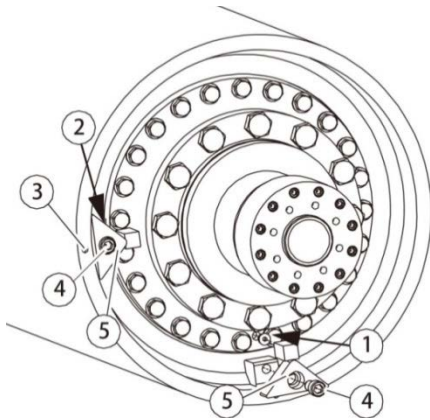


Fig. 1. Filling screw

2. Drainage screw

3. Drum

4. Allen screw

5. Screw sleeve

Oil change

To drain oil, the drainage screw (2) should be in the 6 o'clock position and 2 the filling screw (1) should be in the 9 o'clock position.



Do not change oil when the engine is cold, but rather directly after the transmission has stopped.

This ensures that solid particles do not settle.



Wear protective clothing when working with hot oil. Danger to health if oil contacts skin.

- Lower the machine on to the service supports.
- Lift the side board and secure it.
- Ensure that the drive engine cannot be started.
- Turn the milling drum until the mark (3) on the drum is in the desired position.
- Remove the Allen screw (4) and screw sleeve (5) on the drainage and inspection screw.
- Remove the inspection screw (2).
- Remove the oil drainage screw (1) and collect draining oil.
- After all the oil has drained, properly screw the drainage screw (1) back in.
- Fill oil using the open inspection screw until some oil exits the hole.
- Properly reinstall the inspection screw (2).
- Properly reinstall the Allen screw (4) and screw sleeve (5) on the drainage and inspection screw.



Collect used oil in a suitable container and dispose of properly.



When adding oil, ensure cleanliness.

Milling drum

The coolant must be replenished when necessary, depending on operating conditions.



Freezing water in the milling drum can destroy the component; use the stipulated coolant.

There are two drainage and filling/in section screws (1) positioned opposite to each other on the milling drum.

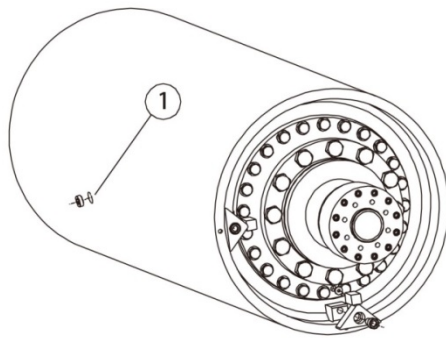


Fig. 1. Section screw

Draining coolant

- Lower the machine on to the service supports.
- Open and secure the drum flap.
- Ensure that the drive engine cannot be started.
- Turn the milling drum until one of the drainage screws points downwards.
- Unscrew the drainage screw and collect coolant in a suitable container.

The milling cylinder is filled with approx.420 liters of coolant.

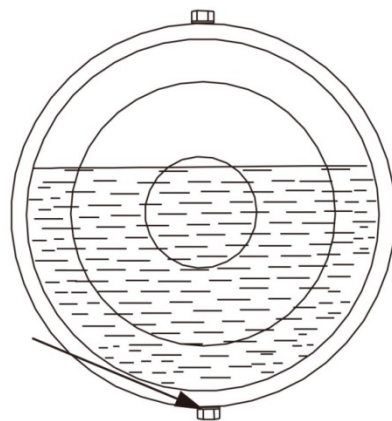
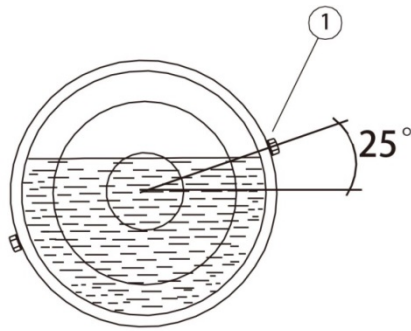


Fig. 1. Coolant level

- After the fluid is completely drained, properly tighten the drainage screw again.



Checking fluid level / adding fluid

- Lower the machine on to the service supports.
- Open and secure the drum flap.
- Ensure that the drive engine cannot be started.
- Turn the milling drum until the inspection and filling screw lies at an angle of approx. 25°.
- Remove the inspection screw.

The liquid level should reach the bottom edge of the hole for the locking screw.

- Add coolant if necessary.
- Properly tighten the filling and inspection screw again.

Scrapers and supporting wear bar (moldboard)

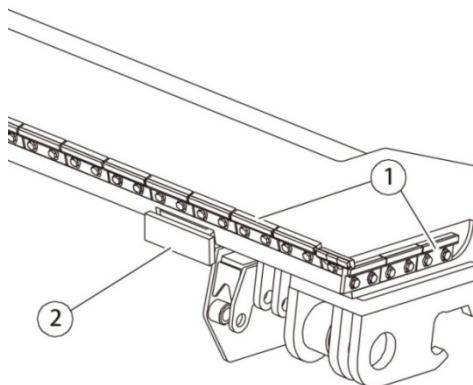


Fig. 1. Scraper

2. Wear bar

If too much material remains in the milling lane, the parts are also to be tested.

The scrapers (1) ensure that hardly any removed material remains in the milled track and consequently guarantees problem free material removal.

The supporting wear bar (2) prevents the scrapers from digging themselves into the milling plane.

Both parts, which are installed on the entire length of the moldboard, are equipped with hard metal strips that wear out with time.

- Lower the machine on to the service supports.
- Lift the side boards and secure them.
- Ensure that the drive engine cannot be started.
- Open the moldboard and take appropriate safety measures.
- Remove the worn scraper (1) and supporting wear bar (2) by loosening the two hex screws.
- Clean the contact surface, properly install the new parts and mount at the required height using the oval holes.

Note that the outer scrapers have different dimensions than the inner scrapers!

Runners on the side boards

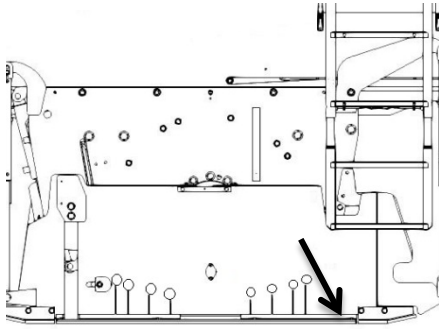


Fig. Side board

The runners of the side boards continuously slide over the asphalt during milling operation and are thus subjected to an elevated degree of wear. If the material of the runner becomes too thin, it must be replaced.

In the case of divided runners, the relevant element is to be replaced.



Check the runners on both side boards regularly and replace if necessary.

- Lower the machine on to the service supports.
- Lift the side board and secure it.
- Ensure that the drive engine cannot be started.
- Remove the worn runner by loosening the hex screws along the length of the part.
- Clean the contact surface and properly install the new parts (it may also be necessary to replace the fastening screws since these can also wear).

Sliding shoe runners

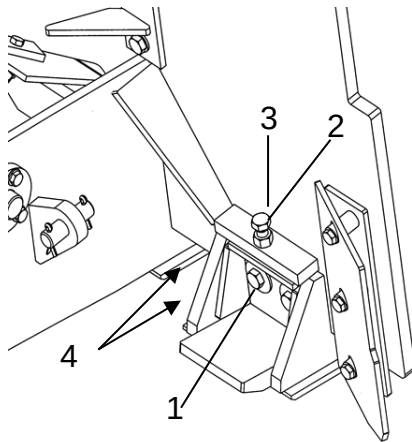
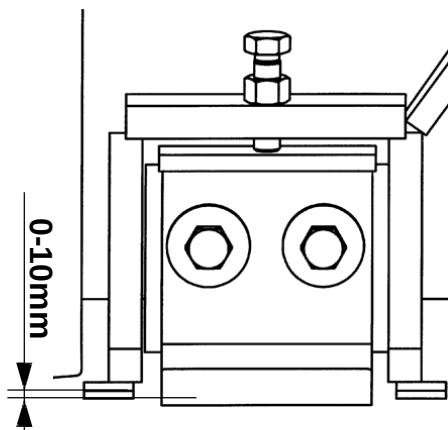


Fig. 1. Fastening bolt
2. Lock nuts
2. Adjusting screw
4. Permanent runner

The runners of the sliding shoe continuously slide over the asphalt that has not yet been removed during milling operation and are thus subjected to an elevated degree of wear.

The runners exert downward pressure and prevent bigger parts from being ripped out.

If the hard metal plate of the runners becomes too thin, this must be replaced.

In order to reduce overall wear, there is an adjustable runner on each outer side.



Check the runners on the sliding shoe regularly and replace and/or readjust if necessary.

- Lower the machine on to the service supports.
- Lift the sliding shoe and secure it in the uppermost position.
- Ensure that the drive engine cannot be started.



Depending on the operating circumstances, the adjustable runners can be installed at a distance of 0-10mm below the permanent runners.

When removing concrete, e.g. a significantly lower distance should be set than is the case for asphalt work.

- If necessary, remove the worn hard metal plates of the permanent runners; ensure that the contact surface is level.
- First attach the new parts, then weld them on properly.
- To install the adjustable runner, loosen fastening bolts (1) and lock nuts (2).
- Use adjusting screw (3) to set height distance to permanent runner (4). If the distance has to be reduced, the runner can be pushed up.
- Retighten fastening bolts (1) and lock nuts (2) correctly.



Observe the required safety measures during dismantling and welding!

Drum flap limit switch

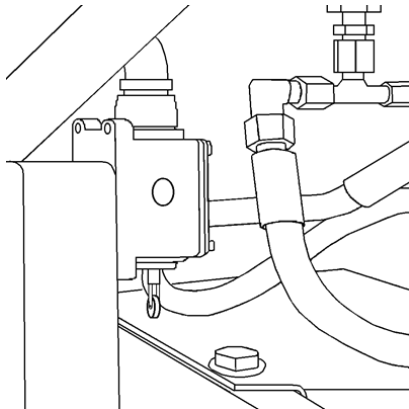


Fig. Drum flap limit switch

The limit switch is located on the rear part of the milling drum box on the left side of the machine.

Open the drum flap using the corresponding operating elements until the limit switch is activated.

- The clutch of the belt drive must be deactivated.
- The belt tensioner must be relaxed.
- The milling drum coasts down slowly and must not be activated.
- The machine cannot be driven.

Milling drum housing fastening bolts

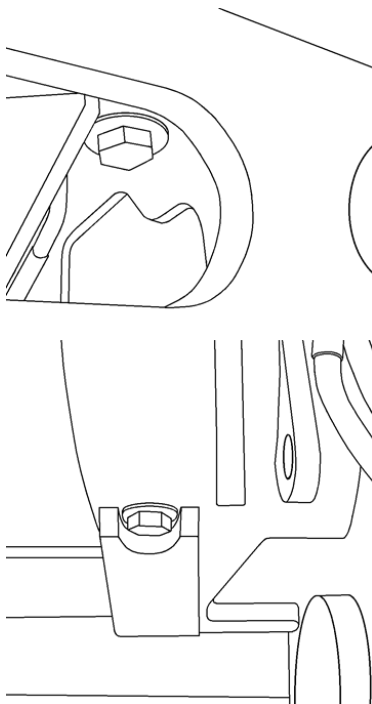


Fig. Fastening bolt



The milling drum housing is screwed onto the vehicle frame on the left and right (two screws on each side).

If the screws have come loose, these must immediately be individually dismantled, secured with screw cement and reinserted using the torque required.

Loading equipment

Belt tension

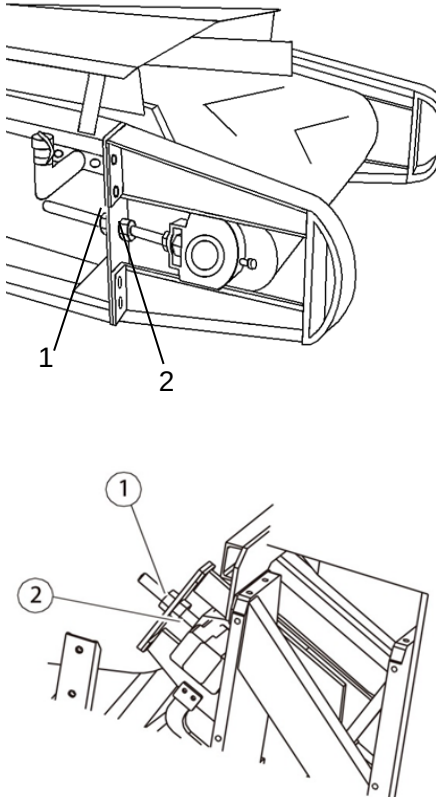


Fig. 1. Lock nuts
2. Adjusting nuts



The belt tension of the loading belt and the upper conveyor is to be checked daily. If the belt sags too far, the tension must be increased.

In the first weeks of operation, the belt will stretch excessively (permanent and elastic stretching).

Therefore, it is necessary to tighten the belt repeatedly during this time.

The sag of the belt of the lower conveyor should be somewhat greater than the sag of the upper conveyor.

To increase the tension:

- Loosen the lock nuts (1) on both sides of the tightening equipment.
- Increase the tension evenly on both sides using a fork wrench on the adjusting nuts (2).
- Tighten the lock nuts (1) again after the adjustment.

The tension setting of the loading belt and the upper conveyor is basically the same.

If the belt runs asymmetrically on the deflection cylinder, tighten the right spindle or loosen the left spindle if the belt runs towards the right or vice-versa.



Excessive slanting of the deflection cylinder is to be avoided since the material of the belt is asymmetrically over-stretched in this situation.

If the tension regulation using the deflection cylinder is not sufficient, the support cylinders must be readjusted. In this case, the displacement plate of the support station is to be loosened and the station is to be turned slightly.

If the belt is to be moved to the right, the left support cylinder must be pushed forward; the right side must be pushed forward if the belt is to be moved to the left. The following can cause skewed running of the belt:

- material encrustations on drums and rollers
- material loading that is not centered
- uneven belt stretching, e.g. asymmetric overstretching
- asymmetric wear of the drum friction lining
- belt rubbing against the framework
- improperly executed endless connection of the belt



Also visually check the belts, conveyor belt rollers and support rings for damage or wear controls.

Worn support rings can be replaced in sets.



Regularly remove material encrustations on the rollers.



Regularly check the screwed connections.



During all work on the loading and upper conveyors, ensure that the belt drive cannot be started!

Drum holder

As a result of high loading levels, clearance in the seat of the holder (2) for the shaft end of the roller (1) may increase over time.

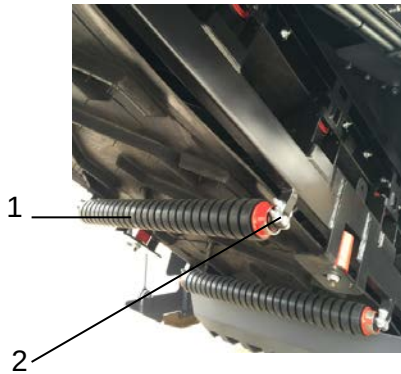


Fig. 1. Roller
2. Holder

Steel cords

The condition of the hold and catch cords (steel cords) as well as the shackles of the upper conveyor is to be tested daily.

Damaged steel cords and shackles must be replaced immediately.



Fig. Steel cords

Tearing steel cords represent a great danger for persons and machinery.

Release the tension of damaged steel cords and shackles on the upper conveyor and replace them.

During all work on the lower and upper conveyors, ensure that the belt drive cannot be started.

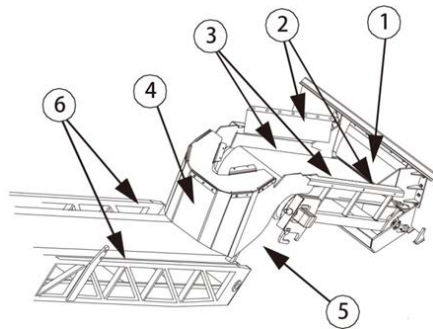


Fig. 1. Scraper rubber
2. Lateral seal
3. Lateral guide for lower conveyor
4. Upper funnel
5. Lower funnel
6. Lateral guide for upper conveyor

Funnel rubber of transfer point and sealing rubbers / guides

On the lower and upper conveyors, different rubber parts are provided to guarantee problem-free material removal. These rubber parts should be visually checked for damage weekly:

- scraper rubber (1)
- lateral seal (2)
- lateral guide of lower conveyor (3)
- upper funnel (4)
- lower funnel (5)
- lateral guide of upper conveyor (6)

All rubber parts are installed with screw connections and can be easily removed when required.

- Remove the fastening screws and the damaged part.
- Properly mount the new part and tighten the fastening screws.

Water system

Water tank

The filling level of the water tank should be tested before each start. If necessary, the tank must be replenished.

Check the fill level of the water tank several times a day using water level indicators located on the sides of the tank.

The water tank should preferably be cleaned when it is empty.

If the machine is not in continuous operation, the water should be replaced once per year.

- Fully drain the tank by opening the drain valve (1) and (4) on the underside of the machine, leaving the valve in its open position.
- To drain out all the residue, open the two outlet points (2) on the left and right of the machine underside.

Opening (3) serves as an overflow if the tank is overfilled.

The cover of water tank can be unscrewed out.

- With the high-pressure cleaner, spray the inside of the empty tank.

If necessary, a person can climb through the opened lid into the tank in order to execute cleaning work.

- The loosened sediments run out through the opened drainage valve.
- After cleaning, close the drainage valve and the locking lid of the water tank again.

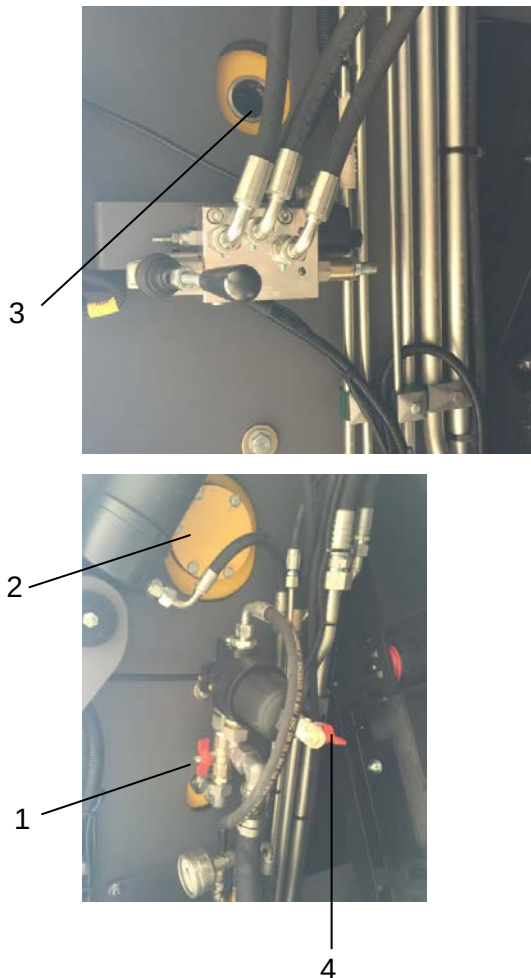


Fig. 1. Valve

2. Outlet points

3. Port

4. Valve

 ***During cleaning work in the interior of the tank, a second person must always oversee the person in the tank!***

 ***If the tank must be entered, a ladder is to be placed against the machine and secured accordingly.***

Wet machine surfaces are slippery! Risk of accident!

 ***The water in the tank is service water, not drinking water!***

 In case of frost, completely empty the water tank using the drainage valve, leave the valve open, loosen the connection hoses and let them run empty. Remove the caps of the water filling openings.

Feed pump

When the temperature is below freezing, the water in the pump must be drained since freezing water can destroy the pump.

The feed pump is located on the left forefront of the machine.

- Remove the oil drainage screw (1) and collect draining oil.
- Remove the filling screw (2).
- After all the oil has drained, properly screw the drainage screw (1) back in.
- Fill the stipulated quantity of new oil via the opened filling cover.
- Properly screw the filling screw (2) back in.

⚠ Wear protective clothing when working with hot oil. Danger to health if oil contacts skin.

⚠ Collect used oil in a suitable container and dispose of properly.

! When adding oil, ensure cleanliness.

When the temperature is below freezing, the water in the pump must be drained since freezing water can destroy the pump.

- Remove the drainage screw (3) and let the water drain completely.
- Properly screw the drainage screw (1) back in.

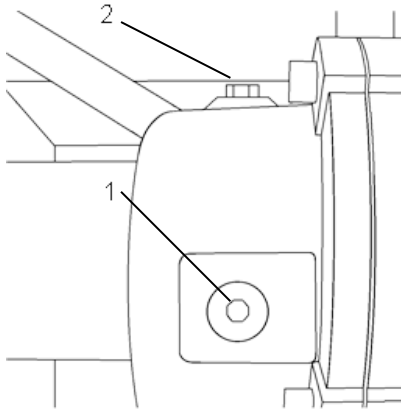
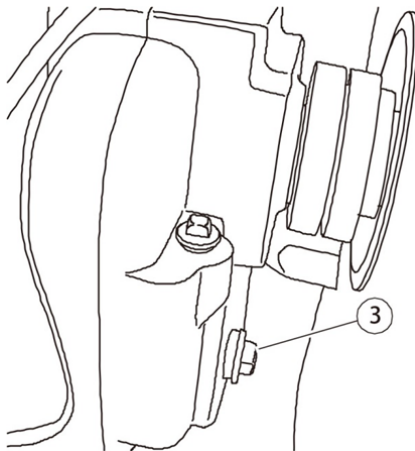


Fig. 1. Drainage screw
2. Filling screw
3. Drainage screw

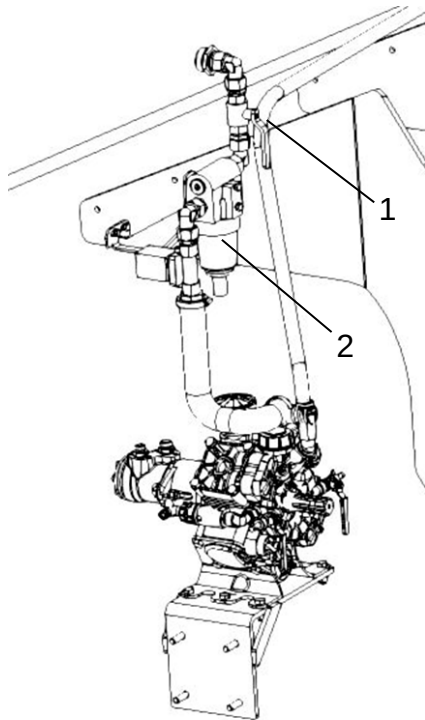


Fig. 1. Stopcock
2. Filter housing

Water filler

Replace the filter element at the end of work every day and according to the soiling display!

The machine accessories include a second set of water filters which makes daily replacement possible without delay.

One water filter is under the frame, in front of the milling drum housing on the right side of the machine, the other one is located nearby the conveyor suspension

The filter can also be replaced if the water tank is not empty.

- Close stopcock (1) (lever in horizontal position).
- Use the wrench provided in on-board tool kit to loosen both filters housings (2) and unscrew by hand.
- Remove filter elements, if necessary rinse out housing and insert new/ cleaned filter.
- Clean the contact surface of the upper and lower parts of the casing and check seal.
- Screw both filter housing on by hand and tighten slightly with wrench.



Check for leaks after replacing the filter!

The removed filter elements can be cleaned and if necessary rinsed with a high pressure cleaner. Once the machine has next been used, the cleaned filter set can therefore be used to replace the other filter set.

The filter casing must be emptied completely in the case of frost in order to protect the casing from damage.

- Close stopcock (1)
- Use the wrench provided in on-board tool kit to loosen both filter housings (2), unscrew by hand and shake out any water found.

Refit emptied filter casings correctly.

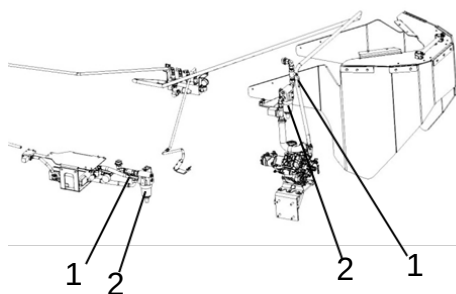


Fig. 1. Stopcock
2. Filter housing

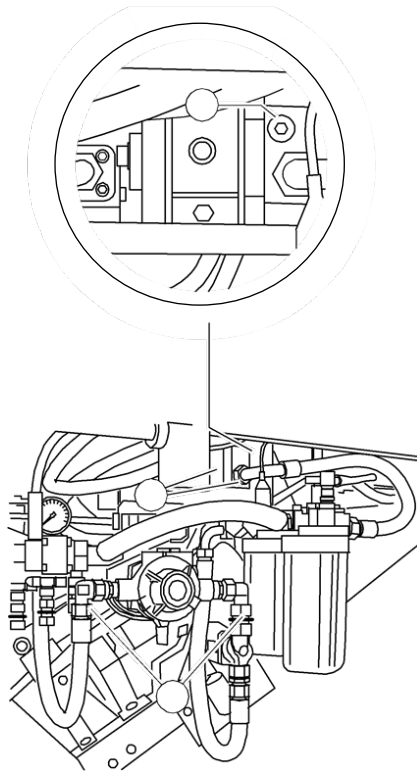


Fig. Water pump

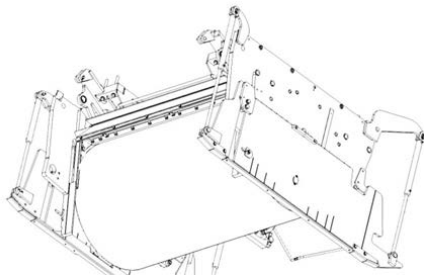


Fig. Spray nozzle

Water pump

If necessary, the water pump (o) must be ventilated.

- Remove the ventilation screw (1) so that air in the pump can be completely removed.
- Properly retighten the ventilation screw.

If there is a risk of frost, the water pump and additional high pressure pump (o) will have to be fully emptied to protect them from damage.

- Loosen both connections (2), allow all water in pump to run out.
- Retighten connections correctly.

Spray nozzles

The spray nozzles are located on the milling drum cabinet and are secured against twisting by guides.

To check and clean them, the nozzles can be removed from the guides through the gaps in the milling drum cabinet.

- Pull the hose with the nozzle (1) out of the holder.
- Clean the nozzle (2) with a wire brush. If necessary, remove or replace the nozzle to be cleaned.
- Properly reinstall the nozzle and insert it into the guide.

The two outer nozzles have a larger diameter than the inner nozzles.

In case of frost, the feed hoses must be pulled with the nozzles from the mounts and emptied completely in order to protect them from damage.

- Pull the hoses with the nozzles out of the holders, drain them and let them hang down.
- Before re-commissioning, properly remount the hoses.

Power supply

Batteries

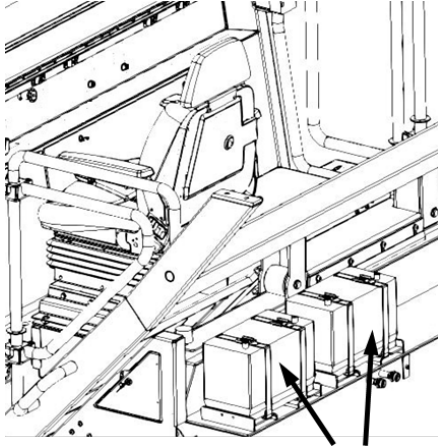


Fig. Batteries

- Behind the maintenance flap, two batteries of the 24 volt system can be found on both the left and right behind the driver's seat.
-
- The batteries are maintenance-free.
-
- The pole terminals must be free of oxide and be protected with special pole grease.

⚠ The gas formed in the battery is explosive. Avoid naked flames and sparks.

! When removing the batteries, always remove the negative pole first; ensure that the battery poles are not short-circuited.

⚠ The battery contains corrosive and poisonous sulphuric acid. Wear goggles and absolutely avoid skin contact!

Compressed air system

Maintenance unit and compressed air system

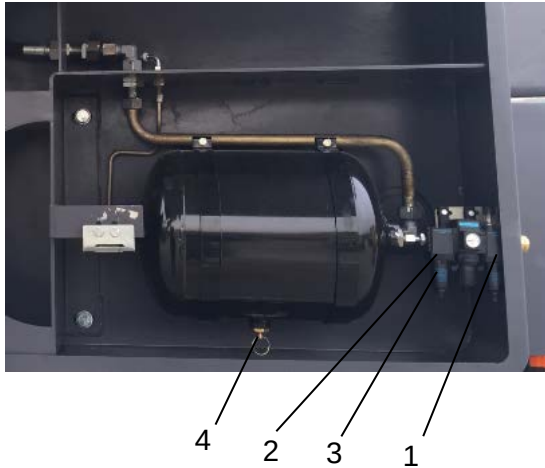


Fig. 1. Oiler

2. Water separator

3. Valve

4. Valve eyelet

A maintenance unit that separates the water from the air and enriches the air-flow with a fine oil mist, thus providing for a longer lifetime of the parts, is located on the compressed air tank.

Check the filling level of the oiler (1) every 50 operating hours and replenish if necessary.

Drain any water that has formed into the water separator (2).

Also drain any condensation that has formed in the compressed air tank.

The compressed air tank and connected maintenance unit can be found behind the storage room flap on the left-hand side of the machine.

- Unscrew the oil reservoir (1) by hand and replenish the stipulated oil up to the mark "max"; then properly screw the oil reservoir in again.
- Drain any water that has formed in the water separator (2) by opening the valve (3); close the valve again properly as soon as the water has completely drained.
- Drain any water that has formed in the compressed air tank by pulling the valve eyelet (4). Drain water only when the drive engine is not running. The escaping air drives the water from the tank. Hold the valve open until no more water exits.

Levelling system

Sensors, controllers, connection cables

The sensors, controllers and connection cables of the levelling equipment should be checked daily in order to guarantee an interruption-free and precise work flow. Damaged parts, such as cables and cords, should be replaced immediately to avoid breakdowns of the levelling equipment and consequent unnecessary delays.

The equipment and sensors should also be cleaned.

Emergency stop button

For your own safety, the safety of other persons and the safety of the machine, the function of all the emergency stop buttons located on the machine should be tested daily.



Defective emergency stop buttons must be replaced immediately. Emergency stop buttons are located

- on the upper control panel (o on both upper control panels)
- on all lower control panels

See more details in “**Machine description**” Chapter.



The engine, drives and steering system are shut down when the emergency stop button is pressed. Any countermeasures required (diverting, lifting the upper conveyor etc.) are then no longer available! Risk of accident!

Lubrication points

Traction unit

Chassis legs

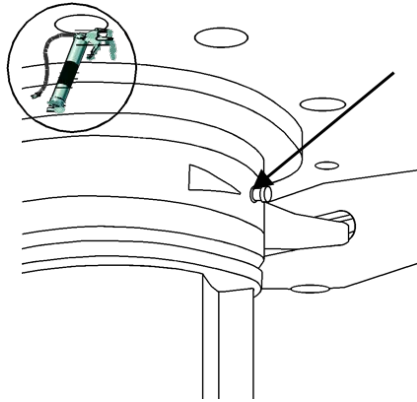


Fig. Lubrication point

A grease nipple is located on each chassis leg.

Add grease with a grease gun until grease flows out of the front and rear guide grooves.



The sliding surfaces in the guide grooves must always be covered by a film of grease!

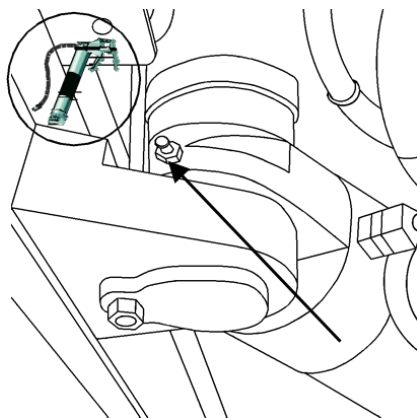


Fig. Lubrication point

Steering cylinder

A grease nipple is located on each bearing point of the steering cylinder.

Add 3 loads of grease with a grease gun.

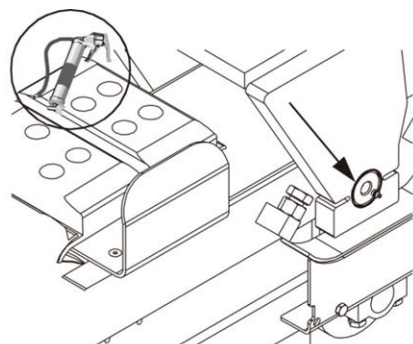


Fig. Lubrication point

Floating pin

A grease nipple is located on each traction unit on the floating pin.

Add 5 loads of grease with a grease gun.

Milling section Belt tensioner

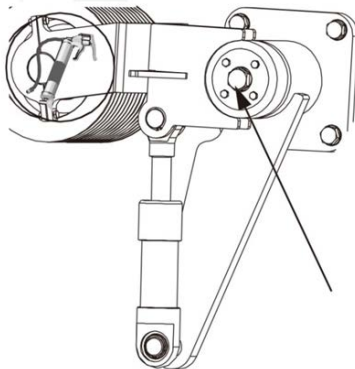


Fig. Lubrication point

A grease nipple is located on the bearing point on the belt tensioner of the milling drum transmission.

Add 3 loads of grease with a grease gun.

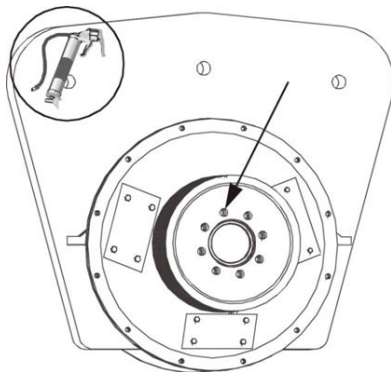


Fig. Lubrication point

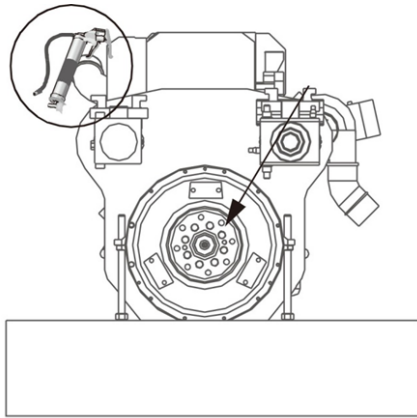
Clutch bearing Type “DESCH”

The grease nipple for the clutch bearing is located behind the belt disc.

- Turn the belt disc until one of the holes is in the uppermost position; then push the hose of the grease gun through the hole onto the grease nipple.

Add 3-5 loads of grease with a grease gun.

Clutch bearing "STROMAG" Type



The grease nipple for the clutch bearing is located behind the belt disc.

- Turn belt disc until the grease nipple can be seen through one of the holes. Slide hose of grease gun through hole on grease nipple.

Add 12 loads of grease with a grease gun.



If the entire volume of grease has to be replaced, please contact the Atlas Copco service team. They will discuss the process with you!

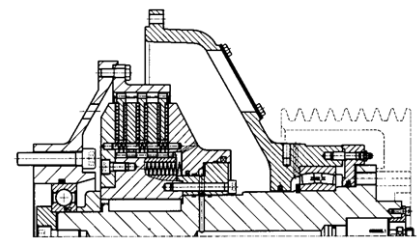
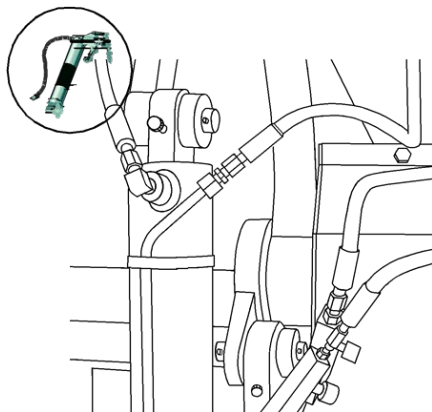


Fig. Lubrication point



Scraper hydraulic cylinder

A grease nipple is located on each bearing point (top and bottom) of the hydraulic cylinder on the drum flap.

Add 3 loads of grease with a grease gun.

Fig. Lubrication point

Milling drum bearing

Each time the drum is replaced, the condition of the bearing must be checked and the bearing must be filled with fresh grease!

- Remove protective cover (1)
- Raise side board until the screw plug (2) is visible
- Remove screw plug

Use a grease gun to add approx. 500ccm of grease.

- Refit screw plug and protective cover.

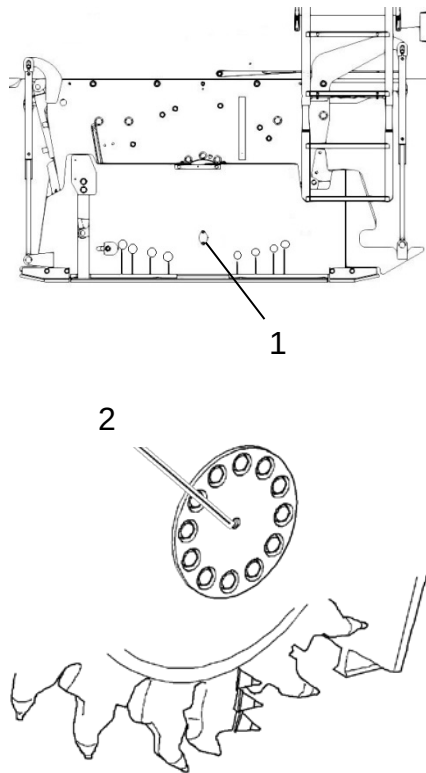


Fig.1. Protective cover
2. Screw plug

Upper/lower conveyor

Upper conveyor (fixed model)

Tail roller pedestal bearing

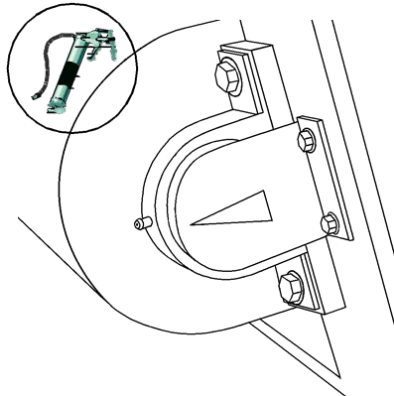


Fig. Lubrication point

A grease nipple is located on the pedestal bearing on each side of the upper conveyor.

Add 4 loads of grease with a grease gun

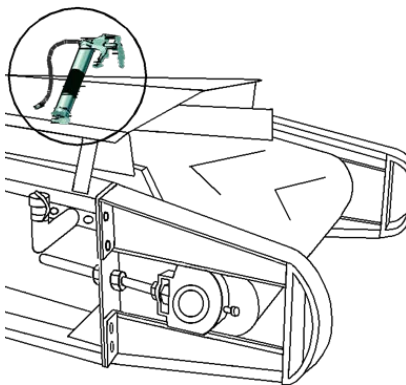


Fig. Lubrication point

Drive roller tension bearing

A grease nipple is located on the tension bearing on the right side of the upper conveyor.

Add 3 loads of grease with a grease gun.

Upper conveyor (foldable model)

Tail roller pedestal bearing

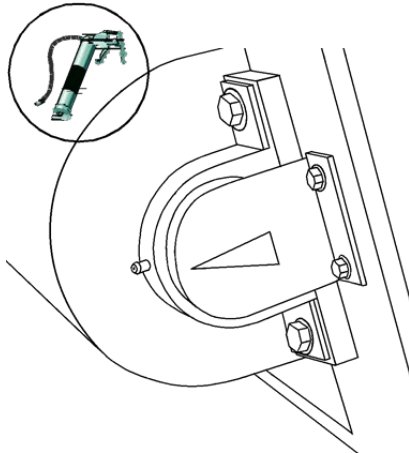


Fig. Lubrication point

A grease nipple is located on the pedestal bearing on each side of the upper conveyor.

Add 3 loads of grease with a grease gun.

Drive roller tension bearing

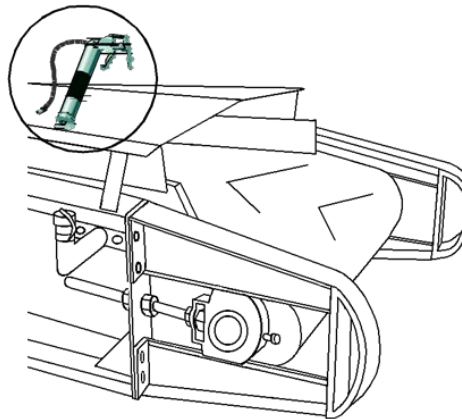


Fig. Lubrication point

A grease nipple is located on the tension bearing on the right side of the upper conveyor.

Add 3 loads of grease with a grease gun

Springs, joints and bolts

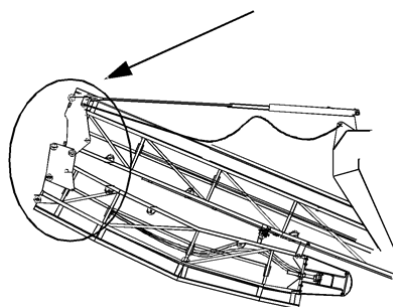


Fig. Lubrication point

Lubricate the springs, joints and bolts on both sides of the joint area of the foldable upper conveyor to maintain flexibility and to protect individual parts from corrosion.

Add oil or grease using a brush.

Flange bolts

The flange bolts, which support the upper conveyor, are equipped with a threaded hole onto which a grease gun can be screwed.

Add 3 loads of grease with a grease gun.

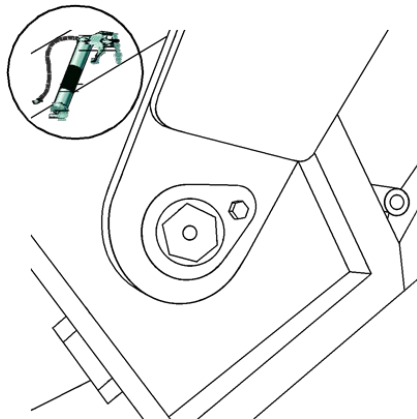


Fig. Lubrication point

Lower conveyor

Tail roller pedestal bearing

A grease nipple is located on the pedestal bearing on each side of the lower conveyor.

Add 4 loads of grease with a grease gun.

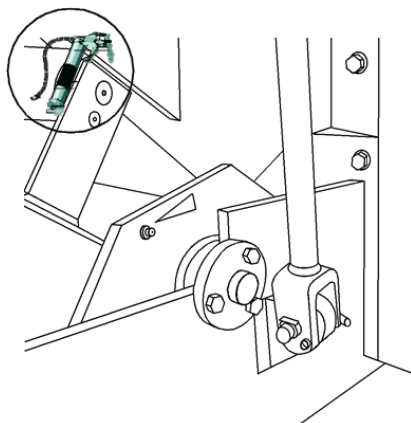


Fig. Lubrication point

Drive roller tension bearing

A grease nipple is located on the tension bearing on the right side of the lower conveyor.

Add 3 loads of grease with a grease gun.

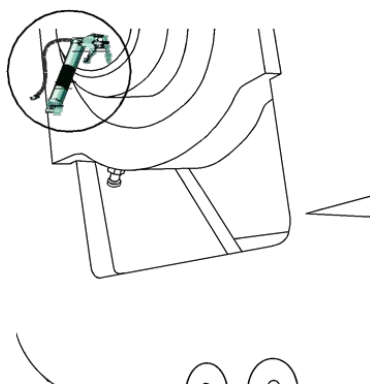


Fig. Lubrication point

Inspection

General visual inspection

The daily routine includes walking around the machine with the following inspections:

- damage to parts or operating elements?
- leaks in engine, hydraulic system, transmission, etc.?
- all fastening points OK?



Eliminate problems immediately in order to avoid damage, accidents and pollution!

Inspection by an expert

The operational condition of the cold planer must be inspected by an expert:

- as necessary (according to use conditions and operational circumstances),
- but at least once per year.

Disposal

Correctly sorted disposal must be carried out after replacing wear and spare parts and after the machine has been withdrawn from service (scrapped).

The materials must be sorted correctly according to metal, plastic, electronic scrap, various operating substances etc.

Any oil greasy parts (hydraulic hoses, lube pipes etc.) must be treated separately.

Electric devices, accessories and packaging should be recycled in an environment-friendly manner.

Always observe the local regulations.

Appendix

Appendix 1: Engine Fault Code

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
111	Engine Control Module Critical Internal Failure - Bad intelligent device or component	629	12	Controller #1
115	Engine Magnetic Speed/Position Lost Both of Two Signals - Data erratic, intermittent or incorrect	612	2	System Diagnostic Code #2
122	Intake Manifold 1 Pressure Sensor Circuit - Voltage above normal, or shorted to high source	102	3	Engine Intake Manifold #1 Pressure
123	Intake Manifold 1 Pressure Sensor Circuit - Voltage below normal, or shorted to low source	102	4	Engine Intake Manifold #1 Pressure
124	Intake Manifold 1 Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	102	16	Engine Intake Manifold #1 Pressure
131	Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage above normal, or shorted to high source	91	3	Accelerator Pedal Position 1
132	Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage below normal, or shorted to low source	91	4	Accelerator Pedal Position 1
133	Remote Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage above normal, or shorted to high source	974	3	Remote Accelerator Pedal Position
134	Remote Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage below normal, or shorted to low source	974	4	Remote Accelerator Pedal Position
135	Engine Oil Rifle Pressure 1 Sensor Circuit - Voltage above normal, or shorted to high source	100	3	Engine Oil Pressure
141	Engine Oil Rifle Pressure 1 Sensor Circuit - Voltage below normal, or shorted to low source	100	4	Engine Oil Pressure
143	Engine Oil Rifle Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level	100	18	Engine Oil Pressure
144	Engine Coolant Temperature 1 Sensor Circuit - Voltage above normal, or shorted to high source	110	3	Engine Coolant Temperature
145	Engine Coolant Temperature 1 Sensor Circuit - Voltage below normal, or shorted to low source	110	4	Engine Coolant Temperature
146	Engine Coolant Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level	110	16	Engine Coolant Temperature

Service Fault Code	Service Description	J1939		J1939 SPN Description
		SPN	FMI	
147	Accelerator Pedal or Lever Position 1 Sensor Circuit Frequency - Data valid but below normal operating Range	91	1	Accelerator Pedal Position 1
148	Accelerator Pedal or Lever Position Sensor 1 - Data valid but above normal operational range - Most Severe Level	91	0	Accelerator Pedal Position 1
151	Engine Coolant Temperature - Data valid but above normal operational range – Most Severe Level	110	0	Engine Coolant Temperature
153	Intake Manifold 1 Temperature Sensor Circuit - Voltage above normal, or shorted to high source	105	3	Engine Intake Manifold 1 Temperature
154	Intake Manifold 1 Temperature Sensor Circuit - Voltage below normal, or shorted to low source	105	4	Engine Intake Manifold 1 Temperature
155	Intake Manifold 1 Temperature - Data valid but above normal operational range – Most Severe Level	105	0	Engine Intake Manifold 1 Temperature
187	Sensor Supply 2 Circuit - Voltage below normal, or shorted to low source	3510	4	Sensor supply voltage 2
195	Coolant Level Sensor 1 Circuit - Voltage above normal, or shorted to high source	111	3	Engine Coolant Level
196	Coolant Level Sensor 1 Circuit - Voltage below normal, or shorted to low source	111	4	Engine Coolant Level
197	Coolant Level - Data Valid But Below Normal Operating Range - Moderately Severe Level	111	18	Engine Coolant Level
221	Barometric Pressure Sensor Circuit - Voltage above normal, or shorted to high	108	3	Barometric Pressure
222	Barometric Pressure Sensor Circuit - Voltage above normal, or shorted to low source	108	4	Barometric Pressure
227	Sensor Supply 2 Circuit - Voltage above normal, or shorted to high source	3510	3	Sensor supply voltage 2
234	Engine Crankshaft Speed/Position - Data valid but above normal operational range - Most Severe Level	190	0	Engine Speed

Appendix

Service Fault Code	Service Description	J1939_SPN	FMI	J1939_SPN Description
235	Coolant Level - Data valid but below normal operational range - Most Severe level	111	1	Engine Coolant Level
238	Sensor Supply 3 Circuit - Voltage below normal, or shorted to low source	3511	4	Sensor supply voltage 3
239	Sensor Supply 3 Circuit - Voltage above normal, or shorted to high source	3511	3	Sensor supply voltage 3
241	Wheel-Based Vehicle Speed - Data erratic, intermittent or incorrect	84	2	Wheel-Based Vehicle Speed
242	Wheel-Based Vehicle Speed Sensor Circuit tampering has been detected - Abnormal rate of change	84	10	Wheel-Based Vehicle Speed
245	Fan Control Circuit - Voltage below normal, or shorted to low source	647	4	Engine Fan Clutch 1 Output Device Driver
249	Ambient Air Temperature Sensor 1 Circuit - Voltage above normal, or shorted to high source	171	3	Ambient Air Temperature
256	Ambient Air Temperature Sensor 1 Circuit - Voltage below normal, or shorted to	171	4	Ambient Air Temperature
271	Engine Fuel Pump Pressurizing Assembly 1 Circuit - Voltage below normal, or shorted	1347	4	Engine Fuel Pump Pressurizing Assembly #1
272	Engine Fuel Pump Pressurizing Assembly 1 Circuit - Voltage above normal, or shorted	1347	3	Engine Fuel Pump Pressurizing Assembly #2
281	Engine Fuel Pump Pressurizing Assembly 1 - Mechanical system not	1347	7	Engine Fuel Pump Pressurizing Assembly #3
285	SAE J1939 Multiplexing PGN Timeout Error - Abnormal update rate	639	9	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link)
286	SAE J1939 Multiplexing Configuration Error - Out of Calibration	639	13	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link)

Service Fault Code	Service Description	J1939		J1939 SPN Description
		SPN	FMI	
288	SAE J1939 Multiplexing Remote Accelerator Pedal or Lever Position Sensor System - Received Network Data In Error	974	19	Remote Accelerator Pedal Position
291	Proprietary Datalink Error (OEM/Vehicle Datalink) - Abnormal update rate	625	9	Proprietary Datalink
292	Auxiliary Temperature Sensor Input 1 - Special Instructions	441	14	Auxiliary Temperature 1
293	Auxiliary Temperature Sensor Input 1 Circuit - Voltage above normal, or shorted to high source	441	3	Auxiliary Temperature 1
294	Auxiliary Temperature Sensor Input 1 Circuit - Voltage below normal, or shorted to low source	441	4	Auxiliary Temperature 1
296	Auxiliary Pressure Sensor Input 2 - Special Instructions	1388	14	Auxiliary Pressure #2
297	Auxiliary Pressure Sensor Input 2 Circuit - Voltage above normal, or shorted to high source	1388	3	Auxiliary Pressure #2
298	Auxiliary Pressure Sensor Input 2 Circuit - Voltage below normal, or shorted to low source	1388	4	Auxiliary Pressure #2
322	Injector Solenoid Driver Cylinder 1 Circuit - Current below normal or open circuit	651	5	Engine Injector Cylinder #01
323	Injector Solenoid Driver Cylinder 5 Circuit - Current below normal or open circuit	655	5	Engine Injector Cylinder #05
324	Injector Solenoid Driver Cylinder 3 Circuit - Current below normal or open circuit	653	5	Engine Injector Cylinder #03
325	Injector Solenoid Driver Cylinder 6 Circuit - Current below normal or open circuit	656	5	Engine Injector Cylinder #06
331	Injector Solenoid Driver Cylinder 2 Circuit - Current below normal or open circuit	652	5	Engine Injector Cylinder #02
332	Injector Solenoid Driver Cylinder 4 Circuit - Current below normal or open circuit	654	5	Engine Injector Cylinder #04
338	Idle Shutdown Vehicle Accessories Relay Driver Circuit - Voltage above normal, or shorted to high source	1267	3	Idle Shutdown Vehicle Accessories Relay Driver Circuit
339	Idle Shutdown Vehicle Accessories Relay Driver Circuit - Voltage below normal, or shorted to low source	1267	4	Idle Shutdown Vehicle Accessories Relay Driver Circuit
343	Engine Control Module Warning Internal Hardware Failure - Bad intelligent device or component	629	12	Controller #1

Appendix

Service Fault Code	Service Description	J1939_SPN	FMI	J1939_SPN Description
349	Transmission Output Shaft Speed - Data Valid But Above Normal Operating Range - Moderately Severe Level	191	16	Transmission Output Shaft Speed
351	Injector Power Supply - Bad intelligent device or component	3597	12	ECU Power Output Supply Voltage #1
352	Sensor Supply 1 Circuit - Voltage below normal, or shorted to low source	3509	4	Sensor supply voltage 1
386	Sensor Supply 1 Circuit - Voltage above normal, or shorted to high source	3509	3	Sensor supply voltage 1
415	Engine Oil Rifle Pressure - Data valid but below normal operational range - Most Severe Level	100	1	Engine Oil Pressure
418	Water in Fuel Indicator - Data Valid But Above Normal Operating Range - Least Severe Level	97	15	Water In Fuel Indicator
428	Water in Fuel Indicator Sensor Circuit - Voltage above normal, or shorted to high source	97	3	Water In Fuel Indicator
429	Water in Fuel Indicator Sensor Circuit - Voltage below normal, or shorted to low source	97	4	Water In Fuel Indicator
431	Accelerator Pedal or Lever Idle Validation Switch - Data erratic, intermittent or incorrect	558	2	Accelerator Pedal 1 Low Idle Switch
432	Accelerator Pedal or Lever Idle Validation Switch Circuit - Out of Calibration	558	13	Accelerator Pedal 1 Low Idle Switch
435	Engine Oil Rifle Pressure - Data erratic, intermittent or incorrect	100	2	Engine Oil Pressure
441	Battery 1 Voltage - Data Valid But Below Normal Operating Range - Moderately Severe Level	168	18	Battery Potential / Power Input 1
442	Battery 1 Voltage - Data Valid But Above Normal Operating Range - Moderately Severe Level	168	16	Battery Potential / Power Input 1
449	Injector Metering Rail 1 Pressure - Data valid but above normal operational range - Most Severe Level	157	0	Engine Injector Metering Rail 1 Pressure
451	Injector Metering Rail 1 Pressure Sensor Circuit - Voltage above normal, or shorted to high source	157	3	Engine Injector Metering Rail 1 Pressure
452	Injector Metering Rail 1 Pressure Sensor Circuit - Voltage below normal, or shorted to low source	157	4	Engine Injector Metering Rail 1 Pressure
483	Injector Metering Rail 2 Pressure Sensor Circuit - Voltage above normal, or shorted to high source	1349	3	Engine Injector Metering Rail 2 Pressure

Service Fault Code	Service Description	J1939_		J1939_SPN Description
		SPN	FMI	
488	Intake Manifold 1 Temperature - Data Valid But Above Normal Operating Range – Moderately Severe Level	105	16	Engine Intake Manifold Temperature
489	Transmission Output Shaft Speed - Data Valid But Below Normal Operating Range - Moderately Severe Level	191	18	Transmission Output Shaft
497	Multiple Unit Synchronization Switch - Data erratic, intermittent or incorrect	1377	2	Engine Synchronization
515	Sensor Supply 6 Circuit - Voltage above normal, or shorted to high source	3514	3	Sensor supply voltage 6
516	Sensor Supply 6 Circuit - Voltage below normal, or shorted to low source	3514	4	Sensor supply voltage 6
523	Auxiliary Intermediate (PTO) Speed Switch Validation - Data erratic, intermittent or incorrect	611	2	System Diagnostic Code #1
527	Auxiliary Input/Output 2 Circuit - Voltage above normal, or shorted to high source	702	3	Auxiliary I/O #02
529	Auxiliary Input/Output 3 Circuit - Voltage above normal, or shorted to high source	703	3	Auxiliary I/O #03
546	Fuel Delivery Pressure Sensor Circuit - Voltage above normal, or shorted to high source	94	3	Engine Fuel Delivery Pressure
547	Fuel Delivery Pressure Sensor Circuit - Voltage below normal, or shorted to low source	94	4	Engine Fuel Delivery Pressure
553	Injector Metering Rail 1 Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	157	16	Engine Injector Metering Rail 1 Pressure
555	Crankcase Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	101	16	Engine Crankcase Pressure
556	Crankcase Pressure - Data valid but above normal operational range - Most Severe Level	101	0	Engine Crankcase Pressure
559	Pressure - Data Valid But Below Normal Operating Range - Moderately Severe Level	157	18	Engine Injector Metering Rail 1 Pressure
584	Starter Relay Driver Circuit - Voltage above normal, or shorted to high source	677	3	Engine Starter Motor Relay
585	Starter Relay Driver Circuit - Voltage below normal, or shorted to low source	677	4	Engine Starter Motor Relay

Appendix

Service Fault Code	Service Description	J1939		J1939 SPN Description
		SPN	FMI	
595	Turbocharger 1 Speed - Data Valid But Above Normal Operating Range - Moderately Severe Level	103	16	Engine Turbocharger 1 Speed
599	Auxiliary Commanded Dual Output Shutdown - Special Instructions	640	14	Engine External Protection Input
649	Engine Oil Change Interval - Condition Exists	1378	31	Engine Oil Change Interval
687	Turbocharger 1 Speed - Data Valid But Below Normal Operating Range - Moderately Severe Level	103	18	Engine Turbocharger 1 Speed
689	Engine Crankshaft Speed/Position - Data erratic, intermittent or incorrect	190	2	Engine Speed
691	Turbocharger 1 Compressor Intake Temperature Circuit - Voltage above normal, or shorted to high source	1172	3	Engine Turbocharger 1 Compressor Intake Temperature
692	Turbocharger 1 Compressor Intake Temperature Circuit - Voltage below normal, or shorted to low source	1172	4	Engine Turbocharger 1 Compressor Intake Temperature
731	Engine Speed / Position Camshaft and Crankshaft Misalignment - Mechanical system not responding or out of adjustment	723	7	Engine Speed 2
741	Turbocharger 1 Compressor Intake Pressure Circuit - Voltage above normal, or shorted to high source	1176	3	Engine Turbocharger 1 Compressor Intake Pressure
742	Turbocharger 1 Compressor Intake Pressure Circuit - Voltage below normal, or shorted to low source	1176	4	Engine Turbocharger 1 Compressor Intake Pressure
743	Turbocharger 1 Compressor Intake Pressure - Data erratic, intermittent or incorrect	1176	2	Engine Turbocharger 1 Compressor Intake Pressure
771	Brake Switch Circuit - Voltage below normal, or shorted to low source	597	4	Brake Switch
778	Engine Camshaft Speed / Position Sensor - Data erratic, intermittent or incorrect	723	2	Engine Speed 2

Service Fault Code	Service Description	J1939_		J1939_SPN Description
		SPN	FMI	
1117	Power Supply Lost With Ignition On - Data erratic, intermittent or incorrect	3597	2	ECU Power Output Supply
1141	Injector Solenoid Driver Cylinder 2 - Mechanical system not responding or out of adjustment	652	7	Engine Injector Cylinder #02
1142	Injector Solenoid Driver Cylinder 3 - Mechanical system not responding or out of adjustment	653	7	Engine Injector Cylinder #03
1143	Injector Solenoid Driver Cylinder 4 - Mechanical system not responding or out of adjustment	654	7	Engine Injector Cylinder #04
1144	Injector Solenoid Driver Cylinder 5 - Mechanical system not responding or out of adjustment	655	7	Engine Injector Cylinder #05
1145	Injector Solenoid Driver Cylinder 6 - Mechanical system not responding or out of adjustment	656	7	Engine Injector Cylinder #06
1239	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage above normal, or shorted to high source	2623	3	Accelerator Pedal #1 Channel 2
1241	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage below normal, or shorted to low source	2623	4	Accelerator Pedal #1 Channel 2
1242	Accelerator Pedal or Lever Position Sensor 1 - Data erratic, intermittent or incorrect	91	2	Accelerator Pedal Position 1
1358	Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage above normal, or shorted to high source	91	3	Accelerator Pedal Position 1
1359	Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage below normal, or shorted to low source	91	4	Accelerator Pedal Position 1
1427	Overspeed Shutdown Relay Driver Diagnostic has detected an error - Condition Exists	4185	31	Overspeed Shutdown Relay Driver
1428	Low Oil Pressure (LOP) Shutdown Relay Driver Diagnostic has detected an error - Condition Exists	4186	31	Low Oil Pressure Shutdown Relay Driver

Appendix

Service Fault Code	Service Description	J1939		J1939 SPN Description
		SPN	FMI	
1429	High Engine Temperature (HET) Shutdown Relay Driver Diagnostic has detected an error - Condition Exists	4187	31	High Engine Temperature Shutdown Relay Driver
1431	Pre-Low Oil Pressure Warning Relay Driver Diagnostic has detected an error - Condition Exists	4188	31	Pre-Low Oil Pressure Indicator Relay Driver
1432	Pre-High Engine Temperature Warning Relay Driver Diagnostic has detected an error - Condition Exists	4223	31	Pre-High Engine Temperature Warning Relay Driver
1515	SAE J1939 Multiplexed Accelerator Pedal or Lever Sensor System - Received Network Data In Error	91	19	Accelerator Pedal Position 1
1539	Auxiliary Pressure Sensor Input 1 Circuit - Voltage above normal, or shorted to high source	1387	3	Auxiliary Pressure #1
1239	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage above normal, or shorted to high source	2623	3	Accelerator Pedal #1 Channel 2
1241	Accelerator Pedal or Lever Position Sensor 2 Circuit - Voltage below	2623	4	Accelerator Pedal #1 Channel 2
1242	Accelerator Pedal or Lever Position Sensor 1 - Data erratic, intermittent or incorrect	91	2	Accelerator Pedal Position 1
1358	Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage above normal, or shorted to high source	91	3	Accelerator Pedal Position 1
1359	Accelerator Pedal or Lever Position Sensor 1 Circuit - Voltage below normal, or shorted to low source	91	4	Accelerator Pedal Position 1
1427	Overspeed Shutdown Relay Driver Diagnostic has detected an error - Condition Exists	4185	31	Overspeed Shutdown Relay
1428	Low Oil Pressure (LOP) Shutdown Relay Driver Diagnostic has detected an error - Condition	4186	31	Low Oil Pressure Shutdown Relay Driver
1429	High Engine Temperature (HET) Shutdown Relay Driver Diagnostic has detected an error - Condition Exists	4187	31	High Engine Temperature Shutdown Relay
1431	Pre-Low Oil Pressure Warning Relay Driver Diagnostic has detected an error - Condition exist	4188	31	Pre-Low Oil Pressure Indicator Relay Driver
1432	Pre-High Engine Temperature Warning Relay Driver Diagnostic has detected an error - Condition Exists	4223	31	Pre-High Engine Temperature Warning Relay
1515	SAE J1939 Multiplexed Accelerator Pedal or Lever Sensor System	91	19	Accelerator Pedal Position 1

Service Fault Code	Service Description	J1939_		J1939_SPN Description
		SPN	FMI	
1539	Auxiliary Pressure Sensor Input 1 Circuit - Voltage above normal, or shorted to high source	1387	3	Auxiliary Pressure #1
1678	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature Sensor - Voltage above normal, or shorted to high source	3031	3	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature
1679	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature - Data erratic, intermittent or incorrect	3031	2	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature
1682	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Input Lines - Condition Exists	3362	31	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Input Lines
1683	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Voltage above normal, or shorted to high source	3363	3	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater
1684	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Voltage below normal, or shorted to low source	3363	4	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater
1685	Aftertreatment Diesel Exhaust Fluid Quality Sensor Circuit - Voltage below normal, or shorted to low source	3364	4	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
1686	Aftertreatment Diesel Exhaust Fluid Quality Sensor Circuit - Voltage above normal, or shorted to high source	3364	3	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
1691	Aftertreatment 1 Diesel Oxidation Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level	5298	18	Aftertreatment 1 Diesel Oxidation Catalyst Conversion Sever level
1694	Aftertreatment 1 Outlet NOx Sensor - Data erratic, intermittent or incorrect	3226	2	Aftertreatment 1 Outlet NOx
1695	Sensor Supply 5 - Voltage above normal, or shorted to high source	3513	3	Sensor supply voltage 5
1696	Sensor Supply 5 - Voltage below normal, or shorted to low source	3513	4	Sensor supply voltage 5
1712	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Data Valid But Below Normal Operating Range - Moderately Severe Level	3363	18	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater
1713	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Data Valid But Above Normal Operating Range - Moderately Severe Level	3363	16	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater

Appendix

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
1714	Aftertreatment Diesel Exhaust Fluid Quality - Out of Calibration	3364	13	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
1715	Aftertreatment Diesel Exhaust Fluid Quality - Root Cause Not Known	3364	11	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
1843	Crankcase Pressure Circuit - Voltage above normal, or shorted to high source	101	3	Engine Crankcase
1844	Crankcase Pressure Circuit - Voltage below normal, or shorted to low source	101	4	Engine Crankcase Pressure
1852	Water in Fuel Indicator - Data Valid But Above Normal Operating Range – Moderately Severe Level	97	16	Water In Fuel Indicator
1866	Exhaust Gas Recirculation Differential Pressure - Data erratic, intermittent or incorrect	411	2	Engine Exhaust Gas Recirculation 1 Differential Pressure
1885	Aftertreatment 1 Intake NOx Sensor Circuit - Voltage below normal, or shorted to low source	3216	4	Aftertreatment 1 Intake NOx
1887	Aftertreatment 1 Outlet NOx Sensor Circuit - Voltage below normal, or shorted to low source	3226	4	Aftertreatment 1 Outlet NOx
1896	EGR Valve Controller - Out of Calibration	2791	13	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control
1898	VGT Actuator Controller - Out of Calibration	641	13	Engine Variable Geometry Turbocharger Actuator #1
1938	ECU Power Output Supply Voltage 1 - Data Valid But Below Normal Operating Range - Moderately Severe Level	3597	18	ECU Power Output Supply Voltage #1
1942	Crankcase Pressure - Data erratic, intermittent or incorrect	101	2	Engine Crankcase Pressure
1961	EGR Valve Control Circuit Over Temperature - Data Valid But Above Normal Operating Range - Least Severe Level	2791	15	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
1962	VGT Actuator Driver Over Temperature (Calculated) - Data Valid But Above Normal Operating Range - Least Severe Level	641	15	Engine Variable Geometry
1974	Crankcase Pressure - Data Valid But Above Normal Operating Range - Least Severe Level	101	15	Engine Crankcase Pressure
1976	VGT Actuator Driver Over Temperature (Calculated) - Data Valid But Above Normal Operating Range - Least Severe Level	641	15	Engine Variable Geometry
2182	Engine Brake Actuator Driver 1 Circuit - Voltage above normal, or shorted to high source	1072	3	Engine (Compression) Brake Output
2183	Engine Brake Actuator Driver 1 Circuit - Voltage below normal, or shorted to low source	1072	4	Engine (Compression) Brake Output
2185	Sensor Supply 4 Circuit - Voltage above normal, or shorted to high source	3512	3	Sensor supply voltage 4
2186	Sensor Supply 4 Circuit - Voltage below normal, or shorted to low source	3512	4	Sensor supply voltage 4
2198	VGT Actuator Driver Circuit - Root Cause Not Known	641	11	Engine Variable Geometry Turbocharger Actuator #1
2265	Electric Lift Pump for Engine Fuel Supply Circuit - Voltage above normal, or shorted to high source	1075	3	Engine Electric Lift Pump for Engine Fuel Supply
2266	Electric Lift Pump for Engine Fuel Supply Circuit - Voltage below normal, or shorted to low source	1075	4	Engine Electric Lift Pump for Engine Fuel Supply
2272	EGR Valve Position Circuit - Voltage below normal, or shorted to low source	27	4	Engine Exhaust Gas Recirculation 1 Valve Position
2273	Exhaust Gas Recirculation Differential Pressure Sensor Circuit - Voltage above normal, or shorted to high source	411	3	Engine Exhaust Gas Recirculation 1 Differential Pressure
2274	Exhaust Gas Recirculation Differential Pressure Sensor Circuit - Voltage below normal or shorted to low source	411	4	Engine Exhaust Gas Recirculation 1 Differential Pressure
2288	Turbocharger 1 Speed - Data Valid But Above Normal Operating Range - Least Severe Level	103	15	Engine Turbocharger 1 Speed
2311	Electronic Fuel Injection Control Valve Circuit - Condition Exists	633	31	Engine Fuel Actuator 1 Control Command

Appendix

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
2321	Engine Crankshaft Speed/Position - Data erratic, intermittent or incorrect	190	2	Engine Speed
2322	Engine Camshaft Speed / Position Sensor - Data erratic, intermittent or incorrect	723	2	Engine Speed 2
2346	Turbocharger Turbine Intake Temperature - Data Valid But Above Normal Operating Range - Least Severe	2789	15	Engine Turbocharger 1 Calculated Turbine Intake Temperature
2349	EGR Valve Control Circuit - Current below normal or open circuit	2791	5	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control
2353	EGR Valve Control Circuit - Current above normal or grounded circuit	2791	6	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control
2357	EGR Valve Control Circuit - Mechanical system not responding or out of adjustment	2791	7	Engine Exhaust Gas Recirculation 1 (EGR1) Valve Control
2363	Engine Brake Actuator Driver Output 2 Circuit - Voltage below normal, or shorted to low source	1073	4	Engine (Compression) Brake Output
2367	Engine Brake Actuator Driver Output 2 Circuit - Voltage above normal, or shorted to high source	1073	3	Engine (Compression) Brake Output
2372	Fuel Filter Differential Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	95	16	Engine Fuel Filter
2373	Exhaust Gas Pressure Sensor 1 Circuit - Voltage above normal, or shorted to high source	1209	3	Engine Exhaust Gas Pressure 1
2374	Exhaust Gas Pressure Sensor 1 Circuit - Voltage below normal, or shorted to low source	1209	4	Engine Exhaust Gas Pressure 1
2375	Exhaust Gas Recirculation Temperature Sensor Circuit - Voltage above normal, or shorted to high source	412	3	Engine Exhaust Gas Recirculation 1 Temperature
2376	Exhaust Gas Recirculation Temperature Sensor Circuit - Voltage below normal, or shorted to low source	412	4	Engine Exhaust Gas Recirculation 1 Temperature
2377	Fan Control Circuit - Voltage above normal, or shorted to high source	647	3	Engine Fan Clutch 1 Output Device Driver

Service Fault Code	Service Description	J1939_ SPN		J1939_ SPN Description
2387	VGT Actuator Driver Circuit (Motor) - Mechanical system not responding or out of adjustment	641	7	Engine Variable Geometry Turbocharger Actuator #1
2448	Coolant Level - Data Valid But Below Normal Operating Range - Least Severe Level	111	17	Engine Coolant
2449	VGT Actuator Controller - Out of Calibration	641	13	Engine Variable Geometry Turbocharger
2468	Engine Crankshaft Speed/Position - Data Valid But Above Normal Operating Range - Moderately Severe Level	190	16	Engine Speed
2554	Exhaust Gas Pressure 1 - Data erratic, intermittent or incorrect	1209	2	Engine Exhaust Gas Pressure 1
2555	Engine Intake Air Heater 1 Circuit - Voltage above normal, or shorted to high source	729	3	Engine Intake Air Heater Driver #1
2556	Engine Intake Air Heater 1 Circuit - Voltage below normal, or shorted to low source	729	4	Engine Intake Air Heater Driver #1
2557	Auxiliary PWM Driver 1 Circuit - Voltage above normal, or shorted to high source	697	3	Auxiliary PWM Driver #1
2558	Auxiliary PWM Driver 1 Circuit - Voltage below normal, or shorted to low source	697	4	Auxiliary PWM Driver #1
2571	Engine Charge Air Cooler Outlet Temperature - Voltage above normal, or shorted to high source	2630	3	Engine Charge Air Cooler 1 Outlet Temperature
2572	Engine Charge Air Cooler Outlet Temperature - Voltage below normal, or shorted to low source	2630	4	Engine Charge Air Cooler 1 Outlet
2634	VGT Actuator Controller - Bad intelligent device or component	641	12	Engine Variable Geometry Turbocharger Actuator #1
2635	VGT Actuator Driver Circuit - Condition Exists	641	31	Engine Variable Geometry Turbocharger Actuator #1
2636	VGT Actuator Driver Circuit - Abnormal update rate	641	9	Engine Variable Geometry Turbocharger Actuator #1
2637	Aftertreatment 1 Diesel Oxidation Catalyst Face Plugged - Root Cause Not Known	5018	11	Aftertreatment Diesel Oxidation

Appendix

Service Fault Code	Service Description	J1939_		J1939_SPN Description
		SPN	FMI	
2638	Aftertreatment 1 Diesel Oxidation Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level	5298	18	Aftertreatment 1 Diesel Oxidation Catalyst
2646	Engine Coolant Temperature - Condition Exists	110	31	Engine Coolant Temperature
2659	Engine Coolant Temperature - Condition Exists	110	31	Engine Coolant Temperature
2754	Engine Diesel Particulate Filter Intake Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	81	16	Engine Diesel Particulate Filter Intake Pressure
2771	Aftertreatment 1 Outlet NOx Sensor - Abnormal update rate	3226	9	Aftertreatment 1 Outlet NOx
2961	Exhaust Gas Recirculation Temperature - Data Valid But Above Normal Operating Range - Least Severe Level	412	15	Engine Exhaust Gas Recirculation 1 Temperature
2962	Exhaust Gas Recirculation Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level	412	16	Engine Exhaust Gas Recirculation 1 Temperature
2964	Intake Manifold 1 Temperature - Data Valid But Above Normal Operating Range - Least Severe Level	105	15	Engine Intake Manifold #1 Temperature
2976	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Temperature - Data erratic, intermittent or incorrect	3361	2	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit
2998	Engine Torque Limit Feature - Special Instructions	1632	14	Engine Torque Limit Feature
3139	Engine Air Shutoff Circuit - Voltage above normal, or shorted to high source	3667	3	Engine Air Shutoff Status
3141	Engine Air Shutoff Circuit - Voltage below normal, or shorted to low source	3667	4	Engine Air Shutoff
3142	Aftertreatment 1 SCR Intake Temperature Sensor Circuit - Voltage above normal, or shorted to high source	4360	3	Aftertreatment 1 SCR Catalyst Intake Gas
3143	Aftertreatment 1 SCR Intake Temperature Sensor Circuit - Voltage below normal, or shorted to low source	4360	4	Aftertreatment 1 SCR Catalyst Intake Gas Temperature
3144	Aftertreatment 1 SCR Intake Temperature Sensor - Data erratic, intermittent or incorrect	4360	2	Aftertreatment 1 SCR Catalyst Intake Gas Temperature

Service Fault Code	Service Description	J1939		J1939_SPN Description
		SPN	FMI	
3146	Aftertreatment 1 SCR Outlet Temperature Sensor Circuit - Voltage above normal, or shorted to high source	4363	3	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature
3147	Aftertreatment 1 SCR Outlet Temperature Sensor Circuit - Voltage below normal, or shorted to low source	4363	4	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature
3148	Aftertreatment 1 SCR Outlet Temperature Sensor - Data erratic, intermittent or incorrect	4363	2	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature
3151	Aftertreatment 1 SCR Catalyst System Missing - Condition Exists	4794	31	Aftertreatment 1 SCR Catalyst System
3164	Aftertreatment 1 SCR Intake Temperature - Data Valid But Above Normal Operating Range - Least Severe	4360	15	Aftertreatment 1 SCR Catalyst Intake Gas Temperature
3165	Aftertreatment 1 SCR Outlet Temperature - Data valid but above normal operational range - Most Severe	4363	0	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature
3186	Tachograph Output Shaft Speed - Abnormal update rate	1623	9	Tachograph output shaft speed
3213	Tachograph Output Shaft Speed - Received Network Data In Error	1623	19	Tachograph output shaft speed
3228	Aftertreatment 1 Intake NOx Sensor - Data erratic, intermittent or incorrect	3216	2	Aftertreatment 1 Intake NOx
3229	Aftertreatment 1 SCR Intake Temperature - Data valid but above normal operational range - Most Severe Level	4360	0	Aftertreatment 1 SCR Catalyst Intake Gas Temperature
3231	Aftertreatment 1 SCR Intake Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level	4360	16	Aftertreatment 1 SCR Catalyst Intake Gas Temperature
3232	Aftertreatment 1 Intake NOx Sensor - Abnormal update rate	3216	9	Aftertreatment 1 Intake NOx
3235	Aftertreatment 1 SCR Outlet Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level	4363	16	Aftertreatment 1 SCR Catalyst Outlet Gas Temperature

Appendix

Service Fault Code	Service Description	J1939		J1939 SPN Description
		SPN	FMI	
3237	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Voltage above normal, or shorted to high source	4340	3	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State
3238	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Voltage below normal, or shorted to low source	4340	4	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State
3239	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Voltage above normal, or shorted to high source	4342	3	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State
3241	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Voltage below normal, or shorted to low source	4342	4	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State
3242	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Mechanical system not responding or out of adjustment	3363	7	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater
3251	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature - Data Valid But Above Normal Operating Range	4765	16	Aftertreatment Diesel Oxidation Catalyst Intake
3258	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Current below normal or open circuit	4340	5	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State
3261	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Current below normal or open circuit	4342	5	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State
3298	Anti-theft Encryption Seed - Out of Calibration	1194	13	Anti-theft Encryption Seed Present Indicator
3313	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature Sensor Circuit - Voltage below normal, or shorted to low source	4765	4	Aftertreatment Diesel Oxidation Catalyst Intake Temperature
3314	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature Sensor Circuit - Voltage above normal, or shorted to high source	4765	3	Aftertreatment Diesel Oxidation Catalyst Intake
3315	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature - Data erratic, intermittent or incorrect	4765	2	Aftertreatment Diesel Oxidation Catalyst Intake Temperature

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
3319	Aftertreatment 1 Diesel Particulate Filter Outlet Temperature Sensor Circuit - Voltage above normal, or shorted to high source	3246	3	Aftertreatment 1 Diesel Particulate Filter Outlet Gas Temperature
3326	SAE J1939 Multiplexed Accelerator Pedal or Lever Sensor System - Abnormal update rate	91	9	Accelerator Pedal Position 1
3328	Transmission Output Shaft Speed - Abnormal update rate	191	9	Transmission Output Shaft Speed
3329	J1939 Network #2 - Data erratic, intermittent or incorrect	1231	2	J1939 Network #2
3331	J1939 Network #3 - Data erratic, intermittent or incorrect	1235	2	J1939 Network #3
3341	Engine Air Filter Differential Pressure - Data Valid But Above Normal Operating Range - Moderately Severe Level	107	16	Engine Air Filter 1 Differential Pressure
3418	Transmission Output Shaft Speed - Received Network Data In Error	191	19	Transmission Output Shaft Speed
3419	Sensor Supply 7 Circuit - Voltage above normal or shorted to high source	5125	3	Sensor supply voltage 7
3421	Sensor Supply 7 Circuit - Voltage below normal, or shorted to low source	5125	4	Sensor supply voltage 7
3422	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Voltage above normal, or shorted to high source	4344	3	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State
3423	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Voltage below normal, or shorted to low source	4344	4	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State
3425	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Current below normal or open circuit	4344	5	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State
3488	Anti-Lock Braking (ABS) Controller - Abnormal update rate	563	9	Anti-Lock Braking (ABS) Active
3497	Aftertreatment 1 Diesel Exhaust Fluid Tank Level - Data Valid But Below Normal Operating Range - Least Severe Level	1761	17	Aftertreatment 1 Diesel Exhaust Fluid Tank Level

Appendix

Service Fault Code	Service Description	J1939		J1939_SPN Description
		SPN	FMI	
3498	Aftertreatment 1 Diesel Exhaust Fluid Tank Level - Data Valid But Below Normal Operating Range - Moderately Severe Level	1761	18	Aftertreatment 1 Diesel Exhaust Fluid Tank Level
3525	Wheel-Based Vehicle Speed - Received Network Data In Error	84	19	Wheel-Based Vehicle Speed
3527	Accelerator Pedal or Lever Idle Validation Switch - Received Network Data In Error	558	19	Accelerator Pedal 1 Low Idle Switch
3531	Ambient Air Temperature - Abnormal update	171	9	Ambient Air Temperature
3543	NOx limits exceeded due to Insufficient Reagent Quality - Condition Exists	4094	31	NOx limits exceeded due to Insufficient Diesel Exhaust Fluid Quality
3545	Aftertreatment 1 Outlet NOx Sensor - Abnormal rate of change	3226	10	Aftertreatment 1 Outlet NOx
3547	Aftertreatment Diesel Exhaust Fluid Tank Empty - Condition Exists	4096	31	NOx limits exceeded due to Empty Diesel Exhaust Fluid
3555	Engine Wait to Start Lamp - Abnormal update rate	1081	9	Engine Wait to Start Lamp
3558	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Voltage above normal, or shorted to high source	3361	3	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit
3559	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit - Voltage below normal, or shorted to low source	3361	4	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit
3562	Aftertreatment Diesel Exhaust Fluid Line Heater Relay - Voltage above normal, or shorted to high source	5491	3	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay
3563	Aftertreatment Diesel Exhaust Fluid Line Heater Relay - Voltage below normal, or shorted to low source	5491	4	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay
3567	Aftertreatment Diesel Exhaust Fluid Dosing Valve - Current below normal or open circuit	5394	5	Aftertreatment Diesel Exhaust Fluid Dosing Valve
3568	Aftertreatment Diesel Exhaust Fluid Dosing Valve - Mechanical system not responding or out of adjustment	5394	7	Aftertreatment Diesel Exhaust Fluid Dosing Valve
3571	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Voltage above normal, or shorted to high source	4334	3	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure
3572	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Voltage below normal, or shorted to low source	4334	4	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
3574	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data Valid But Below Normal Operating Range	4334	18	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure
3575	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data Valid But Above Normal Operating Range	4334	16	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure
3577	Aftertreatment Diesel Exhaust Fluid Return Valve - Voltage above normal, or shorted to high source	4376	3	Aftertreatment 1 Diesel Exhaust Fluid Return Valve
3578	Aftertreatment Diesel Exhaust Fluid Return Valve - Voltage below normal, or shorted to low source	4376	4	Aftertreatment 1 Diesel Exhaust Fluid Return Valve
3582	Aftertreatment SCR Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level	4364	18	Aftertreatment 1 SCR Conversion Efficiency
3583	Aftertreatment 1 Outlet NOx Sensor Heater - Abnormal rate of change	5031	10	Aftertreatment 1 Outlet Gas NOx Sensor Heater Ratio
3596	Aftertreatment 1 Diesel Exhaust Fluid Pressure Sensor - Data erratic, intermittent or incorrect	4334	2	Aftertreatment 1 Diesel Exhaust Fluid Doser Absolute Pressure
3613	SAE J1939 Multiplexing PGN Timeout Error - Abnormal update rate	111	9	SAE J1939 Multiplexing PGN Timeout
3614	Coolant Level Sensor - Received Network Data in Error	111	19	SAE J1939 Multiplexing PGN Timeout
3633	Engine Fan Clutch 2 Control Circuit - Voltage above normal, or shorted to high source	5484	3	Engine Fan Clutch 2 Output Device Driver
3634	Engine Fan Clutch 2 Control Circuit - Voltage below normal, or shorted to low source	5484	4	Engine Fan Clutch 2 Output Device Driver
3641	Transmission Output Retarder - Abnormal update rate	748	9	Transmission Output Retarder
3649	Aftertreatment 1 Intake NOx Sensor Heater - Abnormal rate of change	5024	10	Aftertreatment 1 Intake Gas NOx Sensor Heater Ratio
3681	Aftertreatment 1 Outlet NOx Sensor Power Supply - Data erratic, intermittent or incorrect	3228	2	Aftertreatment 1 Outlet Gas Sensor Power Status
3682	Aftertreatment 1 Intake NOx Sensor Power Supply - Data erratic, intermittent or incorrect	3218	2	Aftertreatment 1 Intake Gas Sensor Power Status

Appendix

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
3697	Engine Control Module Calibration Memory - Bad intelligent device or component	630	12	Engine Control Module Calibration Memory
3712	Aftertreatment SCR Operator Inducement - Data valid but above normal operational range - Most Severe level	5246	0	Aftertreatment SCR Operator Inducement Severity
3714	Engine Protection Torque Derate - Condition Exists	1569	31	Engine Protection Torque Derate
3717	Aftertreatment 1 Outlet NOx Sensor - Out of Calibration	3226	13	Aftertreatment 1 Outlet NOx
3718	Aftertreatment 1 Intake NOx - Out of Calibration	3216	13	Aftertreatment 1 Intake NOx
3724	Battery 1 Voltage - Data Valid But Below Normal Operating Range - Least Severe Level	168	17	Battery Potential / Power Input 1
3725	Aftertreatment 1 Intake NOx Sensor - Abnormal rate of change	3216	10	Aftertreatment 1 Intake NOx
3726	Aftertreatment 1 Intake NOx - Data Valid But Above Normal Operating Range - Moderately Severe Level	3216	16	Aftertreatment 1 Intake NOx
3727	High Pressure Common Rail Fuel Pressure Relief Valve - Mechanical system not responding or out of adjustment	5571	7	High Pressure Common Rail Fuel Pressure
3737	Engine Starter Mode Overcrank Protection - Condition Exists	1675	31	Engine Starter Mode
3741	High Pressure Common Rail Fuel Pressure Relief Valve - Data valid but above normal operational range	5571	0	High Pressure Common Rail Fuel Pressure Relief Valve
3748	Aftertreatment 1 Intake NOx Sensor - Data not Rational - Drifted High	3216	20	Aftertreatment 1 Intake NOx
3749	Aftertreatment 1 Outlet NOx Sensor - Data not Rational - Drifted High	3226	20	Aftertreatment 1 Outlet NOx
3751	Aftertreatment SCR Catalyst System - Mechanical system not responding or out of adjustment	4792	7	Aftertreatment SCR Catalyst
3755	Aftertreatment Diesel Exhaust Fluid Dosing Valve - Data erratic, intermittent or incorrect	5394	2	Aftertreatment Diesel Exhaust Fluid Dosing Valve
3765	Auxiliary Temperature Sensor Input 2 Circuit - Voltage above normal, or shorted to high source	442	3	Auxiliary Temperature 2

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
3766	Auxiliary Temperature Sensor Input 2 Circuit - Voltage below normal, or shorted to low source	442	4	Auxiliary Temperature 2
3843	Cruise Control Disable Command - Abnormal update rate	5603	9	Cruise Control Disable Command
3844	Cruise Control Pause Command - Condition Exists	5605	31	Cruise Control Pause Command
3845	Cruise Control Disable Command - Condition Exists	5603	31	Cruise Control Disable Command
3867	Aftertreatment Diesel Exhaust Fluid Quality - Data Valid But Below Normal Operating Range - Moderate Severe Level	3364	18	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
3868	Aftertreatment Diesel Exhaust Fluid Quality - Abnormal update rate	3364	9	Aftertreatment 1 Diesel Exhaust Fluid Tank 1
3876	Aftertreatment Diesel Exhaust Fluid Quality Sensor - Mechanical system not responding or out of adjustment	3364	7	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
3877	Aftertreatment Diesel Exhaust Fluid Quality Sensor - Bad intelligent device or component	3364	12	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
3878	Aftertreatment Diesel Exhaust Fluid Quality - Data erratic, intermittent or incorrect	3364	2	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
4151	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Abnormal update rate	5742	9	Aftertreatment Diesel Particulate Filter Temperature
4152	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Abnormal update rate	5743	9	Aftertreatment Selective Catalytic Reduction Temperature
4155	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay - Voltage Above Normal, or Shorted to high source	5746	3	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay
4156	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay - Voltage below normal, or shorted to low source	5746	4	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay
4157	Aftertreatment Diesel Exhaust Fluid Return Valve - Mechanical system not responding or out of adjust	4376	7	Aftertreatment 1 Diesel Exhaust Fluid Return Valve

Appendix

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
4158	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Bad intelligent device or component	5742	12	Aftertreatment Diesel Particulate Filter Temperature Sensor Module
4159	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Bad intelligent device or component	5743	12	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module
4161	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Voltage Above Normal, or Shorted to high source	5742	3	Aftertreatment Diesel Particulate Filter Temperature Sensor Module
4162	Aftertreatment Diesel Particulate Filter Temperature Sensor Module - Voltage below normal, or shorted to low source	5742	4	Aftertreatment Diesel Particulate Filter Temperature Sensor Module
4163	Aftertreatment Diesel Particulate Filter Temperature Sensor Module-Data Valid But Above Normal Operating Range	5742	16	Aftertreatment Diesel Particulate Filter Temperature Sensor Module
4164	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Voltage Above Normal, or Shorted to high source	5743	3	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module
4165	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Voltage below normal, or Shorted to low source	5743	4	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module
4166	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Data Valid But Above Normal	5743	16	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module
4168	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater - Voltage Above Normal, or Shorted to High	5745	3	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater
4169	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater - Voltage below normal, or shorted to low source	5745	4	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater
4171	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater - Data Valid But Below Normal Operating Range	5745	18	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater
4213	Aftertreatment Regeneration Inhibit Switch - Data erratic, intermittent or incorrect	3695	2	Aftertreatment Regeneration Inhibit Switch

Service Fault Code	Service Description	J1939		J1939_SPN Description
		SPN	FMI	
4215	Anti-Lock Braking (ABS) Active - Condition Exists	563	31	Anti-Lock Braking (ABS) Active
4241	Aftertreatment Diesel Exhaust Fluid Quality - Received Network Data In Error	3364	19	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
4243	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 - Abnormal Rate of Change	3515	10	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2
4249	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature - Abnormal Rate of Change	4337	10	Aftertreatment 1 Diesel Exhaust Fluid Dosing Temperature
4251	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Temperature - Abnormal Rate of Change	5798	10	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Temperature
4261	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module - Root Cause Not Known	5743	11	Aftertreatment Selective Catalytic Reduction Temperature Sensor Module
4277	Aftertreatment Diesel Exhaust Fluid Quality - Abnormal Rate of Change	3364	10	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
4437	J1939 Network #4 - Data erratic, intermittent or incorrect	1668	2	J1939 Network #4 - Data erratic
4484	Engine Air Shutoff - Mechanical System Not Responding or Out of Adjustment	3667	7	Engine Air Shutoff
4517	Vehicle Identification Number - Out of Calibration	237	13	Vehicle Identification Number
4533	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature Sensor Circuit - Voltage above normal, or shorted to high source	4766	3	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature Sensor Circuit
4534	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature Sensor Circuit - Voltage below normal, or shorted to low source	4766	4	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature Sensor Circuit
4572	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature - Abnormal Update Rate	3031	9	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature

Appendix

Service Fault Code	Service Description	J1939		J1939_SPN Description
		SPN	FMI	
4585	Aftertreatment 1 SCR Catalyst System - Special Instructions	4792	14	Aftertreatment 1 SCR Catalyst System
4677	SAE J1939 Multiplexing PGN Timeout Error - Abnormal update rate	639	9	J1939 Network #1, Primary Vehicle Network (previously SAE J1939 Data Link)
4731	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature Sensor - Out of Calibration	3031	13	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature
4732	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Out of Calibration	1761	13	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature
4734	Auxiliary Input/Output 1 - Special Instructions	701	14	Auxiliary I/O #01
4737	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature - Root Cause Not Known	3031	11	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature
4739	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Root Cause Not Known	1761	11	Aftertreatment 1 Diesel Exhaust Fluid Tank Level
4741	Aftertreatment Diesel Exhaust Fluid Quality Sensor Circuit - Current below normal or open circuit	3364	5	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
4742	Aftertreatment Diesel Exhaust Fluid Quality Sensor Circuit - Current above normal or grounded circuit	3364	6	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Quality
4743	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 Sensor Circuit - Current below normal or open circuit	3515	5	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2
4744	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 Sensor Circuit - Current above normal or grounded	3515	6	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2
4745	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2 - Root Cause Not Known	3515	11	Aftertreatment 1 Diesel Exhaust Fluid Temperature 2

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
4768	Aftertreatment 1 Diesel Exhaust Fluid Property - Root Cause Not Known	3521	11	Aftertreatment 1 Diesel Exhaust Fluid Property
4769	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Abnormal Rate of Change	1761	10	Aftertreatment 1 Diesel Exhaust Fluid Tank Level
4789	Fan Speed - Data Valid but Above Normal Operational Range - Most Severe Level	1639	0	Fan Speed
4791	Fan Speed - Data Valid but Below Normal Operational Range - Most Severe Level	1639	1	Fan Speed
4842	Aftertreatment Diesel Exhaust Fluid Quality - Data Valid But Above Normal Operating Range - Least Severe Level	3364	15	Aftertreatment Diesel Exhaust Fluid Quality
4863	Aftertreatment SCR Operator Inducement Active - Condition Exists	5245	31	Aftertreatment Selective Catalytic Reduction Operator Inducement
4951	Maintain ECU Power Lamp - Voltage Above Normal, or Shorted to High Source	6655	3	ECU Power Lamp
4952	Maintain ECU Power Lamp - Voltage Below Normal, or Shorted to Low Source	6655	4	ECU Power Lamp
4956	Variable Geometry Turbocharger Actuator Software - Out of Calibration	6713	13	Variable Geometry Turbocharger Actuator
4957	Variable Geometry Turbocharger Actuator Software - Condition Exists	6713	31	Variable Geometry Turbocharger Actuator
5177	VGT Actuator Driver Circuit - Abnormal update rate	6713	9	VGT Actuator Driver Circuit
5183	Fan Blade Pitch Position Sensor Circuit - Voltage Above Normal, or Shorted to High source	520784	3	Fan Blade Pitch Position Sensor Circuit
5184	Fan Blade Pitch Position Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	520784	4	Fan Blade Pitch Position Sensor Circuit
5185	Fan Blade Pitch - Mechanical system not responding or out of adjustment	520784	5	Fan Blade Pitch
5221	Engine Air Shutoff Status - Data erratic, intermittent or incorrect	3667	2	Engine Air Shutoff Status
5248	Tachograph Output Shaft Speed - Out of Calibration	1623	13	Tachograph Output Shaft Speed

Appendix

Service Fault Code	Service Description	J1939_SPN		J1939_SPN Description
5278	Aftertreatment 1 Diesel Exhaust Fluid Dosing System Frozen - Condition Exists	6802	31	
5291	Engine Emergency Shutdown Switch Activated - Condition Exists	520808	31	Engine Emergency Shutdown Switch Activated
5292	Excessive Time Since Last Engine Air Shutoff Maintenance Test - Condition Exists	520809	31	Excessive Time Since Last Engine Air Shutoff Maintenance Test
5386	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature - Data Erratic, Intermittent, or Incorrect	4766	2	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature
5387	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature - Data Valid But Above Normal Operating Range - Most Severe Level	4766	0	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature
5388	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature - Data Valid But Above Normal Operating Range - Moderately Severe Level	4766	16	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature
5389	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature - Data Valid But Above Normal Operating Range - Least Severe Level	4766	15	Aftertreatment 1 Diesel Oxidation Catalyst Outlet Gas Temperature
5391	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Abnormal Update Rate	6882	9	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module
5392	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Bad Intelligent Device or Component	6882	12	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module
5393	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Voltage Above Normal or Shorted to High Source	6882	3	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module
5394	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Voltage Below Normal or Shorted to Low Source	6882	4	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module
5395	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Root Cause Not Known	6882	11	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module
5396	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module - Data Valid But Above Normal Operating Range - Moderately Severe Level	6882	16	Aftertreatment Diesel Oxidation Catalyst Temperature Sensor Module

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
5576	Engine Air Filter Differential Pressure - Data Valid But Above Normal Operating Range - Least Severe Level	107	15	Engine Air Filter 1 Differential Pressure
5585	High Pressure Common Rail Fuel Pressure Relief Valve - Data Valid But Above Normal Operating Range - Least Severe Level	5571	15	High Pressure Common Rail Fuel Pressure Relief valve
5617	Aftertreatment 1 Diesel Oxidation Catalyst System- Special Instruction	524286	31	Aftertreatment 1 Diesel Oxidation Catalyst System
5631	SCR System Cleaning Inhibited Due to System Timeout - Condition Exists	6928	31	SCR System Cleaning Inhibited Due to System Timeout
5632	SCR System Cleaning Inhibited Due to Inhibit Switch - Condition Exists	6918	31	SCR System Cleaning Inhibited Due to Inhibit Switch
5653	SCR Operator Inducement Override Switch - Abnormal Update Rate	6881	9	SCR Operator Inducement Override Switch
5654	SCR Operator Inducement Override Switch - Out of Calibration	6881	13	SCR Operator Inducement Override Switch
5939	Machine Constrained Operation- Abnormal Update Rate. No Communication or an invalid data transfer rate has been detected on the J1939 data link between the ECM and the machine electronic control unit.	520968	9	
5941	Machine Constrained Operation- Received Network Data in Error. The received J1939 datalink message was not valid.	520968	19	
6256	Battery 1 Voltage - Data Valid But Above Normal Operating Range - Moderately Severe Level	168	16	Battery Potential / Power Input 1
6257	Battery 1 Voltage - Data Valid But Below Normal Operating Range - Moderately Severe Level	168	18	Battery Potential / Power Input 1
6258	Electric Lift Pump for Engine Fuel Supply Circuit - Voltage above normal, or shorted to high source	1075	3	Engine Electric Lift Pump for Engine Fuel Supply
6259	Electric Lift Pump for Engine Fuel Supply Circuit - Voltage below normal, or shorted to low source	1075	4	Engine Electric Lift Pump for Engine Fuel Supply

Appendix

Service Fault Code	Service Description	J1939 SPN		J1939 SPN Description
6263	Fan Control Circuit - Voltage above normal, or shorted to high source	647	3	Engine Fan Clutch 1 Output Device Driver
6264	Fan Control Circuit - Voltage below normal, or shorted to low source	647	4	Engine Fan Clutch 1 Output Device Driver
6265	Aftertreatment 1 Diesel Particulate Filter System - Mechanical system not responding or out of adjustment	3936	7	Aftertreatment 1 Diesel Particulate Filter System
6336	Crankcase Breather Filter Heater Circuit - Voltage above normal, or shorted to high source	862	3	Crankcase breather Heater Circuit
6337	Crankcase Breather Filter Heater Circuit - Voltage below normal, or shorted to low source	862	4	Crankcase breather Heater Circuit
6418	Engine Brake Actuator Driver 1 Circuit - Voltage above normal, or shorted to high source	1072	3	Engine (Compression) Brake Output #1
6419	Engine Brake Actuator Driver 1 Circuit - Voltage below normal, or shorted to low source	1072	4	Engine (Compression) Brake Output #1
6421	Engine Brake Actuator Driver Output 2 Circuit - Voltage above normal, or shorted to high source	1073	3	Engine (Compression) Brake Output #2
6422	Engine Brake Actuator Driver Output 2 Circuit - Voltage below normal, or shorted to low source	1073	4	Engine (Compression) Brake Output #2
6456	Engine Fan Clutch 2 Control Circuit - Voltage above normal, or shorted to high source	5484	3	Engine Fan Clutch 2 Output Device Driver
6457	Engine Fan Clutch 2 Control Circuit - Voltage below normal, or shorted to low source	5484	4	Engine Fan Clutch 2 Output Device Driver
6458	Aftertreatment 1 Intake NOx Sensor - Data not Rational - Drifted High	3216	20	Aftertreatment 1 Intake NOx
6459	Aftertreatment 1 Intake NOx Sensor - Data not Rational - Drifted High	3216	20	Aftertreatment 1 Intake NOx
6462	Aftertreatment 1 Outlet NOx Sensor - Data not Rational - Drifted High	3226	20	Aftertreatment 1 Outlet NOx
6463	Aftertreatment 1 Outlet NOx Sensor - Data not Rational - Drifted High	3226	20	Aftertreatment 1 Outlet NOx

Service Fault Code	Service Description	J1939 SPN	J1939 FMI	J1939_SPN Description
6464	Aftertreatment 1 Outlet NOx Sensor - Data not Rational - Drifted High	3226	20	Aftertreatment 1 Outlet NOx
6467	Fan Speed - Data Valid but Above Normal Operational Range - Most Severe Level	1639	0	Fan Speed
6468	Fan Speed - Data Valid but Below Normal Operational Range - Most Severe Level	1639	1	Fan Speed
	Fan Speed- Data Erratic, Intermittent, or Incorrect	1639	2	Fan Speed
6471	Fan Blade Pitch Position Sensor Circuit - Voltage Above Normal, or Shorted to High Source	520784	3	Fan Blade Pitch Position Sensor Circuit
6472	Fan Blade Pitch Position Sensor Circuit - Voltage Below Normal, or Shorted to Low Source	520784	4	Fan Blade Pitch Position Sensor circuit
6473	Fan Blade Pitch - Mechanical system not responding or out of adjustment	520784	5	Fan Blade Pitch
6475	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Mechanical system not responding or out of adjustment	3363	7	Aftertreatment 1 Diesel Exhaust Fluid Tank 1
6476	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Data Valid But Below Normal Operating Range - Moderately Severe Level	3363	18	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater
6477	Aftertreatment Diesel Exhaust Fluid Line Heater Relay - Voltage above normal, or shorted to high source	5491	3	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay
6478	Aftertreatment Diesel Exhaust Fluid Line Heater Relay - Voltage below normal, or shorted to low source	5491	4	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay
6479	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Voltage above normal, or shorted to high source	3363	3	Aftertreatment 1 Diesel Exhaust Fluid Tank 1Heater
6481	Aftertreatment 1 Diesel Exhaust Fluid Tank Heater - Voltage below normal, or shorted to low source	3363	4	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Heater
6482	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Current below normal or open circuit	4340	5	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State

Appendix

Service Fault Code	Service Description	J1939		J1939 SPN Description
		SPN	FMI	
6483	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Current below normal or open circuit	4342	5	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State
6484	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Current below normal or open circuit	4344	5	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State
6493	Electronic Throttle Control Actuator Driver Circuit-Voltage above normal, or shorted to high source	3464	3	Electronic Throttle Control Actuator Driver Circuit
6494	Electronic Throttle Control Actuator Driver Circuit-Voltage above normal, or shorted to low source	3464	4	Electronic Throttle Control Actuator Driver Circuit
6496	Electronic Throttle Control Actuator Driver Circuit-Voltage above normal, or shorted to high source	3464	3	Electronic Throttle Control Actuator Driver Circuit
6497	Engine Intake Throttle Actuator Position Sensor Circuit- Voltage above normal, or shorted to high source	51	3	Engine Intake Throttle Actuator Position Sensor Circuit
6498	Engine Intake Throttle Actuator Position Sensor Circuit- Voltage above normal, or shorted to low source	51	4	Engine Intake Throttle Actuator Position Sensor Circuit
6499	ECU Power Output Supply Voltage 1 - Data Valid But Below Normal Operating Range - Moderately Severe Level	3597	18	ECU Power Output Supply Voltage #1
6511	Maintain ECU Power Lamp - Voltage Above Normal, or Shorted to High Source	6655	3	ECU Power Lamp
6512	Maintain ECU Power Lamp - Voltage Below Normal, or Shorted to Low Source	6655	4	ECU Power Lamp
6513	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater - Data Valid But Below Normal Operating Range	5745	18	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater
6517	Aftertreatment SCR Catalyst Conversion Efficiency - Data Valid But Below Normal Operating Range - Moderately Severe Level	4364	18	Aftertreatment 1 SCR Conversion Efficiency

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
6521	Aftertreatment Outlet NOx Sensor Circuit- Voltage below normal or shorted to low source	3226	4	Aftertreatment Outlet NOx Sensor Circuits
6522	Coolant Level Sensor 1 Circuit - Voltage above normal, or shorted to high source	111	3	Engine Coolant Level
6523	Coolant Level Sensor 1 Circuit - Voltage below normal, or shorted to low source	111	4	Engine Coolant Level
6524	Engine Oil Temperature Sensor 1 Circuit - Voltage above normal, or shorted to high source	175	3	Engine Oil Temperature 1
6525	Engine Oil Temperature Sensor 1 Circuit - Voltage below normal, or shorted to low source	175	4	Engine Oil Temperature 1
6526	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Out of Calibration	1761	13	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature
6527	Aftertreatment Diesel Exhaust Fluid Return Valve - Mechanical system not responding or out of adjust	4376	7	Aftertreatment 1 Diesel Exhaust Fluid Return Valve
6529	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay - Voltage Above Normal, or Shorted to high source	5746	3	Aftertreatment 1 Diesel Exhaust Fluid Dosing Unit Heater Relay
6531	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Voltage above normal, or shorted to high source	4340	3	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State
6532	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 Circuit - Voltage below normal, or shorted to low source	4340	4	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 1 State
6533	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Voltage above normal, or shorted to high source	4342	3	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State
6534	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 Circuit - Voltage below normal, or shorted to low source	4342	4	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 2 State
6535	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Voltage above normal, or shorted to high source	4344	3	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State

Appendix

Service Fault Code	Service Description	J1939 SPN	FMI	J1939 SPN Description
6536	Aftertreatment Diesel Exhaust Fluid Line Heater 3 Circuit - Voltage below normal, or shorted to low source	4344	4	Aftertreatment 1 Diesel Exhaust Fluid Line Heater 3 State
6537	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay - Mechanical system not responding or out of adjustment	5491	7	Aftertreatment 1 Diesel Exhaust Fluid Line Heater Relay
6539	Aftertreatment 1 Diesel Oxidation Catalyst Intake Temperature - Data erratic, intermittent or incorrect	4765	2	Aftertreatment Diesel Oxidation Catalyst Intake Temperature
6551	Aftertreatment 1 Diesel Particulate Filter Outlet Pressure Sensor Circuit - Voltage above normal, or shorted to high source	3610	3	Aftertreatment Diesel Particulate Filter Outlet
6552	Aftertreatment 1 Diesel Particulate Filter Outlet Pressure Sensor Circuit - Voltage below normal, or shorted to low source	3610	4	Aftertreatment Diesel Particulate
6553	Aftertreatment 1 Diesel Particulate Filter Outlet Pressure - Data erratic, intermittent or incorrect	3610	2	Aftertreatment Diesel Particulate Filter Outlet Pressure
6556	Engine Intake Air Heater 1 Circuit - Voltage above normal, or shorted to high source	729	3	Engine Intake Air Heater Driver #1
6557	Engine Intake Air Heater 1 Circuit - Voltage below normal, or shorted to low source	729	4	Engine Intake Air Heater Driver #1
6559	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature Sensor - Voltage below normal, or shorted to low source	3031	4	Aftertreatment 1 Diesel Exhaust Fluid Tank Temperature
6562	Aftertreatment 1 Diesel Exhaust Fluid Tank Level Sensor - Root Cause Not Known	1761	11	Aftertreatment 1 Diesel Exhaust Fluid Tank Level
6563	Auxiliary Intermediate (PTO) Speed Switch Validation - Data erratic, intermittent or incorrect	611	2	System Diagnostic Code #1
6565	Aftertreatment 1 Outlet NOx Sensor - Abnormal rate of change	3226	10	Aftertreatment 1 Outlet NOx
6568	Aftertreatment Regeneration Inhibit Switch - Data erratic, intermittent or incorrect	3695	2	Aftertreatment Regeneration Inhibit Switch
6581	Aftertreatment 1 Outlet NOx Sensor Heater - Abnormal rate of change	5031	10	Aftertreatment 1 Outlet Gas NOx Sensor Heater Ratio
6597	SCR System Cleaning Inhibited Due to System Timeout - Condition Exists	6928	31	SCR System Cleaning Inhibited Due to System Timeout

Appendix 2: Check list for machine operator

Once the maintenance and checking work listed in the maintenance manual has been conducted at the specified intervals, the inspections and control work listed in the following list should also be noted and conducted.

This work is used to assess the machine status and to assure perfect operations as well as personal safety.

If permitted by the operations in question, the checks should be conducted before, during and after use.

Any defects found should be rectified immediately in compliance with the safety regulations.

Check!	How?
Emergency-stop button <ul style="list-style-type: none"> - on main control panel - on the ergo control units 	Check with engine running: Engine must shut down immediately after actuation. The button engages and must be pulled out so that the engine can be started again. Warning signal and warning information via display indicator
Horn <ul style="list-style-type: none"> - on main control panel - on the ergo control units 	Briefly press horn knob. Horn signal must sound.
Reverse travel warning device	Check with engine running. Acoustic signal must sound during re-verse travel.
Lighting <ul style="list-style-type: none"> - Operating headlight - Rotary beacons - Hazard flasher 	Lights must function, keep headlight glass clean.
Steering system	Check with engine running: Machine in straight-ahead travel position, steering system responds in sync with the steering lever adjustment, uniform steering locks in all steering variants (when in coordinated steering mode and in crab steering mode, the rear axle does however respond with a slight delay). Precise straight-ahead position of front and rear axle once the appropriate function keys have been pressed.

Appendix

Check!	How?
Traction unit - drive transmission	<p>Check with engine running: Machine accelerates, hesitates and breaks smoothly both in the drive and working gear.</p> <p>When tracks encounter different levels of traction, anti-slip control responds (track in question slips briefly and then immediately rotates again at the speed of the other tracks).</p>
Traction unit- strut tower	Check with engine running: Smooth extension and retraction.
Limit switch of drum flap	<p>Check with engine running:</p> <p>The limit switch opens when the drum flap is opened</p> <ul style="list-style-type: none"> - clutch of milling drum drive disengaged, - belt tensioner relieved. <p>milling drum and travel drives cannot be activated on the main operating panel.</p>
Belt tensioner	<p>Secure tensioning and releasing of powered belt when the engine is running as well as engagement and/or dis- engagement of the milling drum.</p> <p>Check bracket and seat of centering screws.</p>
Drum flap - Retaining and detent pins	<p>Check with engine running:</p> <p>The drum flap opens and closes smoothly.</p> <p>Both retaining pins can be slid in and out easily.</p> <p>The detent pin automatically engages and locks the drum flap in its open position.</p>
Side shields	<p>Check with engine running:</p> <ul style="list-style-type: none"> - Smooth raising up to upper position at the touch of a button and automatic lowering when the button is released - When the drum flap is opened, smooth rising up to upper position at the touch of a button. Side shield is not lowered when button is released. Side shield only lowered at the touch of a button.

Check!	How?
Grab bars	<p>Check with engine running:</p> <p>Grab bars can be connected with detent pins when the side shield is raised. Grab bars automatically release themselves from the detent pins when the downwards button is pressed.</p>
Sliding shoe	<p>Check with engine running:</p> <ul style="list-style-type: none"> - Smooth extension and retraction at touch of a button with full pressure - Smooth extension in floating position at touch of a button.
Scraper	<p>Check with engine running:</p> <ul style="list-style-type: none"> - Smooth extension and retraction at touch of a button with full pressure - Smooth extension in floating position at touch of a button.
Discharge conveyor	<p>Check with engine running: Belt tension, forwards and reversing mode, smooth raising, lowering, swiveling.</p>
Lower conveyor	<p>Check with engine running: Belt tension, forwards and reversing mode</p>
Safety device	<p>Fastening, check condition and function.</p>
Water system	<p>Check:</p> <ul style="list-style-type: none"> - Function of spray nozzles.
Weather protecting sun roof	<p>Check:</p> <ul style="list-style-type: none"> - Raising and lowering - Interlock - Condition of roof and all-round panels.
<p>Other equipment:</p> <ul style="list-style-type: none"> - Engine panels - Lateral flaps 	<p>Check that panels and flaps are secure.</p>

In addition to the tasks listed in the check list, a visual check should be conducted of all components, equipment, functions.

Note the condition, fastening and wear of individual elements, completeness and wear of milling tools as well as checking for specified setting, seal integrity and lubrication.



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