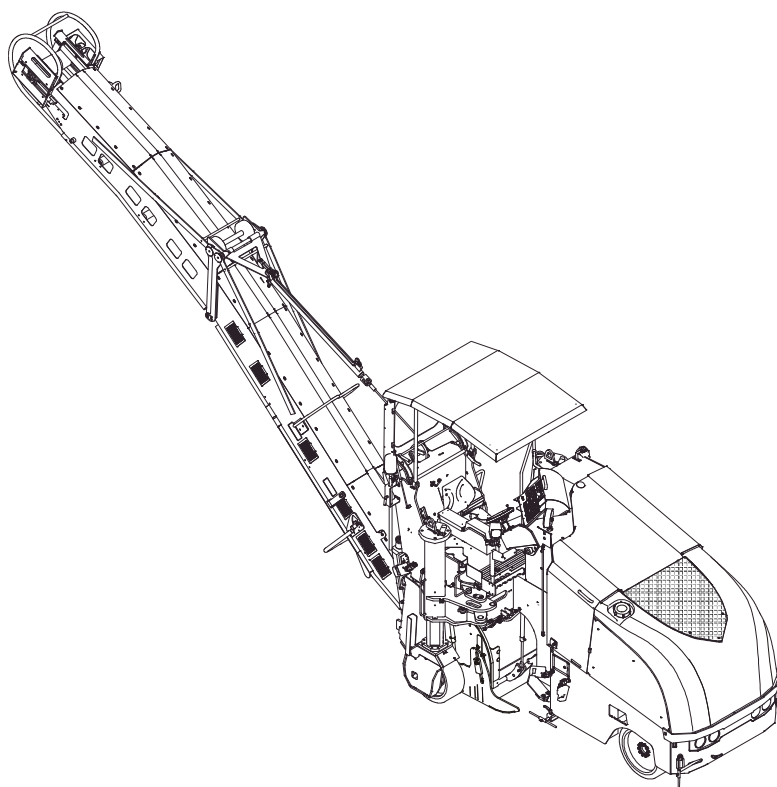


DYNAPAC

Part of the Atlas Copco Group

OPERATION & MAINTENANCE

Cold Planer PL 600 T PL 1000 T



Keep for later use in document compartment

Order no. for this handbook: 4812003404

GB

01-0110

503

DYNAPAC

Part of the Atlas Copco Group

**Original spare parts only
Everything from one source**

Your authorised Dynapac dealer:

Table of Contents

V	Preface	1
1	General notes regarding safety	3
1.1	Laws, guidelines, accident prevention regulations	3
1.2	Warnings	4
1.3	Prohibitive symbols	6
1.4	Protective equipment	7
1.5	Environmental protection	8
1.6	Fire prevention	9
1.7	Additional information	10
A	Correct use and application	1
B	Vehicle description	1
1	Application	1
2	Description of assemblies and functions	
	2	
2.1	Vehicle	3
	Construction	3
3	Danger zones	5
4	Safety devices	6
	Emergency stop button	6
	Horn	6
	Headlights, flashers, rotary beacons	7
	Moldboard failsafe	7
	Battery's main switch	8
5	Technical data, standard configuration	9
5.1	Dimensions of PL1000T, conveyor belt 7.5m	9
5.2	Dimensions of PL600T, conveyor belt 7.5m	10
5.3	Different dimensions for conveyor belt, 1m	11
5.4	Allowed angle of rise and slope	12
5.5	Permissible approach angle	12
5.6	Turning circle	12
5.7	Weights PL 600 T	13
5.8	Weights PL 1000 T	13
5.9	Performance data PL 600 T	14
5.10	Performance data PL 1000 T	14
5.11	Engine PL 600 T	15
5.12	Engine PL 1000 T	15
5.13	Travel drive	16
5.14	Hydraulic system	16
5.15	Water system PL 600 T	16
5.16	Water system PL 1000 T	16
5.17	Loading system.....	17
5.18	Electrical system	17
5.19	Permissible temperature ranges	17

6	Location of instruction labels and type plates	18
6.1	Type plate and vehicle identification number	18
	Type plate, machine	19
6.2	Identification points	20
7	EN standards	23
7.1	Continuous sound pressure level on the PL 600 T	23
7.2	Operating conditions during measurement	23
7.3	Measuring point configuration	23
7.4	Continuous sound pressure level on the PL 1000 T	24
7.5	Operating conditions during measurement	24
7.6	Measuring point configuration	24
7.7	Vibration acting on the entire body	25
7.8	Vibrations acting on hands and arms	25
7.9	Electromagnetic compatibility (EMC)	25
C	Transportation	1
1	Safety regulations for transportation	1
2	Fix points	2
3	Transportation on low-bed trailers	3
4	Normal on-road travel	4
5	Loading by crane	5
6	Towing	7
7	Safely parking the vehicle	8
D	Operation	1
1	Safety regulations	1
2	Controls	2
2.1	Operating panel / control units	2
3	Operation of the input and display terminal	28
	Screen display (01) - Start screen	29
	Screen display (02) - Engine speed / engine coolant temperature / tank display of hydraulic oil temperature ...	29
	Screen display (03) - Engine oil pressure / battery charge indicator / time / operating hours counter	30
	Screen display (04) - Operating hours /status of hydraulic oil filter	31
	Screen display (05) - Error codes for engine	32
	Screen display - Setup - password	33
	Screen display - Password incorrect	33
	Service level: Setup - Setting time / date.	34
	Service level: Setup - Set brightness / lighting.	34
4	Terminal error messages	35
4.1	Terminal error messages (engine)	39
5	Drive engine error codes	41
	Error code screen display:	41
5.1	Flashing error codes	42
	Output of numerical code	42
5.2	Error codes	43
5.3	FMI codes	48

6	Height display	49
6.1	Operation of height display	49
	Main screen	50
	Background lighting	51
	Zero point / value display	51
	Status display for right-hand chassis leg	52
	Settings	52
		52
7	Terminal error messages	53
8	Other controls	54
8.1	Control elements on the operator's control station	54
	Setting up the operator's platform	54
	Driver's seat (o)	55
	Protective roof (o)	56
	Protective roof - electrical adjustment (o)	56
	Battery's main switch	57
	Batteries	57
	Milling edge display	58
	Swivel-mounted chassis leg, hydraulic	59
	Moldboard retaining device	60
	Pressure gauge	
	Relief pressure for moldboard	60
	Direction of travel indicator	61
	Working lights / rotary beacons	62
	Water system	63
	Cleaning system	64
	Steps up to water tank	65
	Fire extinguisher (o)	66
	Rotary beacon	66
	Vandalism protection facility	67
9	Operation	68
9.1	Preparing for operation	68
	Devices and aids	68
	Before starting work	68
	Check list for the machine operator	69
9.2	Starting the machine	71
	Auxiliary starting (electrical starting aid)	73
	Allowing engine to "warm up"	74
	Driving the machine	75

10	Milling instructions	76
	"Driving" position	76
	"Milling" position	76
	Zero setting	77
	Surface milling	77
	Milling on edge of road surface or on offsets	78
	Milling at the curb (with deployed chassis leg)	78
	Milling at the curb (with chassis leg retracted)	79
	Milling without automatic levelling system	81
	Ending the milling operation	83
	Parking the machine	84
	Parking the machine for long periods of time	85
11	Scope for using the small planers	86
	Remedying longitudinal and transverse bumps in the road surface	86
	Remedying cracks	86
	Remedying potholes, frost damage	86
	Remedying damage to edges and bumps	87
	Producing adjoining edges	87
	Producing slots, joints and cable trenches	87
	Removing embedded markings	88
	Removing road markings	88
	Re-establishing surface grip	88
12	Malfunctions	89
12.1	Travel drive error message	89
E	Set-up and modification	1
1	Special notes on safety	1
2	Milling without upper conveyor / Preparation for transport	2
2.1	Dismantling the upper conveyor	2
3	Articulation procedure of foldable upper conveyor (o)	5
3.1	Folding in upper conveyor	5
3.2	Unfolding the upper conveyor	8
4	Levelling	11
4.1	Operating unit for levelling	11
4.2	Digital height display	12
5	Connection diagrams for levelling system	13
5.1	Levelling system with cable sensors / without slope sensor	13
5.2	Levelling system with cable sensors / with slope sensor	14

F	Maintenance	1
1	Notes regarding safety	1
2	Liability is rendered null and void if non-genuine spares or wearing parts or incorrect fuel substances are used. 2	
3	Maintenance intervals	2
3.1	Power unit - engine	11
	Fuel tank	11
	Diesel engine	12
	Oil change	13
	Oil filter	14
	Fuel filter	15
	Air filter	17
	Radiator	18
	Check coolant level / top up coolant / check concentration of anti-freeze	19
	Drive belts	20
3.2	Hydraulics	21
	Hydraulic oil reservoir	21
	Changing the hydraulic oil	22
	Suction-return hydraulic filter	23
	High pressure hydraulic filter	24
	Hydraulic hoses	25
	Pump drive	26
	Replacing belt	27
3.3	Drive wheels, chassis legs	28
	Planetary gear	28
3.4	Milling section	30
	Milling drum	30
	Dismantle milling drum	31
	Milling bits, wearing sleeves, bit boxes	32
	SYSTEM C10HD	32
	Dismantling the bits	35
	Installing the bits	35
	Replacing the bit box	36
	Belt set I: clutch - gear box	37
	Adjusting belt tension	38
	Replacing belt	38
	Belt set II: gear box - milling drum	39
	Replacing belt	39
	Replacing belt	39
	Clutch friction lining	40
	Clutch bearing	41
	Angle drive	42
	Milling drum gear-box planetary gear	44
	Open/close milling box	44
	Milling drum gear box attached bearing	46
	Side boards	47
	Sliding shoes	47
	Moldboard scraper	49
	Milling box screw connections	50
	Sliding shoe rubber skirt	51

3.5	Loading unit	52
	Belt tension	52
	Steel cables	54
	Rubber funnel gasket at transfer point and rubber seals / guides	54
3.6	Water system	55
	Water tank	55
	Water filter	57
	Water pump	58
	Spray nozzles	58
3.7	Power supply	59
	Batteries	59
3.8	Miscellaneous	60
	Emergency stop button	60
	Chassis leg guide	61
4	Lubrication points	62
	Chassis leg, right	62
	Steering:	62
	Upper conveyor swivel console	63
	Hydraulic cylinder	64
5	Inspections	65
	General visual inspection	65
	Inspection by an expert	65
6	Cleaning	66
7	Preservation	67
7.1	Shutdowns for up to months	67
7.2	Shutdowns lasting from 6 months to 1 year	67
7.3	Recommissioning the machine	67
8	Lubricants and operating substances	68
8.1	Hydraulic oil	69
8.2	Capacities	70
9	Electric Fuses	71
9.1	Main fuses (1)	71
9.2	Fuses and relays in the operating panel	72
	Fuses (2.)	73
	Relays (3.)	74
10	Tightening torques	75
11	Maintenance log	76
	Notes on how to fill in the maintenance logs properly:	76
11.1	Assembly Engine, engine systems	77
11.2	Hydraulic system	78
11.3	Drive wheels, steering system, brakes	79
11.4	Milling section	80
11.5	Water system	81
11.6	Electrical system	82
11.7	Miscellaneous equipment	83

V Preface

If the machines are to be operated safely, the information provided in these Operating Instructions will be required. The information is provided in a concise, clearly structured form. The individual chapters are arranged in alphabetical order. and every chapter starts with page 1. The individual pages are identified by the chapter letter and the page number.

Example: Page B 2 is the second page of chapter B.

To avoid misunderstandings relating to enquiries, consultation sessions, orders, etc., always use the terms defined in these Operating Instructions.

These operating instructions cover various machine options. Make sure that during operation and maintenance work the description appropriate to the machine option is used.

The machine may only be operated by trained staff.

These Operating Instructions must be read and applied by every person engaged in the operation, upkeep (maintenance, repair, servicing) or transport of this device.

These Operating Instructions contain important specifications and information on how to safely, economically, professionally and correctly use the machine. Compliance helps to prevent dangerous incidents, downtime and repair costs, while also improving operational reliability, extending service life and safeguarding warranty cover.

Safety instructions and important notes are identified by the following pictograms:



Precedes safety instructions that must be observed in order to prevent danger to personnel.



Precedes notes that must be observed to prevent damage to equipment.



Precedes general notes and explanations.



Used to indicate standard equipment.



Used to indicate optional equipment.

These Operating Instructions must always be stored in a convenient location on the machine. They are valid in conjunction with the Dynapac safety manual, the information on intended usage and the supplementary operator's instructions required on the basis of existing national or regional specifications regarding technical regulations, accident prevention and environmental protection.

In the interest of continued development, the manufacturer reserves the right to make changes to the machine (which will not, however, change the essential features of the type of machine described) without updating the present operating instructions at the same time.

Dynapac GmbH
Niederlassung Lingen

Darmer Esch 81
D-49811 Lingen / Germany
Telephone: +49 / (0)591 / 91275-0
Fax: +49 / (0)591 / 91275-99
www.dynapac.com

1 General notes regarding safety

1.1 Laws, guidelines, accident prevention regulations

-  The locally applicable laws, guidelines and accident prevention regulations must always be observed, even if these are not expressly named here.
The user himself/herself is responsible for compliance with the resulting regulations and measures!
-  The following warnings, prohibitive symbols and instructive symbols indicate dangers for persons, machines and the environment due to residual risks when operating the machine.
-  Failure to observe this information, prohibitions and instructions can result in life-threatening injuries!
-  The “Guidelines for the Correct Use and Application of Paver Finishers” compiled by Dynapac must also be observed.

1.2 Warnings

Warning on a dangerous area or hazard!

Failure to observe the warnings can result in life-threatening injuries!



Warning on danger of being pulled in!



In this working area/on this element there is a danger of being pulled in by rotating or conveying elements!

Only carry out activities with elements switched off!



Warning on dangerous electrical voltage!



All maintenance and repair work on the screed's electrical system must always be carried out by an electrician!



Warning on suspended loads!



Never stand under suspended loads!



Warning on danger of crushing!



There is a danger of crushing when certain components are operated, or certain functions or machine movements are carried out. Always make sure that there are no persons within the endangered areas!



Warning on hand injuries!



Warning on hot surfaces or hot liquids!



Warning on danger of falling!



Warning on dangers posed by batteries!



Warning on hazardous or irritating substances!



Warning on substances which constitute a fire hazard!



Warning on milling shaft!



1.3 Prohibitive symbols

Opening/walking on/reaching in/carrying out/setting up is prohibited during operation or while the drive motor is running!



Do not start engine/drive!
Maintenance and repair work may only be carried out with the diesel engine shut down!



Spraying with water is prohibited!



Extinguishing with water is prohibited!



Unauthorised maintenance is prohibited!
Only qualified experts may conduct maintenance!



Consult the Dynapac Service Department

Fire!, open flame and smoking are prohibited!



Do not switch!



1.4 Protective equipment



Locally applicable regulations may require the wearing of various safety equipment!
Always observe these regulations!

Wear safety goggles to protect your eyes!



Wear suitable head protection!



Wear suitable hearing protection to protect your hearing!



Wear safety shoes to protect your feet!



Always wear close-fitting work clothing!

Wear a warning vest to be seen in time to avoid accidents!



Wear respiratory equipment if breathing air is contaminated!



1.5 Environmental protection



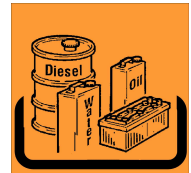
The locally applicable laws, guidelines and accident prevention regulations for the proper recycling and disposal of waste must always be observed, even if these are not expressly named here.

Water-endangering substances like:

- Lubricants (oil, grease)
- Hydraulic oil
- Diesel fuel
- Coolant
- Cleaning liquids

must not get into the soil or sewer system during cleaning, maintenance and repair work!

Substances must be caught, stored, transported and brought to professional disposal sites in suitable containers!



Environmentally hazardous substance!

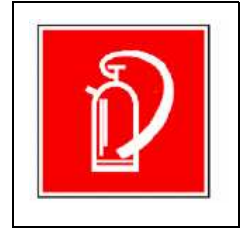


1.6 Fire prevention



Locally applicable regulations may require suitable extinguishing agents to be carried on the vehicle!
Always observe these regulations!

Fire extinguisher!
(optional equipment)



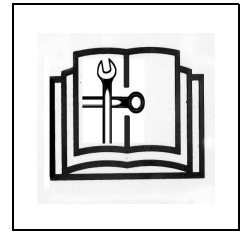
1.7 Additional information



Also observe the manufacturer's documentation and additional documentation!



For example, the maintenance instructions of the engine manufacturer



A Correct use and application



The Dynapac "Guideline for the intended and correct usage of cold planers" falls within the scope of supply of this machine. The guidelines are part of the present operating instructions and must always be heeded. National regulations are fully applicable.

The machine described in these Operating Instructions is a cold planer which can be used as follows in enclosed building sites on roads:

- for partial removal of asphalt, asphalt-cement and layers of concrete
- to remove distortions in the form of track grooves, lateral bulges, lateral warps,
- to recreate a proper surface,
- to perform roughing and demarcation work,
- for use in preparatory work in pipeline and cable-laying work.

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

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

The intended usage also includes compliance with the 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.

Duties of the user: An user, as defined in these Operating Instructions, is any natural or judicial person who uses the cold planer himself or on whose behalf it is used. In special cases (e.g. leasing or renting), the user is considered the person who, in accordance with existing contractual agreements between the owner and the user of the cold planer, is charged with the observance of the operating duties.

The user must ensure that the cold planer is only ever used for its intended purpose and that risks of all kind to the health and safety at work of the operator or third parties are prevented. In addition to this, it must be ensured that the relevant accident prevention regulations and other safety-related provisions as well as the operating, servicing and maintenance guidelines are observed. The user must also ensure that all persons operating the paver finisher have read and understood the present operating instructions.

Technical modifications, attachments and conversions: The cold planer may only be operated with the extension parts, optional equipment and accessories, protection and safety devices authorised by the manufacturer as well as the setting values specified by the manufacturer. Autonomous changes to assemblies, their removal or replacement with other unauthorised parts and any attempt to take these out of service either completely or partially render null and void the manufacturer's liability for any resultant damage.

Mounting or installation of any attachments that will interfere with or supplement the functions of the cold planer is permitted only after written approval by the manufacturer has been obtained. If necessary, the approval of local authorities has to be obtained.

Any approval obtained from local authorities does not, however, make the approval by the manufacturer unnecessary.

B Vehicle description

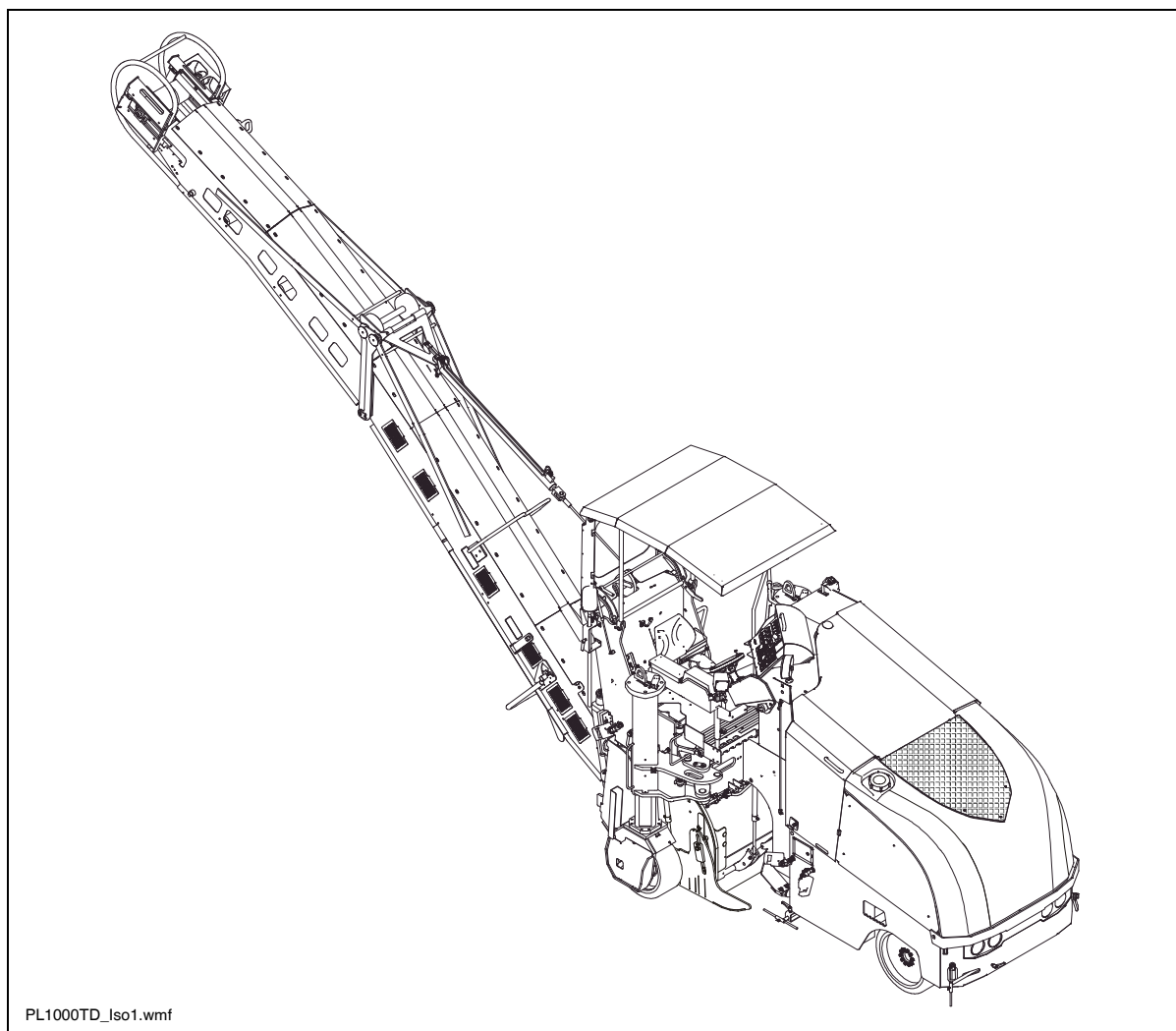
1 Application

The DYNAPAC PL 600 T/PL 1000 T cold planer is a compact and very manoeuvrable cold planer with all-wheel drive and, depending on equipment standard, can be fitted with either three or four drive wheels.

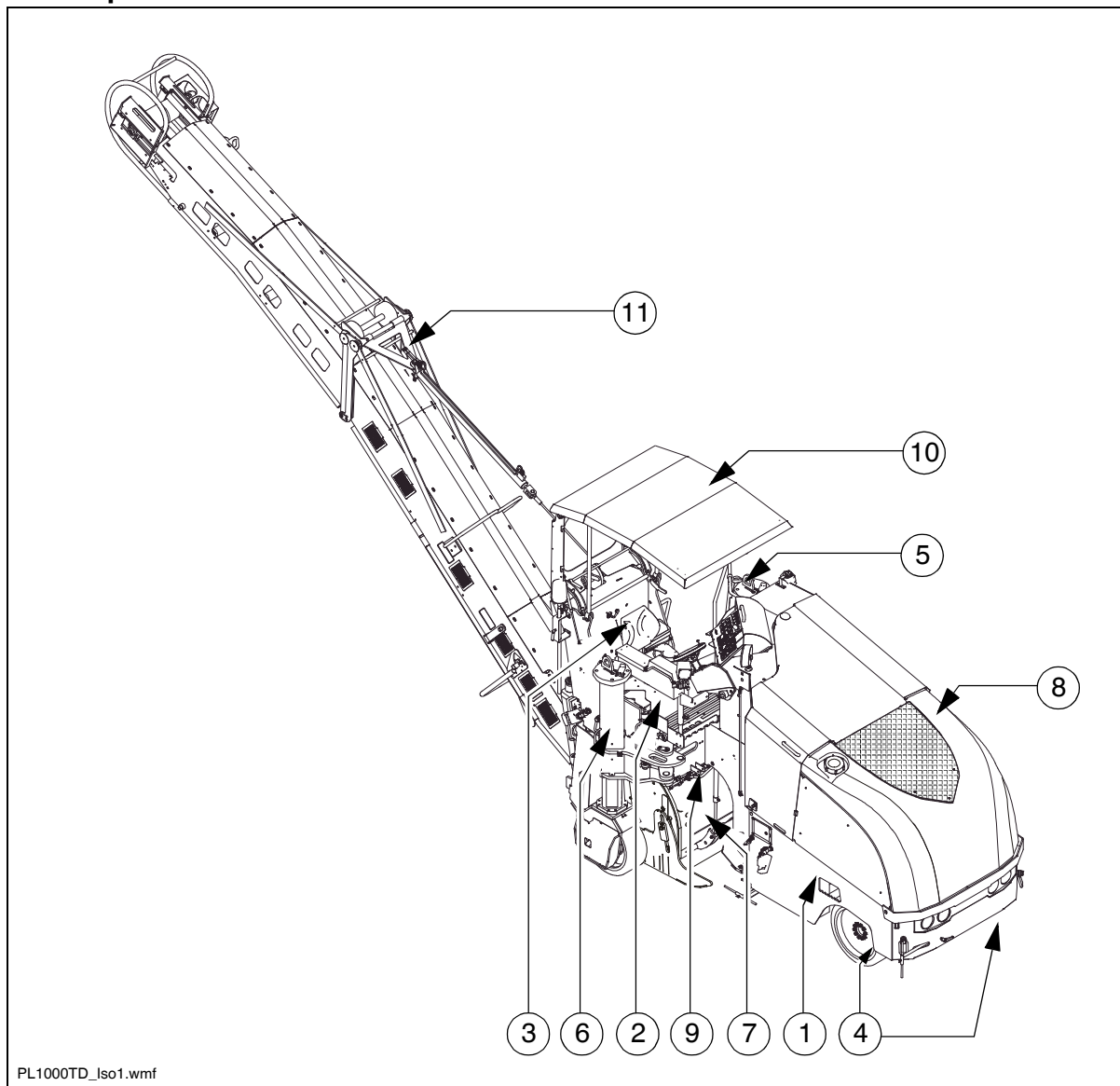
This cold planer has been developed, among other things, for the economical removal of asphalt and concrete for medium to large planing work.

The right-hand chassis leg can be folded in to allow for precision milling of edges.

The PL 600 T/PL 1000 T corresponds to the European safety standard and satisfies very stringent requirements in terms of its reliability, economic viability and environmental responsibility.



2 Description of assemblies and functions



Item	Designation
1	Frame
2	Operator's control station
3	Driver's seat
4	Drive wheel
5	Chassis leg
6	Swivel-mounted chassis leg
7	Milling assembly
8	Water tank
9	Water spraying system
10	Protective roof (○)
11	Upper conveyor (○)

2.1 Vehicle

Construction

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 operator's control station, conveniently located at the rear of the machine affording good all-round visibility, can be reached via a ladder and is equipped with a driver's seat on the right-hand side.

From the operator's control station on the right-hand side of the machine, the planer is easy and safe to operate, affording good visibility and corresponding ease of monitoring for the milling process.

Controls at operator's control station: A convenient operating and control element comprising all the requisite switching and display elements.

The securely arranged controls are obviously marked for all applications.

The steering system involves the use of a steering wheel while traction is controlled by means of a drive lever.

All requisite machine settings such as milling depth and slope control can be performed comfortably from the operator's control station.

Access to all major switching and connection points, as well as to all maintenance locations, can be locked.

Engine: The machine is fitted with a powerful 6-cylinder Deutz diesel engine which effortlessly covers the power requirements of this planer.

The emissions values specified by the U.S. EPA exhaust standard and the European TIER3 exhaust standard are observed. The engine covers are insulated from noise as standard, enabling noise emissions to personnel and the surrounding area to be reduced to a minimum.

Milling assembly: The belt-powered milling drum is located between the two rear chassis legs. The two right-hand chassis legs can be swivelled in front of the milling drum.

The milling drum rotates in the opposite direction to the machine's direction of travel. The special-purpose bit arrangement equipped with the best bits ensures rapid and clean milling as well as high bit life.

On the standard drum, bits can be replaced via the rear milling drum flap, thereby keeping downtime to a minimum for replacement purposes.

The milling drum is bolted to the housing of the mechanical drive and can be replaced easily and quickly after swivelling aside the right-hand housing plate.

Milling depth control: Milling depth control is performed hydraulically, and separately for each chassis leg.

The operator's control station is equipped with a digital milling depth indicator.

Traction unit, steering system, travel drive, brake: The front-wheel suspension takes the form of a parallel rocker arm arrangement which delivers an optimum locating surface at all times.

The right-hand chassis leg can be swivelled in front of the milling drum.

The hydraulic travel drive has two infinitely variable speed ranges. The hydraulic travel drives are connected to the wheel hubs by means of planetary gears. This ensures optimum traction and high gradeability.

A multi-disc brake on the rear wheels acts as brake.

Water system: The water system comprises a water spraying and cooling system. The water spraying and cooling system operates in the low pressure range. This system is used to cool and rinse clean the milling bits, and to keep down dust.

The spraying nozzles can be easily replaced.

The water tank has a large capacity and is filled from the top or from the bottom (pressure filling).

Loading unit (○): The cold planer attachment is designed as a rear-loading unit and features a one-piece load transfer system.

Final loading of milling material occurs from the upper conveyor to the transport container or some other loading area outside the milling lane. The belt is wide and its transport speed can be varied. Here, the speed of the upper conveyor can be gradually adjusted from zero to maximum when in operation.

The belt can then be changed quickly and easily.

The height of the upper conveyor can be adjusted hydraulically over a wide range of heights and the conveyor can also be swivelled to quite a sharp angle on both sides. The full-length cover substantially reduces the dust burden.

The upper conveyor can be dismantled / assembled very rapidly and can be erected on four integrated legs.

The loading conveyor is optionally available in a foldable model which realises a shorter transport and parking length of the machine.

As an additional option, a short version of the loading conveyor can be supplied which can be used for applications such as the conveying of milling material straight into the shovel on a wheel loader.

Hydraulic system: The drive unit, actuator functions and steering system are operated by independent hydraulic circuits ideally suited to the machine.

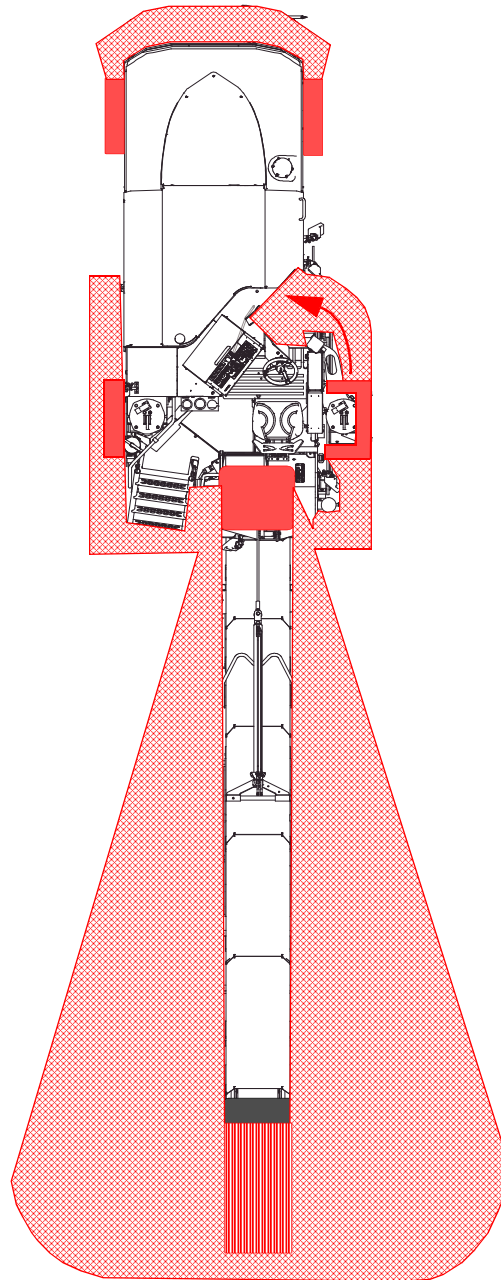
Electrical system: 24 volt system with two in-line cold-start high-performance batteries and a 3-phase alternator.

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

3 Danger zones



In these working areas for the machine, there may be a risk of drawing in or crushing during normal operation caused by rotating and conveying elements, or by components in motion.



4 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.



The function of these devices must be checked regularly (refer to Chapter D, Section "Checklists for the machine operator").

Emergency stop button

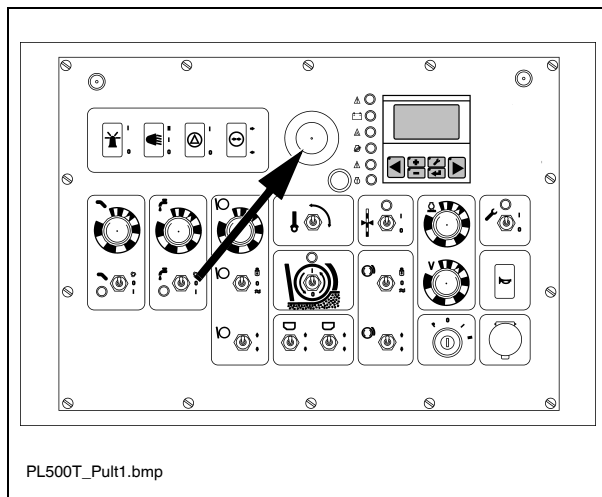
- On the operator's platform
The engine, drives and steering system are shut down when the emergency stop button is pressed. Any countermeasures which may be required (manoeuvring, deploying the chassis legs) are then no longer possible! Danger of accidents!



The EMERGENCY STOP button is not used for normal shut-down of the engine and should only be used in emergencies or for inspection purposes.



The traction system brakes are applied whenever an emergency stop button is pressed!

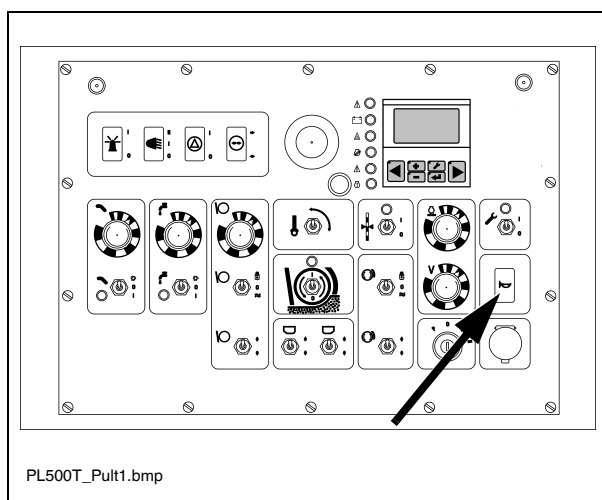


Horn

- On the operator's platform



Before starting up the machine, press the horn button to issue a warning signal.



Headlights, flashers, rotary beacons

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

The machine has three contacts which can be fitted to the headlights or to the rotary beacons.

The headlights or rotary beacons are engaged using their respective switches on the operator's platform.



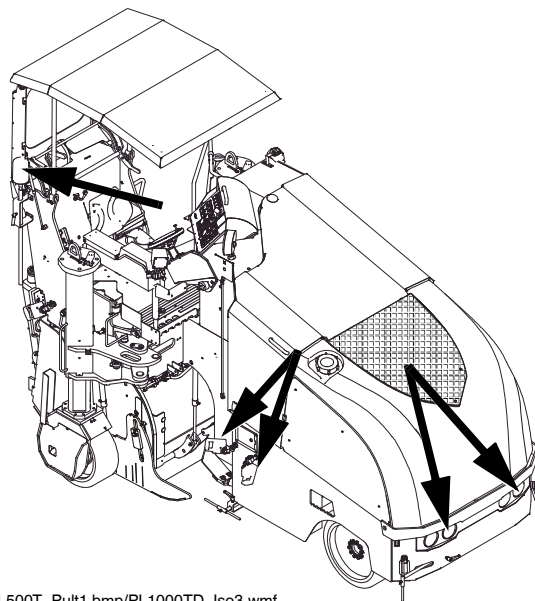
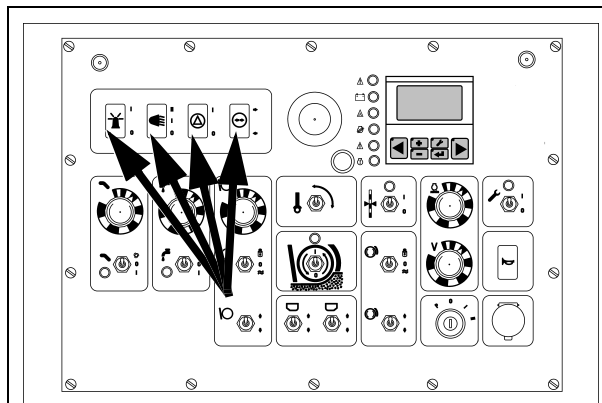
The function of the headlights and warning lamps should be checked on a daily basis before starting work.



The headlights are easy to remove and should therefore, as a safety precaution, be removed at the end of work and stored in a safe location.



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



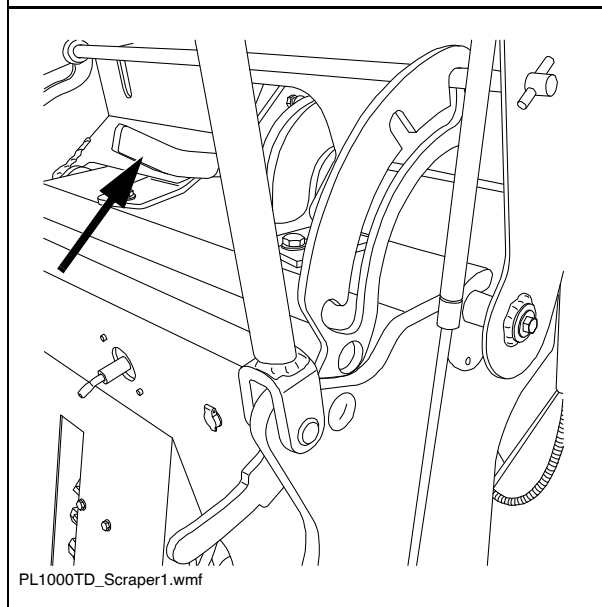
PL500T_Pult1.bmp/PL1000TD_Iso3.wmf

Moldboard failsafe

- The moldboard is held automatically in its raised position.



During maintenance or repair work, this secures the moldboard and prevents it from lowering accidentally.

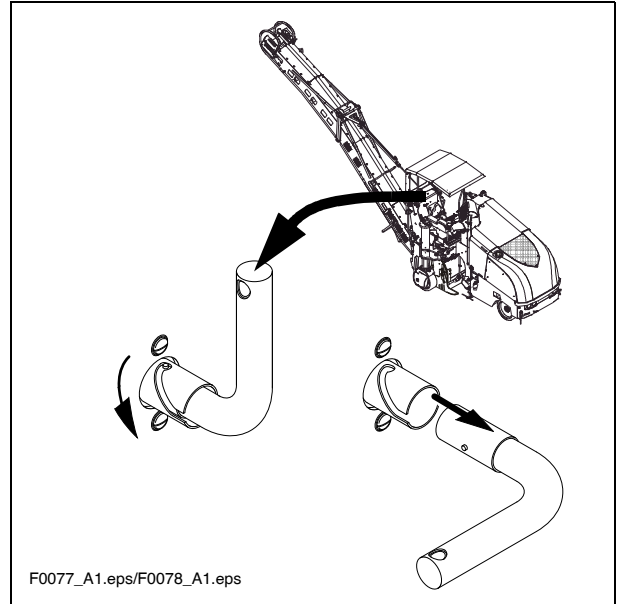


PL1000TD_Scraper1.wmf

Battery's main switch

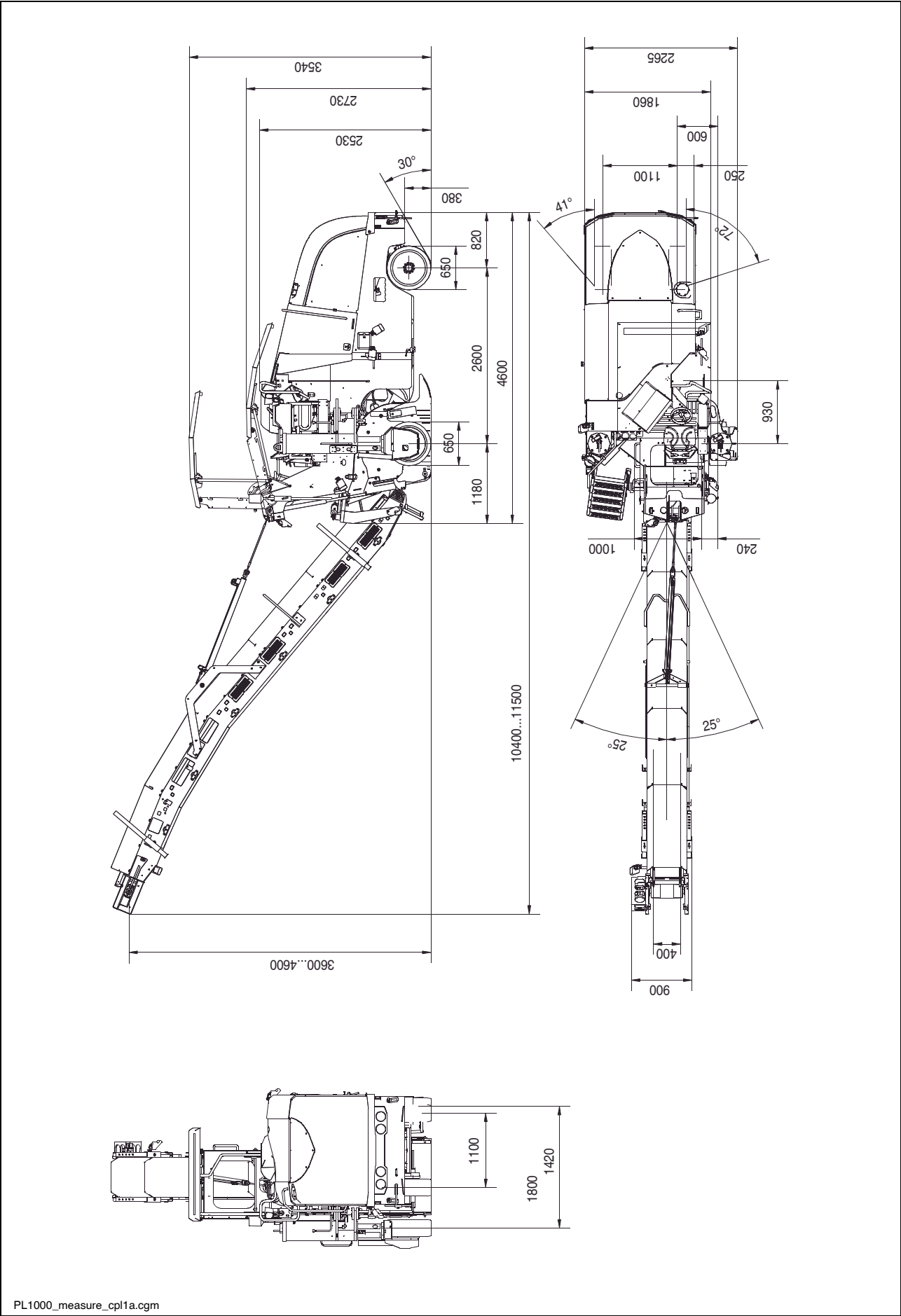


The battery's main switch (1) is located behind the driver's seat. It disconnects the electrical circuit from its earth/ground.

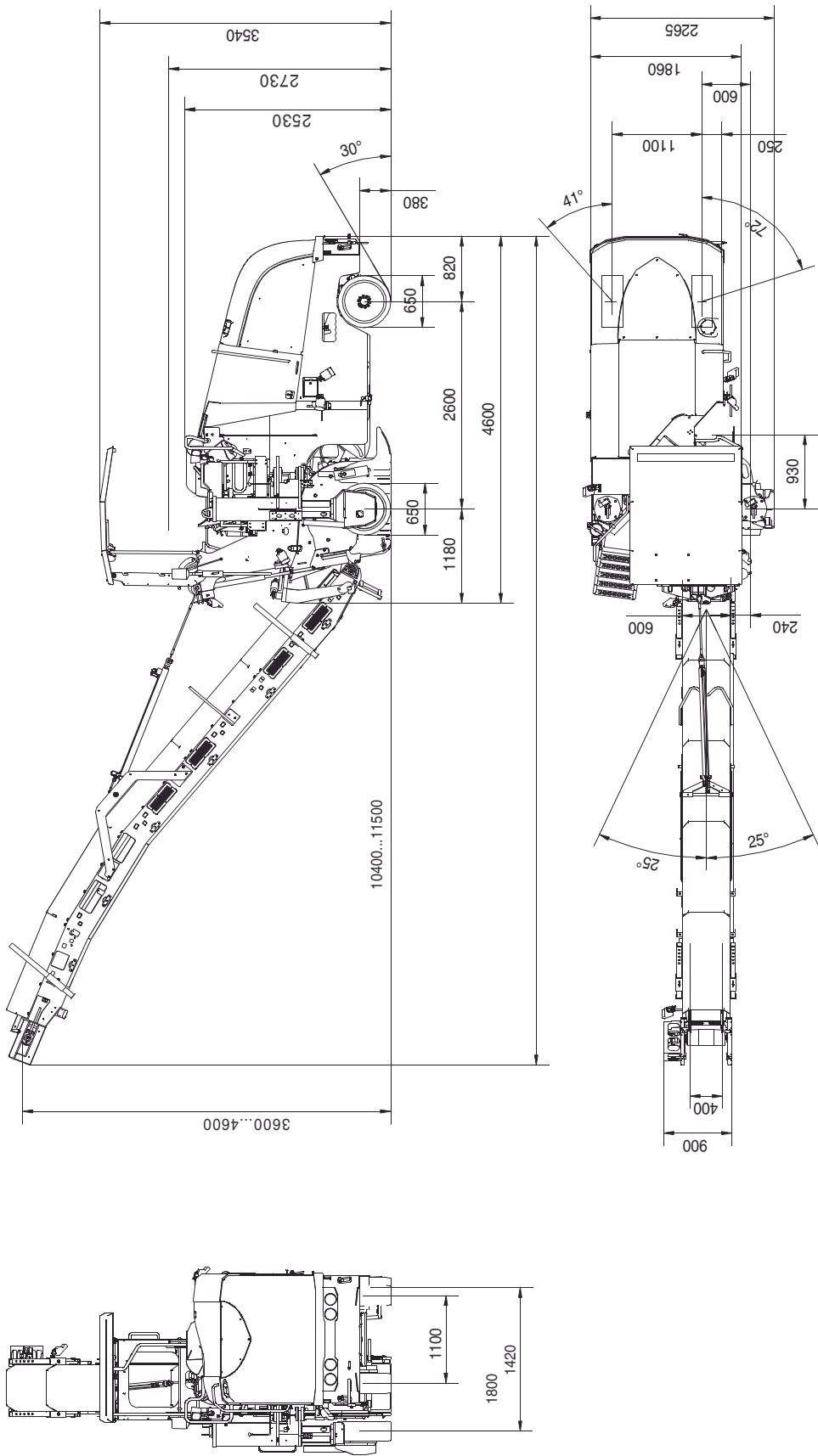


5 Technical data, standard configuration

5.1 Dimensions of PL1000T, conveyor belt 7.5m

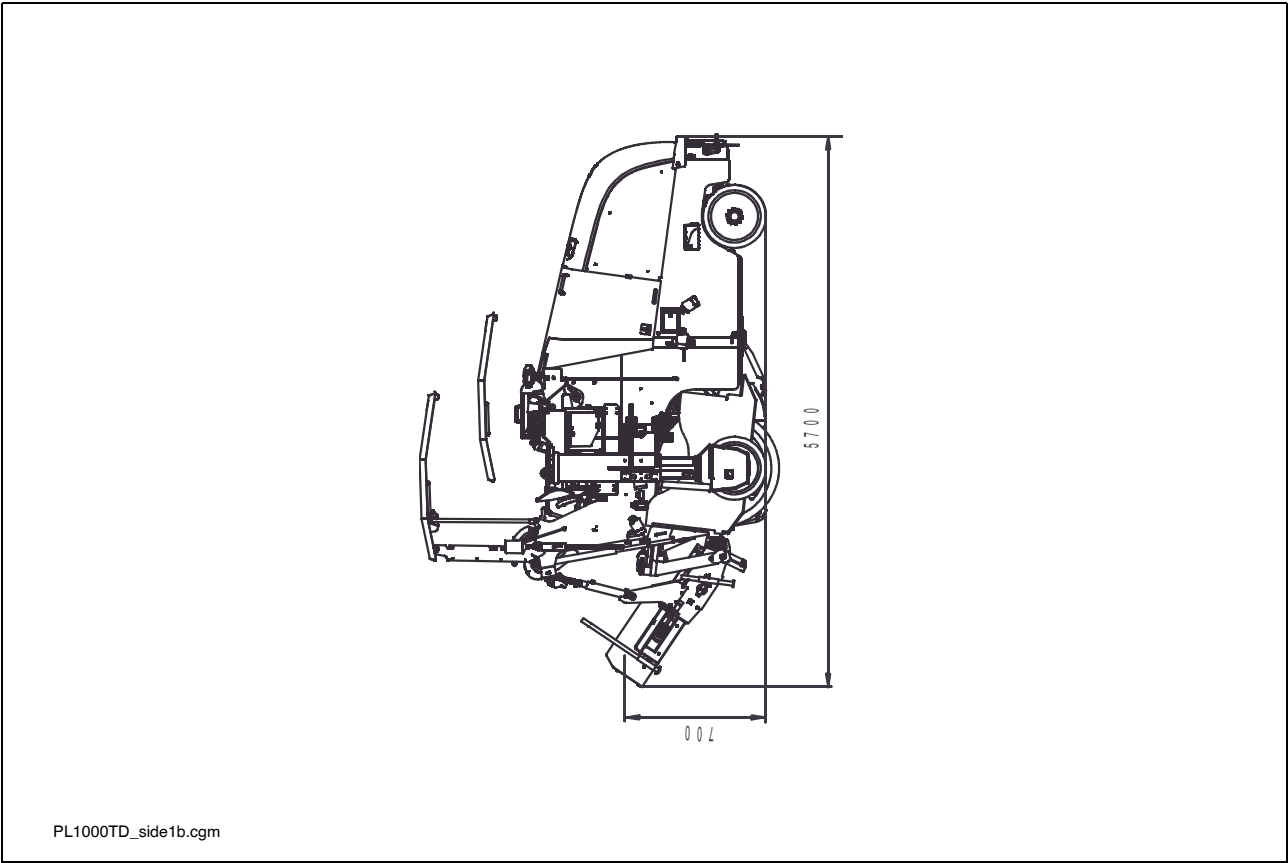


5.2 Dimensions of PL600T, conveyor belt 7.5m

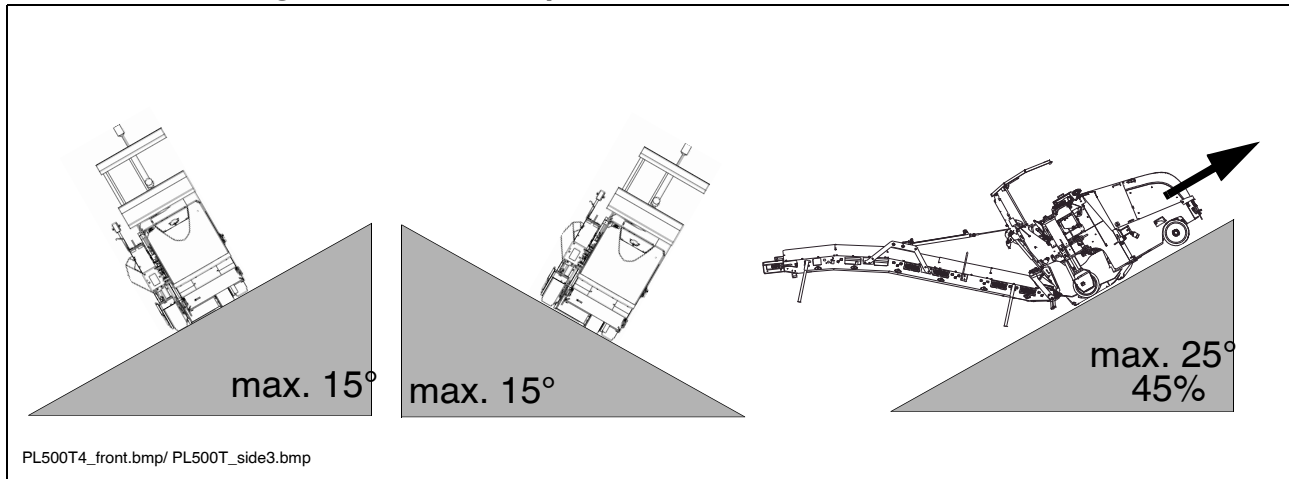


PL600_measure_cpl1a.cgm

5.3 Different dimensions for conveyor belt, 1m

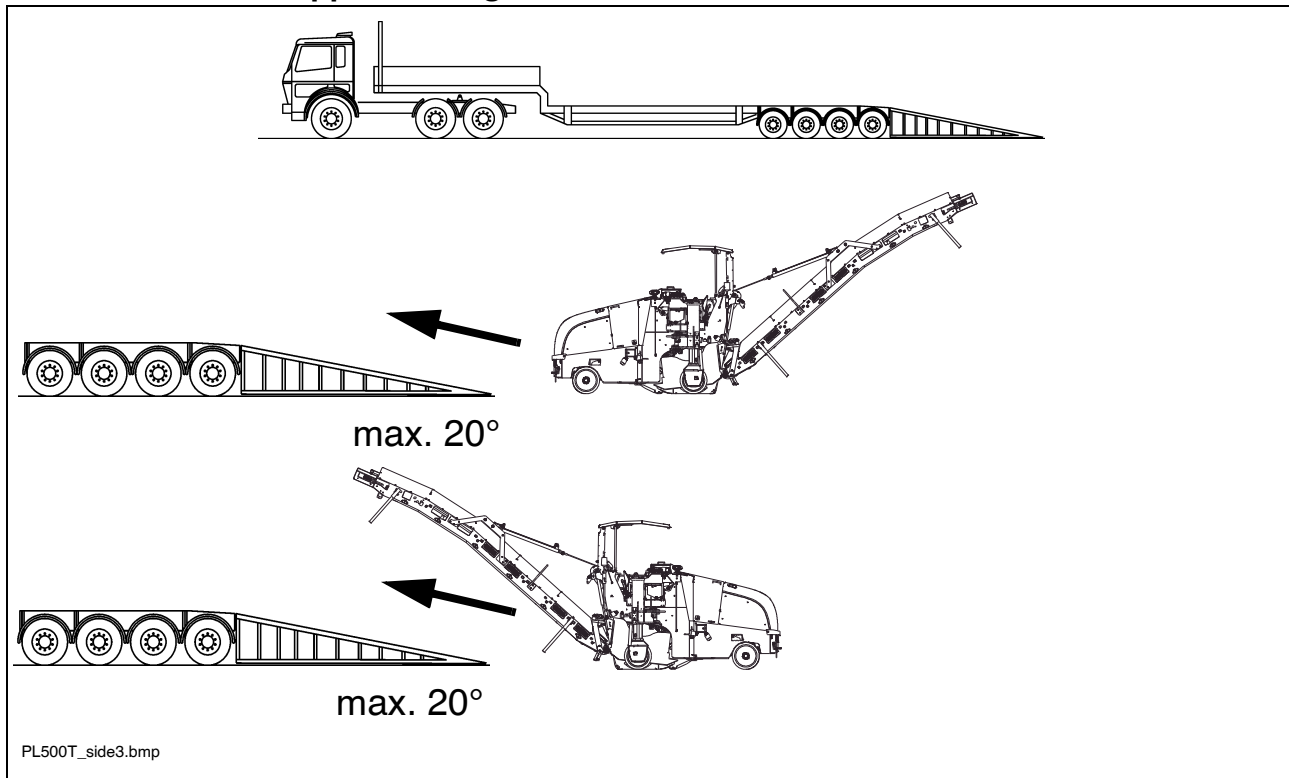


5.4 Allowed angle of rise and slope



Before operating your machine in an inclined position (gradient, slope, lateral inclination) which is above the specified limit value, please consult the customer service department for your machine!

5.5 Permissible approach angle



5.6 Turning circle

Max. turning circle	9.6 m
---------------------	-------

5.7 Weights PL 600 T

	without upper con- veyor	with upper con- veyor	
Transport weight	11,600	12,500	kg

Operating weight (CE)	12,300	kg
max. operating weight (CE)	14,200	kg

5.8 Weights PL 1000 T

	without upper con- veyor	with upper con- veyor	
Transport weight	12,400	13,300	kg

Operating weight (CE)	13,100	kg
max. operating weight (CE)	15,000	kg

5.9 Performance data PL 600 T

Transport speed	6	km/h
Operating speed	30	m/min
Milling width	600	mm
Milling depth	300	mm
Spacing	15	mm
Cutting diameter	930	mm
Number of milling tools	68	items

5.10 Performance data PL 1000 T

Transport speed	6	km/h
Operating speed	30	m/min
Milling width	1,000	mm
Milling depth	300	mm
Spacing	15	mm
Cutting diameter	930	mm
Number of milling tools	89	items

5.11 Engine PL 600 T

Make/type	Deutz TCD2012 L062V
Version	6-cylinder diesel engine (water-cooled)
Power (in accordance with DIN 6270)	150 kw / 204 hp / 201 PS (at 2,200 rpm)
Capacity	6067 cm ³
Fuel consumption, full load Fuel consumption, 2/3 load	37.4 l/h 24.9 l/h
Fuel tank capacity	approx. 450 l

5.12 Engine PL 1000 T

Make/type	Deutz TCD2012 L062V
Version	6-cylinder diesel engine (water-cooled)
Power (in accordance with DIN 6270)	150 kw / 204 hp / 201 PS (at 2,200 rpm)
Capacity	6067 cm ³
Fuel consumption, full load Fuel consumption, 2/3 load	37.4 l/h 24.9 l/h
Fuel tank capacity	approx. 450 l

5.13 Travel drive

Drive	Hydrostatic drive, continuously variable across two speed ranges. Input via the front wheels and rear wheels
Steering	- Hydraulic (power) steering system (Orbitrol)

5.14 Hydraulic system

Pressure generation	Hydraulic pumps (flange-mounted to the engine)
Pressure distribution	Separate hydraulic circuits for: - Travel drive, chassis legs and steering system
Hydraulic oil reservoir - volume	approx. 110 l

5.15 Water system PL 600 T

Spray nozzles	4 units	
Water tank - filling volume	approx. 1100	l
Water contents (minimum)	1.8	h

5.16 Water system PL 1000 T

Spray nozzles	8 units	
Water tank - filling volume	approx. 1100	l
Water contents (minimum)	1.8	h

5.17 Loading system

Belt width, upper conveyor	400	mm
Belt speed	approx. 4	m/s
Loading capacity (theoretical)	approx. 115	m ³ /h

5.18 Electrical system

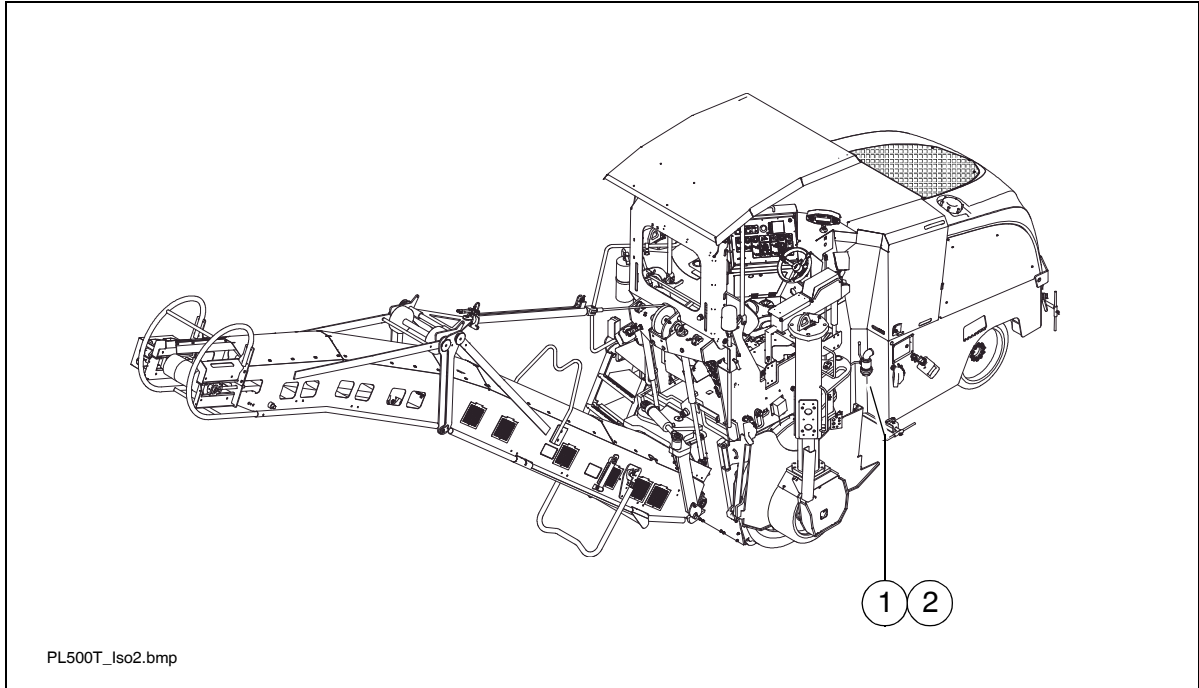
On-board voltage	24 V
Batteries	2 x 12 V, 88 Ah
Alternator	24 V / 80 A

5.19 Permissible temperature ranges

Operation	-5°C / +50°C
Storage	-5°C / +50°C

6 Location of instruction labels and type plates

6.1 Type plate and vehicle identification number



Item	Designation	Position
1	Type plate	Vehicle frame, recess for swivel-mounted chassis leg.
2	Vehicle Identification Number (VIN)	Vehicle frame at rear, right-hand side of engine compartment flap.

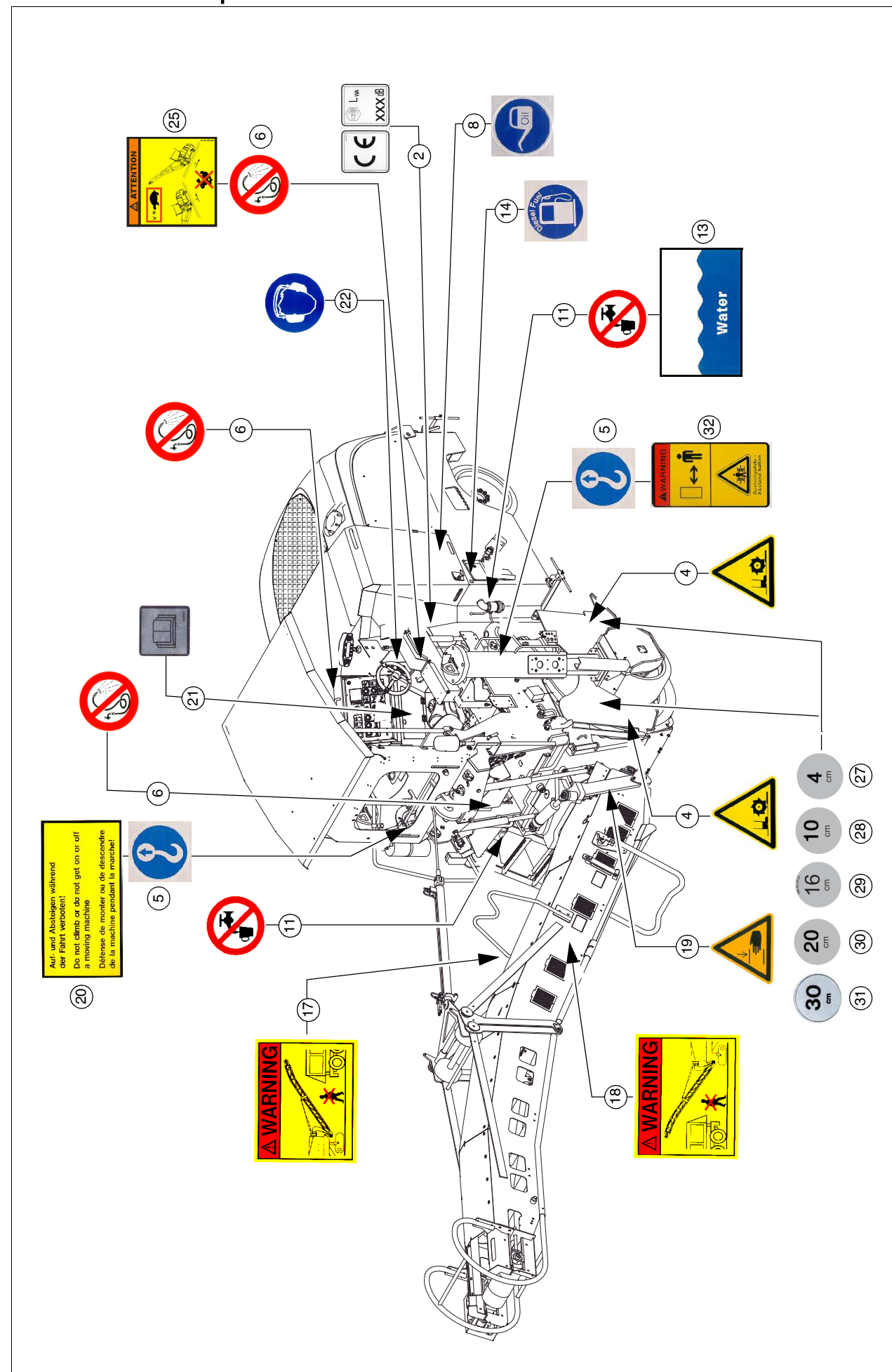
Type plate, machine

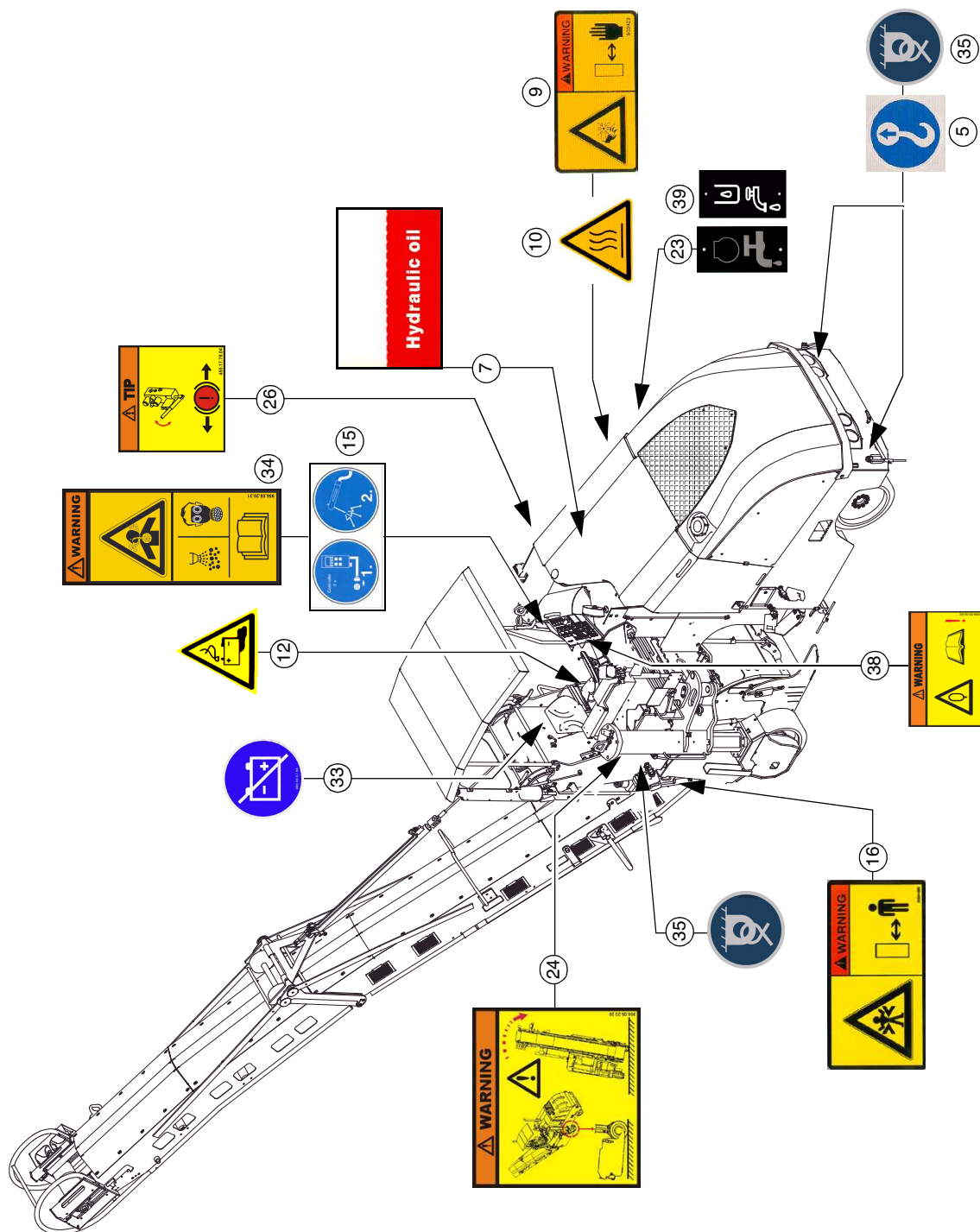
The diagram shows a rectangular type plate for a Dynapac machine. At the top, it features the **DYNAPAC** logo in red, followed by "Part of the Atlas Copco Group", "Dynapac GmbH", and "D-49811 Lingen • Germany". A large **CE** mark is on the right. Below this, the text "COLD PLANER" is followed by a line for "Type" (callout 1) and a line for "Year of Mfg" (callout 2). A line for "Serial Number" (callout 3) follows. Below these are three lines for "Max. Operating mass" (callout 4), "Max. axle load front" (callout 5), and "Max. axle load rear" (callout 6), each with a unit of "kg". A line for "Rated power at RPM" (callout 7) includes a slash and a unit of "kW / RPM". Finally, a line for "Product Identification Number" (callout 8) is at the bottom. The plate is enclosed in a double-line border with small circles at the corners.

Typeplate_Planer2010.wmf

Item	Designation
1	Planer type
2	Year of construction
3	Serial number of machine model
4	Maximum permitted operating weight in kg
5	Maximum permitted axle load at front in kg (CE)
6	Maximum permitted axle load at rear in kg (CE)
7	Rated performance in kW
8	Product identification number (PIN)

6.2 Identification points





Item	Explanation
4	Warning panel, "Milling shaft"***
5	Information panel, "Retaining point or limit stop point for crane loading"***
6	Prohibition panel, "Spraying with water is prohibited"
7	Information panel, "Hydraulic oil tank"
8	Information panel, "Engine filler neck"
9	Warning panel, "Danger from fan"*
10	Warning panel, "Hot surface"*
11	Prohibition panel, "Not drinking water"
12	Warning panel, "Danger from batteries"
13	Information panel, "Water tank"
14	Information panel, "Diesel fuel filler neck"
15	Information panel, "Before welding work, disconnect all controllers from vehicle circuit"
16	Warning panel, "Risk of crushing"***
17	Warning panel, "Do not step under conveyor belt", left side
18	Warning panel, "Do not step under conveyor belt", right side
19	Warning panel, "Danger of injuries to hands"***
20	Prohibition panel, "Climbing up and down is prohibited while vehicle is in motion!"
21	Information panel, "Operating instructions"
22	Advice panel, "Wear ear protectors"
23	Information panel, "Engine oil drain point"*
24	Warning label "Risk of tipping"
25	Warning panel, "Only drive uphill and across inclined slopes at operating speed"
26	Information panel, "Pumps - release brake on travelling drive (towing operation)"
27	Label "Reference point milling depth 4cm"
28	Label "Reference point milling depth 10cm"
29	Label "Reference point milling depth 16cm"
30	Label "Reference point milling depth 20cm"
31	Label "Reference point milling depth 30cm"
32	Warning panel, "Risk of crushing"***
33	Information panel, "Main battery switch"
34	Warning label "Dust load"
35	Information panel, "Lashing point"***
38	Warning label "Hydraulic reservoir"
39	Information panel, "Hydraulic tank drain point"*

* Labels are located beneath the engine hood / maintenance flap

** Labels are located on both sides of the paver finisher

7 EN standards

7.1 Continuous sound pressure level on the PL 600 T



Ear protectors must be worn when operating this machine. The emission value at the ear of the driver varies depending on the materials used for paving and may even rise above 85 dB(A). If no ear protection devices are used, hearing can be impaired. The noise emission level of the cold planer was measured under free-field conditions according to EN 500-2 and ISO 3744.

Sound pressure level at the operator's position

(at the height of the head): $L_{AF} = 86.5 \text{ dB(A)}$

Sound pressure level at the machine: $L_{WA} = 106.2 \text{ dB(A)}$

Measuring point	2	4	6	8	10	12
Sound pressure level L_{AFeq} (dB(A))	71.6	72.5	76.2	74.0	69.3	72.2

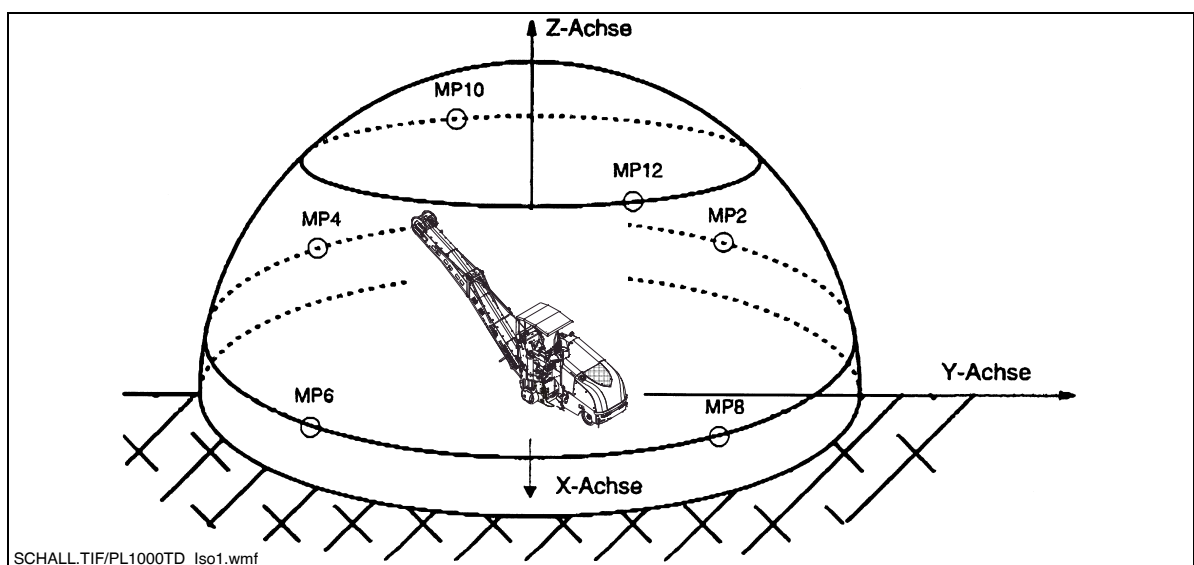
7.2 Operating conditions during measurement

The diesel engine ran at nominal speed and the milling and conveyor units were operating.

7.3 Measuring point configuration

Hemispherical measuring surface with a radius of 16 m. The machine was at the centre. The measuring points had been assigned the following coordinates:

	Measuring points 2, 4, 6, 8			Measuring points 10, 12		
Co-ordinates	X	Y	Z	X	Y	Z
	± 11.2	± 11.2	1,5	- 4.32 +4.32	+10.4 -10.4	11.36 11.36



7.4 Continuous sound pressure level on the PL 1000 T



Ear protectors must be worn when operating this machine. The emission value at the ear of the driver varies depending on the materials used for paving and may even rise above 85 dB(A). If no ear protection devices are used, hearing can be impaired. The noise emission level of the cold planer was measured under free-field conditions according to EN 500-2 and ISO 3744.

**Sound pressure level at the operator's position
(at the height of the head):** $L_{AF} = 86.5 \text{ dB(A)}$

Sound pressure level at the machine:

$L_{WA} = 107.5 \text{ dB(A)}$

Measuring point	2	4	6	8	10	12
Sound pressure level L_{AFeq} (dB(A))	72.2	76.6	74.5	72.8	75.4	73.5

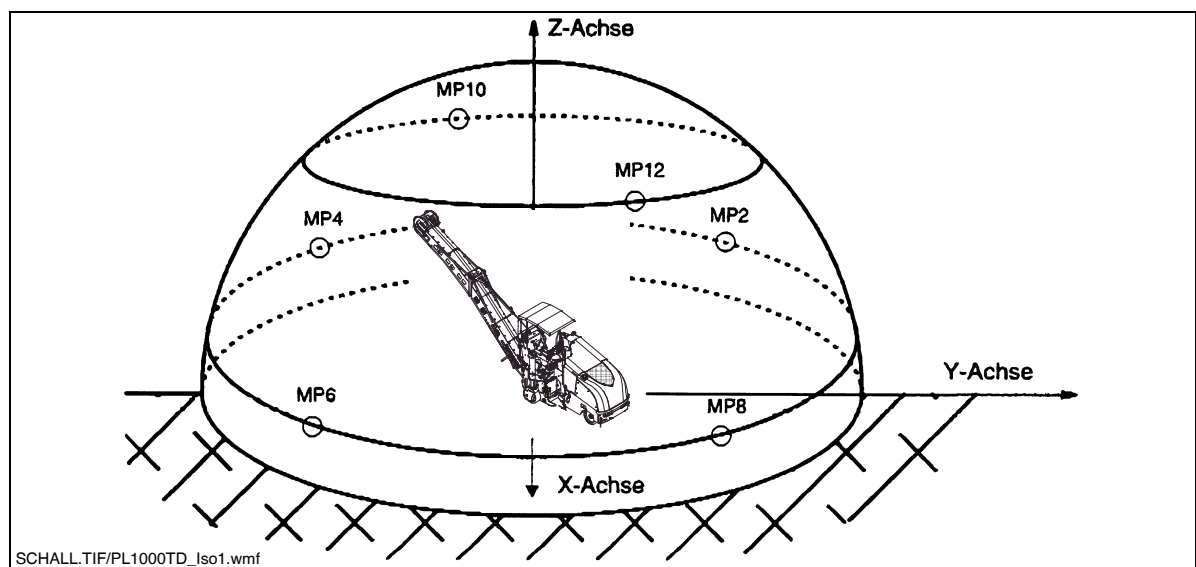
7.5 Operating conditions during measurement

The diesel engine ran at nominal speed and the milling and conveyor units were operating.

7.6 Measuring point configuration

Hemispherical measuring surface with a radius of 16 m. The machine was at the centre. The measuring points had been assigned the following coordinates:

	Measuring points 2, 4, 6, 8			Measuring points 10, 12		
Co-ordinates	X	Y	Z	X	Y	Z
	± 11.2	± 11.2	1.5	- 4.32 +4.32	+10.4 -10.4	11.36 11.36



7.7 Vibration acting on the entire body

When the machine is used properly, the weighted effective acceleration values at the driver's seat of $a_w = 0.5 \text{ m/s}^2$ according to prEN 1032-1995 are not exceeded.

7.8 Vibrations acting on hands and arms

When the machine is used properly, the weighted effective acceleration values at the driver's seat of $a_{hw} = 2.5 \text{ m/s}^2$ according to prEN 1033-1995 are not exceeded.

7.9 Electromagnetic compatibility (EMC)

The following limit values are observed according to the stipulations of the EMC guideline 89/336/EEC/08.95:

- Interference emission according to DIN EN 50081-1/03.93:
 - < 40 dB $\mu\text{V/m}$ for frequencies of 30 MHz - 230 MHz measured at a distance of 3 m
 - < 47 dB $\mu\text{V/m}$ for frequencies of 20 MHz - 1 GHz measured at a distance of 3 m
- Interference immunity against electrostatic discharge (ESD) according to DIN EN 61000-4-2/03.96:
 - The $\pm 4\text{-KV}$ contact and the $\pm 8\text{-KV}$ airborne discharge did not result in any influence on the cold planer which could be detected.
 - Compliance is maintained with the modifications in accordance with assessment criterion "A", i.e. the cold planer continues to operate correctly during the test.



Changes to the electrical or electronic components and their arrangement may only be conducted with the written approval of the manufacturer.

C Transportation

1 Safety regulations for transportation



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!

Lower the machine until the bit tips on the milling drum are approx. 1 cm above the ground, or if wooden supports are available, rest the tips gently on these.

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 authorised 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 coverings and check that they are securely seated.



When loading via ramps, there is a risk that the machine will slip, tilt or overturn. Note wheelbase on 3-wheeled machines!



Drive carefully! Keep people away from the danger area!

Additional stipulations for transportation on public roads:

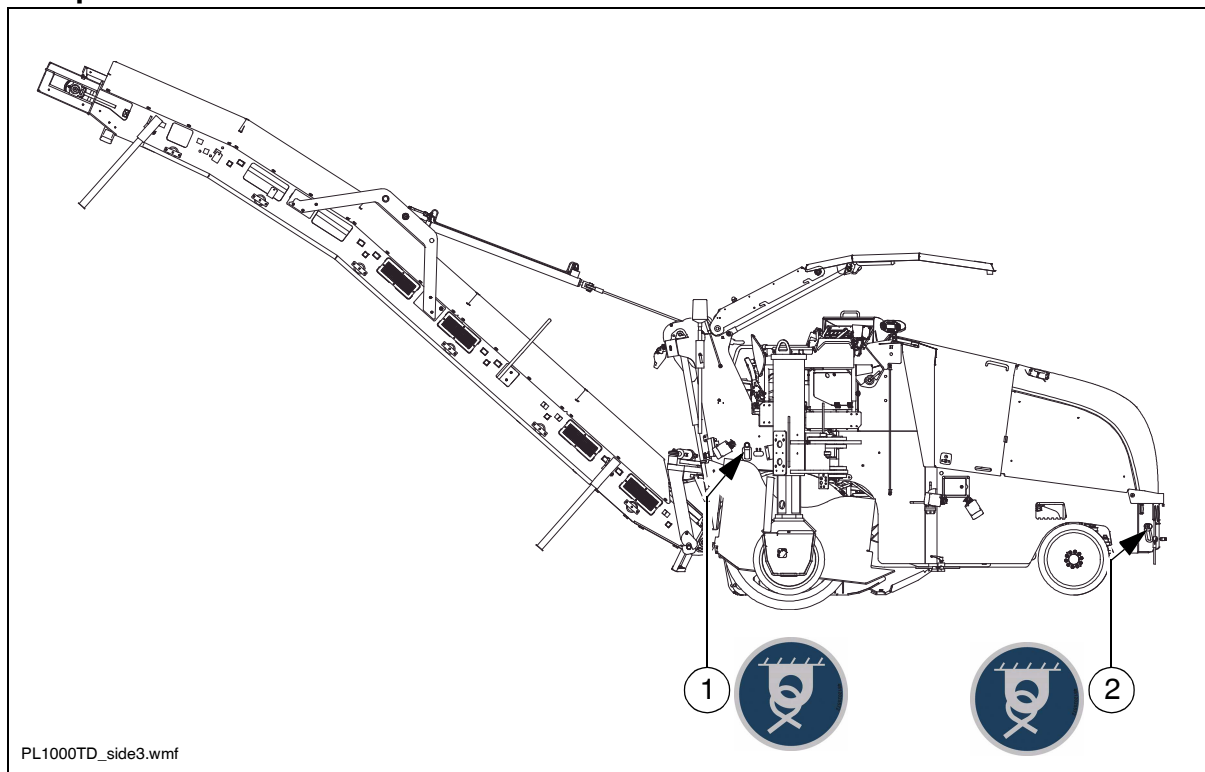
The operator must be in the possession of a valid permit for vehicles of this type.

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

If necessary, the operator must be assisted by a second person when driving on public roads – especially at road crossings and junctions.

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

2 Fix points



On each side of the machine chassis, at both front and back, there are two fix points (1), (2) with which the machine can be secured to the transporter while in transit. 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 cable routing!

If necessary, fit a crosshead or a spacer to prevent damage to the water tank.

3 Transportation on low-bed 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 contamination, such as clay, grease or oil.

The machine must always reverse up onto the trailer (low loader). Only drive and manoeuvre in the operating 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:

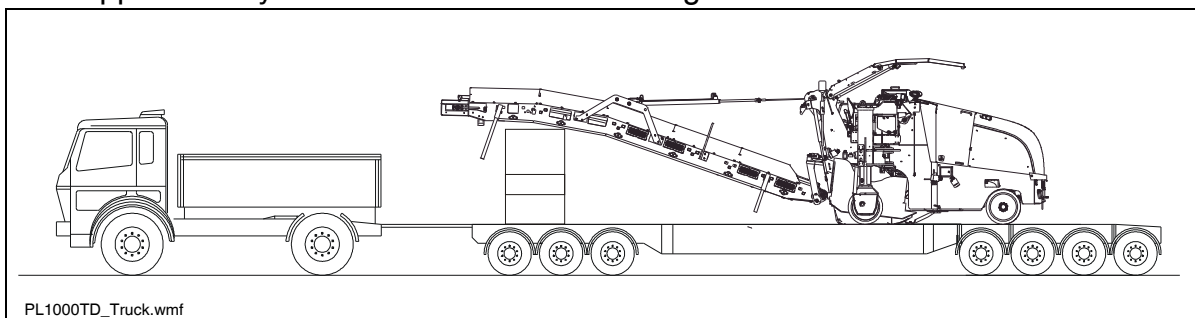


Position the machine on the transporter ensuring that the transport height, width and loaded distribution corresponds to the relevant regulations.

Activities and preventive measures:

- Lower the machine smoothly until the bit tips on the milling drum are approx. 0.5 - 1.0 cm above the ground, or if wooden supports are available, rest the tips gently on these.
- Protective roof, working lights, warning lamps and operating devices should be folded inwards or removed. The weather protecting sun roof must be in its lower position.
- The rear loading belt is placed on its support and the engine is switched off.
- Do not leave any insecure components on the machine or the load surface.
- Secure machine firmly on transport unit.

Depending on the nature of trailer, the upper conveyor can be supported on its own legs for transport, or can be placed on one of the supports provided on the trailer. The upper conveyor must also be secured using suitable means.



PL1000TD_Truck.wmf

4 Normal on-road travel

The machine is intended for operation and use within self-contained construction 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 needs to be parked in an area of heavy traffic, it must be cordoned off in accordance with specifications and the machine must also be chocked to prevent it from rolling away or tipping over.

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

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 (distances > 1 km), the machine should be transported on its transporter for technical and safety reasons.

5 Loading by crane

In the event of breakdown, 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 only lifting gear that can bear the load.

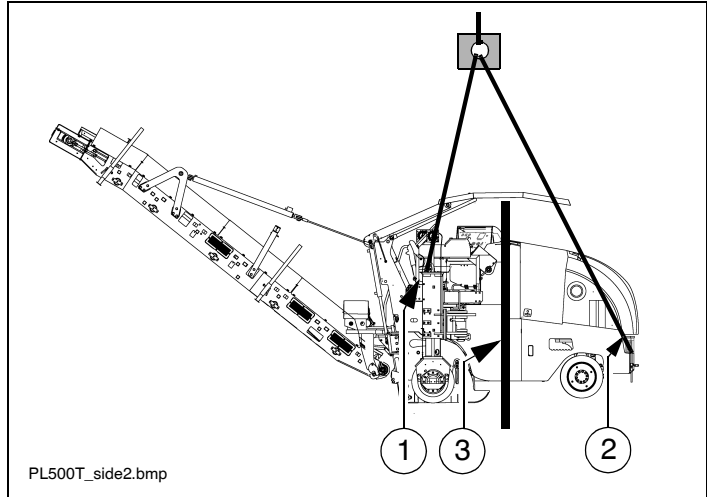
(See chapter B for weights and dimensions). Ensure that the steel cables, shackles and crosshead are large enough.



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



Depending on the type of conveyor or belt which is used, the machine's centre of gravity (3) is located in the area between the control panel and the engine hood.



- Secure vehicle wherever it is parked up.
- Store loose parts and accessories, e.g. lamp fittings, in a safe place.
- Attach lifting gear to the four attachment points (1, 2).



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

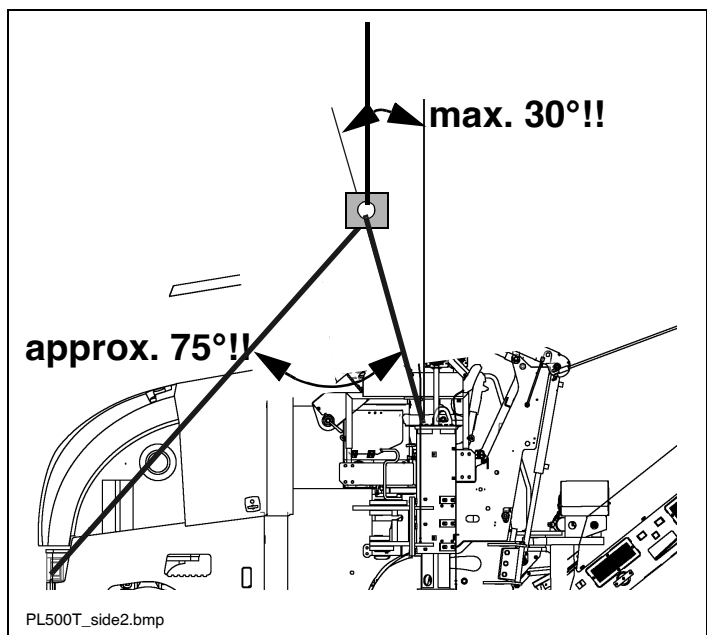


Note cable routing!

If necessary, fit a crosshead or a spacer to prevent damage to the water tank.



The chains or steel cables to the front and rear lift eyes must be arranged at a relative angle of approx. 75°! The rear cable must be at no more than a 30° angle away from the perpendicular! Danger of accidents if this is not done!





The max. permissible attachment point load is

Attachment point (1): ???kN

Attachment point (2): 39.2kN



During transport, ensure that the machine is always horizontal!

6 Towing



Comply with all specifications and introduce all requisite safety measures required for the towing of construction equipment.



The tractor vehicle must be such that it can still hold the machine when travelling downhill.

Use only approved tow bars!



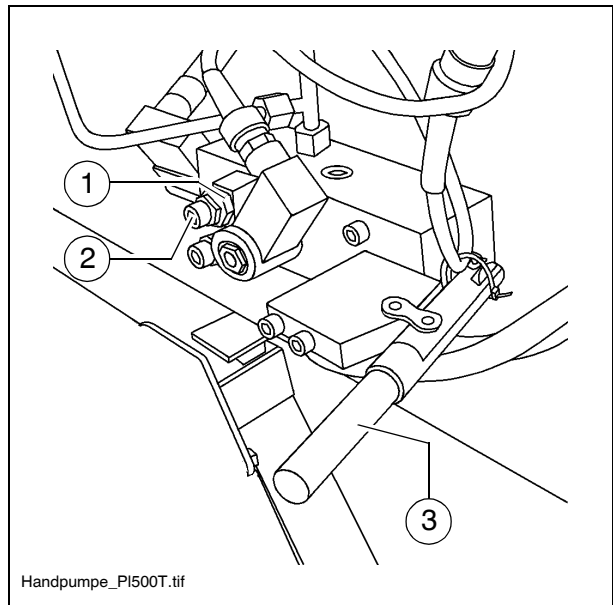
Do not disengage travel drive and release brake until the machine has been properly secured to prevent accidental rolling away, or is already properly connected to the towing vehicle.

The engine compartment of the machine includes a hand pump which must be activated in order to tow away the machine.

- First of all, unfasten the lock nut (1) on the hand pump and tighten the threading dowel (2) as far as possible into the pump.
Retighten the lock nut for safety.
- Now use the lever (3) to activate the hand pump until enough pressure has been developed and the brakes have released.



The brakes will release themselves at a pressure of approx. 30 bar.



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



Only ever tow the shortest distance to the means of transport or the next parking possibility.

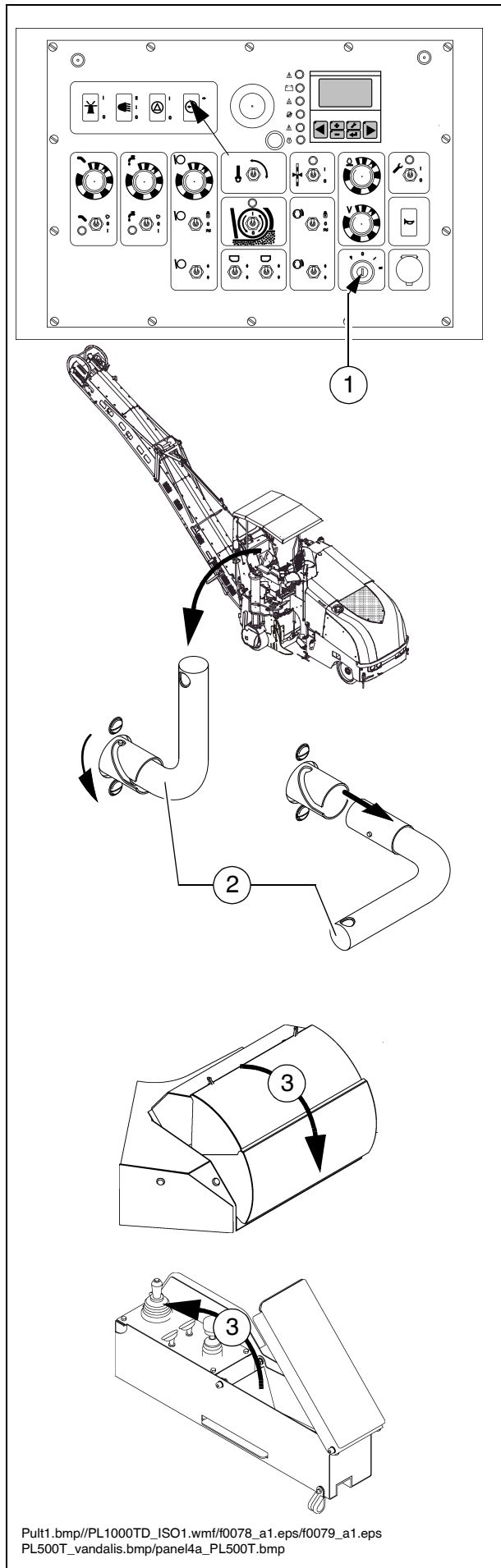
Following towing, unscrew the threaded dowel (2) a few turns again and lock with the lock nut (1).

The brakes are now active again and the machine is protected against rolling away.

7 Safely parking the vehicle

When parking the machine on publicly accessible land, secure it to ensure that unauthorised persons and children cannot do any damage to the machine. The machine should be parked on level ground.

- Lower the machine evenly until the milling drum is almost in contact with the ground. Access to the milling drum should be cordoned off.
- Remove ignition key (1) and main switch (2) and take them with you – do not leave them "hidden" in the machine.
- Fit covers (3) onto operating panels and lock.
- Store loose parts and accessories, e.g. lamp fittings, in a safe place.
- Lock all flaps, covers and storage bins.



D Operation

1 Safety regulations



Injury or death can result whenever the engine, travel drive, milling drum, conveyor or lifting units are engaged.

When operating the machine, therefore maintain strict compliance with the sections of these operating instructions and the safety specifications dealing with personal conduct.

Before starting the machine, ensure that no-one is working on or underneath the machine, or standing in the danger area!

- Do not start the engine or do not actuate any controls when this is expressly forbidden!
Unless otherwise specified, the controls may only be actuated when the engine is running!
- Check thoroughly before starting the machine. Ensure that the machine status and position as well as the position of all safeguards, operating and adjustment fixtures permit the machine to be started safely.
- Sound the horn as a warning before starting the machine.



Do not stand in the danger area of the vehicle unless absolutely necessary. Danger to life and limb!

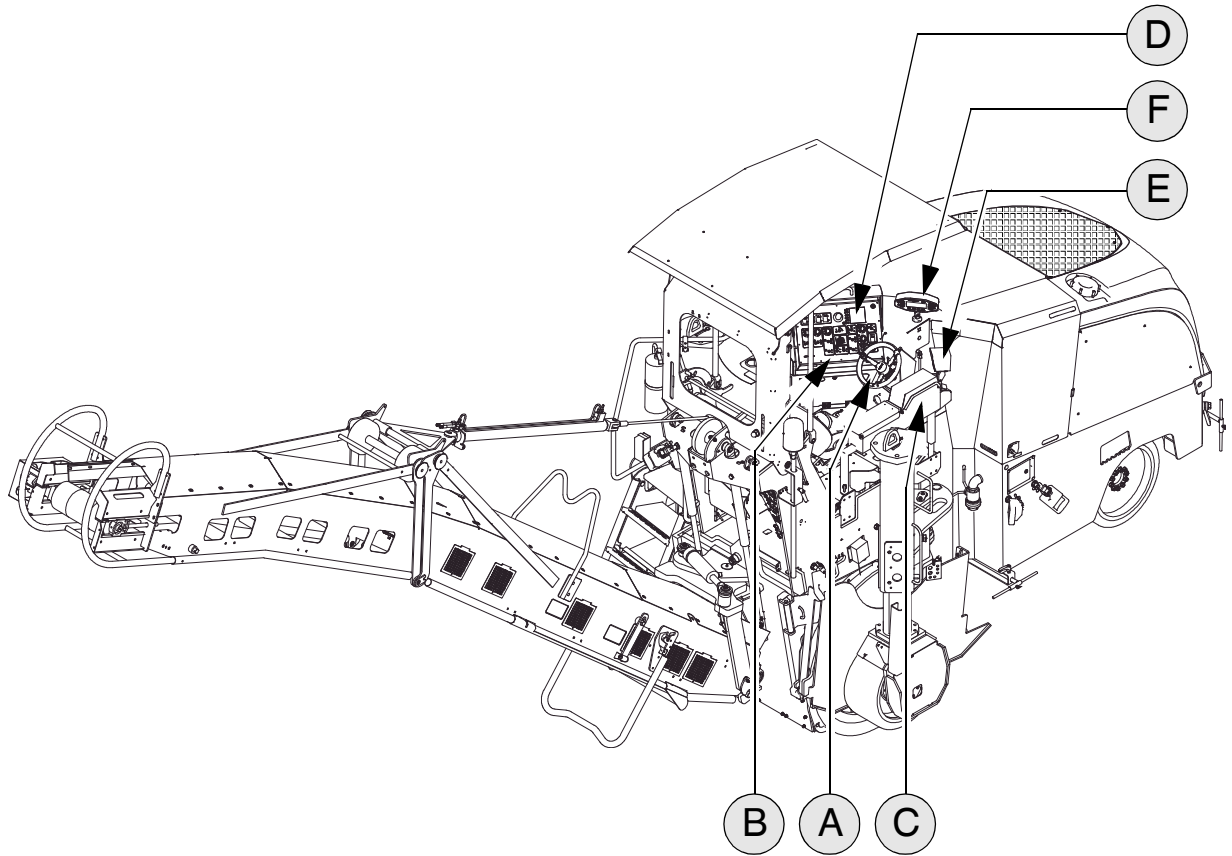
- Always make sure during work that no-one is endangered by the machine!
- Ensure that all protective covers and hoods are fitted and secured accordingly!
- Immediately rectify damage which has been ascertained! Operation must not be continued when the machine is defective!
- Do not allow unauthorised people to travel on the machine.
- Clear all obstacles off the road surface and out of the working area!
- Always try to choose a driver's position that is opposite to the flowing traffic!
- Maintain sufficient safety clearance from overhanging objects, other machines and points of danger!
- Be careful when travelling on rough terrain to keep the paver finisher from slipping, tipping or turning over.
- Always ensure that the ground is able to support the weight of this machine!



Always be the master over the machine; never try to use it beyond its capacities!

2 Controls

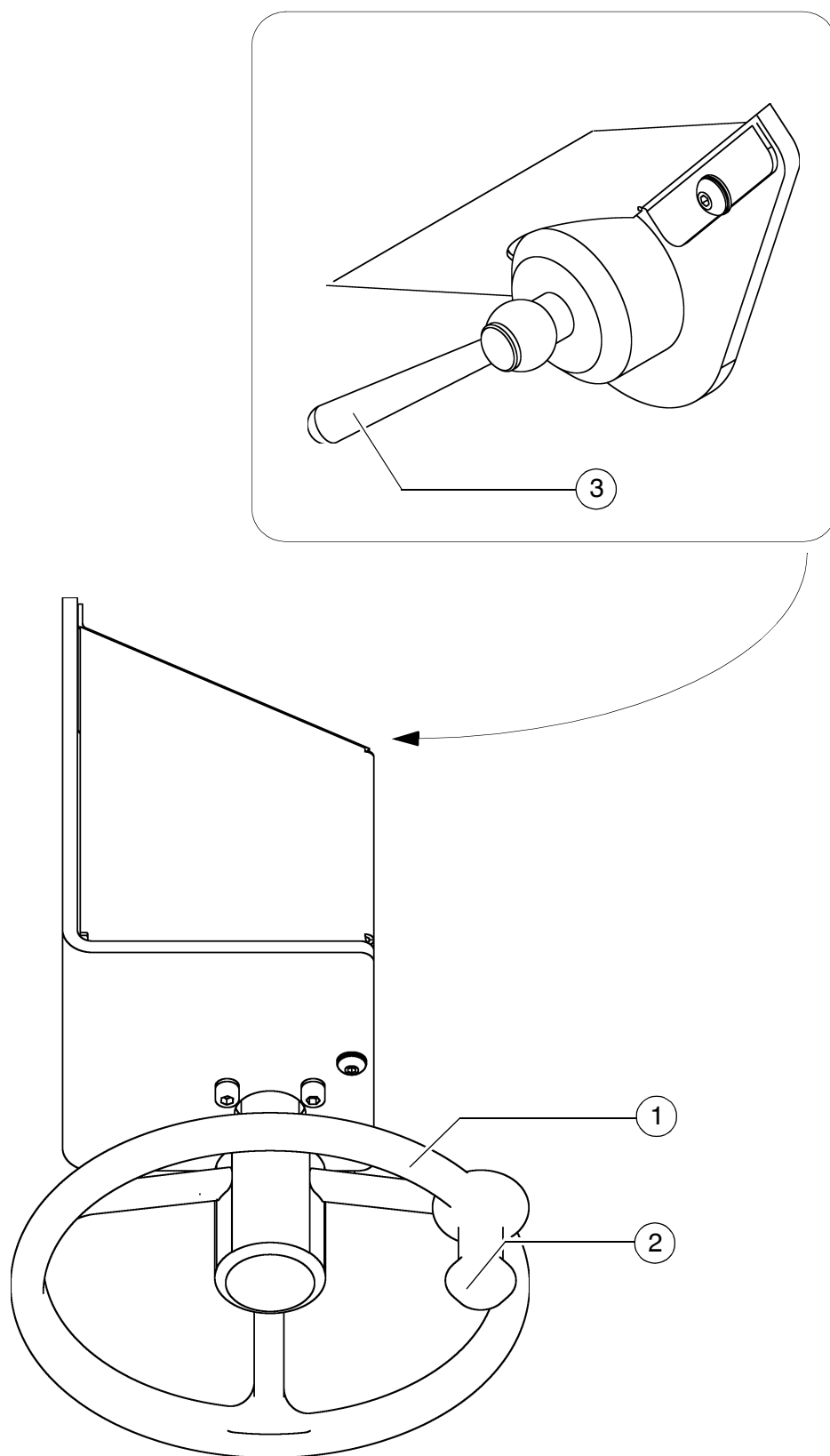
2.1 Operating panel / control units



Panelkompl_500_1000.bmp/Verriegel_Lenk.cdr

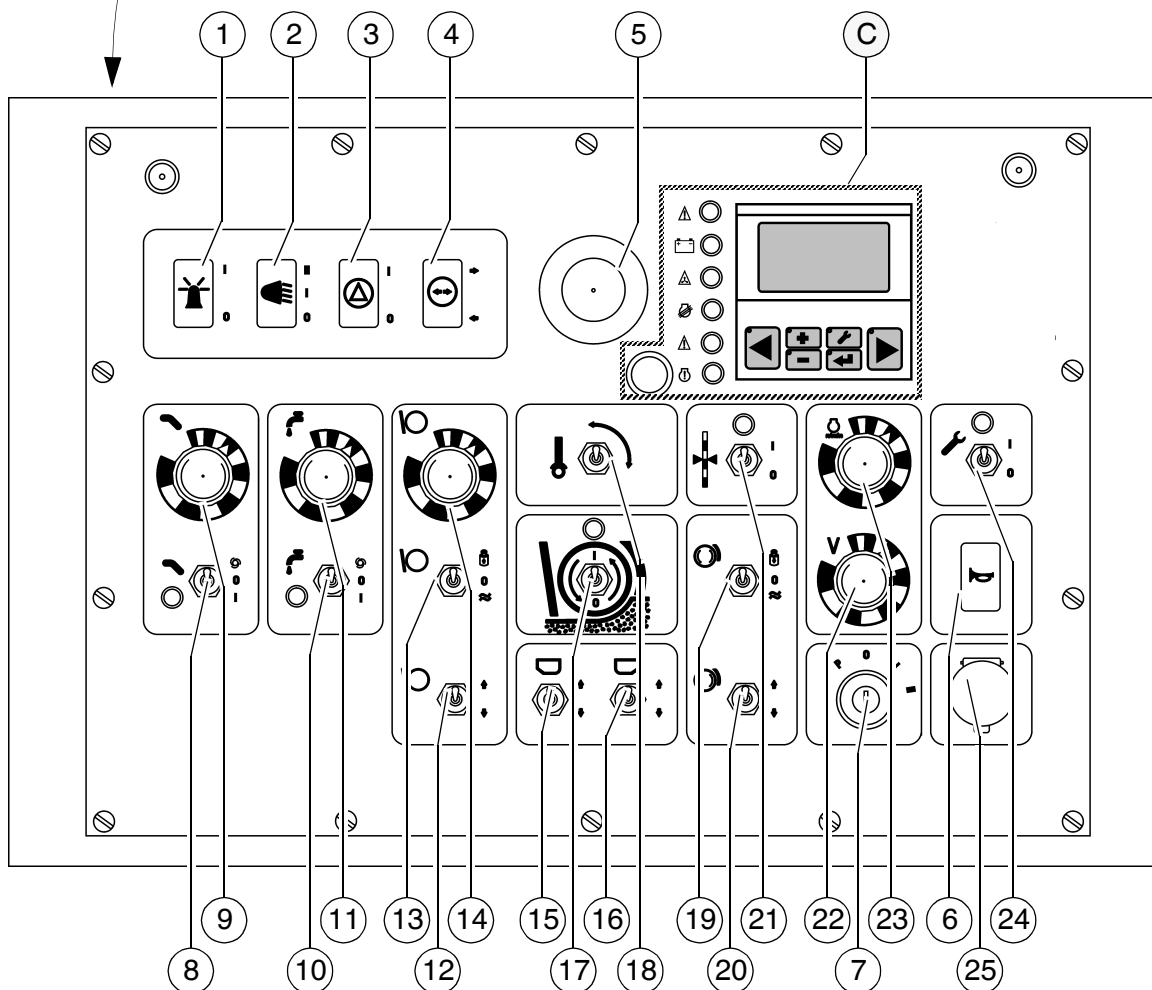
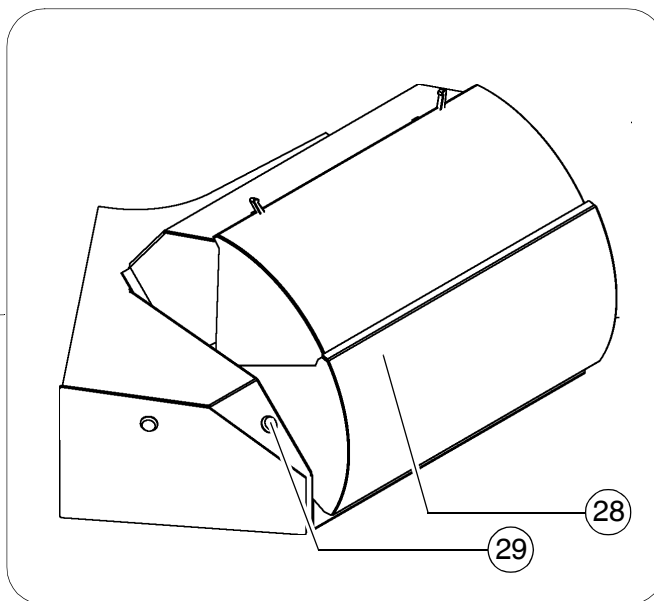
Item	Designation	Brief description
A	Steering unit	
B	Main control panel	
C	Ergonomics kit	
D	Terminal	
E	Height display	
F	Levelling system	

A



Item	Designation	Brief description
1	Steering wheel	Steering action is transmitted hydraulically to the front wheel or wheels.
2	Turning knob	To allow for safe handling, the steering wheel is equipped with a turning knob. This turning knob enables the driver to operate the steering wheel with one hand.
3	Latch of steering unit	The entire steering unit can be adjusted across an inclined plane. - Open interlock and swivel steering unit upwards or downwards using both hands. - Close safeguard again once desired position has been reached.  Only adjust the steering unit while the machine is stationary!

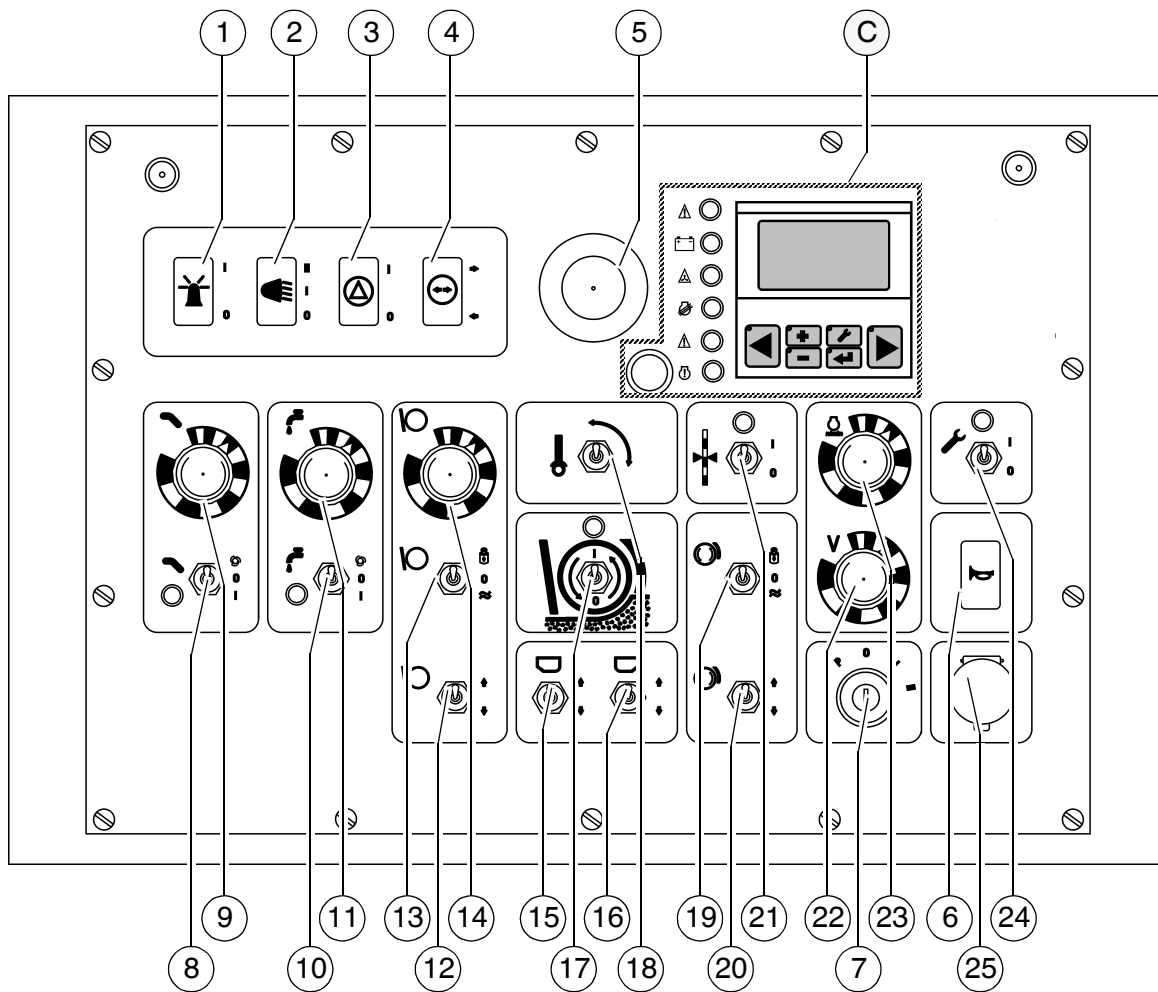
B



Panelxxxxx

Item	Designation	Brief description
1	Warning lights	Two switch positions can be selected: - 0: Hazard lights OFF - 1: Hazard lights (rotary beacon) ON  Switch on for safety on roads
2	Illumination switch	Three switch positions can be selected: - 0: Light OFF - 1: Travel lighting ON (low-beam headlights, operating panel lighting) - 2: Work lighting ON (working lights, low-beam headlights, operating panel lighting)
3	Hazard warning flasher	Switch on for safety on roads
4	Direction of travel indicator ("flasher")	Use when changing direction of travel on roads.
5	EMERGENCY STOP button	In the case of an emergency (danger to persons, possible collision etc.), press in the button! - The engine, drive units and steering are disengaged whenever the EMERGENCY STOP button is pressed. To restart the engine, all EMERGENCY STOP buttons must be raised.  The traction system brakes are applied whenever an emergency stop button is pressed!
6	Horn	If danger threatens and as an acoustic warning signal, activate before setting off.  The horn can also be used to communicate with the truck driver.
7	Ignition lock	Key positions: - P: Lighting active - 0: Ignition OFF - 1: Ignition ON - 2: Starter function  It is only possible to start the engine if the drive lever is in centre position, the milling drum is not engaged and the switches for raising and lowering the machine are in neutral position.  Key can only be removed from ignition lock in positions P and 0.  The hazard flasher can also be switched on without the ignition key fitted.

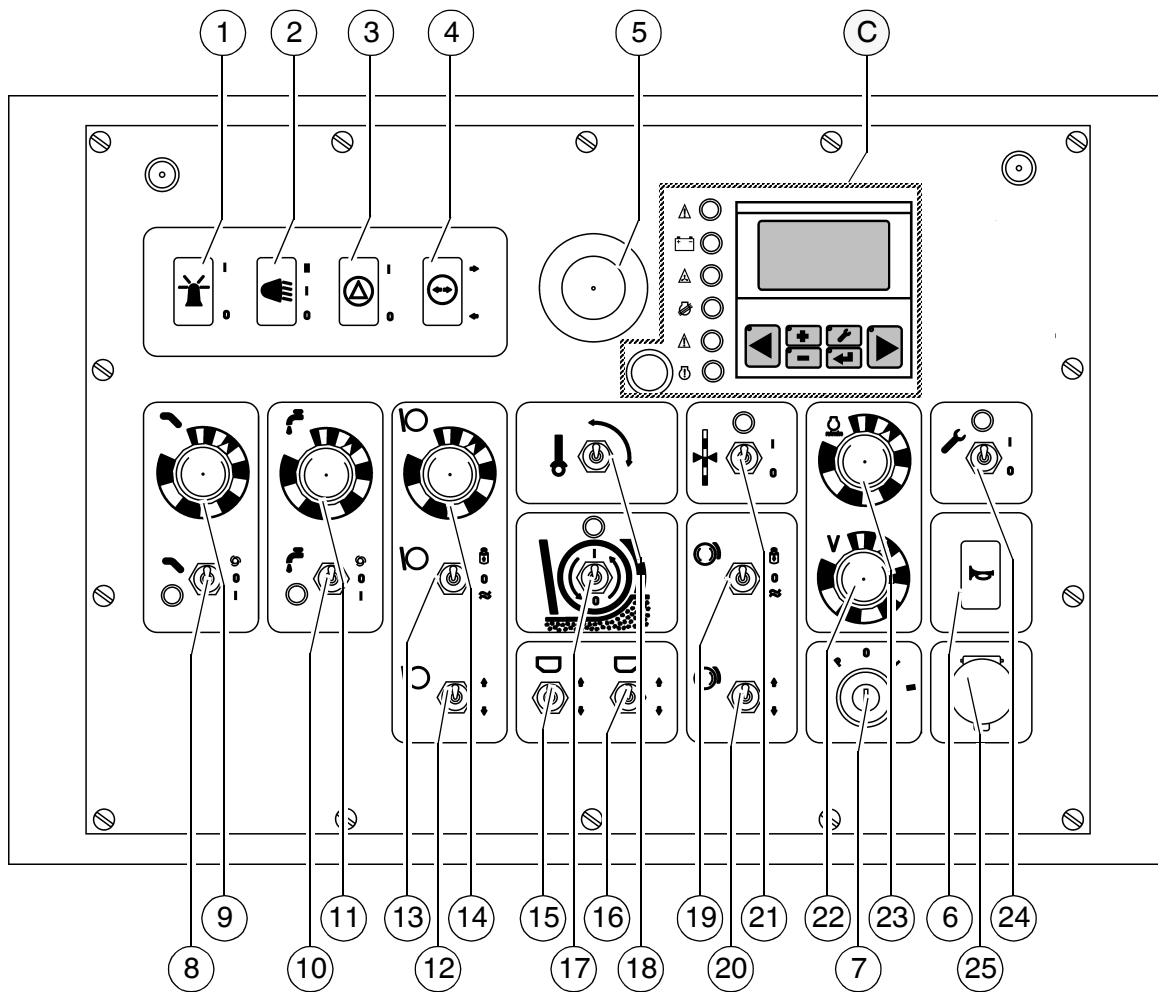
B



Panelxxxxx

Item	Designation	Brief description
8	Mode of upper conveyor	Three switch positions can be selected: - 0: upper conveyor conveying function OFF - AUTO: conveying function is linked to the control lever. The upper conveyor only starts when the milling operation begins. The upper conveyor stops or overruns when the milling operation is interrupted or ended.  The upper conveyor only runs in conjunction with the activated milling drum. - 1: conveying function of upper conveyor in forwards direction ON  Switch setting "ON" and function enabled in "AUTO" switch setting are confirmed by the relevant LED.
9	Speed governor on upper conveyor	Used to adjust the discharge rate for mill material to prevailing conditions (quantity of material involved, delivery speed). This adjustment can also be made while the milling operation is running.  Ensure that no mill material accidentally gets "slung" from the upper conveyor!
10	Water pump ON / OFF / AUTO	Three switch positions can be selected: - 0 : Water pump OFF - AUTO: Water spraying system is linked to the control lever. The water pump does not start to pump water until the milling operation starts (swivel out the drive lever + milling drum ON). 1: Continuous water spraying  Switch setting "ON" and function enabled in "AUTO" switch setting are confirmed by the relevant LED.  This water is definitely not drinking quality!
11	Water pump adjustment	To match the displacement of the water pump to prevailing milling characteristics (milling depth, traction, material).  Adjustment range 50-100%.

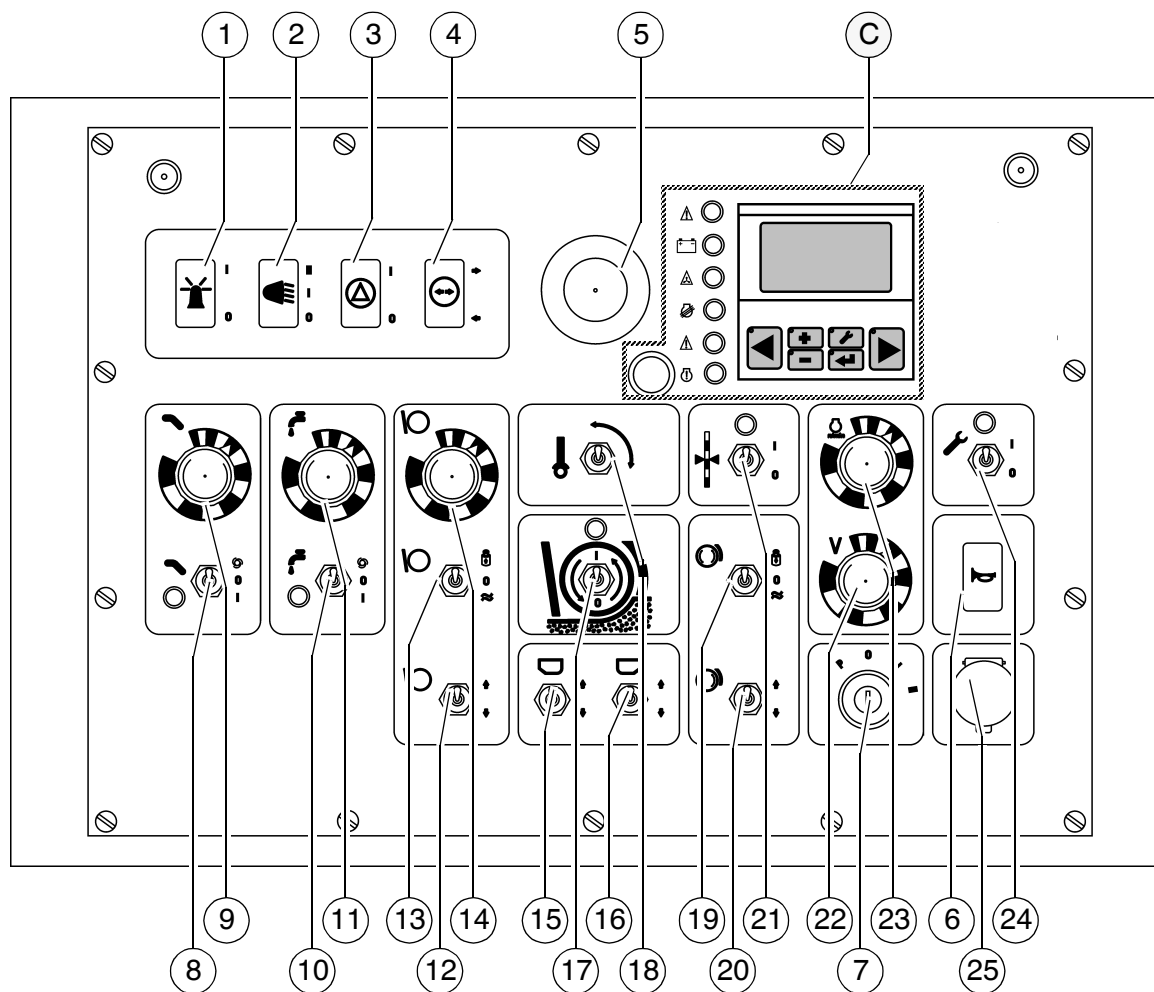
B



Panelxxxxx

Item	Designation	Brief description
12	Moldboard Raising / lowering (moldboard)	The moldboard is raised or lowered to the upper or lower limit position whenever the switch is being pressed in the relevant direction.  Danger resulting from raised loads. Do not enter the danger area.
13	Selector switch Moldboard	Three switch positions can be selected: - Upper switch position: Adjusting scraper relief - Switch setting 0: Scraper blocked - remains in the desired position - Switch setting ~: Scraper in floating position  During milling operations, the moldboard should always be in floating position. Under certain working conditions, it is however possible for the scraper to dig into the substrate. This can be avoided through use of the blocking or relief function.
14	Pressure controller Relief pressure Moldboard	To regulate pressure for scraper relief To set the pressure at which the moldboard slides over the milling lane.  The pressure setting determines the extent to which the milling lane is cleared of milling debris.

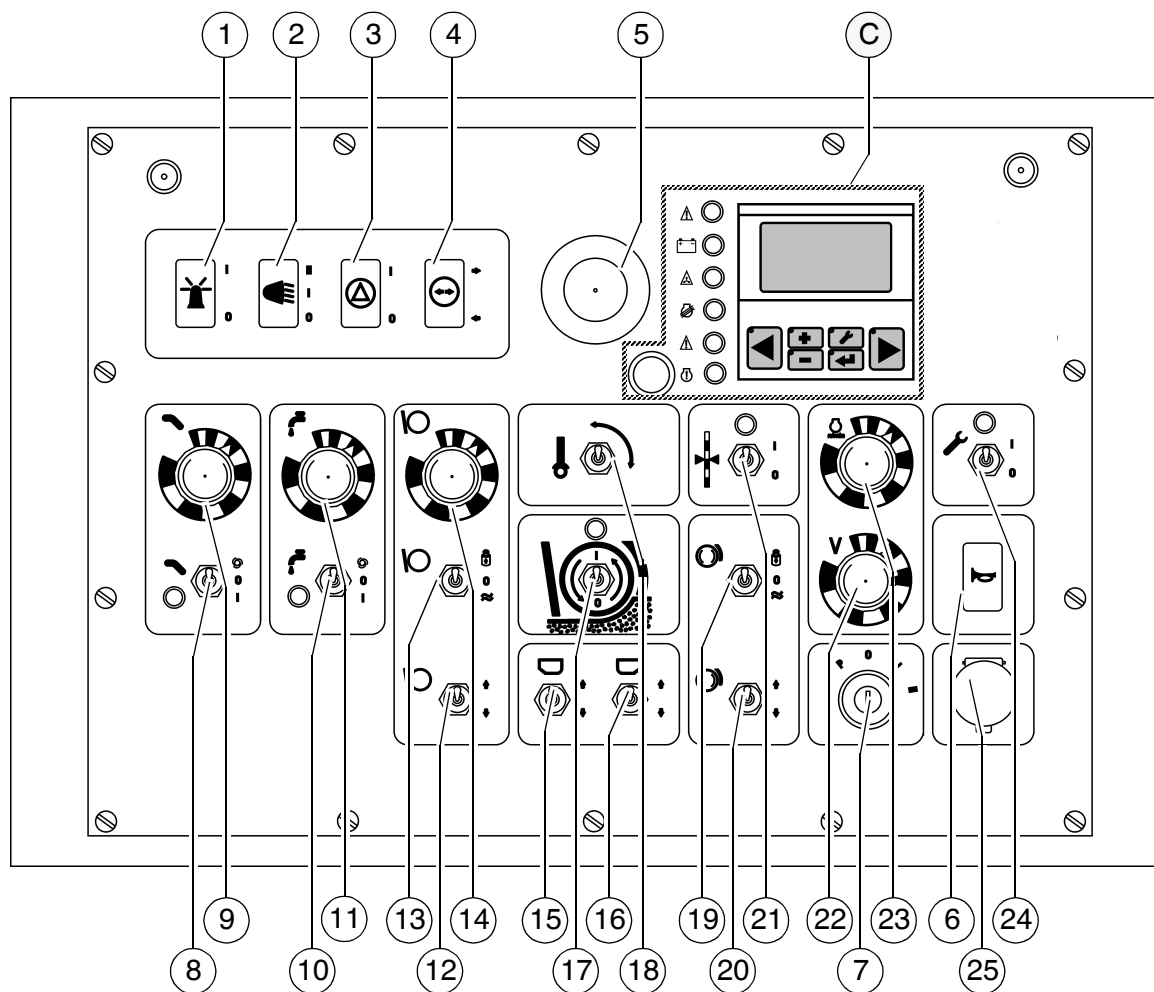
B



Panelxxxxx

Item	Designation	Brief description
15	Raising / lowering left side board	The left side board is raised or lowered to the upper or lower limit position whenever the switch is being pressed in the relevant direction.  The board lowers again automatically.  If the service switch is activated, the side board is held in position.  Danger resulting from raised loads. Do not enter the danger area.
16	Raising / lowering right side board	The right side board is raised or lowered to the upper or lower limit position whenever the switch is being pressed in the relevant direction.  The board lowers again automatically.  If the service switch is activated, the side board is held in position.  Danger resulting from raised loads. Do not enter the danger area.

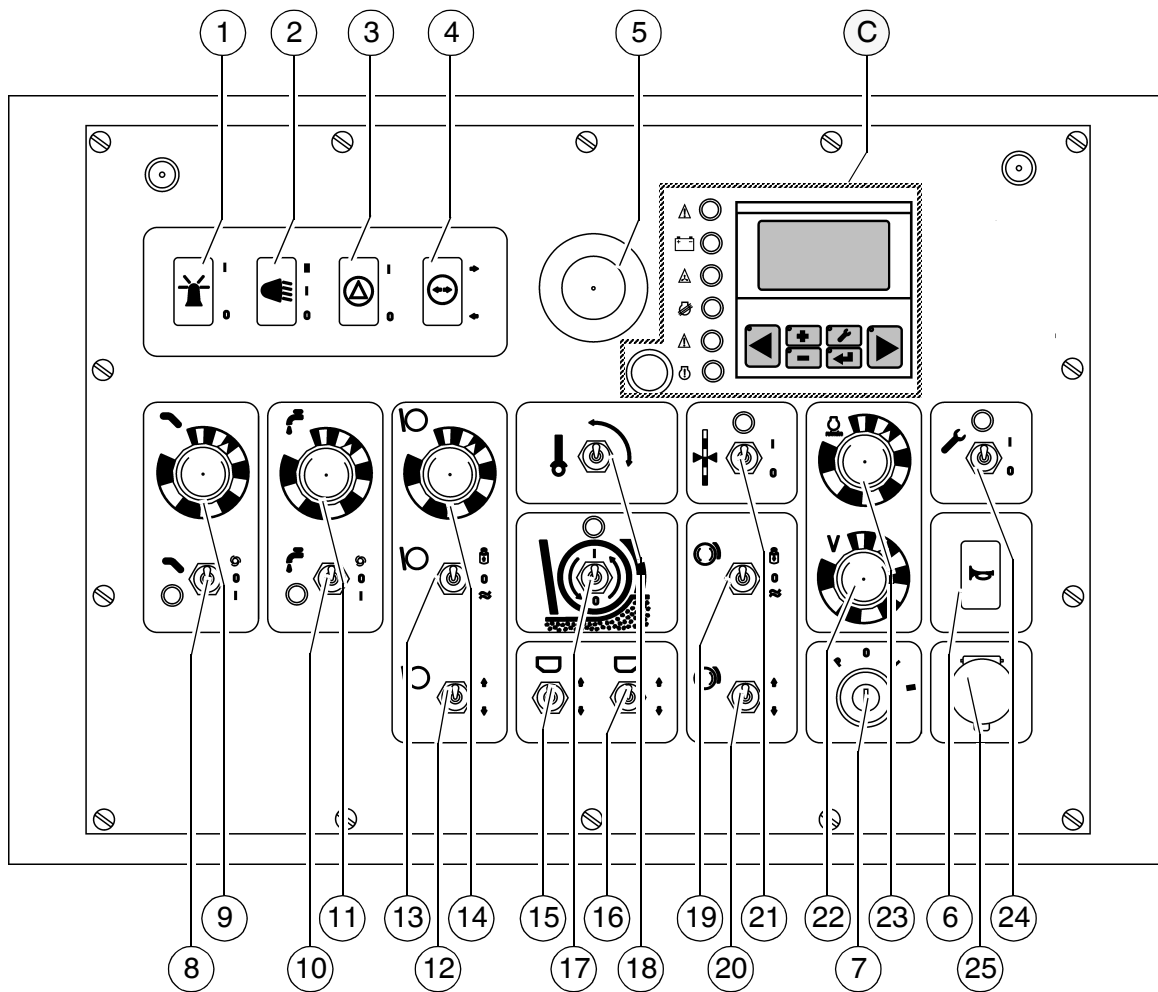
B



Panelxxxxx

Item	Designation	Brief description
17	Milling drum transmission ON / OFF	This switches the milling drum transmission on or off. - Upper switch position: milling drum transmission engaged, - Lower switch position: milling drum transmission engaged.  Before the milling drum transmission is engaged, check to ensure that the machine is not lowered to such a point that the milling drum makes contact with the substrate.  The milling drum transmission can only be engaged in operating gear and with the drive lever in centre position.  Switch setting "ON" is confirmed by the relevant LED.  The engine cannot be started if the milling drum transmission is engaged!
18	Hydraulically swivelling chassis leg in / out	To swivel the right-hand chassis leg in and out, e.g. for precision edge milling.  Before the chassis leg is swivelled in or out, it needs to be retracted completely and the driver's seat needs to be slid inwards as far as possible.  In both positions for the chassis leg, always insert the retaining pin to secure it.

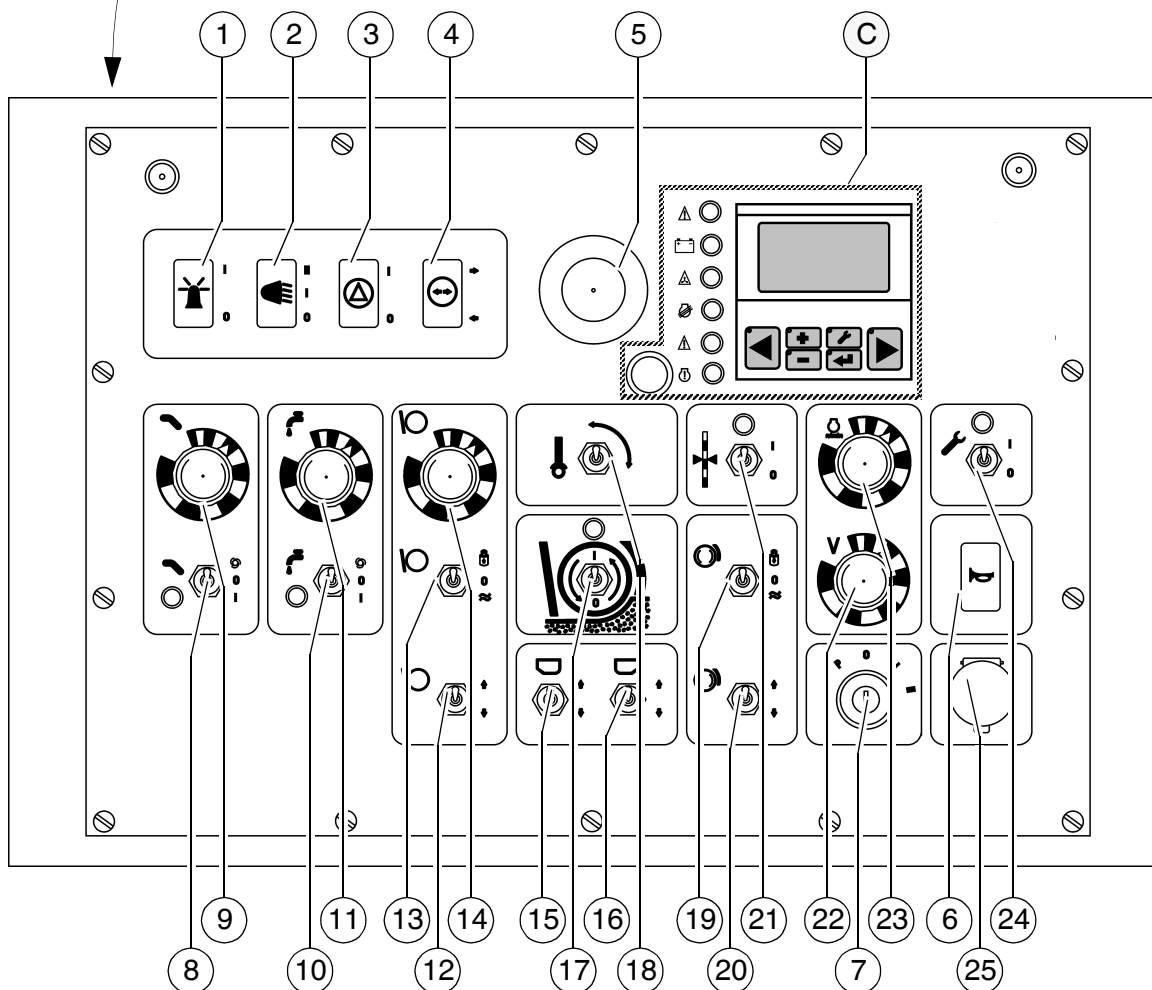
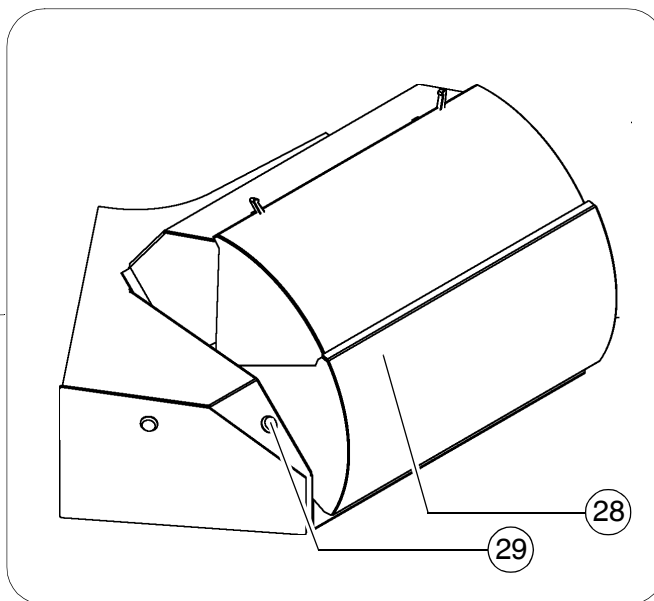
B



Panelxxxxx

Item	Designation	Brief description
19	Selector switch Sliding shoe	Two switch positions can be selected: - Upper switch position: Setting load on sliding shoe - Switch setting 0: Sliding shoe blocked - remains in the desired position - Switch setting ~: Sliding shoe in floating position  During milling operations, the sliding shoe should always be in floating position. For milling depths extending through several superimposed layers of asphalt, the milling operation can cause large "lumps" to be torn out. To prevent the milling tools from doing this, increase their load bearing pressure.
20	Sliding shoe Raising / lowering	The sliding shoe is raised or lowered to the upper or lower limit position whenever the switch is being pressed in the relevant direction.  Danger resulting from raised loads. Do not enter the danger area.  While the milling drum is rotating, material can be thrown outwards.
21	Levelling function	Two switch positions can be selected: - 0: Levelling OFF - 1: Levelling unit ON Levelling unit active, responds independently of control lever.  Adjusting using the connected levelling devices is only possible in switch position "1".  Switch setting "ON" is confirmed by the relevant LED.

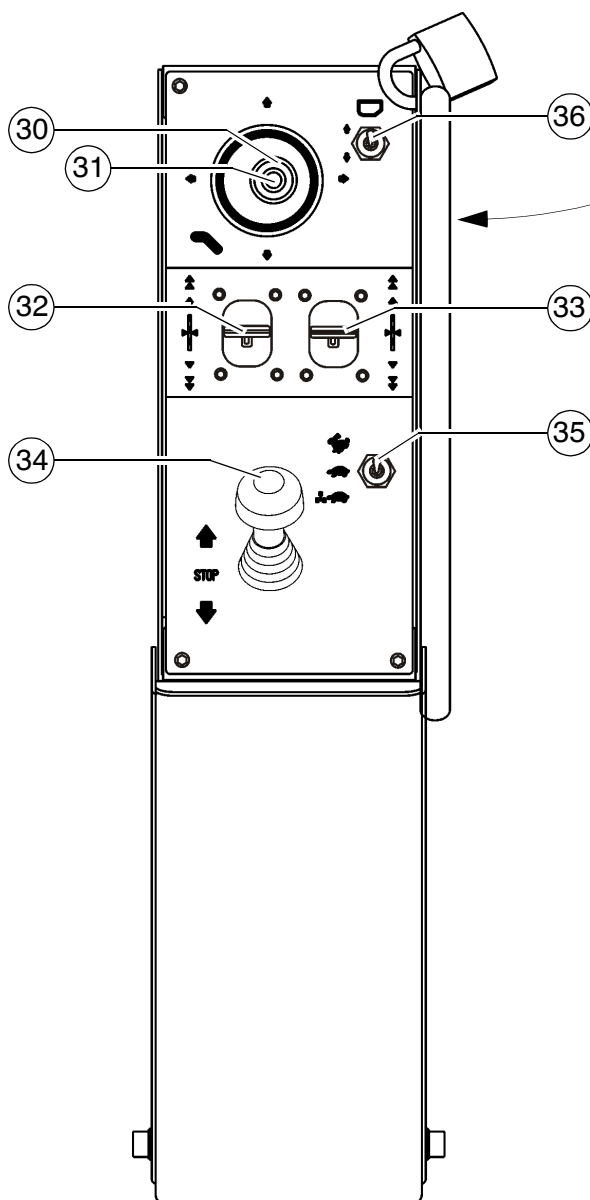
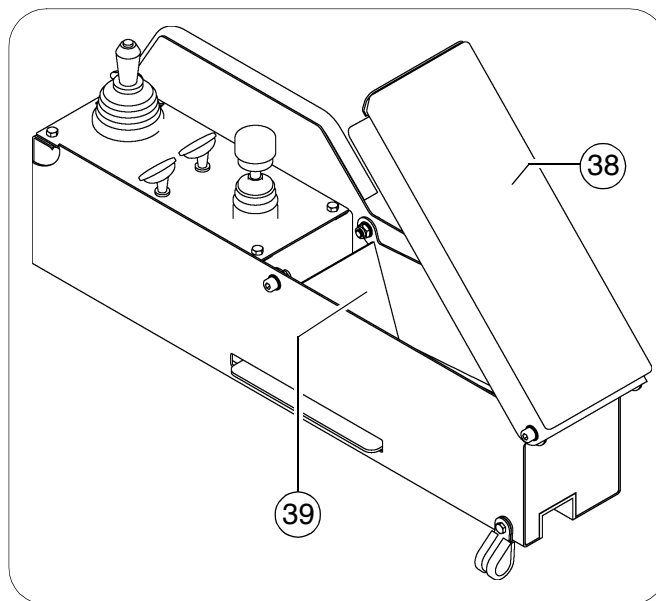
B



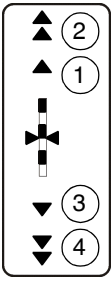
PL500T_Pult1.bmp

Item	Designation	Brief description
22	Engine speed adjuster	Continually adjustable engine speed setting. Min. setting: Idling speed Max. position: nominal speed  Automatic speed control keeps the set speed constant, even when under load.
23	Preselect controller Travel drive	For setting the maximum speed that can be reached when the drive lever is at its stop.
24	Service switch	Shuts down all safety-related functions for maintenance purposes, e.g. replacement of milling bits.  Switch setting "ON" is confirmed by the relevant LED.  Whenever the Service switch is active, travel and milling drives are locked down (inhibited). Belt drive tension on the milling drum is relieved.  The side boards are kept in their raised position after being raised.
25	Socket	24 volt socket for external consumers, e.g. additional working lights or diagnosis equipment.
28	Vandalism protection facility	On completion of work, secure the operating panel with the vandalism protection facility. The vandalism protection guard can be swivelled downwards.
29	Lock	To lock the vandalism protection unit down in its lowered position.

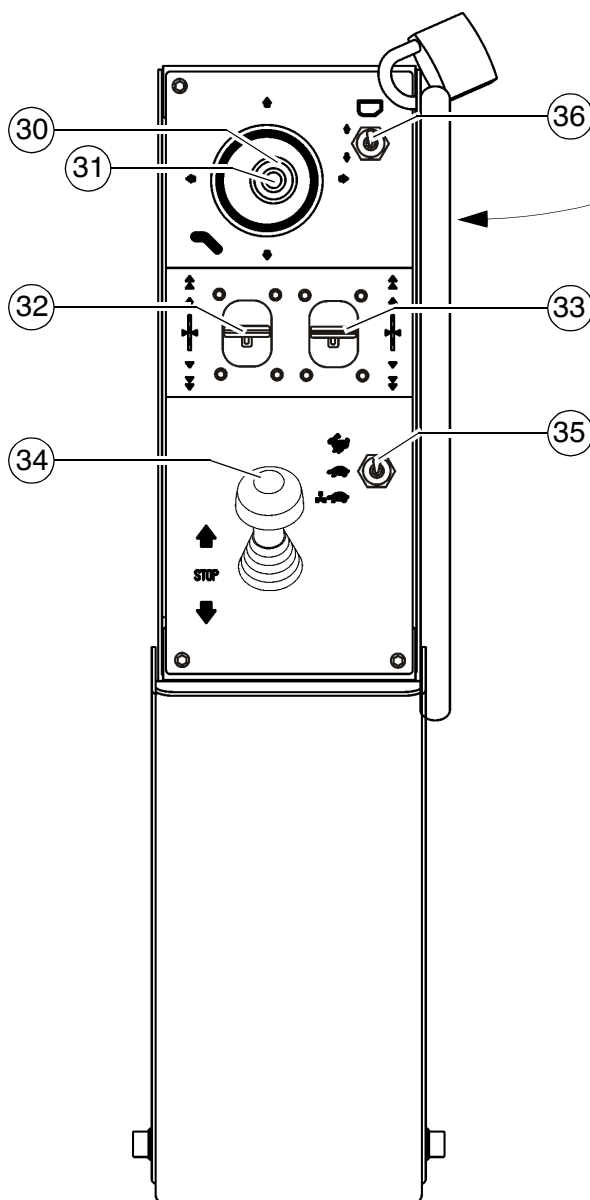
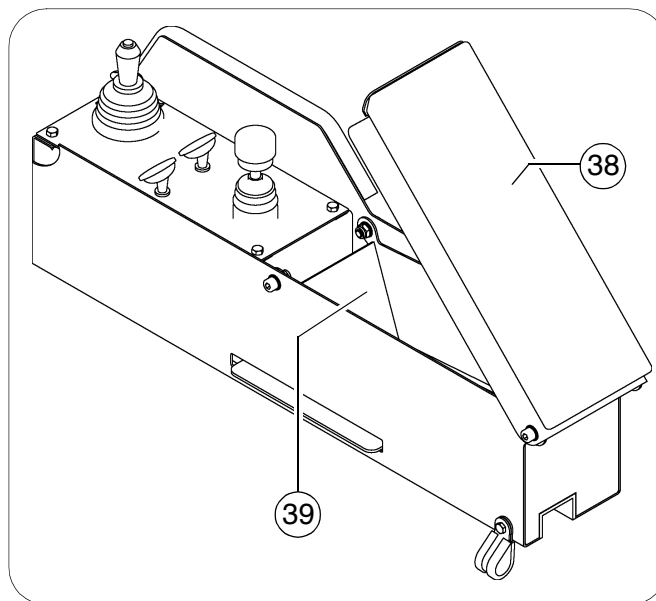
B



Panelxxxxx

Item	Designation	Brief description
30	Control lever Upper conveyor	Dual-axis control lever for moving the lower conveyor: - Swivel direction, left: swivels the upper conveyor to the left - Swivel direction, right: swivels the upper conveyor to the right - Swivel direction forwards: lowers the upper conveyor - Swivel direction backwards: raises the upper conveyor  The upper conveyor is moved continuously while the control lever is swivelled in the appropriate direction.  Ensure that no-one is standing in the danger area beside the upper conveyor.
31	Horn	If danger threatens and as an acoustic warning signal, activate before setting off.  The horn can also be used to communicate with the truck driver.
32 33	Raising and lowering speed Traction unit left/right 	Multi-stage switch Four switch positions can be selected: - Switch position (1): slow raising speed (e.g. for raising machine at the end of the milling lane) - Switch position (2): fast raising speed (e.g. for set-up mode) - Switch position (3): slow lowering speed (e.g. for "initial surface scraping" and for milling operation) - Switch position (4): fast lowering speed (e.g. for set-up mode)

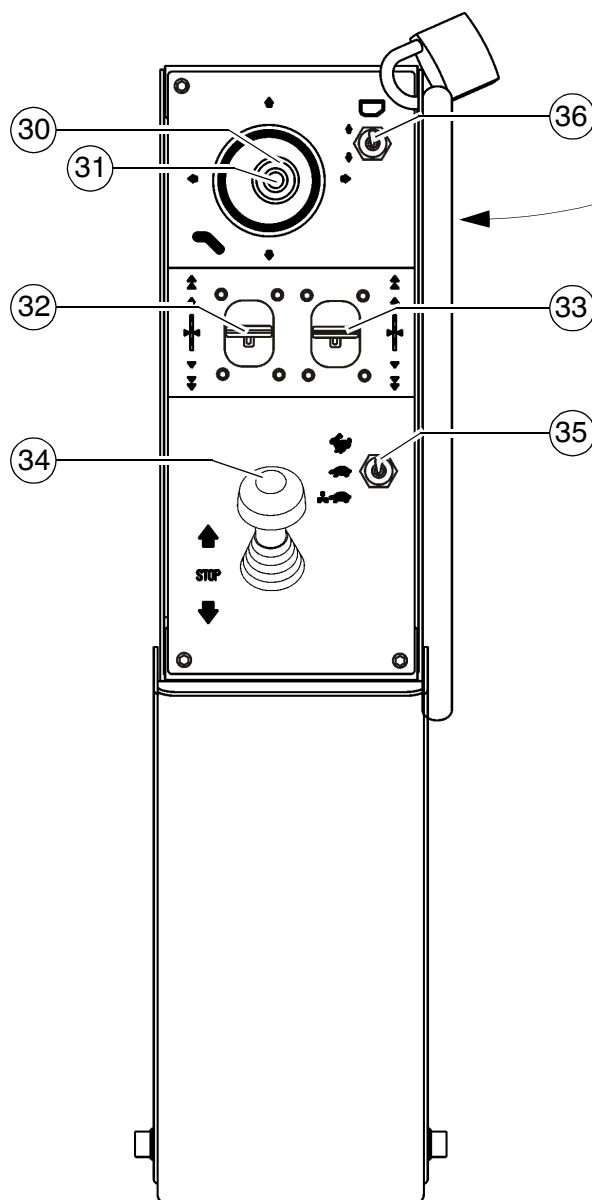
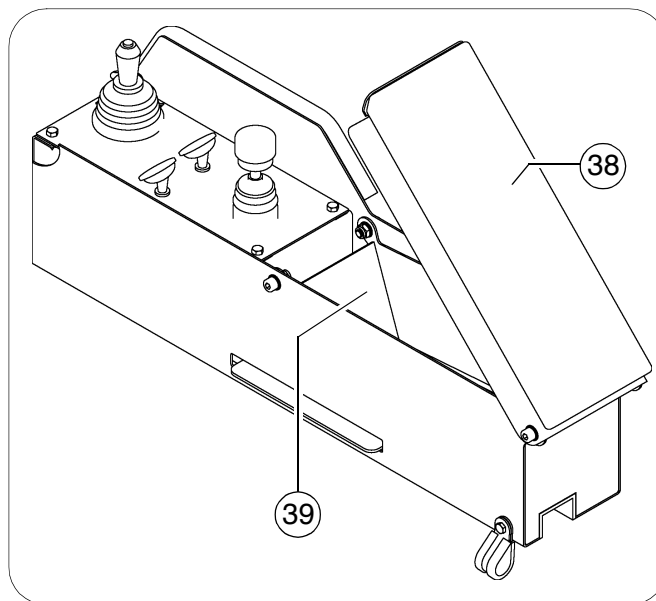
B



Panelxxxxx

Item	Designation	Brief description
34	Drive lever (traction)	Engagement of travel drive and infinitely variable adjustment of road speed - forwards and reverse. Zero position: Starting is possible; engine at idling speed; no travel drive; machine braked Maximum speed can be set using the preselector controller.  The engine is unable to start unless the drive lever is in its centre position!
35	Travel drive fast/slow Working gear + differential lock	Three switch positions can be selected: - Hare: Transport speed - Tortoise: Operating speed  This operating mode can only be changed over once the machine is shut down and the drive lever is in centre position! - Working gear + differential lock When engaging the differential lock in working gear. Apply when the machine encounters traction problems.  Cornering with differential lock switched on is only possible to a limited extent.
36	Raising / lowering right side board	The right side board is raised or lowered to the upper or lower limit position whenever the switch is being pressed in the relevant direction.  The board lowers again automatically.  If the service switch is activated, the side board is held in position.  Danger resulting from raised loads. Do not enter the danger area.

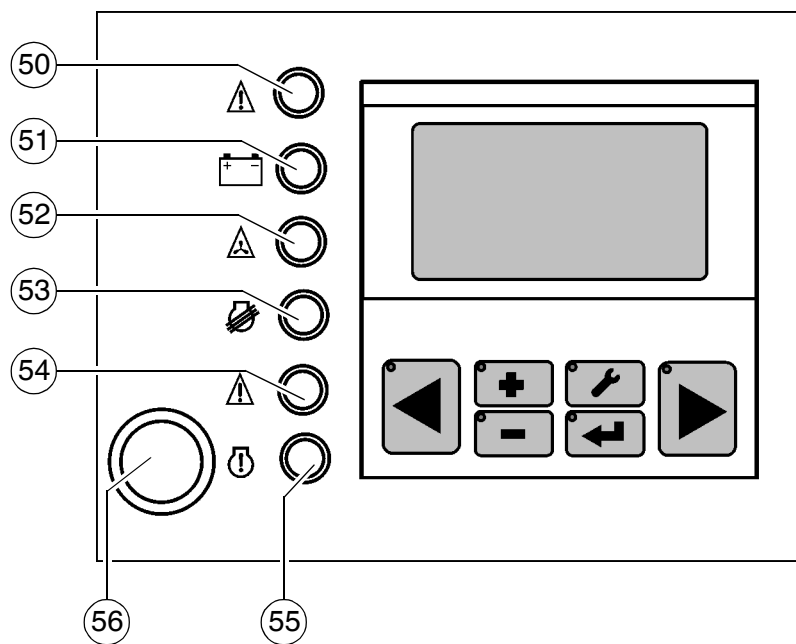
B



Panelxxxxx

Item	Designation	Brief description
38	Armrest	The armrest can be swivelled up into the storage area provided, to protect it from vandalism.
39	Vandalism protection facility	 On completion of work, secure the control unit with its locking vandalism protection.

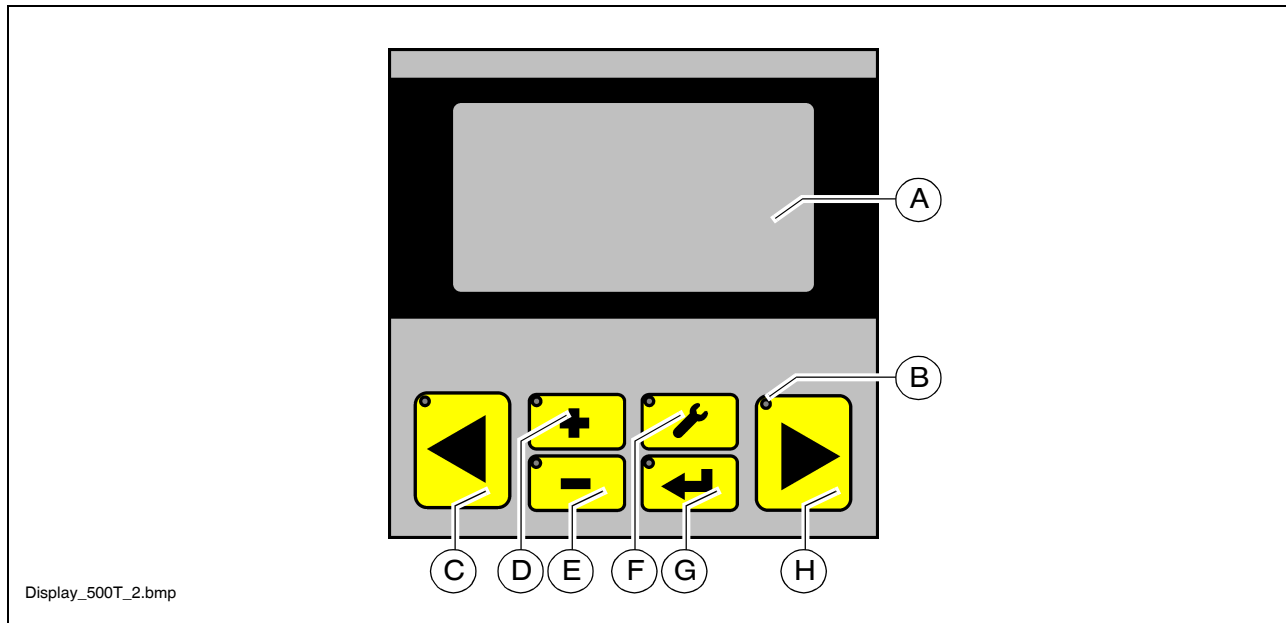
C



Panelxxxxx

Item	Designation	Brief description
50	Error check Travel drive (red)	If a fault occurs in the travel drive control system, a flash code is issued.
51	Battery charge check (red)	Must go out after starting when the engine revs up. - If this light fails to go out, switch off the engine.  Check alternator.
52	Error check for air filter (red)	Lights up if air filter needs /cleaning/ replacing. Switch off machine! Determine the cause and correct it if necessary.
53	Start inhibit	Indicates that an engaged function or actuated emergency stop button prevents the machine from being started.
54	Coolant level warning lamp (red)	Lights up whenever the coolant level is too low.  Switch off machine! Determine the cause and correct it if necessary.
55	Warning light Engine malfunction	Lights up when an error has occurred on the engine. The engine is automatically shut down for safety if necessary.  Lights up for a few seconds once the ignition has been switched on for checking purposes.  Do not start the engine until this indicator lamp has gone out.
56	Error / malfunction retrieval	If a fault discovered on the engine is indicated by one of the warning lamps, a code is displayed which correlates with a defined defect. Press the button until this 3-digit code is indicated by the warning lamp.  Refer to "Malfunctions" section for details of error code query procedure!

3 Operation of the input and display terminal



Item	Designation	Brief description
A	Display	Display indicator
B	LED	No function
C	"LEFT cursor" key	- Calling up the previous screen display. - Selecting parameter fields
D	"Increase value" key	- To make an adjustment to a selected value.
E	"Reduce value" key	- To make an adjustment to a selected value.
F	"Setup" key	Password-protected!
G	"Enter" key	- To confirm a set value / to acknowledge error messages.
H	"RIGHTcursor" key	- Calling up the next screen display. - Selecting parameter fields

Screen display (01) - Start screen

Displayed after ignition is switched on.



After 3 seconds, switches to screen display (02).



If an error message is displayed, the system switches to the relevant screen display.



Display_500T_2.bmp/Bild_1_Intro.gif

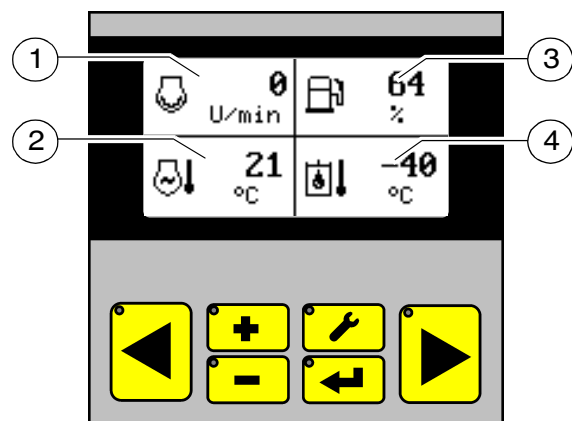
Screen display (02) - Engine speed / engine coolant temperature / tank display of hydraulic oil temperature

Display of the following measuring values:

- Engine speed (1) in rpm
- Engine coolant temperature (2) in °C/F
- Fuel tank display (3) %
- Hydraulic oil temperature (4) in °C/F



The hydraulic oil temperature is first displayed from 50°C (122°F); below this "Low" is displayed.



Display_500T_2.bmp/Motko_Display_1.gif



If a malfunction occurs, the relevant display appears on screen automatically.



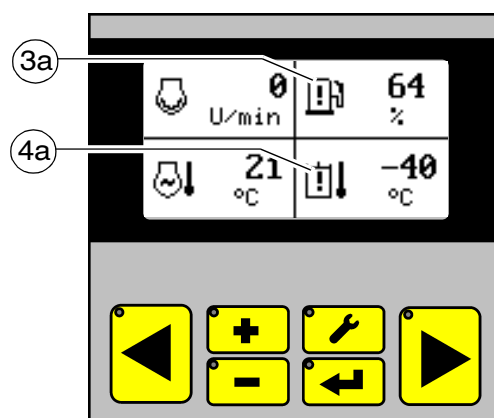
If an exclamation mark appears in the 'Tank display' symbol (3a), there is a defect on the tank sensor (short circuit, defective sensor), or the tank is less than 15% full.



If an exclamation mark appears in the 'Hydraulic oil temperature' symbol (4a), the hydraulic oil temperature is higher than 100°C.



If (4a) is displayed, shut down all hydraulic consumers but leave engine running. If the temperature fails to drop, shut down the vehicle.



Display_500T_2.bmp/Motko_Display_1a.gif

Screen display (03) - Engine oil pressure / battery charge indicator / time / operating hours counter

Display of the following measuring values:

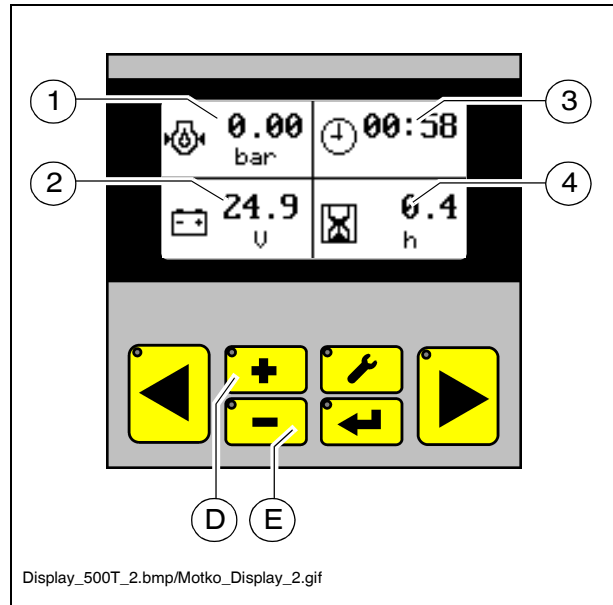
- Engine oil pressure (1) in bar
- Battery charge indicator (2) V
- Time (3)
- Operating hours counter (4) in hrs



If button (D) is actuated, the system jumps to the screen display for 'Setting setup time / date'.



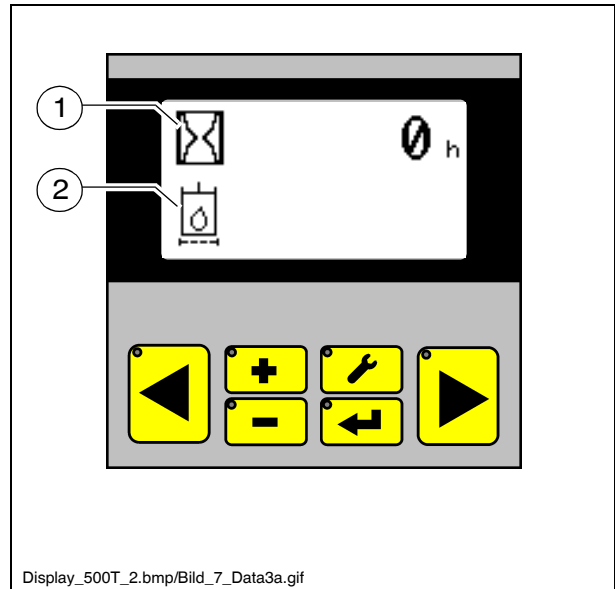
If button (E) is pressed and held down for 3 seconds, the operating hours are reset to "0".



Screen display (04) - Operating hours /status of hydraulic oil filter

Display of the following measuring values / messages:

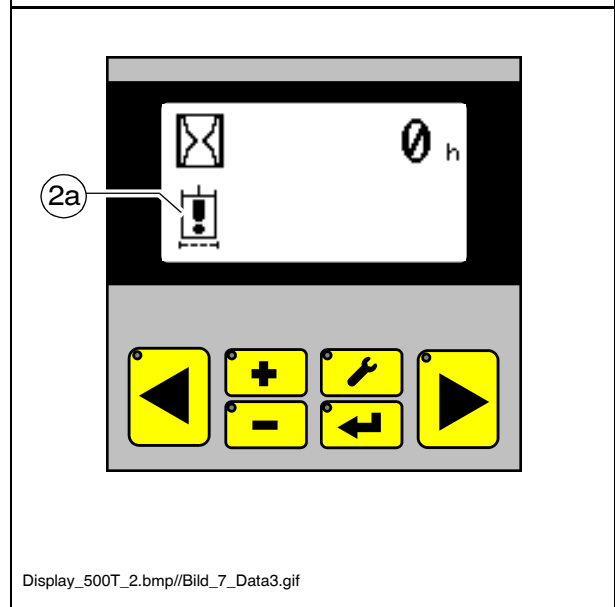
- Operating hours (1)
- Status of hydraulic oil filter (2)



If a malfunction occurs, this display appears on screen automatically.



If an exclamation mark appears on screen beside "Hydraulic oil filter" (2a), the filter needs to be replaced.



Screen display (05) - Error codes for engine

If a fault is detected on the engine, this is indicated by a dedicated warning lamp and appears on the screen display at the same time.



If a malfunction occurs, the relevant display appears on screen automatically.

- You can then jump to the error message by pressing the (G) key.
- The error message displayed on screen contains several numerical codes (2), (3) and (4) which uniquely define the defect after a decoding process.



With some serious error messages, the engine is shut down automatically, or the engine should be switched off to prevent further damage from occurring.



If several defects occur simultaneously, you can scroll through these in quick succession using the plus/minus keys (D) / (E).



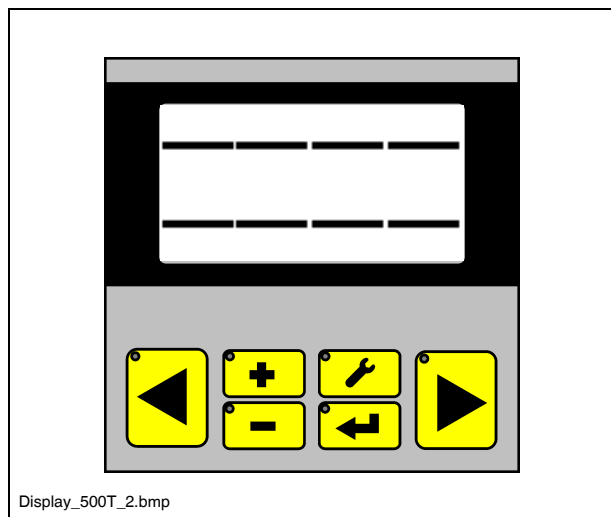
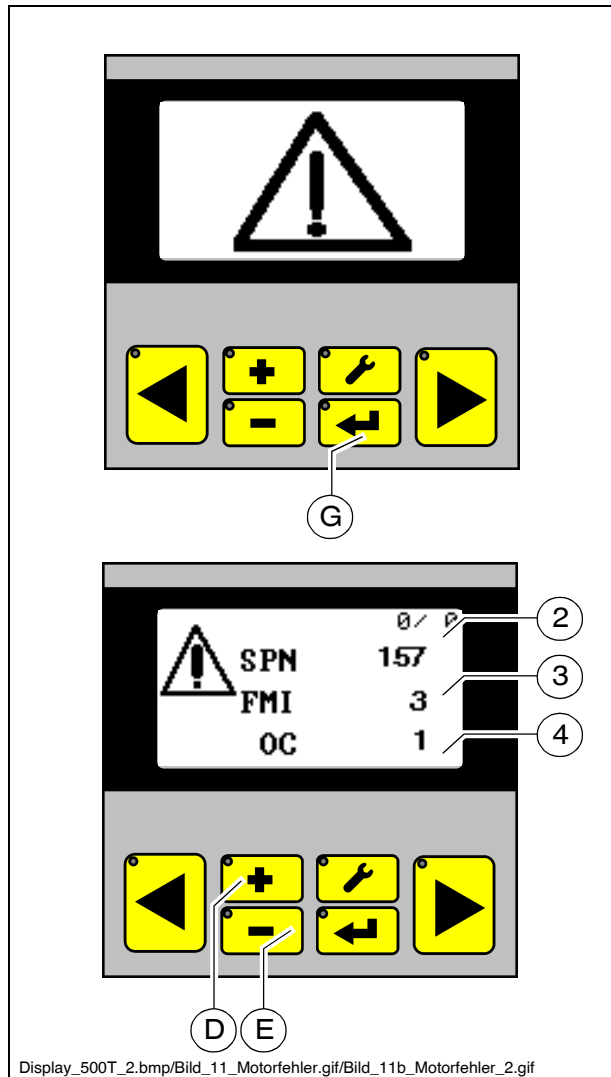
Note contents of "Error codes for engine" section.



If no error has occurred, the display shown at the right appears:



No automatic return is carried out.



Screen display - Setup - password

- If this button (F) is pressed and held down for 2 seconds, the password query for the Setup menu is called up.

To enter the password:

- Four-digit password (1)
- OK display for confirmation purposes (2)



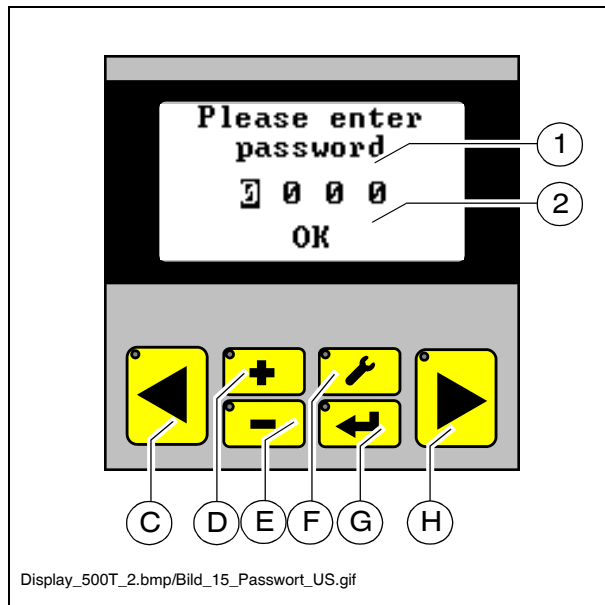
Input must take place within 20 seconds.



Using the cursor (C) + (H) and the plus/minus keys (D) + (E), the password can now be entered. Every numeral must be confirmed using the Enter key (G).



Following correct input, the system jumps back to the Service level.

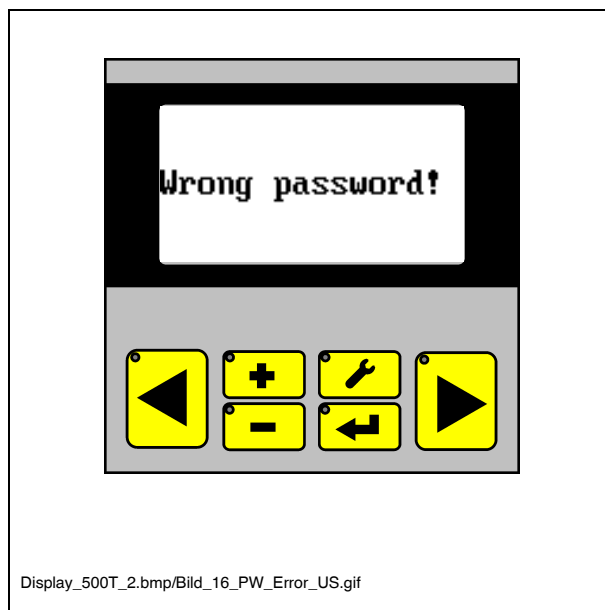


Screen display - Password incorrect

Display if incorrect password is keyed in.



After the 2nd incorrect input, the display is locked down. This inhibit function can be reset (i.e. cancelled) by turning the ignition OFF/ON.



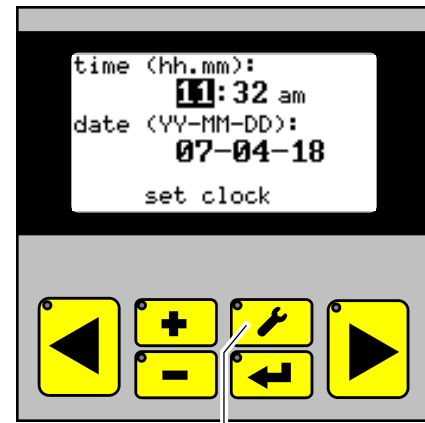
Service level: Setup - Setting time / date.

To set the time and date:

- Press the cursor keys to select the relevant time box (hh.mm) or date box (DD.MM.YY).
- Using + / - keys, set the figure in the black highlighted box to the desired value.
- Confirm this setting by pressing the Enter key.



To quit the Service level, press the (F) key for 2 seconds.



Display_500T_2.bmp/Bild_17_Uhr_US.gif

Service level: Setup - Set brightness / lighting.

- If this button (G) is pressed and held down for 2 seconds, the setup menu is called up.

To set the display brightness and push-button lighting:

- Select the appropriate field by pressing the cursor keys.
- Using + / - keys, set the figure in the black highlighted box to the desired value.
- Confirm this setting by pressing the Enter key.



Display_500T_2.bmp/Bild_17_Uhr_US.gif



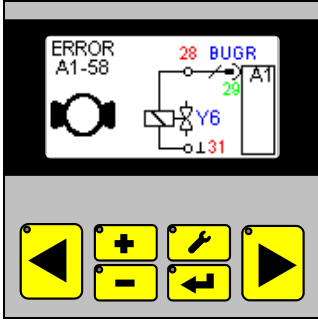
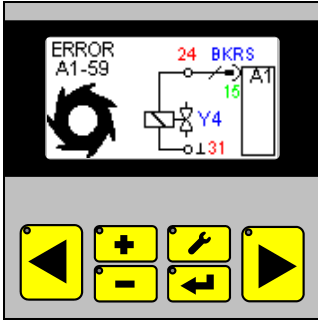
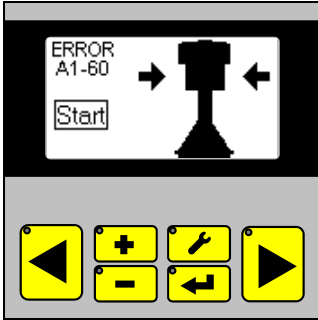
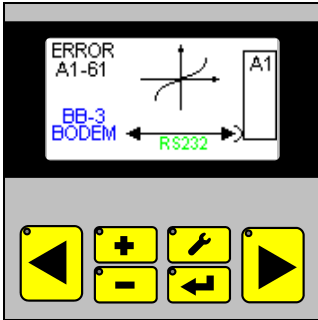
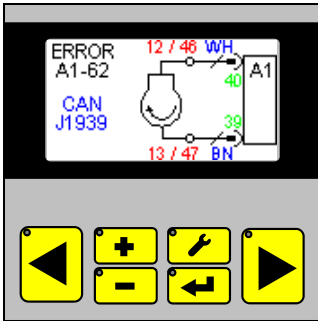
To quit the setup menu, press the (G) key for 2 seconds.

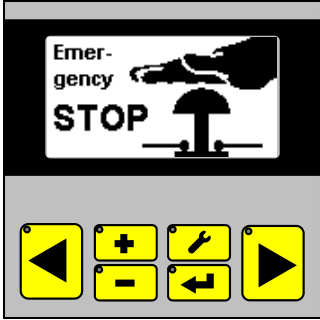
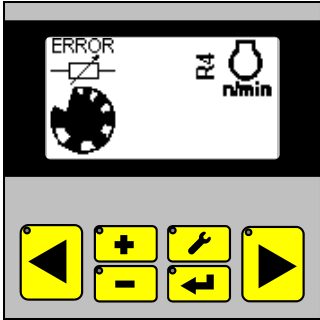
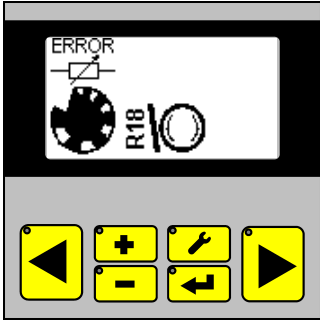
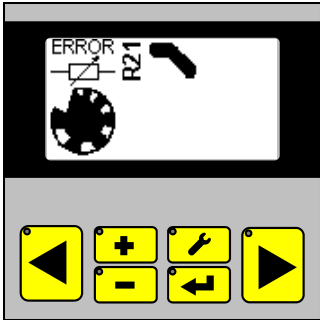
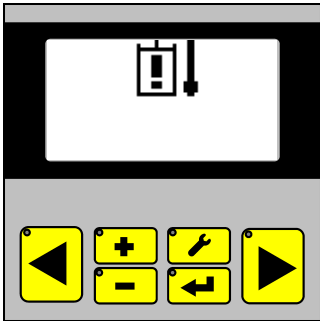
2 Terminal error messages

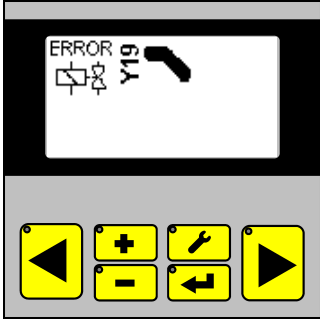
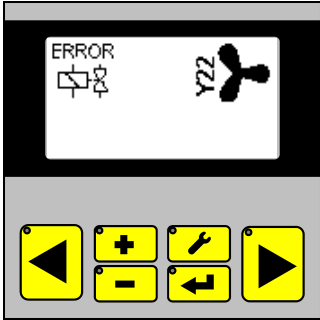
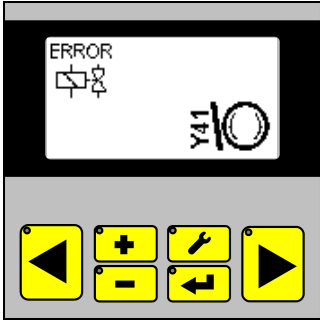


Every error message is assigned a number. If consultation with Technical Support is required for your vehicle, specify this number, together with all other visible information relating to the error message!

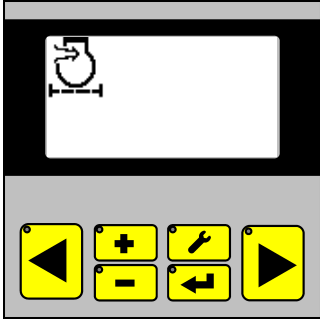
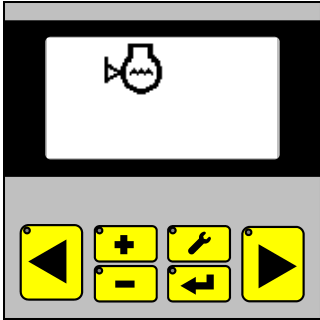
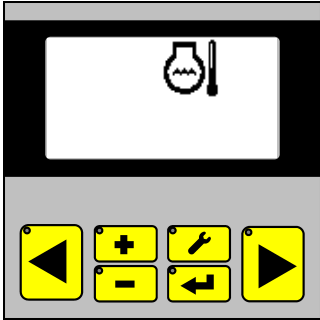
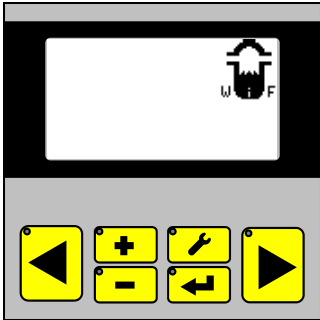
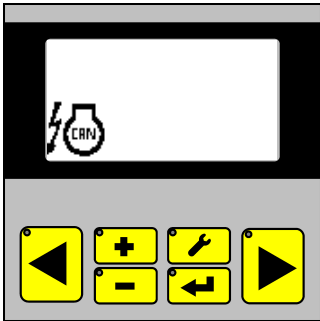
Error No. / meaning	Display
Error message A1-48 - 'Fault on speed potentiometer'	
Error message A1-51 - 'Fault on drive lever'	
Error message A1-56 - 'Activate forwards travel drive pump'	
Error message A1-57 - 'Activate reverse travel drive pump'	

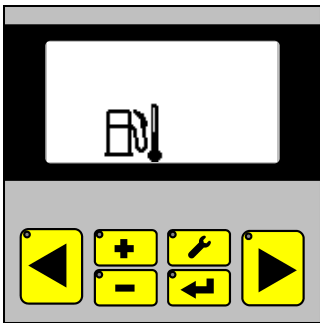
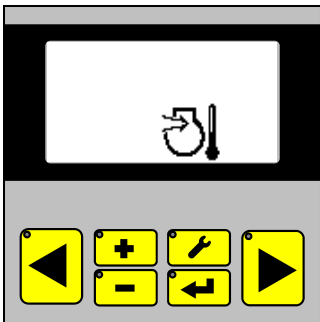
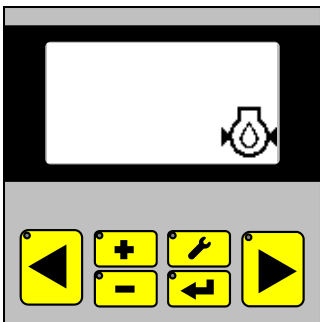
Error No. / meaning	Display
Error message A1-58 - 'Activate travel drive brake'	
Error message A1-59 - 'Activate milling drum transmission'	
Error message A1-60 - 'Start inhibit - drive lever not in centre position'	
Error message A1-61 - 'Characteristics curve error'	
Error message A1-62 - 'Communication error A1 to ECM diesel engine'	

Error No. / meaning	Display
Emergency stop - "Emergency stop button actuated"	
Error message R4 - "Engine speed potentiometer"	
Error message R18 - "Scraper relief potentiometer"	
Error message R21 - "Upper conveyor speed potentiometer"	
Error message hydraulic-oil temperature sensor - "Temperature outside permissible range" / No connection to sensor.	

Error No. / meaning	Display
Error message Y19 - "Upper conveyor proportional valve"	
Error message Y22 - "Fan control proportional valve"	
Error message Y41 - "Scraper relief proportional valve"	

2.1 Terminal error messages (engine)

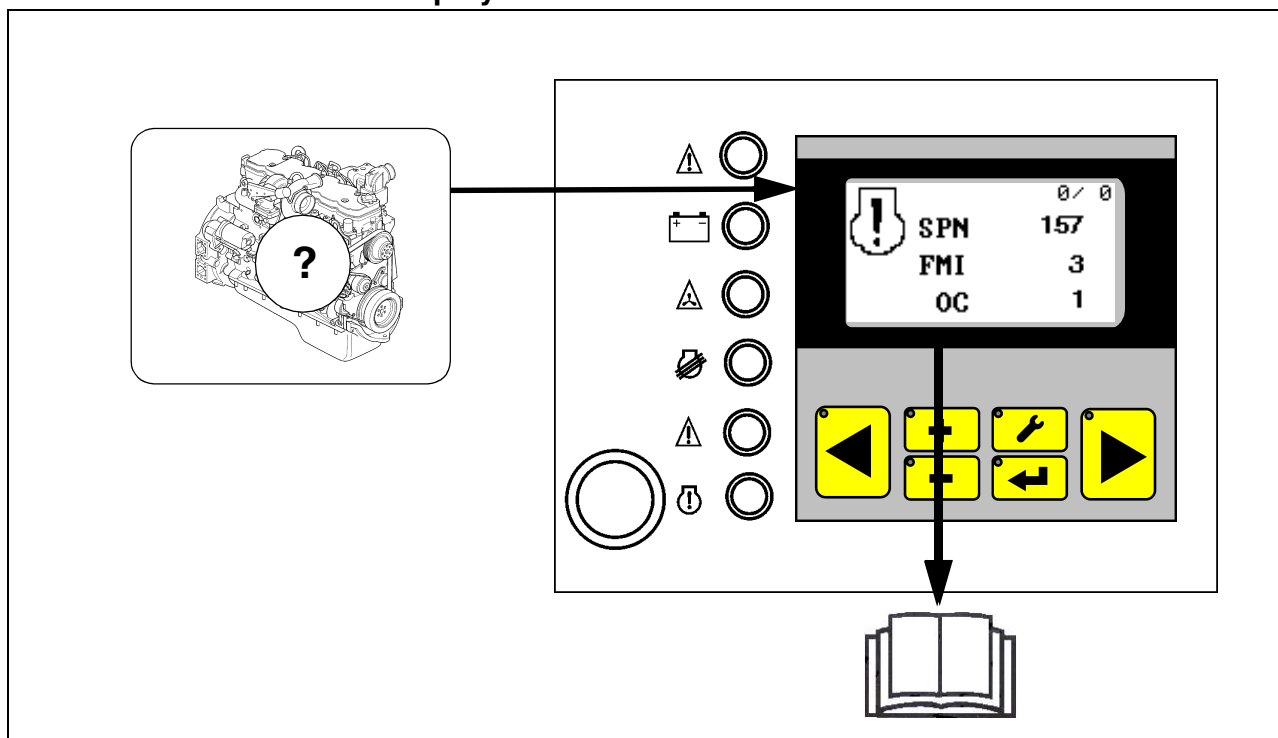
Error No. / meaning	Display
Air filter - "Check filter elements" / No connection to sensor.	
Coolant level - "Coolant level is too low" / No connection to sensor.	
Coolant temperature - "Coolant temperature is too high" / No connection to sensor.	
Water in fuel - "Water level in separator of upstream fuel filter too high" / No connection to sensor.	
CAN error - "Communication interrupted" / No connection to sensor.	

Error No. / meaning	Display
Fuel temperature - "Measured value outside permissible range" / No connection to sensor.	
Charge air temperature - "Measured value outside permissible range" / No connection to sensor.	
Oil pressure - "Measured value outside permissible range" / No connection to sensor.	

3 Drive engine error codes

The engine issues error messages or warnings via screen displays and a flash code. With serious defects, the engine shuts down automatically.

Error code screen display:



Explanation:

Warning light and display signal a serious fault on the drive engine with automatic or necessary engine shut-down.

Display:

SPN: 157
FMI: 3
OC: 1

Cause: Cable break on sensor for rail pressure.

Effect: Engine shut-down.

Frequency: Fault occurs for the 1st time.



Inform the after-sales service for your cold planer of the error numbers displayed. They will discuss with you what course of action to take.



If several defects occur simultaneously, you can scroll through these in quick succession using the plus/minus keys (D) / (E).

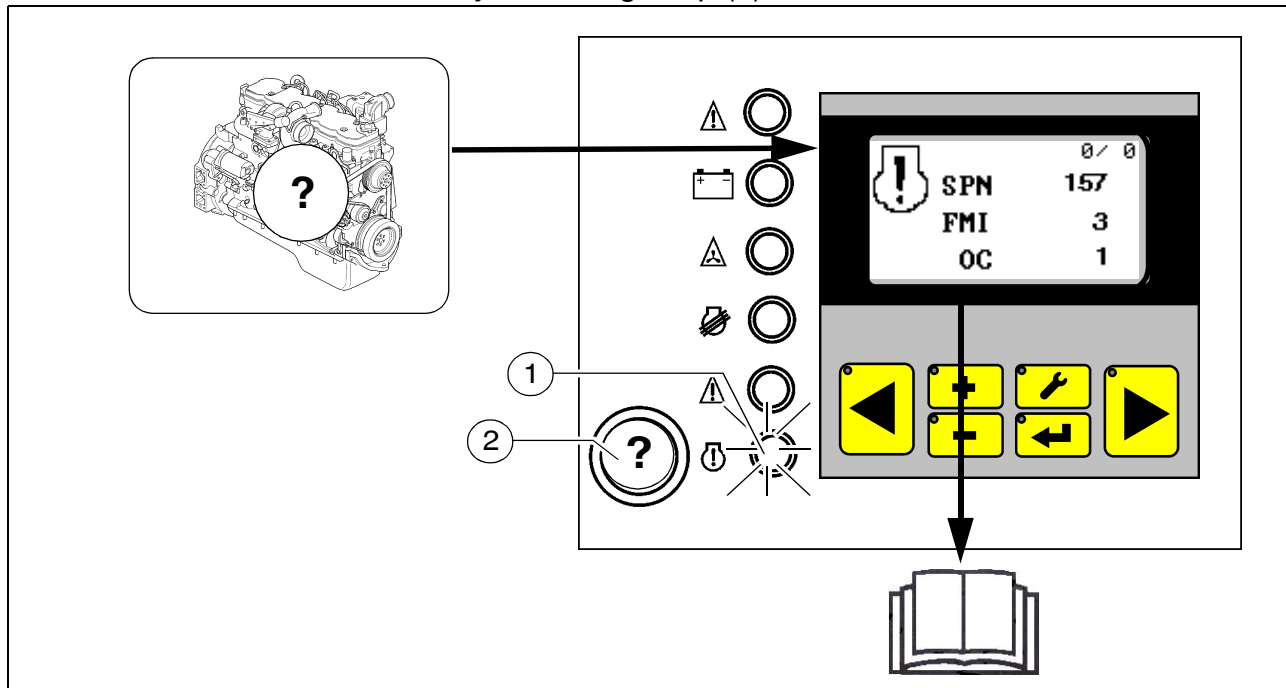
3.1 Flashing error codes



This system of flashing lights to denote error codes is an alternative to the screen display of faults.

If an error detected on the engine has been indicated by one of the warning lamp (1), a code to which a defined error is assigned can be displayed using the retrieval switch for error (2).

The flash code is issued by a warning lamp (1).



Output of numerical code

- Press the button (2) until this 1-digit code is indicated by the warning lamp (3).

Example:

Flash sequence: 1-Pause-5-Pause-7.

Fault code: 157



If the output switch (2) continues to be used, the code is issued once again.

If the output switch (2) stops being actuated, the warning lamp (1) lights up again. This continues until the corresponding error or malfunction has been rectified.



If several errors occur at the same time, the various flash codes are displayed next to one another by pressing the output switch.



Inform the after-sales service for your cold planer of the error numbers displayed. They will discuss with you what course of action to take.

3.2 Error codes

SPN	Component / Location	Description (Error location)	Defined for DCR DMV	Error code SERDIA	ID	Blink code	FMI	Self- curing ¹
29	Hand throttle	Cable break or short circuit, signal implausible compared to signal of idle sensor	●	138	HdThrt	1-2-6	2, 3, 4, 11	
84	Vehicle speed signal	Speed above target range, signal missing or implausible	●	232	VSSCD1	5-2-1	0, 8, 12, 14	●
91	Accelerator pedal	Cable break or short circuit, signal implausible compared to signal of idle sensor (analog pedal)	●	12	APP1	2-2-6	2, 3, 4, 11	
91	Accelerator pedal	Cable break or short circuit, bad PWM signal range or frequency (digital pedal)	●	14	APPPwm	2-2-2	2, 8	●
91	Accelerator pedal	Bad PWM pulse-width repetition rate (digital pedal)	●	15	APPPwmPer	2-2-2	8, 11	●
94	Fuel low pressure sensor	Cable break or short circuit	●	90	FIPSCD	2-1-6	3, 4, 11	●
94	Fuel low pressure	Below target range with system reaction	●	91	FIPSCDSysReac	2-1-6	2, 11	●
97	Fuel filter water level sensor	Cable break or short circuit	●	87	FIFCD	2-2-8	3, 4, 11	●
97	Water level in fuel filter	Above target range	●	89	FIFCD_WtLvl	2-2-8	11, 12	
100	Oil pressure sensor	Cable break or short circuit	●	196	OPSCD	2-2-4	0, 2, 3, 4	●
100	Oil pressure sensor	Pressure value implausible low	●	197	OPSCD1	2-3-1	1, 11	●
100	Oil pressure	Above target range	●	198	OPSCDSysReacHi	2-3-1	0, 11	●
100	Oil pressure	Below target range	●	199	OPSCDSysReacLo	2-3-1	1, 11	●
102	Charge air pressure sensor	Cable break or short circuit	●	32	BPSCD	2-2-3	2, 3, 4	●
102	Charge air pressure	Outside target range with system reaction	●	33	BPSCDSysReac	2-2-3	2, 11	●
105	Charge air temperature sensor	Cable break or short circuit	●	149	IATSCD	1-2-8	2, 3, 4, 11	●
105	Charge air temperature	Above target range with system reaction	●	150	IATSCDSysReac	2-3-3	0, 11	●
107	Air filter condition	Pressure loss above target range with system reaction	●	11	AirFitSysReac	1-3-6	0, 11	●
108	ECU internal error	Ambient pressure sensor defective	●	16	APSCD	2-9-2	2, 3, 4, 11	●
110	Coolant temperature sensor	Cable break or short circuit	●	56	CTSCD	2-2-5	2, 3, 4	●
110	Coolant temperature	Outside target range with system reaction	●	56	CTSCDSysReac	2-3-2	0, 11	●
111	Coolant level	Outside target range with system reaction	●	37	CLSCDSysReac	2-3-5	1, 11	
157	Rail pressure sensor	Cable break or short circuit	●	209	RailCD	1-4-7	3, 4, 11	
157	Rail pressure sensor	Deviation of signal during start or after-run above target range	●	210	RailCDOfsTst	1-4-7	0, 1, 11	●
158	Terminal 15	Ignition ON not detected	●	226	T15CD	5-1-4	11, 12	
168	Battery	Voltage below target range	●	22	BattCD	3-1-8	0, 1, 11	●
168	Battery voltage	Above target range with system reaction	●	23	BattCDSysReac	3-1-8	2, 11	●
174	Fuel temperature sensor	Fuel temp. sensor: cable break or short circuit	●	133	FTSCD	2-2-7	3, 4, 11	●
174	Fuel temperature	Above target range with system reaction	●	134	FTSCDSysReac	2-3-7	0, 11	●
175	Oil temperature sensor	Cable break or short circuit	●	201	OTSCD	1-4-4	2, 3, 4	●
175	Oil temperature	Below target range with system reaction	●	203	OTSCDSysReac	1-4-4	0, 11	●
190	Engine speed sensor	Engine running with cam-shaft speed signal only	●	75	EngIMBackUp	2-1-2	11, 12	●

SPN	Component / Location	Description (Error location)	Defined for DCR DMV	Error code SERJIA	ID	Blink code	FMI	Self- curing ¹
190	Engine speed sensor	Speed signal from cam-shaft bad or missing	●	●	76 EngMCA1	2-1-2	8, 11, 12	●
190	Engine speed sensor	Speed signal from crank-shaft bad or missing	●	●	77 EngMCR1	2-1-2	8, 11, 12	●
190	Engine speed sensor	Speed signals of crank-shaft and cam-shaft are phase-shifted	●	●	78 EngMOfsCaSCrS	2-1-3	2, 11	
190	Overspeed	Engine overspeed with system reaction	●	●	79 EngPriSysReacFOC	2-1-4	0, 11	
190	Overrun conditions	Overrun conditions with system reaction	●	●	80 EngPriSysReacORC	2-1-4	11, 14	●
520	CAN message	Missing (message "TSC1-TR")	●	●	126 FmMngTOTSC1TR	1-1-9	11, 12	
563	Main relay	Short circuit to ground or emergency shut-off (relay 3)	●	●	187 MRlyCDMnRly2	2-6-1	7, 11, 12	
624	Diagnostic lamp	Cable break or short circuit, disabled by ECU	●	●	225 SysLamp	5-1-3	2, 3, 4, 5	
630	ECU internal error	EEPROM memory access	●	●	142 HWEMonEEPROM	2-8-1	11, 12	
639	CAN bus off-state	Cable break or short circuit, off-state (CAN bus A)	●	●	192 NetMngCANAOFF	2-7-1	11, 14	●
651	Single injector	Short circuit (injector 1)	●	●	159 InjVlvCyl1A	1-5-4	3, 4, 11, 13	●
651	Single injector	Cable break (injector 1)	●	●	160 InjVlvCyl1B	1-5-4	5, 13	●
652	Single injector	Short circuit (injector 2)	●	●	161 InjVlvCyl2A	1-5-5	3, 4, 11, 13	●
652	Single injector	Cable break (injector 2)	●	●	162 InjVlvCyl2B	1-5-5	5, 13	●
653	Single injector	Short circuit (injector 3)	●	●	163 InjVlvCyl3A	1-5-6	3, 4, 11, 13	●
653	Single injector	Cable break (injector 3)	●	●	164 InjVlvCyl3B	1-5-6	5, 13	●
654	Single injector	Short circuit (injector 4)	●	●	165 InjVlvCyl4A	1-6-1	3, 4, 11, 13	●
654	Single injector	Cable break (injector 4)	●	●	166 InjVlvCyl4B	1-6-1	5, 13	●
655	Single injector	Short circuit (injector 5)	●	●	167 InjVlvCyl5A	1-6-2	3, 4, 11, 13	●
655	Single injector	Cable break (injector 5)	●	●	168 InjVlvCyl5B	1-6-2	5, 13	●
656	Single injector	Short circuit (injector 6)	●	●	169 InjVlvCyl6A	1-6-3	3, 4, 11, 13	●
656	Single injector	Cable break (injector 6)	●	●	170 InjVlvCyl6B	1-6-3	5, 13	●
657	Single injector	Short circuit (injector 7)	●	●	171 InjVlvCyl7A	1-6-4	3, 4, 11, 13	●
657	Single injector	Cable break (injector 7)	●	●	172 InjVlvCyl7B	1-6-4	5, 13	●
658	Single injector	Short circuit (injector 8)	●	●	173 InjVlvCyl8A	1-6-5	3, 4, 11, 13	●
658	Single injector	Cable break (injector 8)	●	●	174 InjVlvCyl8B	1-6-5	5, 13	●
676	Air heater relay	Cable break or wrong connection	●	●	19 ArHCD_NoLd	2-6-3	4, 11	
676	Air heater relay	Inoperable during shut-off	●	●	20 ArHCD_RlyErr	2-6-3	2, 5, 11	
677	Start relay	Start relay (high side): short circuit	●	●	223 StrtCDHS	5-1-2	3, 4, 11	
677	Start relay	Start relay (low side): cable break or short circuit, disabled by ECU	●	●	224 StrtCDLS	5-1-2	3, 4, 5, 11	
701	Reserve output	Short circuit to Ubatt (output 1)	●	●	57 Dummy1CD_Max	-	11	
701	Reserve output	Short circuit to ground (output 1)	●	●	58 Dummy1CD_Min	-	11	
701	Reserve output	Cable break or ECU internal error (output 1)	●	●	59 Dummy1CD_SigNpl	-	11	
702	Reserve output	Short circuit to Ubatt (output 2)	●	●	60 Dummy2CD_Max	-	11	

SPN	Component / Location	Description (Error location)	Defined for DCR DMV	Error code SERUIA	ID	Blink code	FMI	Self- curing ¹
702	Reserve output	Short circuit to ground (output 2)	●	61	Dummy2CD_Min	-	11	
702	Reserve output	Cable break or ECU internal error (output 2)	●	62	Dummy2CD_SigNpl	-	11	
703	Engine operating signal lamp	Cable break or ECU internal error	●	81	ESLpCD	1-4-2	2, 3, 4, 5	
704	Coolant temperature warning lamp	Cable break or short circuit	●	54	CTLpCD	1-2-3	11	
705	Oil pressure warning lamp	Cable break or short circuit	●	195	OPLpCD	1-3-5	2, 3, 4, 5	
729	Air heater relay	Cable break or short circuit	●	17	ArHt1	2-6-3	3, 4, 5, 11	●
730	Air heater magnetic valve	Cable break or short circuit	●	18	ArHt2	2-6-3	3, 4, 5, 11	●
898	CAN message	Missing (message "TSC1-TE")	●	125	FrmMngTOTSC1TE	1-1-8	11, 12	
923	Engine power output	Engine Power output: cable break or short circuit	●	74	EngCDTrqCalcOut	5-5-5	2, 3, 4, 5	
975	Fan actuator	Fan actuator: cable break or short circuit	●	83	FanCD	2-3-8	2, 3, 4, 5	
1072	Engine brake (internal)	Internal engine brake: cable break or short circuit	●	52	CRERCD	5-2-8	3, 4, 5, 11	
1074	Engine brake flap actuator	Engine brake flap actuator: cable break or short circuit	●	82	ExFICD	2-1-9	3, 4, 5, 11	
1079	ECU internal error	Wrong voltage of internal 5V reference source 1	●	219	SSpMon1	2-8-2	3, 4, 11	●
1080	ECU internal error	Wrong voltage of internal 5V reference source 2	●	221	SSpMon2	2-8-2	3, 4, 11	●
1081	Preheating signal lamp	Cable break or short circuit	●	53	CSLpCD	3-2-8	2, 3, 4, 5	
1109	Shut-off request	Shut-off request ignored by operator	●	48	CoEngShOffDemigr	3-4-1	2, 11	
1231	CAN bus off-state	Cable break or short circuit, off-state (CAN bus B)	●	193	NetMngCANBOff	2-7-1	11, 14	●
1235	CAN bus off-state	Cable break or short circuit, off-state (CAN bus C)	●	194	NetMngCANCOff	2-7-1	11, 14	●
1237	Override switch	Switch hangs	●	200	OSWCD	1-4-5	2, 11	●
1322	Multiple cylinders	Misfire detected	●	46	CmbChbMisfireMul	2-4-1	11, 12	
1323	Single cylinder	Misfire detected (cylinder 1)	●	38	CmbChbMisfire1	2-4-1	11, 12	
1324	Single cylinder	Misfire detected (cylinder 2)	●	39	CmbChbMisfire2	2-4-1	11, 12	
1325	Single cylinder	Misfire detected (cylinder 3)	●	40	CmbChbMisfire3	2-4-1	11, 12	
1326	Single cylinder	Misfire detected (cylinder 4)	●	41	CmbChbMisfire4	2-4-1	11, 12	
1327	Single cylinder	Misfire detected (cylinder 5)	●	42	CmbChbMisfire5	2-4-1	11, 12	
1328	Single cylinder	Misfire detected (cylinder 6)	●	43	CmbChbMisfire6	2-4-1	11, 12	
1346	Misfire	Misfire detected with system reaction	●	47	CmbChbSysReac	2-4-1	0, 11	
1450	Single cylinder	Misfire detected (cylinder 7)	●	44	CmbChbMisfire7	2-4-1	11, 12	
1451	Single cylinder	Misfire detected (cylinder 8)	●	45	CmbChbMisfire8	2-4-1	11, 12	
1638	Customer-specific sensor	Cable break or short circuit (sensor 2)	●	139	HOTSCD	3-1-4	3, 4, 11, 12	●
1638	Customer-specific temperature	Outside target range with system reaction (temperature 2)	●	140	HOTSCDSysReac	3-1-4	2, 11	●
2634	Main relay	Short circuit to Ubatt (relay 1)	●	182	MnRly1_SCB	1-3-7	3, 11	
2634	Main relay	Short circuit to ground (relay 1)	●	183	MnRly1_SCG	1-3-8	4, 11	
2634	Main relay	Short circuit to ground or emergency shut-off (relay 2)	●	186	MRlyCD	2-6-1	7, 11, 12	

SPN	Component / Location	Description (Error location)	Defined for		Error code SERDIA	ID	Blink code	FMI	Self-curing ¹
2634	Main relay	Short circuit to ground or emergency shut-off (relay 3)	●	●	188	MRVCDMnRly3	2-6-1	7, 11, 12	
2791	EGR actuator (external)	Short circuit to Ubatt	●	●	69	EGRCD_Max	4-1-4	3, 11	
2791	EGR actuator (external)	Short circuit to ground	●	●	70	EGRCD_Min	4-1-4	4, 11	
2791	EGR actuator (external)	Cable break or ECU internal error	●	●	71	EGRCD_SigNpl	4-1-5	2, 5, 11	
2791	EGR actuator (external)	Cable break or short circuit	●	●	72	EGRCD_IniEGR	4-1-6	2, 3, 4, 5	
523212	CAN message	Missing (message "EngPrt" = engine protection)	●	●	106	FrmMngTOEngPrt	3-3-3	11, 12	●
523216	CAN message	Missing (message "PRHtEnCmd" = preheat and engine command)	●	●	110	FrmMngTOPRtHtEnCmd	3-3-7	11, 12	●
523218	CAN message	Missing (message "RxCcVS" = cruise control)	●	●	112	FrmMngTORxCcVS	1-1-1	11, 12	●
523222	CAN message	Missing (message "TCO1" = speedo signal)	●	●	118	FrmMngTOTCO1	1-1-6	11, 12	●
523238	CAN message	Missing (message "SwTOut" = switch outputs)	●	●	117	FrmMngTOSwTOut	1-1-5	11, 12	●
523239	CAN message	Missing or value above target range (message "DecV1" = pseudo pedal)	●	●	94	FrmMngDecV1	5-2-6	2, 12	●
523240	CAN message	Missing (message "FunModCtl" = function mode control)	●	●	95	FrmMngFunModCtl	5-2-7	11, 12	●
523350	Multiple injectors	Short circuit (cylinder bank 1)	●	●	153	InjVwBnk1A	1-5-1	3, 4, 11, 13	●
523351	Multiple injectors	Cable break (cylinder bank 1)	●	●	154	InjVwBnk1B	1-5-1	5, 13	●
523352	Multiple injectors	Short circuit (cylinder bank 2)	●	●	155	InjVwBnk2A	1-5-2	3, 4, 11, 13	●
523353	Multiple injectors	Cable break (cylinder bank 2)	●	●	156	InjVwBnk2B	1-5-2	5, 13	●
523354	ECU internal error	Injector power stage A	●	●	157	InjVwChipA	1-5-3	2, 3, 12, 14	
523355	ECU internal error	Injector power stage B	●	●	158	InjVwChipB	1-5-3	12	
523370	Rail pressure	Compression test active: rail-pressure monitoring is going to be disabled	●	●	175	InjVwErDet	5-5-5	11, 14	
523420	ECU internal error	Watchdog counter exceeds maximum	●	●	184	Montr	1-3-9	11, 14	
523450	Multi state switch	Cable break or short circuit, input voltage outside target range (switch 1)	●	●	189	MSSCD1	1-4-3	2, 3, 4, 11	●
523451	Multi state switch	Cable break or short circuit, input voltage outside target range (switch 2)	●	●	190	MSSCD2	1-4-3	2, 3, 4, 11	●
523452	Multi state switch	Cable break or short circuit, input voltage outside target range (switch 3)	●	●	191	MSSCD3	1-4-3	2, 3, 4, 11	●
523470	Rail pressure limiting valve	Opening failure	●		208	PRVMon	1-4-6	2, 11, 12, 14	
523470	Rail pressure limiting valve	Opening failure with system reaction	●		236	PRVMonSysReac	1-4-6	11, 12	
523490	ECU internal error	Redundant shut-off conditions detected	●	●	218	SOPTst	1-4-9	3, 4, 11, 12	
523500	CAN message	Time-out of at least one send message	●	●	131	FrmMngTxTO	2-7-1	11, 12	●
523550	Terminal 50	Engine start switch hangs	●	●	227	T50CD	5-1-5	11, 12	
523550	ECU internal error	Time processing unit (TPU) defective	●	●	228	TPUMon	5-5-5	2, 11	
523561	Begin of injection period	Outside target range or missing (cylinder 1)		●	24	BIPCy1	5-3-1	2	●
523562	Begin of injection period	Outside target range or missing (cylinder 2)		●	25	BIPCy2	5-3-2	2	●
523563	Begin of injection period	Outside target range or missing (cylinder 3)		●	26	BIPCy3	5-3-3	2	●
523564	Begin of injection period	Outside target range or missing (cylinder 4)		●	27	BIPCy4	5-3-4	2	●
523565	Begin of injection period	Outside target range or missing (cylinder 5)		●	28	BIPCy5	5-3-5	2	●

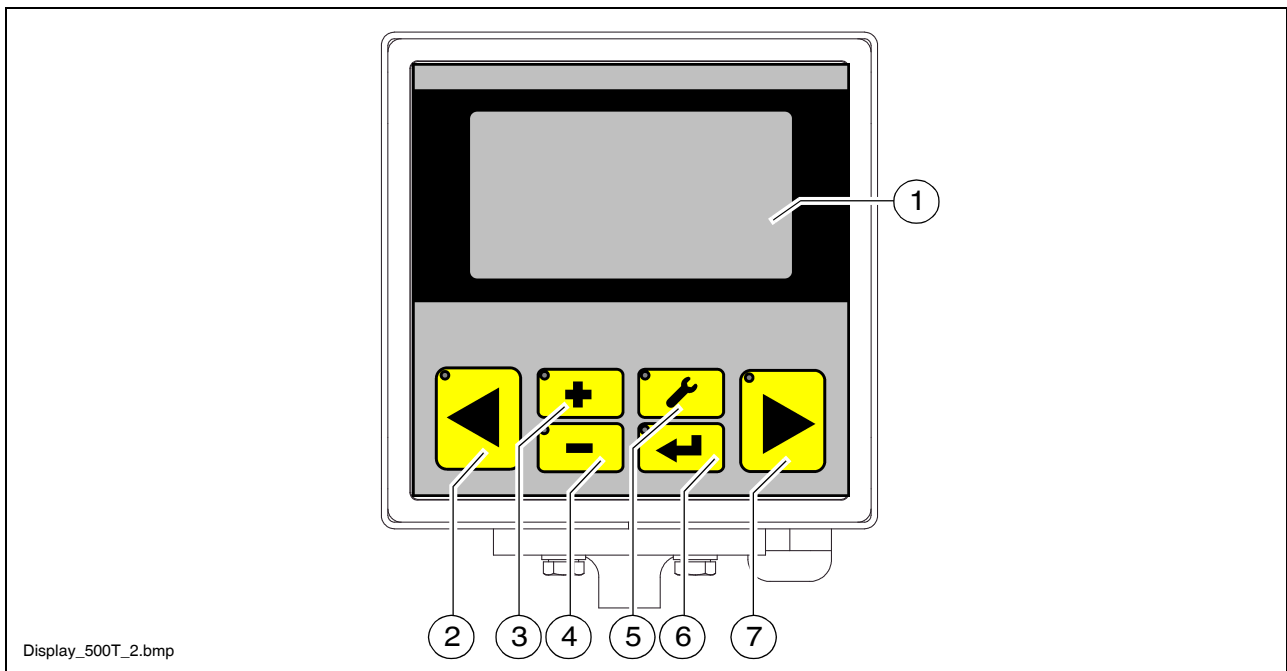
SPN	Component / Location	Description (Error location)	Defined for DCR DMV	Error code SERUIA	ID	Blink code	FMI	Self- curing ¹
523566	Begin of injection period	Outside target range or missing (cylinder 6)	●	29	BIPCyI6	5-3-6	2	●
523567	Begin of injection period	Outside target range or missing (cylinder 7)	●	30	BIPCyI7	5-3-7	2	●
523568	Begin of injection period	Outside target range or missing (cylinder 8)	●	31	BIPCyI8	5-3-8	2	●
523600	ECU internal error	Serial communication interface defective	●	235	WdCom	5-5-5	11, 12	
523601	ECU internal error	Wrong voltage of internal 5V reference source 3	●	222	SSpMon3	2-8-2	3, 4, 11	●
523602	Fan speed	Above target range with system reaction	●	86	FanCDSysReac	2-3-8	2, 11	●
523604	CAN message	Missing (message "RxEngTemp" = engine temperature)	●	113	FrmMngTORxEngTemp	1-1-2	11, 12	●
523605	CAN message	Missing (message "TSC1-AE")	●	120	FrmMngTOTSC1AE	1-1-8	11, 12	
523606	CAN message	Missing (message "TSC1-AR")	●	121	FrmMngTOTSC1AR	1-1-9	11, 12	
523607	CAN message	Missing (message "TSC1-DE")	●	122	FrmMngTOTSC1DE	1-1-8	11, 12	
523608	CAN message	Missing (message "TSC1-DR")	●	123	FrmMngTOTSC1DR	1-1-9	11, 12	
523609	CAN message	Missing (message "TSC1-PE")	●	124	FrmMngTOTSC1PE	1-1-8	11, 12	
523610	CAN message	Missing (message "TSC1-VE")	●	127	FrmMngTOTSC1VE	1-1-8	11, 12	
523611	CAN message	Missing (message "TSC1-VR")	●	128	FrmMngTOTSC1VR	1-1-9	11, 12	
523612	ECU internal hardware monitoring	A recovery occurred which is stored as protected	●	143	HWEMonRcyLocked	5-5-5	11, 14	
523612	ECU internal hardware monitoring	A recovery occurred which is not stored	●	144	HWEMonRcySuppressed	5-5-5	11, 14	
523612	ECU internal hardware monitoring	A recovery occurred which is visible in the error memory	●	145	HWEMonRcyVisible	5-5-5	11, 14	
523612	ECU internal hardware monitoring	Overvoltage	●	146	HWEMonUMaxSupply	5-5-5	3, 11	
523612	ECU internal hardware monitoring	Undervoltage	●	147	HWEMonUMinSupply	5-5-5	4, 11	
523613	Rail pressure	Positive deviation (speed dependent) outside target range	●	211	RailMeUn0	1-3-4	0, 11	●
523613	Rail pressure	Positive deviation (flow dependent) outside target range (⇒ leakage!)	●	212	RailMeUn1	1-3-4	0, 11	●
523613	Rail pressure	Negative deviation (flow dependent) outside target range	●	213	RailMeUn2	1-3-4	0, 11	●
523613	Rail pressure	Negative deviation (speed dependent) outside target range	●	214	RailMeUn3	1-3-4	1, 11	●
523613	Rail pressure	Pressure above target range	●	215	RailMeUn4	1-3-4	0, 11	●
523613	Rail pressure	Implausible (leakage, injector needle blocked in open position)	●	216	RailMeUn7	1-3-4	2, 11	●
523615	Metering unit valve	Flow rate outside target range	●	176	MeUnCD_ADC	1-3-5	3, 4, 11	
523615	Metering unit valve	Not connected or output disabled	●	177	MeUnCDNoLoad	1-3-5	5, 11, 12	
523615	Metering unit valve	Short circuit to Ubatt	●	178	MeUnCDSCBat	1-3-5	11, 12	
523615	Metering unit valve	Short circuit to ground	●	179	MeUnCDSCGnd	1-3-5	11, 12	
523617	ECU internal error	Communication with chip CJ 940 disturbed	●	141	HWEMonCom	5-5-5	11, 12	
-	Customer-specific sensor	Cable break or short circuit (sensor 1)	●	136	GOTSCD	1-3-3	2, 3, 4, 11	●
-	Customer-specific temperature	Outside target range with system reaction (temperature 1)	●	137	GOTSCDSysReac	1-3-3	2, 11	●

3.3 FMI codes

FMI	Description	FMI	Description
0	Data valid but above normal operational range	8	Abnormal frequency, pulse width, or period
1	Data valid but below normal operational range	9	Abnormal update rated
2	Data erratic, intermittent, or incorrect	10	Abnormal rate of change
3	Voltage above normal or shorted high	11	Failure mode not identifiable
4	Voltage below normal or shorted low	12	Bad intelligent device or component
5	Current below normal or open circuit	13	Out of Calibration
6	Current above normal or grounded circuit	14	Special Instructions
7	Mechanical system not responding properly	15	Reserved

4 Height display

4.1 Operation of height display



Item	Designation	Brief description
1	Display	Display indicator
2	"LEFT" key	- Adjustment of the height display for the left-hand chassis leg
3	"Increase value" key (+)	- To make an adjustment to a selected value.
4	"Reduce value" key (-)	- To make an adjustment to a selected value.
5	"Setup" key	- Direct calling up of adjustment screen display. Keep button pressed for approx. 3 seconds.
6	"Enter" key	- To confirm set parameter.
7	"RIGHT" key	- Adjustment of the height display for the right-hand chassis leg

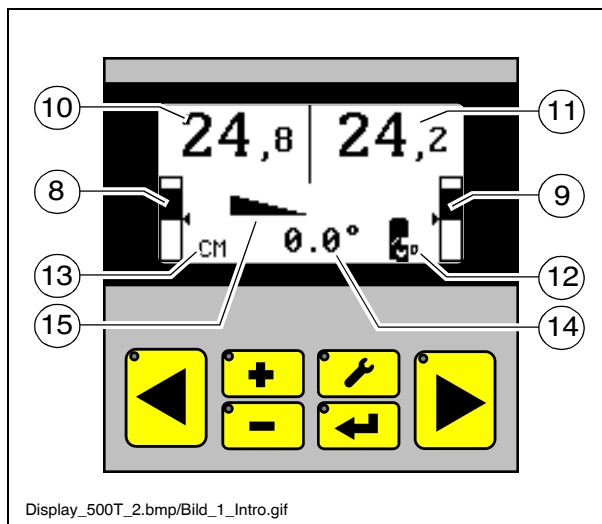
Main screen

If no error has occurred, is displayed after the ignition is switched on.

The display is divided in the centre with a vertical line. The displays on the left and right-hand half of the display appear for the chassis leg of the corresponding machine side.



If an error message is displayed, the system switches to the relevant screen display.



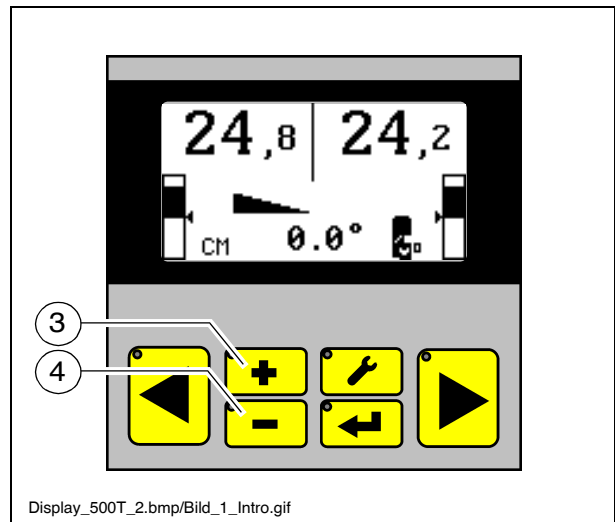
Item	Designation	Brief description
8	Bar display - Left-hand chassis leg	Displays the current measured value with reference to the zero point of the left-hand chassis leg. The zero point is located in the centre of the bar in this case. The detected traverse distance is shown as a full bar.
9	Bar display - Right-hand chassis leg	Displays the current measured value with reference to the zero point of the right-hand chassis leg. The zero point is located in the centre of the bar in this case. The detected traverse distance is shown as a full bar.
10	Measured value display - Chassis leg, left	Height display / value display in accordance with the selected display mode (absolute zero point / set zero point).
11	Measured value display - Chassis leg, right	Height display / value display in accordance with the selected display mode (absolute zero point / set zero point).
12	Status display - Right-hand chassis leg	Automatic display of the current status of the right-hand chassis leg - Chassis leg retracted - Chassis leg extended
13	Unit of measurement for measured values	Display of the set units of measure cm / inch
14	Slope symbol	Indicates the corresponding direction of slope for the present machine slope. If no slope is set, the symbol is hidden
15	Slope display in °	Indicates the set machine slope as a value in °.

Background lighting



The background lighting is set by pressing the buttons (3) / (4)

- Press button (3) to increase the brightness.
- Press button (4) to decrease the brightness.



Zero point / value display

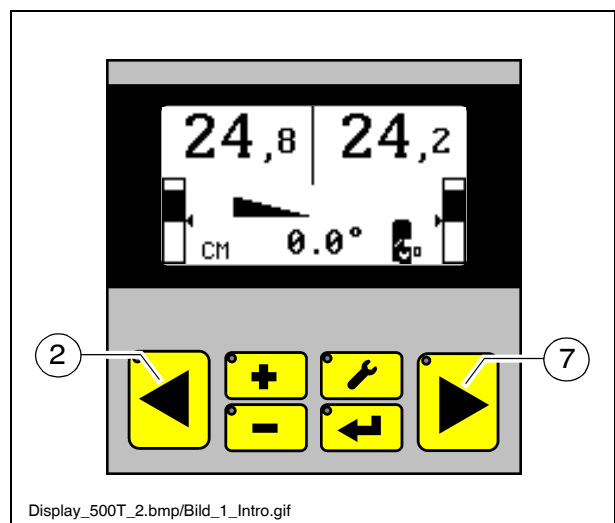


The value display is carried out in accordance with the selected display mode:

- Mode 1: Absolute height value
- Mode 2: Height value from set zero point



The modes can be set for the two chassis legs independently of each other. This also affects the different states (retracted / extended) of the right-hand chassis leg.



Set zero point:

- Chassis leg, left
 - Keep button (2) pressed for approx. 2 seconds - the current measured value is adopted as the zero point.
- Chassis leg, right
 - Keep button (7) pressed for approx. 2 seconds - the current measured value is adopted as the zero point.

Delete zero point:

- Chassis leg, left
 - Keep button (2) pressed for approx. 4 seconds - the current zero point is deleted and the absolute value is displayed.
- Chassis leg, right
 - Keep button (7) pressed for approx. 4 seconds - the current zero point is deleted and the absolute value is displayed.

Status display for right-hand chassis leg

Status	Symbol
Chassis leg retracted	
Chassis leg extended	

Settings



The setting display is used to set the current type of machine and the desired unit of measure.



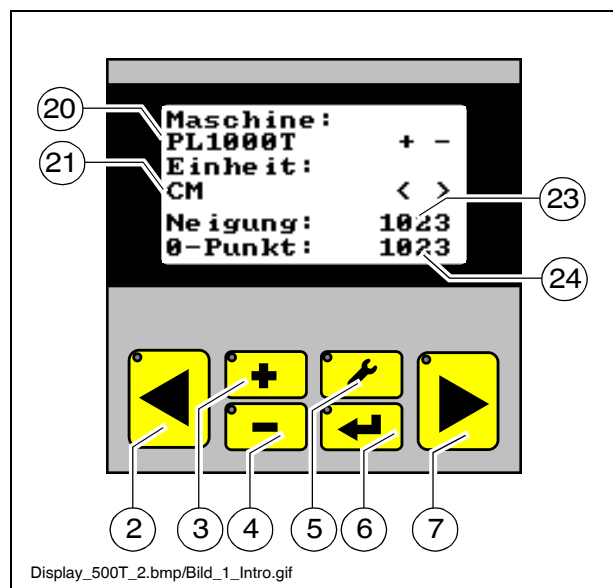
Keep button (5) pressed for approx. 3 seconds.

- Set type of machine (20):
 - press button (3) / (4) until the existing type of machine is displayed.
- Set unit of measure (21):
 - press button (2) / (7) until the desired unit of measure is displayed.
- Set lateral-slope zero point:
 - Press button (5) to adopt the current slope value as the "zero point" reference for lateral slop display.



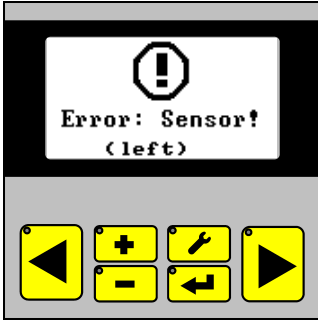
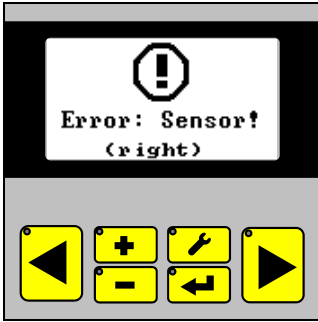
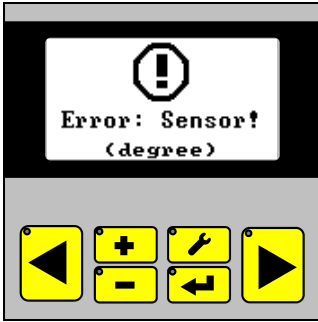
Display (23) shows the current slope value, while display (24) is equivalent to the slope shown as 0°.

- Save set parameters and return to the main screen: button (6)



2 Terminal error messages

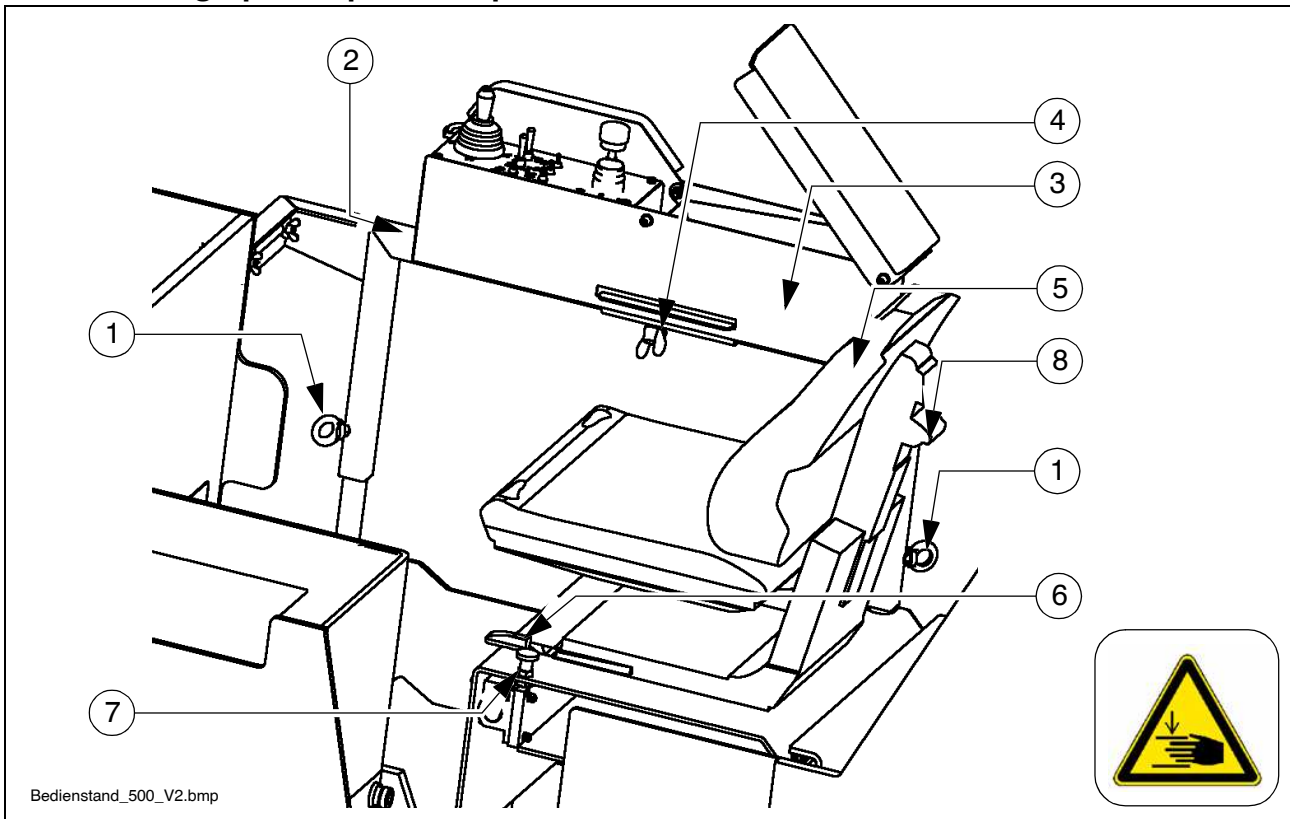
-  The error messages are displayed if the imported measured value lies outside the defined range.
-  Should a repositioning of the chassis legs fail to provide a remedy, then it must be checked whether a cable break has occurred on the corresponding sensor.

Error No. / meaning	Display
Measuring error for chassis leg, left	
Measuring error for chassis leg, right	
Measuring error for lateral slope	

3 Other controls

3.1 Control elements on the operator's control station

Setting up the operator's platform



To set up an optimum working position for the operator, a few settings can be performed on the operator's platform:

- Vertical position of the ergonomics sets (height compared to driver's seat):
 - Stop screws (1).
 - Raise handrails (2) together with ergonomics set (3).
 - Tighten the stop screws (1) back down.
- Horizontal position of the ergonomics set :
 - Unfasten stop screw (4) on underside of ergonomics set (3).
 - Slide ergonomics set (3) into desired position on handrail.
 - Tighten the stop screw (4) back down.
- Distance between driver's seat (5) / controls (longitudinal adjustment of seat):
 - Pull lever (6) on driver's seat, slide driver's seat (5) into desired position.
 - Allow level (6) to relocate.
- Position of seat unit over outer edge of machine (lateral adjustment of seat):
 - Pull out detent pin (7).
 - Slide seat unit into desired position.
 - Allow detent pin (7) to relocate.
- Height adjustment of driver's seat:
 - Pull out detent pin (8).
 - Raise driver's seat (5) - can be locked into position at various heights.
 - Lower driver's seat (5) - full raise driver's seat once; detent is released.

Driver's seat (○)

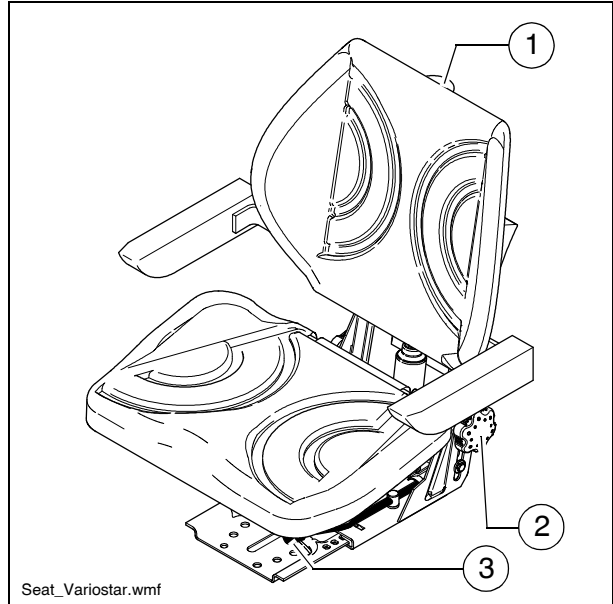


To avoid damage to health, the individual seat settings should be checked and adjusted before starting the vehicle.



After locking the individual elements, it must no longer be possible to shift them to another position.

- **Weight setting (1):** The driver's seat can be adjusted to a driver's weight of 50kg to 120kg with the handwheel behind the backrest padding.
- **Height adjustment (2):** The driver's seat is equipped with a continuous height adjustment in the area of 50mm. To do this, loosen the handwheels on the left and right below the seat padding on the springs. Adjust the desired height and fix the seat in this position by tightening the handwheels.



You should not sit on the driver's seat during the height adjustment. Before the start of driving, please make sure that the handwheels for height adjustment are firmly tightened.

- **Longitudinal adjustment (3):** You can adjust the longitudinal adjustment of the seat with the lever on the seat base. To do this, pull the lever upward and move the seat into the desired position with the lever pulled. When you have found the most comfortable position for yourself, release the lever and carefully slide the seat back and forth until the interlock audibly engages in the desired position.



The seat should only be adjusted with the vehicle at a complete stop and the parking brake set.

Protective roof (○)

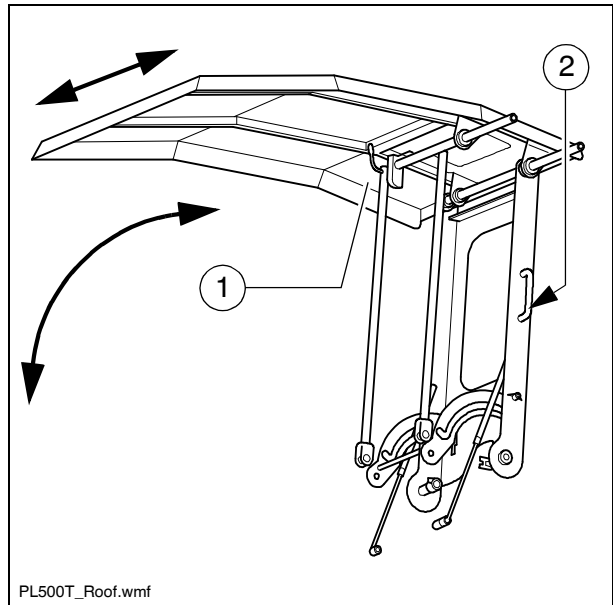
To protect against rain and direct sunlight, the protective roof can be pushed to one side.

- Unfasten detent (1), then slide roof into desired position on the roof.
- Tighten the locking device (1).

For transport purposes, the roof can be lowered.

- Secure roof with lever (1) on right-hand limit stop.
- Press roof down into lower position by turning handle (2) in direction of travel.

- The roof can be erected again by pulling the handle (2).



Danger of crushing! Avoid placing fingers near the articulated joints during the roof folding operation.

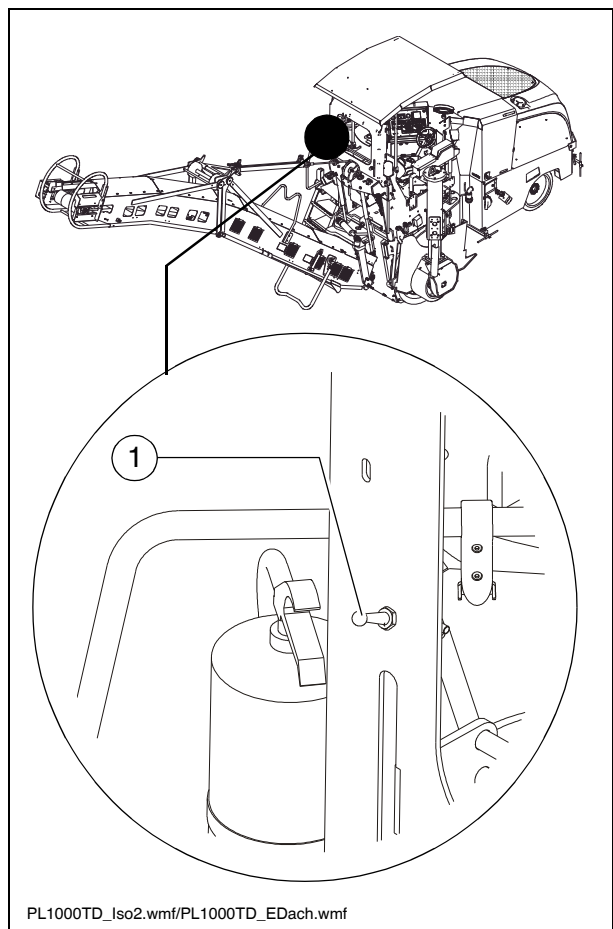
Protective roof - electrical adjustment (○)

The roof can be moved electrically into the lower or upper position for transport or working.

- Actuate switch (1) until the roof has reached the upper or lower stop.



Danger of crushing! Avoid placing fingers near the articulated joints during the roof folding operation.



Battery's main switch

The battery's main switch (1) is located behind the driver's seat. It disconnects the electrical circuit from its earth/ground.

- To deactivate the main switch, turn to the left and remove.



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



Always switch off the main switch after finishing work! (battery might discharge as a result of creep currents)



The main fuses are located behind the right-hand maintenance flap.



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

Batteries

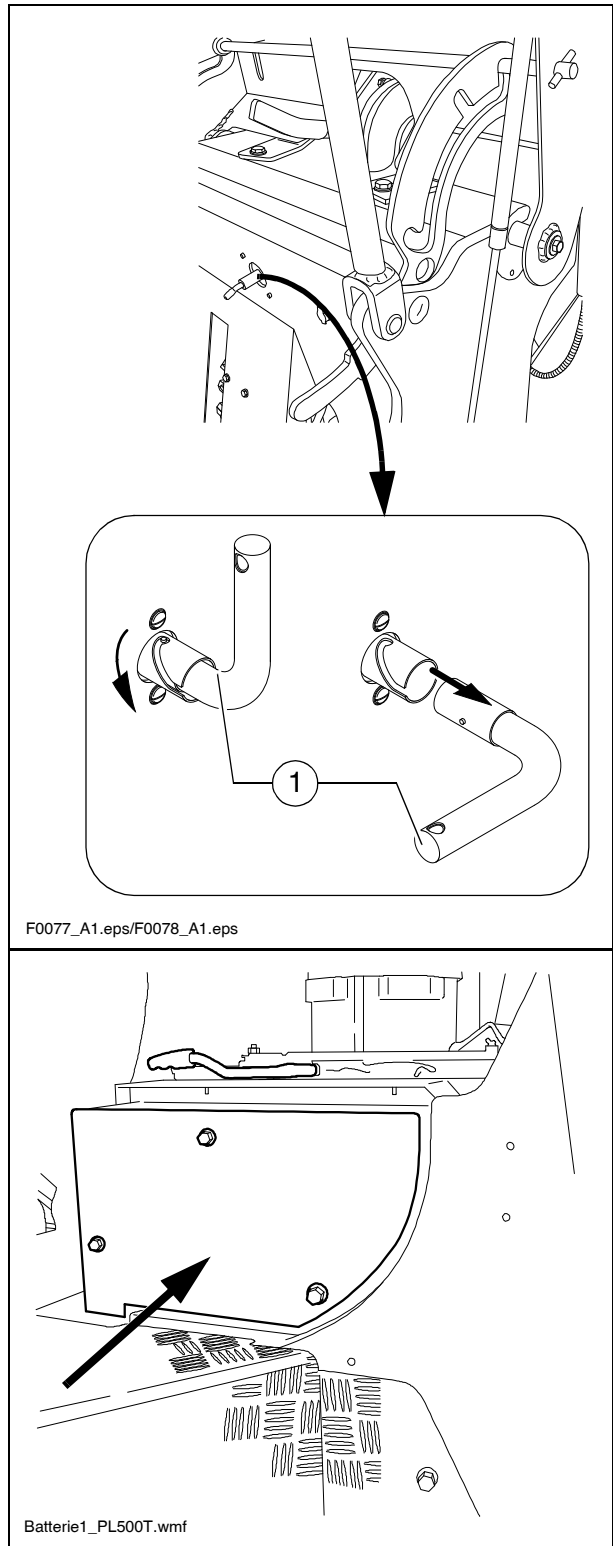
Both batteries in the 24 Volt system are located under the seat console.



For the specifications, refer to Chapter B "Technical data".
For maintenance, refer to Chapter "Maintenance".



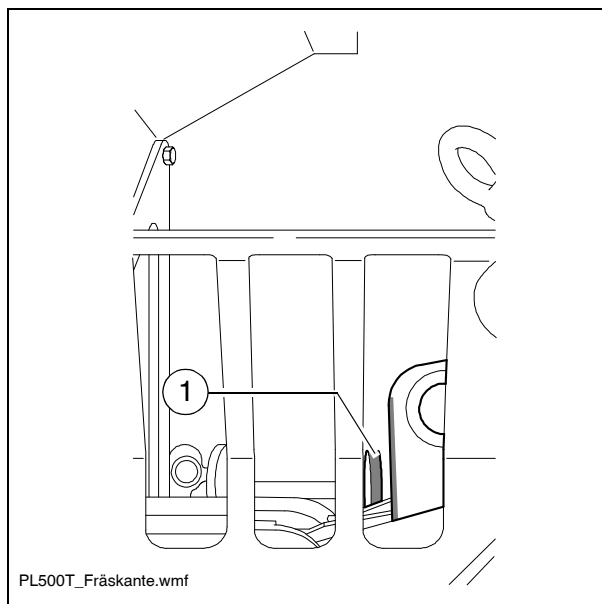
External starting only in accordance with instructions
(refer to Section "Starting machine, external starting (starting aid)").



Milling edge display



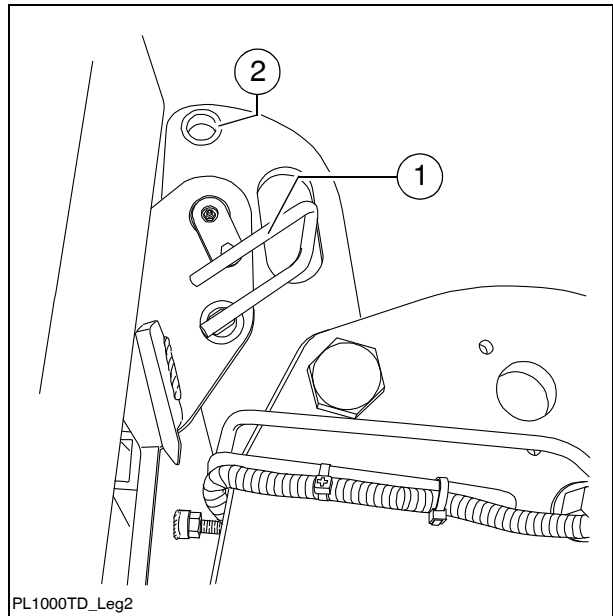
There is a mark (1) below the seat footwell which indicates the right-hand milling edge of the machine.



Swivel-mounted chassis leg, hydraulic

For certain working requirements, e.g. to ensure precision edge milling, the right-hand chassis leg can be swivelled out so far that it meets the outer edge of the vehicle.

- Carefully and uniformly lower machine onto milling drum and fully retract the left chassis leg.
- Remove the pin (1) and swivel in the chassis leg.
- With the chassis leg in retracted position, secure by placing pin in bore (2).



Before the chassis leg is swivelled in or out, it needs to be retracted completely and the driver's seat needs to be slid inwards as far as possible.



As an option, a hydraulically swivelling chassis leg can be obtained.



Operating instructions for the hydraulically swivelling chassis leg: see section 2.1

Moldboard retaining device

For safety reasons, during maintenance work on the milling drum or on the milling box, the moldboard is automatically secured in its upper position by means of a retaining device.



Ensure that the pawl has locked into position properly.

Unfastening the retaining device:

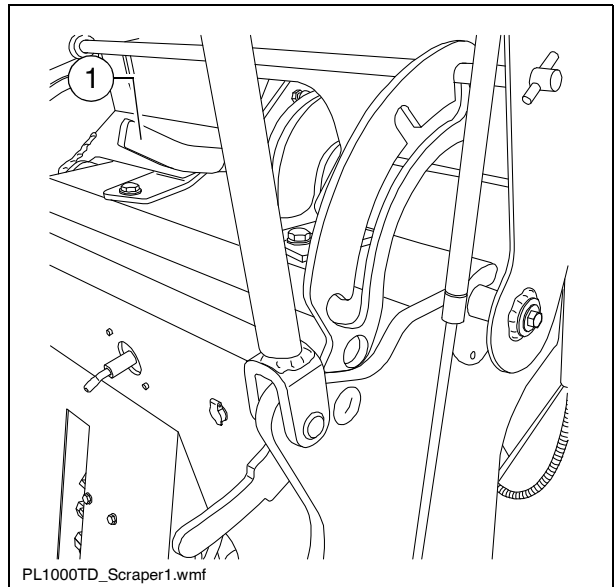
- Press lever (1) downward and lower scraper.



To lower the moldboard, first raise the board slightly.



When working on the machine with raised moldboard (e.g. when replacing the milling bit), always raise the board until it locks into position.



Pressure gauge

Relief pressure for moldboard

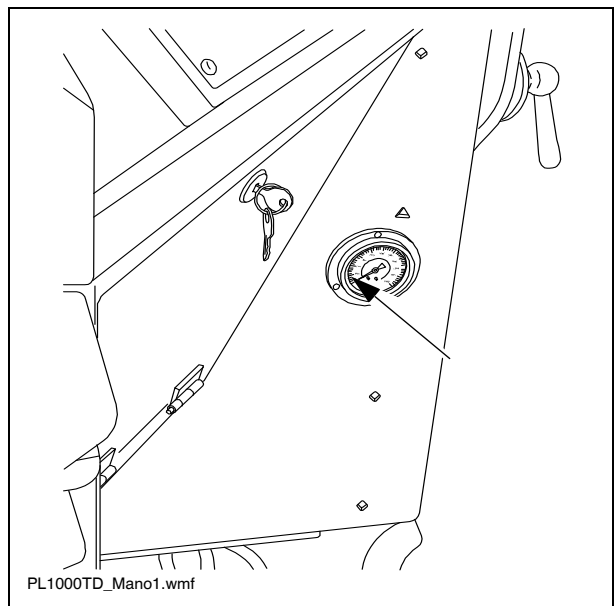
Indicates the relief pressure for the moldboard by means of a pressure regulator.



The pressure setting determines the extent to which the milling lane is cleared of milling debris.



The optimum adjustment range is 0...50 bar

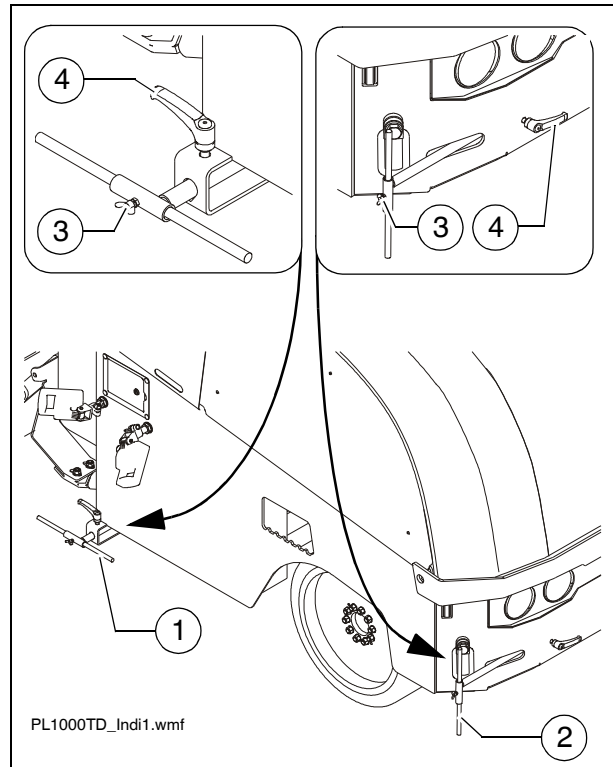


Direction of travel indicator

To enable the planer to operate in a straight line, direction marks should be in place, or be added (edge of road surface, kerb, line of chalk, etc.).

There are two different direction indicators (1) / (2) on the chassis frame:

- The pointers can be adjusted as desired and fixed in place with the related fastening screws (3), (4).



Working lights / rotary beacons

Plug-in contacts (1) for working lights are provided at several locations on the vehicle chassis.

- Fit headlights in desired position and secure using wing nut (2).



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



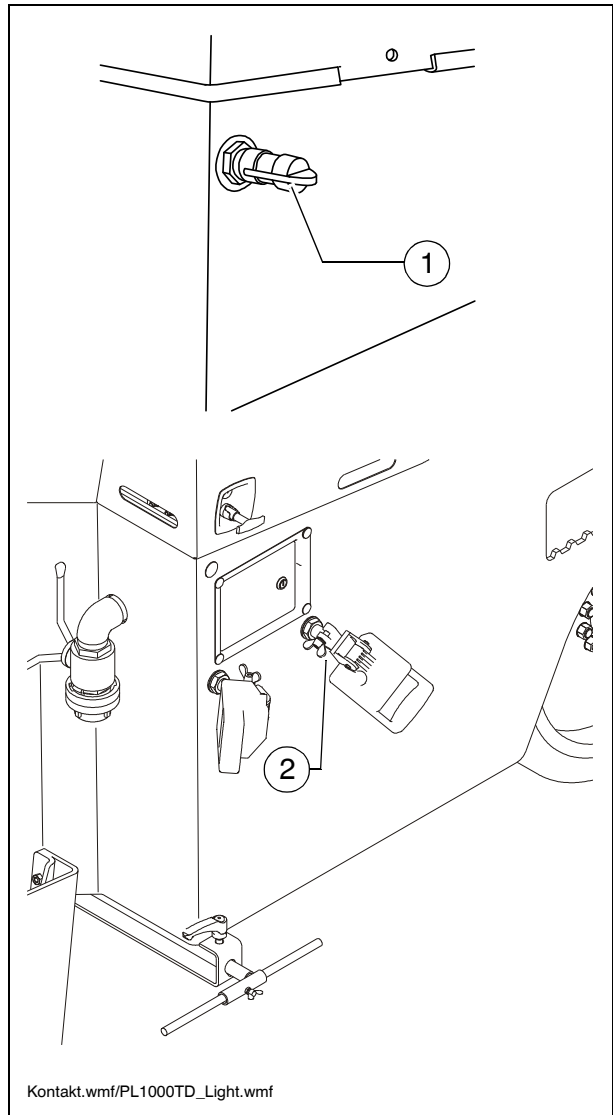
The headlights are easy to remove so should be taken off at the end of work and stored in a safe place.



Avoid dazzling oncoming traffic.



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



Water system

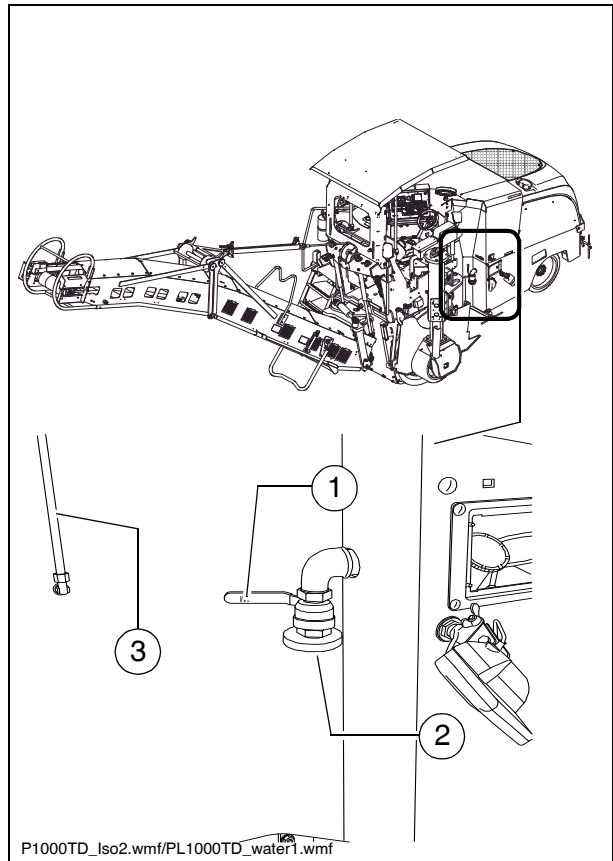
Water tank drain valve / pressure filling of water tank

Drain:

- If it proves necessary to drain the water tank, open the drain cock (1) and completely drain off the contents of the tank.
 - If necessary, attach drain line to connection point (2). (use open-ended wrench)
- Close the drain cock (1) again.

Pressure filling:

- Attach pressure line to connection (2) and tighten it.
- Open the stop cock (1).
- Signal to the operator of the external filling pump that the filling process can be started
- Switch off filler pump as soon as desired fill level in water tank is reached (monitored by fill level indicator (3) on water tank).
- Close the stop cock (1) again before removing the filler hose.



Cleaning system

A cleaning system located in the engine compartment can be connected to the water pump.

- Connect the quick-release coupling (1) of the nozzle-block supply line to the supply line of the hose package (2).
- Pull the hose (3) out of the winder until a click is audible.



When released, the hose automatically engages here. The hose is automatically rolled up again after pulling and discharging again.

- Start up the water pump with switch (4).

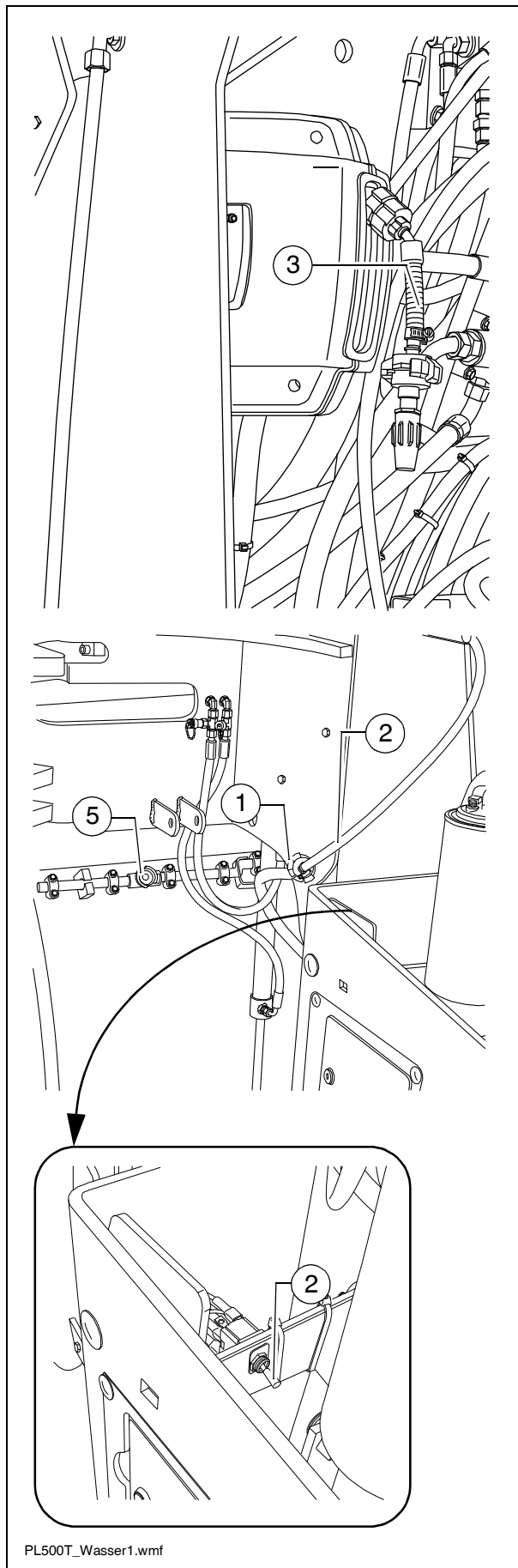


Only switch on the spraying system when the diesel engine is running; otherwise, the battery will be discharged. Switch off after use.



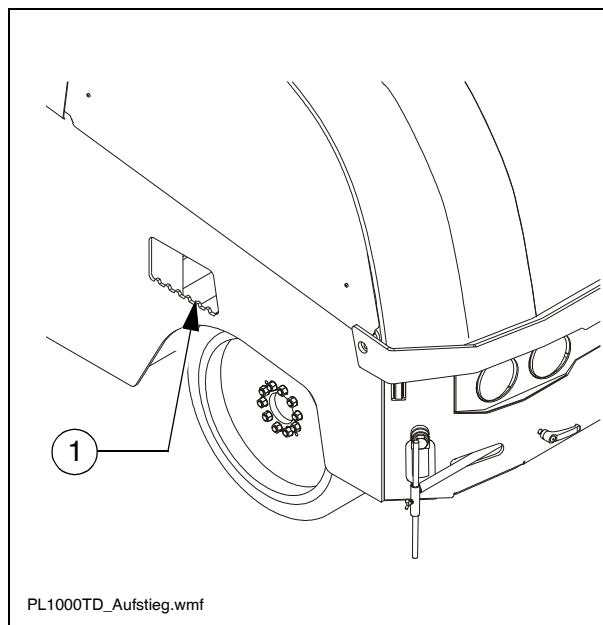
Do not spray bearing points, electrical or electronic components with water.

- On completion of work:
 - Switch off the water pump (4).
 - Connect the quick-release coupling (1) to the nozzle block (5).
 - Roll up the hose (3) again properly.



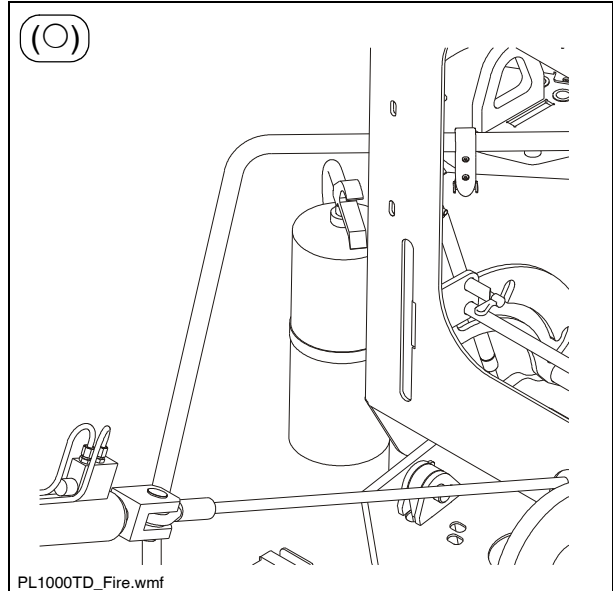
Steps up to water tank

There is a recessed step (1) in the frame on the right side of the machine to enable staff to reach certain parts of the machine (e.g. to top up the water tank or to work on the engine).



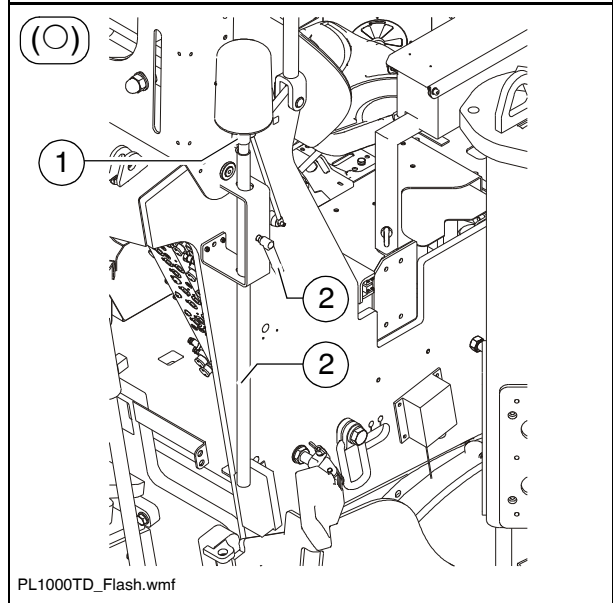
Fire extinguisher (○)

-  The suitable fire extinguisher version must be selected by the vehicle operator depending on the type of operation.
-  The machine personnel must be familiarised with fire extinguisher operation.
-  Observe the inspection intervals for the fire extinguisher!



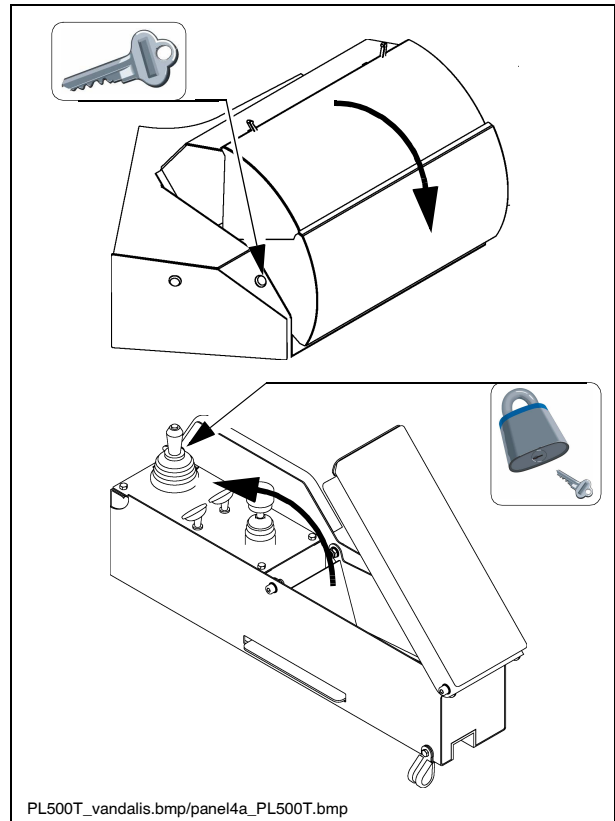
Rotary beacon

-  The function of the rotary beacon must be checked daily before starting work.
 - Place the rotary beacon onto the plug-in contact and secure with a wing bolt (1).
 - Slide the rotary beacon with the tube (2) out to the desired height and secure with the clamping bolt (3).
 - Activate the function on the operating panel as necessary.
-  The rotary beacon is easy to remove and should be stored securely at the end of work.



Vandalism protection facility

Vandalism protection is fitted to the operating panels.
When work is finished, these guards should be closed and locked down.



4 Operation

4.1 Preparing for operation

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 operations are available.

A sufficient quantity of lubrication agents and fuel substances, tools, spare bits 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".

Check list for the 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 - on main control panel	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.
Horn - on the operating panel	Briefly press the horn button. Horn signal must sound.
Lights - Operating headlight - Rotary beacons - Hazard warning flasher	Lights must function, keep headlight glass clean.
Steering	Check with engine running: Straight ahead travel for machine, steering responds synchronously to steering wheel motion.
Travel drive	Check with engine running: Machine accelerates, hesitates and brakes smoothly both in the drive and working gear.
Traction unit - chassis legs	Check with engine running: Smooth extension and retraction.
Safety switch	Fastening, check condition and function.
Water system	Check: - Function of spraying nozzles.
Starter	Engine cannot be started unless: - drive lever is not in centre position - milling drum is engaged - the actuator switches for chassis legs are not in O position.

Check!	How?
Miscellaneous: - Engine panels - Lateral flaps	Check that the hoods and flaps are securely seated.



In addition to the checklist, a visual check should be carried out of all components and function settings.

Note the condition, fastening and wear of individual elements, completeness and wear of milling tools as well as checking for specified settings, seal integrity and lubrication!

4.2 Starting the machine

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

- Daily machine maintenance.

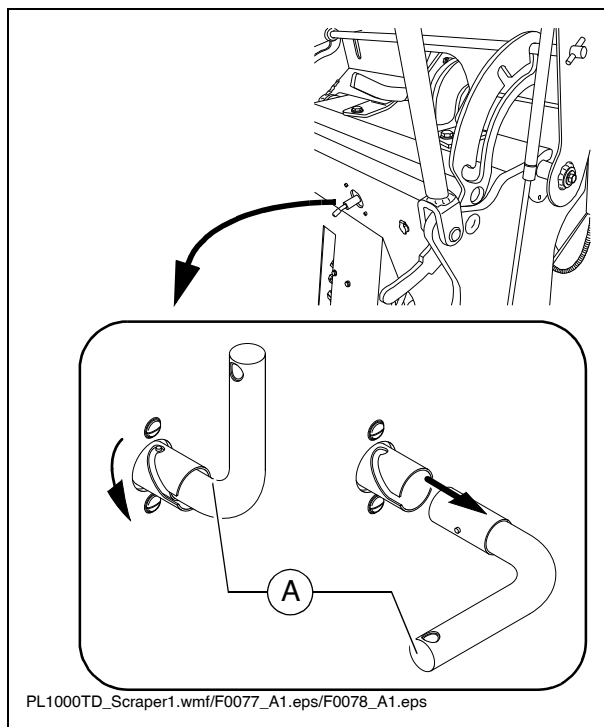


Check the operating hours counter to determine whether further maintenance work should be conducted.

- Check the safety devices and protective devices.

If necessary:

- Remove vandalism protection.
- Set up the operator's platform.
- Switch on battery's main switch (A).



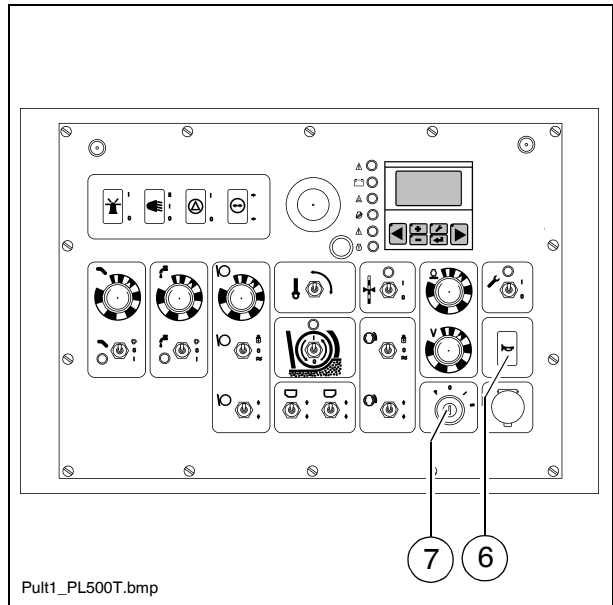
- Insert ignition key (7) into position "0" in the ignition lock. When starting, ensure that the light is not switched on in order to save the battery.
- Switch on ignition (Pos. 1).
- Turn ignition key in Pos. 2 to start the diesel engine.



Before starting, sound the horn by briefly pressing the horn button (6).



It is not possible to start the vehicle unless the drive lever is in its 0 position or if the emergency stop button is pressed, and the milling drum transmission or height adjuster must also be engaged.



If the engine does not start straightaway, continue starting for a maximum of 10 seconds without a break, then wait 1 minute.



If the battery has gone flat, perform an auxiliary start.

- Once the diesel engine fires, let go of the ignition key.
- The ignition key automatically jumps back into Pos. 1.
- Check operating values using the indicator lamps and display instruments, performing corrections if necessary.
- Allow the machine to warm up if necessary.

Auxiliary starting (electrical starting aid)



The engine can be started with the help of an external power source if the batteries are empty and the starter no longer turns.

Suitable power sources are:

- Other vehicles with a 24 V system
- Additional 24 V battery
- starting aid, 20V/100A.



Standard chargers or quick chargers cannot be used for external starting.

To externally start the engine:

- Use appropriate cables to connect source of power up to batteries.



Observe the polarity! Always connect the negative cable last and disconnect it first!

- Insert ignition key (7) into position "0" in the ignition lock.
- Switch on ignition (Pos. 1).
- Turn ignition key in Pos. 2 to start the diesel engine.
- Once the diesel engine fires, let go of the ignition key.
- The ignition key automatically jumps back into Pos. 1.

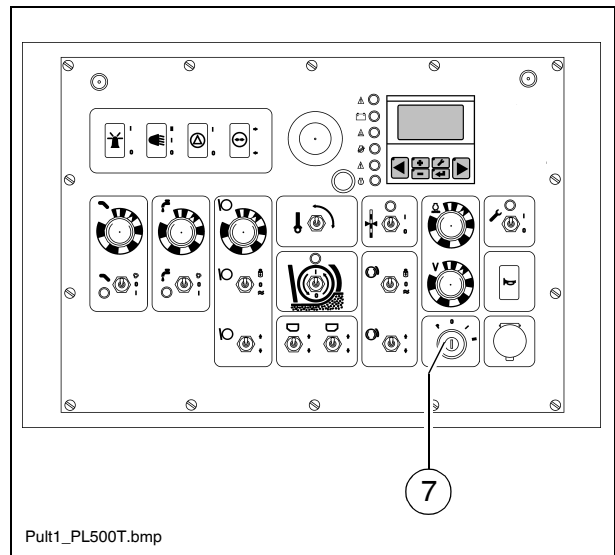
If the engine fails to start despite this starting aid: track down the cause, then proceed in accordance with the Engine's Operating Instructions if necessary.

When the engine is running:

- disconnect external source of power.



When using starting aid spray, ensure fuel injection system is properly ventilated, as defined in the Engine's Operating Instructions.



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 milling drum should be engaged.



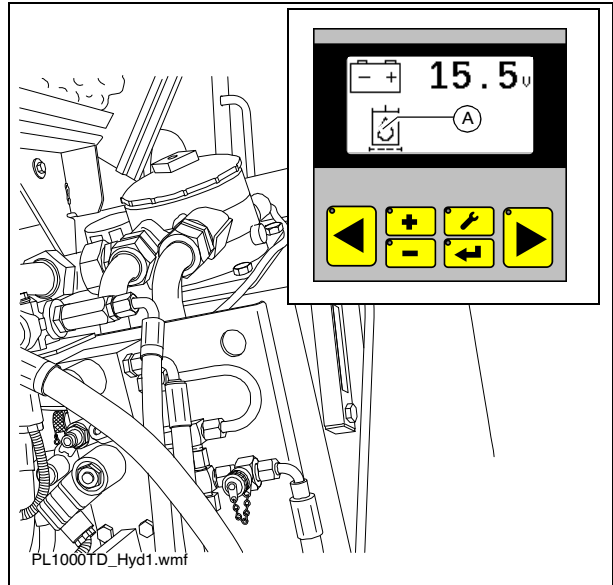
The optimum operating values of a warm machine are:

- Coolant temperature of engine: $>70^{\circ}\text{C}$
- Hydraulic oil temperature: $60-70^{\circ}\text{C}$

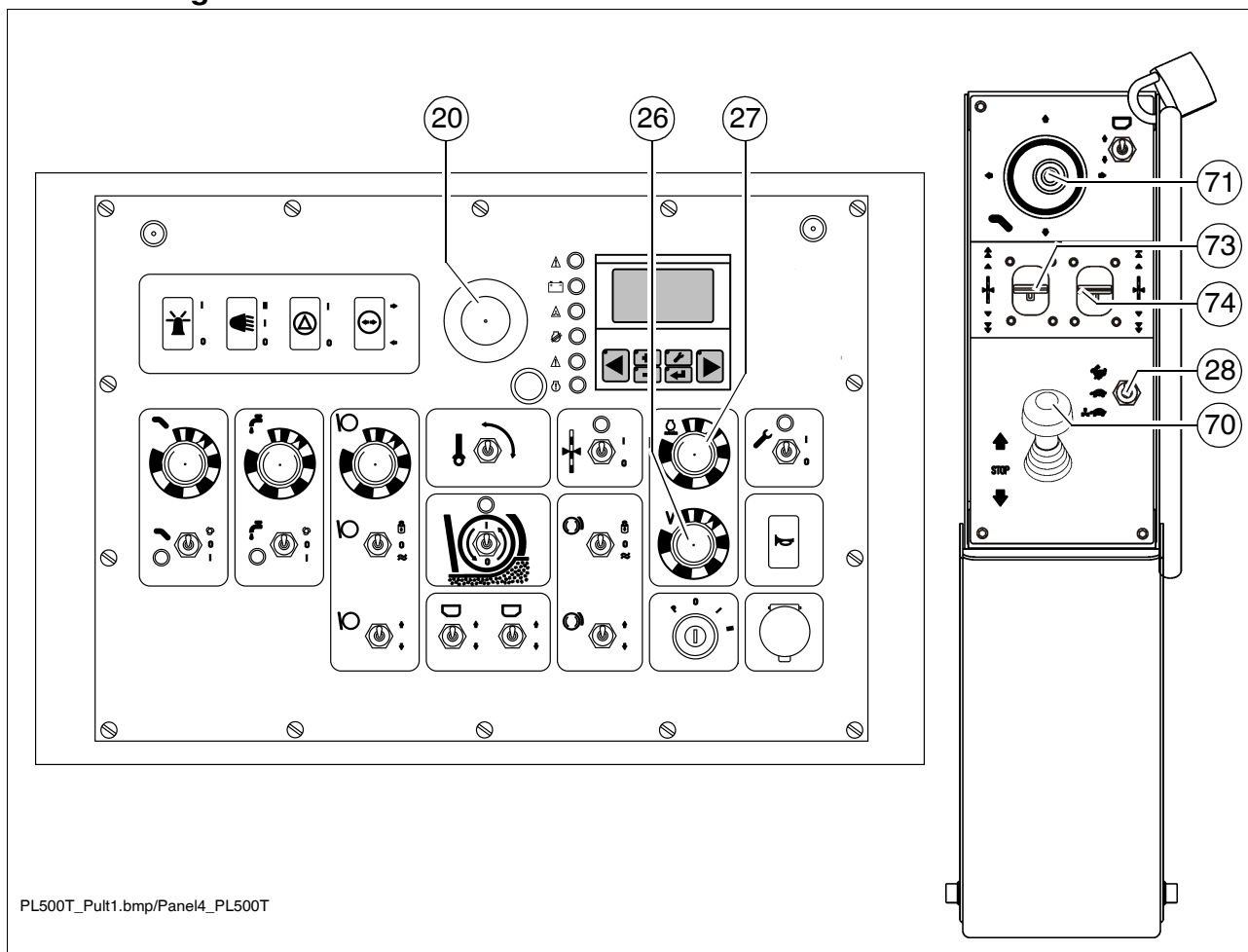


If a warning message (A) is displayed, milling must be interrupted or should not be started. Check hydraulic oil filter for signs of dirt, and also check the oil level.

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



Driving the machine



PL500T_Pult1.bmp/Panel4_PL500T

- Raise machine uniformly by pressing both switches (73) + (74) together until the desired ground clearance has been reached.
- Ensure that machine is as horizontally positioned as possible (pay close attention to the inclination - or "slope" - indicator)
- Move switch (28) to transport gear (hare symbol).
If necessary, move the machine in working gear (tortoise symbol).
- Check that all other functions are switched to "0" and, if necessary, select this setting.



Always operate hazard lights when moving the machine (rotary beacons and hazard warning flashers)!

- Set controller for engine speed (26) to "MAX".
- Move preselector controller for travel drive (27) to full power setting.
- To drive the vehicle, carefully move the drive lever (70) forwards or backwards in the desired direction of travel.
- The maximum road speed is set in accordance with the distance the drive lever (70) moves from its centre position.
- Where necessary, guide the upper conveyor using the control lever (71).



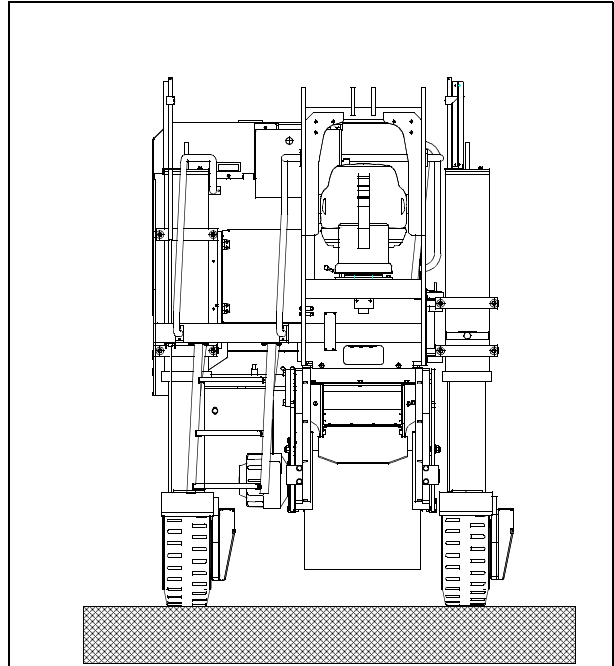
In emergency situations, press the emergency stop button (20)!

- To stop the vehicle, move the drive lever (70) into its centre position.

5 Milling instructions

"Driving" position

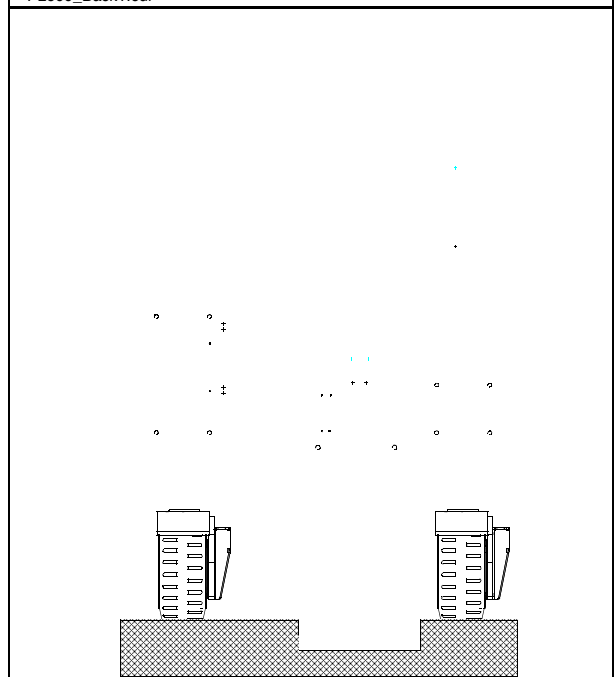
- Chassis legs lowered - planer raised



PL600_Back1.cdr

"Milling" position

- Chassis legs raised - planer lowered



PL600_Back2.cdr

Zero setting

- Run milling drum at low rotational speed.
- Lower the planer until the bit tips scratch the road surface evenly across the entire breadth of the milling drum.
- Set milling depth scales to zero.



The zero setting has to be undertaken both when the chassis leg is swivelled out and in! Always place in zero setting on flat, level ground (no slope).

Surface milling

1. With deployed right-hand chassis leg:

The right-hand chassis leg engages in the milled and cleaned first lane.

Depth setting:

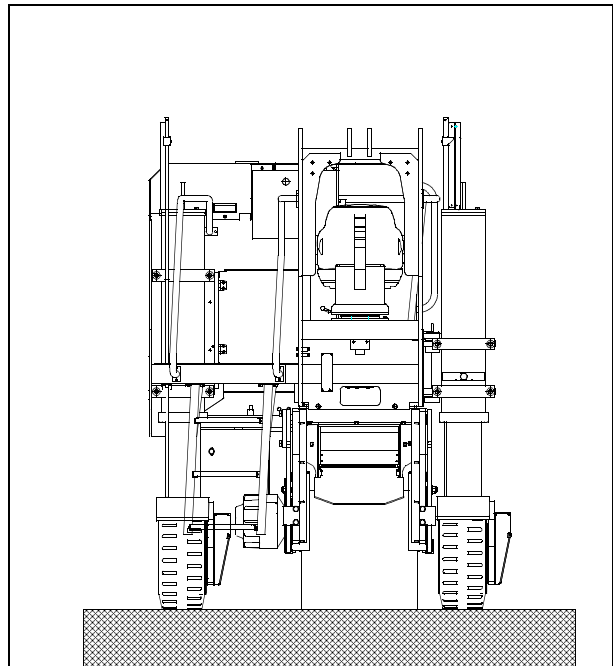
- right - zero
- left - desired milling depth

2. With retracted right-hand chassis leg: (right-hand chassis leg runs in front of milling drum along the lane which has not yet been mill).

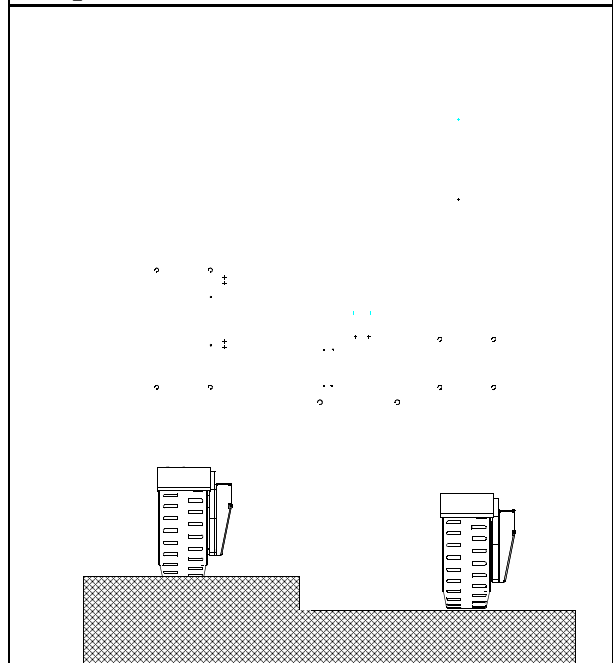
Necessary if space constraints prevent the right-hand chassis leg from being deployed or if the right-hand lane does not have sufficient load-bearing capacity for the vehicle.

Depth setting:

- Same milling depth on left and right sides



PL600_Back3.cdr



PL600_Back4.cdr

Milling on edge of road surface or on offsets



Pay close attention to load-bearing capacity of right-hand track.



Raise planer sufficiently!
The milling drum must have more ground clearance than the height of the offset.



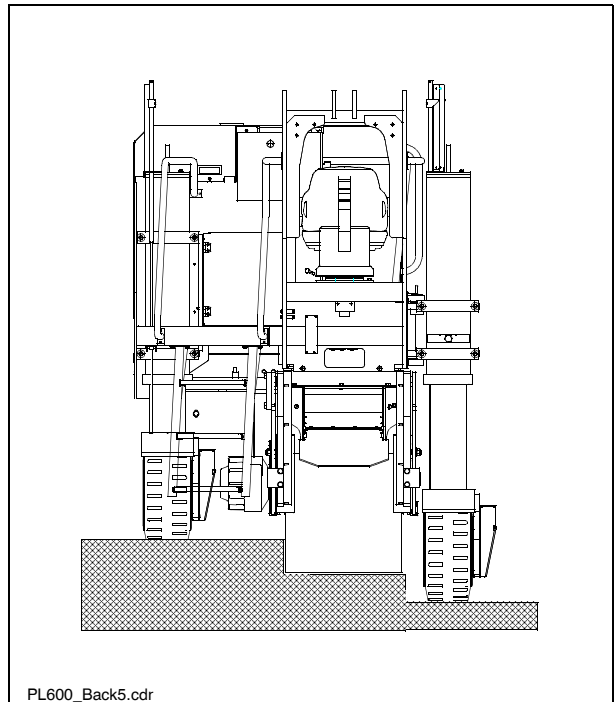
Always keep planer level when engaging it in the milling position!



For milling operations, lower the machine evenly down to the desired milling depth.

Depth setting:

- left - desired milling depth
- right - desired milling depth + height of offset or in such a way that the planer is always in a horizontal position.



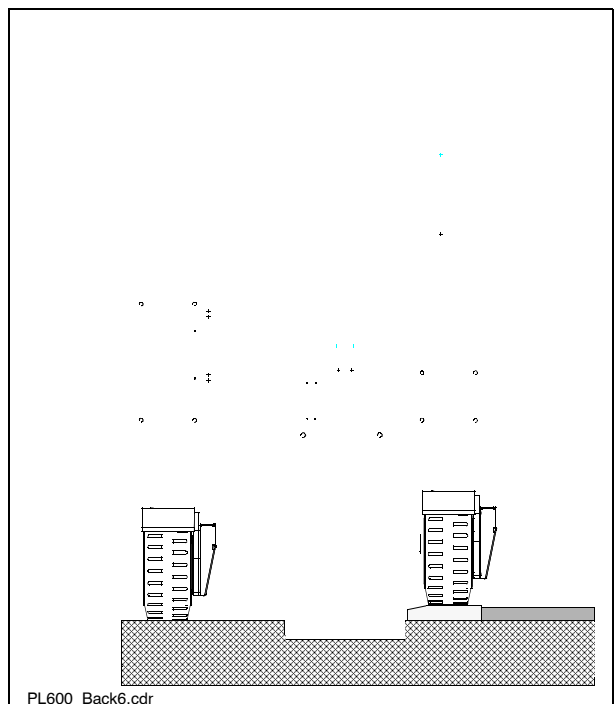
Milling at the curb (with deployed chassis leg)

Advantages:

- high milling precision
- exact milling surface
- direct milling against kerb possible

Disadvantages:

- Under certain circumstances, it may not be possible to achieve the required milling depth



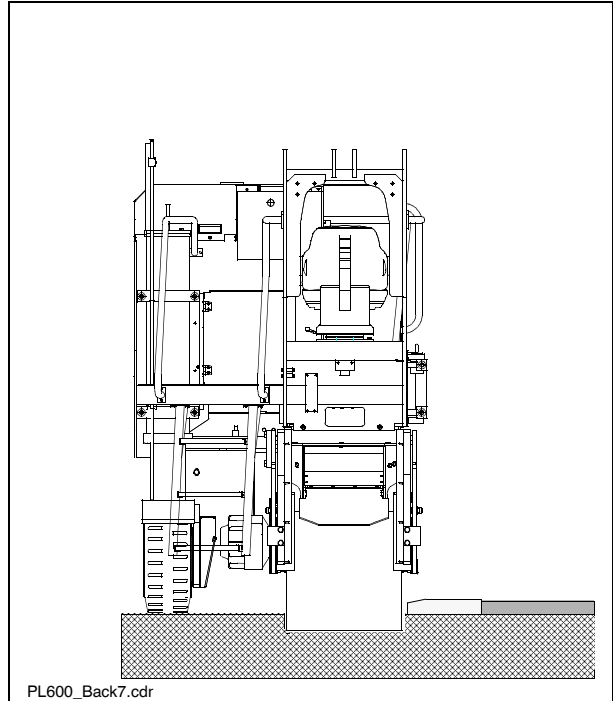
Milling at the curb (with chassis leg retracted)

Advantages:

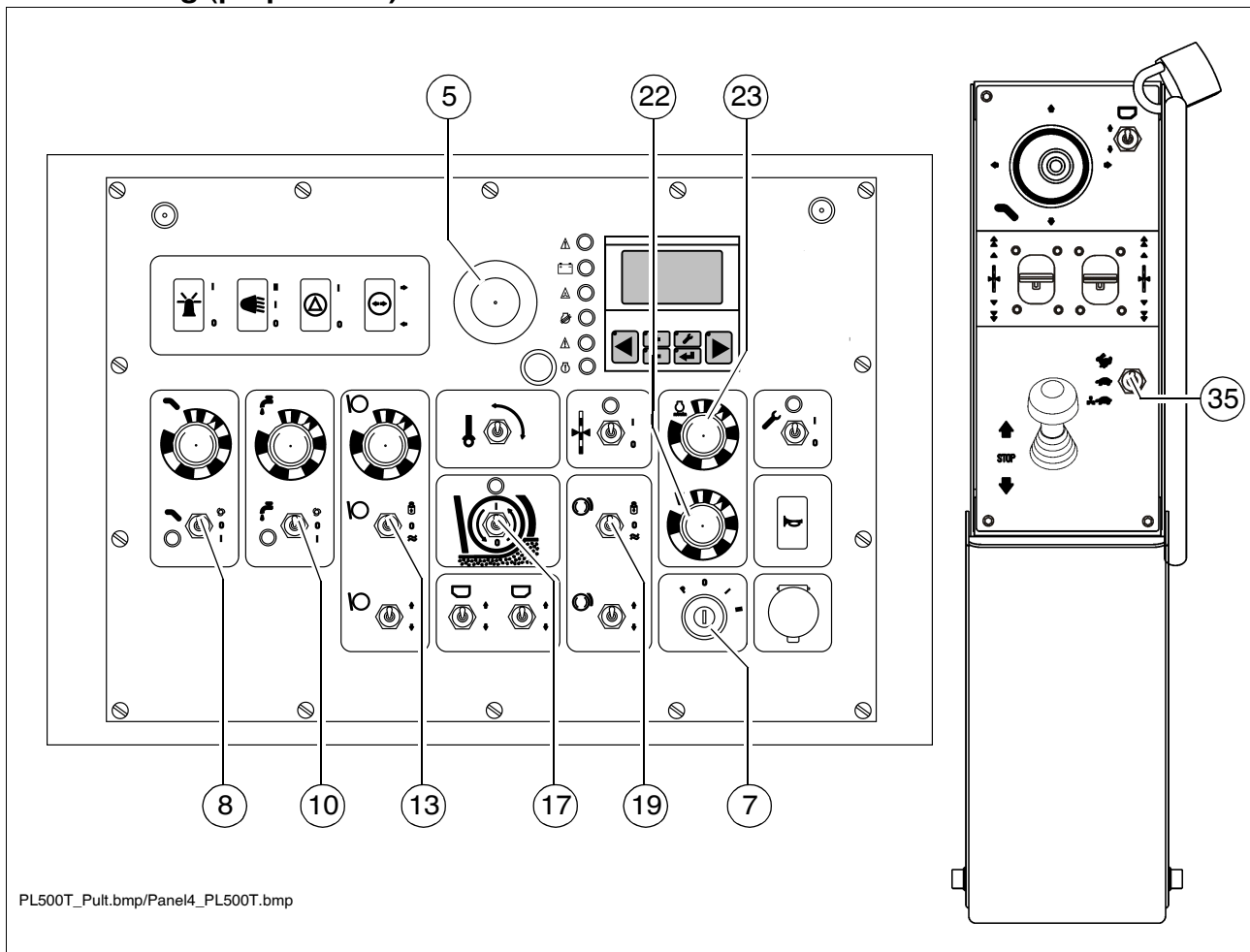
- maximum milling depth is reached
- direct milling against kerb possible

Disadvantages:

- less precise milling results
- machine responds very unfavourably to irregularities in the road surface



Milling (preparation):



- Drive the machine to the milling location and lower manually as far as possible (milling drum does not make contact with ground at this stage).

Engage the following functions on the main operating panel:

Item	Travelling direction	Position
35	Traction drive fast/slow	Working gear (tortoise mode)
23	Preselector for travel drive	Approx. average power
17	Milling drum ON / OFF	Milling drum transmission ON
10	Water pump ON / OFF	Pos "Auto" or "1"
22	Increase the engine speed	"max"
19	Selector switch for sliding shoe	Floating position
13	Selector switch for scraper	Floating position
8	Upper conveyor mode	Pos "Auto" or "1"

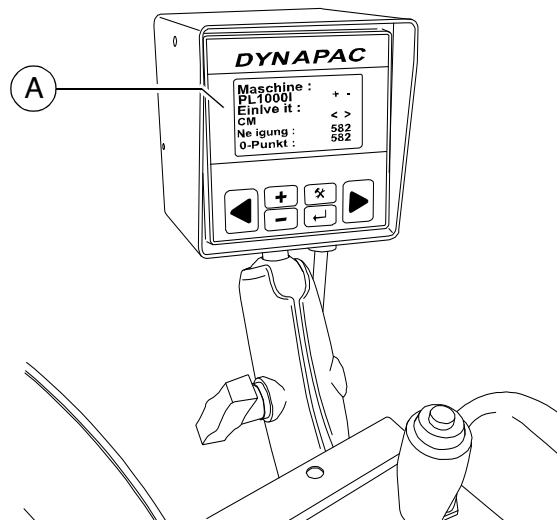
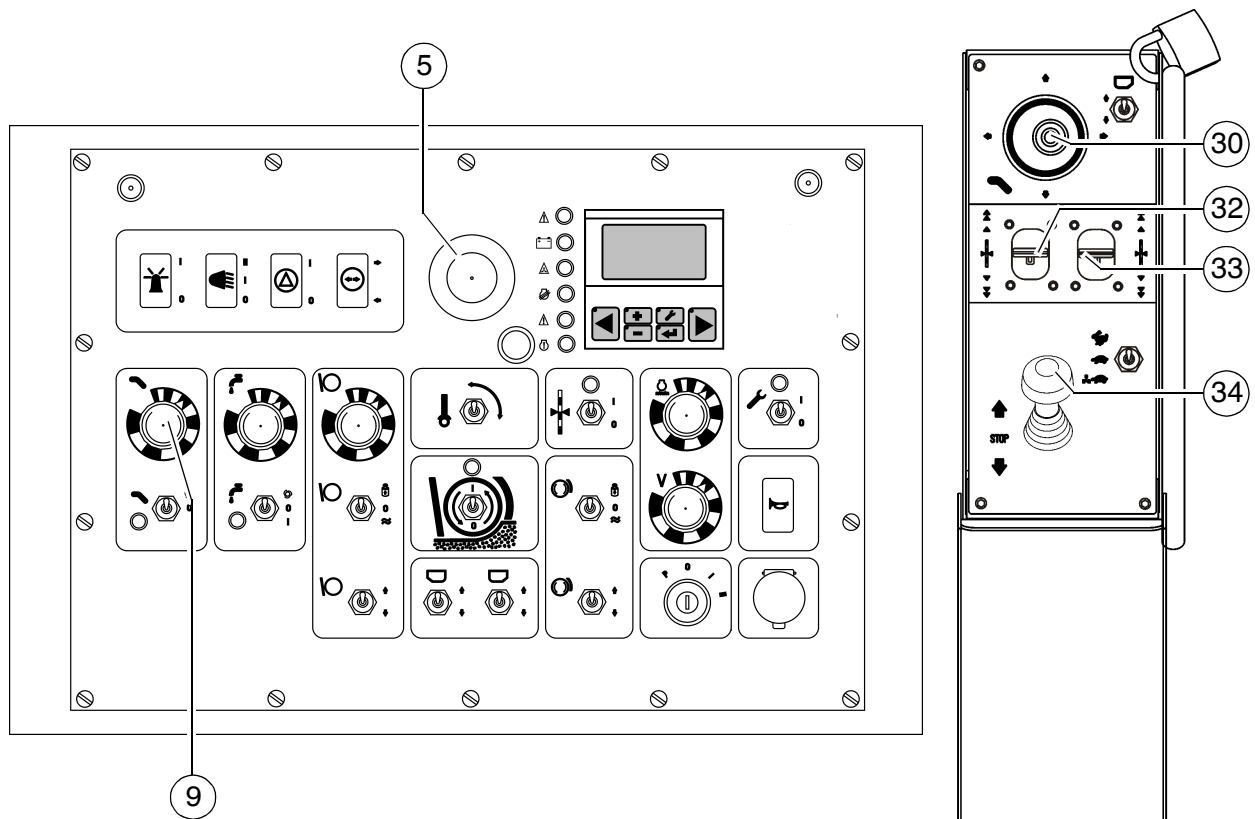


The automatic function for water spraying system and upper conveyor is engaged as soon as the milling drum is running and the drive lever moves out of its central position. In its 0 position, the system shuts down.



In emergency situations, press the emergency stop button (5)!

Milling without automatic levelling system



PL500T_Pult1.bmp/PL1000TD_Digiheigt.wmf

Once all preparatory work for milling has been completed, the planer is ready for operation and a truck is parked below the upper conveyor to receive milling debris, the stationary machine is lowered to the required depth.

- Carefully lower the stationary machine by pressing the switches (33 + 32) until the milling drum makes gentle contact with the working surface.
- Set the milling depth indicators (A) on both sides of the machine to zero.
- Press the switches (33 + 32) again to lower the machine carefully down to the desired milling depth paying careful attention to the milling depth indicators.
- Set desired milling speed by adjusting the setting of the drive lever (34). The machine starts to move when the drive lever moves out of its central position.
- If necessary, adjust the speed of the upper conveyor using the preselector (9).
- If necessary, guide the upper conveyor using the control lever (30).

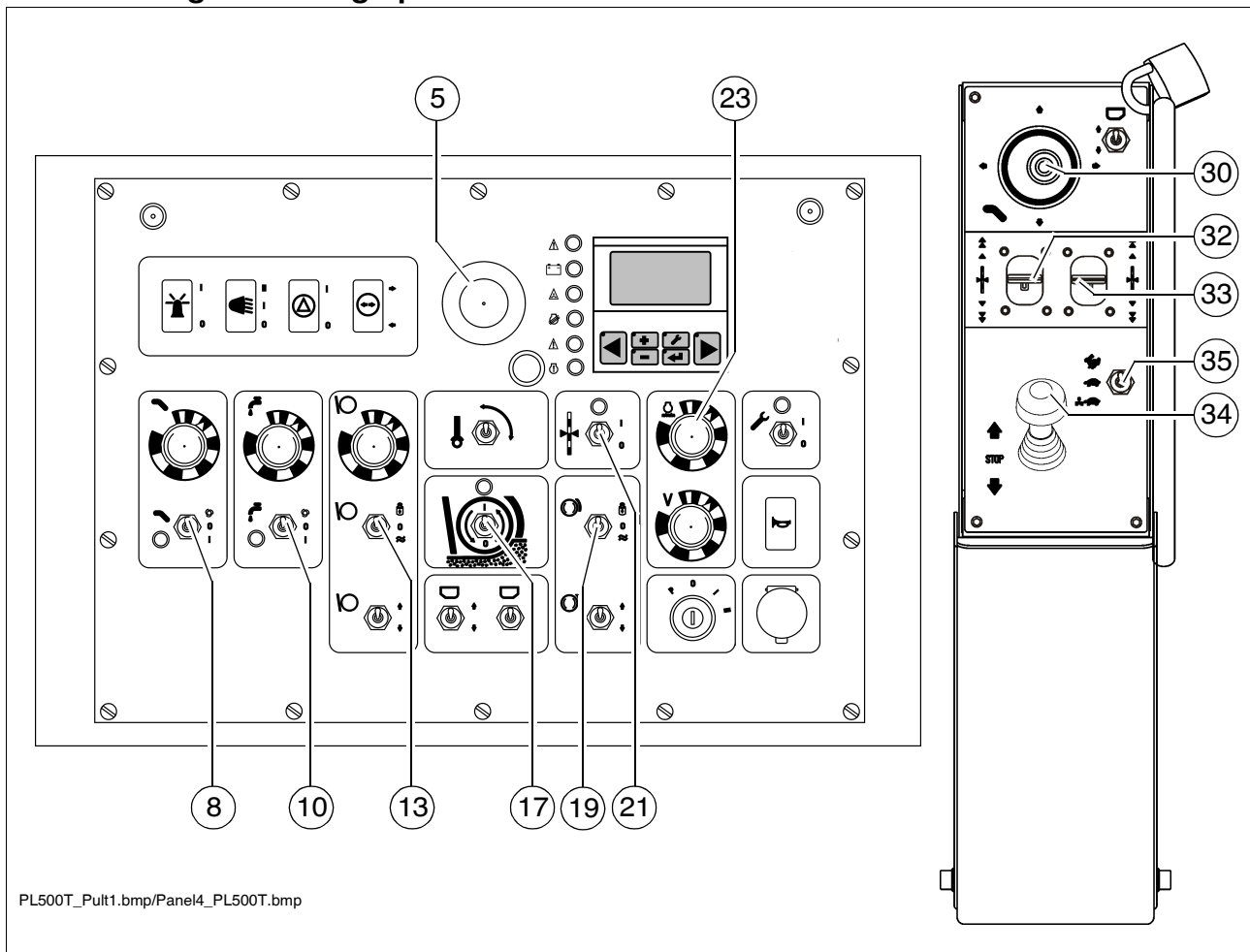


The automatic function for water spraying system and upper conveyor is engaged as soon as the milling drum is running and the drive lever moves out of its central position. In its 0 position, the system shuts down.



In emergency situations, press the emergency stop button (5)!

Ending the milling operation



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

- The drive lever (34) is located in centre position.
- If the automatic levelling system is used for milling, first shut down the levelling unit using switches (21).
- Change over selector switch for front scraper (19) and moldboard (13) to "0".
- Raise machine uniformly by pressing both switches (32) + (33) together until the desired ground clearance has been reached.
- Allow milling drum transmission (17), water pump (10) and upper conveyor (8) to run on briefly, then switch to "0".
- Move switch (35) to transportation speed (hare).
- Set preselector controller for road speed (23) to around 50%.
- Start to move the machine by deflecting the drive lever out of its centre position and move out of the construction site area. If necessary, use the preselector controller (23) to slowly increase the road speed.
- Where necessary, guide the upper conveyor using the control lever (30).



Comply with safety regulations when moving the machine outside the construction site!



In emergency situations, press the emergency stop button (20)!

Parking the machine

Before parking the machine, take a reading from the operating hours counter and check if any maintenance work is required at that point.

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

The machine should be parked on level ground. Lower the machine evenly until the milling drum is almost in contact with the ground.

- Remove ignition key and main switch and take them with you – do not leave them "hidden" in the machine
- Fit cover to operating panel and lock.
- Stow loose parts and accessories such as plug-in lights or rotary beacons.
- Lock down all flaps and covers.

Parking the machine for long periods of time

When storing the machine for the season, it should be parked so that it is protected from strong sunlight, wind, dampness and frost.

If the machine cannot be parked in enclosed buildings, it should be parked in a covered area or the entire machine should be covered with an appropriate canopy.

In addition, protect the operating panels by fitting the supplied locking cover and securing its lock.



Storage temperature must not exceed +70°C or be less than -12°C!

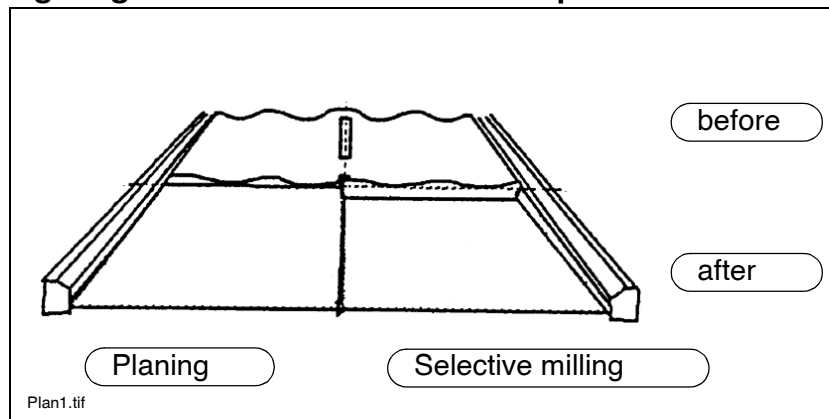
If the machine is stored at temperatures below 0°C, it should be checked for sufficient protection from frost. The water should be fully drained from the water system (tank, filter housing, pumps, hose connections and nozzles).

Observe the relevant information in the Maintenance Instructions!

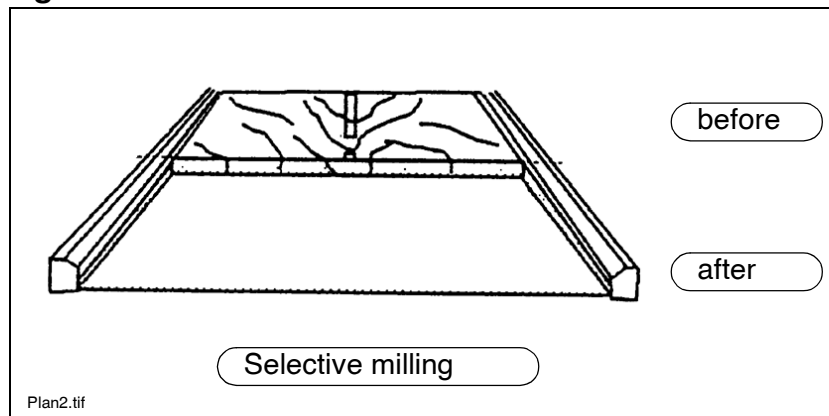
The batteries should be removed during the storage period or connected to appropriate battery trickle chargers to maintain their charge level.

6 Scope for using the small planers

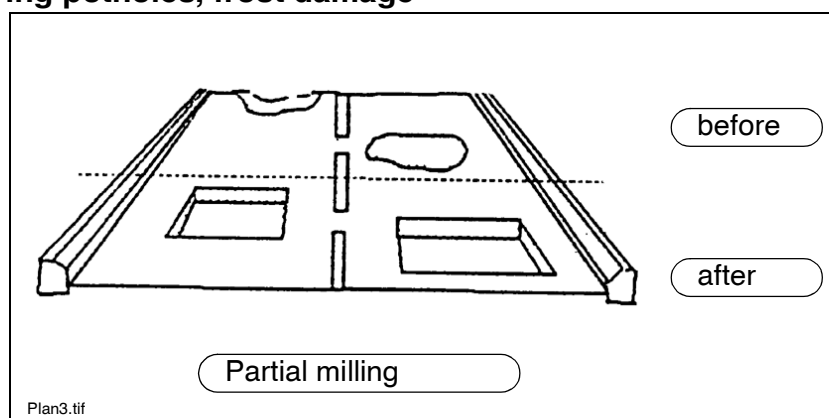
Remedying longitudinal and transverse bumps in the road surface



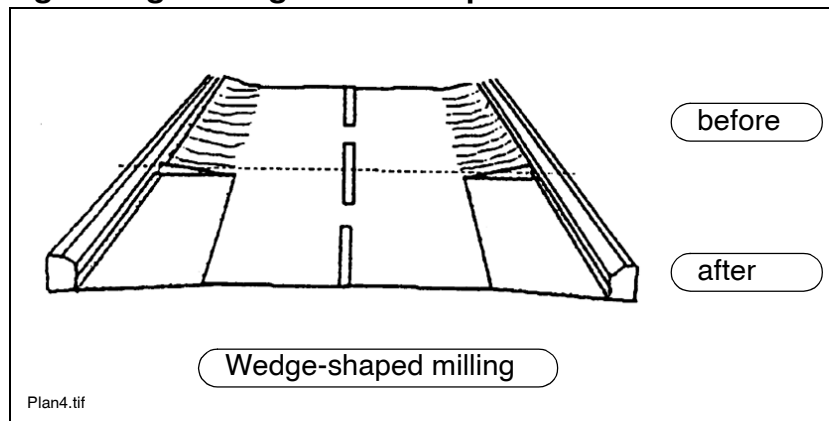
Remedying cracks



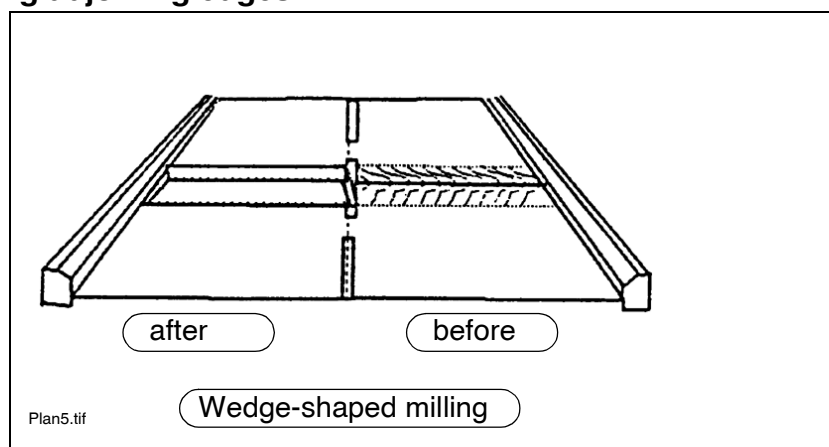
Remedying potholes, frost damage



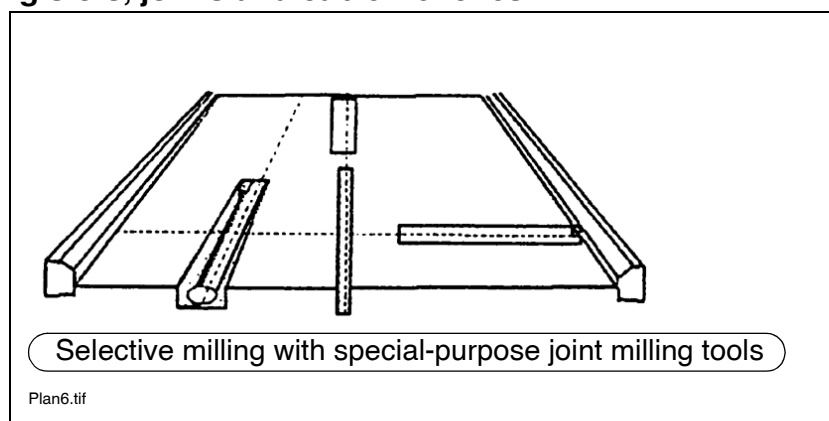
Remedying damage to edges and bumps



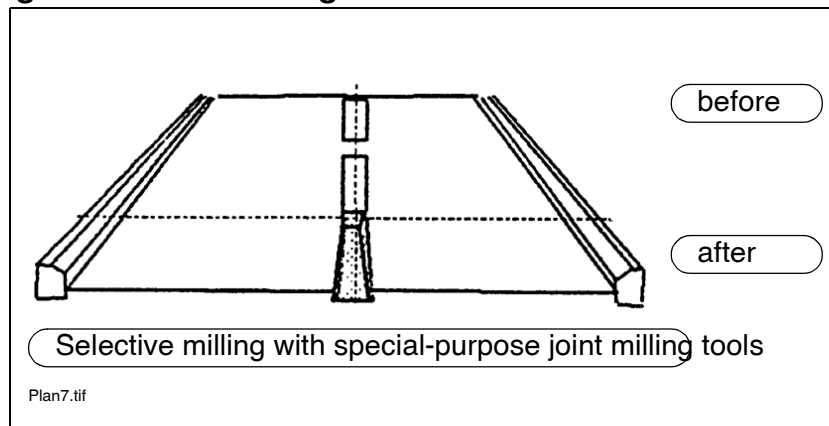
Producing adjoining edges



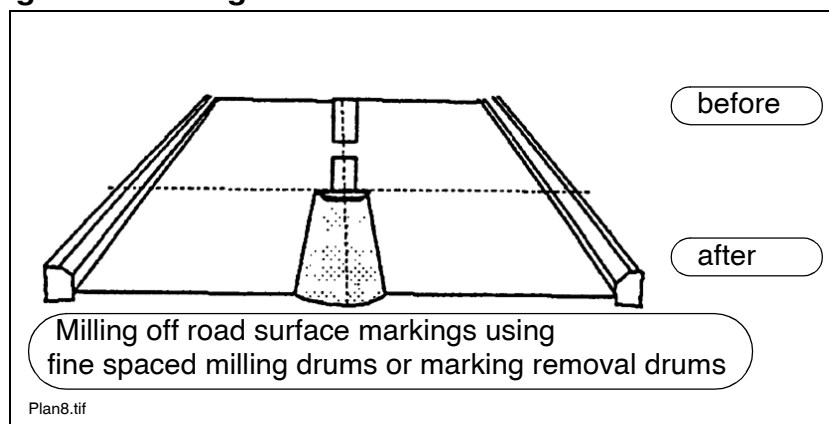
Producing slots, joints and cable trenches



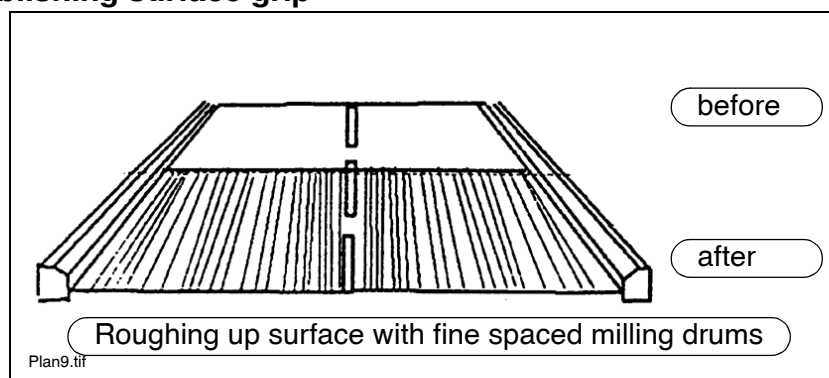
Removing embedded markings



Removing road markings



Re-establishing surface grip



7 Malfunctions

7.1 Travel drive error message

Error Message	No.	Spr.	Possible Cause	Effect	Quit	Remedy
Drive lever voltage	0	Y	Drive lever defective. Voltage in drive lever potentiometer outside permitted limits.	Both PWM outputs are shut down.	reset	Check drive lever and wiring. Reset drive lever if necessary. Reboot the control unit.
Drive lever current	1	Y	Drive lever defective. Current in drive potentiometer outside permitted limits.	Both PWM outputs are shut down.	reset	Check drive lever and wiring. Reboot the control unit.
Drive lever comparison check	2	N	Errors when balancing the drive lever potentiometer. Voltage below the permitted limit of 0.2V.	Both PWM outputs are shut down.	auto	Check resistance value and wiring of drive lever potentiometer.
Inching potentiometer voltage	3	Y	Inching potentiometer defective. Voltage in inching potentiometer outside permitted limits.	Vehicle stop. Driving only possible in operating gear with limited inching value.	reset	Check inching potentiometer and wiring. Reset inching potentiometer if necessary. Reboot the control unit.
Inching potentiometer reset	4	N	Error during reset of inching potentiometer. Voltage below the permitted limit of 0.2V.	Vehicle stop. Driving only possible in operating gear with limited inching value.	auto	Check resistance value and wiring of inching potentiometer.
PWM forwards	5	Y	Short circuit or open circuit in power circuit for forward-direction PWM output.	PWM forwards remains disabled. PWM reverse remains enabled.	reset	Inspect solenoid and wiring. Reboot the control unit.
PWM reverse	6	Y	Short circuit or open circuit in power circuit for reverse-direction PWM output.	PWM reverse is shut down. Forward-direction PWM remains enabled.	reset	Inspect solenoid and wiring. Reboot the control unit.
Brake	7	Y	Short circuit or open circuit in power circuit to brake output.	Output is shut down. Travel drive inhibited.	reset	Inspect solenoid and wiring. Reboot the control unit.
Milling unit	8	N	Short circuit or open circuit in power circuit to milling unit output.	Output is shut down. Milling drive function is shut down.	reset	Inspect solenoid and wiring. Reboot the control unit.
Start-up conditions	9	N	Start-up conditions are satisfied. Drive lever is not in Neutral.	Both PWM outputs remain shut down.	auto	Move drive lever or direction switch into Neutral position.
Characteristic curve	10	N	Error during input of characteristic curve (sequence on X axis is not a rising progression).	Both PWM outputs are shut down.	reset	With the help of BODEM or BB-3, enter characteristic values on a rising curve. Reboot the control unit.
CAN Diesel	11	Y	Short circuit or open circuit in CAN line to diesel engine.	Actual speed is set to lower idle setting.	reset	Check wiring and/or diesel control unit. Reboot the control unit.



Flashing error code:

Whenever a fault occurs, an LED issues an appropriate flash error code. The flashing symbols follow the same sequence as the error table described here. If a lamp remains lit for 2 seconds, this indicates the presence of an active error. If one remains lit for 0.5 seconds, the associated error is not active. Between these individual flashing error codes, the LED goes out for 1 second. The starting point for a complete error sequence is indicated by a pause lasting 5 seconds.



Inform the after-sales service for your cold planer of the error numbers displayed. They will discuss with you what course of action to take.

E Set-up and modification

1 Special notes on safety



Injury or death can result whenever the engine, travel drive, release, conveyor or lifting units are engaged.

When operating the machine, therefore maintain strict compliance with the sections of these operating instructions and the safety specifications dealing with personal conduct.

Before starting the machine, ensure that no-one is working on or underneath the machine, or standing in the danger area!

- Protect machine to prevent it from being started accidentally:
Set the drive lever to the centre position and set the preselector to zero, pull out the ignition key and the battery main switch.
- Secure raised machine components (e.g side board or moldboard) mechanically to prevent them from lowering accidentally.
- Replace parts or have them replaced as stipulated.



When connecting or disconnecting hydraulic hoses and when working on the hydraulic system, hot hydraulic fluid may spurt out at high pressure.

Switch off engine and depressurise the hydraulic system! Protect your eyes!



Mount all protective devices before re-commissioning the paver finisher.

2 Milling without upper conveyor / Preparation for transport

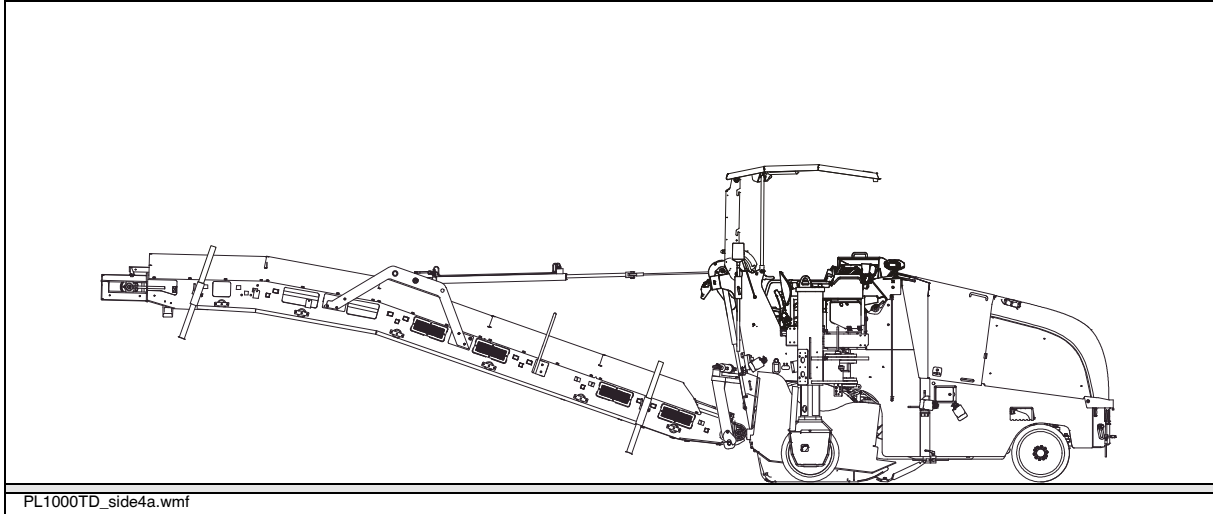
2.1 Dismantling the upper conveyor

To reduce the transport length of the machine and to carry out milling operations without the upper conveyor, this should be removed from the machine. This operation involves following a few simple steps.

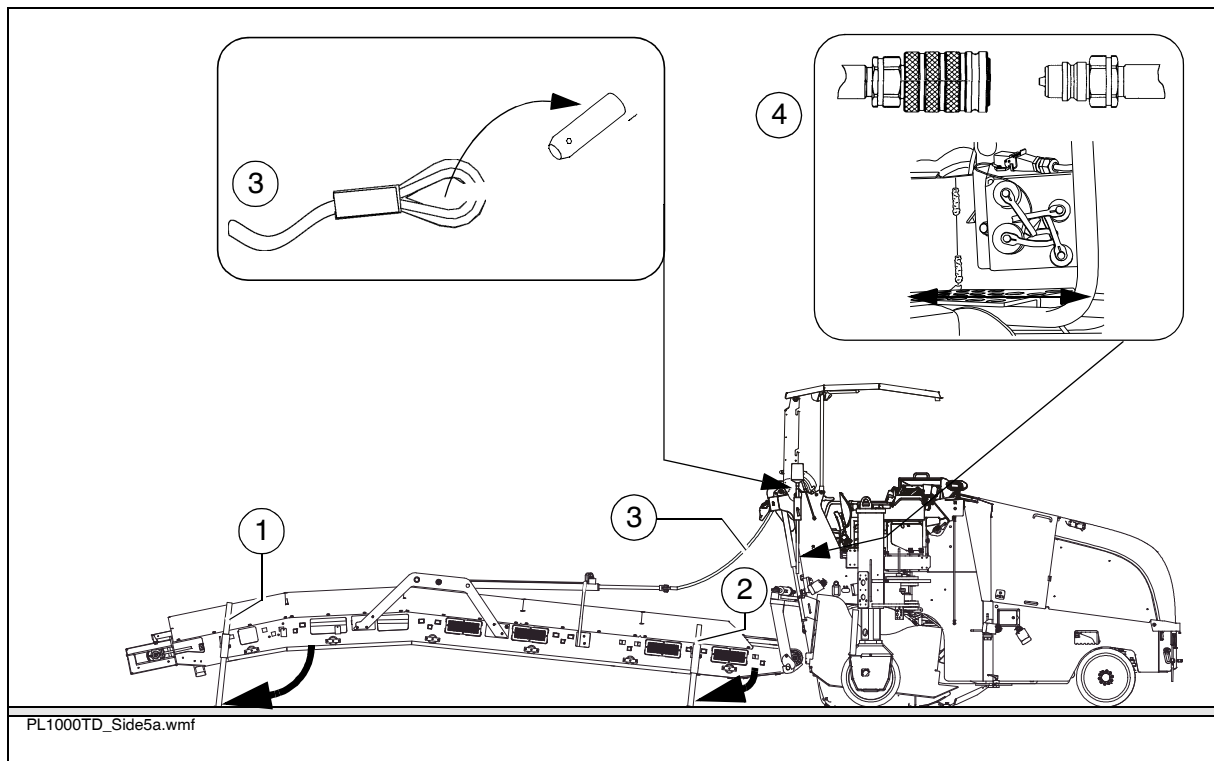


Upper conveyor and milling drum must be disengaged before commencing this disassembly work!

Operations required:



- Position upper conveyor over the desired parking location, which should ideally be on level ground.



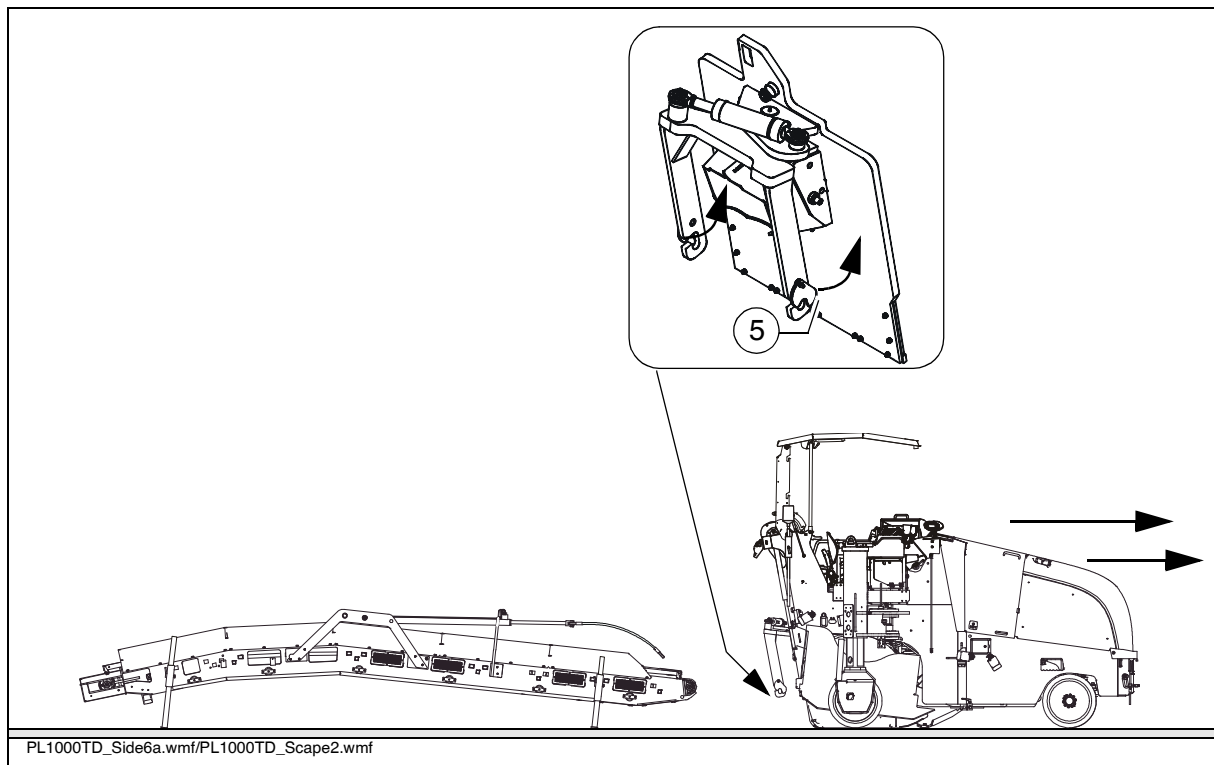
- Continue lowering machine until the locked parking legs (1) + (2) are supported on the ground.

If necessary, adjust the parking legs to the required length and lock beforehand.



If the machine is equipped with a foldable conveyor belt, parking is carried out on the two parking legs (1a) + (2a) following folding.

- Lower machine on chassis legs until retaining cable (3) tension is relieved.
- Unfasten the retaining cable (3) from the machine frame.
- Disconnect four screw couplers from the hydraulic circuit (4) and fit protective caps, then disconnect the electrical plugged connection.



- Open the interlock on both sides of the swivel arm (5).
- Drive machine off its upper conveyor.

3 Articulation procedure of foldable upper conveyor (○)

3.1 Folding in upper conveyor

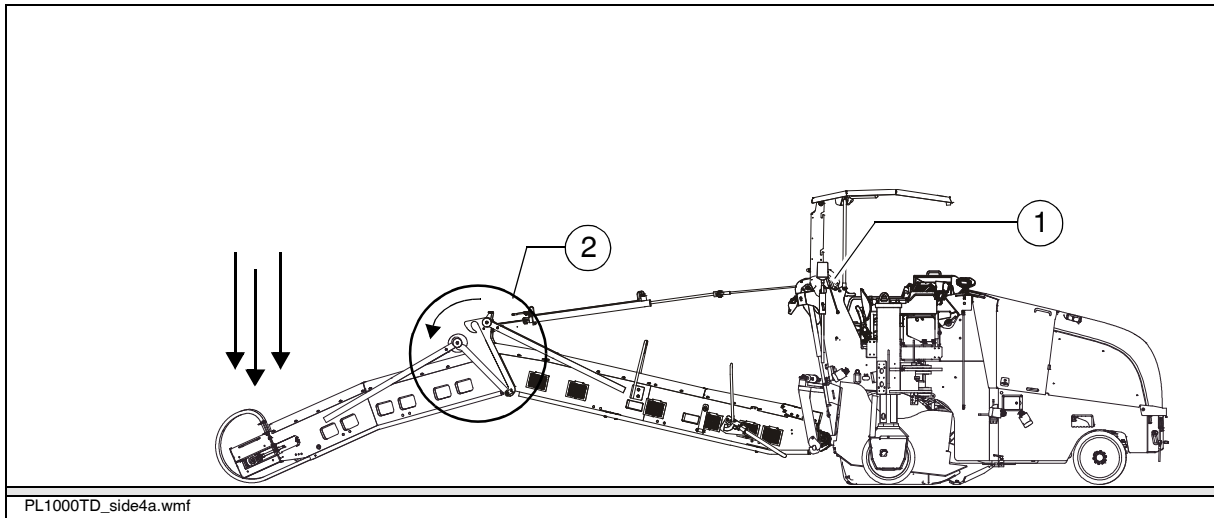


The transport length of the machine can be significantly reduced using the foldable upper conveyor (available as an option).

Various operations are required and conditions should be checked and/or set to enable the upper conveyor to be folded in.

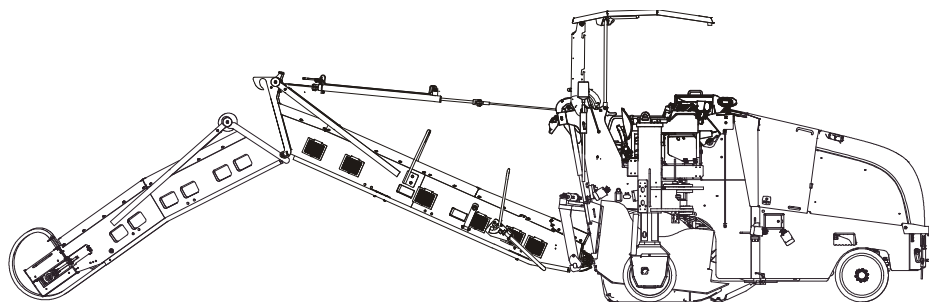
- The machine is on level ground and in a secure lowered position.
- Milling drum is not activated.
- The upper conveyor is not operating.

Operations required:

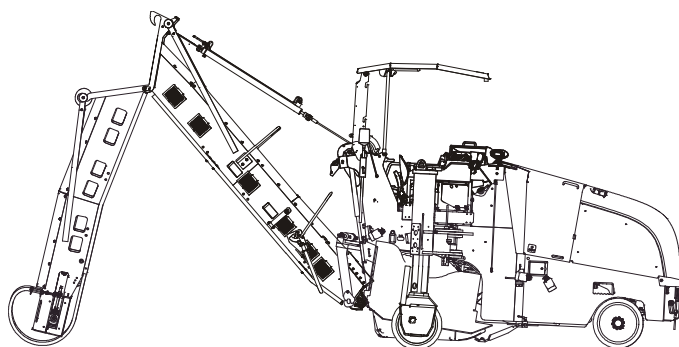


- Lower upper conveyor until the front section of the belt frame touches the ground.
If necessary, regulate the machine with the chassis legs.

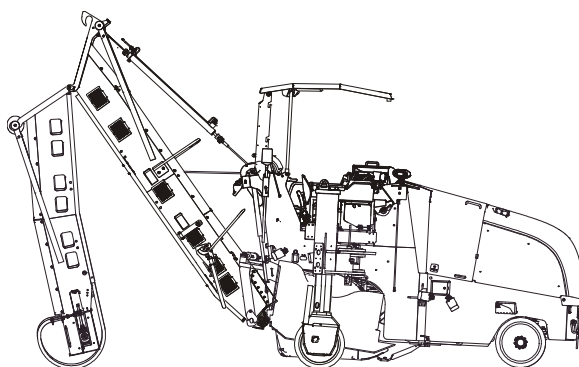
- Pull the handle (1) to unlock the articulated joint.
- Raise the conveyor belt with the lifting cylinder until the articulated joint (2) is opened.



PL1000TD_side4a.wmf

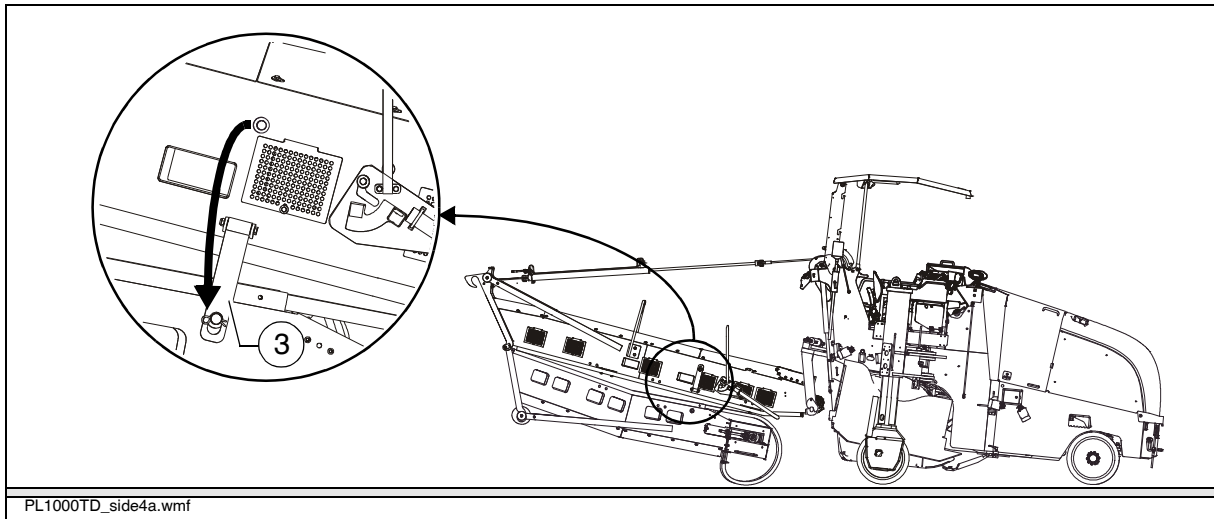


PL1000TD_side4a.wmf

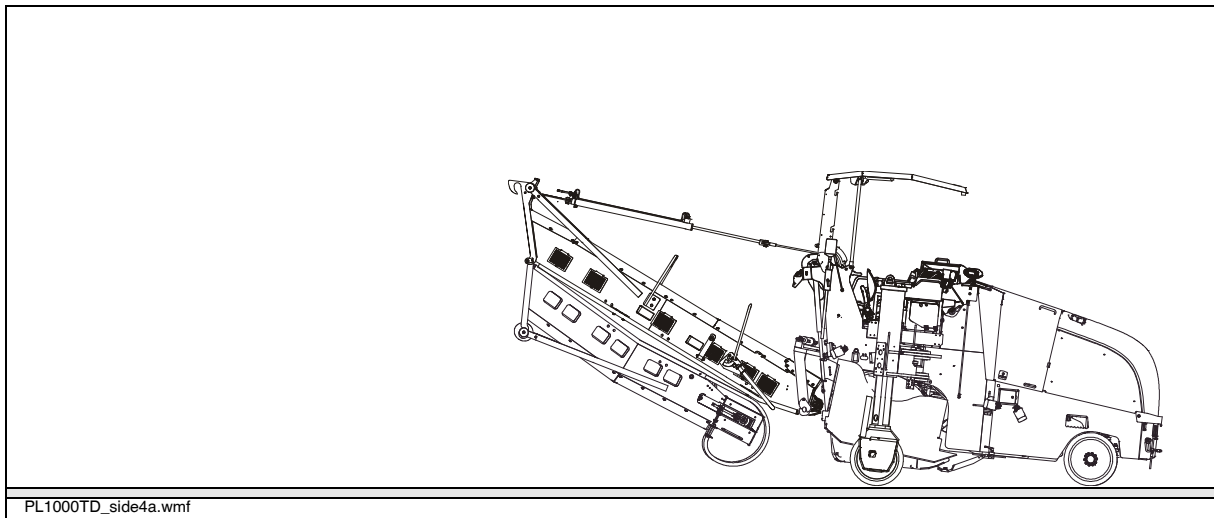


PL1000TD_side4a.wmf

- Raise the upper conveyor with the lifting cylinder until the cylinder is completely retracted.
- Align the machine by regulating the chassis legs until the belt frame is standing vertically and firmly on the roll-off bar.



- Slowly move the machine backward or lower it with the chassis legs until the two conveyor belt sections are swivelled together as far as possible.
- Extend the lifting cylinder until the two conveyor belt sections are completely swivelled together.
- Insert retaining tab (3) on both sides of the belt frame.
- Remove the retaining cotter pin, guide the retaining tab over the journal of the lower frame section and secure with cotter pin.



- Finally, raise the folded conveyor belt until the machine can be moved.



If necessary, the machine will have to be raised via the chassis legs.

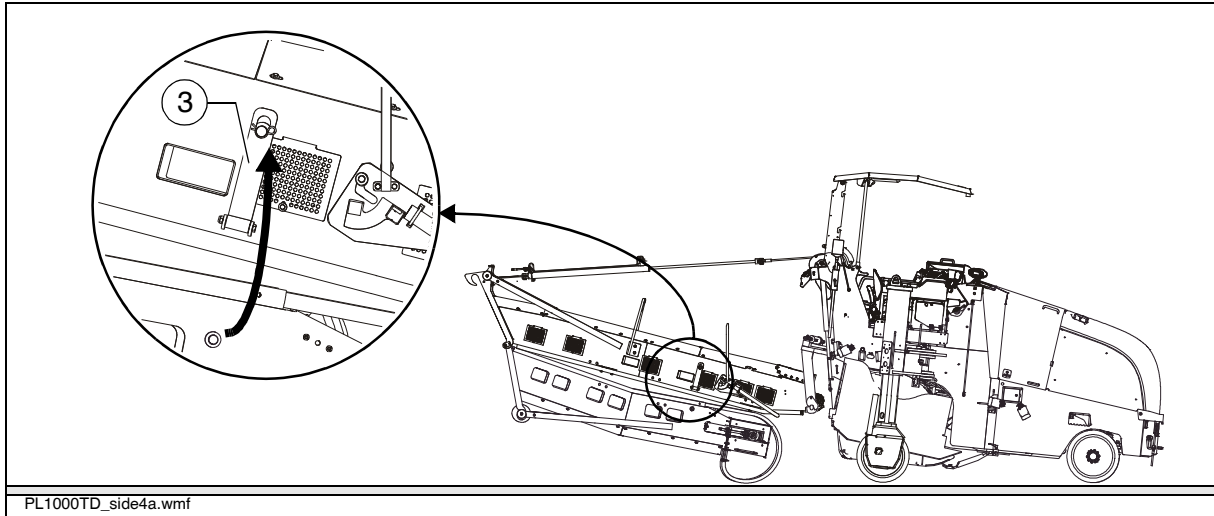


Ensure sufficient ground clearance of the conveyor belt!

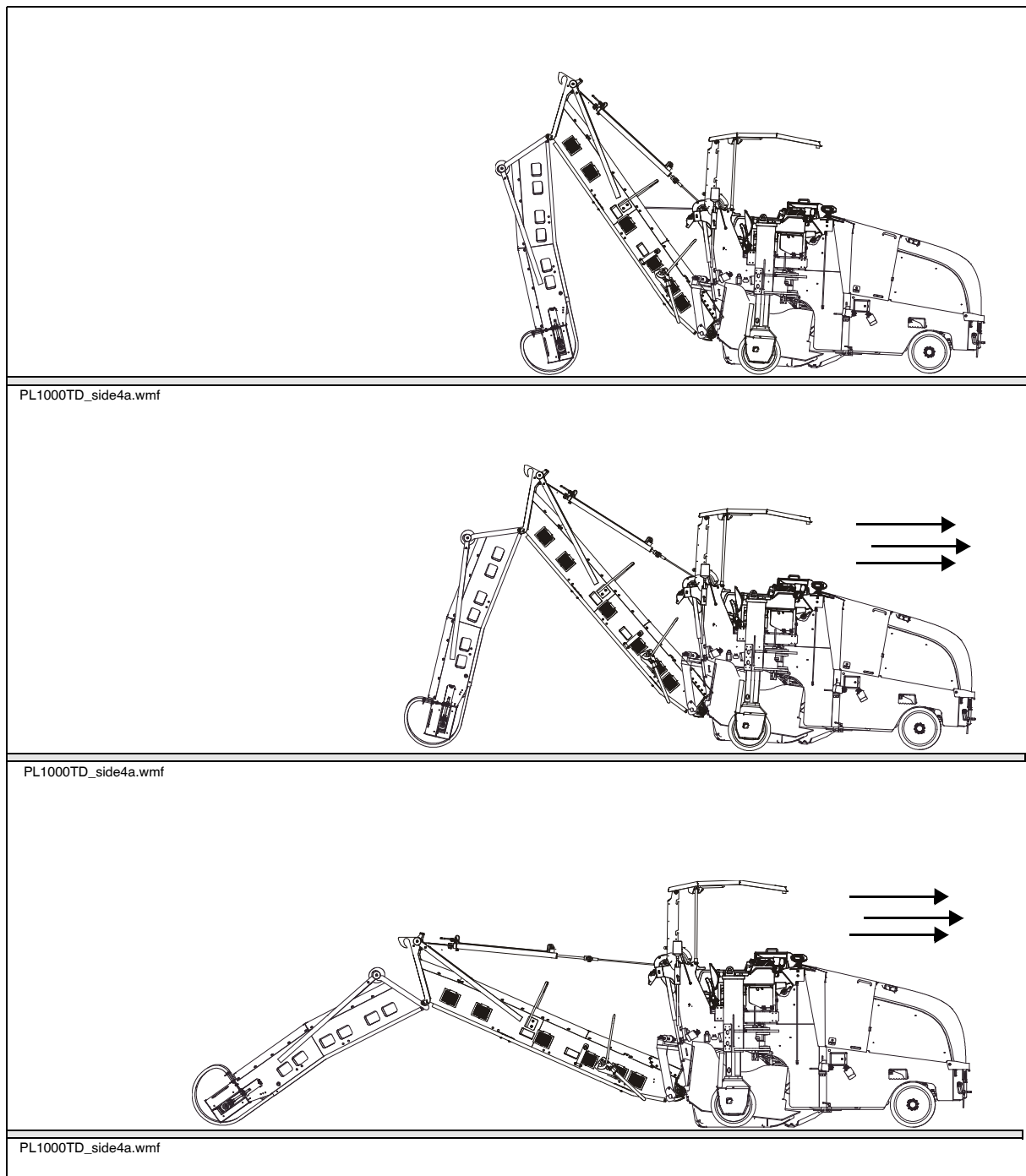
3.2 Unfolding the upper conveyor

The procedure for unfolding the upper conveyor is exactly the same as the procedure for folding it in, but in reverse order.

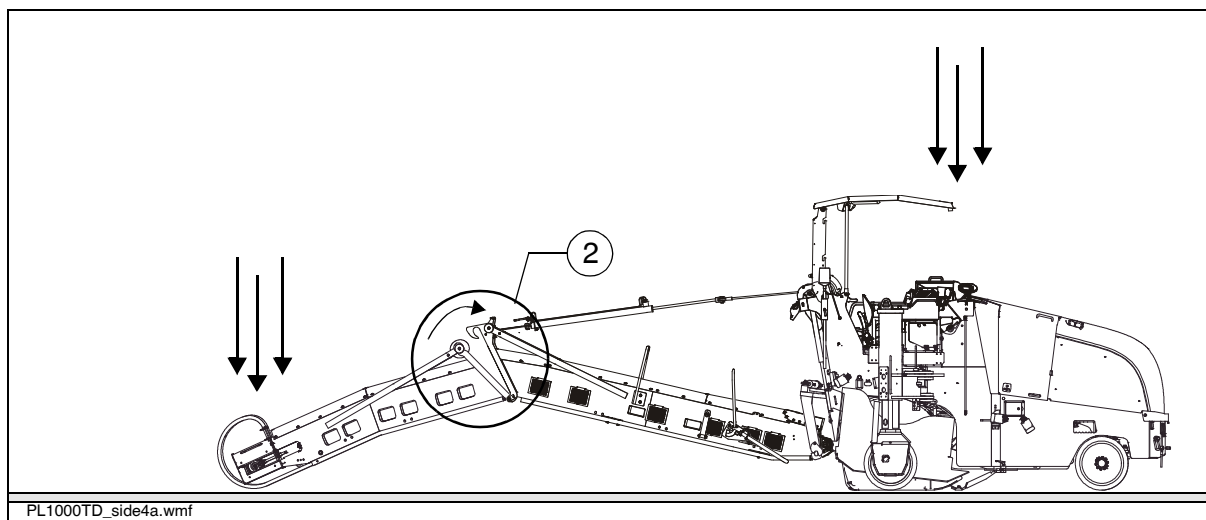
Before the upper conveyor can be unfolded, the transport safeguards on both sides of the machine must be opened.



- Lower the upper conveyor with the lifting cylinder until the belt frame firmly rests on the roll-off bar and the retaining tab (3) is relieved.
- Open retaining tab (3) on both sides of the belt frame:
 - Remove retaining cotter pin, guide tab over the journal of the upper frame section and secure using the cotter pin.



- Raise the upper conveyor with the lifting cylinder until the cylinder is completely retracted.
- Align the machine by regulating the chassis legs until the belt frame is standing vertically and firmly on the roll-off bar.
- Slowly move the machine forward until the two conveyor belt sections are swivelled up as far as possible.
 - Readjust the lifting cylinder accordingly in the process.



- Lower the machine with the chassis legs until the latch (2) of the articulated joint engages.



If necessary, readjust the conveyor belt height with the lifting cylinder.

- Finally, raise the conveyor belt until the machine can be moved.

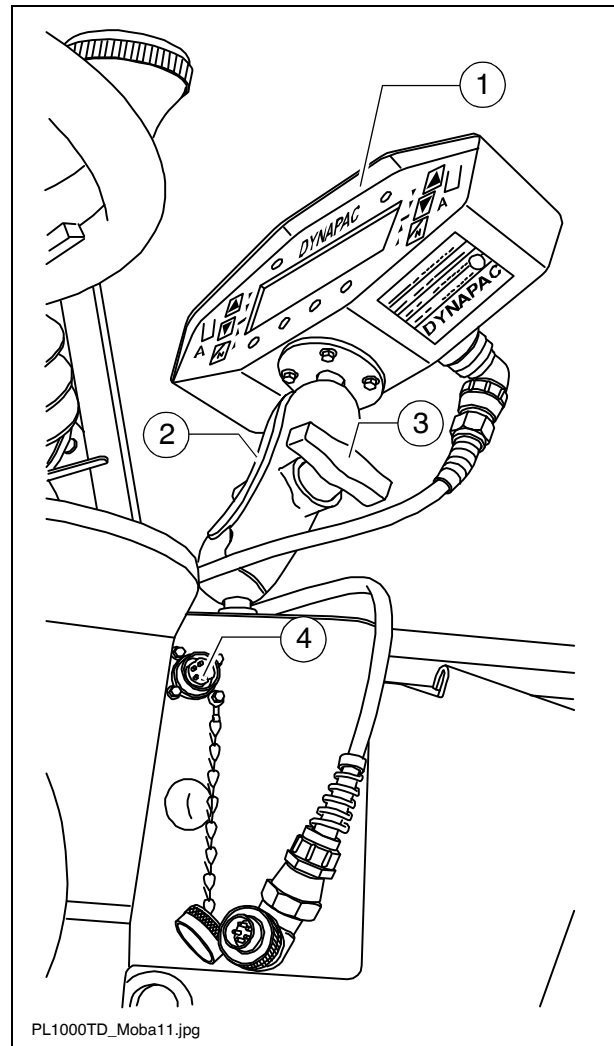
4 Levelling

4.1 Operating unit for levelling

- Insert the operating unit (1) into the bracket (2) provided and secure with a clamping bolt (3).
- Connect the related connection cable to the operating unit (1) and the interface of the machine (4).
- Secure both connectors with the related cap.



Exhaustive operating instructions can be found in the documentation for the corresponding levelling system.

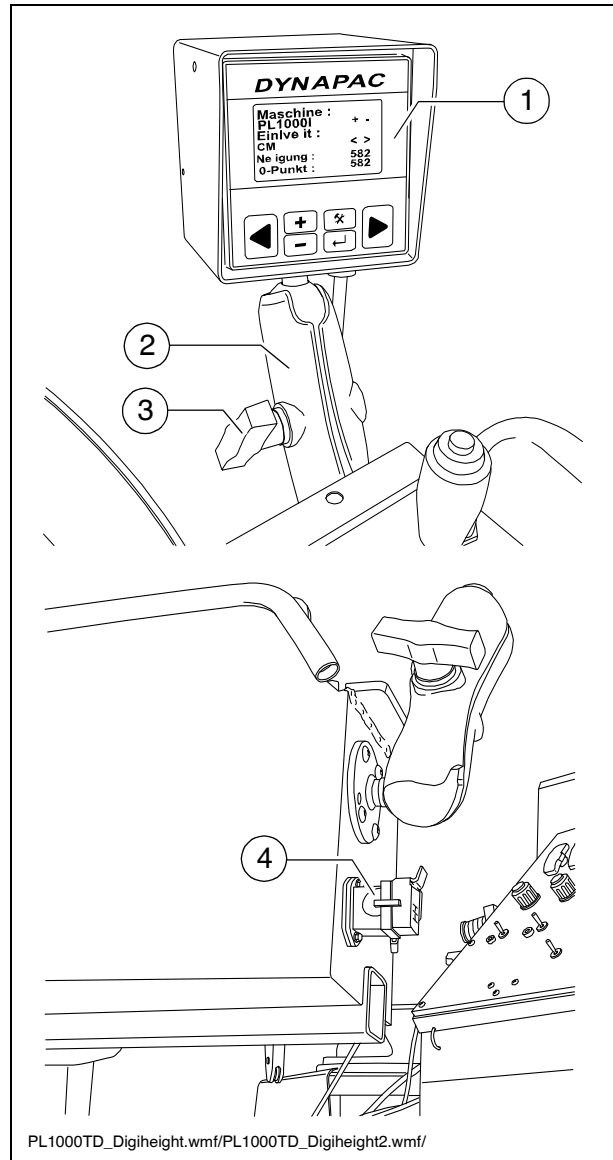


4.2 Digital height display

- Insert the height display (1) into the bracket (2) provided and secure with a clamping bolt (3).
- Connect the related connection cable of the height display (1) on the interface of the machine (4).
 - Secure the connector accordingly.

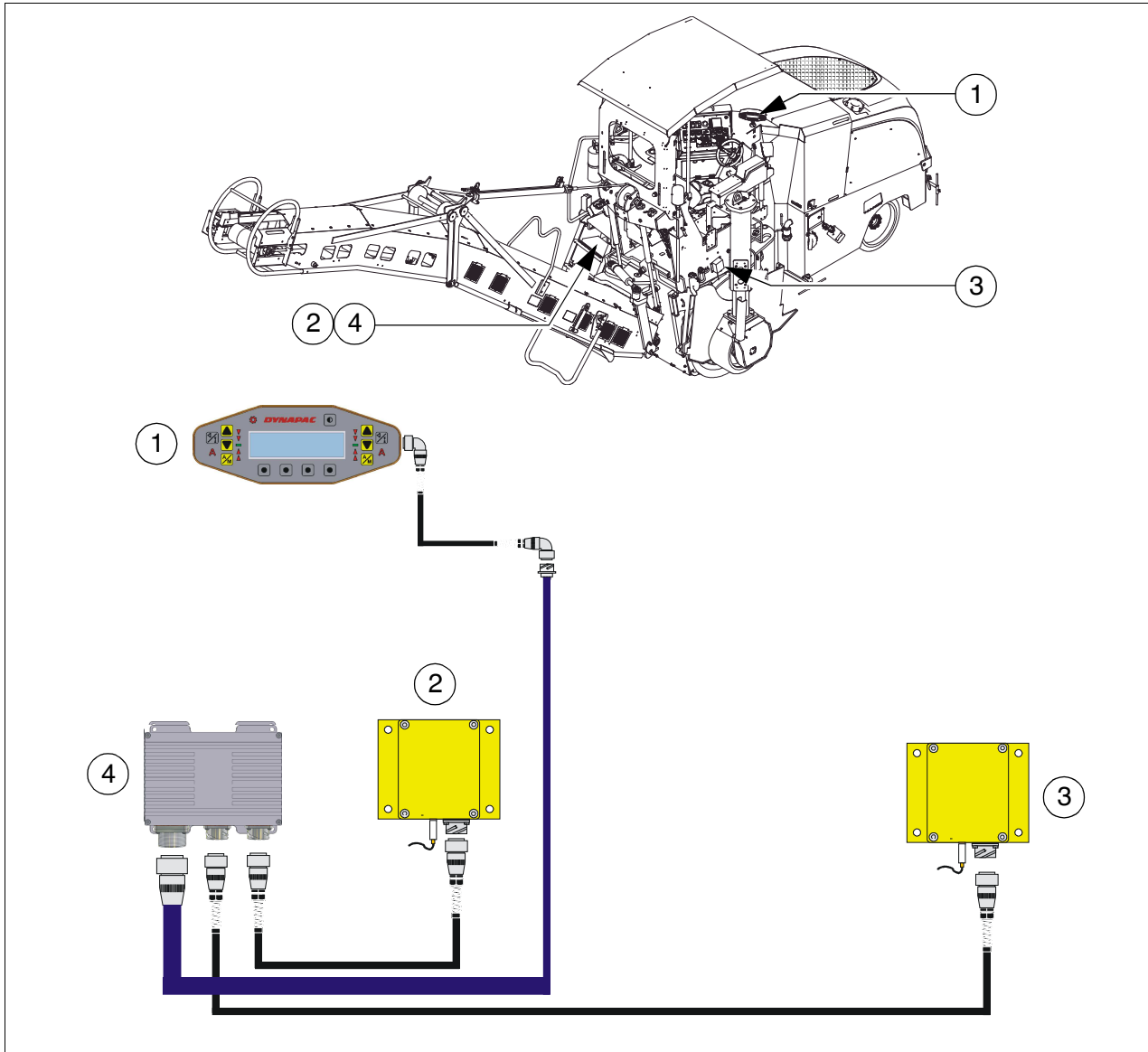


For exhaustive operating instructions, see the chapter "Operation".



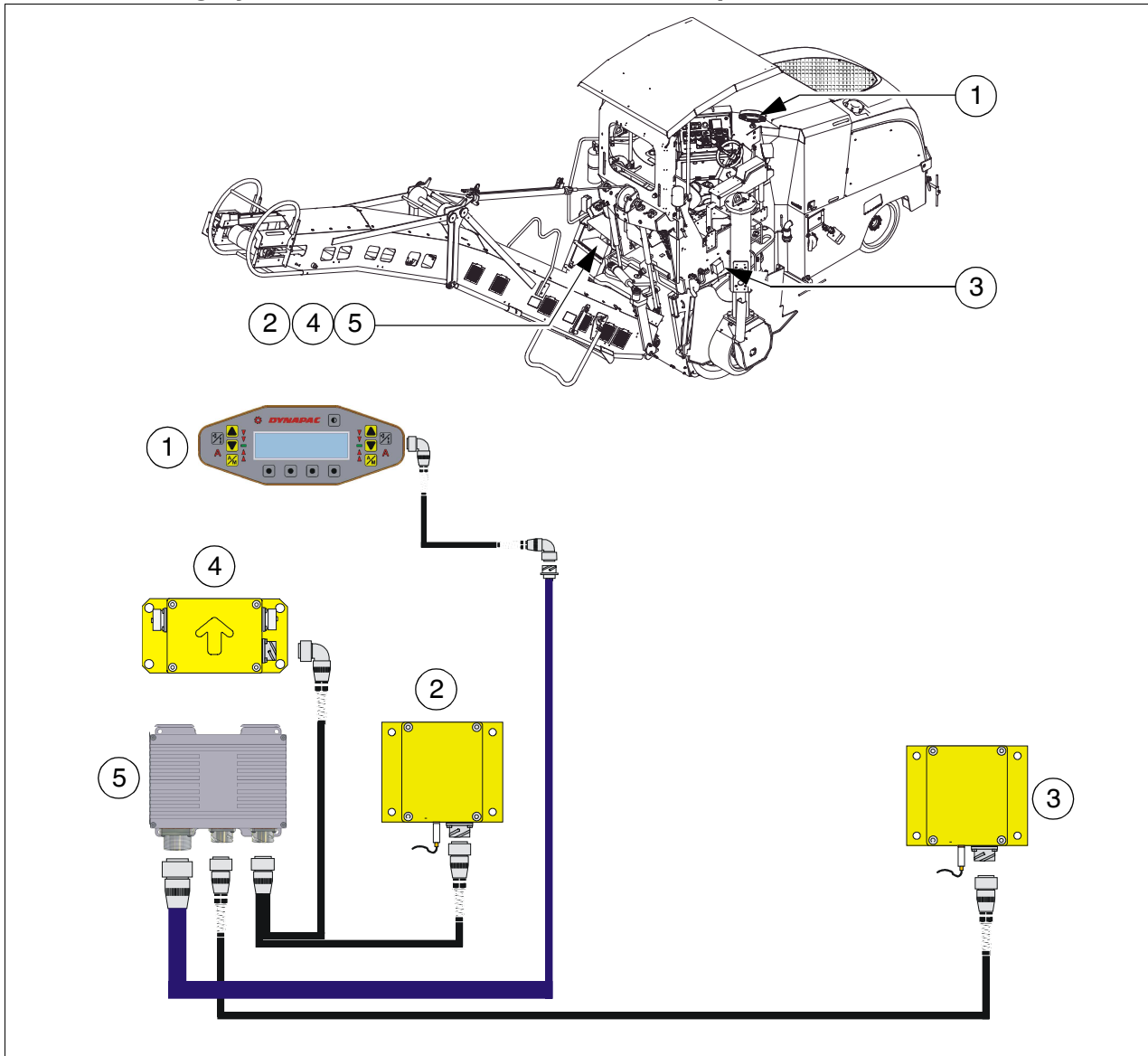
5 Connection diagrams for levelling system

5.1 Levelling system with cable sensors / without slope sensor



- Operating unit (1)
- Cable sensor, left (2)
- Cable sensor, right (3)
- Controller (4)

5.2 Levelling system with cable sensors / with slope sensor



- Operating unit (1)
- Cable sensor, left (2)
- Cable sensor, right (3)
- Lateral slope controller (4)
- Controller (5)

F Maintenance

1 Notes regarding safety



Always comply with Health & Safety and Fire Prevention regulations when carrying out maintenance work. Always wear appropriate protective clothing and equipment.



If not otherwise stated, always switch off the engine before carrying out maintenance work.



Carry out all maintenance work on flat, firm ground.



When working in confined spaces, ensure that exhaust gases are vented to atmosphere. Provide adequate ventilation.



Before starting maintenance work, secure the machine to prevent accidental starting, rolling or lowering. To do this, take the following precautions:

- Move drive lever into neutral centre position then set machine feed to "Zero" using the preselector.
- Remove ignition key and main battery isolator.
- Attach "DO NOT START" panel to the operator's platform in clearly visible location.
- When working below the machine, always secure the frame to prevent it from lowering accidentally and always wear a safety hat.
- If necessary, fit chocks under wheels to prevent machine from starting to roll away.



If safety and guards need to be removed for maintenance work, always ensure that they are reinstalled before the machine goes back into service.



Never use highly flammable substances for cleaning work.
Keep ladders and (access) steps free of grease and in non-slip condition at all times. When using a high pressure cleaner or a steam jetter to spray down the machine, never subject electrical components, electronic assemblies, insulation materials and fans to a direct jet of water or steam and cover them up whenever and wherever possible.



Avoid electric welding work on the machine because this can lead to damage to electronic and hydraulic assemblies!

In exceptional circumstances, if electric welding work is required on the machine, always take due note of the following before starting work:

- ignition must be switched off
- interrupt the electrical circuit
- fit earth/ground terminal of welding unit as close as possible to welding location.



Whenever you work on the electrical system, always disconnect the earth/ground cable from the battery.

Only use fuses with the specified ratings.

2 Liability is rendered null and void if non-genuine spares or wearing parts or incorrect fuel substances are used.



For maintenance and repair work, only use wearing parts and spare parts approved by the manufacturer and fit them properly.

In cases of doubt, consult the manufacturer.

Only use substances recommended in these Operating Instructions as lubrication agents and fuel substances.

Failure to comply with these regulations excludes all manufacturer's liability for any resultant damage.

2 Maintenance intervals

The manufacturer is incorporating an ever increasing number of zero-maintenance assemblies in the design of this machinery. The number of lubricating points described in the next section may therefore differ from the actual number of lubricating points present on the machine.



As well as this maintenance manual, always also pay close attention to the maintenance manual provided by the engine manufacturer. All maintenance work and service intervals itemised here are binding in nature.

Maintenance point	Operation	Operating hours							
		10	50	100	250	500 / annually	1000 / annually	2000 / every 2 years	If necessary
(3.1) Engine (power unit)									
Fuel tank	Check fill level	■							
	Top up fuel								■
	Clean tank and system							■	
Engine	Check oil level	■							
	Top up the oil								■
	Change oil					■			
	Change oil filter					■			
	Fuel filter (drain water separator)	■							
	Change fuel filter						■		
	Replace upstream fuel filter						■		■
	Check air cleaner	■							
	Empty dust collector	■							
	Air filter cartridge Clean / replace						■		■
	Check cooler - cooling ribs	■							
	Clean cooler - cooling ribs								■
	Check fan for signs of damage				■				
	Check coolant level	■							
	Top up coolant								■
	Check coolant level (anti-freeze concentration)					■			
	Change coolant							■	■
	Check drive belts					■			
	Replace drive belt								■

Maintenance	■
Maintenance during the running-in period	▼

Maintenance point	Operation	Operating hours						
		10	50	100	250	500	1000 / annually 2000 / every 2 years	If necessary
(3.2) Hydraulics								
Hydraulic oil reservoir	Check oil level	■						
	Top up the oil							■
	Change oil						■	
Suction/return hydraulic filter	Change filter element						■	■
Suction/return hydraulic filter	Check maintenance display	■						
	Change filter element						■	■
High-pressure filter	Check maintenance display	■						
	Change filter element							■
Hydraulic hoses	Perform a visual inspection					■		
	Replace hoses							■
Pump drive	Check the belts				■			
	Replacing belt						■	■
	Adjusting belt tension	▼						■
(3.3) Drive wheels								
Planetary gear drive wheels	Check oil level		■					
	Top up the oil							■
	Change oil				▼		■	
	Check visible unattached nuts and screws and tighten if necessary				▼		■	

Maintenance	■
Maintenance during the running-in period	▼

Maintenance point	Operation	Operating hours							
		10	50	100	250	500	1000 / annually 2000 / every 2 years	If necessary	
(3.4) Milling assembly									
Milling drum	Dismantle milling drum								■
Milling bits, wearing sleeves, bit boxes	Check condition	■							
	Replace milling bits, wearing sleeves, bit boxes								■
Side boards	Replace sliding shoes								■
	Replace support plates								■
Belt drive	Check the belts	■							
	Replacing belt							■	■
	Adjusting belt tension								■
Clutch friction lining	Check the friction lining					■			
	Replace the friction lining								■
Clutch bearing	Lubricate the bearing						■		
Angle drive	Check oil level		■						
	Top up the oil								■
	Change oil		▼			■			
Milling drum gear box planetary gears	Check oil level		■						
	Top up the oil								■
	Change oil			▼			■		
	Screw connections Check				■				
Milling drum gear box attached bearing	Screw connections Check				■				

Maintenance	■
Maintenance during the running-in period	▼

Maintenance point	Operation	Operating hours						
		10	50	100	250	500	1000 / annually 2000 / every 2 years	If necessary
(3.4) Milling assembly								
Side-board sliding shoes	Check the sliding shoes		■					
	Replace sliding shoes							■
Scraper Moldboard	Check scrapers		■					
	Replace scrapers							■
Milling box screw connections	Screw connections Check			▼				
	Screw connections Tighten							■
Sliding-shoe rubber skirt	Replace rubber seal							■

Maintenance	■
Maintenance during the running-in period	▼

Maintenance point	Operation	Operating hours							
		10	50	100	250	500	1000 / annually 2000 / every 2 years	If necessary	
(3.5) Loading unit									
Conveyor belt	Tension / sag Check	■							
	Adjust tension / deflection								■
	Check for signs of damage	■							
	Replace conveyor belt								■
Conveyor belt rollers	Check condition	■							
	Replace rollers								■
Steel securing rope	Check condition	■							
	Replace securing rope								■
Hopper rubber on transfer points and rubber seals	Check for signs of damage		■						
	Replace hopper rubber / rubber seals								■

Maintenance	■
Maintenance during the running-in period	▼

Maintenance point	Operation	Operating hours						
		10	50	100	250	500	1000 / annually 2000 / every 2 years	If necessary
(3.6) Water system								
Water tank	Check fill level	■						
	Top up top up water level							■
	Change water						■	
	Clean tank					■		
	Dismantle tank							■
Water filter	Check water filter	■						■
	Clean filter							■
	Drain off water							■
Spray nozzles	Check function							■
	Drain off water							■
(3.7) Electrical power supply								
Batteries	Check fill level of battery acid			■				
	Top up with distilled water							■
	Apply grease to battery terminals				■			
(3.8) Miscellaneous								
Emergency stop button	Check function	■						■
	Replace pushbuttons							■
Limit switches on upper conveyor	Check function	■						
Chassis leg guide	Apply grease to guide surface							■
	Adjust clearance on sliding plates	▼						■

Maintenance	■
Maintenance during the running-in period	▼

Maintenance point	Operation	Operating hours						
		10	50	100	250	500	1000 / annually 2000 / every 2 years	If necessary
(4.0) Lubricating points								
Belt tensioner PL500TD	Lubricate belt tensioner (grease nipple)		■					
Chassis leg, right	Grease the joint (grease nipple)		■					
Steering	Grease the steering unit (grease nipple)		■					
Upper conveyor reversing roller (○)	Lubricate clamping mount for drive drum (grease nipple)		■					
Upper conveyor drive (○)	Grease the bearing (grease nipple)		■					
Upper conveyor swivel console (○)	Grease the fulcrum (grease nipple)		■					
Hydraulic cylinder	Grease the bearing points (grease nipple)		■					
(5.0) Inspections								
General visual inspection		■						
Inspection by an expert							■	

Maintenance	■
Maintenance during the running-in period	▼

Maintenance point	Operation	Operating hours						
		10	50	100	250	500	1000 / annually 2000 / every 2 years	If necessary
(6.0) Cleaning								
Machine cleaning		■						■
(7.0) Preservation								
Machine preservation								■

2.1 Power unit - engine

Fuel tank

To prevent the formation of condensate, top up the fuel tank after each work session. This prevents the fuel tank from running dry, and eliminates the need for time-consuming purges of the fuel system.



Check fuel level at regular intervals using the display on the operating panel.



The locking tank neck (1) is located under the left-hand flap on the machine.



When fuelling, ensure that no fuel penetrates the earth. Switch off the engine and do not smoke. Do not fuel in enclosed spaces. Danger to health! Have a fire extinguisher ready.



If there is any need for cleaning work which requires the fuel tank to be emptied, drain off all remaining fuel from the tank.



The drain plug for this diesel fuel is located on the left, underneath the machine.

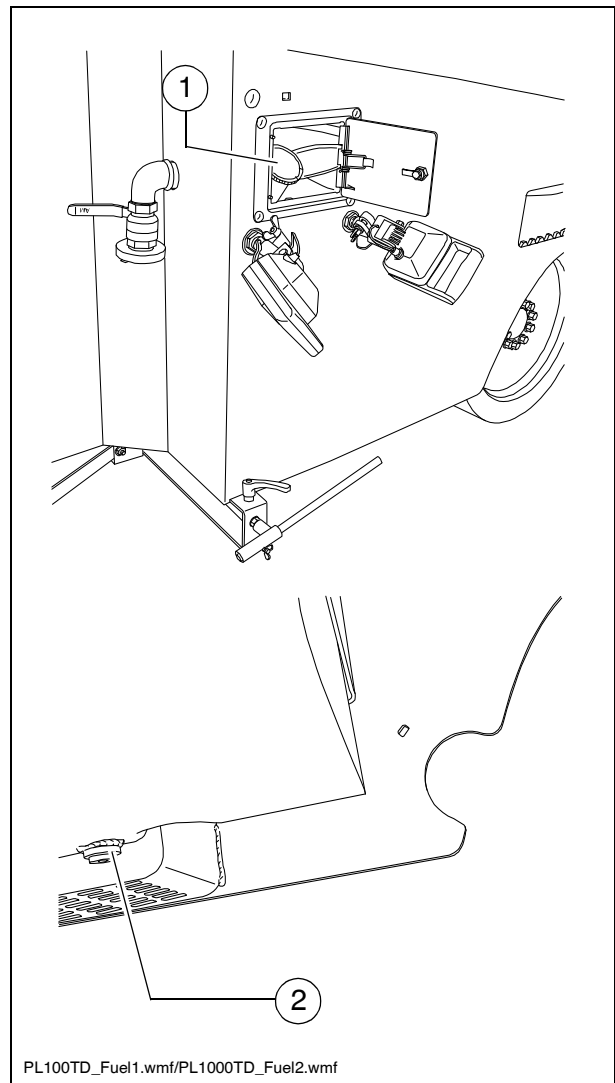
- To drain the fuel, first place a suitable receptacle under the drainage point, then remove the screw plug (2). After draining, screw the screw in again, using a new gasket.



Wear protective clothing when draining off diesel fuel.
Health hazard caused by contact with the skin.
Smoking and naked flame prohibited!



Never fill machine with dirty or contaminated fuel! Impurities in the fuel can cause serious malfunctions and may cause the engine to fail!



Diesel engine

Check oil level



When the oil level is between the two marks on the dipstick (1) it is correct.



Only check the oil level when the finisher is in a horizontal position!



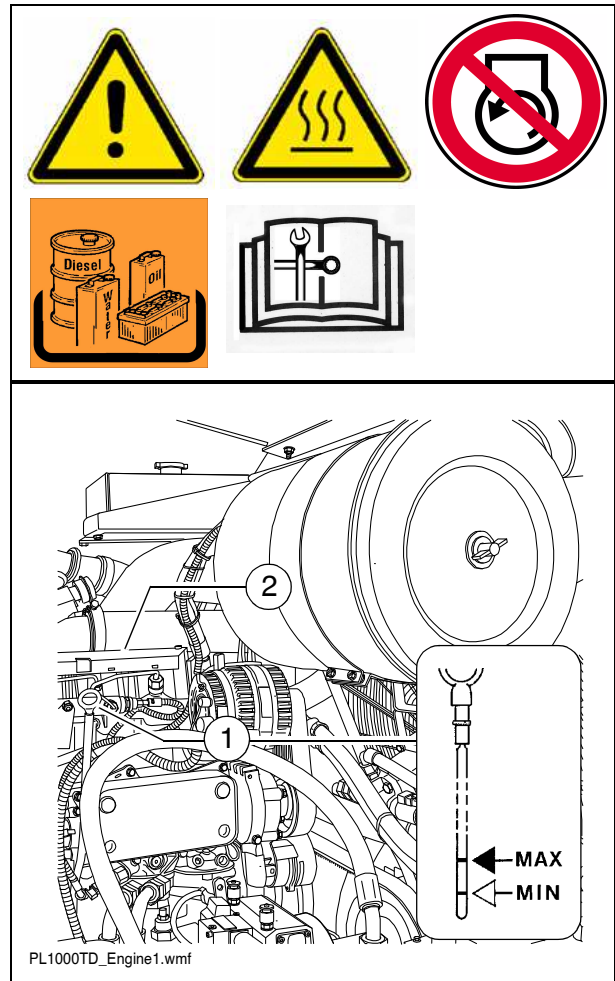
Too much oil in engine damages gas-kets; too little oil results in overheating and engine destruction.

For **filling in** the oil:

- Take off cover (2).
- Fill up oil to correct level.
- Return cap (2).
- Use dipstick to check level again.



Observe Engine Operating Instructions!



Oil change



The oil drain cock (3) is located on the left-hand side of the machine behind the storage room flap.



Risk of scalding from hot oil!

Before changing the oil, run the engine up to operating temperature.

- Twist and turn screw cap to remove.
- Hold the end of the hose down in the waste oil container.
- Open the shut-off valve with a wrench and completely drain the oil.
- Close the shut-off valve properly and reinstall the screw cap.
- Add new oil using the filler (2).
- Use a dipstick (1) to check the fill level.



Before checking the oil level with the dipstick, wait for a moment to allow the filled oil to reach the oil pan.



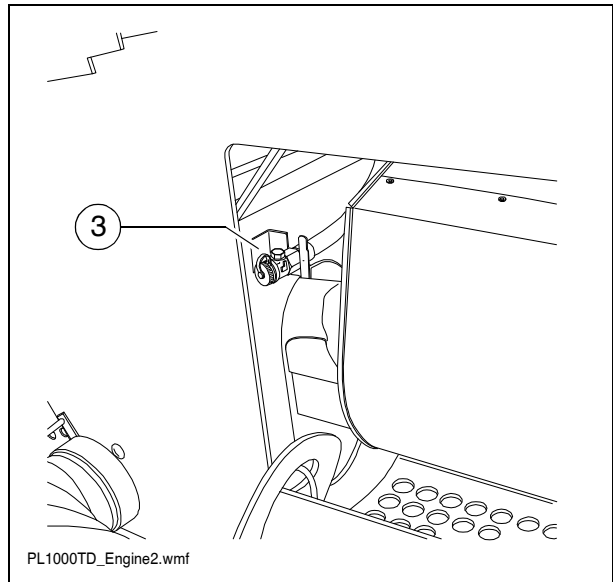
After filling with oil, run engine for short period then check oil level again after a few minutes.



Collect used oil in a suitable container and dispose of



Observe Engine Operating Instructions!



Oil filter

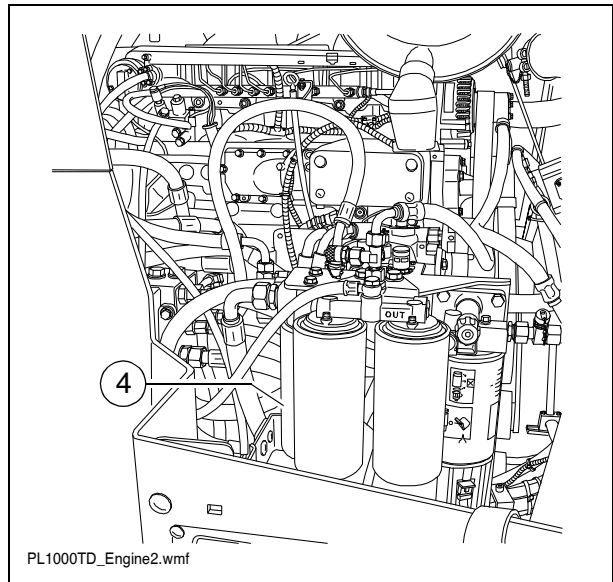


The new filter is inserted during an oil change once the used oil has been drained out.

- Unfasten filter (4) and clean the supporting surface.
- Apply light coating of oil to the gasket on the new filter and fill filter with oil before installing it.
- Tighten filter by hand.



After installing the oil filter, attention must be paid to the oil pressure display and good sealing during the test run. Check oil level again.



Fuel filter

Prefilter - draining of water



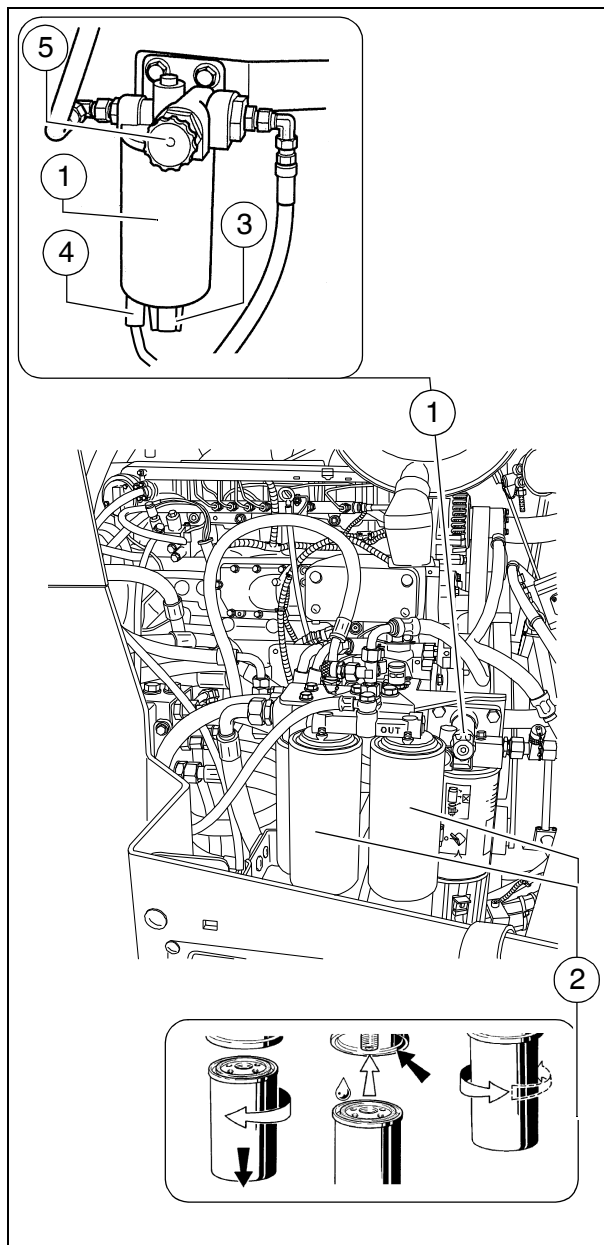
Drain the collecting vessel at regular intervals, or in response to an error message from the engine control unit.

There is a drain valve (3) on the underside of the filter cartridge.

- Disconnect engine control unit plug (4) and screw on drain valve (3) until the neck can be pulled out. Drain off fluid until only clear fuel emerges. Then slide the support back into place and hand-tighten the drain valve.
- Reconnect plug connection on water sensor (4).

Changing the prefilter:

- Remove connector from water sensor (4).
- Unfasten filter cartridge (1) with a filter wrench or filter strap and unscrew to remove.
- Clean sealing surface of filter bracket.
- Oil in filter cartridge gasket (only use a little oil) and screw (hand-tight) under the bracket.
- Reconnect plug connection on water sensor (4).
- Drain the filter.



Replacing the main filter:

- Unfasten filter (2) and clean the supporting surface.
- Apply light coating of oil to new filter gasket
- Tighten filter by hand.



After fitting the filter, ensure good sealing action during the test run.

Venting the filter:

- Unscrew and remove pump handle (5) then pump until filter is filled with fuel.



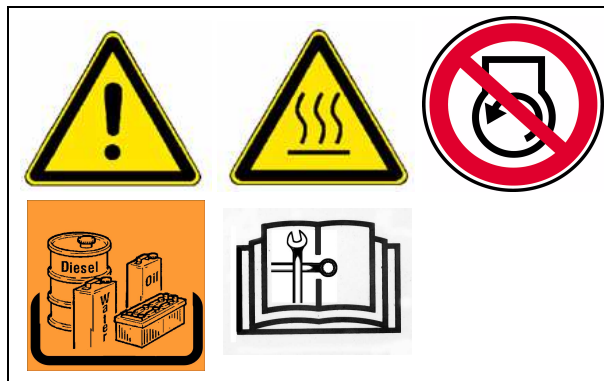
The fuel level in the system is high enough again if slight resistance can be detected on the pump handle during the pumping process.

- Screw pump handle (5) back in again.

Air filter

Empty dust collector

- Empty the dust removal valve (B) on the air cleaner housing (A) by pressing the discharge port in the direction of the arrow.
- Remove any dust deflectors by pressing together the upper valve section.



Clean outfeed slot occasionally.

Cleaning / replacing the air filter cartridge



Pollution of the combustion air filter depends on the dust content of the air and the mesh size of the filter selected.



Maintenance of the filter becomes necessary if:

- Engine electronics service indicator
 - Open the air filter lid.
 - Withdraw the filter cartridge (C) and the safety cartridge (D)



Clean the filter cartridge (C) and replace min. after one year.

- Blow out with dry pressure air (max. 5 bar) from inside out or tap it (in case of emergency only).

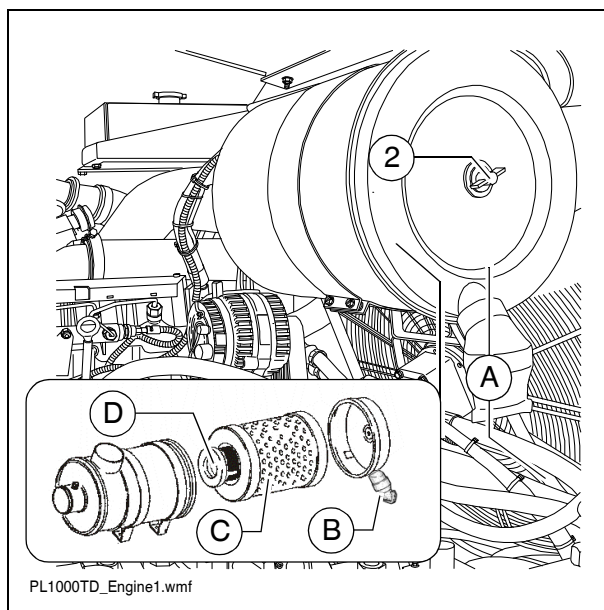


Do not damage cartridge when doing so.

- Check the soundness of the filter papers of the filter cartridge (by exposing to light) and the soundness of the seals. Replace them as required.



Replace the safety cartridge (D) after 5 filter maintenance, but min. after 2 years (never clean it!).



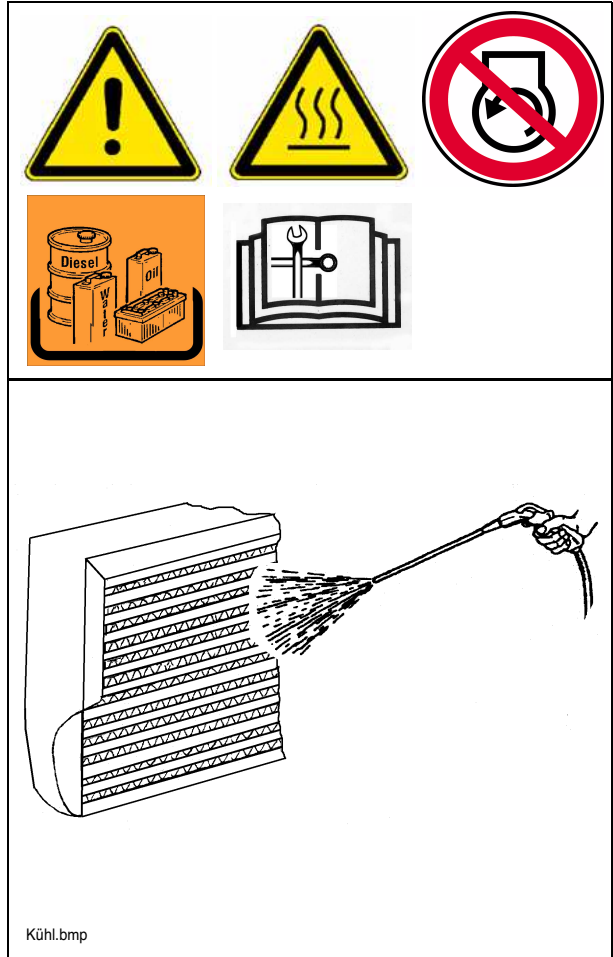
Radiator



Check the cooling ribs on the radiator for dirt and leaks on a daily basis.



With severe contamination, it is advisable to spray the radiator with dirt solvent, then to spray it down with a water jet.



Check coolant level / top up coolant / check concentration of anti-freeze



The expansion tank (1) is in the engine compartment.

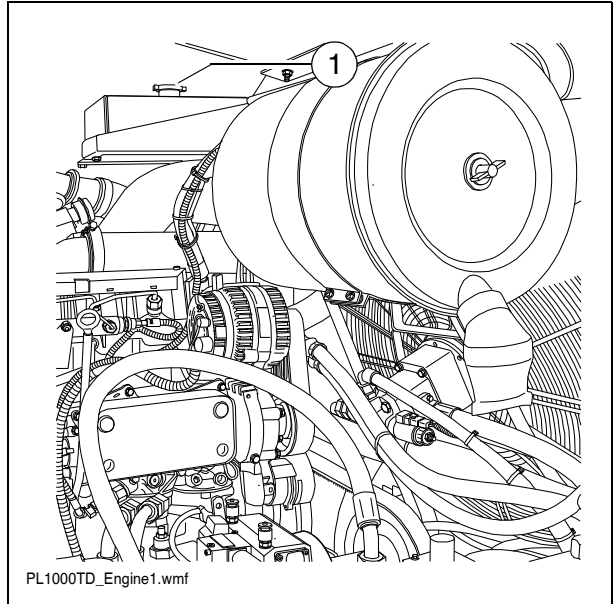
- If necessary, top up appropriate coolant through opened filler point in expansion tank.



During the filling process, the machine must be in transport position to vent the engine more effectively.



The cooling water level must be checked when the system is cold. Make sure that the anti-freeze and anti-corrosive liquid is sufficient (-25 °C).



System is under pressure when hot. Therefore a risk of scalding when opened!



Observe Engine Operating Instructions!

Change coolant

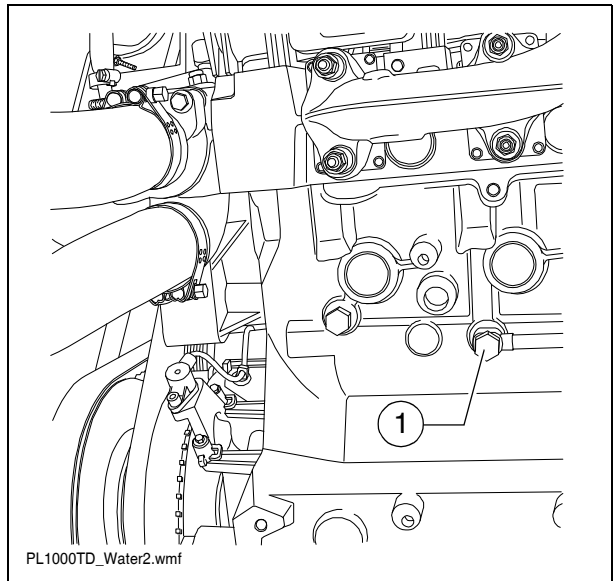


System is under pressure when hot. Therefore a risk of scalding when opened!



Collect used coolant in a suitable container and send for disposal.

- Screw out the drain plug (1) on the engine block.
- Completely drain the coolant.
- Screw in the drain plug again properly with a new seal (1).
- Top up coolant
(see section on checking coolant level / topping up coolant)



After replacing the coolant, ensure good sealing action during the test run.



Observe Engine Operating Instructions!

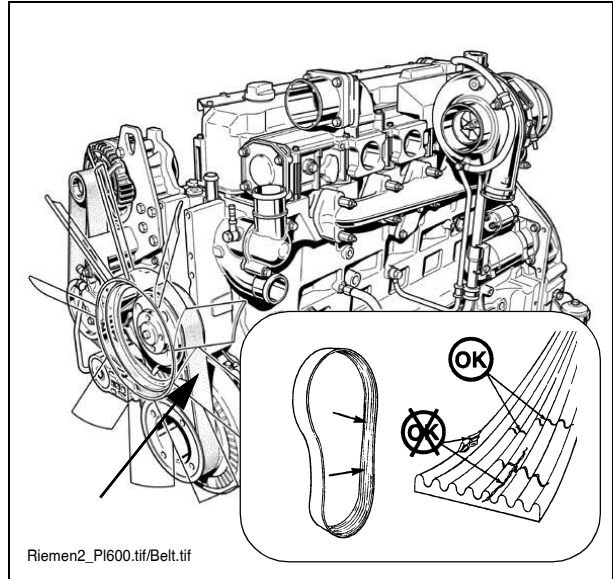
Drive belts



For maintenance of the drive belt: refer to Engine Operating Instructions.



In order to replace the engine drive belts, the pump drive has to be pressed off the engine.



2.2 Hydraulics

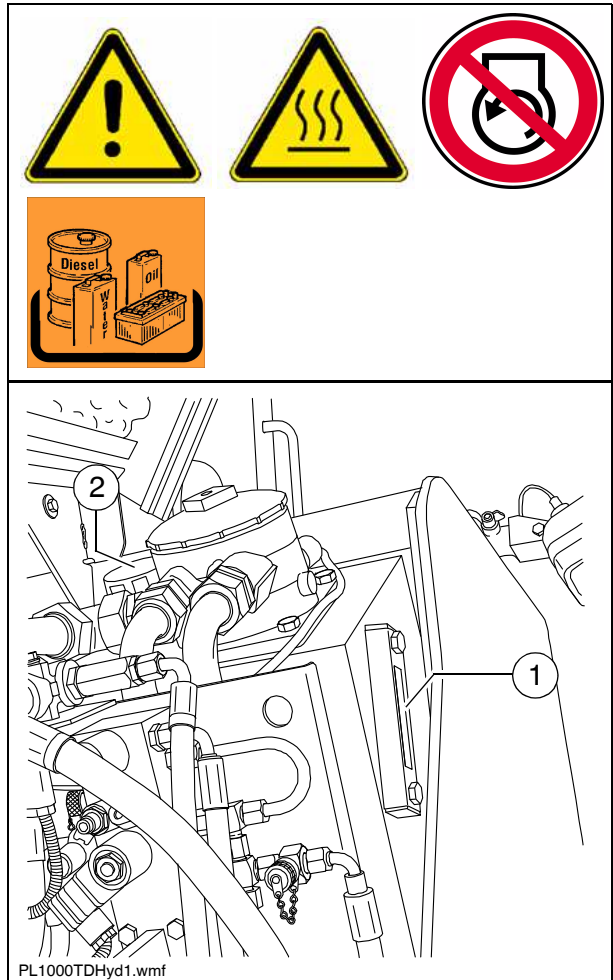


Before performing maintenance or repair work on the hydraulic system, the hydraulic reservoir must be depressurised. The separating clutch must be switched off for this purpose.

Hydraulic oil reservoir



Check the oil level daily on the indicator (1) located on the right-hand side of the machine.



To top up the hydraulic oil, open the screw cap (2) and fill new oil through a funnel.



Ensure that no impurities are able to enter the tank.



Avoid skin contact with hydraulic oil.



Always use recommended grades of hydraulic oil.

Changing the hydraulic oil

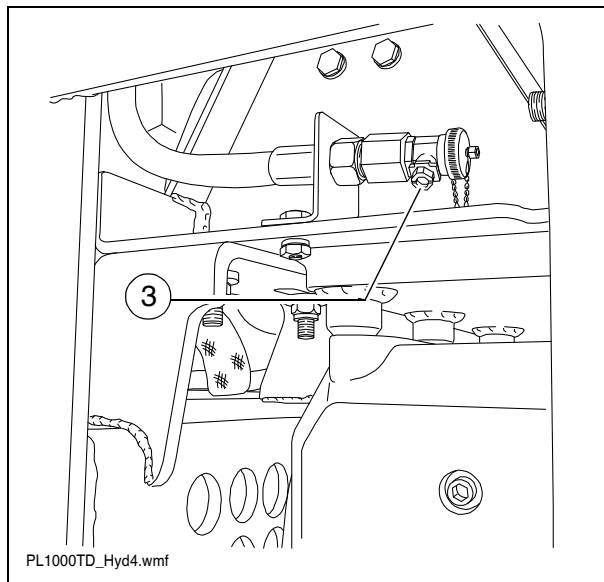


The oil drain cock (3) is located on the left-hand side of the machine behind the storage room flap.



Risk of scalding from hot oil!

- Unscrew the screw cap.
- Hold the end of the hose down in the waste oil container.
- Open the shut-off valve with a wrench and completely drain the oil.
- Close the shut-off valve properly and reinstall the screw cap.
- Add new oil using the filling opening (2) of the hydraulic oil tank.
- Use the display (1) to check the fill level.



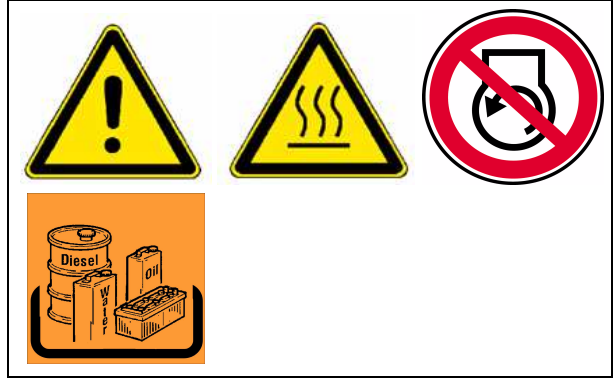
Collect used oil in a suitable container and send for disposal.



Protective clothing when draining hot oil. Health hazard caused by contact with the skin.

Suction-return hydraulic filter

- Unfasten the filter housing cover (4) by removing the square-section bolts.
- Remove the complete filter element from the housing.
- Remove handle (5) from the used filter element.
- Fit handle to the new filter element and install in the filter housing.
- Reinstall the filter housing cover (4) properly.



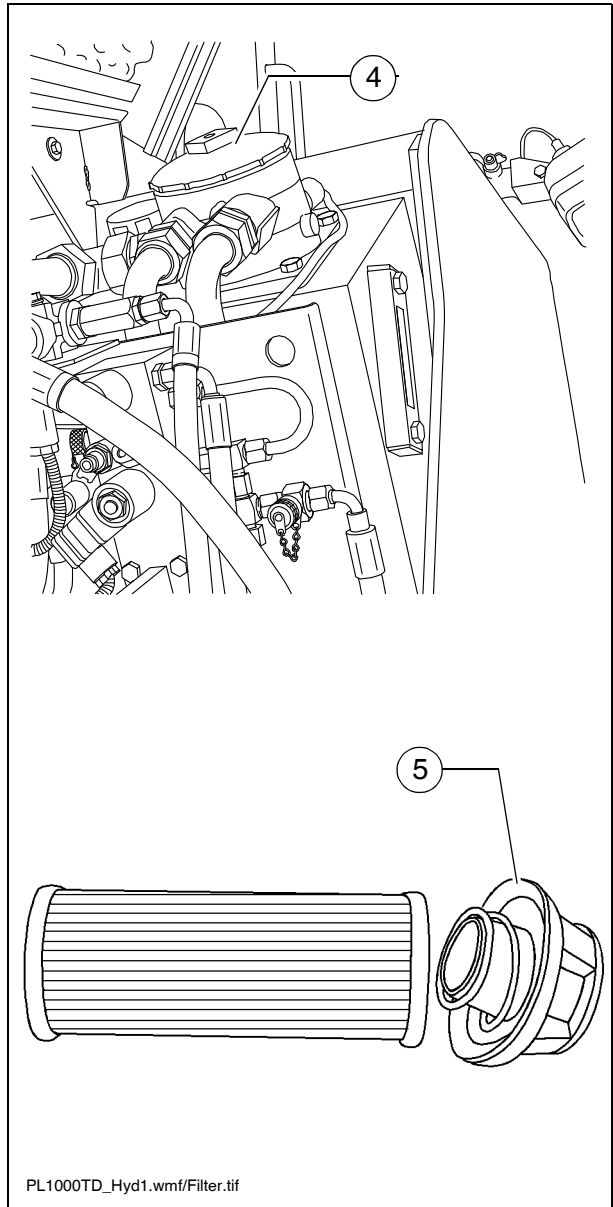
Wear protective clothing when draining hot oil. Health hazard caused by contact with the skin.



Never clean and reuse the filter! Always fit a new filter.



Dispose of used filters properly.



High pressure hydraulic filter



Replace filter element when maintenance indicator (1) turns red.



The filters should be checked 10 operating hours after repairs on the hydraulic system and replaced if necessary!

- Loosen the filter pot with a hexagonal key and then unscrew it by hand.
- Empty any dirt which has built up in the filter pot 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.



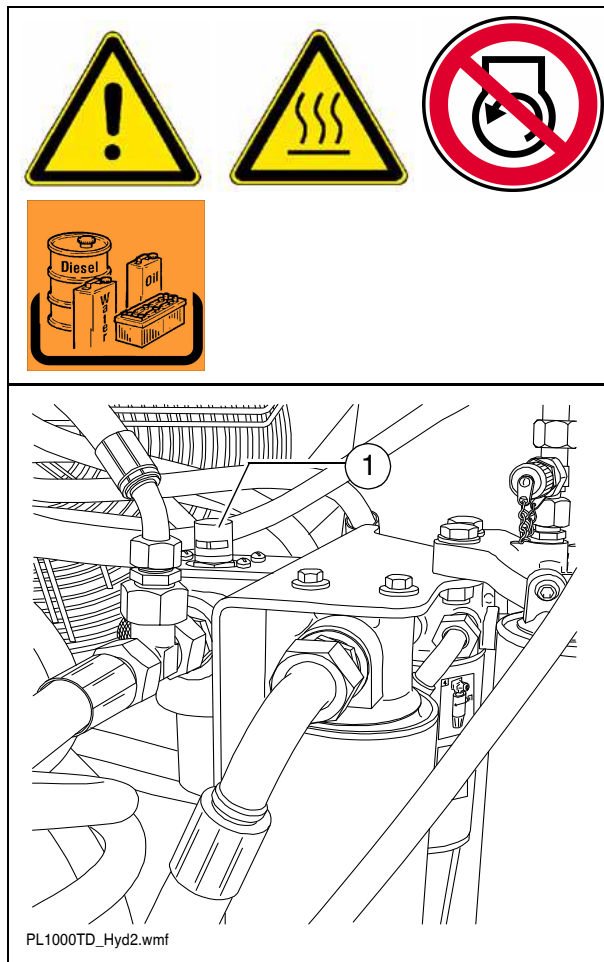
The red mark on the maintenance indicator (1) is reset automatically.



Wear protective clothing when draining hot oil. Health hazard caused by contact with the skin.



Never clean and reuse the filter! Always fit a new filter.



Hydraulic hoses



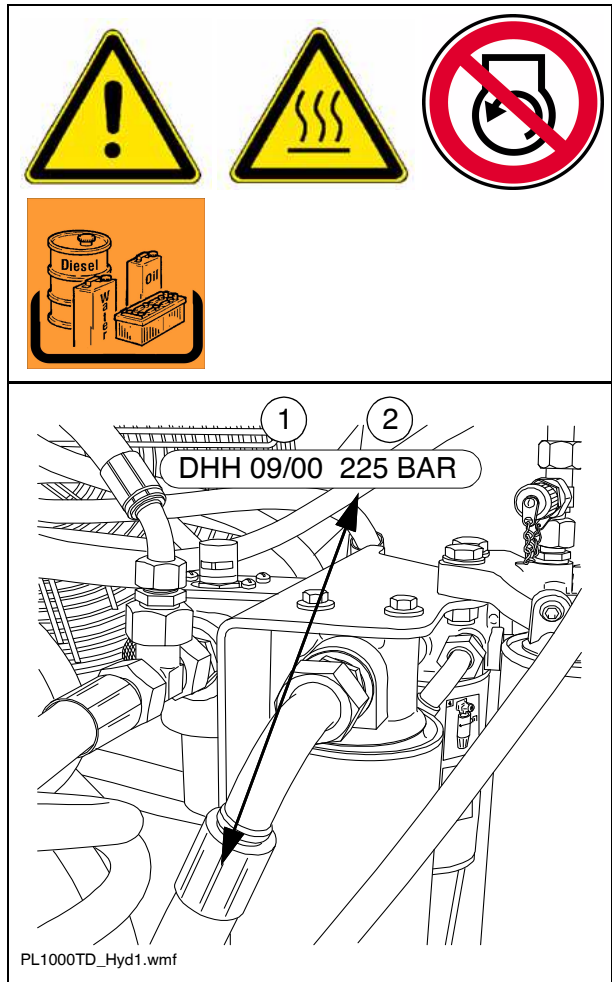
Ageing hoses become porous and may burst! Danger of accidents!



A stamped number on their screw connection provides information about the date of manufacture (1) and also quotes the maximum pressure limit (2) for this hose.



Never install hoses on top of one another and always ensure that they are at the correct pressure.



Pump drive



The pump drive is located between engine and cooler.



Checking belt tension



The tension of each belt must be inspected with a pretension checking instrument.



Information on checking the tension and on the correct belt tension is contained in the instructions of the tension measuring instrument!

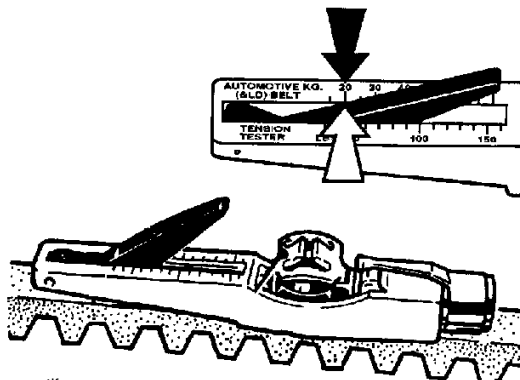
- Check the belt tension at the testing point (X) and readjust if necessary



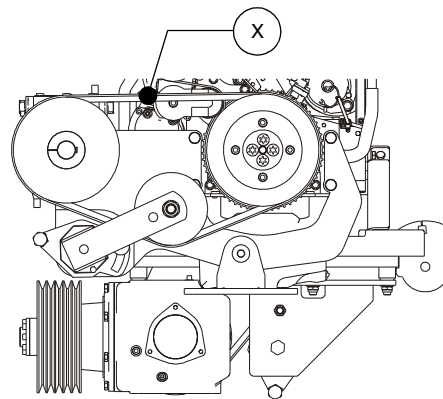
The tension must be adjusted to approx. 440N!



A pretension measuring instrument can be ordered under Article No. 4753200045!



Riemensp.tif



PL1000TD_Belt6a.wmf

Adjusting belt tension

- Loosen the mounting screw (1) and nut (2) of the tensioning arm.
- Swivel tensioning arm into "tensioning position":
 - Swivel the tensioning arm of the belt tensioner on the hexagon (3) against the belt.
- Tighten the mounting screw (1) and nut (2) of the tensioning arm properly.
- Check the belt tension at the testing point (X) and readjust if necessary



The tension must be adjusted to approx. 440N!

Replacing belt

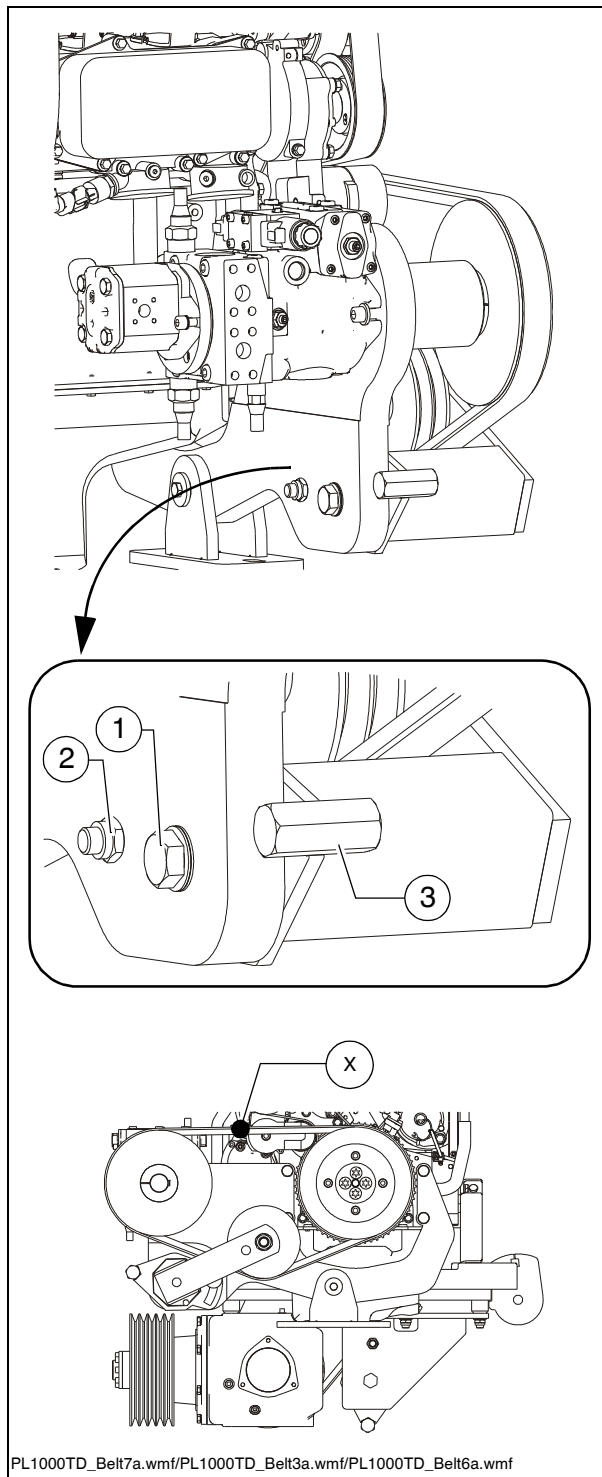
- Loosen the mounting bolt (1) and nut (2) of the tensioning arm.
- Swivel the entire belt tensioner inward on the hexagon (3) with a spanner.
- Mount the new belt and adjust tension again.



Always replace the belts in sets.



The condition of the pulleys is also to be tested. If the flank wear on the pulleys is too high, they must be replaced immediately.



2.3 Drive wheels, chassis legs

Planetary gear

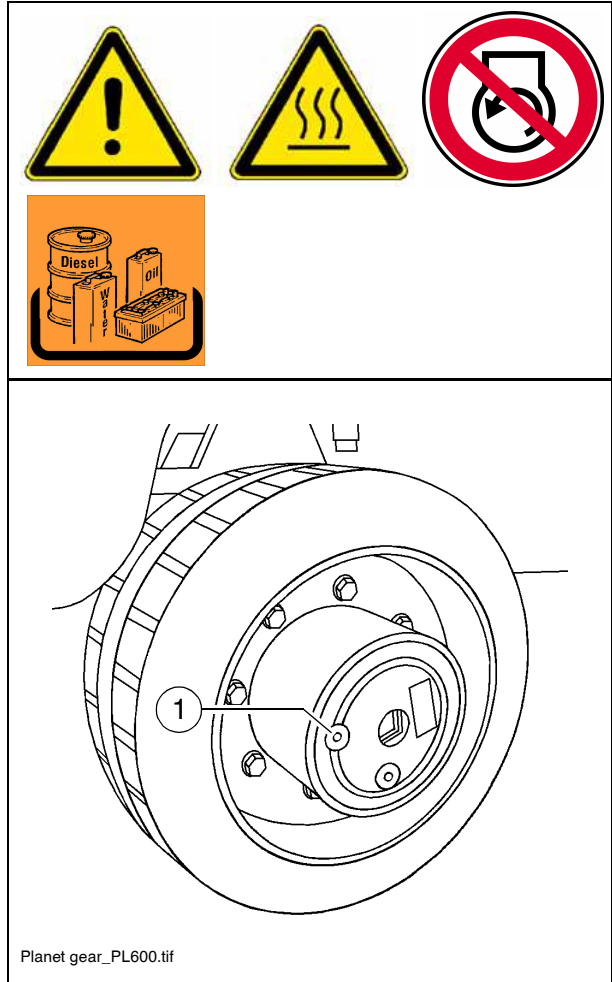
Oil level check

When checking the oil level and while filling with oil, the screw plug used for oil level checks (1) must be in its 9 o'clock position.

The oil level should reach the lower edge of the hole for the locking screw. Top up oil through the opened filler screw until a small amount of oil emerges from the screw plug bore.



When filling with oil, ensure high standards of cleanliness are observed.



Changing oil in planetary gear unit

To drain the oil, turn the drain plug (2) into its 6 o'clock position, ensuring that the filler screw (1) is in its 9 o'clock position.



Carry out an oil change only at operating temperature, immediately after the gear unit has come to a standstill. This ensures that solid particles have not had time to settle.

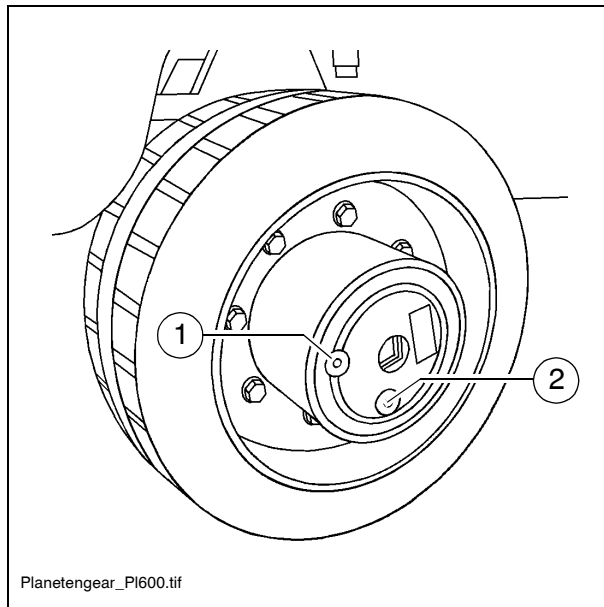
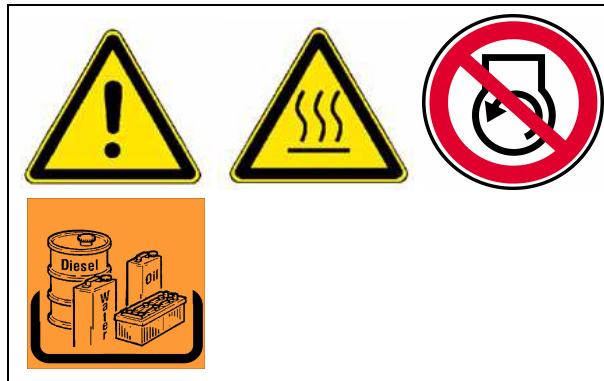


Wear protective clothing when draining hot oil. Health hazard caused by contact with the skin.

- Unscrew the oil drain screw (2), collect escaping oil.
- To bleed the system, unscrew the filler screw (1).
- After all the oil has drained, properly screw the drain plug (2) back in.
- Top up oil through the opened filler screw until a small amount of oil emerges from the screw plug bore.
- Screw the filler screw (1) back in properly.



When filling with oil, ensure high standards of cleanliness are observed.



2.4 Milling section

Milling drum

The milling drum is bolted to the planetary gear on the milling drum transmission. It is not mounted in bearings on its right-hand side.

Dismantle milling drum

The milling drum is easy to dismantle for repair work, or for replacement of the tool, e.g. when changing to a different drum width.

- Swivel right-hand chassis leg into its front position.
- Raise machine and secure to prevent it from lowering accidentally.
Ensure that the milling drum does not make contact with the ground.



Secure heavy components to prevent them from dropping accidentally. Use appropriate restraining and lifting tackle!

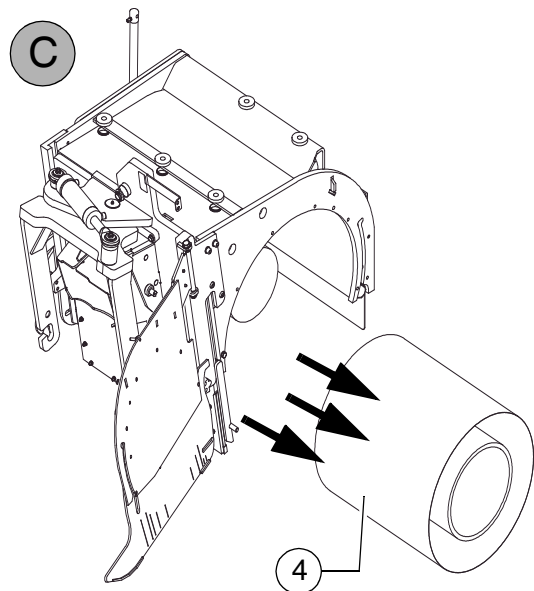
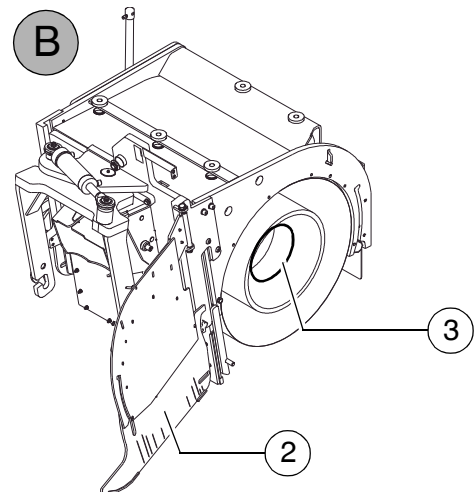
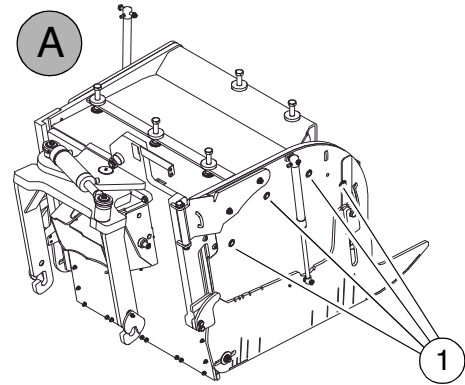
- Dismantle screws (1) from the milling case cover (A).
- Swivel up the milling case cover (2).
- Unfasten mounting screws securing milling drum (3).
- Pull milling drum (4) off transmission.



Reassemble in reverse order. Ensure that mounting screws are installed in the correct order, are tightened to the correct torque and are kept clean!



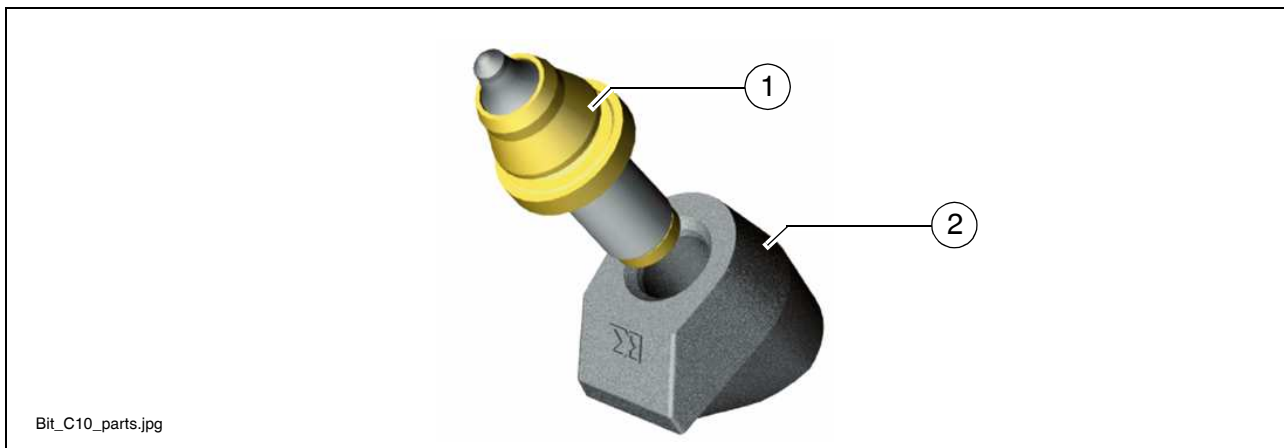
During disassembly and assembly, ensure that the milling drum is not tilted but guided in as straight a line as possible!



PL1000TD_Box1.wmf/PL1000TD_Box2.wmf/PL1000TD_Box3.wmf

Milling bits, wearing sleeves, bit boxes

SYSTEM C10HD



The two-part C10HD quick-change system comprises:

- Bit (1)
- Block (2)

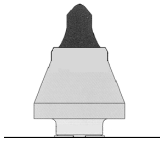
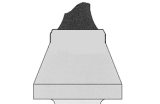


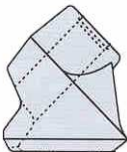
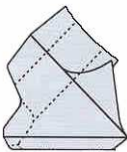
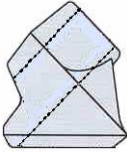
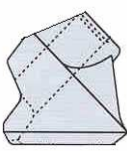
The condition of the milling bits and if necessary that of the wearing sleeve and bit boxes needs to be checked several times a day.

Immediately replace worn or damaged bits, wearing sleeves and blocks.



The machine capacity can only be fully utilised if milling tools are in perfect condition.

Wear characteristics on round-shafted bits	
	New bits
	Worn bits - replace as soon as possible
	Eroded bits - replace as soon as possible
	Bits with one-sided wear - replace immediately
	Worn bits - replace immediately
	Broken off bits - replace immediately
	Broken off bits - replace immediately

Wear characteristics of bit boxes		
		New bit box
		Serious wear to locating faces of the milling bit or wearing sleeve - replace without delay
		Serious wear to locating bore on the milling bit or wearing sleeve - replace without delay
		Severe wear to flank - replace immediately



The following safety precautions need to be taken, and the following action needs to be taken when inspecting and replacing the bits, bit boxes and, where necessary, to the wearing sleeves:

- Ensure that the engine cannot be started.

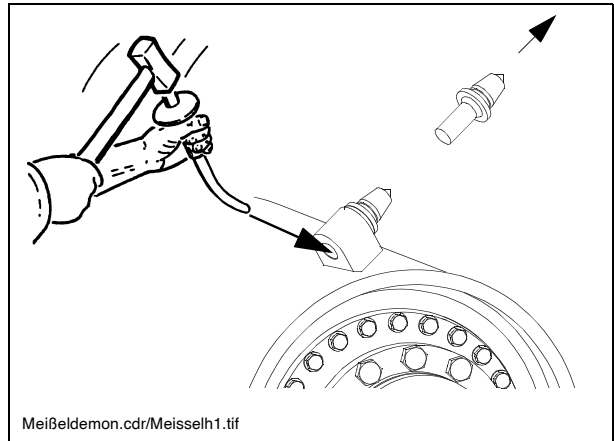


When using the pneumatic extractor, ensure compliance with the relevant safety regulations!

Dismantling the bits

System:
C10HD

- Fit hammer punch into bore on reverse side of bit box then drive out worn and damaged bits by striking with a hammer.



Installing the bits

System:
C10HD

- Knock new bits into the bit box with a hammer with copper, brass or rigid plastic head.



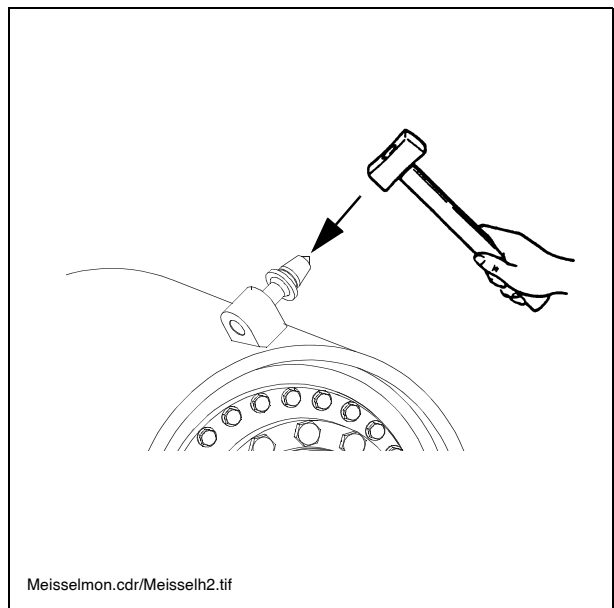
Do not use a steel-headed hammer to drive bits into their holders because this could destroy their bit tips. Risk of injury from flying metal splinters.



After assembly, ensure that the milling bits are able to rotate. Jammed bits suffer from one-sided wear so wear out too rapidly.



When installing new bits and wearing sleeves, always ensure that all bores and locating surfaces are free of dirt!

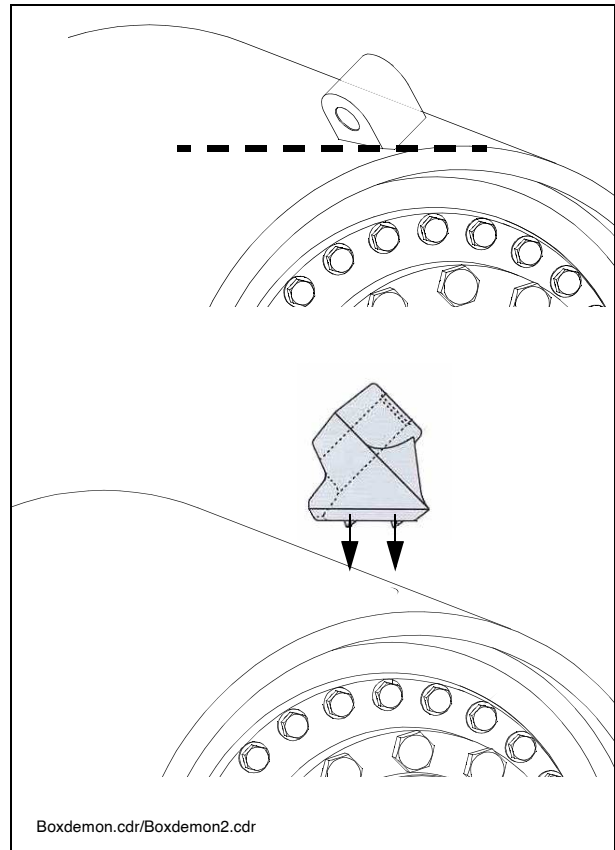


Replacing the bit box

- The bit boxes arranged on the drum need to be so firmly and reliably welded to the milling drum that they only very occasionally break off, and then only under extreme conditions (e.g. old steel rails lying concealed in the milling surface). Defective bit boxes are then relatively easy to replace:
- Remove the defective bit box from the milling drum and ensure that the locating face is smooth and even.
- Position the new bit box (with bit inserted!) on the drum.
- Attach new bit box to the shaft then weld firmly into place.



Take all necessary safety precautions during cutting and welding work!



Belt set I: clutch - gear box

Checking belt tension



The tension of each belt must be inspected with a pretension checking instrument.



Information on checking the tension and on the correct belt tension is contained in the instructions of the tension measuring instrument!

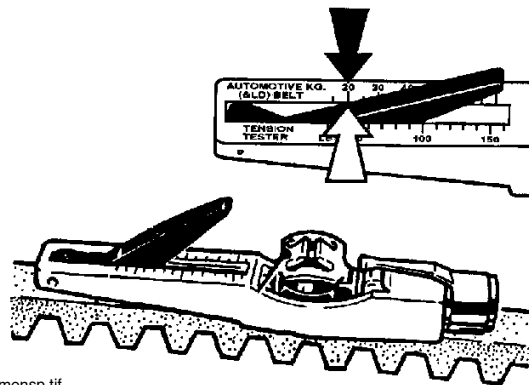
- Check the belt tension at the testing point (X) and readjust if necessary



The tension must be adjusted to approx. 300N on all individual belts!
On new belts the tension must be adjusted to approx. 600N.

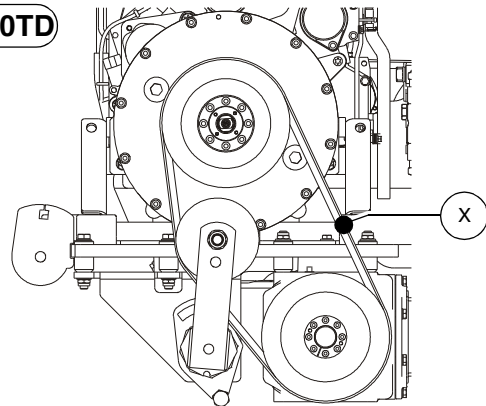


A pretension measuring instrument can be ordered under Article No. 4753200045!

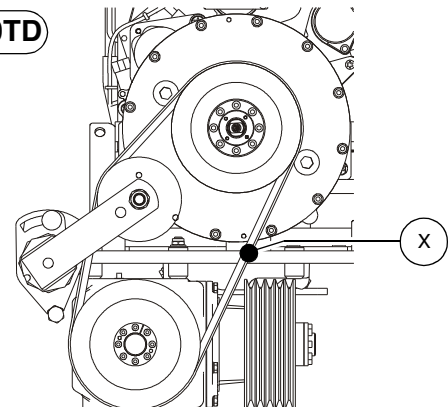


Riemensp.tif

PL600TD



PL1000TD



PL600TD_Belt4a.wmf/PL1000TD_Belt4a.wmf/

Adjusting belt tension

- Loosen the mounting screw (1) and nut (2) of the tensioning arm.
- Swivel tensioning arm into "tensioning position":
 - Swivel the tensioning arm of the belt tensioner on the hexagon (3) up to the stop on the oval hole (4) against the belt.
- Tighten the mounting screw (1) and nut (2) of the tensioning arm properly.
- Check the belt tension at the testing point (X) and readjust if necessary



The tension must be adjusted to approx. 300N on all individual belts!
On new belts the tension must be adjusted to approx. 600N.

Replacing belt

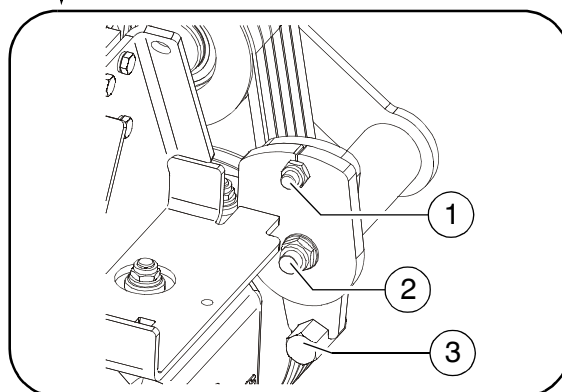
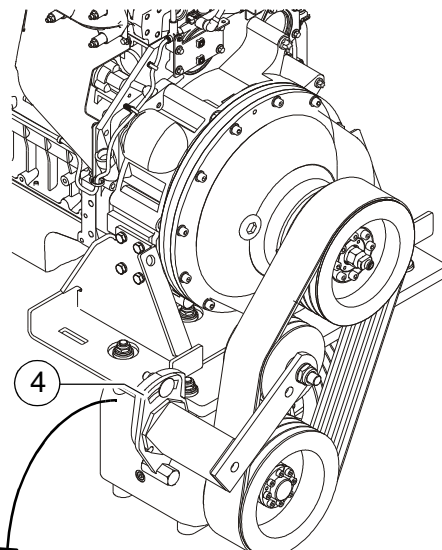
- Loosen the mounting screw (1) and nut (2) of the tensioning arm.
- Swivel the entire belt tensioner inward on the hexagon (3) with a spanner.
- Mount the new belt and adjust tension again.



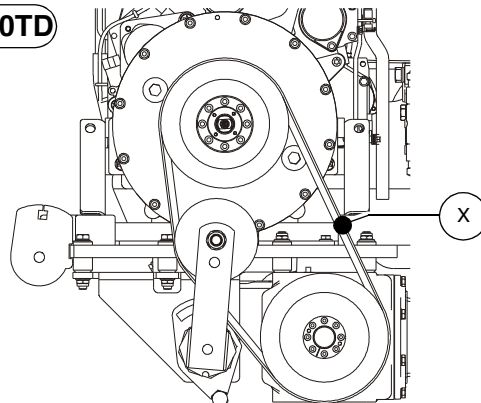
Always replace the belts in sets.



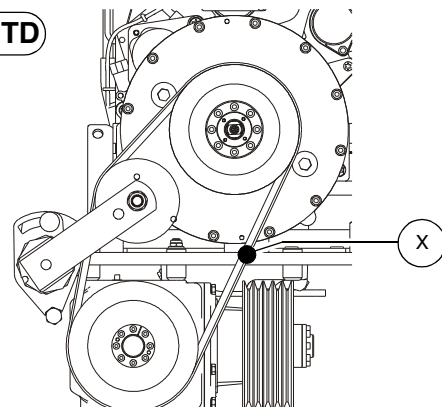
The condition of the pulleys is also to be tested. If the flank wear on the pulleys is too high, they must be replaced immediately.



PL600TD



PL1000TD



PL1000TD_Belt2.wmf/PL1000TD_Belt3.wmf/PL1000TD_Belt4a.wmf/
PL600TD_Belt4a.wmf/

Belt set II: gear box - milling drum



Replacing belt



After actuation of the service switch (operating panel), tension on the belt tensioner of the angle drive/milling drum is relieved and it is then easy to remove the belts from the pulleys.



Switch off the machine and secure it against starting!

Replacing belt

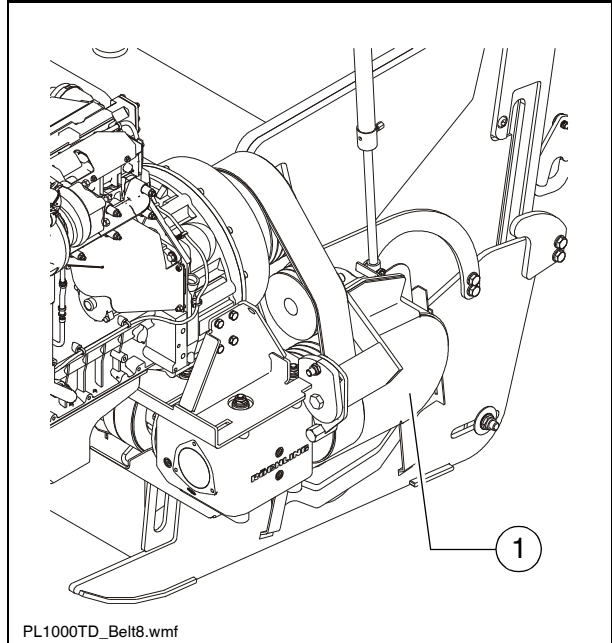
- Remove belt guard (1).
- Remove worn belts and lay on new belt.
- Reinstall the belt guard (1) properly.



Always replace the belts in sets.



The condition of the pulleys is also to be tested. If the flank wear on the pulleys is too high, they must be replaced immediately.



Clutch friction lining

The inspection cover (1) of the clutch casing must be removed to check for wear.

- Remove inspection cover (1).
- Check wear on outer pulley through the open inspection port.

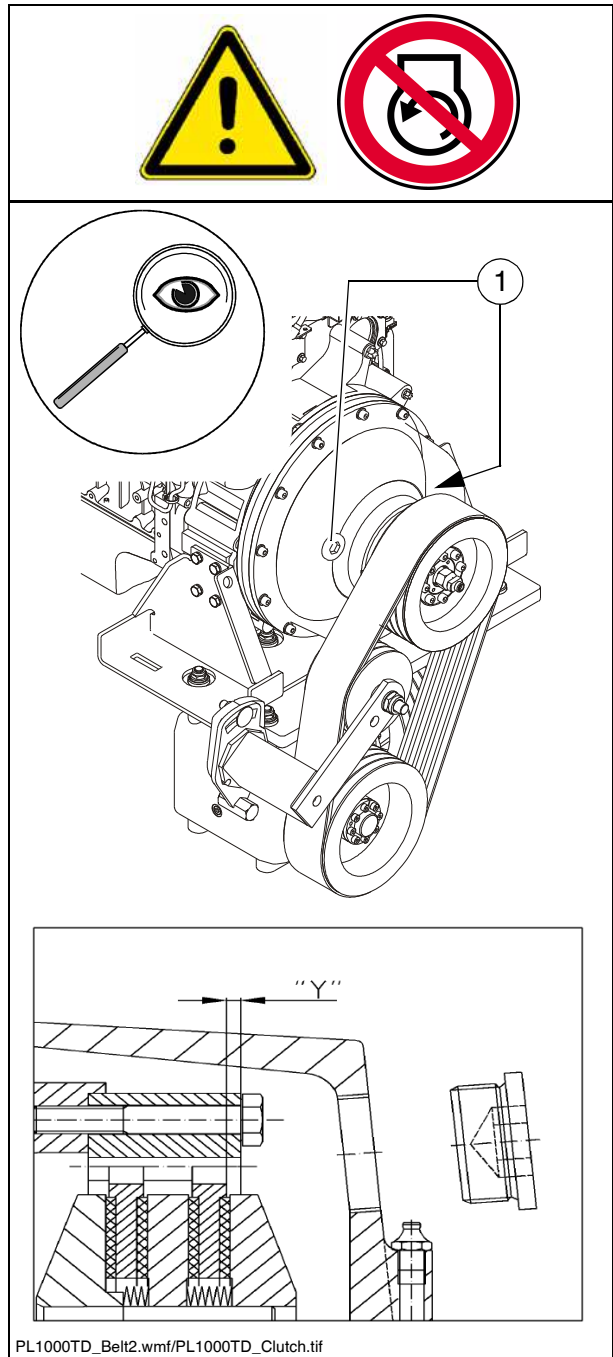


If it has reached its maximum design rating for mechanical wear (Y), the outer pulley(s) must be replaced.



Clutch in new condition 4 mm, wear limit at 8,5 mm.

- After the inspection, lock the inspection cover again properly.

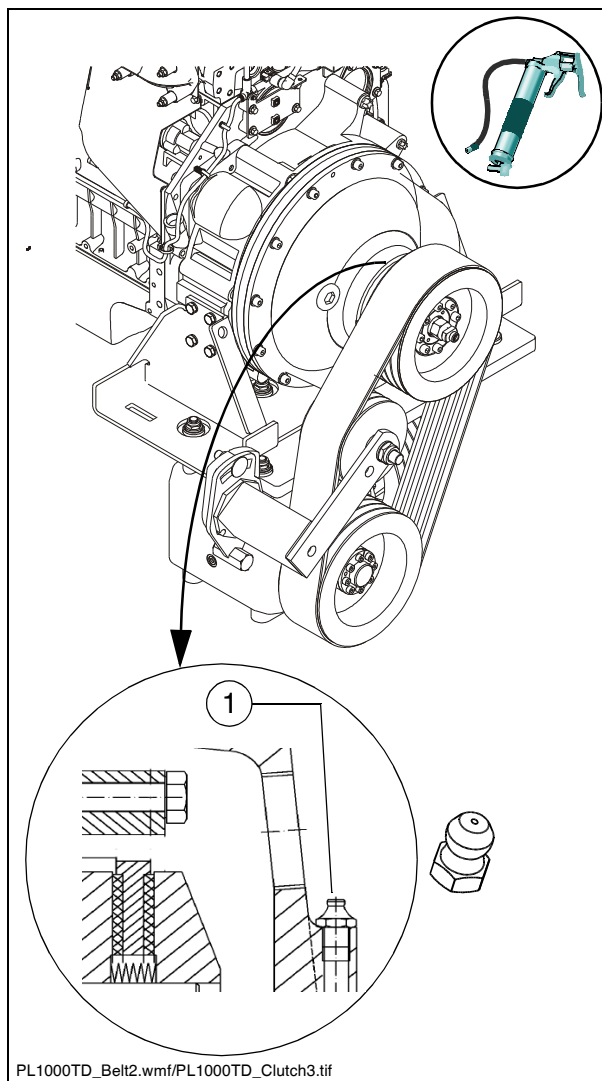


Clutch bearing



Ensure that the drive engine cannot be started!

- Add 20 g of the specified lubricating grease with a grease gun at the lubricating nipple (1).



Angle drive

Oil level check

To check the oil level and while filling with oil, the machine must be in a horizontal position.

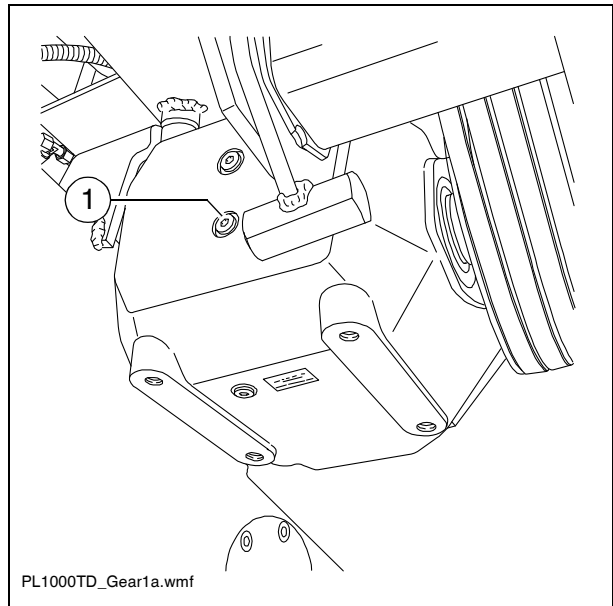
- Unscrew and remove the filler and level checking screw (1).

The oil level should reach the lower edge of the hole for the locking screw.

- Top up with oil through the opened bore until a small amount of oil starts to escape.
- Refit the filling and inspection screw again properly.



When filling with oil, ensure high standards of cleanliness are observed.



Oil change

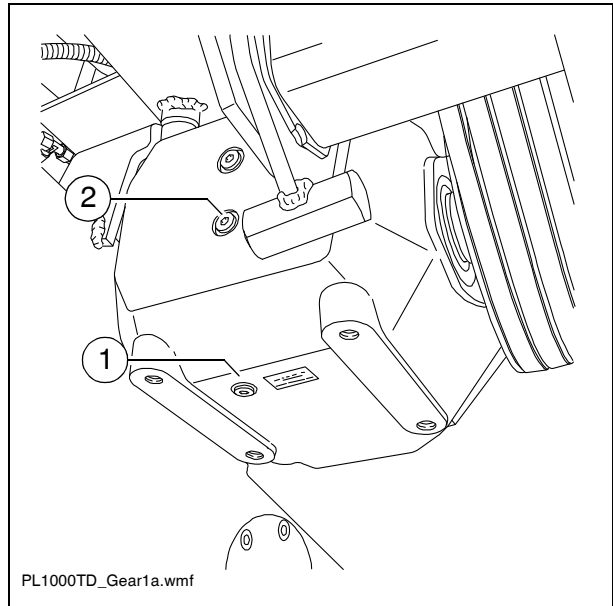


Carry out an oil change only at operating temperature, immediately after the gear unit has come to a standstill. This ensures that solid particles have not had time to settle.



Wear protective clothing when draining hot oil. Health hazard caused by contact with the skin.

- Park machine in horizontal position
- Remove the inspection screw (2).
- Unscrew the oil drain screw (1), collect escaping oil.
- After all the oil has drained, properly screw the drain plug (1) back in.
- Top up with fresh oil through the opened bore in the level checking screw until a small amount of oil emerges from the bore.
- Screw the filler screw (2) back in properly.



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



When filling with oil, ensure high standards of cleanliness are observed.

Milling drum gear-box planetary gear



To change the oil and check the oil level, first the milling box must be opened:

Open/close milling box

- Swivel right-hand chassis leg into its front position.
- Raise machine and secure to prevent it from lowering accidentally.



Ensure that the milling drum does not make contact with the ground.

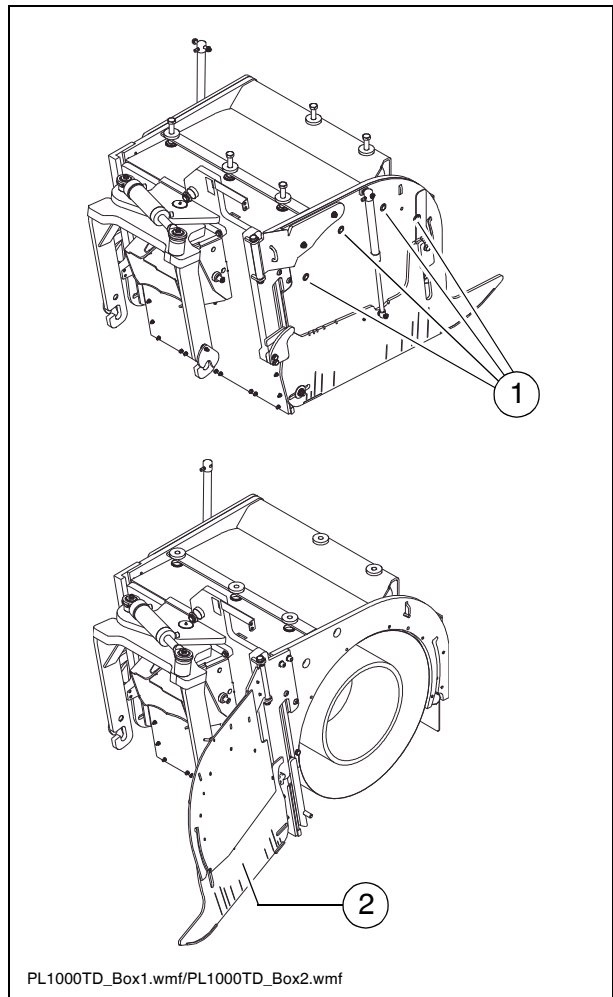
- Dismantle screws (1) from the milling box cover.
- Swivel up the milling case cover (2).



Close the milling box again properly after performing maintenance!



Reassemble in reverse order. The proper torque and cleanliness must be ensured when doing so!



Checking the oil level:

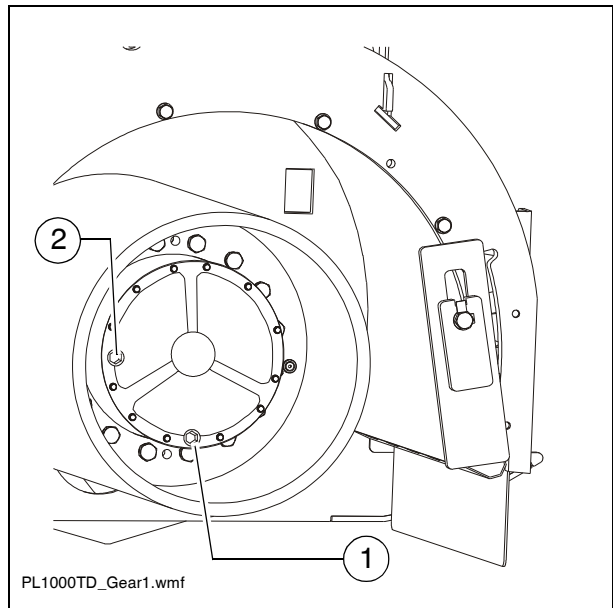
To check the oil level and while filling with oil, the machine must be in a horizontal position.

- Turn the milling drum so that the drain plug (1) is located in the lowest position.
- Unscrew and remove the filler and level checking screw (2).



The oil level should reach the lower edge of the hole for the locking screw.

- If necessary, top up with oil through the opened bore until a small amount of oil starts to escape.
- Refit the filling and inspection screw (2) again properly.



When filling with oil, ensure high standards of cleanliness are observed.

Oil change:



The oil should be changed when at operating temperature.



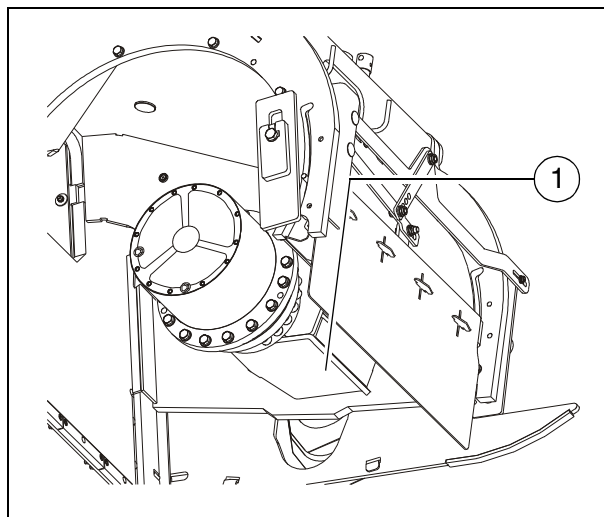
Ensure that no dirt or foreign bodies are able to enter the gear.

- Turn the milling drum so that the drain plug (1) is located in the lowest position.
- Unscrew and remove the drain plug (1) and filler screw (2) and drain off oil.
- Check gaskets on both screws and replace if necessary.
- Reinstall the drain plug (1) properly.
- Top up with oil through the opened bore (2) until a small amount of oil starts to escape.
- Refit the filling and inspection screw (2) again properly.

Milling drum gear box attached bearing

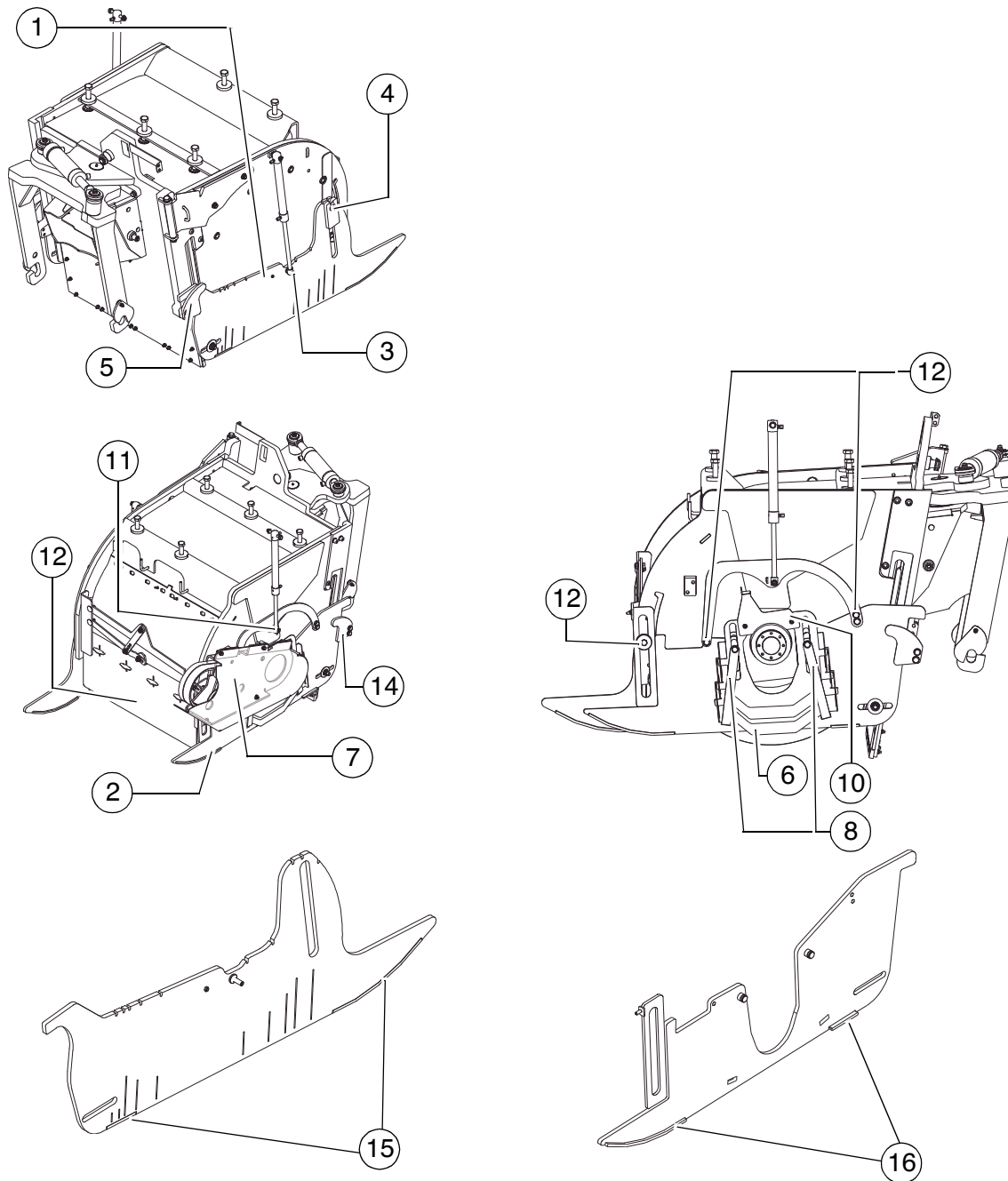


The attached bearing (1) is provided with a lifetime oil filling! It is not necessary to check or change the lubricant!



Side boards

Sliding shoes



PL1000TD_Box1.wmf/PL1000TD_Box6.wmf/PL1000TD_Box7.wmf/PL1000TD_Schild_RH.wmf/PL1000TD_Schild_LH.wm

The side boards which slide over the ground (1), (2) should be checked every 50 hours to ensure that they are still properly attached.

There is one side board on either side of the milling box.

The sliding shoes on the side boards are in continuous sliding contact with the milling (i.e. road) surface during milling operations, as a result of which they are subject to increased levels of wear.



Once the material on these shoes becomes too thin, the shoes have to be replaced.

- Remove right-hand side board (1) A:
 - Fold in the chassis leg
 - Lower side board until it makes contact with the ground.
 - Dismantle hydraulic cylinder at retaining point (3).
 - Retract the hydraulic cylinder.
 - Remove guide (4).
 - Remove plate (5).
 - Pull side board sideways to remove.



An eye bolt can be fitted to the lifting point (3) on the hydraulic cylinder to hold and lift the side board after disassembly.

- Remove left-hand side board (2) A:
 - Lower side board until it makes contact with the ground.
 - Dismantle cover panels (6) A:
 - Remove belt guard (7) and remove belt from pulley.
 - Unfasten retainer on cover panels (8) and disconnect from the side board.
 - Remove top connecting element (10).
 - Individually remove cover plates from below.
 - Dismantle hydraulic cylinder at retaining point (11).
 - Dismantle web on input aperture by unfastening the screws (12).
 - Remove mounting screws (13) with washer and guide bush.
 - Remove plate (14).
 - Lift machine and pull side board sideways to remove.
- Cut the welded sliding shoes (15) / (16) off the side board.
- Weld new sliding shoes firmly to the side board.



Take all necessary safety precautions during cutting and welding work!

Moldboard scraper



Inspect the scrapers on the moldboard every 50 operating hours and replace if necessary.
If surplus material is left in the milling lane, also check these components.

The scrapers ensure that almost no mill material remains in the milling lane, thereby ensuring that waste material is collected up properly.
These components, installed down the full length of the moldboard, are fitted with hardened metal tips which gradually wear down over time.

- Raise the machine, completely lower the scraper and fully raise the side boards.



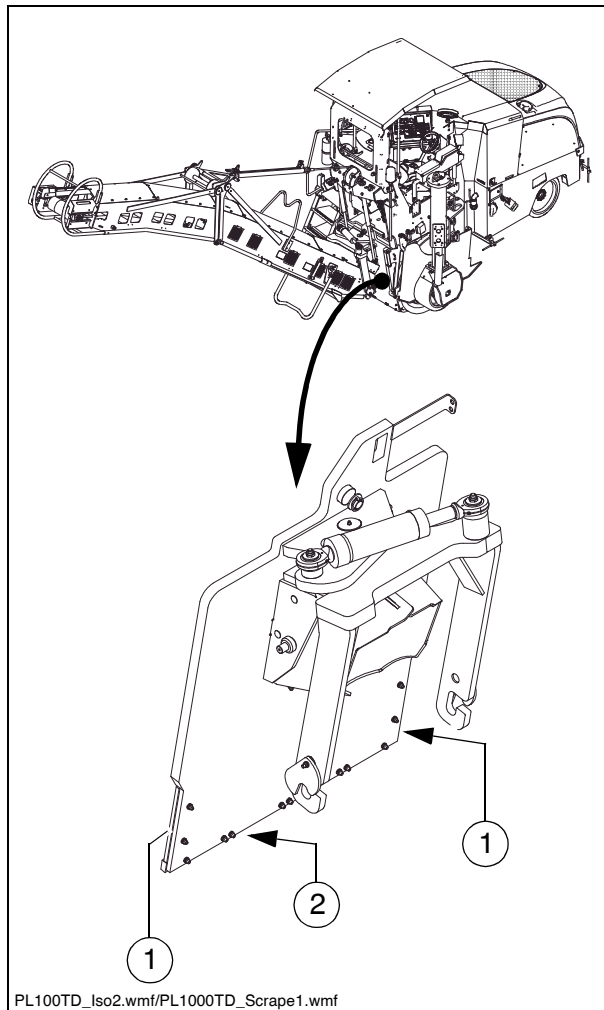
Ensure that the engine cannot be started.



Check that the moldboard is secured by the retaining hook!



There are two different wearing elements (1), (2) on the moldboard.



- Remove worn scrapers by unfastening the two mounting screws.
- Clean the locating surface, install new components properly and, if necessary, adjust to the required height using the longitudinal slots.

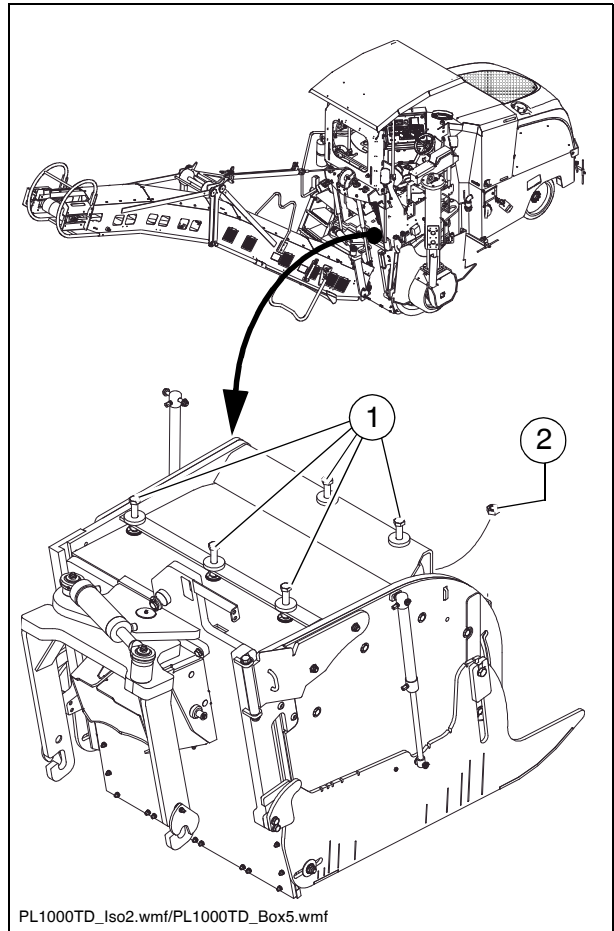
Milling box screw connections

The connection between milling box and machine frame must be checked / retightened using a suitable torque wrench:

Tightening torque: 1060 Nm



Tightening is performed on the milling box nut (2). Screws (1) are held in the machine frame.



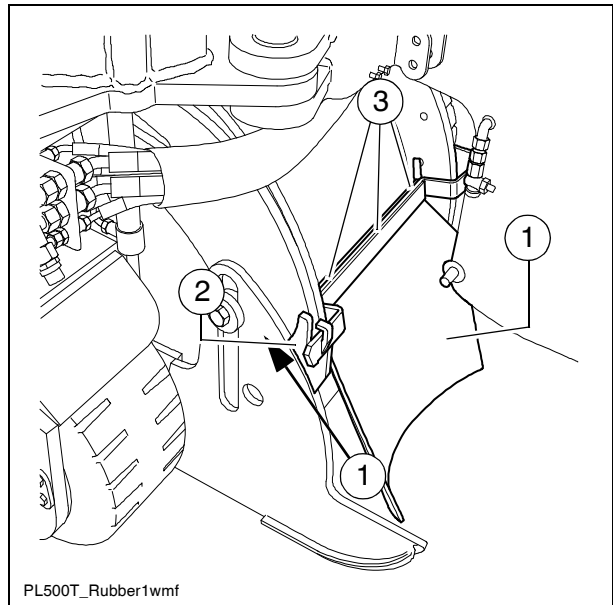
Sliding shoe rubber skirt

There is a rubber skirt on the sliding shoes (1) which is intended to catch spraying material.

This skirt must be inspected at regular intervals for signs of damage.

Replacing rubber skirt:

- Remove rubber skirt from bracket (2)
- Remove mounting screws (3) and remove the damaged component.
- Fit new component properly then tighten the mounting screws.



2.5 Loading unit

Belt tension



Check belt tension on the upper conveyor on a daily basis. If there is too much slack in the belt, adjust the tension.



During the first weeks of operation, the belt may stretch excessively (residual and elastic elongation). It is therefore necessary to adjust the belt tension repeatedly during this period.

Increasing the tension:

- Unfasten lock nuts (1) on both sides of the tensioning fixtures.
- Adjust tension on both sides evenly on the adjusting nuts (2) using an open-end wrench.
- Tighten lock nuts (1) back down after the adjustment procedure.



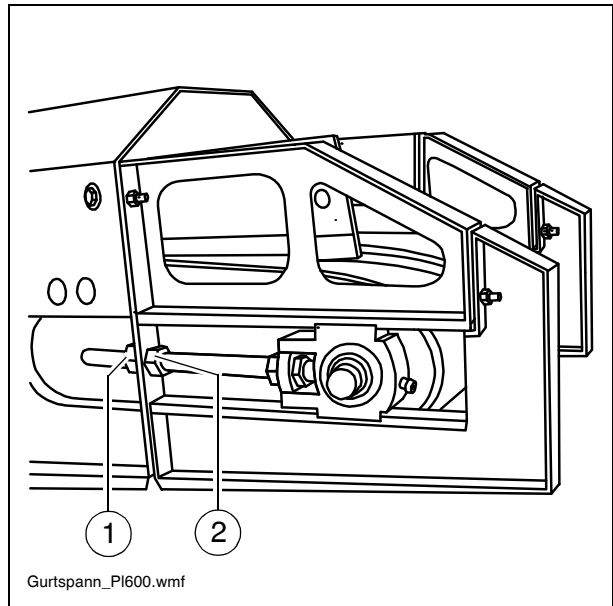
If the belt on the reversing drum is running to one side, tighten the right-hand spindle or loosen the left-hand spindle if the drum is rotating clockwise, or vice versa for anti-clockwise rotation.



Avoid excessive angle setting on the reversing drum because this can cause the belt fabric to stretch excessively.



If the reversing roller is unable to apply sufficient tension control, the load-bearing rollers need to be realigned. To do this, unfasten the displacement plate for the load-bearing station and twist the station round slightly. If the belt is to be adjusted to the right, the left-hand load-bearing roller needs to be pushed forwards, or its right-hand side needs to be pushed forwards if the belt needs to be adjusted towards the left side.



The following factors can cause the belt to run at an oblique angle:

- Encrusted material on drums and rollers.
- Off-centre material buildup
- Differing levels of belt stretch, e.g. one-sided over-tightening
- One-sided wear of the drum friction lining
- Chafing of belt against machine frame.
- Improper version of endless belt connection.



In addition, perform visual check of belt and conveyor belt rollers for signs of damage or wear.



Remove encrusted material from the drums on a regular basis.



Inspect bolt connections on a regular basis.



During all work on the upper conveyor, ensure that the conveyor drive cannot be started!

Steel cables



Check the condition of the steel retaining cable on the upper conveyor on a daily basis.

Always replace damaged steel cables immediately.

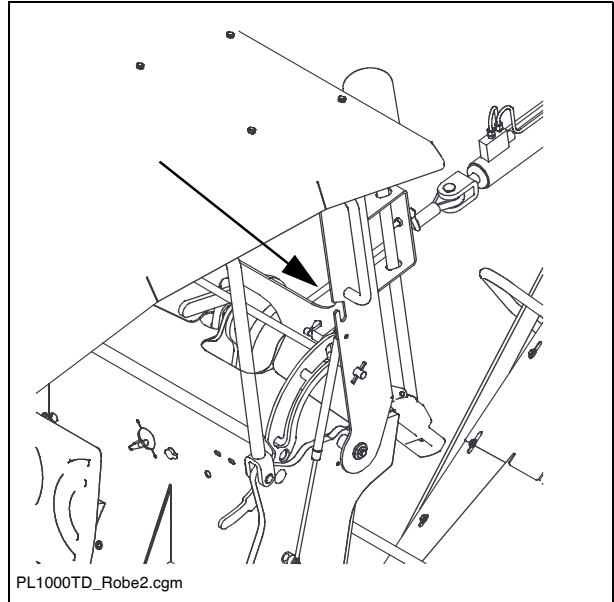


Tearing steel cables constitute a serious threat to man and machine.

Relieve tension on any damaged steel cables on the upper conveyor and replace!



During all work on the upper conveyor, ensure that the conveyor drive cannot be started!



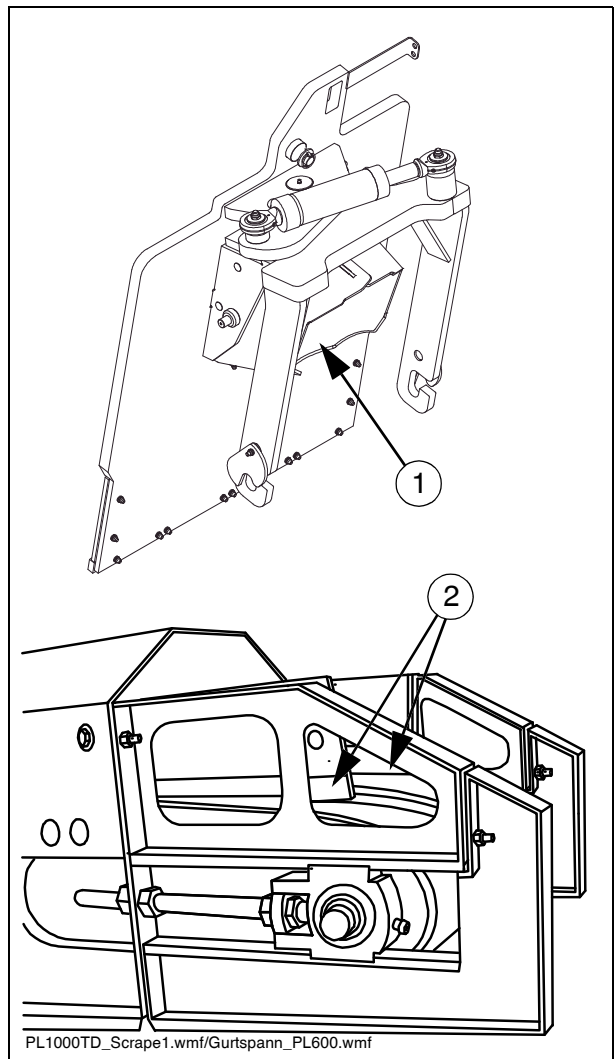
Rubber funnel gasket at transfer point and rubber seals / guides

Various rubber components are located on the upper conveyor which should provide problem-free material removal. These rubber components should be visually inspected on a weekly basis for signs of damage.

- Collecting funnel (1)
- Side guide on upper conveyor (2)

All rubber components are fitted using bolt connections and are easy to remove if required.

- Dismantle mounting screws then remove damaged components.
- Fit new component properly then tighten the mounting screws.



2.6 Water system

Water tank

Check the water tank level before starting work by inspecting the filler gauge (4) on the right-hand side of the water tank. If necessary, top up the tank.

Filling:

- Unscrew filler aperture (3), fill with water to top edge then close aperture properly.



Clean the mesh filters in the filler aperture if necessary.

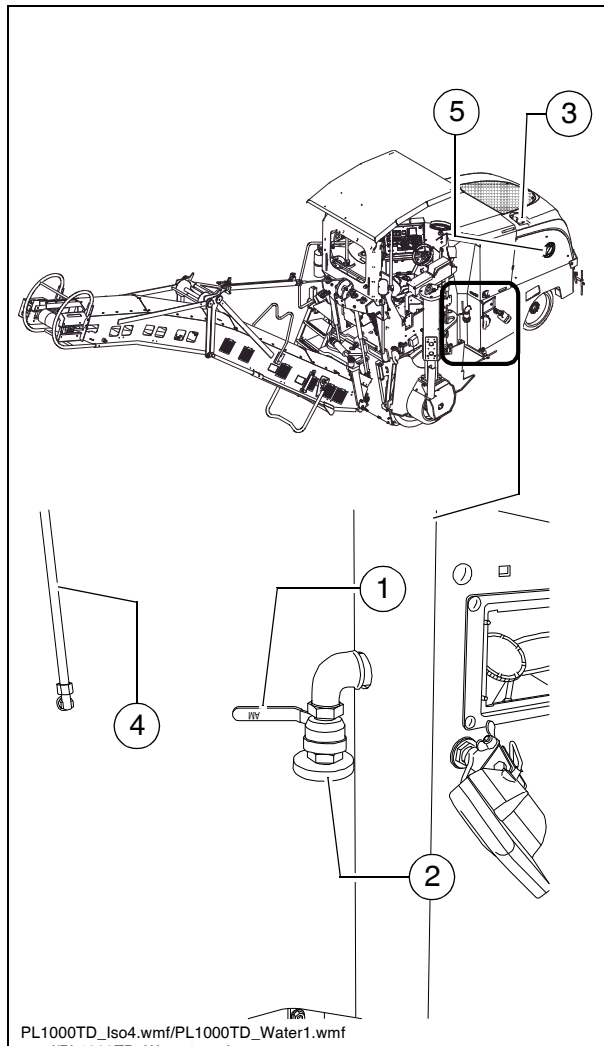
Pressure filling:

- Attach pressure line to connection (2) and tighten it.



To allow the system to breathe better, open the tank cover (3).

- Open the stop cock (1).
- Signal to the operator of the external filling pump that the filling process can be started
- Switch off filler pump as soon as desired fill level in water tank is reached (monitored by fill level indicator (4) on water tank).
- Close the stop cock (1) again before removing the filler hose.



Tank cleaning:

If necessary, and at least every 500 operating hours, the inside of the tank needs to be cleaned. Clean the water tank as thoroughly as possible once it is empty.

Wash out the tank as thoroughly as possible with a water lance.

If the machine is not operating continuously, this water should be changed once a year.

- Remove both side covers (5) from the tank.
- Open the drain cock (1) and completely drain off the tank contents.
 - If necessary, attach drain line to connection point (2).
- Clean the system.
- Close the drain cock (1) again.
- Close the side tank cover (5) again.



This water is definitely not drinking quality!



In case of frost, completely empty the water tank using the drainage valve, loosen the connection hoses and let them run empty. Remove screw cap from water filler apertures.

Water filter



Replace the filter element daily after work, and whenever the contamination indicator shows that this is necessary!



The water filter is located on the left next to the milling box.



The filter can be changed even if the water tank has not been drained.

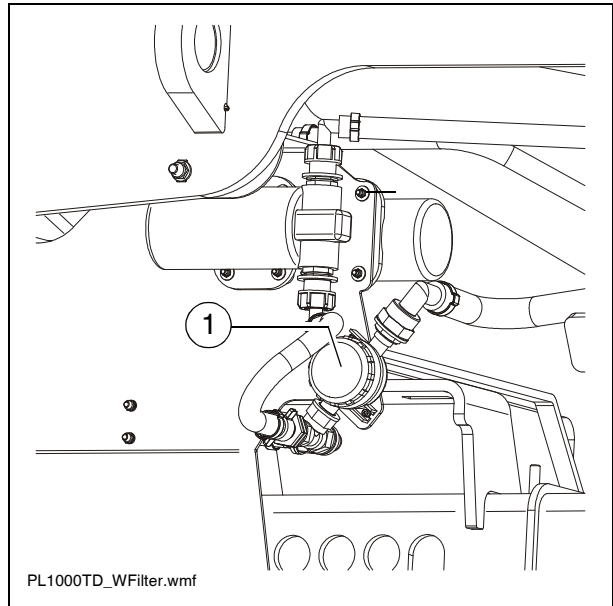
- Ensure that the water pump is not operating.
- Open the filter housing (1) by hand and remove the filter element.
- Wash out the filter element if necessary.
- Mount the filter element and tighten the filter housing (1) by hand.



Ensure seal integrity is good after changing the filter.



If there is a risk of frost, the filter housing must be emptied completely to protect it from damage.

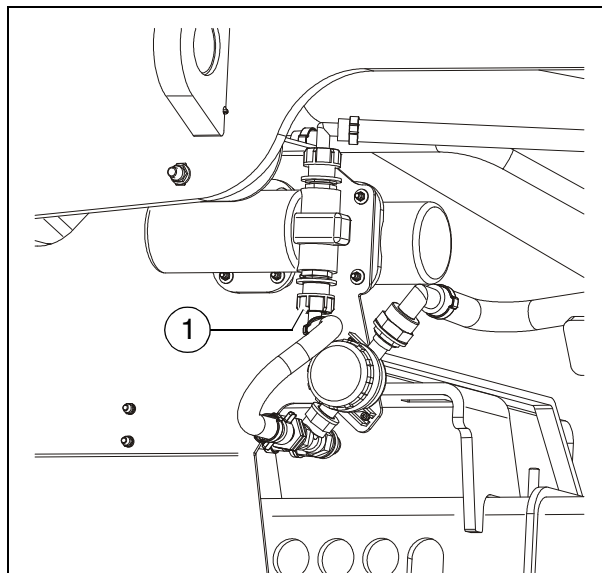


Water pump



If there is a risk of frost, the water pump must be emptied completely to protect it from damage.

- Loosen the bottom screw connection (1) of the water pump and allow all water in pump to run out.
- Before restarting the unit, remount the screw connection (1) properly.

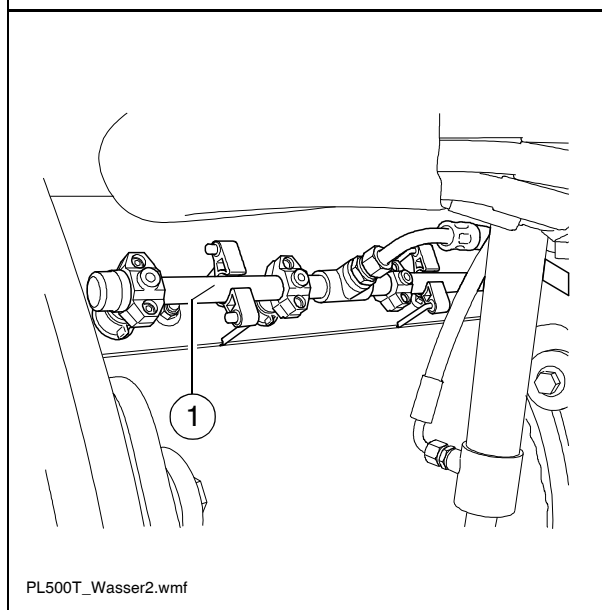


PL1000TD_WFilter.wmf

Spray nozzles

The spray nozzles are located on the milling drum case. For inspection and cleaning purposes, these nozzles can be pulled out of their retaining brackets.

- Remove retaining clips from the nozzle supports.
- Remove the pipe and nozzles (1) from the supports.
- Clean nozzle with a wire brush. If necessary, dismantle nozzle for cleaning purposes or replace.
- Reinstall nozzles properly and secure in the nozzle support.



PL500T_Wasser2.wmf



When reinstalling the nozzles, ensure that the flat jet of spray is aligned at right angles to the milling drum.



If there is a risk of frost, the feed hoses need to be pulled out of their bracket together with the nozzles and completely drained to protect them from damage.

- Pull hoses and nozzles out of their brackets, drain them completely and hang them up to dry.
- Before restarting the unit, reinstall these hoses properly.

2.7 Power supply

Batteries



Check the charge level of the batteries every 250 operating hours and at least every 3 months.

Both batteries are located under the seat console.

- Unfasten screw (1) and fold up the seat console.



Secure the seat console to prevent it from dropping back down again.

The batteries are factory-filled with the correct quantity of acid. The fluid level should come up to the top mark. If required, top up the battery, but only use distilled water to do so!

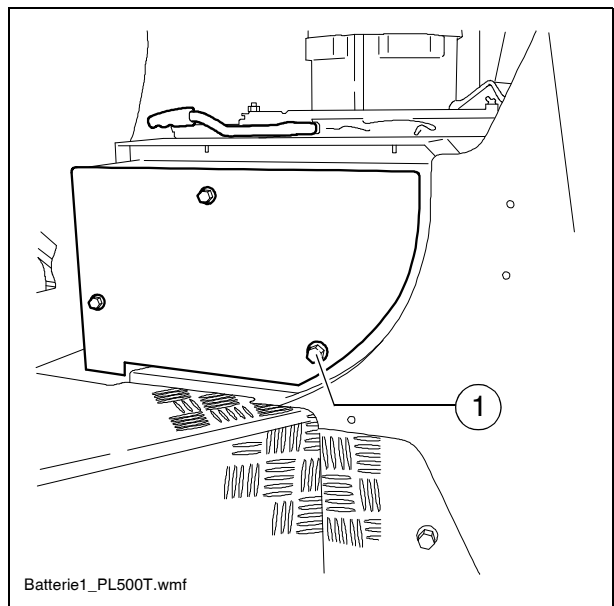
The battery terminal clips must be free of corrosion (oxide) and protected with a special grade of terminal grease.



The gas in the battery is explosive. Avoid naked lights and sparks.



When removing the batteries, always first remove the negative terminal, ensuring that the battery terminals cannot be short circuited.



The battery contains corrosive and toxic sulphuric acid. Wear protective goggles and avoid all contact with the skin!

2.8 Miscellaneous

Emergency stop button

For your personal safety, the safety of other persons and of the machine, you should check the function of the emergency stop button on a daily basis.



Defective emergency stop buttons must be replaced immediately.

The emergency stop button is located on the operator's platform.



The engine, drives and steering system are shut down when the emergency stop button is pressed. Any action which may then be required, e.g. steering, is no longer possible at this time! Danger of accidents!

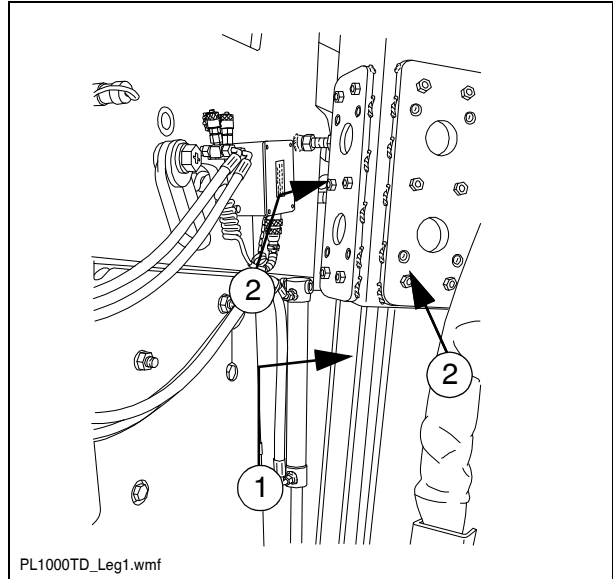
Chassis leg guide

There are several sliding plates in the guides on both chassis legs through which the chassis legs can be guided when extending or retracting.



The sliding surfaces (1) on all sides of the square tube should always be properly greased.

- In extended position, apply grease to the sliding surfaces of the square tube with a brush.



Adjust clearance



Clearance on the chassis leg guides is adjusted on either side by three individual sliding plates.



Load on the chassis leg must be supported during adjustment work!

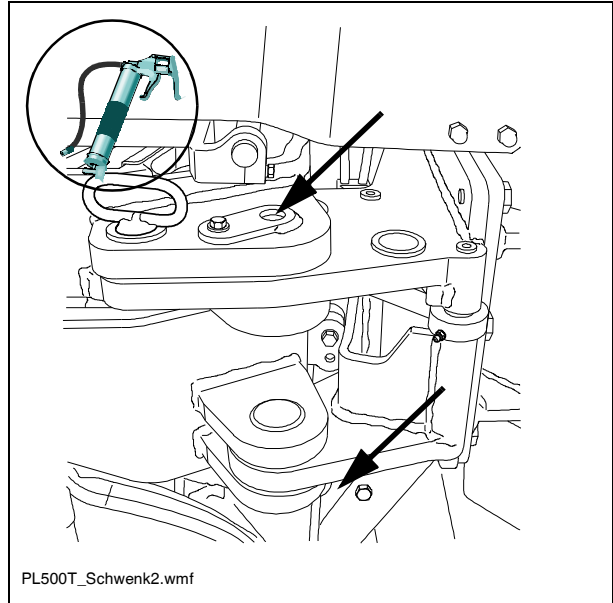
- Tighten adjusting screws (2) evenly to torque preload level (85Nm).
- Unfasten adjusting screws 90° and secure with a lock nut.
- Perform a function test:
 - The chassis leg must be virtually clearance-free and uniformly shaped.
 - Readjust if necessary.

2 Lubrication points

Chassis leg, right

There are two grease nipples on the swivel joint on the chassis leg.

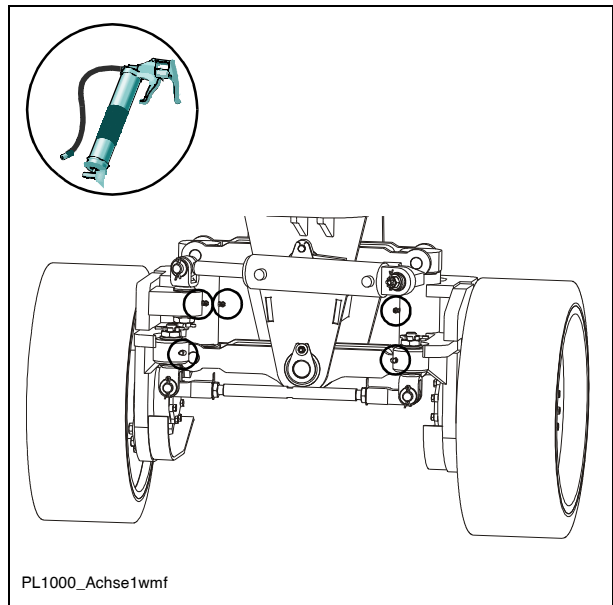
Fill 5 strokes of grease using the grease press.



Steering:

There are 5 grease nipples near the steering system underneath the machine.

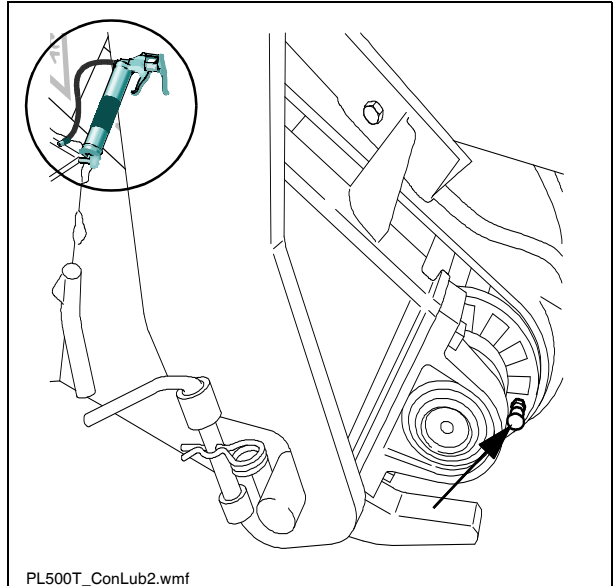
Fill 5 strokes of grease using the grease press.



Upper conveyor reversal (○)

A grease nipple is located on the clamping bearings to either side of the conveyor belt.

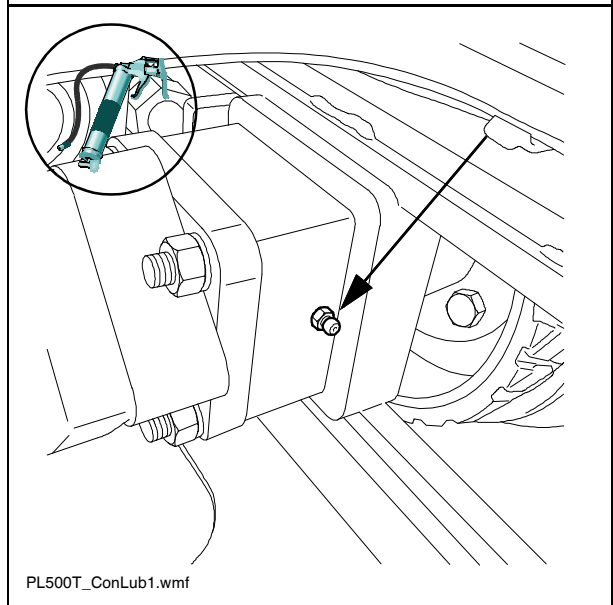
Fill 3 strokes of grease using the grease press.



Upper conveyor drive (○)

A grease nipple is located on the input point at either side of the conveyor belt.

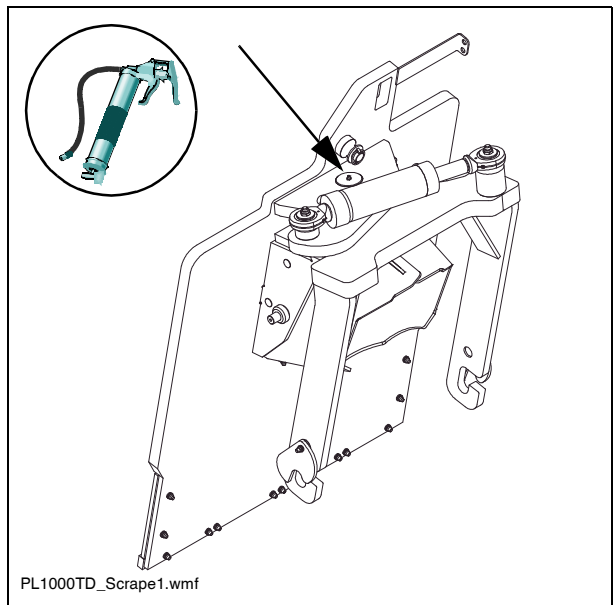
Fill 3 strokes of grease using the grease press.



Upper conveyor swivel console

There is a grease nipple on the bearing point of the upper conveyor mounting.

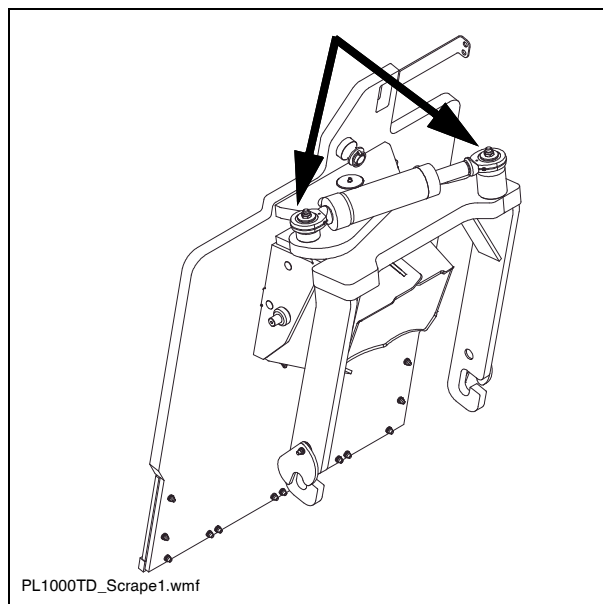
Fill 1 stroke of grease using the grease press.



Hydraulic cylinder

There are grease nipples on each bearing point on most hydraulic cylinders.

Fill 3 strokes of grease using the grease press.



2 Inspections

General visual inspection

A walk around the machine and the following inspections form part of the daily routine:

- Are components or controls damaged?
- Any signs of leakage on engine, hydraulic system or gearbox, etc.?
- All fastening points OK?



Remedy defects immediately to prevent damage, danger of accidents and environmental contamination!

Inspection by an expert



The cold planer must be inspected by a skilled specialist

- when required (according to the operating conditions and the nature of application),
- however, at least once a year, check that they are all in good operational condition.

2 Cleaning

- Clean all parts coming into contact with milled material.



Before cleaning work with the high pressure cleaner, grease all lube points acc. to specification.

- Clean the machine with water after milling mineral aggregates, lean-mixed concrete, etc.



Do not spray bearing points, electrical or electronic components with water.

- Remove residual milling material and buildups of dust.



After cleaning work with the high pressure cleaner, grease all lube points acc. to specification.



Danger of slipping! Ensure that all steps and ladders are free of grease and oil!



2 Preservation

2.1 Shutdowns for up to months

- Park machine in a place where it is protected from great exposure to direct sunlight, wind, humidity and frost.
- Grease all lube points in accordance with specifications.
- Change oil in diesel engine.
- Seal exhaust silencer to make it airtight.
- Remove batteries, charge them and store them in a well ventilated place at room temperature.
- Apply preserving agent to the water system.



Recharge removed batteries every 2 months.

- Protect all bare metal components, e.g. piston rods on hydraulic cylinders, with a suitable corrosion inhibitor.
- If it is not possible to park up the machine in an enclosed building or under cover, it must be covered with a suitable size of tarpaulin. In all cases, seal all air intake and exhaust apertures with plastic film and adhesive tape.

2.2 Shutdowns lasting from 6 months to 1 year

- Carry out all the actions listed for "Shutdowns of up to 6 months".
- Once the engine oil has been drained off, fill the diesel engine with a manufacturer-approved grade of preserving oil.

2.3 Recommissioning the machine

- Reverse all the steps described in the "Shutdown" sections.

2 Lubricants and operating substances

Use only the lubricants listed below or comparable qualities of well-known brands.

Only use containers which are clean on inside and outside for filling oil or fuel.



Comply with specified filling volumes!



Incorrect oil or lubricant levels promote rapid wear and paver finisher failure.

Grease	BP Multigrade grease L2	ESSO Multi-pur- pose grease	FINA Marson L2	Mobilux 2 Mobiplex 47	Aral Aralub MPU	SHELL EP 2	Retinax A
Grease (clutch bear- ing)		ESSO UNIREX N3					
Engine oil	Shell Rimula Super 10W40						
	Shell Rimula Super 10W40 has been filled at the factory.						
Hydraul- ic oil	Shell Tellus T46						
	Shell Tellus Oil T46 has been filled in at the factory.						
Planetary gear	Shell Omala HD 220	Shell Omala HD 320	Mobilube HD-A 85W-90	Castrol Optigear 220	Mobil Mobilgear 600XP 220		
	Mobilube HD-A 85W-90 has been filled at the factory						
Angle drive	Shell Omala HD 220	Shell Omala HD 320	Mobilube HD-A 85W-90				
	Shell Omala HD320 has been filled at the factory						
Attached bearing	Shell Omala HD 220						
	Shell Omala HD220 has been filled at the factory						
Dist. water							
Diesel fuel							
Cool- ant	Shell long-life 40 fluid	40% radiator anti-freeze					
	Shell long-life 40 fluid is filled at the factory						

2.1 Hydraulic oil

Preferred hydraulic oils:

a) Synthetic hydraulic liquids based on ester, HEES

Manufacturer	ISO viscosity class VG 46
Shell	Natural HF-E46
Panolin	HLP SYNTH 46
Esso	HE 46

b) Mineral oil pressure fluids

Manufacturer	ISO viscosity class VG 46
Shell	Tellus Oil 46



When changing from mineral oil pressurised fluids to biodegradable pressure fluids, please contact our factory advisory service!



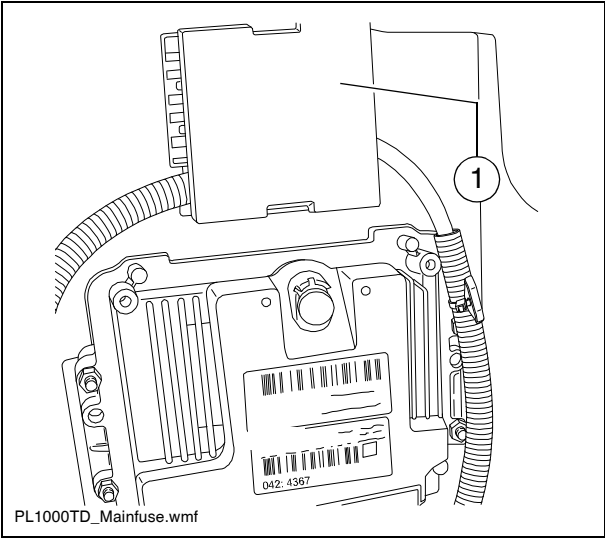
Only use containers which are clean on inside and outside for filling oil or fuel.

2.2 Capacities

	Volume
Fuel tank	approx. 450 litres (up to max. fill level)
Engine oil	approx. 19.5 litres
Hydraulic oil reservoir	approx. 110 litres (up to max. fill level)
Water tank	approx. 1,100 litres (up to max. fill level)
Planetary gear on drive wheels	approx. 1.3 litres on each (up to max. fill level)
Angle drive Milling drum transmission	approx. 4.0 litres (up to max. fill level)
Milling drum gear-box planetary gears	approx. 4.5 litres (up to max. fill level)
Milling drum gear-box attached bearing (PL600T)	approx. 0.4 litres (up to max. fill level)
Milling drum gear-box attached bearing (PL1000T)	approx. 1.8 litres (up to max. fill level)
Engine coolant	approx. 42 litres (up to max. fill level)
Batteries	up to max. fill level indicator

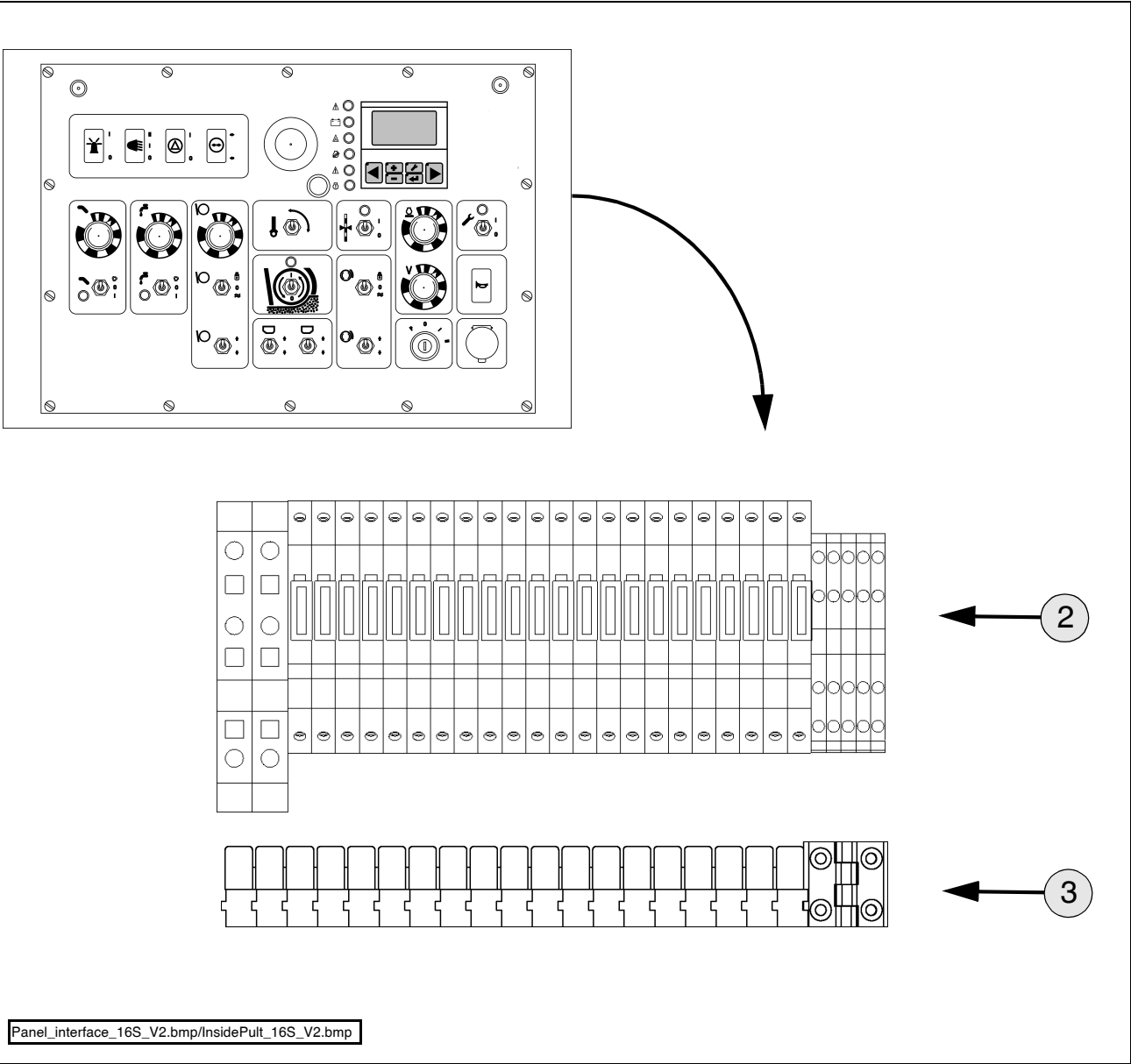
2 **Electric Fuses**

2.1 **Main fuses (1)**



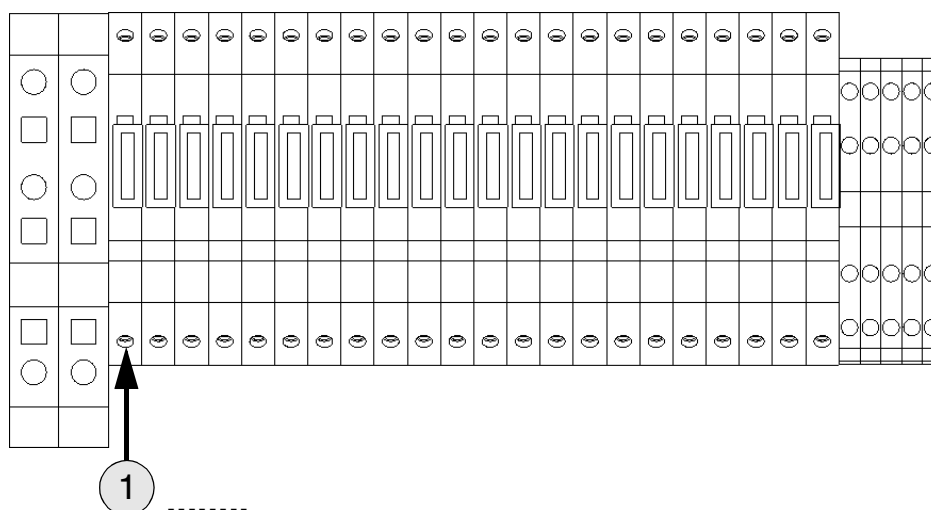
1.	- F1.1 Main fuse	50A
----	------------------	-----

2.2 Fuses and relays in the operating panel



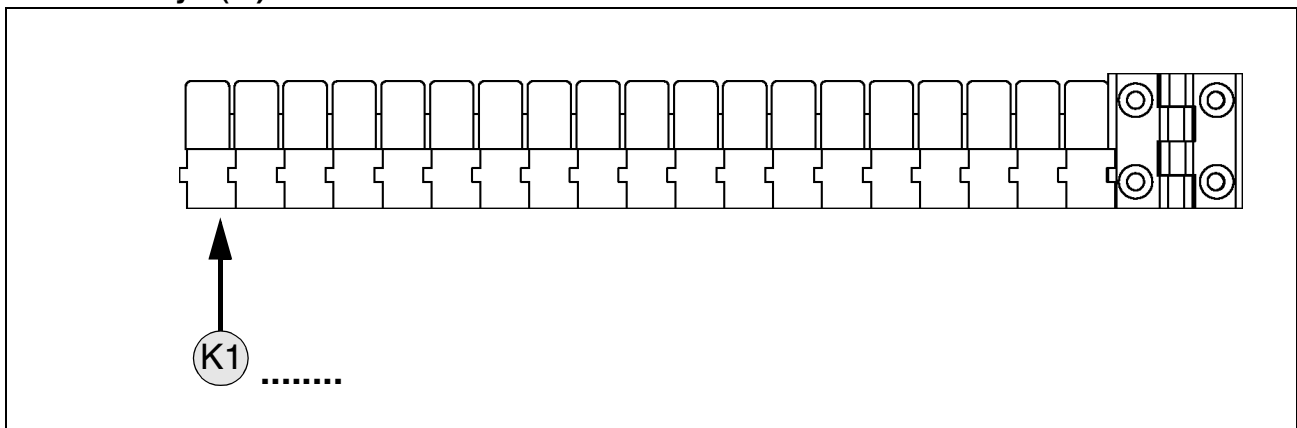
2.	Fuses	
3.	Relays	

Fuses (2.)



No.	F		A
1.	2.1	Ignition key switch	30
2.	2.2	Terminal 15, load	40
3.	2.3	Engine control system, load	25
4.	2.4	Travel drive power	15
5.	2.5	Working lights	20
6.	2.6	Flashers	10
7.	2.7	Horn	5
8.	2.8	Hazard flashers, 24V sockets	10
9.	2.9	Brake light	10
10.	2.10	Rotary beacon	10
11.	2.11	Terminal 60, starter inhibit	10
12.	2.12	Side boards	10
13.	2.13	Display	5
14.	2.14	Height display	5
15.	2.15	Water pump M3	10
16.	2.16	Water pump M4	10
17.	2.17	Engine control	7.5
18.	2.18	Travel drive	3
19.	2.19	Scraper, compression device	10
20.	2.20	Service hold labels, chassis legs, conveyor belt	10
21.	2.21	Service switch belt tensioner	5
22.	2.22	External levelling	10
23.	2.23	Starter	10
24.	2.24	Left/right parking lights	10
25.	2.25	Lights	20
26.	2.26	Low-beam headlights, left	10
27.	2.27	Low-beam headlights, right	10
28.	2.28	Roof	10

Relays (3.)



K		
K1	Start inhibit	
K2	Power 15	
K3	Power A3	
K4	Shut down controller with emergency stop	
K5	Working lights	
K6	Flashers	
K7	Brake light	
K8	Valve changeover	
K9	Valve changeover	
K10	Release compression device	
K19	Manual left-hand levelling	
K20	Manual left-hand levelling	
K21	Manual right-hand levelling	
K22	Manual right-hand levelling	

2 Tightening torques



Maximum tightening torques for shaft screws with metric ISO standard threads

	 8.8		 10.9		 12.9	
	Preload (N)	Tightening torque (Nm)	Preload (N)	Tightening torque (Nm)	Preload (N)	Tightening torque (Nm)
M3	2,250	1.3	3,150	1.9	3,800	2.3
M4	3,900	2.9	5,450	4,1	6,550	4.9
M5	6,350	6.0	8,950	8.5	10,700	10
M6	9,000	10	12,600	14	15,100	17
M8	16,500	25	23,200	35	27,900	41
M10	26,200	49	36,900	69	44,300	83
M12	38,300	86	54,000	120	64,500	145
M14	52,500	135	74,000	190	88,500	230
M16	73,000	210	102,000	295	123,000	355
M18	88,000	290	124,000	405	148,000	485
M20	114,000	410	160,000	580	192,000	690
M22	141,000	550	199,000	780	239,000	930
M24	164,000	710	230000	1,000	276,000	1,200
M27	215,000	1,050	302,000	1,500	363,000	1,800
M30	262,000	1,450	368,000	2,000	442,000	2,400



Screw tightening torques on engine: refer to Engine Operating Instructions.

2 Maintenance log

To keep a proper record of all maintenance, service and repair work, please use the pre-printed forms on the following pages.

Notes on how to fill in the maintenance logs properly:

e.g.

9.1 Assembly, engine, engine systems

Date	MH	Occasion	Comments about scope of work	Result, name, signature
2001-06-10	980	1,000 hour service	Replacing fuel, oil and water filters, changing the oil, replacing the air filter, general visual inspection total of 3 working hours	V-belts must be replaced - order.

e.g.

9.6 Assembly, water system

Date	MH	Occasion	Comments about scope of work	Result, name, signature
2001-01-02	550	High-pressure pump failure	Lack of maintenance - filter contaminated, water pump worn, needs to be replaced, filter replaced, total of 2 working hours	New pump installed

2.1 Assembly Engine, engine systems

Result, name, signature	Comments about scope of work	Occasion	Mh	Date

2.2 Hydraulic system

Date	Mh	Occasion	Comments about scope of work	Result, name, signature

2.3 Drive wheels, steering system, brakes

Result, name, signature	Comments about scope of work	Occasion	Mh	Date

2.4 Milling section

Date	Mh	Occasion	Comments about scope of work	Result, name, signature

2.5 Water system

Date	Mh	Occasion	Comments about scope of work	Result, name, signature

2.6 Electrical system

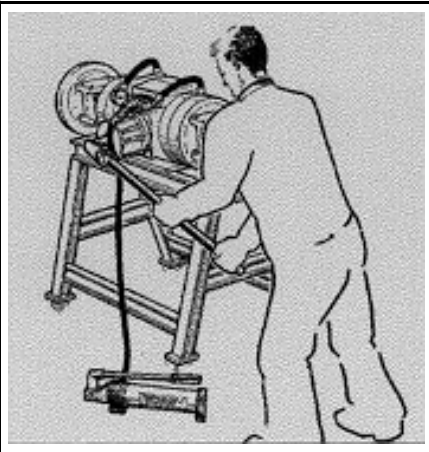
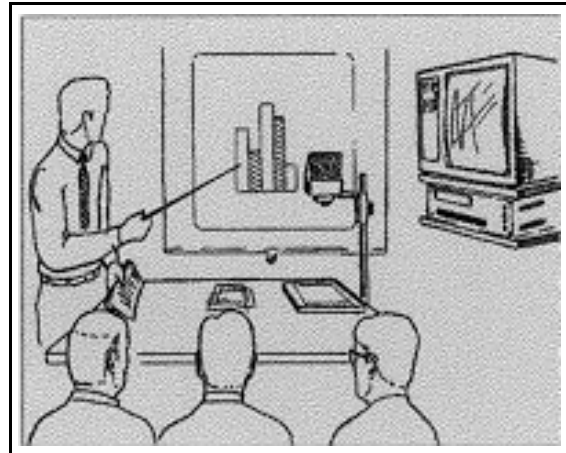
Date	Mh	Occasion	Comments about scope of work	Result, name, signature

2.7 Miscellaneous equipment

Date	Mh	Occasion	Comments about scope of work	Result, name, signature

TRAINING/ INSTRUCTIONS

We offer our customers training courses on DYNAPAC equipment in our dedicated factory training centre. We hold regular training courses in this training centre as well as courses outside the scheduled hours.



SERVICE

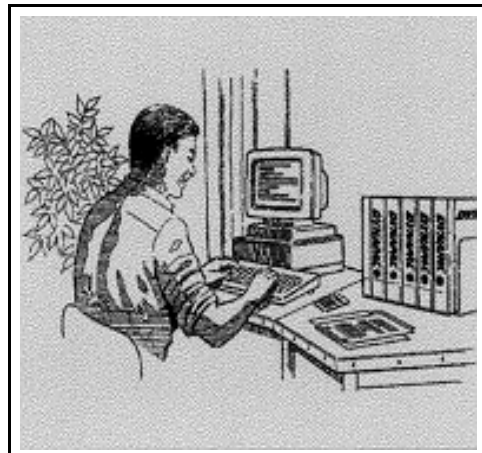
Please contact one of our Service outlets if you encounter any operational problems or have enquiries about spare parts.

Our trained, specialist staff will ensure that you receive prompt attention and repairs in the event of any accident or malfunction you may encounter.

FACTORY ADVISORY SERVICE

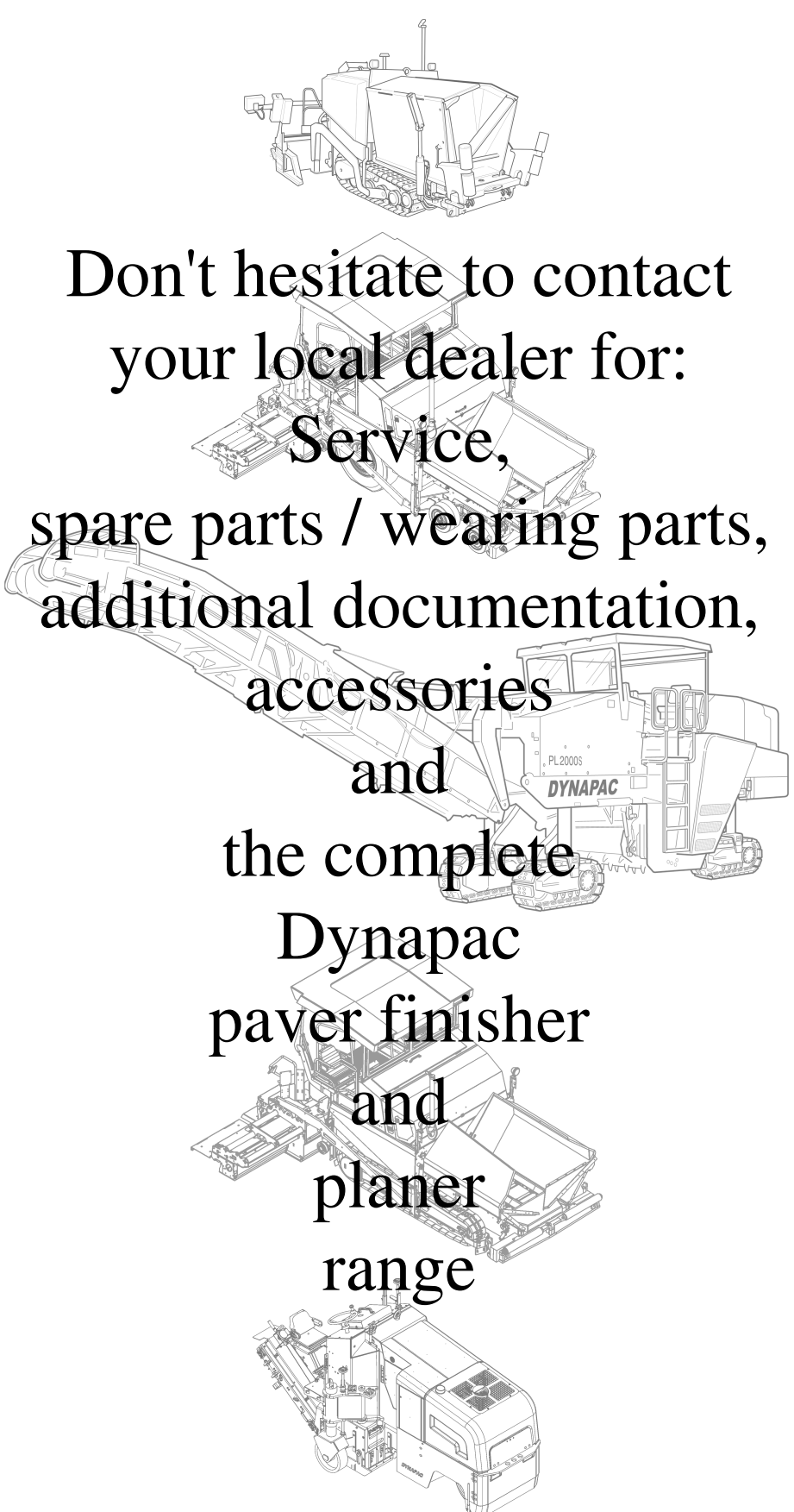
If ever for any reason our dealership network encounters limits to what it is able to do for you, please always feel free to contact us directly.

Our team of technical advisers is on hand to assist you.



DYNAPAC

Part of the Atlas Copco Group



Don't hesitate to contact
your local dealer for:
Service,
spare parts / wearing parts,
additional documentation,
accessories
and
the complete
Dynapac
paver finisher
and
planer
range