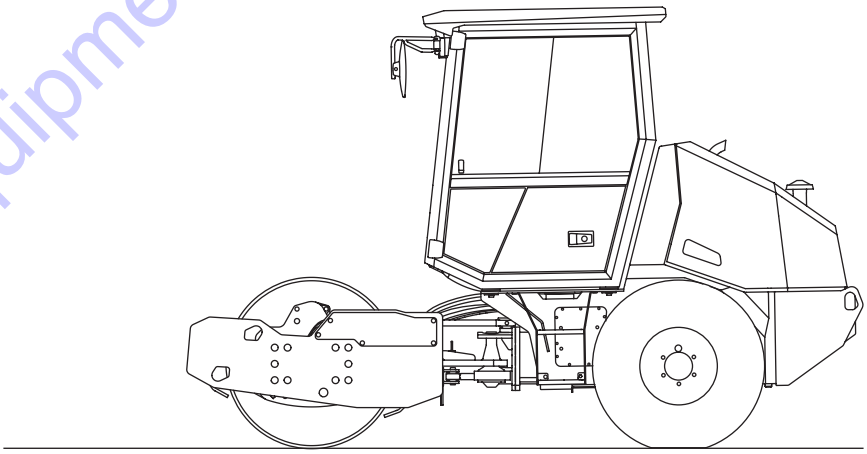
ARS 50

SINGLE DRUM ROLLER
KUBOTA V2403-CR-TE5
EU Stage V / U.S. EPA Tier 4 Final



OPERATING INSTRUCTIONS

EDITION 04/2022 EN
Product Identification Number 3000000 -

AMMANN

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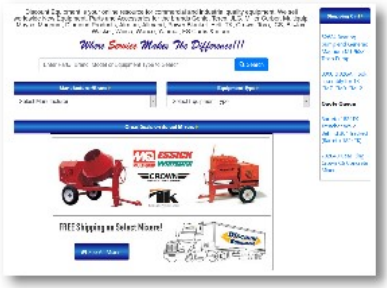

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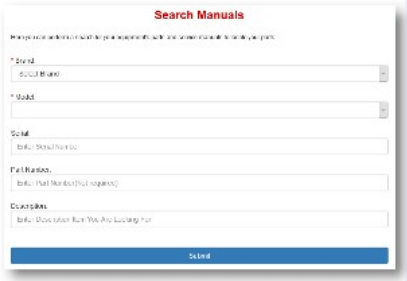

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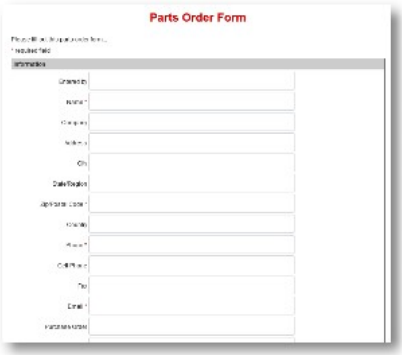

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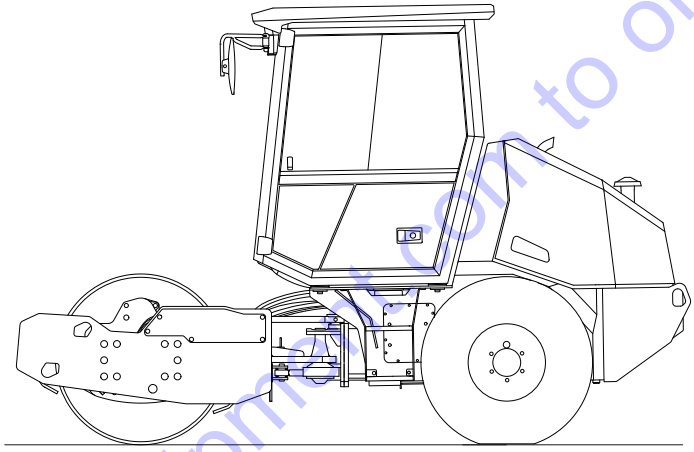
Congratulations on your purchase of the AMMANN compaction machine. This modern compaction machine is characterised by simple operation and maintenance and is the product of many years of experience of the AMMANN company in compaction machines, especially road rollers. In order to avoid faults due to improper operation and maintenance, we request you to read these operating instructions with great care and keep it for later reference.

With kind regards,

Ammann Czech Republic a.s. | Náchodská 145 | CZ-549 01 Nové Město nad Metují

☏ + 420 491 476 111 | Fax + 420 491 470 215 | info@ammann.com | www.ammann.com



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These instructions are "original instructions for use" within the meaning of paragraph 1.7.4.1 of Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006.

These operating instructions consists of:

I. Specification manual

II. Operating manual

III. Maintenance manual

The purpose of this manual is to familiarize operators with safe operation of the roller and provide them information for maintenance. Therefore it is necessary to pass this manual to operators and ensure that it will be read by them carefully before the road roller is used.

AMMANN assumes no responsibility if the machine is operated incorrectly or is used incorrectly in operating modes, which may result in injury or death, damage to the machine or property or environmental pollution.

Adherence to maintenance instructions increases the reliability and lifetime of the machinery and reduces repair costs and down time.

In order to ensure smooth operation of the AMMANN compaction equipment, use only original spare parts supplied by AMMANN for repairs.

The operating instructions must always be kept available on the machine in an appropriate place.

Preface

Information, specifications, and recommended operation and maintenance instructions contained in this publication are basic and final information at the time of the printing of this publication. Print errors, technical modifications and modifications of illustrations are reserved. All dimensions and weights are approximate, and therefore not binding.

Ammann Czech Republic a.s. reserves the right to perform modifications at any time with no obligation to inform the machine user. If you identify any differences between the machine operated by you and the information contained in this publication, contact your local dealer.

SAFETY NOTICES AND SIGNS:

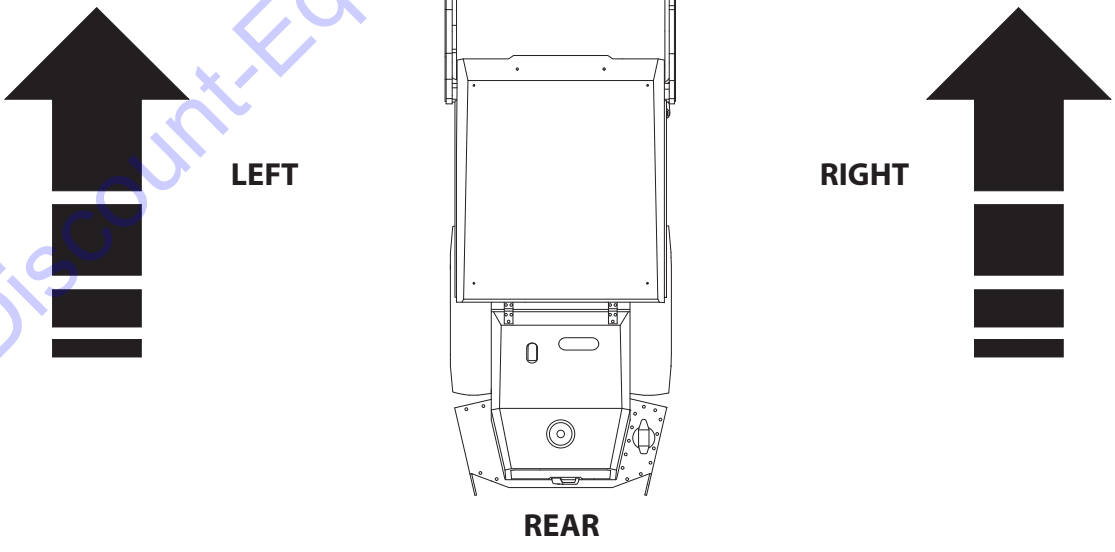
The notice warns of a serious risk of personal injury or other personal hazards.

The notice warns of possible damage to the machine or its parts.

The notice warns of the necessity of environmental protection.

! CAUTION!

As used in this operating manual, the terms right, left, front and rear indicate sides of the machine moving forward.



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1 SPECIFICATION MANUAL

ARS 50
(Kubota Tier 4 Final)

1.1 Basic data

Machine description

Single drum roller with an articulated frame with a front smooth drum or a pad-foot steel driven vibratory drum and a rear driven axle with two tyres with tread pattern. Steering using the articulated frame.

Specification of the expected use of the machine

The **ARS 50** series rollers are most suitable for small-scale compaction work in traffic construction (local roads, field and forest roads, car parks) and in building construction (industrial areas, backfills and gravel packing), etc.

The **ARS 50 D** roller with a smooth drum is suitable for compacting loam soils up to the layer thickness of 15 cm (5.9 in), mixed soils up to the layer thickness of 20 cm (7.9 in) and gravel materials up to the layer thickness of 30 cm (11.8 in).

The **ARS 50 PD** roller with a padfoot drum is suitable for compacting clay soils up to the layer thickness of 12 cm (4.7 in), loam soils up to the layer thickness of 15 cm (5.9 in) and mixed soils up to the layer thickness of 20 cm (7.9 in).

The machines are designed for operation in arid, mild temperate and cold climates according to EN 60721-2-1:2014 with a limited temperature range from -15°C (5°F) to +45°C (113°F) and a maximum absolute humidity of 25 g/cubic meter. The standard version of the machine is not designed for operation on roads.

Please fill in the following data:
(see the nameplate and Kubota engine nameplate)

Machine type

.....

Product Identification Number

.....

Year of manufacture

.....

Engine type

.....

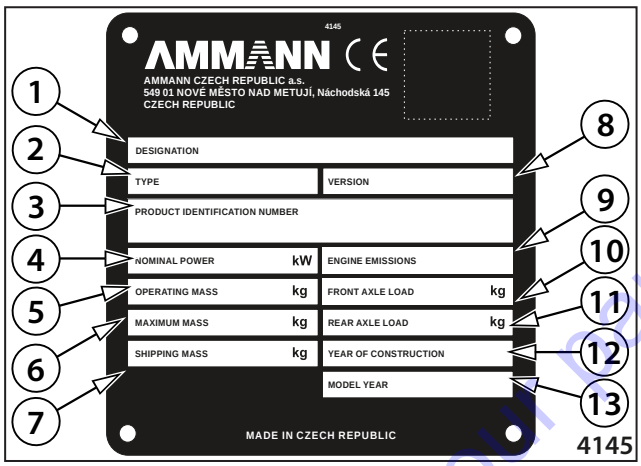
Serial number of the engine

.....

The data mentioned in the table refer always when you contact the dealer or manufacturer.

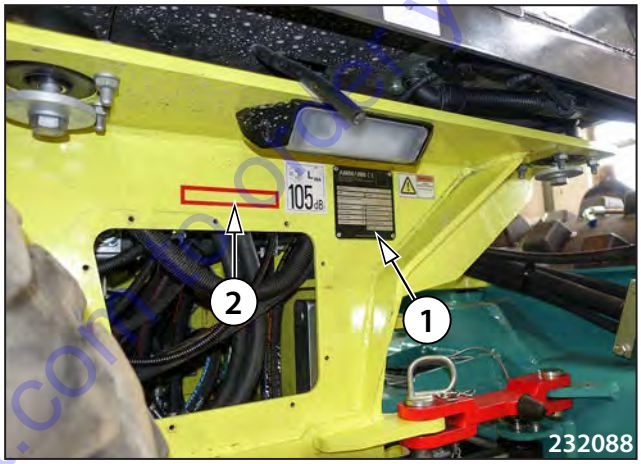
The machine that complies with the health and safety requirements is provided with a nameplate with CE marking.

1. Name – always stated only in the English version
2. Type
3. Product identification number
4. Rated power
5. Operating weight
6. Maximum weight
7. Transport weight
8. Version
9. Engine emission
10. Front axle load
11. Rear axle load
12. Year of manufacture
13. Model year



Nameplate position

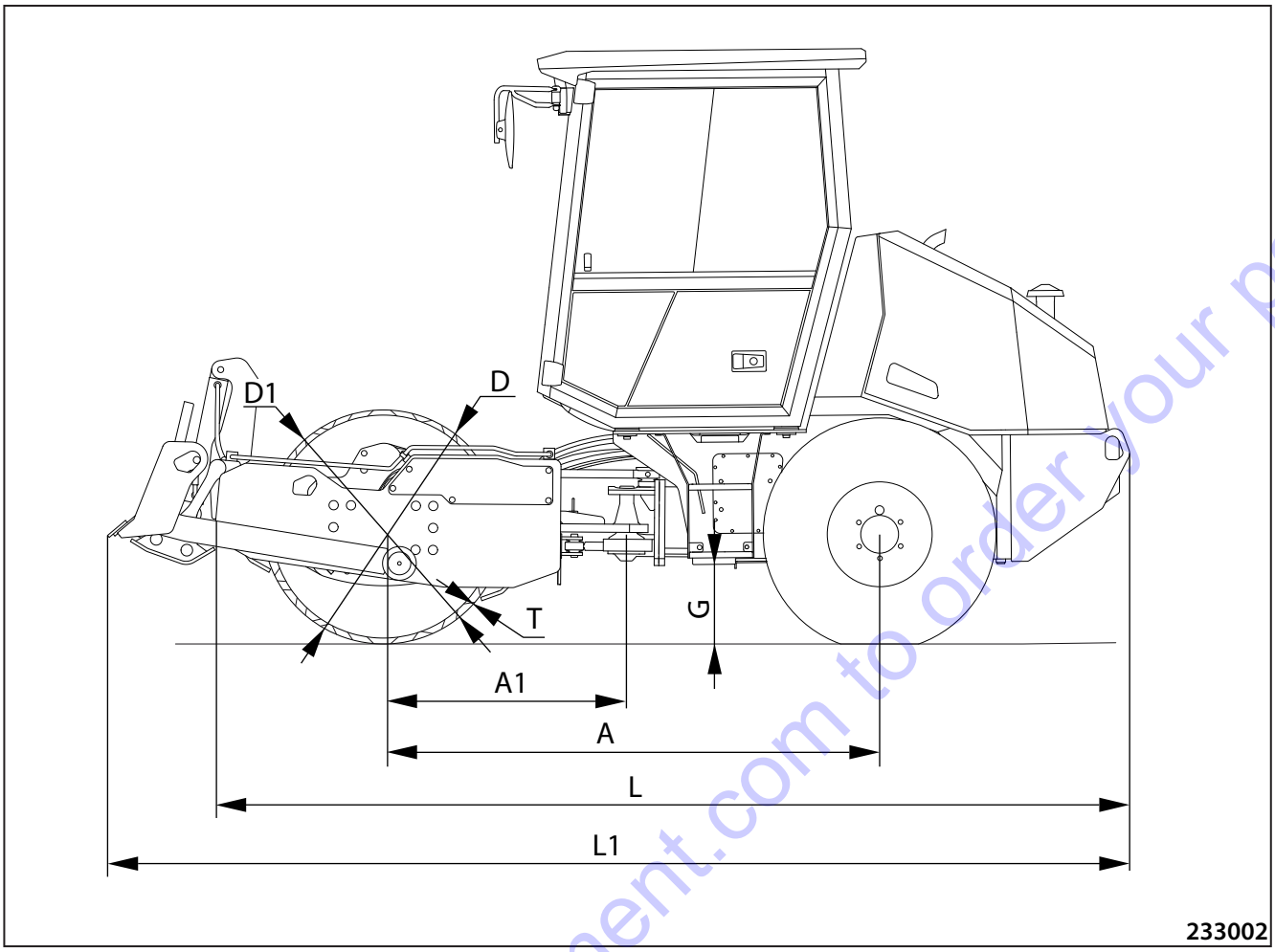
1. Nameplate
2. Machine frame number



Engine nameplate position

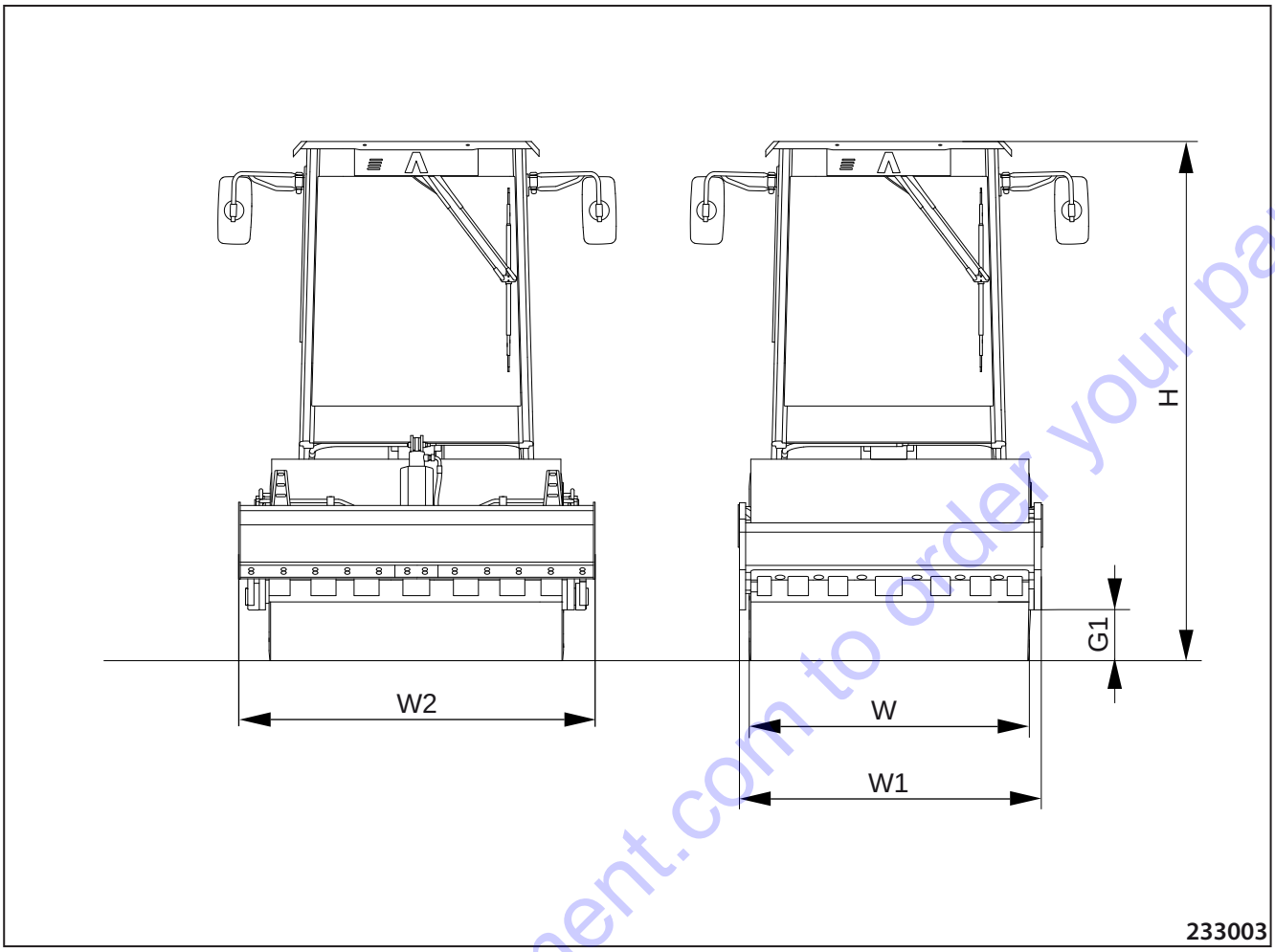
1.2 Dimensioned drawing of the machine

Dimensional drawing of the machine ARS 50



mm (in)	A	A1	D	D1	G	G1	H	L	L1	T	W	W1	W2
ARS 50 D	2125	1050	1000		345	240	2545	3925	4330	18	1400	1548	1726
	(83.7)	(41.3)	(39.4)		(13.6)	(9.4)	(100.2)	(154.5)	(170.5)	(0.7)	(55.1)	(60.9)	(68.0)
ARS 50 PD	2125	1050	1000	1030	345		2545	3925	4330		1400	1548	1726
	(83.7)	(41.3)	(39.4)	(40.6)	(13.6)		(100.2)	(154.5)	(170.5)		(55.1)	(60.9)	(68.0)

Dimensional drawing of the machine ARS 50



mm (in)	A	A1	D	D1	G	G1	H	L	L1	T	W	W1	W2
ARS 50 D	2125	1050	1000		345	240	2545	3925	4330	18	1400	1548	1726
	(83.7)	(41.3)	(39.4)		(13.6)	(9.4)	(100.2)	(154.5)	(170.5)	(0.7)	(55.1)	(60.9)	(68.0)
ARS 50 PD	2125	1050	1000	1030	345		2545	3925	4330		1400	1548	1726
	(83.7)	(41.3)	(39.4)	(40.6)	(13.6)		(100.2)	(154.5)	(170.5)		(55.1)	(60.9)	(68.0)

1.3 Technical data

		ARS 50			
		EU Stage V / U.S. EPA / CARB Tier 4			
		D	PD	HXD	HXPD
Weight					
Operating weight of EN 500-1+A1 (CECE) with cab, ROPS	kg (lb)	4165 (9180)	4205 (9270)	4210 (9280)	4250 (9370)
Operating weight (EN 500-1+A1 (CECE)) of open cab, ROPS	kg (lb)	4045 (8920)	4165 (9180)	4130 (9110)	4170 (9190)
Operating load of EN 500-1+A1 (CECE) with cab, ROPS on front axis	kg (lb)	2310 (5090)	2350 (5180)	2310 (5090)	2350 (5180)
Operating load of EN 500-1+A1 (CECE) with cab, ROPS on rear axis	kg (lb)	1855 (4090)	1855 (4090)	1900 (4190)	1900 (4190)
Weight of half fluid capacities	kg (lb)	40 (90)	40 (90)	40 (90)	40 (90)
Operating weight of ISO 6016 with cab, ROPS	kg (lb)	4210 (9280)	4250 (9370)	4250 (9370)	4290 (9460)
Maximum weight with the cab, ROPS, accessories, weighing	kg (lb)	4455 (9820)	5340 (11770)	4500 (9920)	5385 (11870)
Maximum permitted weight according to ROPS	kg (lb)	5500 (12130)	5500 (12130)	5500 (12130)	5500 (12130)
Static linear load of front drum	kg/cm (lb/in)	5.89 (32.98)	-	5.89 (32.98)	-
Weight of blade	kg (lb)	-	310 (680)	-	310 (680)
Weight of 3 smooth drums	kg (lb)	-	535 (1180)	-	535 (1180)
Tyre filling weight (BKT 12.5/80-18 with tractor pattern)	kg (lb)	250 (551)	250 (551)	250 (551)	250 (551)
Deduction for the transport weight to the EN 500-1+A1 (CECE) operating weight.	kg (lb)	110 (240)	110 (240)	110 (240)	110 (240)
Driving characteristics					
Number of speeds	-	1	1	1	1
Working speed	km/h (MPH)	9.5 (5.9)	9.5 (5.9)	7.6 (4.7)	7.6 (4.7)
Maximum speed	km/h (MPH)	12 (7.5)	12 (7.5)	9.6 (6)	9.6 (6)
Climbing ability	%	40	40	40	40
Climbing ability with vibration	%	30	30	30	30
Lateral static stability	%	46	44	46	44
Lateral stability during driving without vibration	%	25	25	25	25
Lateral stability during driving with vibration	%	15	15	15	15
Maximum gradient when towing machine on slope	%	60	60	60	60
Turning radius inner (edge)	mm (in)	3270 (128.7)	3270 (128.7)	3270 (128.7)	3270 (128.7)
Turning radius outer (contour)	mm (in)	4800 (189)	4800 (189)	4800 (189)	4800 (189)
Front approach slope	%	90	90	90	90
Rear approach slope	%	80	80	80	80
Type of drive	-	Hydrostatic	0	Hydrostatic	Hydrostatic
Number of driving axles	-	2	2	2	2
Oscillation angle	°	± 10	± 10	± 10	± 10
Angle of steering	°	± 30	± 30	± 30	± 30

		ARS 50			
		EU Stage V / U.S. EPA / CARB Tier 4			
		D	PD	HXD	HXPD
Steering					
Type of steering	-	Joint	Joint	Joint	Joint
Steering control	-	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Linear hydraulic motors	-	1	1	1	1
Engine					
Manufacturer	-	Kubota	Kubota	Kubota	Kubota
Type	-	V2403-CR-TE5B	V2403-CR-TE5B	V2403-CR-TE5B	V2403-CR-TE5B
Power according to ISO 3046-1	kW (HP)	43.2 (58)	43.2 (58)	43.2 (58)	43.2 (58)
Number of cylinders	-	4	4	4	4
Cylinder capacity	cm^3 (cu in)	2434 (149)	2434 (149)	2434 (149)	2434 (149)
Nominal speed	min^{-1} (RPM)	2400	2400	2400	2400
Maximum torque	Nm/rpm	198.5 / 1500	198.5 / 1500	198.5 / 1500	198.5 / 1500
Average fuel consumption	l/h (gal US/h)	5.4 (1.4)	5.4 (1.4)	5.4 (1.4)	5.4 (1.4)
Engines complies with emission regulations	-	EU Stage V, U.S. EPA/CARB Tier 4	EU Stage V, U.S. EPA/CARB Tier 4	EU Stage V, U.S. EPA/CARB Tier 4	EU Stage V, U.S. EPA/CARB Tier 4
Cooling system of engine	-	Liquid	Liquid	Liquid	Liquid
Maximum permitted speed during engine braking	min^{-1} (RPM)	2600	2600	2600	2600
Axle					
Maximum tyre pressure	MPa (PSI)	0.6 (87)	0.35 (50.8)	0.6 (87)	0.35 (50.8)
Pattern of tyres	-	MITAS NB38	BKT IMPLE-MENT-AS 504	MITAS NB38	BKT IMPLE-MENT-AS 504
Number of tyres	-	2	2	2	2
Number of rear wheels	-	2	2	2	2
Size of tyres	-	8.25-20	12.5/80-18	8.25-20	12.5/80-18
Type of tyres	-	Tube type	Tubeless	Tube type	Tubeless
Number of pads (only PD version)	-	-	63	-	63
Pad contact surface (only PD version)	cm^2 (sq in)	-	75 (11.6)	-	75 (11.6)
Pad height (only PD version)	mm (in)	-	60 (2.4)	-	60 (2.4)
Brakes					
Operating	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic
Parking	-	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake
Emergency	-	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake
Vibration					
Frequency I	Hz (VPM)	29 (1740)	29 (1740)	29 (1740)	29 (1740)
Frequency II	Hz (VPM)	37 (2220)	37 (2220)	37 (2220)	37 (2220)
Amplitude I	mm (in)	1.6 (0.06)	1.5 (0.06)	1.6 (0.06)	1.5 (0.06)
Amplitude II	mm (in)	1.6 (0.06)	1.5 (0.06)	1.6 (0.06)	1.5 (0.06)
Centrifugal force I	kN	53	53	53	53
Centrifugal force II	kN	85	85	85	85
Type of drive	-	Hydrostatic	0	Hydrostatic	Hydrostatic

1.3 Technical data

		ARS 50			
		EU Stage V / U.S. EPA / CARB Tier 4			
		D	PD	HXD	HXPD
Fluid capacities					
Fuel	l (gal US)	98 (25.9)	98 (25.9)	98 (25.9)	98 (25.9)
Engine (oil filling)	l (gal US)	9.5 (2.5)	9.5 (2.5)	9.5 (2.5)	9.5 (2.5)
Cooling system	l (gal US)	13 (3.4)	13 (3.4)	13 (3.4)	13 (3.4)
Hydraulic system	l (gal US)	45 (11.9)	45 (11.9)	45 (11.9)	45 (11.9)
Washer tank	l (gal US)	2.5 (0.7)	2.5 (0.7)	2.5 (0.7)	2.5 (0.7)
Wiring					
Voltage	V	-	-	12	12
Battery capacity	Ah	-	-	90	90
Noise and vibration emissions					
Measured sound power level A, L_{pA} at the operator's position (cab) *	dB	80	80	80	80
Uncertainty K_{pA} *	dB	2	2	2	2
Guaranteed sound power level A, L_{WA} **	dB	104	104	104	104
Declared highest weighted effective value of vibration acceleration transmitted to the whole body (cab) ***	m/s^2 (ft/s^2)	<0.5 (<1.6)	<0.5 (<1.6)	<0.5 (<1.6)	<0.5 (<1.6)
Declared total value of vibration acceleration transmitted to hands (cab) ***	m/s^2 (ft/s^2)	<2.5 (<8.2)	<2.5 (<8.2)	<2.5 (<8.2)	<2.5 (<8.2)

* measured according to EN 500-4
** measured according to DIRECTIVE 2000/14/EC and EN 500-4
*** measured according to EN 1032+A1 while driving with vibration on gravel foundation

Optional equipment

Air conditioning
Radio
Reverse alarm
Reversing camera
Green beacon
Warning beacon
Licence plate holder
Road traffic lighting (including direction indicators)
Additional working lights
Blade
ACEecon
ACE Force
Telematic
Tractor tyres
Triangle for slow-moving vehicles
Fire extinguisher
Set of filters, 500 h
Set of filters, 1000 h
Set of filters, 2000 h
Biodegradable hydraulic oil
Additional documentation set
Contact scrapers
Air pre-filter

2 OPERATING MANUAL

ARS 50
(Kubota Tier 4 Final)

2.1.1 Safety measures during machine operation

Safety measures given in the individual chapters of the technical documentation supplied with the machine must be supplemented with safety precautions in the workplace in force within the respective country where the machine is used, with respect to organization of work, working process and personnel involved.

2.1.1.1 Before compacting works are started

- The building contractor (machine user) is liable to issue instructions for drivers and maintenance workers that include requirements for safety of operation when the machine is used.
- Before the compacting works are started, he must verify:
  - utility lines
  - underground areas (direction, depth)
  - seepage or sudden escape of harmful substances
  - ground-bearing capacity, travel plane slope
  - other obstacles and specify work safety measures

  The contractor must make the machine driver carrying out the earth works familiar with the above items.
- He must specify a technological procedure including a working process for the specific job that specifies among others:
  - measures for works under extraordinary conditions (works within protection zones, extreme slopes, etc.)
  - precautions for any natural disaster hazards
  - work performance requirements and observance of principles of health and safety at work
  - technical and organizational measures to ensure safety of employees, workplaces and surroundings.
- He must make the machine drivers provably familiar with the technological procedures.

2.1.1.2 Work in the dangerous area

Any damage to the utility lines must be immediately reported to their provider, and at the same time measures must be taken to prevent unauthorized persons from entering the dangerous area.

The worker is not allowed to work alone in a workplace where another worker is not in sight and within an ear shot who if necessary will be able to provide help or call for help unless another effective form of supervision or communication is ensured.

2.1.1.3 Ensurance of safety measures by the owner

- The owner must ensure that the machine is operated only in such conditions and only for such purposes, for which the machine is technically capable according to conditions specified by the manufacturer and in relevant standards.
- He must ensure that the roller is used only in such a manner and in such workplaces where there is no danger of damage to nearby facilities, etc.
- He must ensure a regular inspection of operation and technical condition, and regular machine maintenance in intervals according to the lubrication and maintenance instructions. If the technical condition of the machine does not meet requirements to such an extent that the machine endangers safety of operation, persons and property, or damages and impairs the environment, it must be put out of service until the defects are removed.
- He must specify who is allowed to carry out operation, maintenance and repairs of the machine as well as what activities can be carried out in such cases.
- The person (driver) who drives the machine and each person carrying out maintenance works and repairs of the machine must be familiarized with instructions specified in the Operation manual.
- He must ensure that the "Operation instructions" and the operation book are kept on a specified place to be at disposal for the driver all the time.
- He must ensure continuous supervision by an appointed person during machine operation on public roads and is liable in particular for releasing instructions to ensure health protection and work safety.
- He must ensure that dangerous substances (such as fuel, oils, coolant, brake fluid, etc.) must be removed from places of leakage according to their nature to avoid their adverse impact on the environment, safety of operation and health of people.

2.1.1.4 Cab with integrated ROPS

- The ROPS cab must not be deformed and must not show signs of corrosion, cracks or breaks. It must be fixedly connected to the machine frame. No additional modifications of the cab may be performed without approval of the manufacturer because such modifications can reduce its strength. The screwed connections must comply with the specification and must be tightened to the specified torque, must be neither damaged nor deformed, and must not show signs of corrosion.

2.1.2 Requirements for the driver´s qualification

- Only a driver having been trained according to ISO 7130 and other local and national instructions and standards specified for drivers of such a group of machines is allowed to operate the roller.
- Only the one who learns to drive the machine with the approval of the user for the purpose of getting preliminary practice may drive the machine with no licence, and such a person has to be under direct and continuous surveillance of a professional teacher or trainer.
- The licence (certificate) holder is obliged to take due care of the licence and when requested to submit it to the control authorities.
- The licence holder must not make any records, changes or corrections in the licence card.
- He is obliged to immediately report his lost licence to the authority that issued the licence.
- The roller may be driven without a respective licence independently and for a short term only by a worker who is mentally and physically fit, over 18 years old and is:

  a) charged by the machine manufacturer with assembling, testing and presenting the machine and possibly with training the drivers whereas he must be familiar with work safety regulations in force at the workplace

  or

  b) assigned by the building works contractor for operation (maintenance), trained and practised in a provable manner and/or having the professional qualification to operate and drive the roller in compliance with special provisions (machine operator licence, etc.).
- The machine driver must undergo training and examination concerning the work safety regulations at least once every 2 years.

2.1.3 Driver's obligations

- Before starting operation of the machine, the driver is obliged to get familiar with instructions stated in the documentation supplied together with the machine, especially with safety precautions, and strictly observe the instructions. This also applies to personnel assigned to maintain, adjust and repair the machine. (If you do not understand some parts of the manuals, contact the nearest dealer or the manufacturer.)
- The driver must not drive a roller, unless he is fully familiarized with all functions of the machine, working and operating elements and unless he precisely knows how to operate the machine.
- The driver is obliged to follow the safety signs located on the machine and keep them legible.
- Before starting the work, the driver must get familiar with the workplace environment, i.e. with obstructions, slopes, utility line system and necessary types of workplace protections with respect to the surroundings (noise, vibration, etc.).
- When the driver finds out any hazard to health or life of persons, property hazard, failure, accident of the technological equipment, or when he finds out any symptoms of such hazards during operation, then the driver unless is able to eliminate such hazards by himself must stop the work and secure the machine against undesirable starting and attach the warning sign "MACHINE REPAIR" on the steering wheel as shown in the chapter "Safety notices and signs used on the machine", report this to the person in charge, and if possible, notify all persons exposed to such a danger.
- Before starting operation of the machine, the driver is obliged to get familiar with records and operational deviations found during the previous work shift.
- Before starting the work, the driver is obliged to inspect the machine and accessories and to check control elements and communication and safety equipment for functioning according to the manual. If he finds a defect that might endanger the safety of work and is not able to repair it, then he must not put the machine into operation and must report the defect to a responsible worker.
- The driver while working with the machine must be fastened with the safety belt.
- The safety belt and its brackets must not be damaged.
- If the driver finds a defect during operation, he must immediately stop the machine and secure it safely against undesirable starting.
- During operation the driver must watch operation of the machine and record any detected defects into the operational logbook.
- The driver must maintain the operational logbook, which is defined for records on the machine acceptance and takeover carried out between drivers, for defects and repairs done during operation and keeping the serious events during the working shift on files.
- Before the engine is put into operation, the controls must be in the parking brake position; no persons are allowed to stay within dangerous reach of the machine.
- The driver must always notify the others each time the machine is put into operation with the help of a sound or light signal before starting the engine of the machine.
- Before putting the machine into operation, he must check the brakes and steering for functioning.
- After a warning alarm, the operator may put the machine into operation only when all workers have left the endangered area. At not clearly arranged workplaces, the machine can be put into operation not earlier than after expiration of the period of time needed for people to leave the endangered area.
- During operation of the machine, it is necessary to follow safety instructions and not to carry out any activity that might endanger the safety of work; the driver must be fully engaged in steering the machine. Always sit on the seat while driving the machine.
- The driver must always sit on the seat while driving the machine considering the restrictions imposed by the seat switch.
- The driver must comply with technological procedures of works or instructions of a responsible worker.
- When rolling (traversing) the machine within the workplace, he must adapt the driving speed to terrain conditions, the work performed and weather conditions. Watch continuously the clearance to avoid collision with any obstruction.
- When the machine operation is finished or stopped and the driver leaves the machine, he must take measures against unauthorized use of the machine or against spontaneous starting. Remove the key from the ignition box, lock the cab and disconnect the wiring using the disconnector.
- When the operation is completed, park the machine at a suitable parking place (flat, bearing surface) so as not to endanger stability of the machine; the machine must not interfere with traffic roads, must not be exposed to falling objects (rocks), and must be protected against any natural disaster of another kind (floods, landslides, etc.).
- When parking the machine on roads, the measures according to road traffic regulations shall be taken. The machine must be marked properly.
- After finishing the work with the machine, all of the defects, damages to the machine and any repairs made must be recorded in operational logbook. When drivers take turns, the driver is obliged to report any identified facts to the following driver.
- The driver must use personal protective equipment (PPE) – work clothing, safety shoes, The clothing must not be too loose, impaired, hair must be protected with a suitable cap. During maintenance (lubrication, refilling and replacement of working media) the hands must be protected with suitable gloves.
- The driver must use suitable ear protection when using the machine without cab or with open windows.
- He must keep accessories of the machine as prescribed.
- He must keep the driver's stand, foot rests and walkway surfaces clean.
- Before lifting off the bonnet, check that there is a sufficient space needed for lifting and that there are no electrical circuits there. Before lowering the bonnet, he must check that nobody is endangered by this activity.
- If the machine could come into contact with high voltage, the following principles must be observed:
  - try to leave the hazardous zone with the machine;
  - do not leave the driver's stand;
  - warn the others to keep off and not touch the machine.
- Keep the machine free of oil contaminants and inflammable materials.

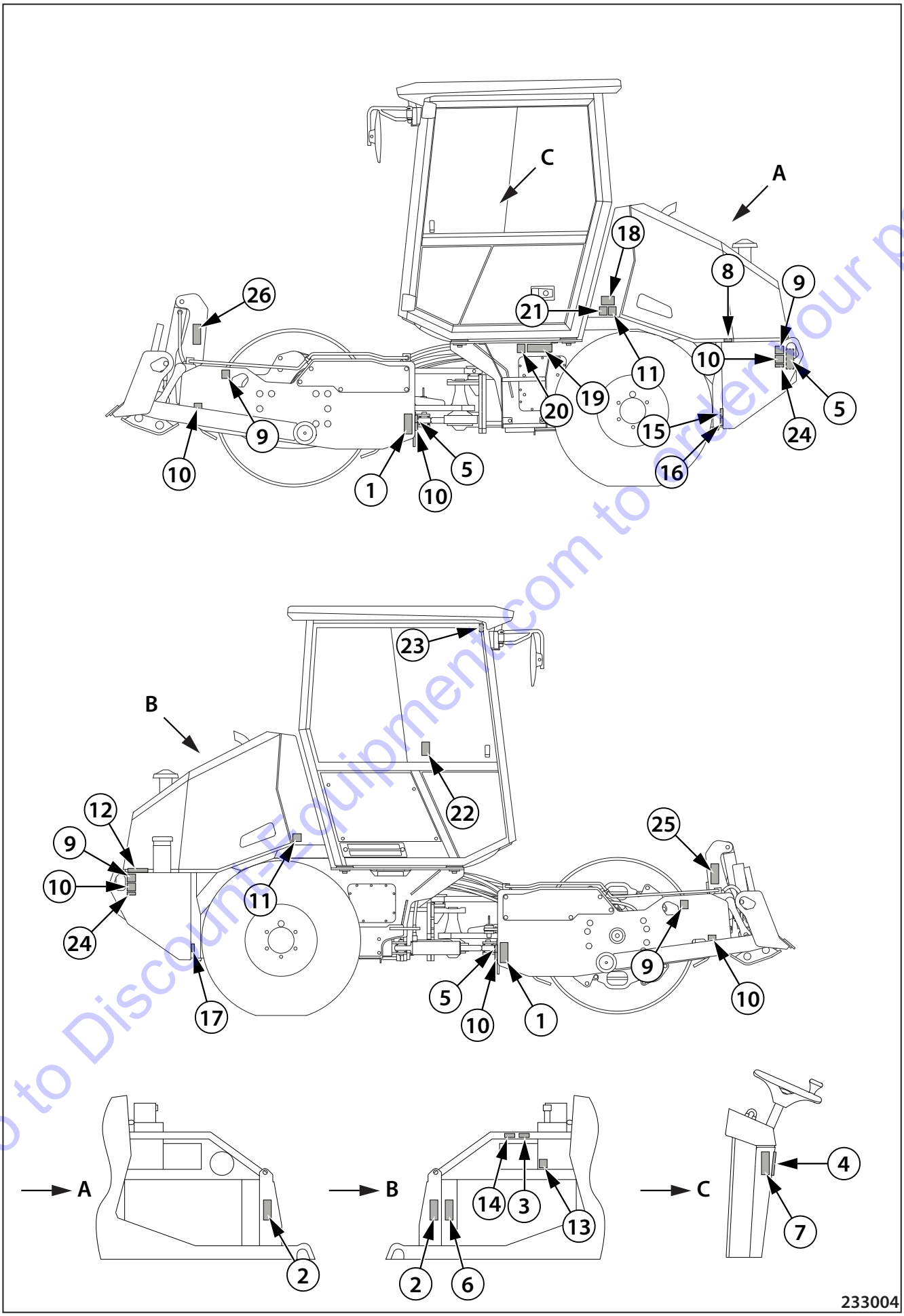
2.1.4 Forbidden activities – safety and guarantee

The following is forbidden

- Vibrating on the spot.
- Filling the hydraulic circuit during the guarantee period in a different way than using the hydraulic unit.
- Using the machine in case of an evident defect of the machine.
- Using the machine when any of the operating fluid levels is low.
- To repair the engine without authorization – Except common changes of operating fluids and filters, only the Kubota service department is allowed to intervene in the engine, including the peripheral components of the engine – the alternator, starter, thermostat, electrical installation of the engine.
- Increasing and decreasing the engine speed rapidly; you could damage the engine.
- Using the emergency brake for turning off the engine during normal operation of the machine.
- Operate the machine in potentially explosive atmospheres (ATEX) and underground areas.
- Using the machine after ingestion of alcoholic beverages or drugs.
- Using the machine if its operation might endanger its technical condition, safety (life, health) of persons, facilities or objects, or road traffic and its continuity.
- Putting the machine into operation and using the machine when other persons are within its danger zone – the exception is training of a driver by an instructor.
- Putting the machine into operation and using the machine when a safety device (emergency brake, hydraulic locks, seat switch etc.) has been removed or damaged.
- Travelling and compacting in such slopes where the machine stability would be broken (overturning). The stated machine static stability is reduced by dynamic effects of the drive.
- Travelling and compacting in such gradients of slopes where there is a risk of soil breaking off (dropping) under the machine or of loss of adhesion and of uncontrolled slip.
- Controlling the machine in some other way than stated in the operation manual.
- Travelling and compacting with vibration according to the bearing capacity of the subsoil in such a distance from the slope edge or trenches where there is a risk of landslide or shoulder breaking off (dropping) together with the machine.
- Travelling and compacting with vibration in such a distance from walls, cuts and slopes where there is a risk of landslide and the machine could be covered up with soil.
- Travelling with vibration on a hard (frozen, concrete, overcompacted) surface or on a bedrock. There is a risk of damaging the machine.
- Compacting with vibration in such a distance from buildings or facilities and equipment, within which there is a risk of damage due to transmission of vibration.
- Moving and transporting persons on the machine.
- Working with the machine if the driver's stand is not properly attached.
- Working with the machine when the bonnet is lifted off.
- Working with the machine if there are other machines or means of transport in its danger zone, except those that operate in mutual cooperation with the machine.
- Working with the machine at a place that is not seen from the driver's stand and where hazard to people or property could occur unless the work safety is ensured through some other way, e.g. with mediate signalling by a duly instructed person.
- Working with the machine in a protected zone of electric lines or substations.
- Crossing electric cables if they are not properly protected against mechanical damage.
- Working with the machine in reduced visibility or at night unless the machine's working area and the workplace are illuminated sufficiently.
- Leaving the seat of the machine driver when the machine is running and the parking brake is not enabled.
- Leaving the machine unattended – moving away from the machine without having prevented its misuse.
- Disabling safety, protective or locking systems or altering their parameters.
- Using a machine, from which the oil, fuel, coolant or other operating fluid is leaking.
- Starting the engine in a different way than it is given in the operation manual.
- Placing other items (tools, accessories) than items for personal use in the driver's stand.

- Placing materials or other items on the machine.
- Removing dirt while the machine is running.
- Performing maintenance, cleaning or repairs with the machine not secured against spontaneous movement or accidental start, and if a person can come in contact with moving parts of the machine.
- Touching moving parts of the machine with the human body or items and tools held in hands.
- Smoking or handling open fire when checking or pumping fuels, replacing and refilling oils, lubricating the machine and inspecting the battery and refilling the battery.
- Carrying rags soaked with flammable materials or flammable liquids in free vessels on the machine (in the engine compartment, cab).
- Leave the engine running in enclosed, unventilated areas. Exhaust fumes are dangerous to life.
- Travelling with open doors.
- Performing modifications on the machine without the prior consent of the manufacturer.
- Travelling with the seat belt not fastened.
- Moving electrical conductors.
- Using other than original spare parts.
- Intervening in electrical and electronic units in any manner.

Non-observance of the above provisions can impact on the assessment of a complaint and effectiveness of the engine guarantee period.



2.1.5 Safety notices and signs applied on the machine

1	Risk of pressing	 4209bz	Keep a safe distance from the machine, there is a danger of squeezing by the machine between the front and rear frame.
2	Risk of injury	 2409bz	There is a risk of injury! Do not touch rotating parts while the engine is running.
3	Coolant	 4211bz	There is a risk of scalding Do not open the cap until the fluid cools down below 50 °C (122 °F).
4	Carry out adjustments calmly	 2584bz	Turn off the engine and remove the key from the ignition box before performing maintenance or repairs.
5	Dangerous area	 4210bz	Keep a safe distance from the machine.
6	Risk of injury	 4049bz	Risk of trapping of the hand by the belt. There is a risk of burns. Do not touch hot parts of the machine unless you make sure that they are sufficiently cold.

7 Unplug the wiring


4119bz

Before welding or washing the machine, unplug the wiring, alternator, machine electronics and engine control unit. Before washing the machine, cover all electrical equipment.

8 Risk of explosion


3698bz

There is a risk of explosion when the battery is handled. Read the operation instructions!

9 Suspension points


2153bz

Only use these points to lift the machine.

10 Sling points


3048bz

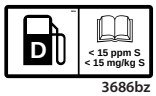
Tie-down the machine for transport at these points only. The maximum allowable force to fasten the machine to the vehicle using the rear lifting eyes is 1.5 t.

11 Tyre pressure

4213bz

4220bz

12 Refuelling

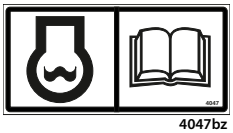


3686bz

13 Hydraulic oil level


2158bz

14 Coolant


4047bz

The coolant is harmful to health. Read the operation instructions!

15 Coolant drain plug

3189bz

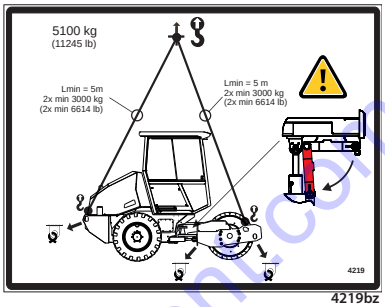
16 Engine oil drain plug

3212

17 Hydraulic oil drain plug

3960

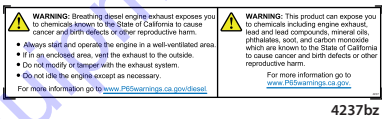
18 Suspension diagram



4219bz

To lift the machine, use binding means of sufficient loading capacity, refer to the chapter Machine loading. Before hanging, lock the articulation of the machine.

19 California – Proposition 65 Warning



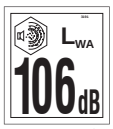
4237bz

Exhaust gases and their components, operating fluids, batteries and other machine accessories contain chemicals known in the state of California to be substances which may cause cancer, congenital defects and other reproduction problems.

When handling these substances, abide by relevant safety precautions.

For further information see www.p65warnings.ca.gov

20 Guaranteed sound power level



3191bz

21 Maximum machine height

4221bz

Pay attention when passing through areas with height limitations.

22 Emergency exit

If you cannot leave the machine through the left door, use the emergency exit.

23 Ear protectors

Use ear protectors when operating a machine without a cab.

24 Maximum load

The maximum permissible load of the rear lifting eyes is 1.5 tons.

25 Risk of injury

Before switching off the engine, lower the blade to the ground.

26 Securing the blade

When the work has been finished, lower the blade to the ground or secure it with the locking rods. Read the operation instructions!

27 Machine under repair

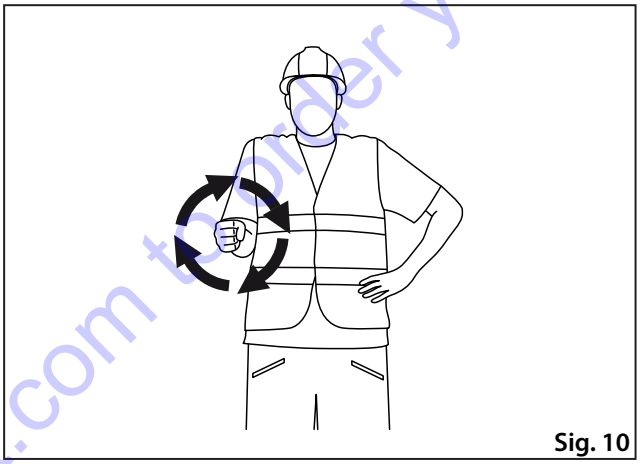
Do not start the engine! Hang the tag on the steering wheel. The tag is delivered together with machine accessories and should be kept in the document box.

2.1.6 Hand signals

- Signals given by an assistant operator if the operator cannot see the travelling or working area or work devices of the machine.
- The following principles must be observed:
  - For communication purposes, only a limited number of signals must be used.
  - The signals must be clearly distinguishable to prevent any misunderstanding.
  - Hand signals can only be used when ambient conditions allow clear communication between persons.
  - Hand signals must be as similar as possible to intuitive movements.
  - Single-handed signals can be done with any hand.

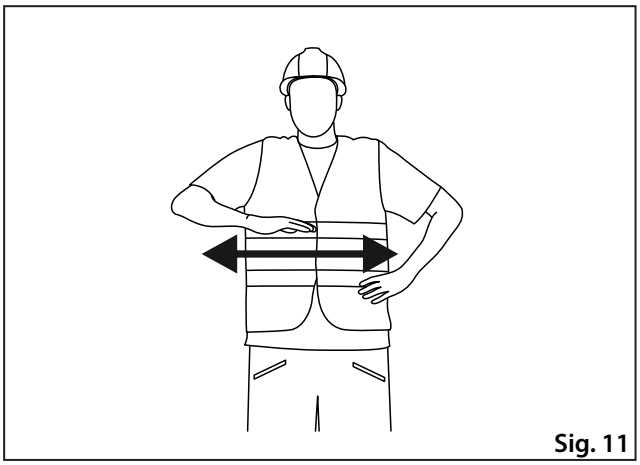
EXAMPLES OF COMMUNICATION SIGNALS:

Engine start



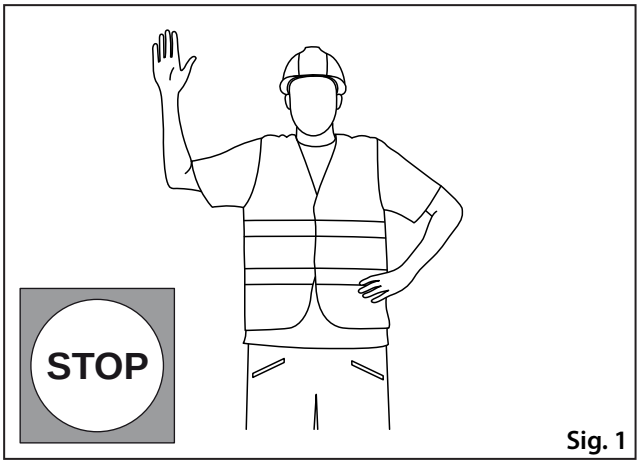
Sig. 10

Engine shutdown



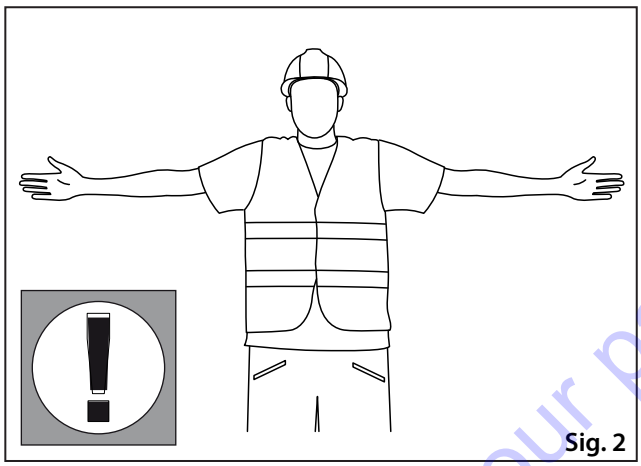
Sig. 11

Stop



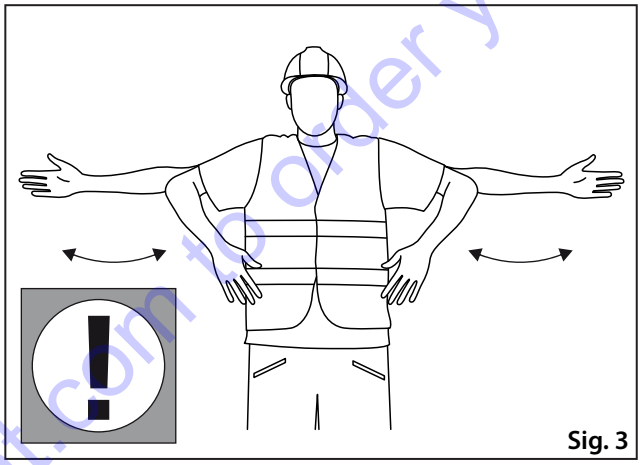
Sig. 1

Watch out



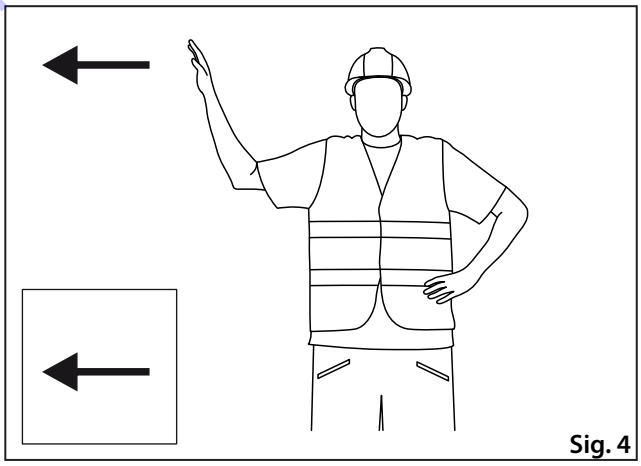
Sig. 2

Watch out, danger



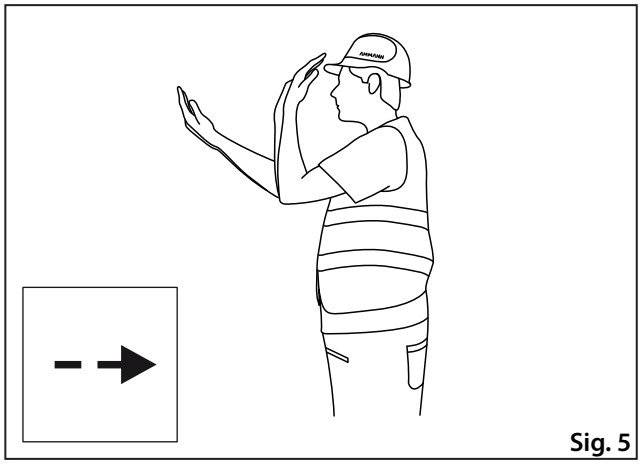
Sig. 3

Travel



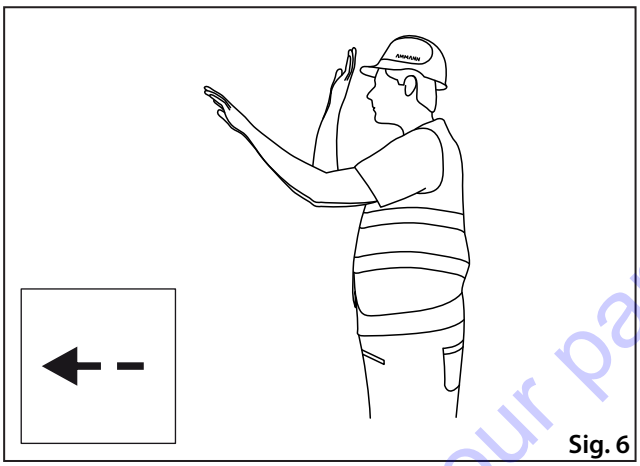
Sig. 4

Slow forward travel – towards me



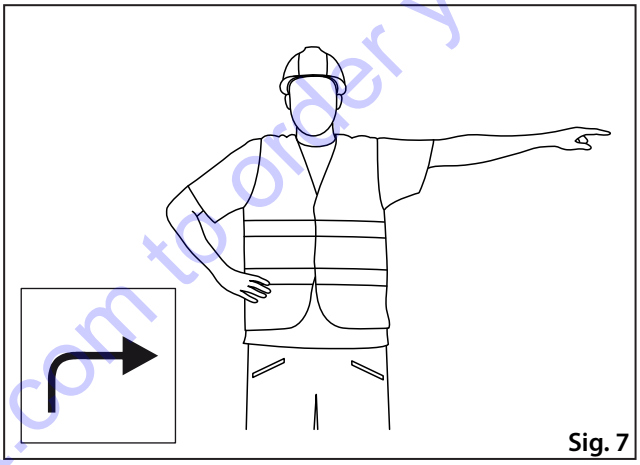
Sig. 5

Slow reverse travel – away from me



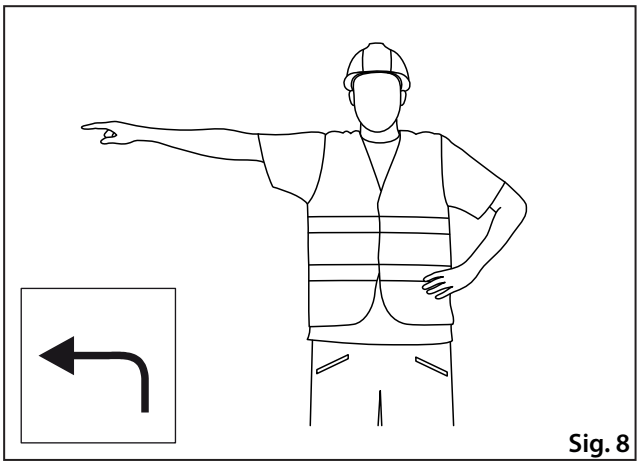
Sig. 6

Drive to the right



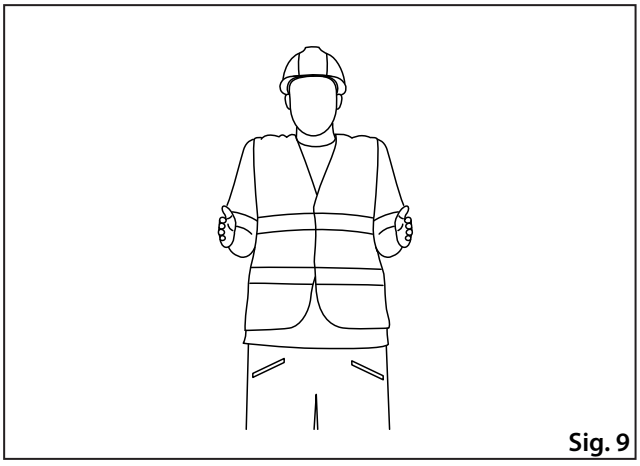
Sig. 7

Drive to the left



Sig. 8

Short distance travel



Sig. 9

When operating and storing the machines, the user is obliged to observe general principles of health and environmental protection, and laws and regulations relating to the given points at issue and being in force within the territory where the machine is used.

2.2.1 Hygiene principles

- Petroleum products, cooling system fluids, battery fluids and coating compounds including thinners are substances harmful to health. Workers coming into contact with the above products during operation or maintenance of the machine are obliged to follow general principles of their own health protection and comply with safety and hygienic manuals made by manufacturers of the products.

  In particular we draw your attention to the following:

  - Protect your eyes and skin while working with the batteries
  - Protect your skin while handling petroleum products, coating compounds and coolants
  - Wash your hands properly after finishing the work and before eating, treat your hands with a suitable reparation cream.
  - When handling cooling systems, follow instructions given in the Operating manual supplied with the machine.

- Always store petroleum products, cooling system fluids, battery fluids and coating compounds including thinners and also cleaners and preservation agents in their original and properly labelled containers. These materials are not allowed to be stored in unlabelled bottles or in any other containers considering the possible risk of confusion. Possible confusion with foodstuffs or beverages is very dangerous.
- If by accident the skin, eyes or mucous membrane is stained or if you breathe in the vapours of such products, apply first aid measures immediately. In case of accidental ingestion of these products, immediately seek medical help.
- When working with a machine that is not provided with a cab or when the cab windows are open, always use ear protectors of suitable type and version.

2.2.2 Environmental principles

- Discarded operating fluids of individual systems of the machine and also some of its parts become hazardous wastes with dangerous properties for the environment.

  This category of waste products includes in particular:

  - organic and synthetic lubricating materials, oil or fuels,
  - coolants,
  - battery fluids and batteries,
  - tyre fillings,
  - cleaning and preservation agents,
  - all dismounted filters and filter cartridges,
  - all used and discarded hydraulic or fuel hoses, rubber-metal elements and other parts of the machine contaminated by the above mentioned products.

- The manufacturer and contractual service organizations accredited by him, or dealers take back the following materials or parts free of charge:

  - Oils
  - Batteries
  - Tyres

It is necessary to treat the above mentioned materials and parts after their discard in accordance with relevant national regulations valid for protection of individual parts of the environment and in compliance with regulations of health protection.

2.3.1 Short-term preservation and storage for 1 – 2 months

Wash and clean the entire machine carefully. Before parking the machine for preservation and storage, run the engine to warm it up to its operating temperature. Park the machine on a solid and flat surface at a safe place with no risk of natural disaster (floods, landslides, fire, etc.) for the machine.

In addition:

- Repair paints where damaged.
- Lubricate all lubricating points, cable hoses, joints of the controls, etc.
- Check that water fluids are drained.
- Check that the coolant has the required antifreeze properties.
- Check that the batteries are charged and/or recharge them if necessary.
- lubricate chromed surfaces of piston rods with preservative grease;
- We recommend you to protect the machine against corrosion with a preservative coating (applied by spraying), especially where corrosion can occur.

If you treat the machine as above described, it is not necessary to prepare the machine in a special manner before it is put into operation again.

2.3.2 Preservation and storage for more than 2 months

For machine shut-down, the same principles are applicable as for the short-term preservation.

In addition it is recommended to:

- remove the batteries, check for condition and store them in a cool and dry room (recharge the batteries regularly);
- support the drum frame so that the shock-absorbing system shows a minimum sag;
- protect the rubber elements by coating with special preservation agent;
- inflate the tyres to the prescribed pressure and protect them before sunlight;
- lubricate chromed surfaces of piston rods with preservative grease;
- preserve the machine by spraying a special liquid, in particular in places with risk of corrosion;
- cover the suction and exhaust pipe of the engine with double PE foil and tighten it carefully with a sealing tape;
- spray a special liquid on the headlights, external rear-view mirrors and other elements of the external electrical installation and wrap them into PE foil to protect them;
- preserve the engine according to the manufacturer's manual – mark visibly that the engine is preserved.

After 6 months, we recommend you to inspect the condition of preservation and renew if required.

When the machine is stored under field conditions, check that the parking place is not exposed to danger of flooding due to floods and that there is no other type of danger in this area!

Never start the engine during storage!

2.3.3 Removal of preservation and inspection of the delivered machine

Check the machine according to transport documents.

Check all parts of the machine for damage during transport and for missing parts. Inform the shipper of any discrepancies.

Before operating the machine, wash the preservation agents away using high pressure stream of hot water with common degreasers while observing ecological principles.

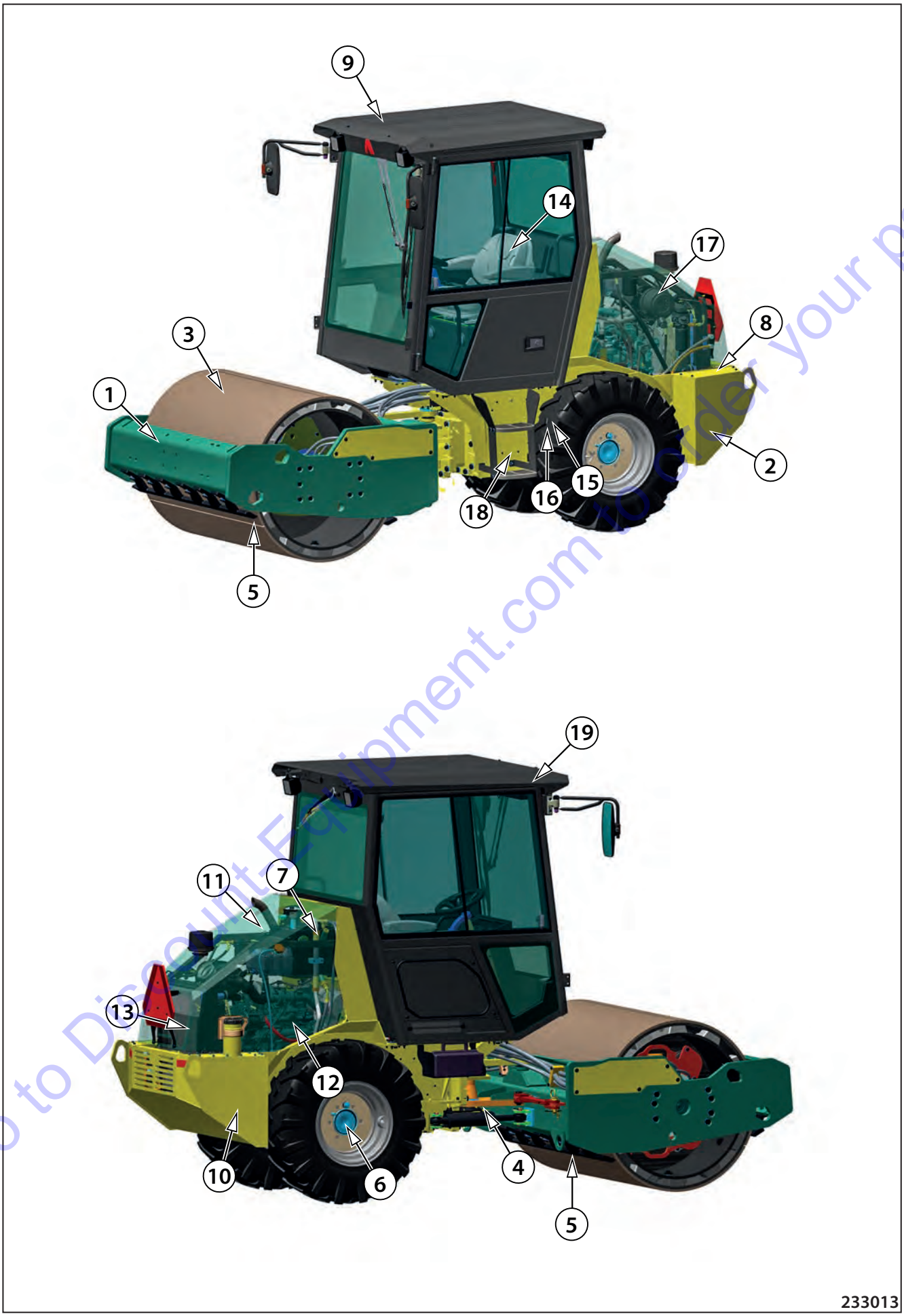
Remove the preservation agents and wash the machine in places provided with intercepting sumps to trap the rinsing water as well as de-preservation agents.

2.4 Machine disposal after its service life

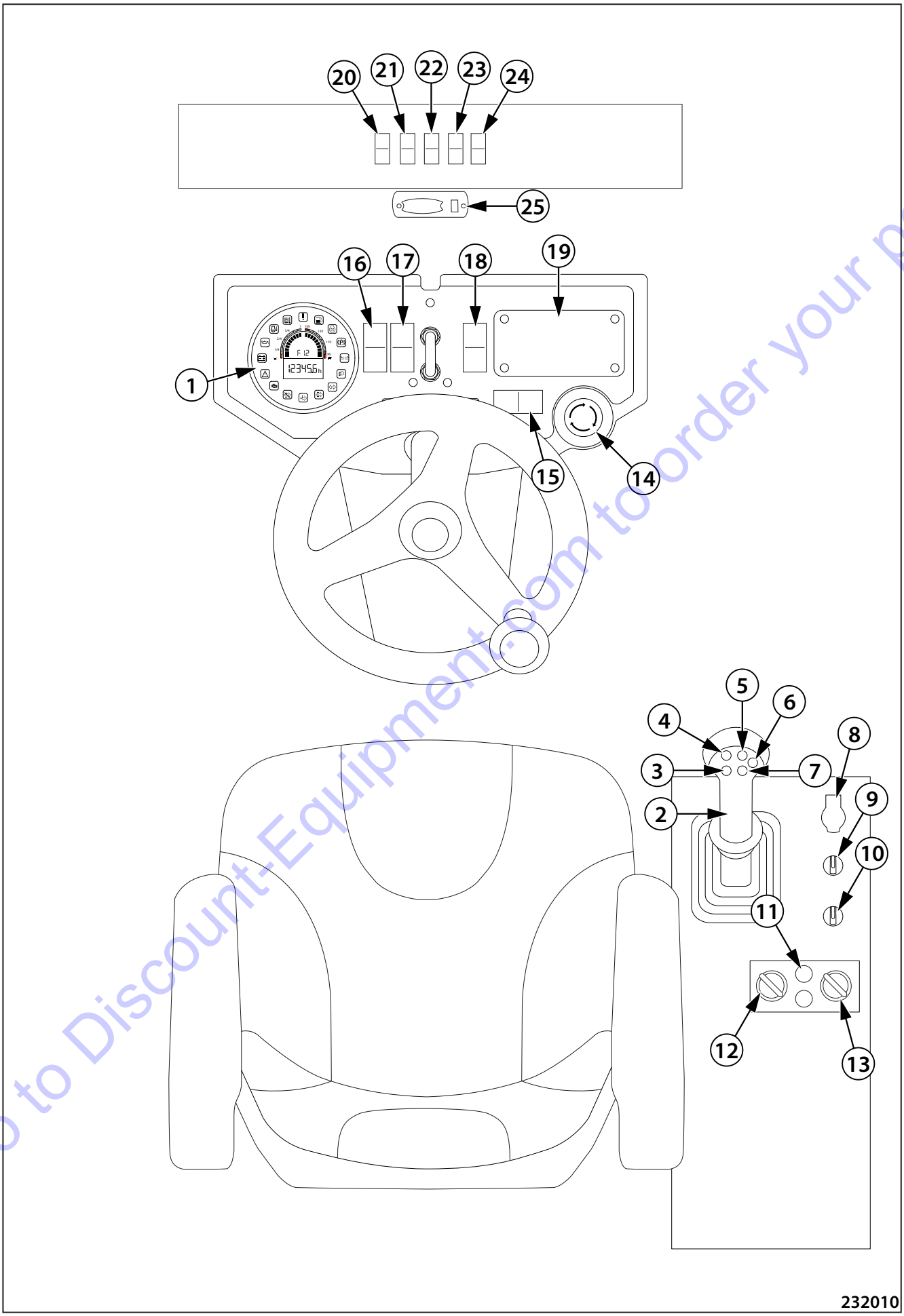
When disposing the machine following its service life, the user is obliged to follow national waste and environmental regulations and acts. In the above cases, we recommend you to always contact:

- specialized companies with a respective authorization for these operations,
- the machine manufacturer or accredited contracting service organizations authorized by the manufacturer.

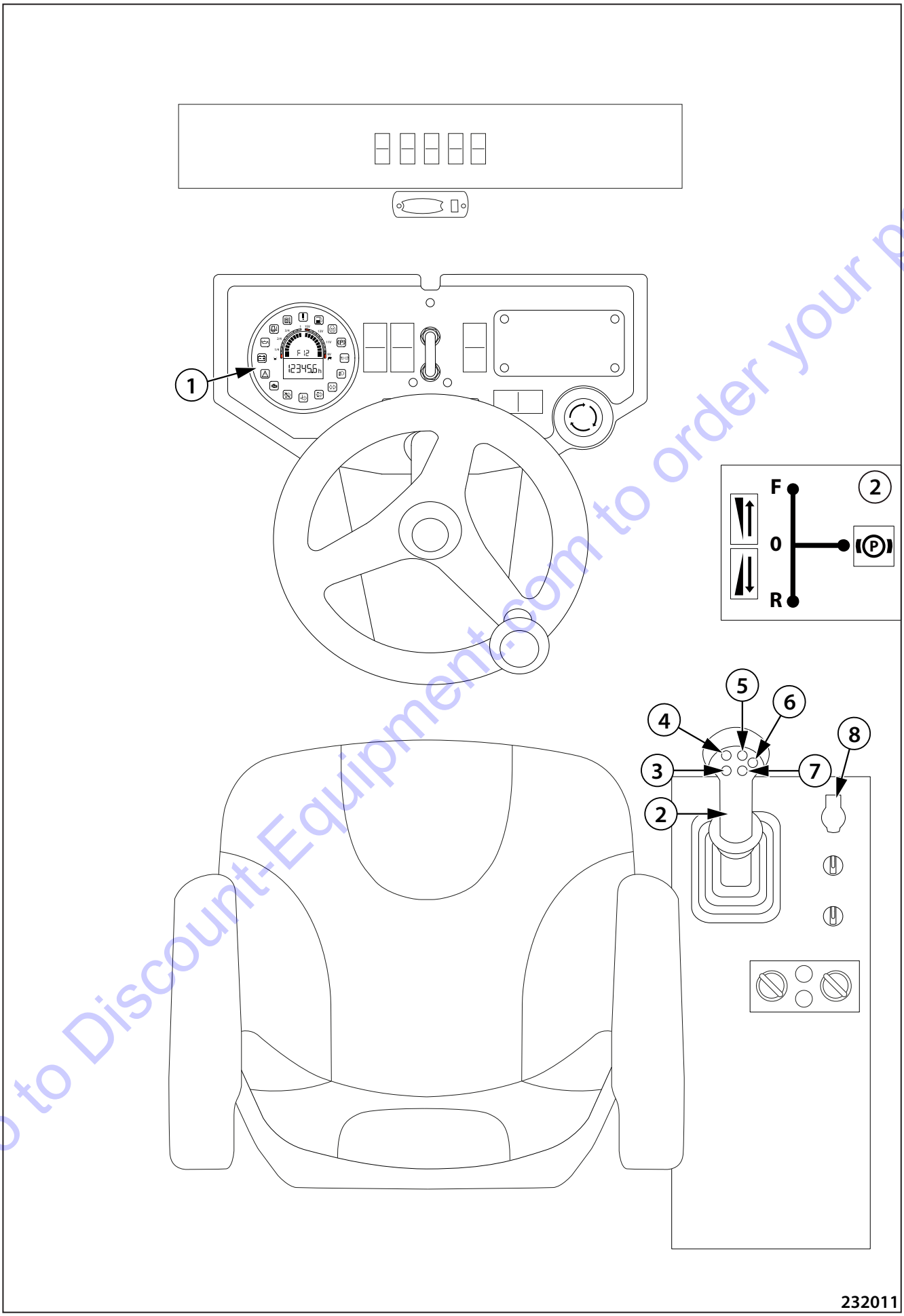
The manufacturer shall not be responsible for damage to the health of users or environmental damage caused by the non-compliance with the above mentioned rules.



1. Drum frame
2. Tractor frame
3. Vibratory drum
4. Joint
5. Scrapers
6. Axle
7. Hydraulic tank
8. Battery
9. Cab with integrated ROPS frame
10. Fuel tank
11. Bonnet
12. Engine
13. Combined cooler
14. Driver's stand
15. Steering hydraulic generator
16. Vibration and travel hydraulic generator
17. Air filter
18. Hydraulic oil pressure filter
19. Air conditioning



1. Display
2. Travel control
3. Warning horn button
4. Vibration button
5. Blade button – up (optional equipment)
6. Blade button – floating position (optional equipment)
7. Blade button – down (optional equipment)
8. Ignition box
9. Regeneration switch
10. Engine speed selector switch
11. Air-conditioning switch (optional)
12. Heater fan speed switch
13. Heating temperature control
14. Emergency brake button
15. Direction indicators switch
16. Road lights switch
17. Warning lights switch
18. Additional lights switch
19. ACEecon (optional equipment)
20. Front screen wiper switch
21. Rear screen wiper switch
22. Washer switch
23. Working lighting switch
24. Warning beacon switch (optional)
25. Cab light



Display (1)

Multifunction instrument to display parameters of the engine and machine functions.

Travel control (2)

The travel control is used for braking the machine and setting the direction and speed of travel.

Travel control positions:

P – parking brake – parking brake of the machine enabled

0 – zero position – the machine is not braked

F – forward travel

R – reverse travel

The machine braking is indicated by lighting up the brake indicator lamp on the display (1).

The travel speed corresponds to the speed selected by the travel selector switch (10) and to the deflection of the travel control from the zero position (0).

If you leave the travel control in the zero position (0), it is possible that the machine will move from the slope due to leakages of the hydraulic system.

Warning horn button (3)

Vibration button (4)

Press the button to turn on/off the function.

It is forbidden to vibrate on the spot!

Blade button – up (5)

Use the button to adjust the blade to the transport position.

Blade button – floating position (6)

Press the button to enable the floating position of the blade. The blade will drop to the ground and copy the terrain.

Blade button – down (7)

Use the button to adjust the blade to the working position.

Ignition box (8)

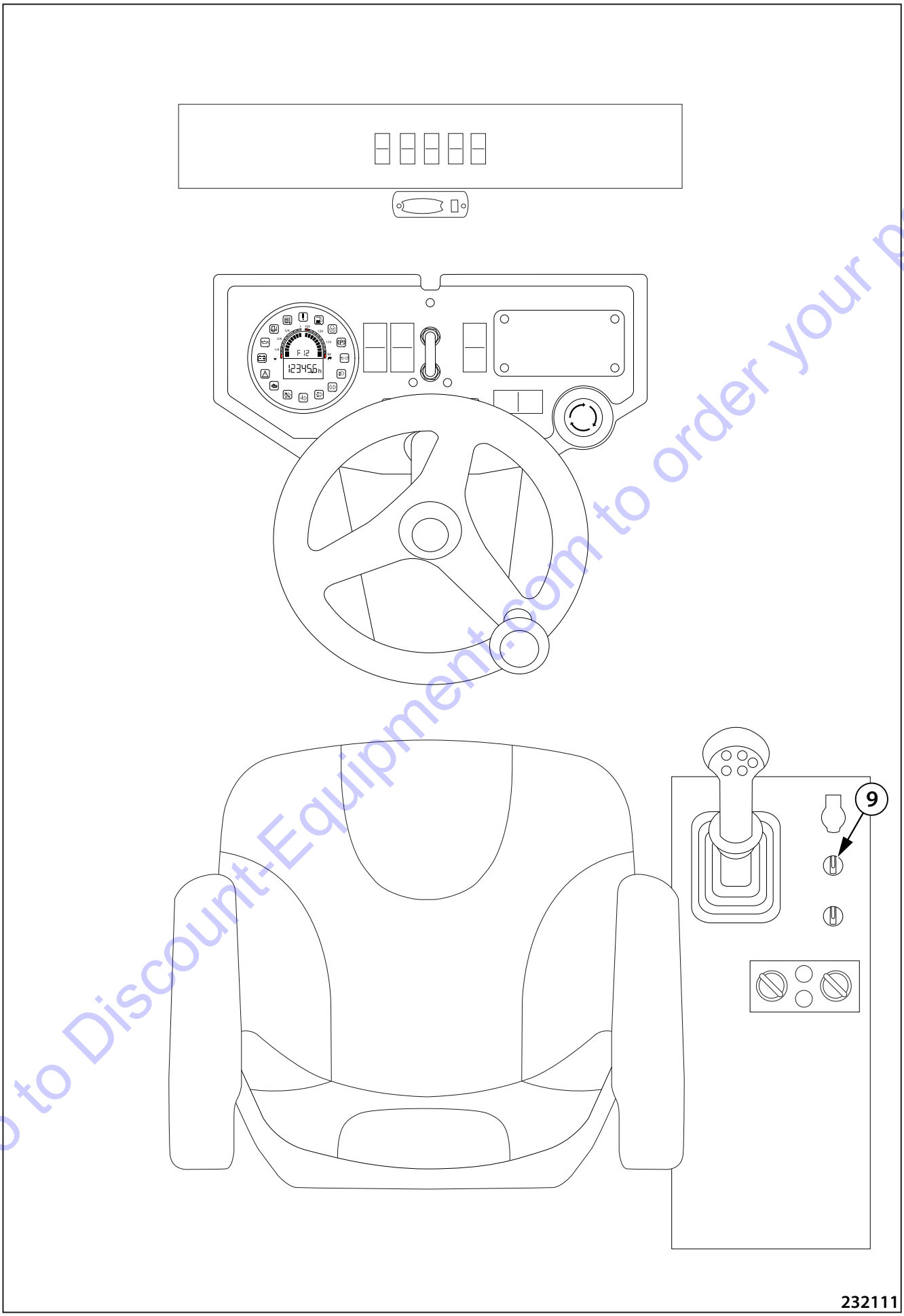
There are three positions "0-I-II" of the ignition box. The key can be inserted and removed in position "0" only.

Turn a bit the key to the right side to enable the position "I" first and then the position "II".

The "I" position is used for connecting instruments.

The position "II" is used for starting the engine.

Protect the ignition box with the protective cover after the key is pulled out.



Regeneration switch (9)

It is used for enabling the DPF regeneration.

Left position – regeneration OFF

- It is used to interrupt regeneration in emergency situations only, such as machine operation in an explosive or flammable environment.
- Do not suppress regeneration unless is it absolutely necessary.

Repeated suppression of regeneration results in DPF damage. Prolonged operation of the machine with suppressed regeneration will destroy the diesel particulate filter (DPF).

Centre position – AUTO

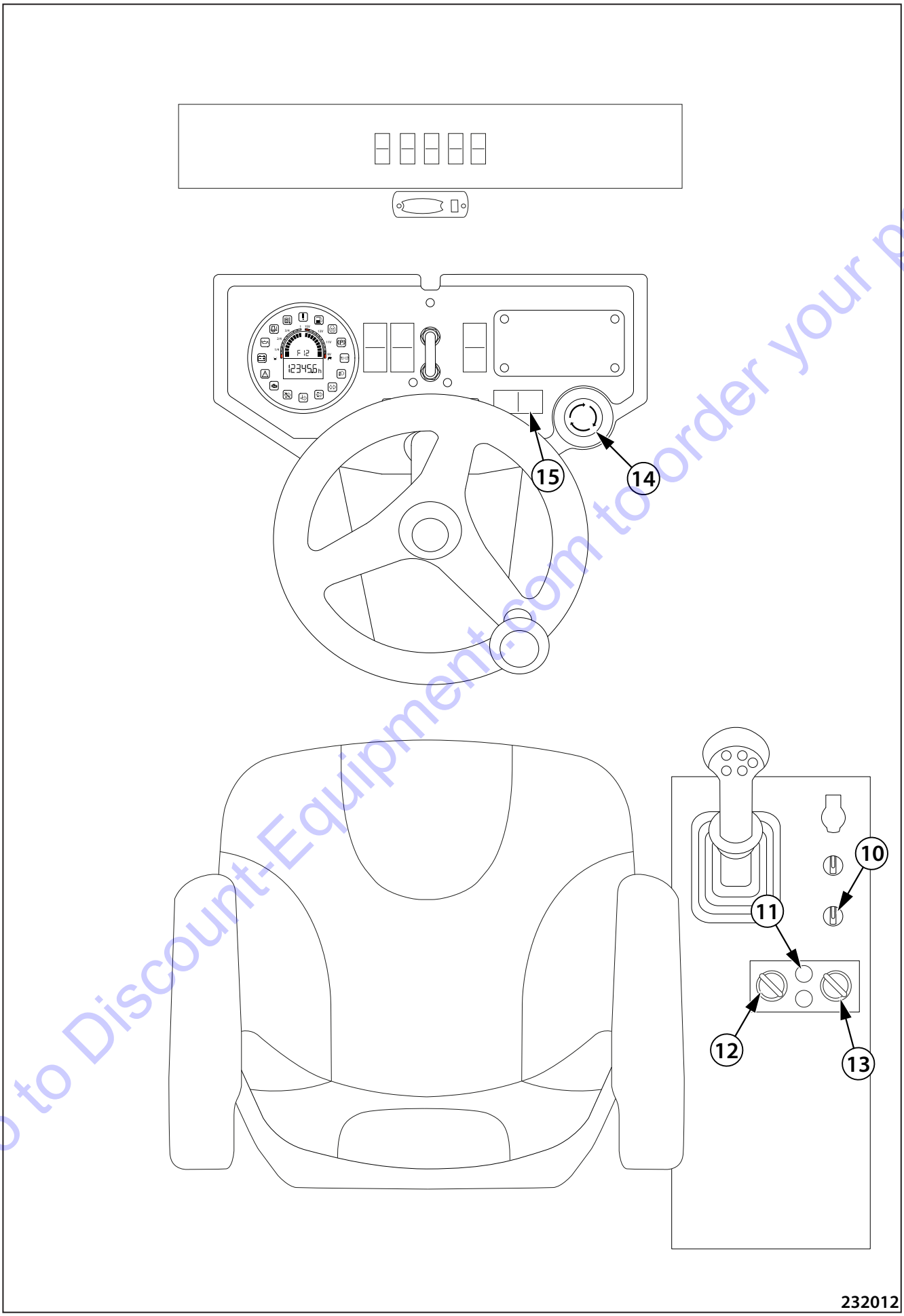
Active regeneration is automatic without operator input (according to Chapter 2.7.10.2.2).

Leave the AUTO position set for the whole duration of machine operation. This will prevent diesel particulate filter (DPF) damage.

Right position – parking active regeneration ON

It is used to activate parking active regeneration.

Perform the DPF (diesel particulate filter) clogging regeneration according to Chapter « 2.7.10 Principles of use of the machine with a DPF (Diesel Particulate Filter) ».



Engine speed selector switch (10)

- Idle speed – 1000 rpm – slow travel, vibration blocked
- Speed 1 – 1900 rpm – travel, low frequency vibration
- Speed 2 – 2400 rpm – travel, high frequency vibration


2441

Air-conditioning switch (11)

It is used for turning on/off the air-conditioning system.


AMN469

Heater fan speed switch (12)

It is used for air flow control.

0 – OFF

1 – minimum

2 – medium

3 – maximum

Heating temperature control (13)

It is used for adjusting the air temperature.

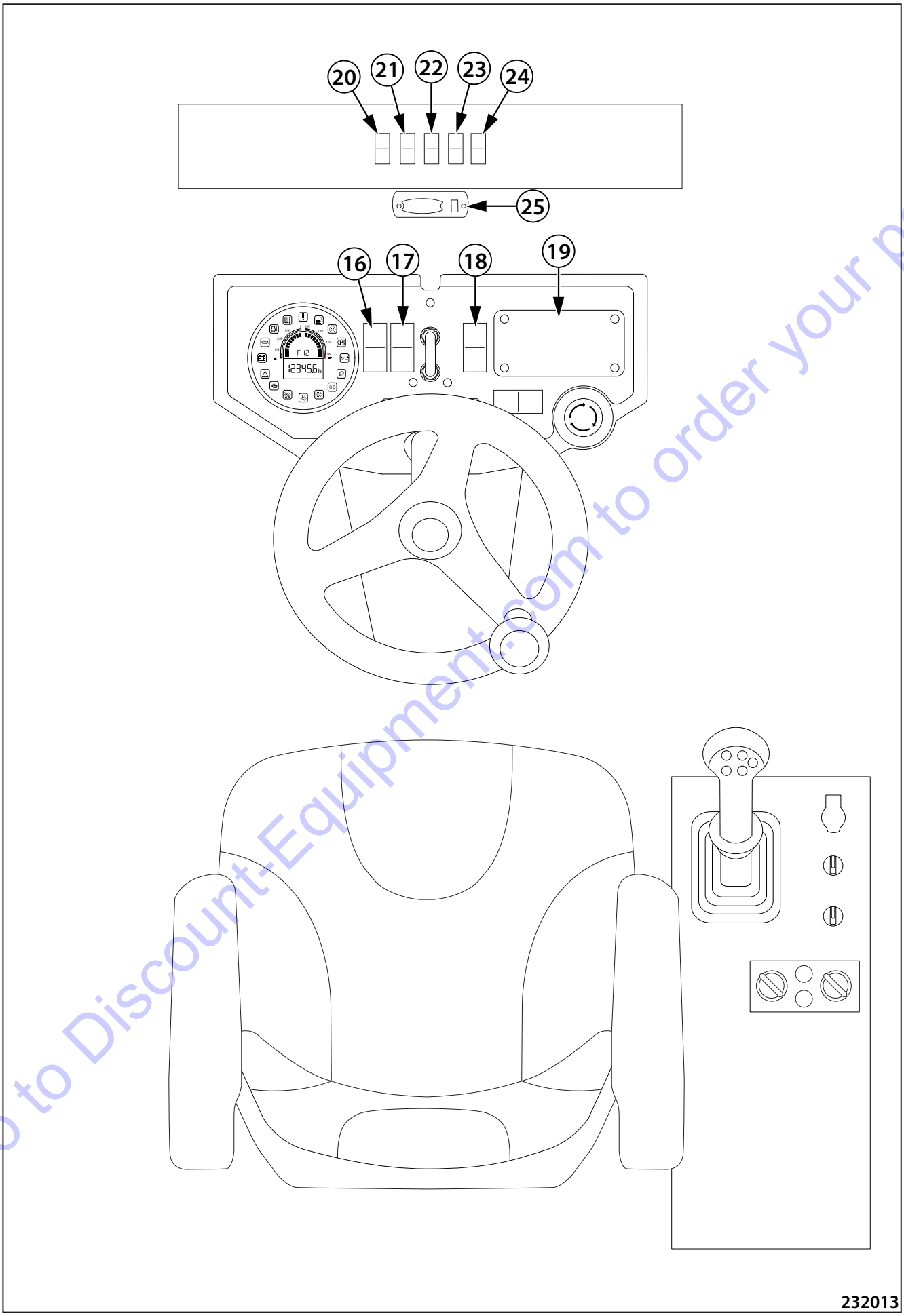

2582

Emergency brake button (14)

Pressing the button activates the emergency brake of the machine. The machine stops, the engine shuts down. After activating the emergency brake button the indicator lamps for battery charging (31), engine lubrication (32), parking brake (38) and emergency stop (35) are shown on the display.


2489

Direction indicators switch (15)




AMN448

AMN449

Road lights switch (16)

It is used for turning on/off the road lights.

- Off
- Parking lights
- Low beam lights


595417

Warning lights switch (17)


AMN450

Additional lights switch (18)

ACEecon (19)

It is used for material compaction degree.


596625

Front screen wiper switch (20)

- Off
- Intermittent
- Continuous wiping

The wiping interval of 5 sec. is set automatically by changing the switch from OFF to Intermittent. You can readjust the interval by changing the switch to OFF and then after a required time (from 0.5 to 60 sec.) back to the Intermittent position.


596307

Rear screen wiper switch (21)

- Off
- Intermittent
- Continuous wiping

The wiping interval of 5 sec. is set automatically by changing the switch from OFF to Intermittent. You can readjust the interval by changing the switch to OFF and then after a required time (from 0.5 to 60 sec.) back to the Intermittent position.


2260

Washer switch (22)

- Windscreen washing ON
- Off
- Rear window washing ON

After the windscreen is sprayed, it is wiped twice.


AMN450

AMN451

Working lights switch (23)

It is used for turning on/off the additional lights.

- Off
- Headlamps
- Front and rear lights


592348

Warning beacon switch (24)

It is used for turning on/off the warning beacon.


592305

Cab lighting (25)

Fuse box (26)

Fuse (F1) – 10 A .....Service sockets

Fuse (F2) – 7.5 A .....Ignition box

Fuse (F4) – 5 A.....Horn

Fuse (F5) - 10 A .....Road headlamps, parking lights

Fuse (F6) – 5 A.....Memories

Fuse (F7) - 20 A .....ECU power supply circuit, fuel pump, air weight

Fuse (F8) – 5 A.....ECU

Fuse (F12) – 5 A .....Display, charging

Fuse (F13) - 7.5 A.....Lever, vibration, engine speed selector switch, seat switch

Fuse (F14) – 7.5 A.....Power supply circuit 15/54 of TTC32

Fuse (F15) – 10 A.....Blade

Fuse (F16) – 5 A .....Reversing horn, switch back light

Fuse (F18) – 5 A .....Control circuit of TTC32

Fuse (F19) - 20 A.....Power part of the TTC32 power supply circuit (brake lights, vibration electro-magnets, fuel level indicator, parking brake valve, coolant level, hydraulic oil sensor)

Fuse (F21) – 10 A.....Radio

Fuse (F22) – 7.5 A.....Lights 360°

Fuse (F23) – 10 A.....Air-conditioning relay

Fuse (F24) – 10 A.....Wipers, screen washer

Fuse (F25) – 15 A.....Heating

Fuse (F26) - 7.5 A.....Telematic, green beacon, beacon, cab lighting

Fuse (F27) – 15 A.....Working lights

Fuse (F28) – 5 A .....CM

Fuse (F29) – 10 A.....Crankshaft heating

Fuse (F30) – 80 A.....Main fuse

Fuse (F37) – 30 A.....Power supply circuit – in front of the disconnector

Fuse (F40) – 50 A.....Pre-heating

Fuse (F50) – 40 A.....Start circuit

Fuse (F52) – 5 A .....Regeneration


232014


232015

232016

Connector CAN 3 (diagnostics) (27)

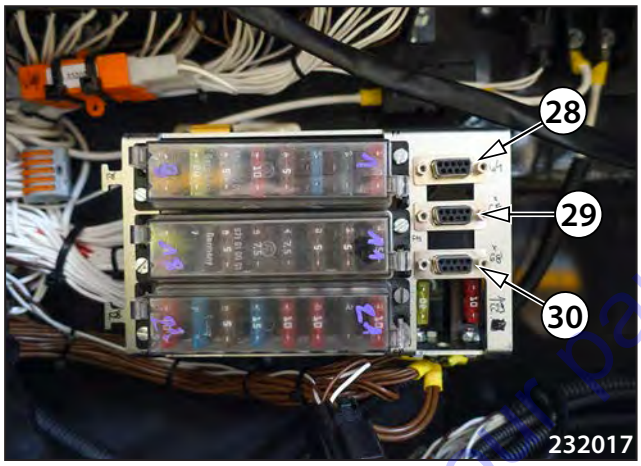
It is used for connecting an external computer (laptop) to determine proper communication between the CM module, the ACE display and the RC computer.

CAN 1 connector (diagnostics) (28)

It is used for connecting an external computing unit (laptop) to ensure correct communication between the travel control and RC computer. After connecting to this bus using Bodas software, you can update PC, parameterize, troubleshoot, etc.

CAN 2 connector (29)

It is used for connecting an external computing unit (laptop) to ensure correct communication between the engine, RC computer, display and travel control.



Service socket

The service socket is used for connecting a lamp or other equipment (12 V).

Fire extinguisher (optional equipment)

Place to install a fire extinguisher.

The manufacturer recommends that the machine be equipped with a fire extinguisher.

Windscreen washer tank

Fill with standard available media.

Fill with antifreeze or drain before the winter season starts!

Battery disconnector

It is used for disconnecting the battery from the machine frame.

Position "0" – Electrical installation of the machine disconnected.

Position "1" – Electrical installation of the machine connected.

Relays in the machine

The relays are situated in the switchboard box on the right side of the cab.

K1, K2 .....Power circuit 15/54

K4 .....Start blocking

K5 .....Engine relay

K7 .....Regeneration relay

K8 .....Reversing horn relay

K10.....Air-conditioning relay

K15.....Horn relay

K16.....TTC32 power supply switching relay

K20.....Crankshaft heating relay

K21 .....Blade valve control electronic relay – upwards

K22.....Blade valve control electronic relay – downwards

K22.....Glowing contactor

K23.....Blade valve control electronic relay – floating position

A1 .....Direction indicator flasher

A12.....Front wiper intermittent

Seat

Seat adjustment

1. Backrest inclination adjustment
2. Seat springing stiffness
3. Longitudinal seat travel

Seat springing stiffness

Turn the switch (2) to set stiffness according to driver's weight between 50 and 120 kg (110 - 265 lb).

Adjust the seat before driving the machine.

The driver must be fastened with the safety belt while driving.

Non-observance of this instruction can lead to death or serious injury.

Longitudinal seat travel

After raising the lever (3), it is possible to move the seat in the longitudinal direction forward-rearward.

Seat cross travel

After raising the lever (4), it is possible to move the seat in the cross direction to the left and right.

Seat switch

The seat switch is located in the seat cushion.

If the driver is not sitting on the seat, the seat switch is deactivated and the operation of the machine is restricted in one of the following ways – blocking of moving off of the machine, stopping of the machine or switching off the engine.

These restrictions vary depending on:

the time for which the seat switch is deactivated, the position of the travel control (if it is in the parking brake "P" position or outside this position).

Engine start blocking

Engine start is blocked in case that the travel control is set out of the parking brake position (P),

To enable engine start, set the travel control to the parking brake position (P).

Movement blocking

If the driver is not sitting on the seat, moving off is blocked. In this case, moving the travel control out of the parking brake (P) position immediately switches off the engine.

To enable engine start, sit on the seat and set the travel control to the parking brake position (P).

Machine stop

If the driver leaves the seat for more than 3 seconds and less than 6 seconds when the travel control is not in the parking brake position (P), the engine will be shut down.

To move off the machine, sit on the seat. At that moment, it is possible to start the engine thanks to the momentum of the machine.

Engine shutdown

If the driver leaves the seat for more than 6 seconds when the travel control is not in the parking brake position (P), the engine will be shut down.

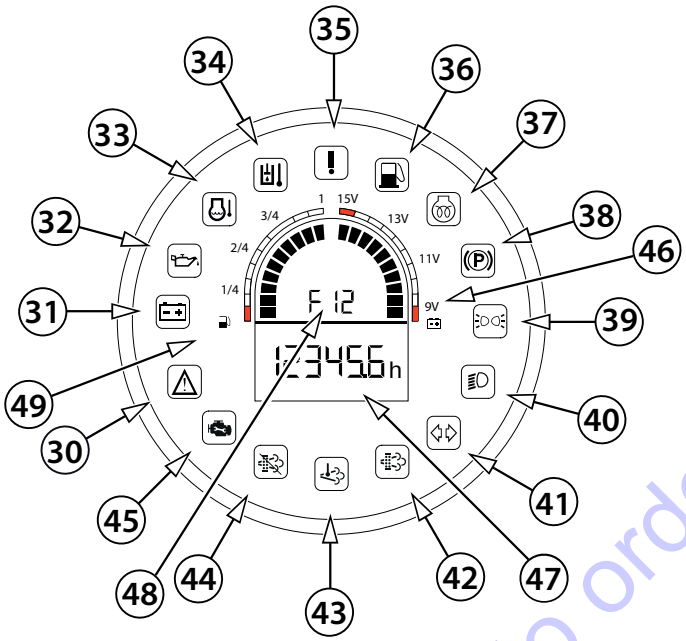
To re-enable engine start, sit on the seat and set the travel control to the parking brake position (P). The engine cannot be started again only by the momentum of the machine.

Dashboard cover

The cover protects the dashboard from:

- weather effects
- vandalism
- handling by others

The cover of the dashboard can be locked with a padlock; the padlock is not delivered in the machine equipment.



232022

Indicator lamps

30. Error message indicator lamp
31. Battery charging indicator lamp
32. Engine lubrication indicator lamp
33. Engine overheating indicator lamp
34. Indicator lamp for hydraulic oil temperature
35. Emergency stop indicator lamp
36. Fuel indicator lamp
37. Engine glowing indicator lamp
38. Parking brake indicator lamp
39. Parking lights indicator lamp
40. Headlamps indicator light
41. Indicator lamp of turn signal lights
42. DPF clogging indicator lamp
43. Indicator lamp of high exhaust gas temperature
44. Suppression of DPF regeneration indicator lamp
45. Engine failure indicator lamp
46. Current battery voltage indicator
47. Hours worked indicator
48. Error message indicator
49. Fuel level indicator


AMN58

Error message indicator lamp (30)

The error message indicator lamp lights up when the control system detects an error. At the same time, the error code appears on the display.

Check the machine according to the table of error message codes.

If the indicator lamp remains lighting, contact the service!

See Annex 3.8 – Error codes.


2777

Battery charging indicator lamp (31)

If the indicator lamp does not go off or it lights up while driving, turn the key in the ignition box to the "0" position and look for a fault!

Check the V-belt of the engine for damage and loosening. If the indicator lamp is still lit up when the engine is started, contact the service centre.


AMN49

Engine lubrication indicator lamp (32)

If the indicator lamp lights up after the engine is started or while driving, it indicates an engine lubrication failure. Stop the machine and remove the fault.

Check the engine for oil leaks and for correct oil level.

If the oil level in the engine is correct, contact the service!

Start the engine only after the defect is repaired!


AMN76

Engine overheating indicator lamp (33)

The indicator lamp indicates a high temperature of the engine.

If the engine overheating indicator lamp lights up during operation, turn off the engine and refill the coolant! Check the cooling circuit for leaks! Check the hoses for damage and missing hose clips.


2635

Hydraulic oil temperature indicator lamp (34)

The indicator lamp for hydraulic oil temperature lights up when the oil temperature exceeds 85°C.

An error code will be displayed on the display.


592520

Emergency stop indicator lamp (35)

The emergency stop indicator lamp lights if the emergency brake button (15) is enabled.

If the indicator lamp does not go off when the emergency brake button is disabled, look for the cause!

The engine can be started only after the defect is repaired!

The indicator lamp is also lit if the machine operator is in the service mode of the machine.


595425

Fuel indicator lamp (36)

When the fuel indicator lamp lights up, the tank capacity is sufficient for half-an-hour operation of the machine.

Refill the fuel!


3518

Engine glowing indicator lamp (37)

It indicates the engine warming up before cold start.

Start the engine after the indicator lamp goes out!


2703

Parking brake indicator lamp (38)

When the indicator lamp is lit, it indicates that the parking brake is engaged.


AMN146

Outline lights indicator lamp (39)

The indicator lamp indicates that the parking lights are ON.


596303

Headlamps indicator light (40)

The indicator lamp indicates that the headlamps are ON.


2489

Indicator lamp for direction indicators (41)

The indicator lamp indicates that the directions indicators are ON.


AMN118

DPF clogging indicator lamp(Diesel Particulate Filter) (42)

The indicator lamp signals the requirement to regenerate DPF and the course of regeneration.

If the indicator lamp is lit, proceed according to Chapter « 2.7.10 Principles of use of the machine with a DPF (Diesel Particulate Filter) ».


AMN120

Indicator lamp of high temperature of exhaust gases (43)

The indicator lamp signals ongoing DPF (diesel particulate filter) regeneration.

If the indicator lamp is lit, proceed according to Chapter « 2.7.10 Principles of use of the machine with a DPF (Diesel Particulate Filter) ».


AMN442

Indicator lamp of DPF (diesel particulate filter) regeneration suppression (44)

The indicator lamp signals blocked start of DPF regeneration.

Prolonged operation of the machine with suppressed regeneration is prohibited.

Repeated suppression of regeneration results in diesel particulate filter (DPF) damage. Prolonged operation of the machine with suppressed regeneration will destroy the diesel particulate filter (DPF).


AMN47

Engine failure indicator lamp (45)

The indicator lamp indicates an engine failure.

When the indicator lamp is lit during operation of the engine, it indicates a failure. The engine stalls – the machine stops and the parking brake is engaged.

The engine can be started only after the defect is repaired!


2777

Battery voltage indicator (46)


AMN73

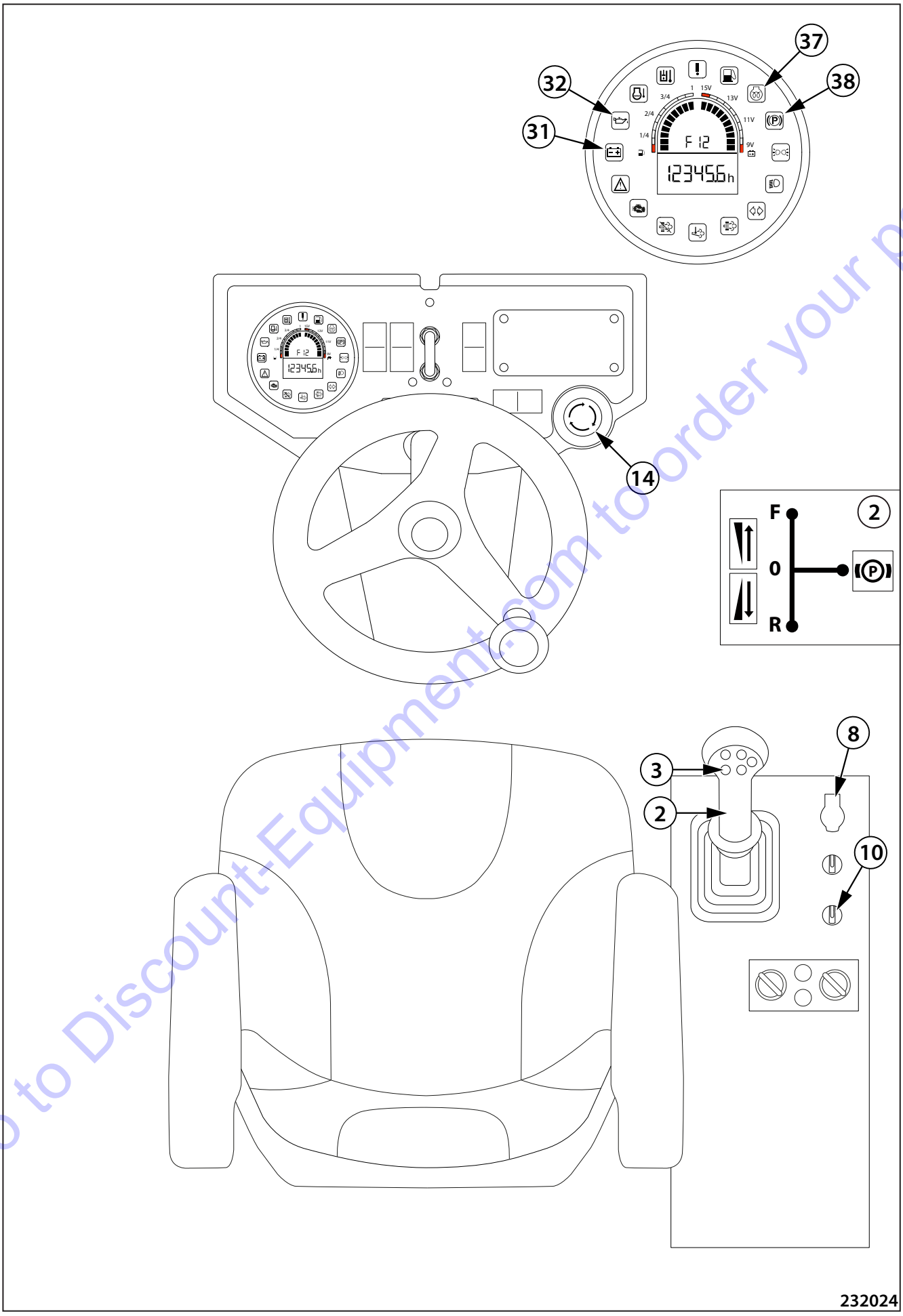
Worked hours indicator (47)

Error message indicator (48)


595425

Fuel level indicator (49)

The indicator shows the fuel level in the tank.



2.7.1 Starting up the engine

Before starting the engine, daily check the oil level in the engine and hydraulic tanks, coolant level in the cooling circuit and fuel level in the fuel tank. Check that there are no loosened, worn or missing parts on the machine.

Start the engine only from the driver's stand! Use the warning horn to signal the engine starting and check that nobody is endangered by starting the engine!

Daily the machine operator must perform the brake test according to Chapter 3.6.9.

Conditions to start the engine:

- the emergency brake is disabled,
- the driver sits on the seat – the seat switch is enabled,
- the travel control is in the parking brake position,
- no fault is detected.

Start-up procedure:

- Turn on the battery disconnector.
- Sit down on the seat.
- Set the travel control (2) to the brake position (P).
- Set the engine speed selector switch (10) to the "Idling speed" position.
- Check that the emergency brake (14) is not activated.
- Insert the key into the ignition box (8) in the position "0" and switch over to the position "I".
- The parking brake indicator lamp (38), engine lubrication (32), battery charging (31) and glowing (37) indicator lamps will light up on the display.
- Wait until the glowing indicator lamp goes out.
- Use the warning horn (3) to signal that the engine is starting.
- Turn the key to position "II" to start the engine.
- After the start, the battery charging indicator lamp (31) and engine lubrication indicator lamp (32) must go out on the display.
- After the travel control (2) is changed to the zero position (0), the brake indicator lamp goes out.

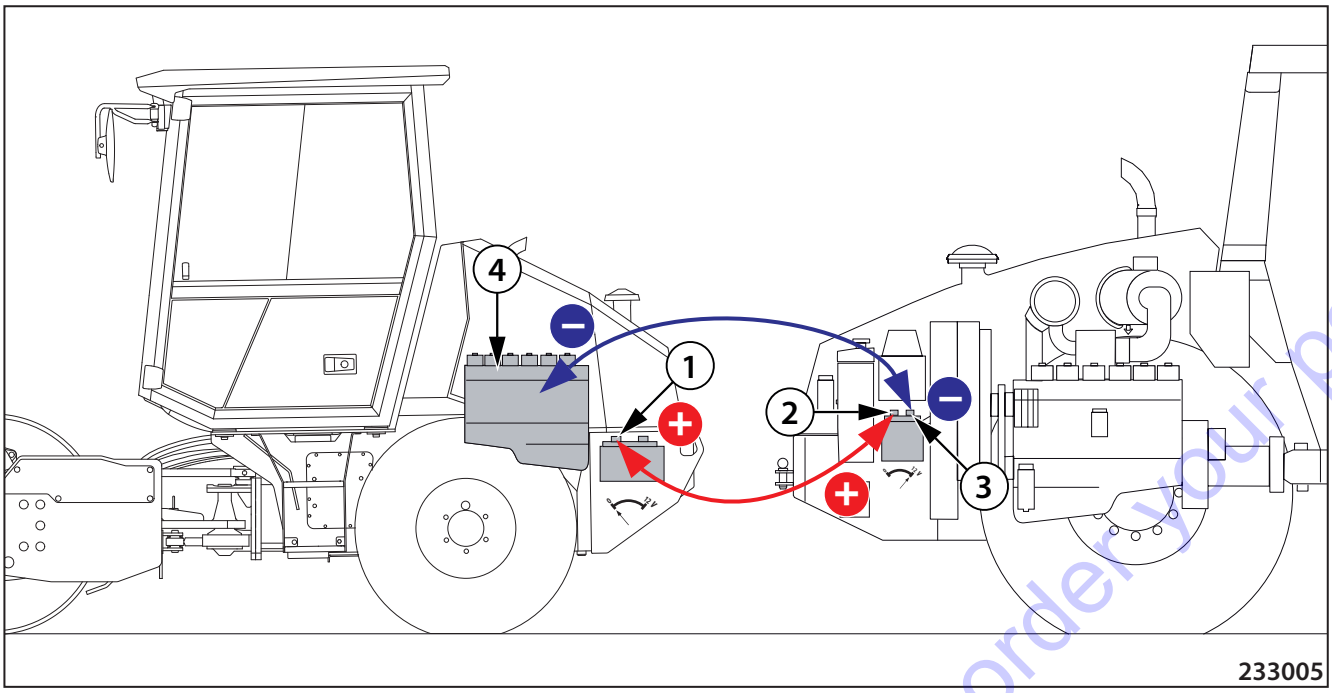
Note

If the start-up fails, turn the key back to position "I". If the engine is not started up even after 3 attempts – check the fuel system.

Do not start the engine for more than 10 seconds. Wait for 30 seconds before starting again.

Following the engine start let the engine idle at increased speed for 3–5 minutes.

If the coolant temperature does not reach at least 60°C (140°F) – do not load the engine at full power!



Start-up procedure using leads from an external power supply:

The starting supply voltage from the external power supply must be 12 V.

Always follow the undermentioned operation sequence.

1. Connect one end of the (+) pole of the cable to the (+) pole of the discharged battery.
2. Connect the second end of the (+) pole of the cable to the (+) pole.
3. Connect one end of the (–) pole of the cable to the (–) pole of the external battery.
4. Connect the second end of the (–) pole of the cable to any part fixed to the engine of the machine being started (or to the engine block itself).

When the engine has been started, disconnect cables in reverse order.

Do not connect the (–) pole of the cable to the (–) pole of the discharged battery of the machine being started! During the starting heavy sparking may occur and gases of the charged battery may explode.

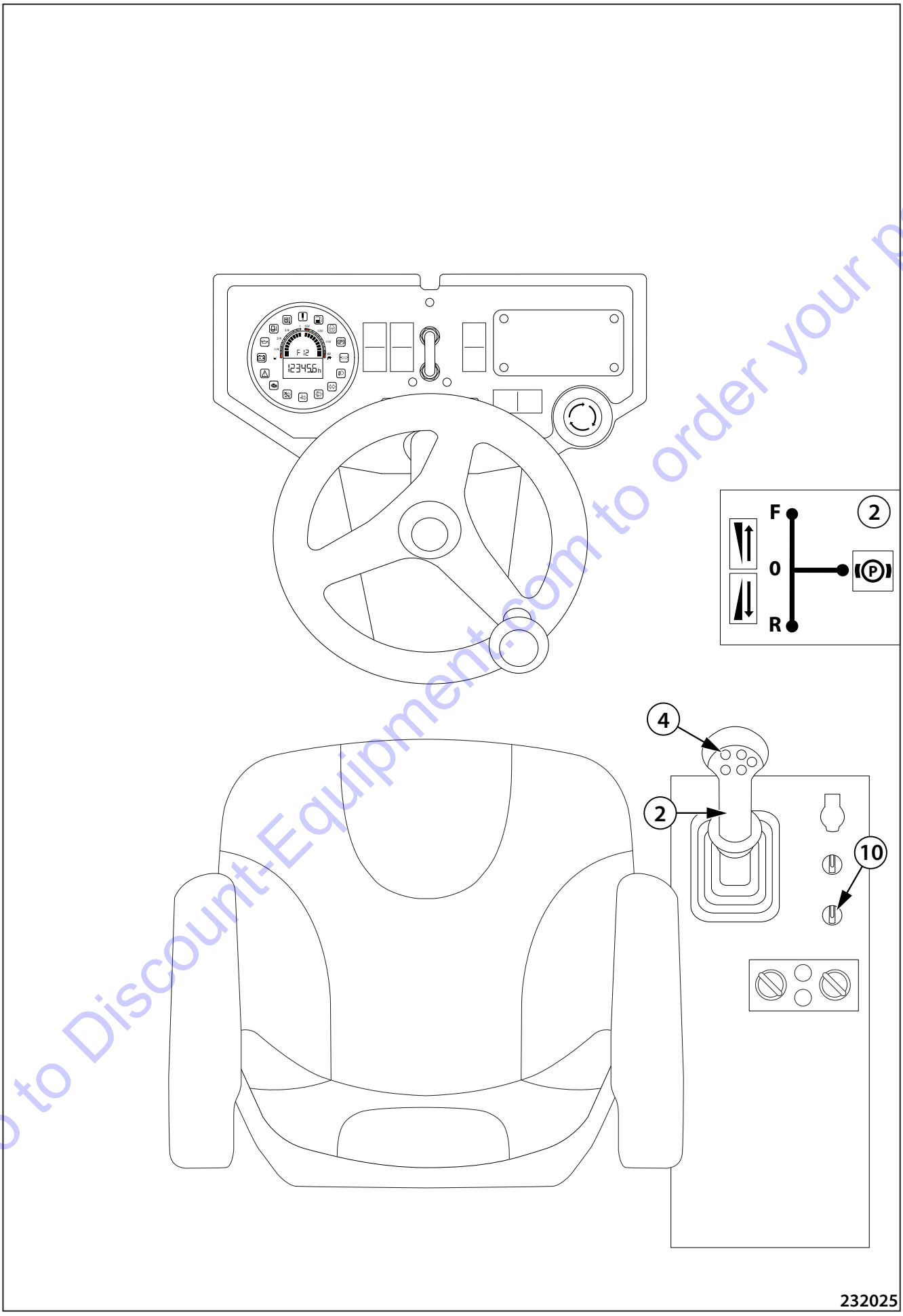
Uninsulated parts of clamps of the jump leads must not touch each other!

The jump lead connected to the (+) pole of the batteries must not come into contact with electrically conductive parts of the machine – danger of a short circuit!

Do not lean over the batteries – possibility of electrolyte burns!

Avoid the presence of ignition sources – open flame, cigarettes, etc.

Do not check the presence of voltage in the wire by sparking against the machine frame!



2.7.2 Travel and reversing

Use the warning horn to signal that the engine is starting and wait long enough so that all persons could leave the area around the machine or under the machine in time!

Before moving off, check that the area in front of and behind the machine is empty and that there are no persons or obstructions there!

Before moving off, check that the articulation joint of the machine is locked.

Machine travel and reversing:

Selection of travel direction:

- Start the engine
- Move the travel control (2) from the parking brake (P) to the zero position (0) – the brake will be released and the parking brake indicator lamp will go out.
- Move the travel control (2) to the position (0) and select a travel direction (F/R). Set the engine speed by selector switch (10).

Travel speed selection:

- The travel speed corresponds to the deflection of the travel control (2) from the zero position (0).
- The travel speed can also be changed with the engine speed selector switch (10).

Travel and reversing with vibration

- Set the engine speed using the selector switch (10).
- Use the travel control (2) to select a direction.

Turning on:

- Press the button (4) on the travel control (2) to turn on the vibration.

Turning off:

- Turn off the vibration by pressing the button (4) on the travel control (2).
- The vibration is turned off automatically when the travel control (2) is shifted into the position (P).

It is forbidden to vibrate on the spot!

When driving on a slope, choose the manner of operation and speed with regard to your safety, steepness of the slope and adhesion conditions.

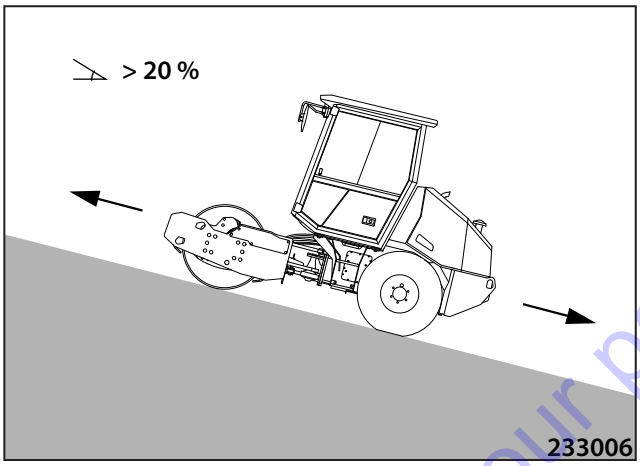
When driving up a slope, adjust your speed so that the machine is able to overcome the slope.

When driving down a slope, engage such an engine speed and use such a speed in which the machine was able to get up the slope or would be able to do so. Do not use speed 2 on slopes over 20%.

On slopes over 20%, drive with the drum up the slope and wheels down the slope.

Use vibration when driving with the drum up the slope.

When driving down the slope, vibration is allowed only on slopes up to 15%.



It is prohibited to use vibration when driving down a slope over 15%.

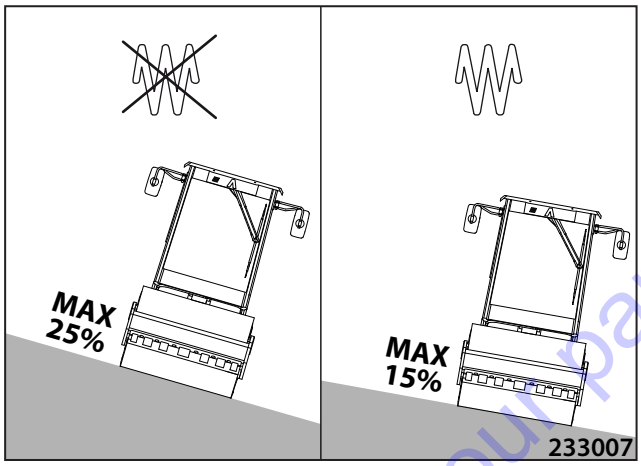
It is prohibited to drive in speed 2 down a slope over 20%.

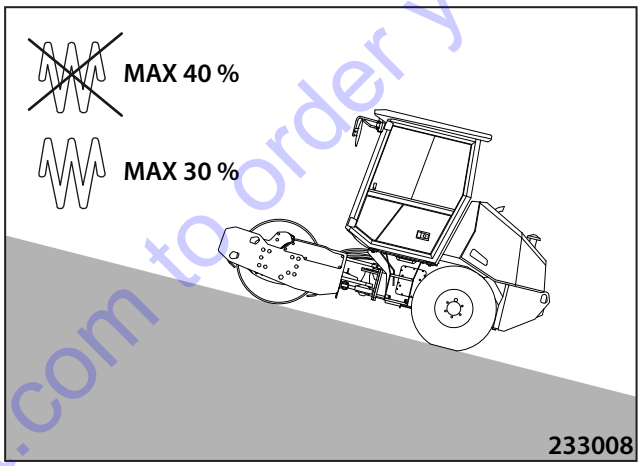
It is prohibited to abruptly change the driving direction (reverse) when driving on a slope.

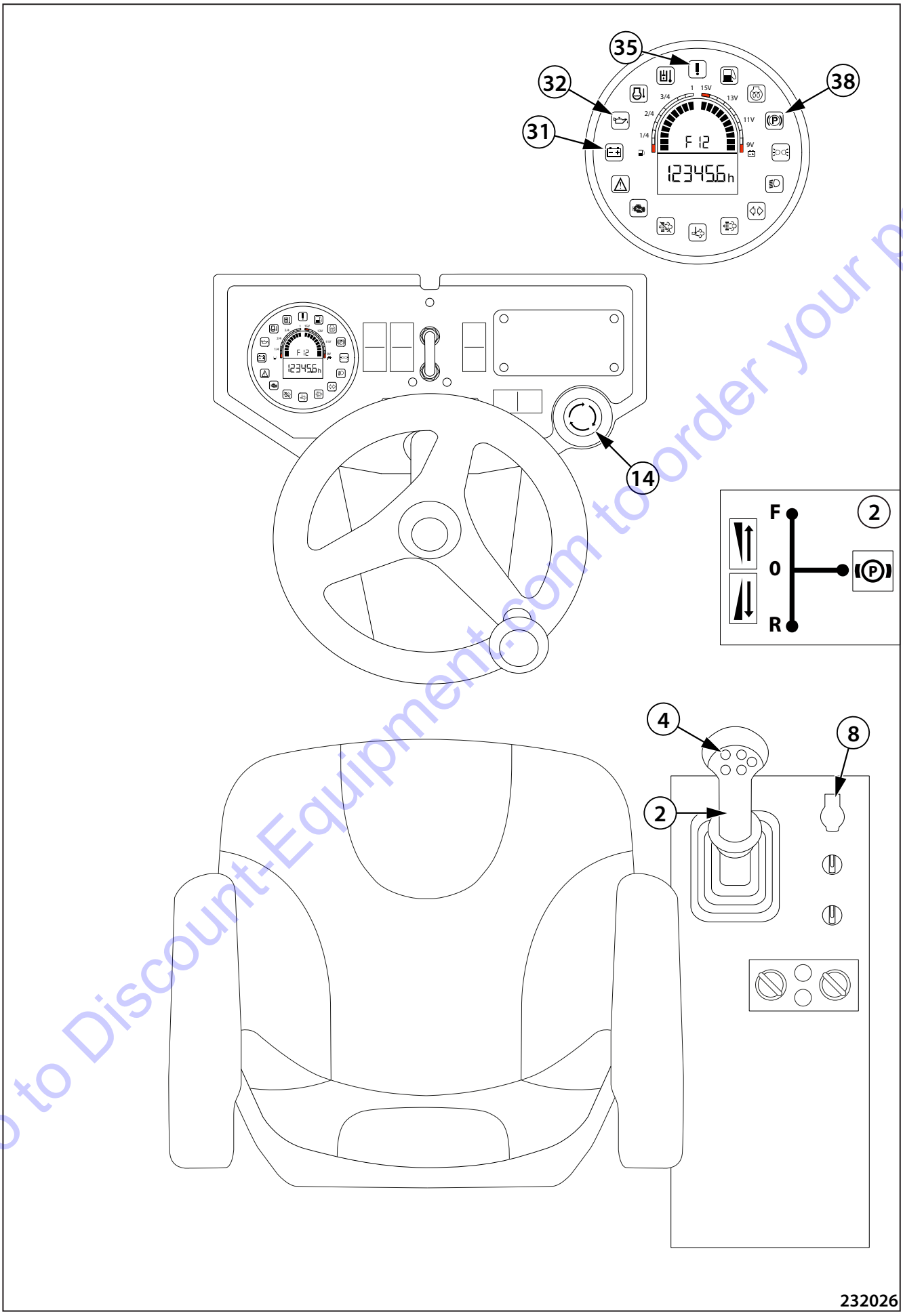
Driving down a slope is only allowed up to such a speed in which the machine was able to get up the slope or would be able to do so.

For the maximum permissible slope gradient when driving uphill and across the slope gradient, see figures.

The given values will be lower depending on adhesive conditions and the instantaneous weight of the machine!







2.7.3 Stopping the machine and engine

- Press the button (4) on the travel control (2) to switch off the vibration.
- Stop the machine by changing the travel control (2) to the zero position (0).
- Brake the machine by changing the travel control (2) to the brake position (P).
- Turn the key in the ignition box (8) to position "0" and close the cap of the ignition box.

Do not stop the hot engine instantly but let it idle for 5 minutes. The engine and the turbocharger will cool down slowly and evenly!

The travel control (2) must be always in the brake position (P)!

Turn off the battery disconnector when shutting down the machine!

2.7.4 Machine emergency stop

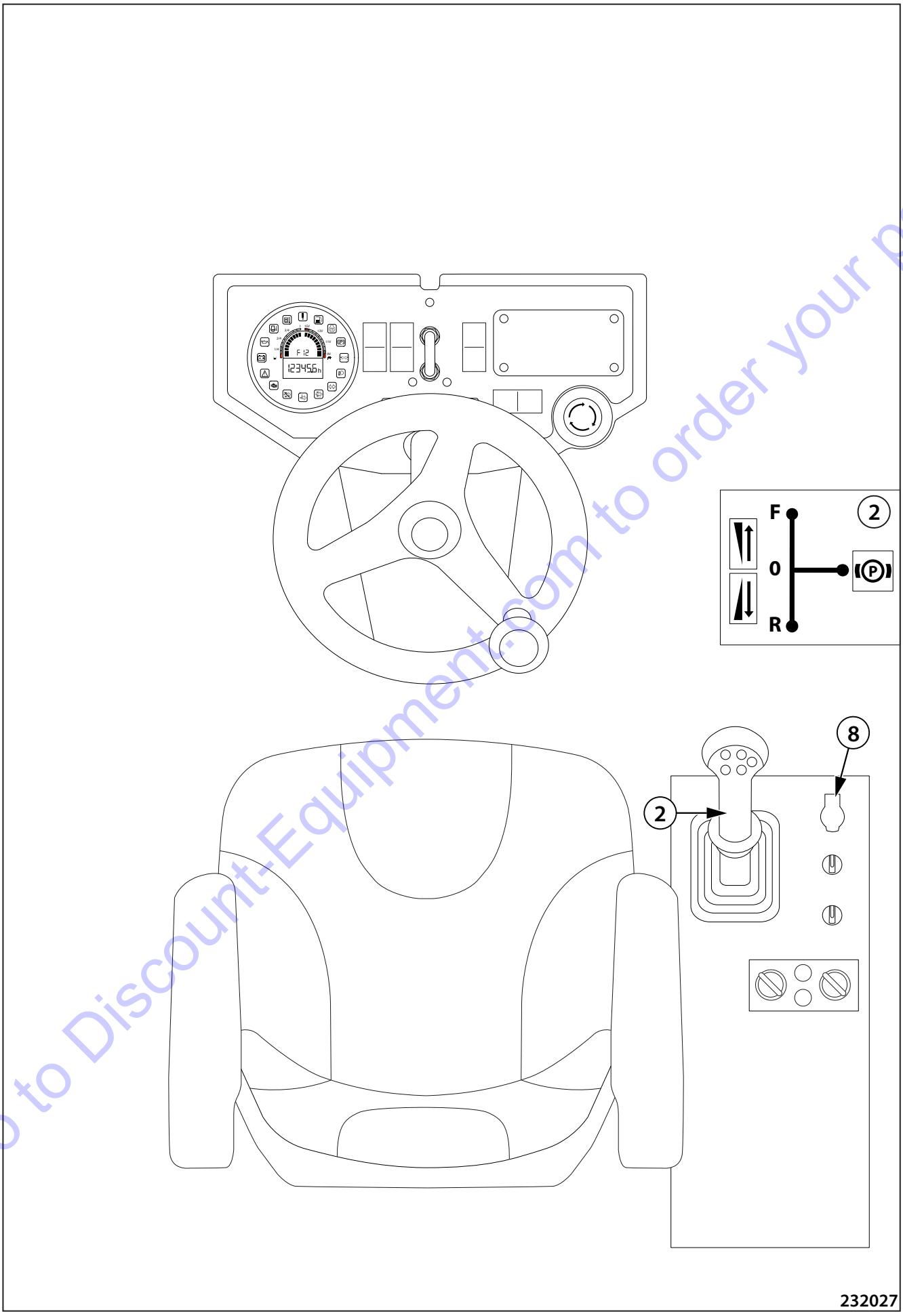
Use in case of a failure when it is impossible to stop the engine with the key in the ignition box or by changing the travel control (2) to the brake position (P)!

Turning on:

- After pressing the emergency brake button (14), the machine is braked and the engine stops.
- The indicator lamps for battery charging (31), engine lubrication (32), parking brake (38) and emergency stop (35) will light up on the display.

Turning off:

- Turn the emergency brake button (14) in the direction of arrows.
- The battery charging indicator lamp (31), engine lubrication indicator lamp (32) and parking brake indicator lamp (38) will remain light up on the display.
- Move the travel control (2) to the position (P); you can restart the engine in this position.



2.7.5 Machine parking

- Park the machine on a flat and solid surface where there is no potential natural hazard (landslides, flooding, etc.).
- Change the travel control (2) to the brake position (P).
- Switch over the key in the ignition box (8) to the position "0", take out the key from the ignition box and close the lid.
- After stopping the engine, turn off the battery disconnector before leaving the machine.
- Clean the machine (scrapers and drums).
- Check the whole machine and repair defects that occurred during operation.
- Lock the covers and cab of the machine.

Do not stop the hot engine instantly but let it idle for 5 minutes. The engine and the turbocharger will cool down slowly and evenly!

2.7.6 Telematics Readiness

- Global positioning system with telemetry that monitors operating systems of the machine (machine start, diesel engine speed, machine consumption, number of engine hours, etc.) and its current position.
- The GPS system allows the geofencing function (machine operation limited to a defined area) and remote machine monitoring, which helps finding a stolen machine.

Note

The availability and content of the given data depends on the selected manufacturer of the telematic system.

2.7.7 Tyre ballasting with liquid

It is used for reducing the centre of gravity of the machine. Mixing ratios for individual temperatures per tyre are given in the table.

Tyre ballasting with liquid up to 0°C

The tyre interior is filled with the solution of water and 33% calcium chloride $CaCl_2$.

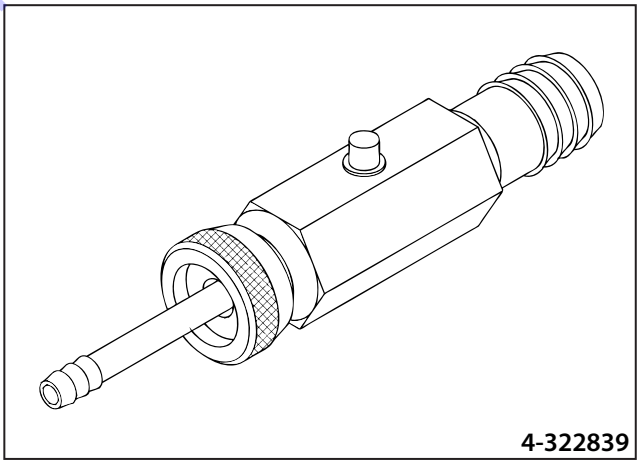
water	calcium chloride $CaCl_2$	additional weight
(l) [gal US]	(kg) [lb]	(kg) [lb]
160 [42.3]	66 [145.5]	226 [498]

Tyre ballasting with liquid up to -25°C

The tyre interior is filled with the solution of water and 33% calcium chloride $CaCl_2$.

water	calcium chloride $CaCl_2$	additional weight
(l) [gal US]	(kg) [lb]	(kg) [lb]
77 [20.3]	173 [381.4]	250 [551]

The filling adapter can be ordered as a spare part under the number 4-5325190009



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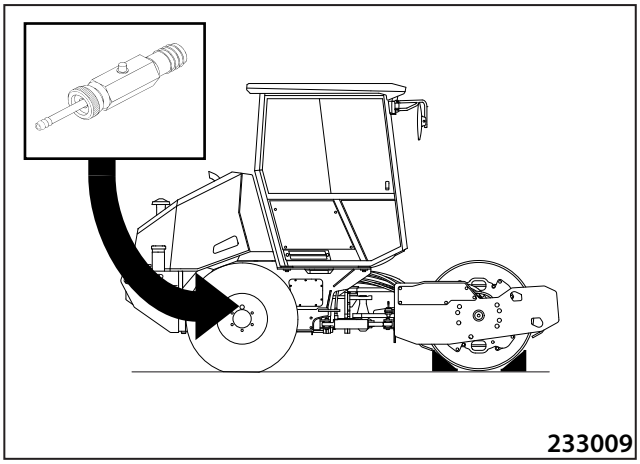
Filling process

- Place the machine on a solid and flat surface. Drive the machine with tyres on the surface so that the filling valve is in the highest position. Use scotch blocks to secure the drum from both sides.
- Unscrew the detachable insert of the valve and screw in the filler cap.

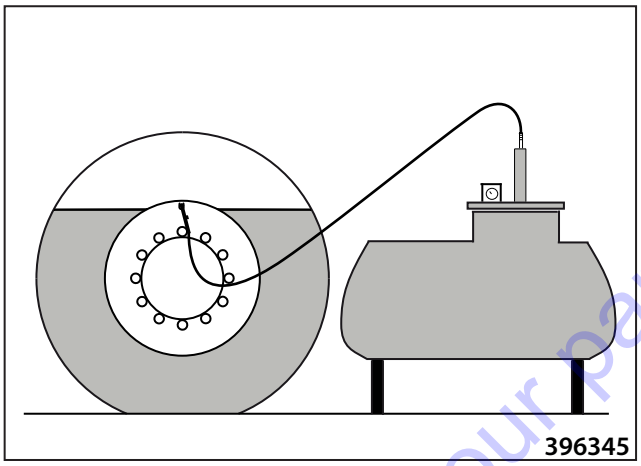
Note:

It is possible to ballast tubeless tyres with the dimension of 12.5/80-18.



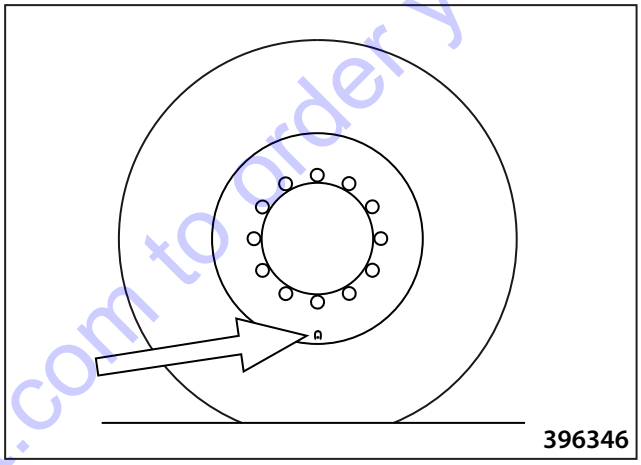
233009

- Mount the hose from the filling device (upper vessel, pump, etc.) to the adapter and fill the tyres with the solution.
- During the filling, the air from the tyre leaks through the side opening from the filling adapter. The tyre is sufficiently filled (75%) when the solution starts to flow out from the opening.
- Unscrew the filling adapter, screw on the valve insert back and pump up the tyre to the pressure of 350 kPa (50.76 PSI).



Draining procedure:

- Place the machine on a solid and flat surface. Drive the machine with tyres onto the surface so that the filling valve is in the lowest position. Use scotch blocks to secure the drum from both sides.
- Unscrew the detachable valve insert and the solution will run out.



When you remove the valve insert, the solution may splash out.

- As soon as the pressure drops so much that almost no solution is running out, screw on the filling adapter and pump up the tyre to the pressure of 350 kPa (50.76 PSI).
- When the tyres are filled up, take out the filling adapter and screw on the valve insert back.

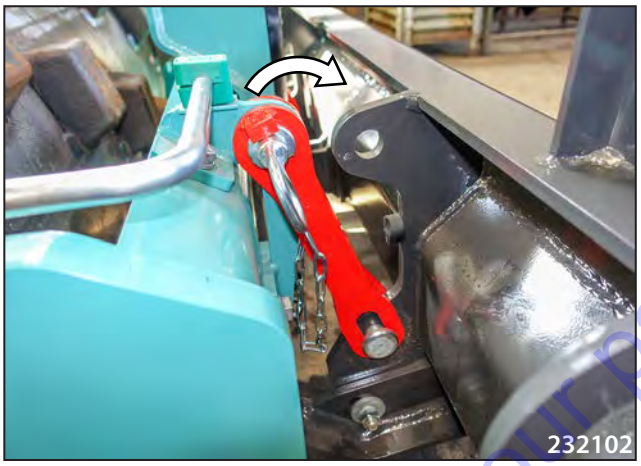
Protect your eyes with glasses (protective shield) and hands with rubber gloves!

Wash the spilt solution with clean water.

The solution must not come in contact with metal parts and the wiring.

2.7.8 Blade

Unlock the blade on both sides.

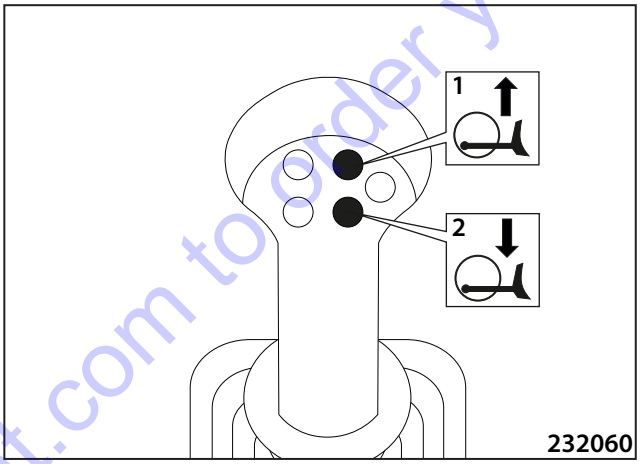


The blade is controlled using the buttons on the travel control.

Button 1 – blade – up

Button 2 – blade – down

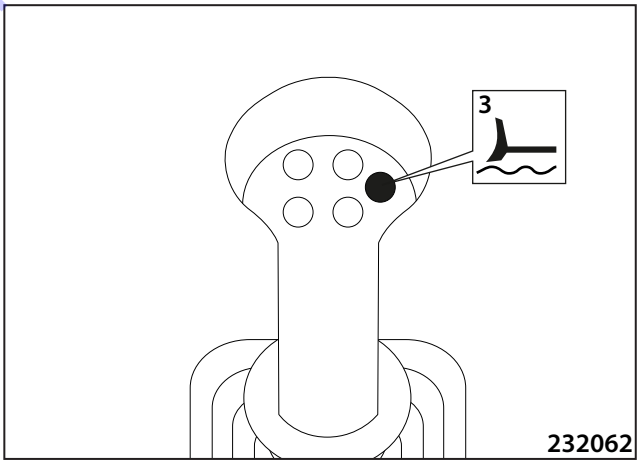
Button 3 – floating position of the blade



Floating position:

By pressing the button (3), the blade is placed to the floating position.

The blade will drop to the ground and copies the terrain while driving.

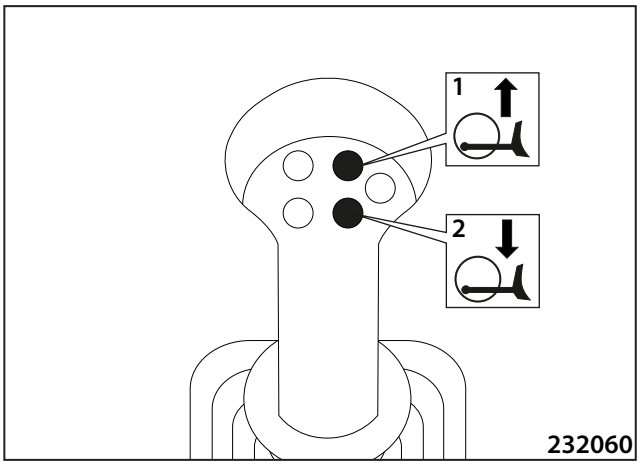


End the floating position using the blade – up button (1).

If you press the blade – down button in the floating position mode, the blade will move down. When the button is released, it activates the floating position again.

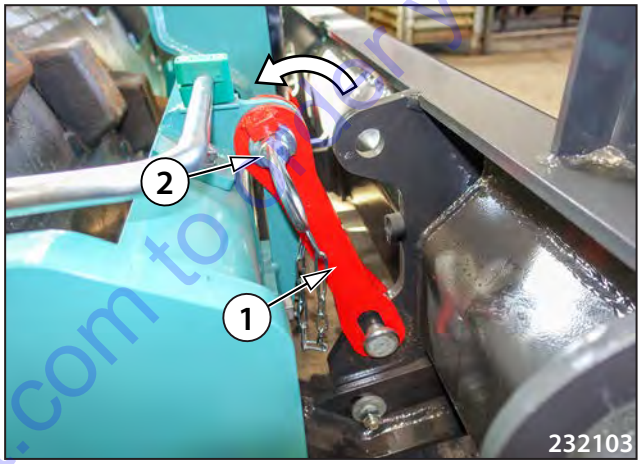
Read the size of the recess from the pointer on the blade.

The blade can be lowered to the ground when the engine is turned off by pressing the blade button – down (2).



To push the material over a flat plane, you can use the floating positions of the blade. You can use the floating position also for redistributing and evening the spread material. The blade glides over the skids.

After finishing the work with the machine, the blade must always be locked at the terrain height or in its upper position using the locking connecting rods (1) and pins (2) on both sides.



Note:

The blade edges are removable and if worn, you can turn them by 180°.

Do not adjust the scrapers and do not work on the blade unless it is lowered to the ground and the engine is stopped or the blade is locked by both safety connecting rods.

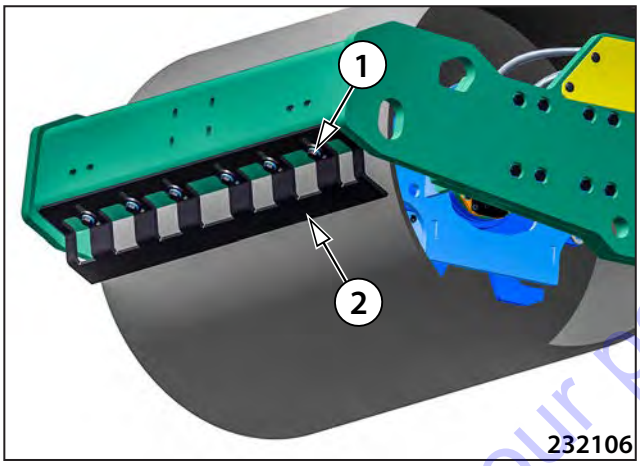
Do not work with the blade if it is locked.

There is a risk of damage to the blade if it is attached to one locking rod.

2.7.9 Scraper adjustment

Scrapers for smooth drum

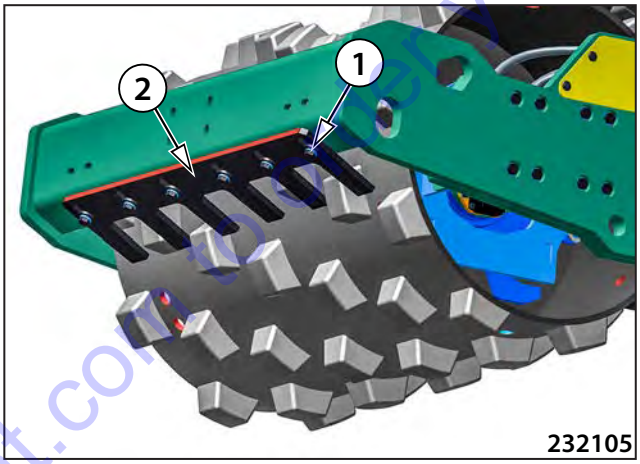
- Loosen the screws (1) and move the scraper (2) to the drum at the distance of 20 mm (0.79 in) between the scraper and the drum.



Scrapers for pad-foot drum

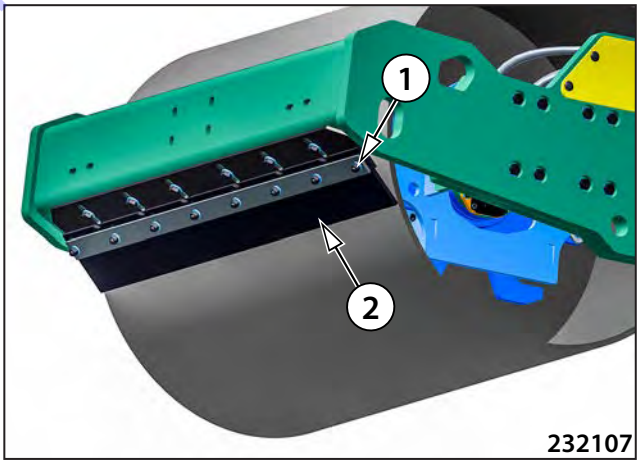
- Loosen the screws (1) and move the scrapers (2) to the drum at the distance of 25 mm (0.98 in).
-

If a small gap is adjusted between the scraper and the drum, the scraper can get in contact with the drum when the machine turns.



Polytane contact scrapers (optional equipment)

- Loosen the screws (1) and move the scraper (2) to the drum.



2.7.10 Principles of use of the machine with a DPF (Diesel Particulate Filter)

2.7.10.1 Diesel particulate filter (DPF)

It absorbs solid particles contained in exhaust gases and reduces fine dust in the emissions produced by diesel engines.

Conditions for maintaining the DPF in a fully functional state. Use fuels with low sulphur content (according to Chapter).

- Use only the oil recommended by the engine manufacturer (according to Chapter).
- Do not interfere with the DPF, do not tamper with it.
- When operating the machine, do not leave the switch in the DPF regeneration suppression position. Operate the machine only when the switch is in the AUTO position.
- Replace the DPF after 6000 hours or after 5 years at the latest.
- Avoid short engine operating times and low engine load (long engine idling times).

2.7.10.2 Diesel particulate filter (DPF) regeneration

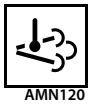
A process in which accumulated solid particles burn in the diesel particulate filter.

During regeneration, keep away from flammable or explosive materials and do not touch any part of the particulate filter system.

The diesel particulate filter regeneration can be done in three ways:

- passive regeneration
- automatic active regeneration
- active parking regeneration

The following table explains the indicator lamps displayed on the screen with the regeneration switch set to the AUTO position. If the indicator lamps are different, set the regeneration switch to the AUTO position and follow the table.

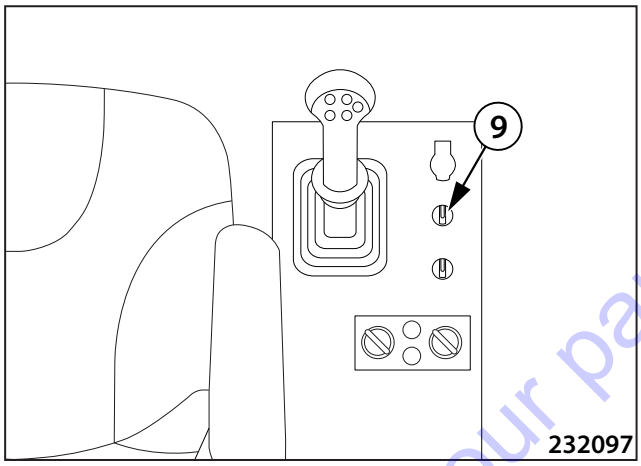
Before the start of regeneration			
 AMN120 **Indicator lamp of high exhaust gas temperature**	 AMN118 **DPF clogging indicator lamp**	**Description**	**Procedure**
Off	Off	DPF does not require regeneration	
Lighting	Lighting/flashing	Automatic active regeneration in progress	According to Chapter 2.7.10.2.2
Off	Lighting/flashing	Active parking regeneration required	According to Chapter 2.7.10.2.3

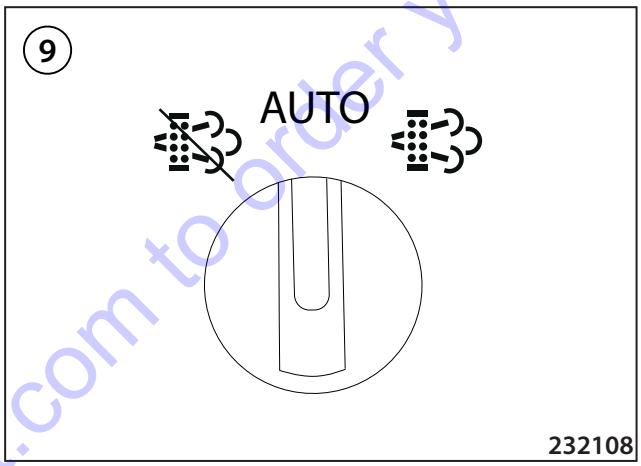
Regeneration progress			
 AMN120 **Indicator lamp of high exhaust gas temperature**	 AMN118 **DPF clogging indicator lamp**	**Description**	**Procedure**
Lighting	Lighting/flashing	Active automatic regeneration in progress Active parking regeneration in progress	According to Chapter 2.7.10.2.2 According to Chapter 2.7.10.2.3

End of regeneration			
 AMN120 **Indicator lamp of high exhaust gas temperature**	 AMN118 **DPF clogging indicator lamp**	**Description**	**Procedure**
Off	Off	Correct diesel particulate filter (DPF) cleaning performed	
Off	Lighting/flashing	Correct diesel particulate filter (DPF) cleaning not performed	Contact AMMANN / KUBOTA service

2.7.10.2.1 Passive regeneration

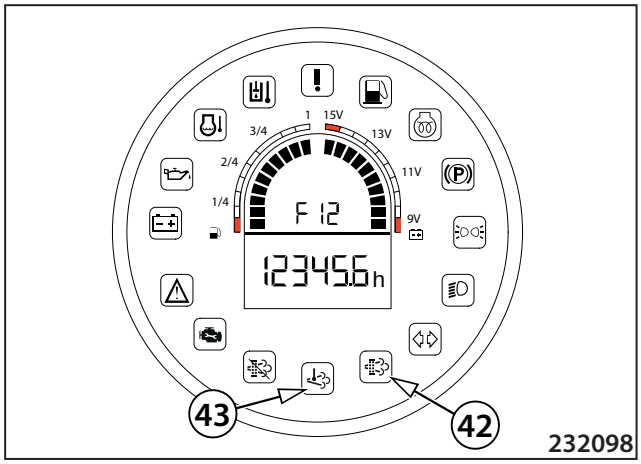
- Occurs due to high exhaust gas temperature independently of the degree of DPF clogging.
- To enable the start of regeneration, the switch (9) must be in the AUTO position.
- The regeneration starts and stops without any interaction between the operator and the machine.





2.7.10.2.2 Automatic active regeneration

- It is a controlled regeneration, during which higher temperatures are reached in the exhaust system using additional fuel injection into the exhaust gases to achieve smooth active regeneration process.
- To start the regeneration, the switch (9) must be in the AUTO position.
- Work with the machine is not interrupted.
- Do not suppress regeneration, do not reduce engine power and do not turn off the engine. Suppression of the regeneration can result in DPF damage.
- Once the DPF is cleaned, the process automatically stops.

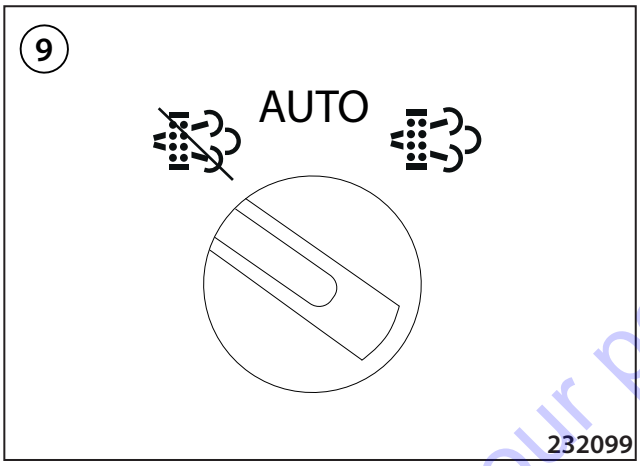


The duration of automatic regeneration depends on the conditions of use and the engine temperature.

When the regeneration is suppressed, the diesel particulate filter (DPF) may get damaged.

2.7.10.2.2.1 Suppression of DPF regeneration

- Active automatic DPF regeneration can be suppressed by switching over the regeneration switch (9) to the left position – regeneration switched off.
- When DPF regeneration suppression is activated, the DPF regeneration suppression indicator lamp (44) lights up on the display.
- The regeneration switch (9) returns to the AUTO position after it was held.
- Suppress regeneration only when absolutely necessary (e.g. when working indoors).
- Long-term and/or repeated suppression of regeneration results in DPF damage.

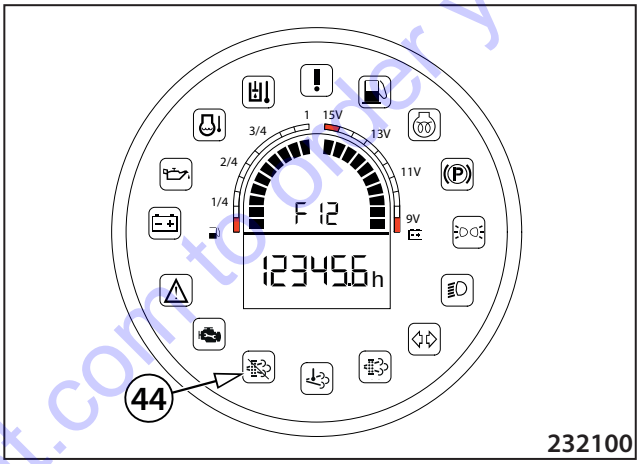


The regeneration suppression can be switched off:

- By switching off the engine – turning the key to position "0".

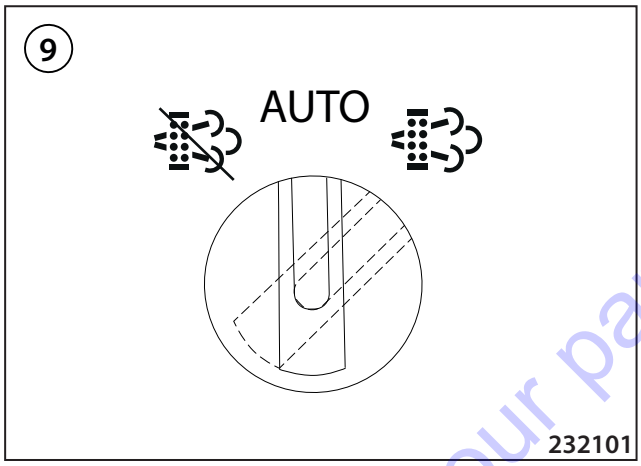
After the regeneration has been completed, let the machine run for at least 10 minutes at idle speed to remove excessive heat generated during the process from the engine compartment.

Ignoring a request of the machine for regeneration results in DPF damage.



2.7.10.2.3 Active parking regeneration

Regeneration is required if the filter clogging exceeds a limit when it is not possible to clean the filter in the above ways.



Before starting regeneration, follow these steps:

- Place the machine on a level and firm surface in an open and well-ventilated area.
- Keep away from flammable or explosive materials.
- Warm up the machine to the operating temperature. The coolant temperature must be around 50°C.
- Set the travel control to the parking brake position "P" and engine idle speed.
- The fuel tank must be filled to at least ¼ of the maximum capacity.

Note

Interfering with any of the above controls during active regeneration will automatically stop the regeneration process.

After starting the regeneration, hold the switch (9) in the right position for 2 seconds. After regeneration starts, the engine speed increases.

Do not turn off the engine or suppress the regeneration during regeneration.

Once the DPF is cleaned, the process automatically stops and the engine speed decreases.

Regeneration takes approximately 25–45 minutes depending on ambient conditions and the degree of filter clogging.

Note

If the indicator lamps do not turn off at the end of regeneration, contact KUBOTA / AMMANN service.

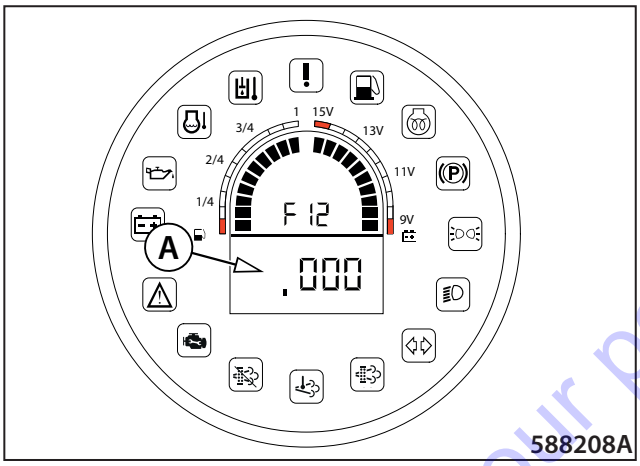
After the regeneration has been completed, let the machine run for at least 10 minutes at idle speed to remove excessive heat generated during the process from the engine compartment.

Do not suppress the regeneration and do not turn off the engine during regeneration. The diesel particulate filter (DPF) may get damaged.

Risk of burns. Keep away from flammable or explosive materials.

2.7.10.3 Diesel particulate filter (DPF) clogging

- Switching the key in the ignition box (8) to the “I” position displays DPF clogging.
- First, a soot clogging value – SOOT (A) – is displayed for a period of 3 – 5 sec. DPF clogging is reduced after regeneration depending on the previous DPF degree.



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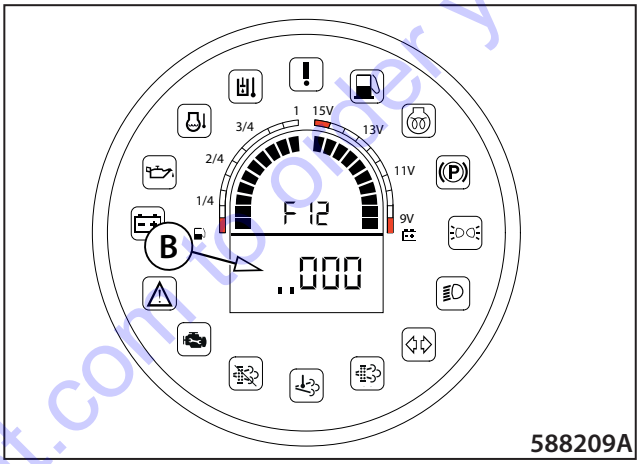
- Subsequently, an ash clogging value – ASH (B) – is displayed for a period of 3 – 5 sec.
- The soot clogging value (SOOT) and ash clogging value (ASH) displays are only for checking that the active parking regeneration is correctly performed.
- When the diesel particulate filter is properly cleaned, the SOOT value decreases and the ASH value increases.



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- The machine can move on its own between working sites.

When driving, observe the safety measures applicable to the working site.

When driving over long distances, stop every 30 minutes for an hour to let the machine cool down. By failing to do so you take the risk of damaging the machine, for which the manufacturer bears no responsibility.

The machine should be transported on a vehicle on public roads.

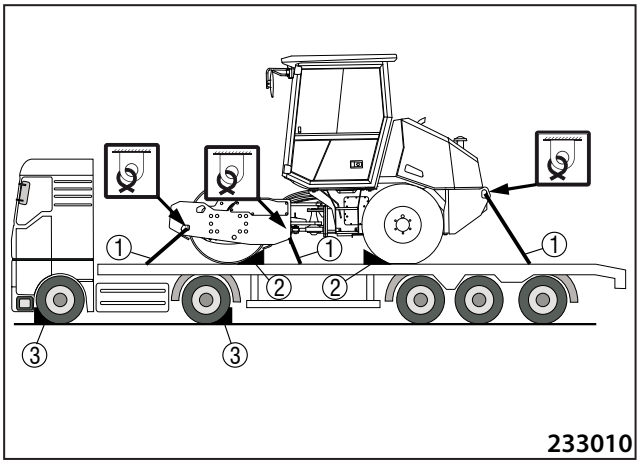
When transporting the machine on a vehicle, observe regulations applicable to the given territory.

When loading and unloading, the vehicle transporting the machine must be braked and mechanically protected against accidental movement using scotch blocks (3).

While driving onto a vehicle, it is recommended to support the drum with rubber belts or wooden boards etc.

Place the machine on the mean of transport in the direction of travel (see Figure). If it is placed in the opposite direction, it is necessary to plug the engine intake before the transport.

The machine on the vehicle must be properly tied and mechanically secured against longitudinal and lateral displacement as well as against tilting (1). The wheels must be wedged with wedges (2). The maximum allowable force to fasten the machine to the vehicle using the rear lifting eyes is 1.5 t.



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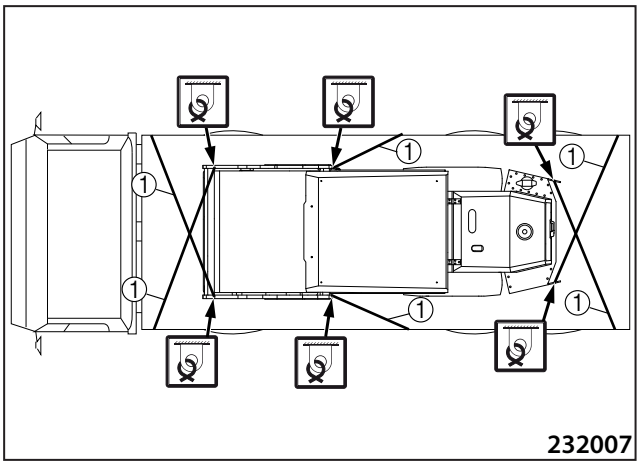

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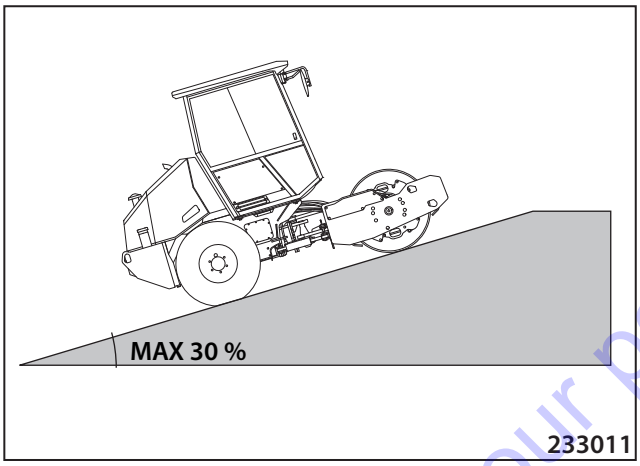
2.8.1 Loading the machine

- Use a loading ramp or a crane to load the machine onto a mean of transport.

2.8.1.1 Loading the machine using a ramp

- When loading the machine using a ramp, all safety regulations related to loading of the machine valid in the place of loading must be adhered to. The ramp must have an appropriate loading capacity, anti-slip surface and must be put on a flat surface. We recommend that you adhere to the BGR 233 regulation.
- The maximum allowable inclination of the access ramp is 30%.



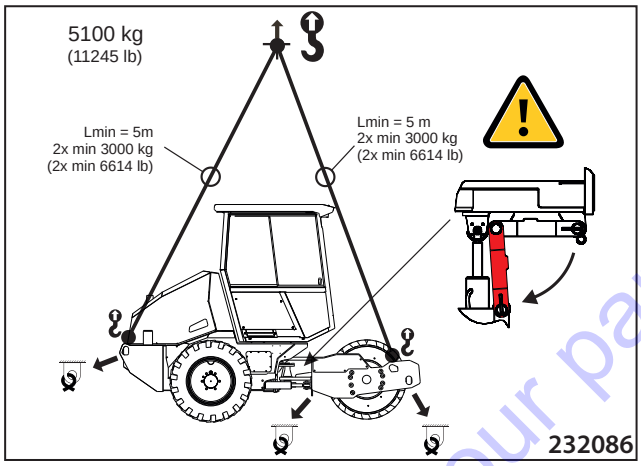
Non-adherence to the prescribed parameters of the access ramp may result in damage to the machine.

When loading the machine, another person must be present to give hand signals to the machine operator for driving on the ramp. See the list of hand signals in Chapter 2.1.6.

Pay increased attention when loading the machine. Improper handling can cause serious injury or death.

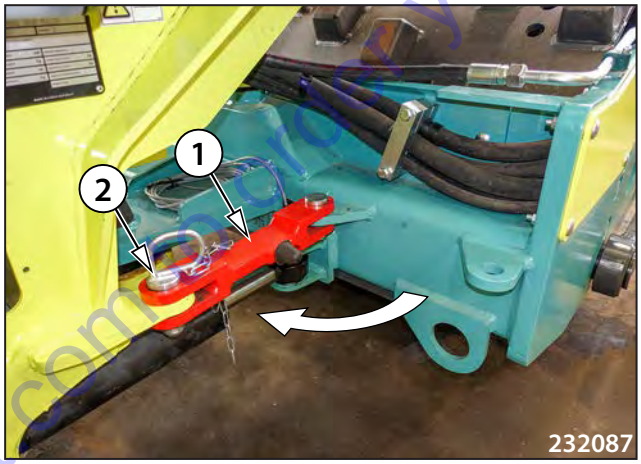
2.8.1.2 Loading the machine with a crane

- For loading with a crane, the roller is provided with lifting lugs.
- Before lifting the roller, the articulation joint of the machine must be locked against turning.



Locking the articulation joint:

- Lower the arm (1), secure with the safety pin (2).



Do not enter under the lifted load!

Observe relevant national safety measures while loading the machine using a crane.

When the loading is completed, return the safety arm to the starting position.

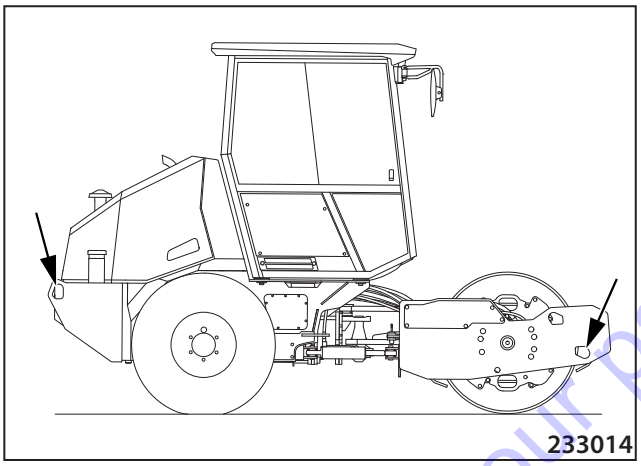
Use corresponding and unbroken hoisting slings with a sufficient load capacity.

To sling, use only lifting lugs on the machine designed for that purpose.

Only a trained slinger may carry out the slinging.

2.9 Special conditions to use the machine

2.9.1 Towing the machine



- For towing, the machine is provided with two towing lugs on the drum frame and with two towing lugs on the rear frame.

The towed machine must be attached to both tow lugs.

For towing, use undamaged tow ropes or tow bars of a sufficient capacity 1.5 × higher than the weight of the towed vehicle. Do not use a chain for the towing.

It is necessary to maintain the minimal angular deviation from the direction of towing. The maximum possible angular deviation is 30°.

Smooth and constant movement must be maintained in towing. Do not exceed the towing speed by more than 1 km/hour (0.62 mph).

Tow the roller at the shortest distance possible – to rescue when it gets stuck or to remove when it is broken and obstructing. Do not tow for a distance exceeding 300 m (0.19 miles).

The towing machine should correspond with its size to the damaged machine. It must have a sufficient traction power (output), weight, and brake effect.

While towing downhill using a rope, another towing machine must be connected to the rear part of the damaged machine. In this way you can prevent an uncontrolled motion of the damaged machine.

- If the engine does not work, or there is a defect in the hydraulic system, then you must short-circuit the hydraulic circuit and release the brake of the machine. Then the machine can be towed.

No person may be on the towed machine!

After the hydraulic circuit of the travel is short-circuited and the machine brakes are released, all of the brakes are disabled!

Before releasing the brake, secure the machine with wooden scotch blocks against movement!

The bonnet must be moved down before the brakes are released.

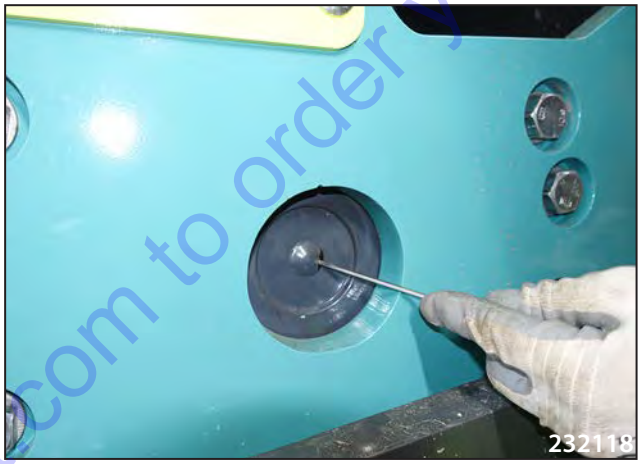
Do not touch hot parts of the machine, there is a burn hazard!

Releasing the machine brake

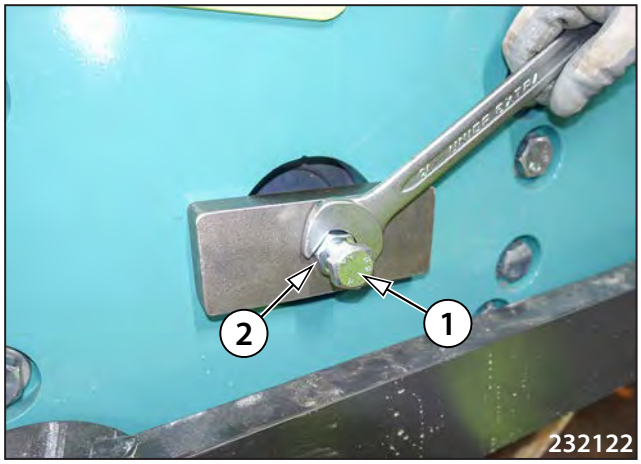
Check the drum or tyres in the towed machine for braking or skidding.

After completion of towing, chock the wheels and the drum and restore the machine.

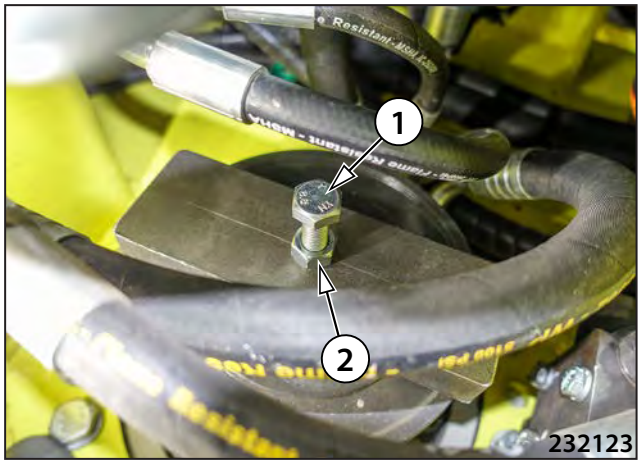
- Remove the rubber cover on the drum travel hydraulic motor.



- Install the plate to the drum travel hydraulic motor using the screw (1). Tighten the screw as far as it will go.
- Tighten the nut (2).

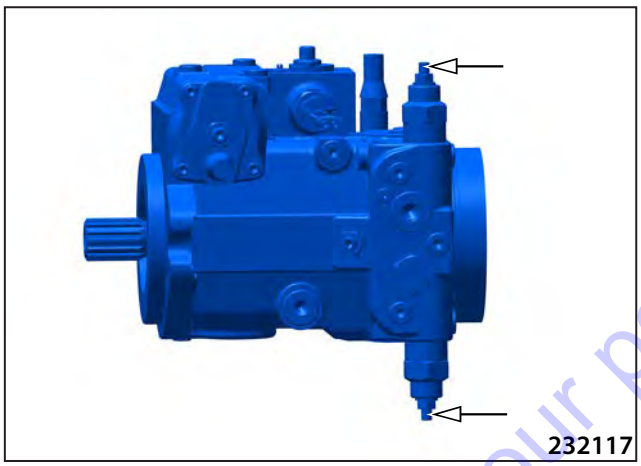


- Remove the rubber cover on the wheel travel hydraulic motor.
- Install the plates to the wheel travel hydraulic motors using the screws (1). Tighten the screws as far as they will go.
- Tighten the nuts (2).



2.9 Special conditions to use the machine

- Short circuit the travel hydraulic circuit by tightening the pump valves. Tighten the screws as far as they will go.



After towing, return the machine to its original condition in the reverse order.

2.9.2 Operating the machine during running-in period

When putting a new machine into operation, during the first 50 hours do not run the machine at full power (uphill driving with vibration).

2.9.3 Operating the machine at low temperatures

The compaction in the winter season depends on the content of fine particles and water in the soil being compacted. With the temperature dropping below the freezing point the soil becomes more solid and harder to compact.

If it necessary to compact at temperatures below 0 °C (32 °F) then it is possible to compact dry soil (and loose stones) or make swift compaction of non-frozen materials (before earth freezes through).

Preparation for work under low temperatures:

- Check concentration of the engine coolant.
- Replace the oil in the engine with the recommended one for given range of low ambient temperatures.
- Use hydraulic oil of the corresponding cinematic viscosity.
- Replace the oil in the drum gearbox with the oil recommended for the given range of gearbox temperatures.
- Use winter fuel.
- Check that the batteries are recharged.

Note

Warm the batteries to ca 20°C (68°F) (removing the batteries and storing them in a warn room) to lower the limit temperature for starting by 4 to 5°C (39.2 to 41°F).

The minimum temperature of the engine cooling liquid is 60°C (140°F). The maximum temperature of 100°C (212°F).

The machine can be used at full power only after the operating fluids have been heated to their operating temperatures (coolers can be partly covered).

When using HV 100 oil in the hydraulic system NEVER start the Machine at ambient temperatures below +2 °C (36 °F).

If it is necessary to start the machine at temperatures below -8°C (18°F), replace the oil in the hydraulic system with an oil with the viscosity class HV 46.

Replace for the oil of viscosity class HV 32 at temperatures below -13°C (9°F).

Starting the machine at a temperature below -23°C (-9°F) cannot be done without preheating the fluids.

2.9.4 Machine operation under high temperatures and humidity

The engine power output decreases with the increasing temperature and air humidity. Both factors reducing the power are independent of each other.

- Every 10 °C (18 °F) of the temperature rise means a power drop by up to 4 % (at a constant humidity);
- Every 10 % of the relative humidity rise means a power drop by up to 2 % (at a constant temperature).

Note

For oil of the viscosity class HV 46, the maximum permitted oil temperature is 90°C (194°F); for oil of the viscosity class HV 32, the maximum permitted oil temperature is 70°C (158°F).

In the environment where hydraulic oil temperature is constantly at about 90°C (194°F), we recommend exchanging the hydraulic oil for an oil of a higher class with HV 100 cinematic viscosity.

2.9.5 Machine operation at high altitudes

With the increasing altitude, the engine power output decreases as a result of the lower atmospheric pressure and specific density of the incoming air.

If the engine issues black smoke at a high altitude (above 1,500 m), contact the service support of the engine manufacturer that will adjust the injection pump for such operating conditions.

The engine power depends on the environment, in which the machine is working.

The machine may be used up to the maximum altitude of 1,950 m (6,400 ft) without adjusting the power of the engine.

2.9.6 Machine operation in a very dusty environment

In very dusty environments, shorten the cleaning and replacement intervals. Shorten the cleaning intervals of the engine cooler, hydraulics and cab dust filter replacement.

The recommended cleaning interval is once a week.

2.9.7 Driving with vibration on compacted and hard materials

When the machine works with vibration on hard materials (e.g. loose stony materials) or materials with a high degree of compaction, the drum can lose its contact with the compacted material (so-called vibro stroke). Due to this condition, the transfer of vibrations to the machine frame and to the driver's stand increases. It can be partly removed by increasing the travel speed or by changing the vibration parameters of the machine (using a smaller amplitude).

If it is necessary to work with the machine in conditions when the operator can be exposed to higher vibrations, the machine user must modify working procedures to protect the driver's health.

Note

When driving with vibration on a different background material than specified in the Specification manual, the emission values of the vibration acceleration will be different – Noise and vibration emissions.

Travelling with vibration on a hard (frozen, concrete, overcompacted) surface or on a bedrock is forbidden. There is a risk of damaging the machine.

3 MAINTENANCE MANUAL

ARS 50
(Kubota Tier 4 Final)

3.1 Safety and other measures during maintenance of the machine

3.1.1 Safety during maintenance of the machine

Carry out lubrication, maintenance and adjustment as follows:

- By professionally trained personnel;
- According to safety instructions given in the operating manual
- In intervals stated in the lubrication chart according to worked hours
- On the machine standing on a flat and solid surface and secured against movement (with scotch blocks), always with the engine off, the key removed from the ignition box and the wiring disconnected;
- When the tag **Machine repair** is attached on the steering wheel (the tag is delivered with the machine accessories);
- At cold machine parts;
- After the machine, lubrication points and maintenance points have been cleaned
- Using suitable undamaged tools,
- By replacing parts with new original parts according to the spare parts catalogue;
- By providing sufficient lighting of the entire machine during poor visibility and at night;
- By reinstalling all removed covers and safety elements after the work is completed;
- By retightening screw connections to the specified tightening torque and checking the connections for leakage;
- After the operating fluids are heated – beware of burns – use only recommended media.

After the adjustment or maintenance is completed, check all safety devices for proper operation!

3.1.2 Fire protection when operating fluids are changed

- Considering the fire danger, the flammable liquids used on the machine are divided into the following hazard classes:

  II hazard class – diesel fuel

  IV hazard class IV – mineral oils, lubricating greases
- The oil change point must be where it cannot interfere in explosion or fire hazard areas.
- It must be identified by “No smoking” and “No open flame” plates and signs.
- The handling area must be dimensioned so that it can catch a volume of the flammable liquid equal to the capacity of the biggest vessel, transport container.
- It must be equipped with portable fire extinguishers.
- For handling oils and diesel fuel, use vessels such as metal barrels, jerry cans and sheet-metal cans.
- The transport containers must be properly closed during storage.
- The containers must be provided with one hole, always stored with the hole up and secured so that their content cannot flow out and drip off.
- Vessels must be marked with non-removable writings showing the contents and flammability classes.

3.1.3 Environmental and hygienic principles

When operating or maintaining the machines, the user is obliged to follow general principles of health and environment protection according to laws, ordinances and regulations in individual territories when the machine is used.

Hygiene principles

- Petroleum products, cooling system fluids, battery fluids and coating compounds including thinners are substances harmful to health. Workers coming into contact with the above products during operation or maintenance of the machine are obliged to follow general principles of their own health protection and comply with safety and hygienic manuals made by manufacturers of the products.
- In particular we draw your attention to the following:
  - Protect your eyes and skin while working with the batteries
  - Protect your skin while handling petroleum products, coating compounds and coolants
  - Wash your hands properly after finishing the work and before eating, treat your hands with a suitable reparation cream.
  - Follow instructions given in this manual.

- Always store petroleum products, cooling system fluids, battery fluids and coating compounds including thinners and also cleaners and preservation agents in their original and properly labelled containers. These materials are not allowed to be stored in unlabelled bottles or in any other containers considering the possible risk of confusion. Possible confusion with foodstuffs or beverages is very dangerous.
- If by accident the skin, eyes or mucous membrane is stained or if you breathe in the vapours of such products, apply first aid measures immediately. In case of accidental ingestion of these products, immediately seek medical help.
- While working with the machine when it is provided with a platform or the cab windows are open, always use ear protectors of suitable type and version.

Environmental principles

The operating fluids of the individual systems of the machine and also some of its parts after discarded (dismounted, exchanged) become hazardous wastes with dangerous properties for the environment.

- This category of waste products includes the following in particular:
  - organic and synthetic lubricating materials, oils and fuels;
  - brake fluids;
  - coolants;
  - battery fluids and batteries;
  - air-conditioning media;
  - cleaning and preservation agents;
  - all removed filters and filter cartridges;
  - all used and discarded hydraulic or fuel hoses, rubber-metal elements and other parts of the machine contaminated by the above mentioned products.

It is necessary to treat the above mentioned materials and parts after they have been discarded in accordance with relevant national regulations valid for protection of the environment and in compliance with regulations of the health protection.

3.2.1 Engine oil

The engine oil is specified according to the performance and viscosity classification.

Performance classification according to

API (**A**MERICAN **P**ETROLEUM **I**NSTITUTE)

ACEA (**A**SSOCIATION DES **C**ONSTRUCTEURS **E**UROPÉENS D'**A**UTOMOBILE)

Viscosity classification

To determine the SAE (Society of Automotive Engineers) viscosity class, the ambient temperature and type of operation where the machine is used are decisive.

Use of permissible oils according to API: CJ-4 , CK-4

SAE 15W-40 year-round

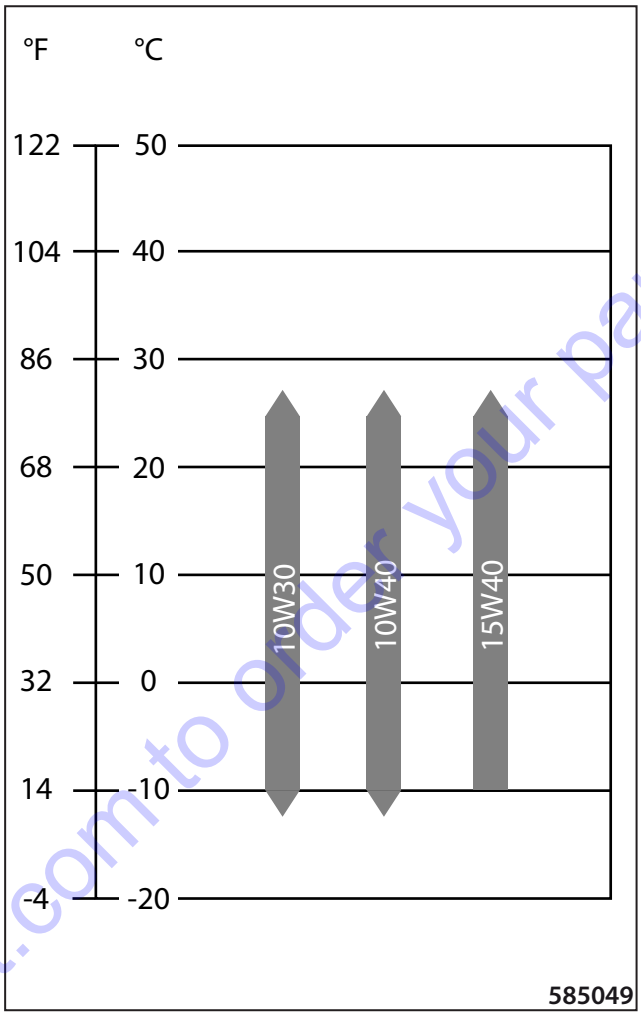
Note

Exceeding the lower temperature limit does not result in damage to the engine; it can only cause some starting difficulties.

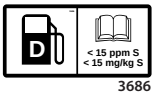
It is recommended that universal multi-range oils are used to avoid the necessity of oil changes due to changes of ambient temperature.

For easier starting at the temperatures below 0°C (32°F), the engine manufacturer recommends the SAE 10W-30 oil.

Considering the reduced lubricating capabilities of the oil, the upper temperature limit must not be exceeded for a long period.



3.2.2 Fuel



3686

Diesel oil is used as fuel for the engine:

EN590

ASTM D975: 1D S15, 2D S15

Note

Do not use fuels with a sulphur content exceeding 0.0015 percent by weight.

At ambient temperatures below 0°C (32°F), use winter diesel fuel.

Mixing diesel with special additives is forbidden.

3.2.3 Coolant


2152

The coolant specification must meet requirements of:

SAE J1034

SAE J814c

To fill the cooling circuit, use the coolant in the mixing ratio of 50%/50% with high-quality water (thermal protection up to -37°C).

Change the coolant every 2 years at the latest.

Note:

The machines are filled with a cooling solution with the Bantleon Avia Antifreeze NG coolant, specification SAE J 1034 at the manufacturer's during the production.

It is a coolant containing silicates based on monoethylene glycol. It does not contain phosphates, nitrates, amines and borates.

There is an Avia NG label placed where the coolant is to be filled into the machine.

Refill the cooling circuit with the same or a completely miscible coolant of the required specification.

If the use of a different, immiscible coolant is necessary, the cooling circuit must be completely drained and cleaned with clean water repeatedly, at least 3 times. However, it is not allowed to use a coolant of a different specification than stated by the engine manufacturer.

The coolant protects the cooling system from freezing, corrosion, cavitation, overheating etc.

It is forbidden to operate the machine without coolant even for a short time.

It is forbidden to use a coolant of a different than prescribed specification and base. The engine and the cooling system can get damaged, which will void the warranty.

Always check the ratio of antifreeze cooling agent in the coolant with a refractometer before the winter season starts.

Water quality

Do not use hard water with a higher content of calcium and magnesium, which results in scale formation, and with a higher content of chlorides and sulphates, which causes corrosion.

The maximum content of compounds of calcium and magnesium is 170 milligrams – hardness of water.

The maximum content of compounds of chlorine is 40 milligrams.

The maximum content of compounds of sulphur is 100 milligrams.

Safety instructions:

1) **Protect your hands with protective gloves.**
2) **In case of ingestion, immediately seek medical treatment.**
3) **In case of contact with skin or clothing, immediately wash the affected area with clean water.**
4) **Do not mix different types of coolants. The mixture can cause a chemical reaction with formation of harmful substances.**

3.2.4 Hydraulic oil


2158

For the hydraulic system of the machine, it is necessary to use only high-quality hydraulic oil grades according to ISO 6743/4 HV (equal to DIN 51524 part 3 HVLP).

Fill the machines normally with the ISO VG 46 hydraulic oil with a kinematic viscosity of 46 mm^2/s at 40°C (104°F). This oil is the most suitable to be used in the widest range of ambient temperatures.

At high external temperatures when the oil temperature is constantly 90°C (194°F), we recommend you to replace the oil with an oil with the kinematic viscosity 100 mm^2/s – HV 100.

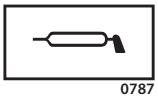
At temperatures below -13°C (9°F), replace it with an oil with the kinematic viscosity of 32 mm^2/s – class of viscosity HV 32; see Operating manual, Chapter. 2.9.3.

Synthetic hydraulic oil

The hydraulic system can be filled with synthetic oil, which if leaks occur will be degraded completely by micro-organisms present in water and soil.

Please consult always with oil manufacturer or dealer any switching from mineral oil to synthetic one or mixing the oils of various brands!

3.2.5 Lubricating grease


0787

To lubricate the machine you must use plastic grease containing lithium according to:

ISO 6743/9 CCEB 2

DIN 51 502 KP2K-30

3.2.6 Windscreen washer fluid


2260

When filling the windscreen washer tank, use water (for temperatures above 0°C) and windscreen washer fluid for motor vehicles.

Replace the water with an antifreeze agent at temperatures below 0 °C (32 °F).

3.2.7 Air-conditioning fluid


2441

Mixture:

1.2 kg coolant Halocarbon 134a

0.2 l of oil PAG 150

0.005 l of contrast medium

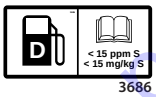
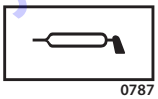
3.2.8 Vibrator oil


2412

For vibrator lubrication, use oils according to:

SAE 75W-90, API GL-5

3.3 Operating fluids

Part	Fluid type	Fluid quantity l (gal US)	Brand
Engine	Engine oil according to Chapter 3.2.1	9.5 (2.5)	 2412
Fuel tank	Diesel oil according to Chapter 3.2.2	98 (25.9)	 3686
Hydrostatic system	Hydraulic oil according to Chapter 3.2.4	45 (11.9)	 2158
Door hinges pins	Plastic grease according to Chapter 3.2.5	as required	 0787
Engine cooling system	Year-round anti-freeze according to Chapter 3.2.3 – for temperatures up to -25°C (-13°F)	13 (3.4)	 2152
Air conditioning	Mixture according to Chapter 3.2.7	-	 2441
Windscreen washers	Water and anti-freeze agent – ratio according to outdoor temperature	2.5 (0.7)	 2260
Tyres	For air or fluid see Operating instructions, Chap. 2.7.7		

3.4 Lubrication and maintenance chart

Every 20 hours of operation (daily)	
3.6.1	Fuel check
3.6.2	Engine oil check
3.6.3	Engine coolant check
3.6.4	Check of the oil in the hydraulic tank
3.6.5	Check of the fan and engine belt for condition
3.6.6	Air filter dust valve inspection
3.6.7	Engine intake piping and exhaust pipe inspection
3.6.8	Inspection of warning and checking devices
3.6.9	Brake test
Every 50 hours of operation	
3.6.10	Engine leakage check
3.6.11	Cleaning the water separator on the fuel filter
After 50 hours of operation	
3.6.22	Engine oil change
Every 100 hours of operation	
3.6.12	Tyre pressure check
After 100 hours of operation	
3.6.25	Checking the wheel screws for tightening
Every 250 hours of operation	
3.6.13	Checking the hoses and clips for mounting
3.6.14	Cooler inspection
3.6.15	Air filter cleaning
3.6.16	Machine lubrication
3.6.17	Checking the smooth segments
3.6.18	Seat switch check

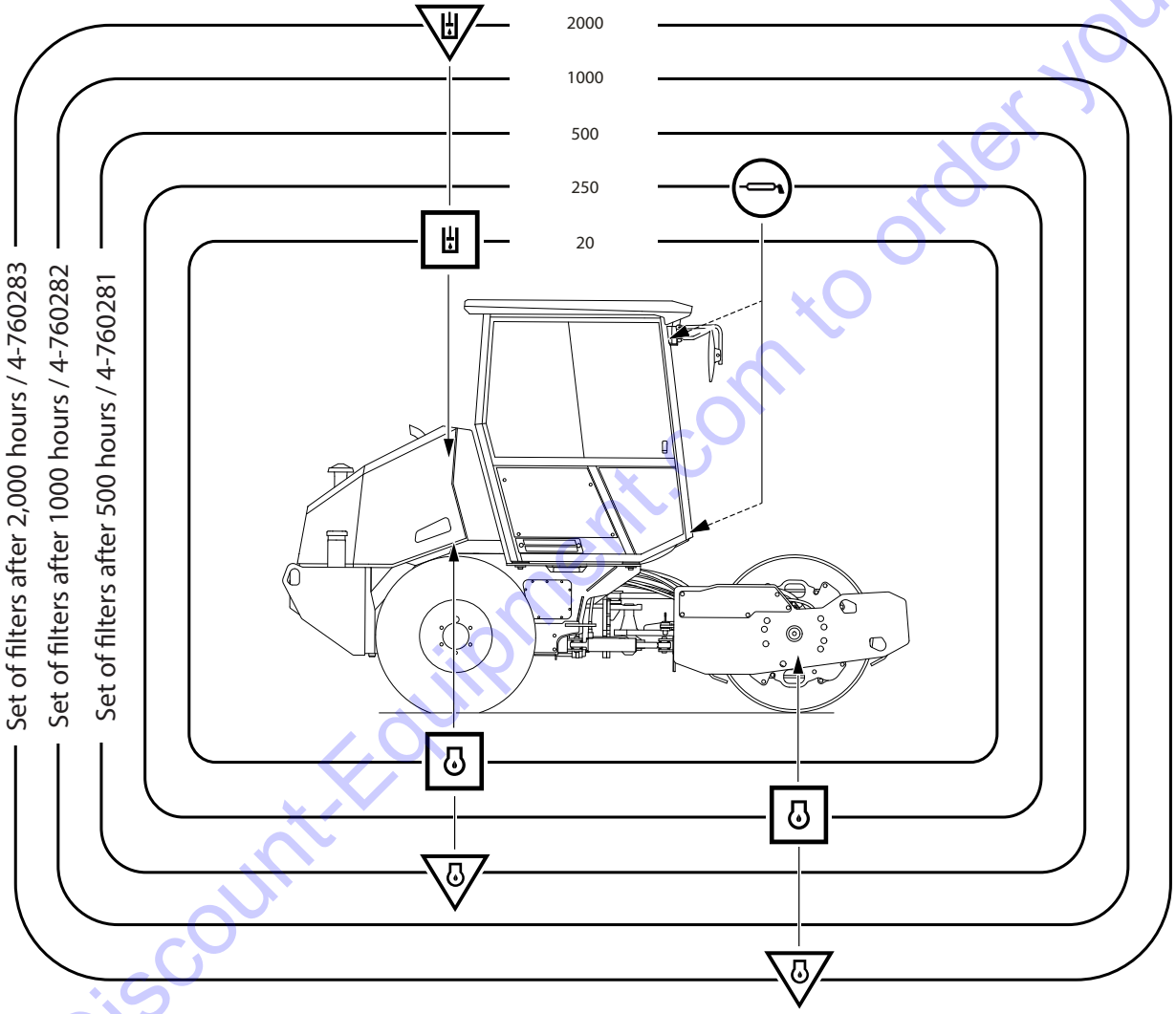
3.4 Lubrication and maintenance chart

Every 500 hours of operation, but at least once a year	
3.6.19	Fuel filter replacement
3.6.20	Electrical installation inspection
3.6.21	Replacement of the main cartridge of the air filter
3.6.22	Engine oil change *
3.6.23	Cab ventilation filter replacement
3.6.24	Engine coolant check
3.6.25	Checking wheel screws for tightening **
Every 1000 hours of operation	
3.6.26	Replacement of air filter cartridges
3.6.27	Damping system check
3.6.28	Oil separator cartridge replacement
3.6.29	Fuel tank cleaning
3.6.30	Valve clearance check and adjustment
3.6.31	Battery inspection
3.6.32	Inspection of the air-conditioning unit compressor mounting
Every 2000 hours of operation	
3.6.33	Engine coolant change
3.6.34	Cleaning and checking the air conditioning system
3.6.35	Hydraulic oil change and filter replacement
Every 3000 hours of operation	
3.6.36	DPF cleaning

Maintenance as required	
3.6.37	Gas strut replacement
3.6.38	Scraper adjustment
3.6.39	Cleaning the machine
3.6.40	Fuel system bleeding
3.6.41	DPF (diesel particulate filter) clogging regeneration
3.6.42	Charging of the battery
3.6.43	Checking the screw connections for tightening
*** First after 50 hours** **** First after 100 hours**	

LUBRICATION AND SERVICE PLAN

□	INSPECTION
○	LUBRICATION
▽	REPLACEMENT

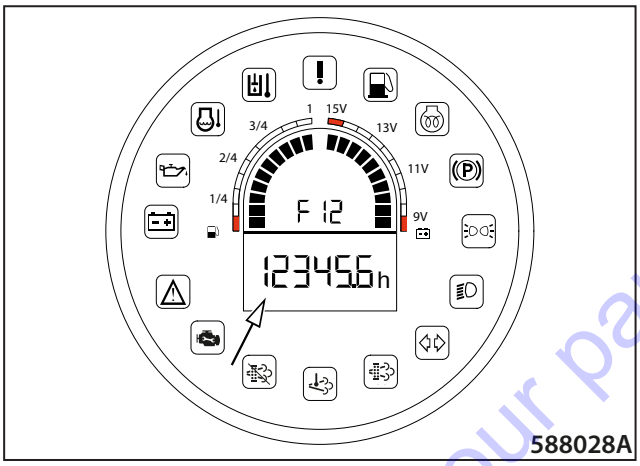


	Engine oil:	API: CJ-4, CK-4	SAE 15W-40
	Hydraulic oil:	ISO VG 46	ISO 6743/4 HV
	Lubricating grease:	ISO 6743/9	CCEB 2
	Gear oil:	SAE 80W/90 SAE 80W/140	API GL-5 API GL-5

233012

3.6 Lubrication and maintenance operations

Carry out lubrication and maintenance in regular intervals according to daily values on the counter of worked hours.



This manual includes only basic information about the engine; the other data are given in the operation and maintenance manual, which is a part of documentation supplied together with the machine.

Follow also instructions given in the engine operating and maintenance manual!

Tighten removed or loosened bolts, plugs, threaded joints in the hydraulic system, etc. with the tightening torque specified in tables in Chapter 3.6.43 unless a different value is given for the respective operation.

Carry out maintenance works with the machine placed on a flat, solid surface and secured against any spontaneous movement, always with the engine off, and the key removed from the ignition box and with the disconnected electrical installation (unless required otherwise).

If the engine must be running, enable the service switch.

If the exhaust piping with the flexible piece between the engine and the catalytic converter leaks or is damaged, the machine must not be operated until the defect is repaired.

After the first 50 hours of operation of the new machine (or after a general overhaul), carry out the following operations according to:

3.6.22 Engine oil change

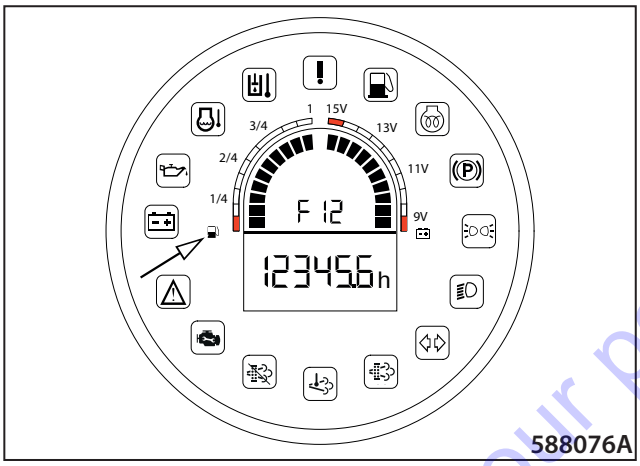
After the first 100 hours of operation of the new machine (or after a general overhaul), carry out the following operations according to:

3.6.25 Checking the wheel screws for tightening

Every 20 hours of operation (daily)

3.6.1 Fuel check

- Check the fuel level on the dashboard and refill if necessary.



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- Clean the tank cap and the filler neck.
- Unlock the lock and remove the cap.
- Fill the tank until the first fuel enters the throat. Do not continue refuelling. You would fill the space for the thermal expansion of the fuel.


232028

Note

The fuel tank volume is 98 l (25.9 gal US).

Do not smoke and do not use open flame while working.

Do not refill the fuel when the engine is running.

Do not pump out the tank completely. After the tank is completely pumped out, bleeding of the fuel system must be done.

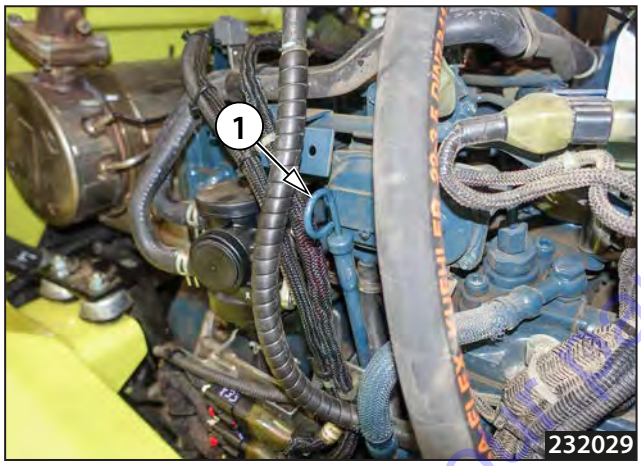
Use only recommended clean fuel according to Chapter 3.2.2.

Do not refill the fuel in closed spaces.

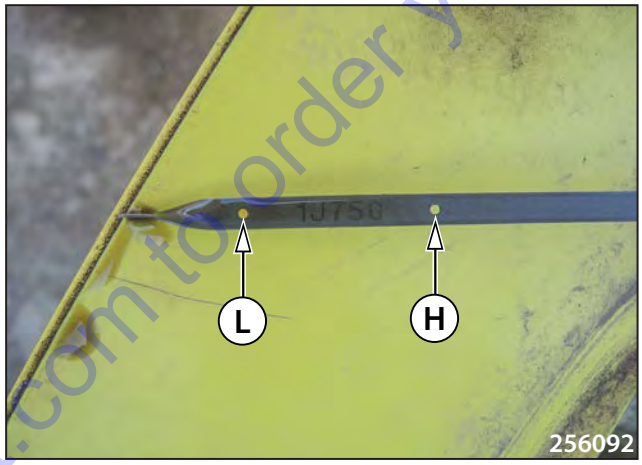
Do not spill the fuel.

3.6.2 Engine oil check

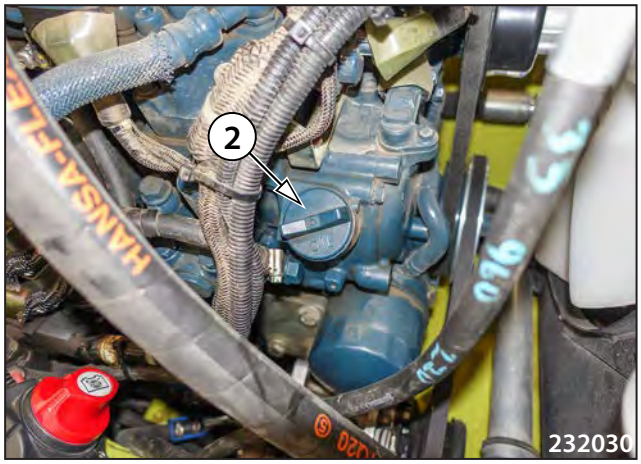
- Wait for about 5 min. until the oil flows down into the engine sump.
- Take out the oil dipstick (1), wipe it, insert fully back and take it out again to read out the oil level.



- Keep the level within the range of gauge marks imprinted in the dipstick. The lower mark L (Low) shows the lowest possible oil level, the upper mark H (High) the highest one.



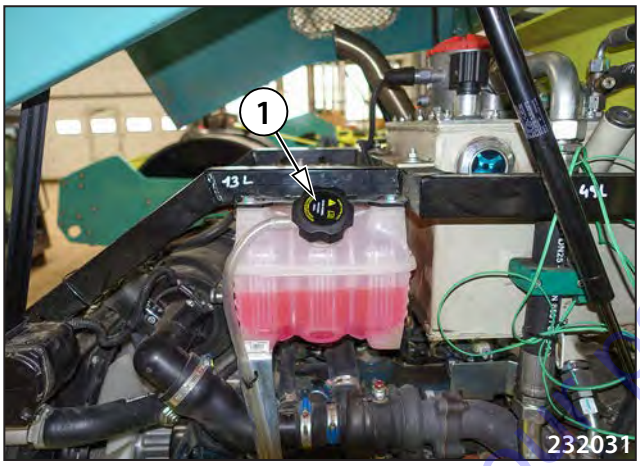
- After removing the filler cap (2), refill the oil through the oil filler. Wait about 1 min. until the level is stable and check again.
- Refill the identical type of oil. Use oils according to Chapter 3.2.1.
- Check the engine for leaks and remove the cause.
- Check the engine for damaged and/or missing parts and for changes in appearance.



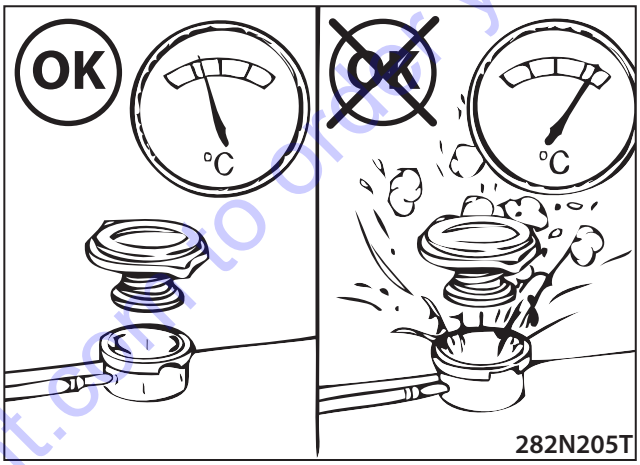
Do not use the engine unless the oil level in the engine is correct.

3.6.3 Engine coolant check

- Let the coolant cool below 50°C (120°F).
- Check visually the level.
- Refill through the filler neck (1).



Remove the filler cap only after the temperature of the engine coolant drops below 50°C (120°F). If you remove the plug at a higher temperature, there is a risk of steam or coolant scalding due to an internal overpressure.



The level must not fall below the sight hole of the level indicator.

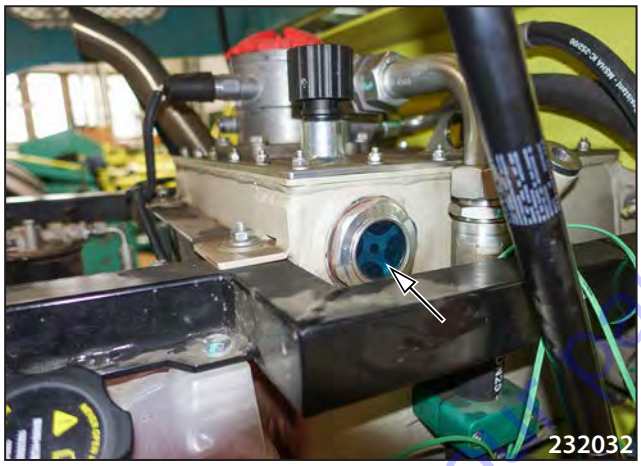
Fill up only with the coolant according to Chapter 3.2.3.

Do not use any additives to repair the cooling system leakage into the engine coolant!

In case of larger losses, find out where the cooling system leaks and repair the cause.

3.6.4 Check of the oil in the hydraulic tank

- Check the oil level in the oil gauge.



- Fill up oil via the filling device using quick-coupling (1), proceed according to Chapter 3.6.35.

The oil level must be always visible in the oil gauge!

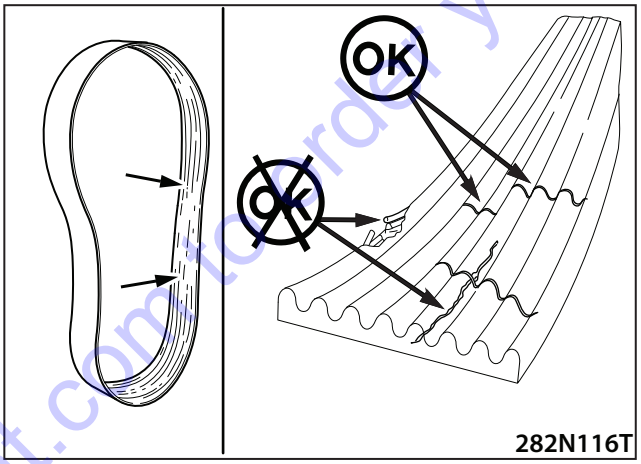
Fill with the specified oil according to Chapter 3.2.4.

If large oil losses occur, find out the cause of leakage of the hydraulic system (leakage of screwed hose connections, hydraulic generators, hydraulic motors etc.) and remedy the defects.

3.6.5 Check of the fan and engine belt for condition

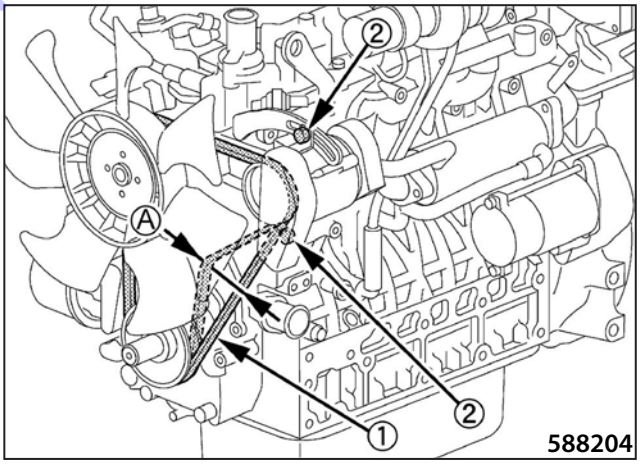
Fan wear check

- Check the fan visually. Replace the fan if damaged (e.g. missing parts of materials, cracks, shape changes, etc.).



Belt wear check

- Visually inspect the belt.
- Cracks perpendicular to the belt width are not considered to be a fault. If longitudinal cracks appear on the belt, or the belt edges are ragged, or some material parts are pulled off, then the belt must be replaced.

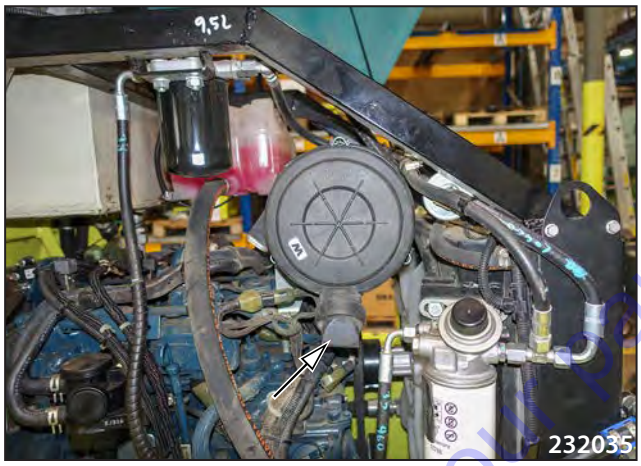


Belt tension check

- Press with your thumb at the spot where the belt length between the pulleys is the longest, using the 98 N (22.1 lb) force. The max. slack (A) is 7 – 9 mm (0.28 – 0.35 in).
- Tighten the belt (1) by loosening the screws (2) and shifting the alternator (3) if required.
- Check the belt for correct tension.

3.6.6 Air filter dust valve inspection

- Clean the exit slit and squeeze to remove any dust trapped.



Note

Any dust trapped in the dust valve is automatically emptied during operation of the machine.

Do not work with the machine if the dust valve is damaged.

If the dust valve of the air filter is damaged, replace it with a new valve of the same type.

3.6.7 Engine intake piping and exhaust pipe inspection

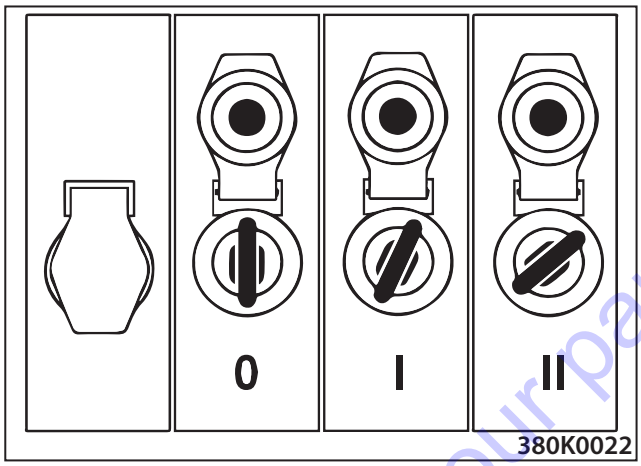
- Check the engine intake piping for leakage. Check the hoses for damage and missing hose clips.

- Check the engine exhaust piping for leakage.
- Check for missing clamping clips.

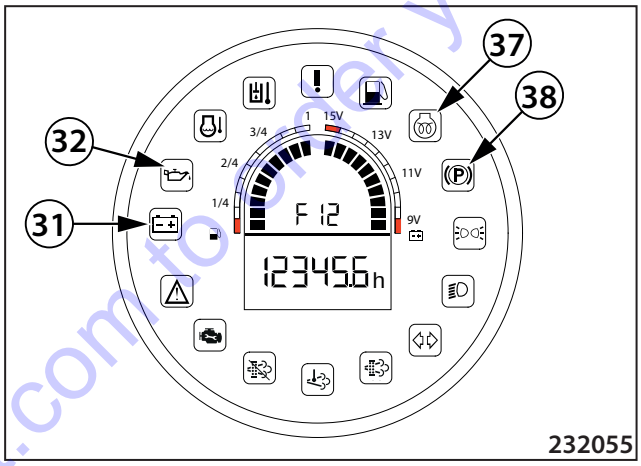
If the exhaust piping with the flexible piece between the engine and the catalytic converter leaks or is damaged, the machine must not be operated until the defect is repaired.

3.6.8 Inspection of warning and checking devices

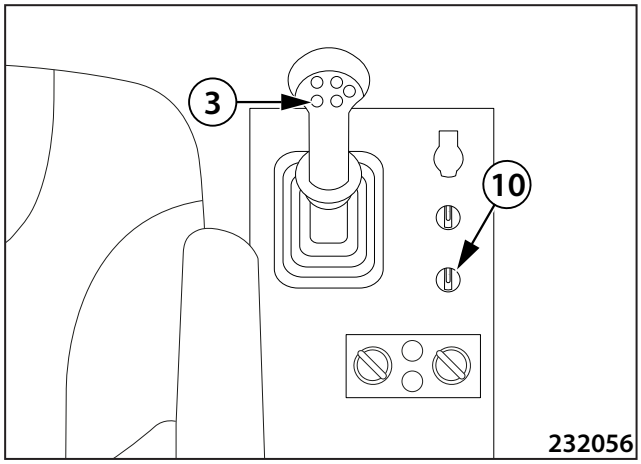
- Turn the key in the ignition box to position “I”.

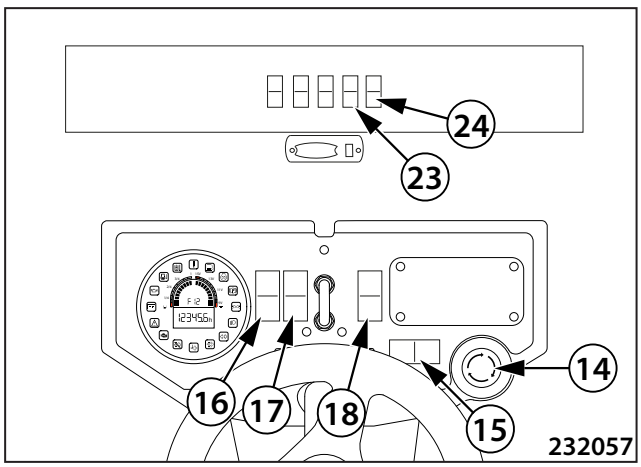


- The brake, charging, engine lubrication and glowing indicator lamps will light up on the display.

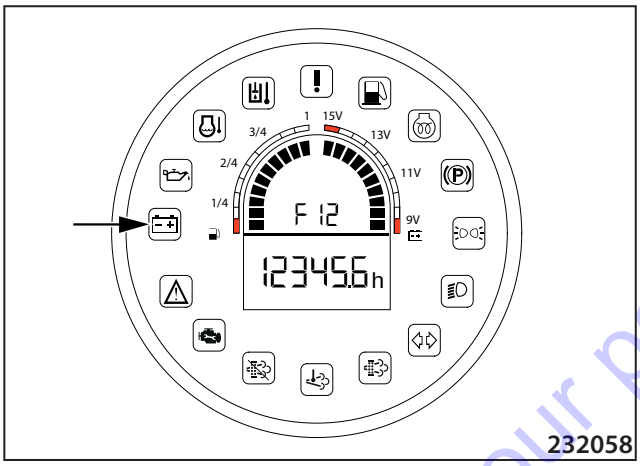


- Then check the switches (3, 10, 14 – 18, 23 – 24) for operation.





- Turn the key to position "II" to start the engine.
- The charging indicator lamp must go out after the starting is completed.



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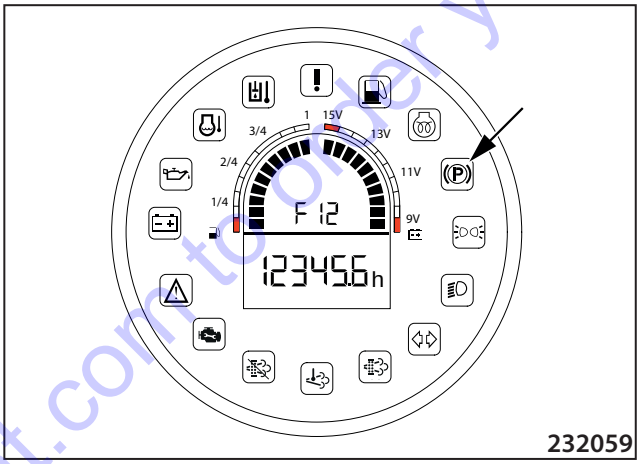
- The brake indicator lamp goes off after the travel control is changed to the neutral position (0).



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Use the audible alarm to announce the engine start!

Before starting the engine, check that the engine start does not endanger anyone!

Give the audible alarm before the machine starts moving and wait long enough so that all present persons can leave the area around the machine (space under the machine) in time!

Make sure that the area in front of and behind the machine is free and no persons are present there!

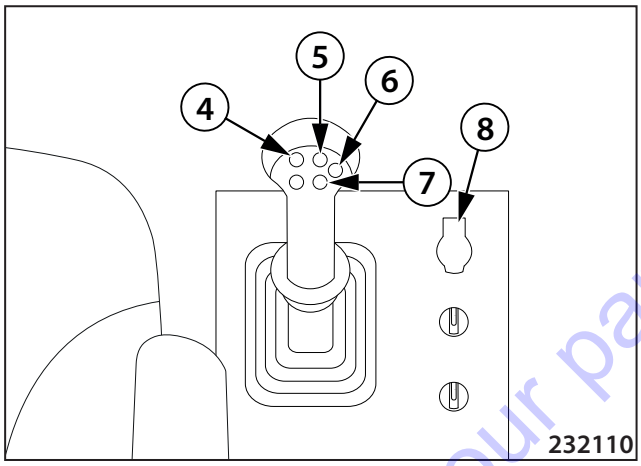
During operation, check the instruments and indicator lamps continuously.

Promptly repair any failures!

3.6.9 Brake test

3.6.9.1 Check of the parking brake

This test verifies the function of the parking brake. The ability of the parking brake to hold the machine can be checked using the "Brake Test" mode. After starting this mode, the traction force of the machine acts on the stationary machine with the parking brake (P) engaged for a given time.



Perform the test on a level and solid surface.

Check that the area in front of and behind the machine is empty and that there are no persons or obstacles there! Ensure a suitable safe distance in front of the machine, behind the machine as well as on its sides.

Procedure

- Place the machine on a flat and solid surface.
- Sit on the driver's position.
- Turn the key in the ignition box (8) to position "I".
- Go to the service menu by pressing button (6) for 5 sec.
- Using buttons (5) and (7), browse the service menu and select "Brake test". Confirm the selection by pressing button (4).
- Select "Enable" and confirm. The service menu will be closed.
- Start the engine according to Chapter 2.7.1.
- The display will show a message on the ongoing brake test.
- Set the travel control to the forward travel position "F".
- The machine must not move off. If the machine moves off, the test is unsuccessful.
- The engine must be shut down for common operation or repeating the brake test.
- To repeat the test, follow the steps above to start the "Brake test" mode.
- After an unsuccessful brake test, secure the machine against spontaneous movement by wedges and contact service.

3.6.9.2 Check of the emergency brake

This test verifies the function of the emergency brake. Due to possible wear of the parking brake, the emergency brake check is to be performed with a stationary machine. During normal operation, the emergency brake button is to be used in the event of danger when the machine is running. After pressing the emergency brake button, the engine is immediately shut down and the parking brake (P) is engaged.

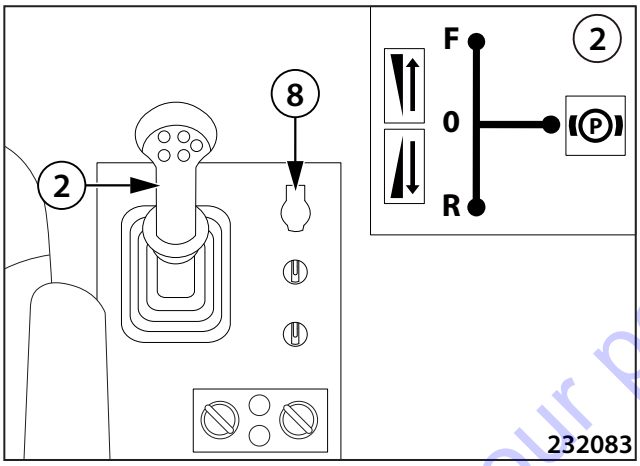
Check that the area in front of and behind the machine is empty and that there are no persons or obstacles there! Ensure a suitable safe distance in front of the machine, behind the machine as well as on its sides.

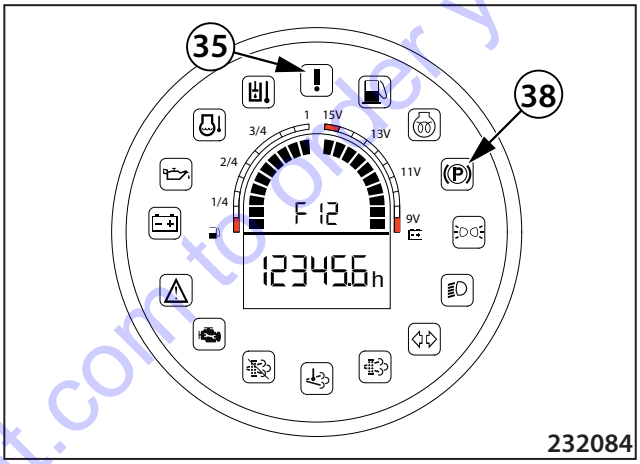
Procedure:

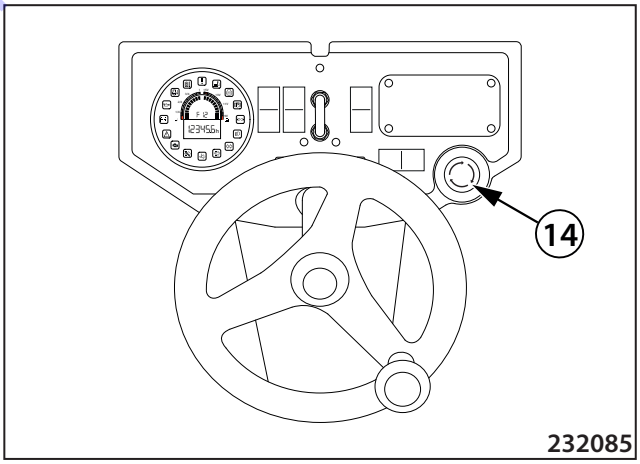
- Place the machine on a flat and solid surface.
- Sit on the driver's position and start the engine according to Chapter 2.7.1.
- Set the travel control (2) to the zero position (0).
- The parking brake indicator lamp (38) goes off.
- The machine is unbraked.
- Press the emergency brake button (14). The engine of the machine stops and the parking brake indicator lamp (38) and the emergency stop indicator lamp (35) light up.
- If the engine does not shut down, turn it off using the key in the ignition box (8), secure the machine against spontaneous movement using wedges on a level and solid surface and contact service.
- To start the machine again, move the key in the ignition box (8) to the "0" position and turn the emergency brake button (14) slightly to release it.

Note:

The emergency brake button (14) is only to be used to stop the machine in an emergency. Use the service brake to stop the machine normally. To turn off the engine normally, use the ignition box (8) – turn the key to the "0" position.

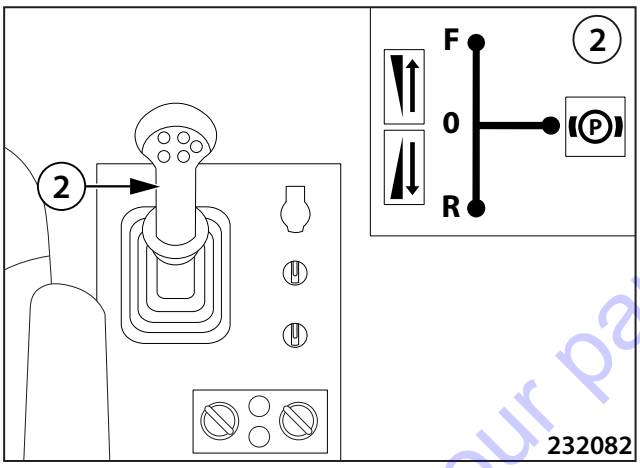






3.6.9.3 Check of the service brake

This test verifies the function of the service brake. After activating the service brake, the hydraulic components of the machine drive adjust to stop the machine. The service brake can be controlled at any time. Using the service brake does not activate the parking brake (P).



Check that the area in front of and behind the machine is empty and that there are no persons or obstacles there! Ensure a suitable safe distance in front of the machine, behind the machine as well as on its sides.

Perform the test on a level and solid surface. If the test is performed on a slope, the machine may start moving due to leaking hydraulics even though the service brake is in order!

Procedure:

- Place the machine on a flat and solid surface.
- Sit on the driver's position and start the engine according to Chapter 2.7.1.
- Move off the machine by setting the travel control (2) to the forward travel position "F".
- Set the travel control to the zero position (0).
- The machine will stop and the parking brake will not activate.
- To move off again or control the brake during braking, move the travel control (2) back to the forward travel position "F".
- If the machine does not stop, activate the emergency brake, secure the machine against spontaneous movement using wedges on a level and solid surface and contact service.

Activation of the emergency brake will cause a high mechanical and hydraulic load of the machine. Always test the parking brake after activating the emergency brake while driving.

Every 50 hours of operation

3.6.10 Engine leakage check

- Visually check the engine and the engine compartment for oil leakage.
- Remove the identified defects.

3.6.11 Cleaning the water separator on the fuel filter

- Turn off the engine.
- Prepare a sediment catch pan.
- Disconnect the electrical installation.
- Release the separator valve manually and drain the fuel until clean fuel starts to flow out.
- Remount the valve.
- Connect the electrical installation.
- Bleed the fuel system.

Do not smoke while working!

Check the water separator for leaks.

Prevent the fluid from soaking into the ground.

Every 100 hours of operation

3.6.12 Tyre pressure check

Turn the tyres so that the valve bodies are in the highest position.

- Check the pressure with a pressure gauge when the tyre is cold.
- Maintain the tyre pressure at the following value:

  Tractor tyres: 350 kPa (51 PSI)

  Loader tyres (NB38): 600 kPa (87 PSI)

Every 250 hours of operation

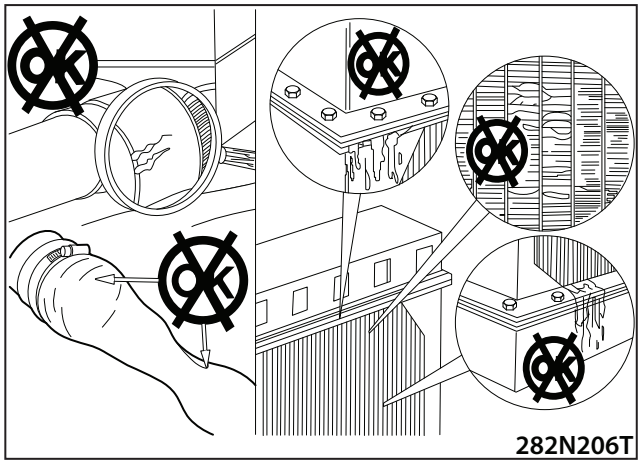
3.6.13 Checking the hoses and clips for mounting

- Check the engine intake piping for leakage. Check the hose for damage and missing hose clips.

- Check the cooling circuit for leakage. Check the hoses for damage and missing hose clips. When hoses are cracked or hardened, replace them with new ones.

3.6.14 Cooler inspection

- Check the cooling circuit for leakage. Check the hoses for damage and missing hose clips.
- Check the cooler fins for clogging. If fins are clogged, then clean them e.g. by purging the cooler with pressure air (steam or hot water).

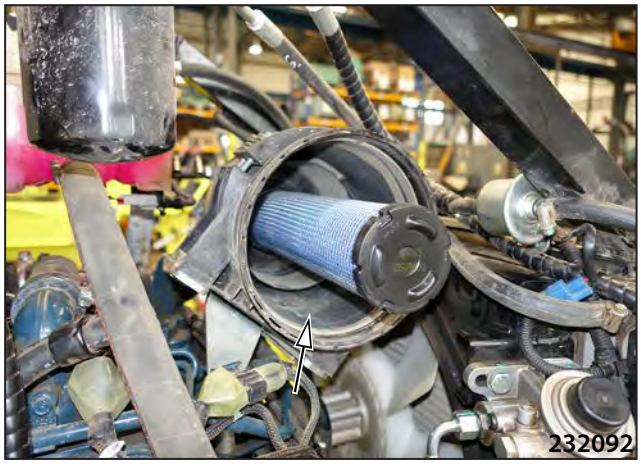


3.6.15 Air filter cleaning

- Remove the filter cap.

- Remove the main cartridge of the air filter and clean with compressed air.

- Clean the internal area of the filter and of the contact surface to avoid contamination of the safety cartridge.



Never use compressed air to clean the filter interior.

3.6.16 Machine lubrication

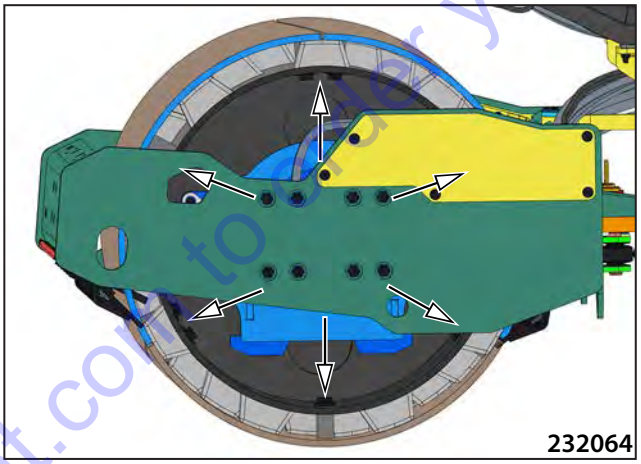
- Remove the caps on the grease nipples.
- Put on the grease nipple of the high-pressure press gradually and lubricate until the old grease starts flowing out.
- Replace the oil grease nipple caps.

Door hinges pins

Pins 2×

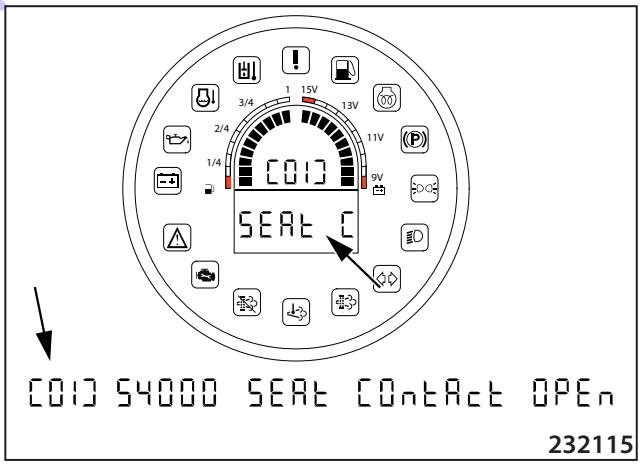
3.6.17 Checking the smooth segments

- Before checking, clean the surface of the segments mainly around screw connections. Check the segments for general condition (cracks, deformations) and the screws for tightening to the torque of 550 Nm (406 lb ft).



3.6.18 Seat switch check

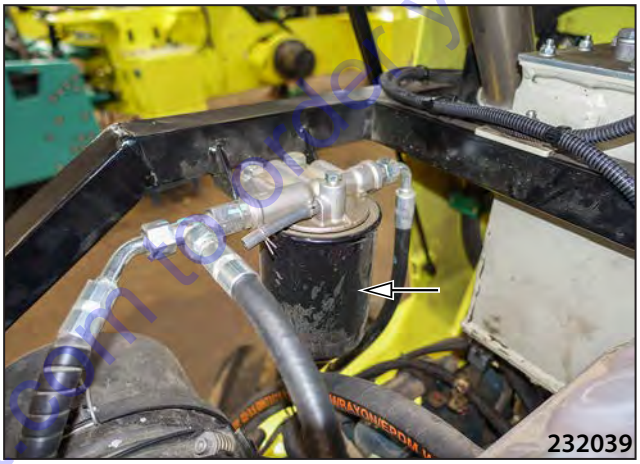
- Sit on the seat.
- Turn the key in the ignition box to the "I" position.
- Stand up from the seal.
- The "(01) 54000 SEAT CONTACT OPEN" message must be shown on the display.
- The message must disappear after you sit on the seat again.



Every 500 hours of operation, but at least once a year

The set of filters after 500 operating hours can be ordered under the order number 4-760281. For the list of all spare parts see the table in the end of this publication.

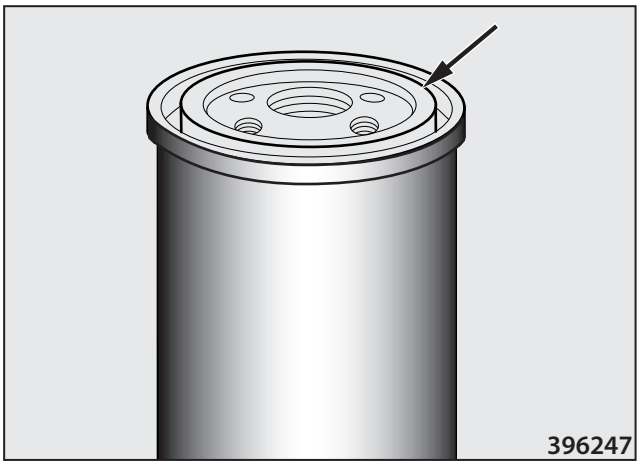
3.6.19 Fuel filter replacement



Fuel filter

- Clean the fuel filter head.
- Remove the filter.

- Lubricate the seal ring of the new filter with oil.



Fuel filter
Order number: 1579220

- Fuel pre-filter
- Disconnect the connector.
- Clean the fuel filter.
- Prepare a suitable vessel.
- Remove the filter.

Fuel filter cartridge
Order number: 1713590

- Clean the sealing surface of the filter holder.
- Apply oil on the sealing ring.
- Mount the filter.
- Connect the sensor connector.

- Turn the ignition on. The fuel pump will bleed the system automatically.

Start the engine and then check the filters for leaks.

Use original filters specified by the manufacturer.

Do not overtighten the filters to prevent damage to the thread and gasket.

During the replacement, observe fire protection measures!

Carry out the replacement in ventilated rooms where there is no fire risk.

Do not smoke and do not use open flame while working.

Catch the drained fuel.

Store used filters in a separate container and hand them over for disposal.

3.6.20 Electrical installation inspection

- Check cables, connectors, protective hoses and their attachments for damage, in particular if they are near hot surfaces and moving parts of the machine including the engine. Replace damaged parts. Use only original spare parts.

3.6.21 Replacement of the main cartridge of the air filter

- Remove the filter cap.

- Take out the main cartridge.
- Mount the new main cartridge of the air filter.
- Check that the cartridge is mounted correctly and is sealing.

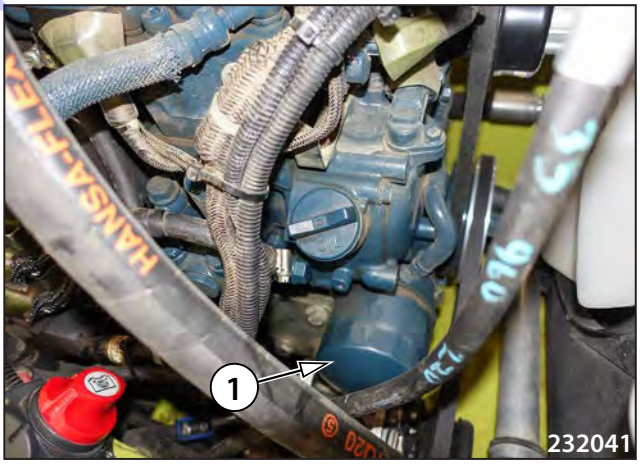
Air filter cartridge (external)
Order number: 1713581

3.6.22 Engine oil change

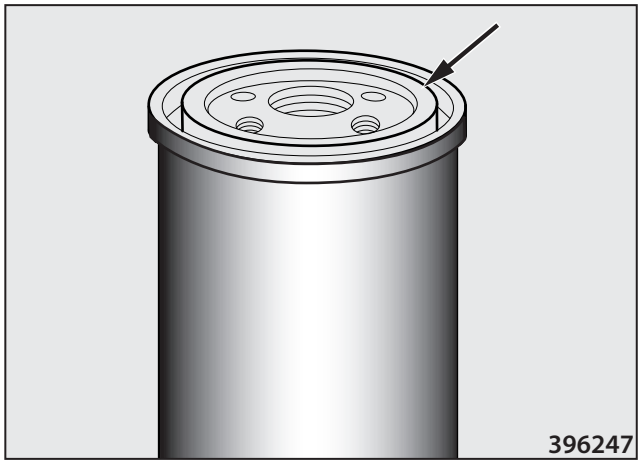
Check for the first time after 50 hours.

Drain the oil after the operation is finished immediately after the coolant has been cold down to 80°C (176°F), or warm up the engine during operation until the coolant temperature reaches 80°C (176°F).

- Turn off the engine.
- Prepare a suitable vessel with the volume of approximately 9.5 l (2.5 gal US).
- Remove the drain plug and let the oil drain out.
- Remount the plug.



- Clean the surface around the head of the oil filter.
- Dismount the filter (1).
- Clean the seating surface for the filter gasket.



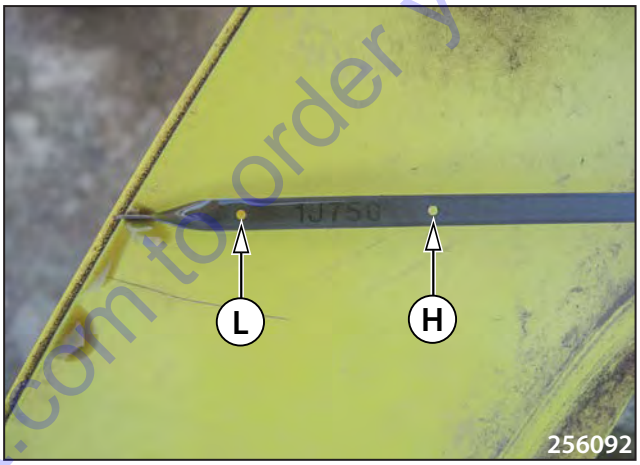
- Lubricate the gasket with oil.
- Mount the new filter.

Engine oil filter
Order number: 1504183

Do not overtighten the filter to prevent damage to the thread and gasket.

- Fill the engine through the filler neck.

- Refill the oil to the upper oil level mark (H).
- The oil volume is 9.5 l (2.5 gal US) including the oil filter volume.



Note

After refilling, start the engine and leave it running for 2–3 min. Check tightness of drain plug and filter.

Stop the engine, wait for 5 minutes until the oil runs down to the engine sump. Then check the level with the oil dipstick.

Caution! There is a risk of scalding when draining hot oil.

Follow the fire-fighting measures!

Change the oil after 6 months at the latest even if 500 hours have not been worked. Exchange oil in the interval that comes first.

Use recommended filters only; refer to the Spare Parts Catalogue. Use recommended oil – see Chap. 3.2.1.

Catch the drained oil and do not let it soak into the ground.

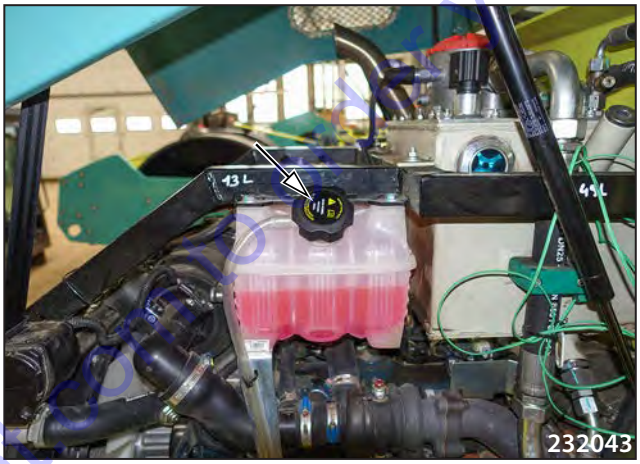
Used oil and filters are environmentally hazardous waste – hand it over for disposal.

3.6.23 Cab ventilation filter replacement

Cab

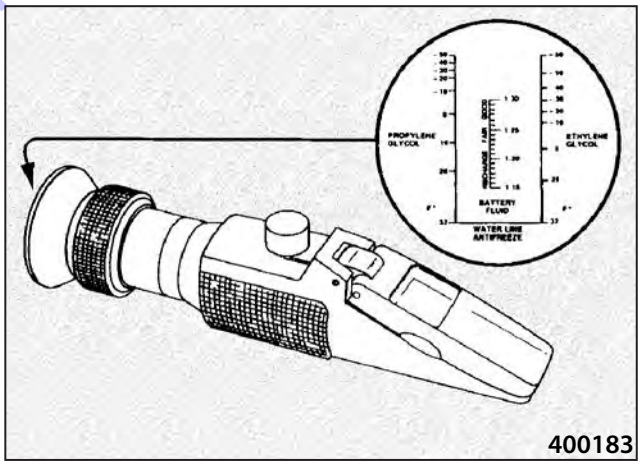
- Remove the cover.
- Dust the cartridge carefully.
- If the cartridge is damaged or cannot be cleaned properly, replace it with the new one.

3.6.24 Engine coolant check



- Check the antifreeze concentration in the coolant using a refractometer.

Always check the coolant before the winter season. If the measured concentration is not for the appropriate temperature, adjust it by adding the antifreeze into the coolant or change the coolant.



- Add anti-freeze agent according to Chapter 3.2.3.

3.6.25 Checking the wheel screws for tightening

Check for the first time after 100 hours.

- Using a torque spanner, check wheel screws for tightening.
- Tightening torque 420 Nm (310 lb ft).

Every 1000 hours of operation

The set of filters after 1000 operating hours can be ordered under the order number 4-760282. For the list of all spare parts see the table in the end of this publication.

3.6.26 Replacement of air filter cartridges

- The proper maintenance of the air filter and of the whole intake piping, the rubber parts in particular, will protect the engine against dust effects significantly and extend the cartridge lifetime and efficiency.
- The side effect of the filter clogging is the smoking exhaust pipe, higher fuel consumption, power loss and increased temperature of the engine.

- Principles of correct replacement of the filter cartridge:
- Slowly pull out the clogged cartridge as carefully as possible.
- Always clean the inner bodies of the cleaner to prevent dust from entering the interior of the inlet manifold to the engine.
- Clean the seating surfaces for the gasket in the cleaner body.
- Examine dust marks in the removed cartridge that show its leakage in the filter body.
- Push the gasket on the new cartridge to check it for flexibility.
- Check that the gasket sits correctly.

Never use damaged cartridges!

Do not use different cartridges than required!

Do not remove the cartridges only for checking purposes!

The filter must not be open longer than necessary!

Never operate the machine with the damaged filter body!

Air filter cartridge replacement:

- The air filter contains a main cartridge and a safety cartridge.
- Always replace the main and safety cartridges when the clogging indicator lamp indicates that the air filter is clogged.
- Check the air cleaner and intake piping for fastening and integrity.

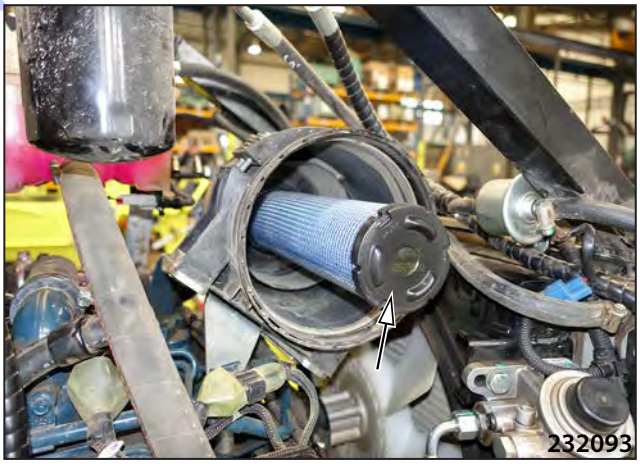
- Open the bonnet.
- Remove the filter cap.

- Take out the main cartridge.

Air filter cartridge (external)
Order number: 1713581

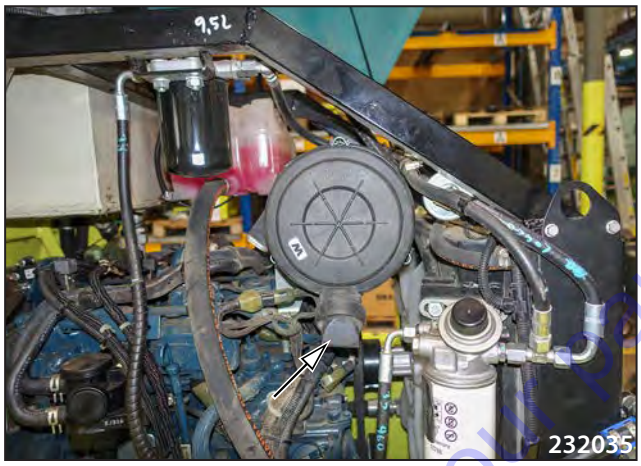
- Take out the safety cartridge.

Air filter cartridge (internal)
Order number: 1713593



- Clean the internal area of the filter and of the contact surface so that no dust is taken into the supply piping towards the engine.
- Check connections and the piping for leakage and the engine inlet opening on the bonnet for clogging (e.g. by leaves).

- Insert the new safety cartridge.
- Insert the new main cartridge. Check that both cartridges are mounted correctly and are sealing.
- Remove the dust valve, clean it and remount.



Do not clean the filter's inner space with pressure air to prevent dust from entering the engine intake manifold.

Use original cartridges, only.

Take care not to splash water into the air filter.

Replace the dust valve immediately if it is damaged!

NEVER operate the machine with the filter body or lid damaged.

3.6.27 Inspection of the shock-absorbing system

- Recheck the rubber-metal elements for condition and for rubber-to-metal bond strength.

Shock-absorbing system of the drum.

Rubber-metal element
Order number: 1669981

Rubber-metal elements of the driver's stand

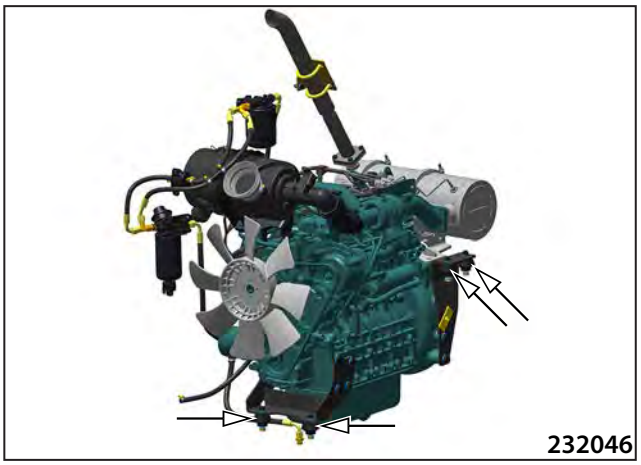
Rubber-metal element
Order number: 4–43700

Rubber-metals elements of the engine 6x

Rubber-metal element
Order number: 1515888

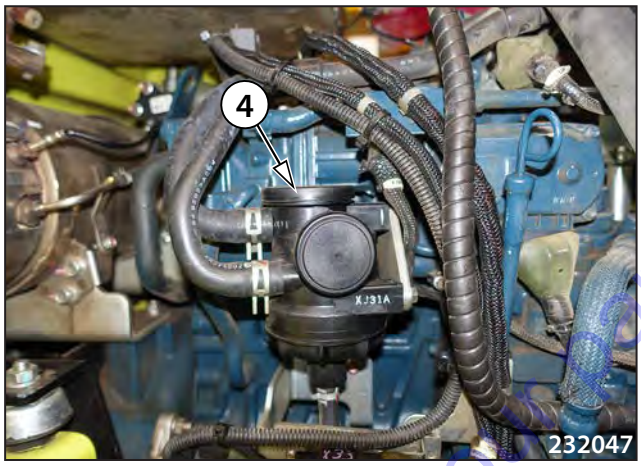
Replace if damaged.

Recheck screws and nuts for tightening.



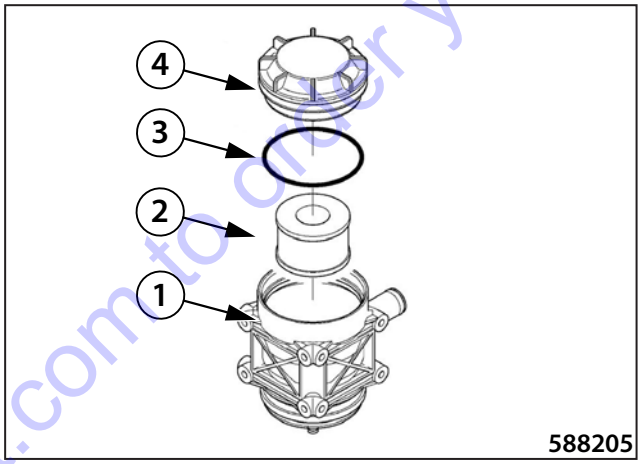
3.6.28 Oil separator cartridge replacement

- Remove the cap (4).



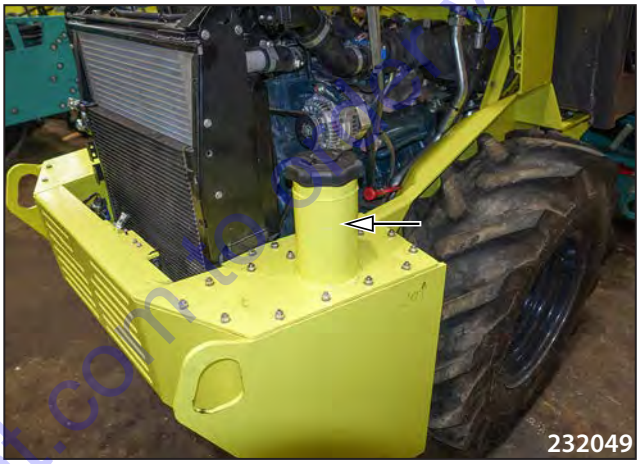
- Replace the filter cartridge (2) and the seal ring (3).
- Clean the internal area of the filter (1).
- Insert a new filter cartridge (2) and a seal ring (3).

Oil separator cartridge
Order number: 1521826



3.6.29 Fuel tank cleaning

- Over time, condensed water accumulates in the fuel tank. It should be drained once a year.
- Place a vessel under the drain plug.
- Remove the plug from the fuel tank.
- Drain the diesel fuel.
- Check and clean the interior of the tank.
- Mount the drain plug.



- Fill the tank until the first fuel enters the throat. Do not continue refuelling. You would fill the space for the thermal expansion of the fuel.

Do not smoke while working!

Catch the drained fuel.

3.6.30 Valve clearance check and adjustment

- Contact the Kubota service for adjusting the engine valves.

3.6.31 Battery inspection

- Stop the engine and use the disconnector to disconnect the wiring.
- Clean the surface of batteries.
- Check the condition of the terminals and clamps. Clean the terminals and clamps. Apply a thin layer of grease on the terminals.

MAINTENANCE-FREE BATTERY

- In case of a maintenance-free battery version (the battery has no accessible plugs), check only the rest voltage on the terminals. The batteries cannot be refilled. If the rest voltage is 12.6 V and more, the battery is fully charged. If the rest voltage is below 12.4 V, the battery should be charged immediately. The mounting is recommended 24 hours after the charging.

Note

The rest voltage is the voltage measured at the terminals of the battery, which was at rest for at least 12 hours – it was not either charged or discharged.

Keep the battery dry and clean.

Do not disconnect the battery when the engine is running.

When working with the battery always follow instructions of the battery manufacturer!

Disconnect the battery for repair or while handling wires and electrical components in the wiring circuit to prevent short-circuit.

When disconnecting the battery, first disconnect the cable of the (–) pole. When connecting the battery, first connect the (+) pole.

Use rubber gloves and eye protection devices when handling the battery.

Use suitable clothing to protect your skin against contact with the electrolyte.

After eye contact with the battery electrolyte, immediately flush the affected eye thoroughly with running water for several minutes. Then seek medical advice.

After ingestion of the electrolyte drink large quantities of milk, water or suspension of magnesium hydroxide in water. Then seek medical advice.

In case of skin contact with electrolyte, remove your clothing and shoes, wash the affected skin immediately with soap and water or with solution of water and soda. Then seek medical advice.

Do not eat, drink and smoke while working. After completing the work, wash your hands and face thoroughly with water and soap!

Do not check that a wire is live by touching the machine frame.

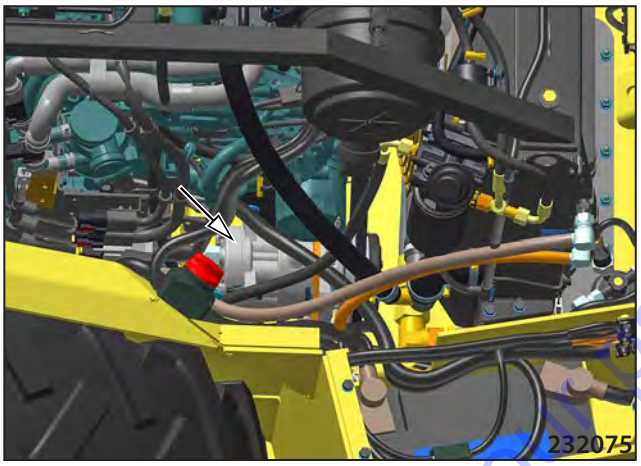
Never make direct conductive connection between both poles of the battery to avoid a short circuit and a risk of explosion of the battery.

Do not turn the battery upside down; the electrolyte may pour down from the degassing plugs.

If the electrolyte is spilled, wash the affected area with water and neutralize with lime.

Hand over the old inoperative battery for disposal.

3.6.32 Inspection of the air-conditioning unit compressor mounting



- Check the compressor and the compressor bracket for strength of attachment. Check that the belt does not slip. Retighten the screws if needed.
- Check the belt visually for damage. Cracks perpendicular to the belt width are not considered to be a fault. If longitudinal cracks appear on the belt, or the belt edges are ragged, or some material parts are pulled off, then the belt must be replaced.

Every 2000 hours of operation

The set of filters after 2000 operating hours can be ordered under the order number 4-760283. For the list of all spare parts see the table in the end of this publication.

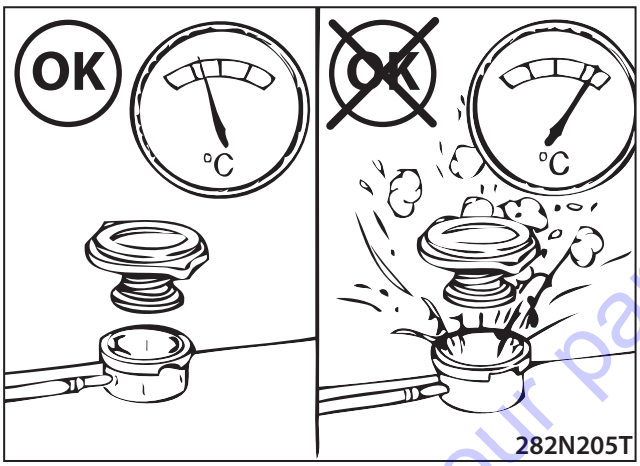
3.6.33 Engine coolant change

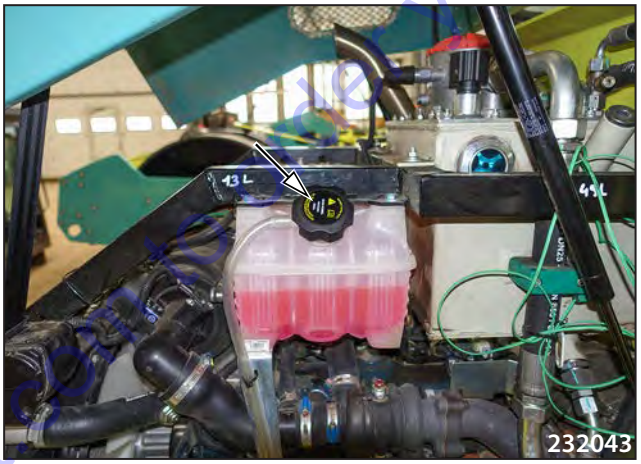
Draining the cooling circuit:

Before draining the coolant from the cooling circuit let the engine run for 5 minutes so that the liquid temperature can reach 50 °C (122 °F).

Do not open the pressure plug before the coolant temperature drops below 50°C (122°F). Beware of gushing of the coolant and scalding when opening the pressure plug.

- Open the cooling system by removing the overpressure plug on the expansion tank.

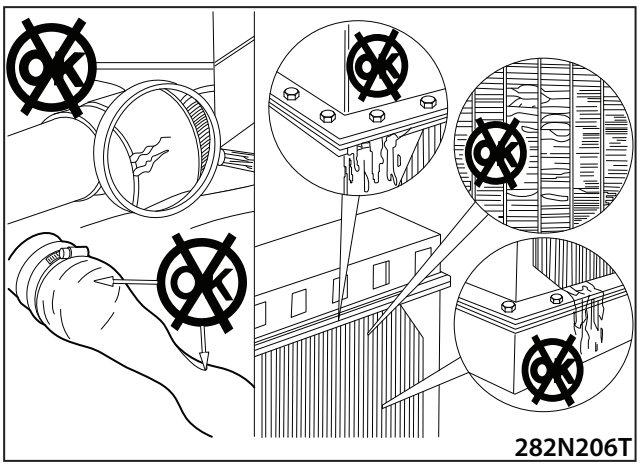




- Stop the engine.
- Remove the drain plug.
- Let the fluid drain into the prepared pans.
- The drained volume is about 13 l (3.4 gal US).

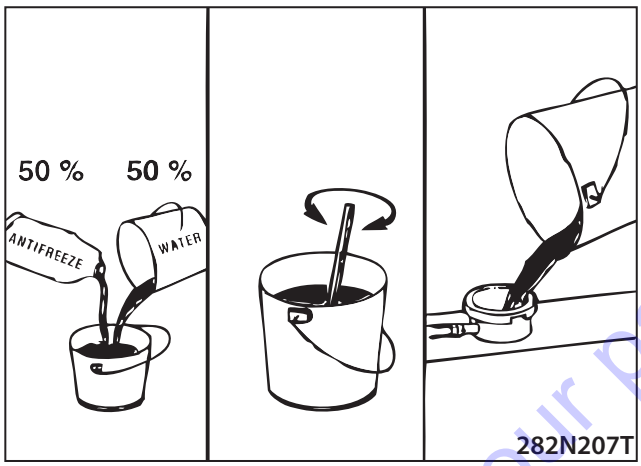
Note

Check the cooling system for defective hoses and missing hose clips. Check the cooler for damage and leaks and the cooling fins for clogging. Clean and repair it, if necessary.



Fill the cooling circuit

- Mount the drain plug and fill the cooling system with the new coolant with the minimum ratio of 50 % water + 50 % antifreeze agent.



Wear gloves to protect your hands!

Protect your eyes with safety glasses or face shield!

Fill with the coolant according to Chapter 3.2.3!

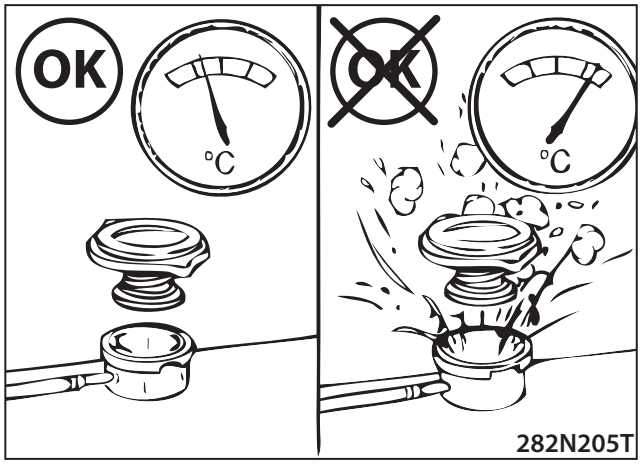
When changing coolant, follow instructions of the anti-freeze manufacturer!

- Refill the coolant to the maximum level. After filling, wait for about 2 – 3 minutes until the air escapes and the circuit is filled. The appropriate filling rate is 11 l/min [3 gal US/min]. Close the expansion tank with the overpressure plug.

Start the engine and wait until the temperature reaches 82°C (180°F). While waiting, check the coolant for leakage and the level on the indicator.

- Stop the engine.
- Check the level on the water gauge. If the level is low, refill the coolant to maximum.

Do not open the pressure plug before the coolant temperature drops below 50°C (122°F). Beware of gushing of the coolant and scalding when opening the pressure plug.



Catch the used liquid and hand it over for safe disposal in accordance with regulations!

3.6.34 Cleaning and checking the air conditioning system

- Replace the filter dehydrator.
- Have the individual components and wiring checked and the air-conditioning system cleaned (moulds and bacteria removed) by an authorized company.
- When working in a very dusty environment, the check must be carried out in shorter intervals.

3.6.35 Hydraulic oil change and filter replacement

Drain the oil when cooled down below 50°C (122°F).

Follow the fire-fighting measures!

Change the oil before the season starts, or after a long shut-down of the machine.

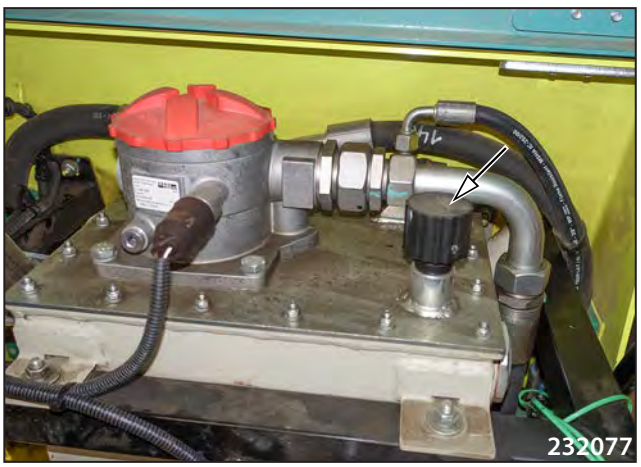
When disconnecting the hydraulic circuits, blind all of holes with plugs.

Catch the drained oil and do not let it soak into the ground.

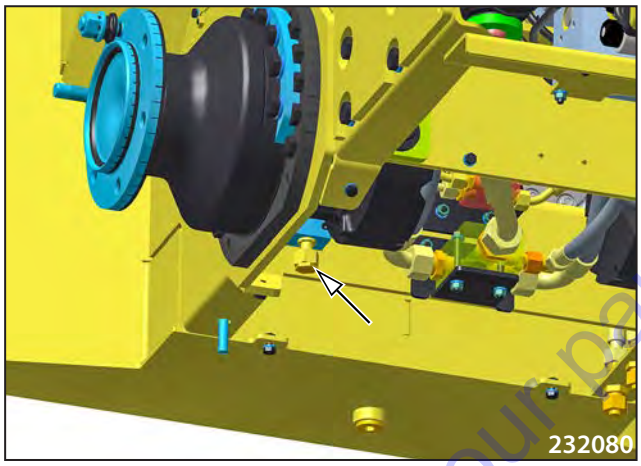
Used oil and filter cartridges are environmentally dangerous waste – hand them over for disposal.

Hydraulic oil draining

- Drain hydraulic oil only at operating temperature.
- Residues in the tank are drained with the oil.
- Place a vessel under the hydraulic oil drain plug.
- The drained volume is about 45 l (11.9 gal US).
- Take out the ventilation filter.

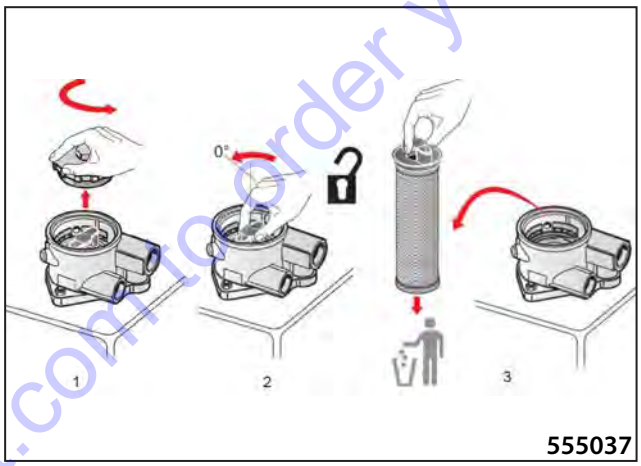


- Remove the drain plug.
- Let the oil flow out into the vessel.

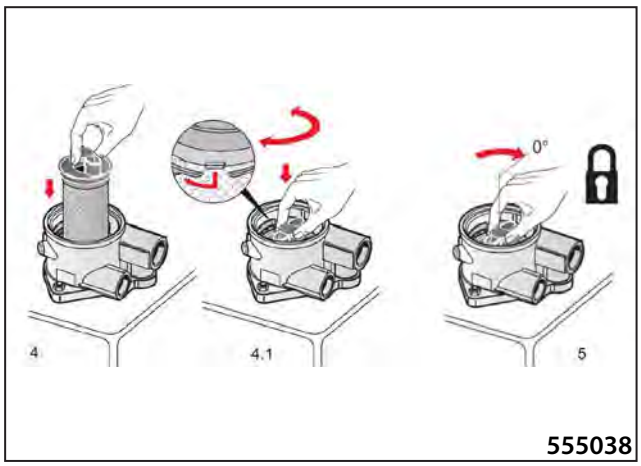


Hydraulic oil filter replacement

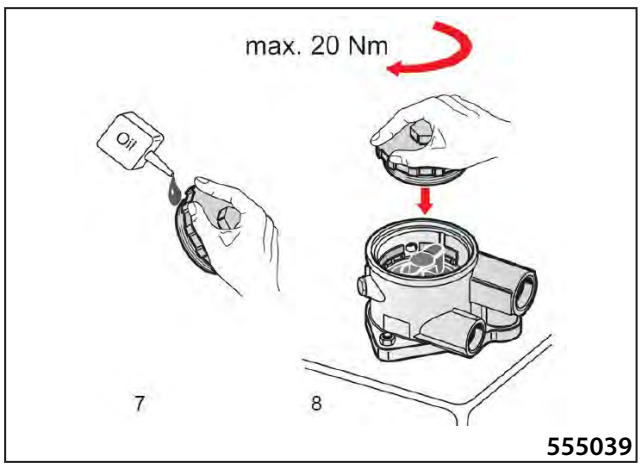
- Take off the filter cap.
- Unlock the filter cartridge.
- Pull out the filter cartridge from the filter housing.
- Dispose of the filter cartridge environmentally.



- Insert the new filter cartridge in the correct place. Keep the position of the safety cam.
- Turn the filter cartridge clockwise up to the stop.



- Oil the sealing ring on the filter cap.
- Mount the filter cap.
- Tighten the cap. The maximum tightening torque is 20 Nm.

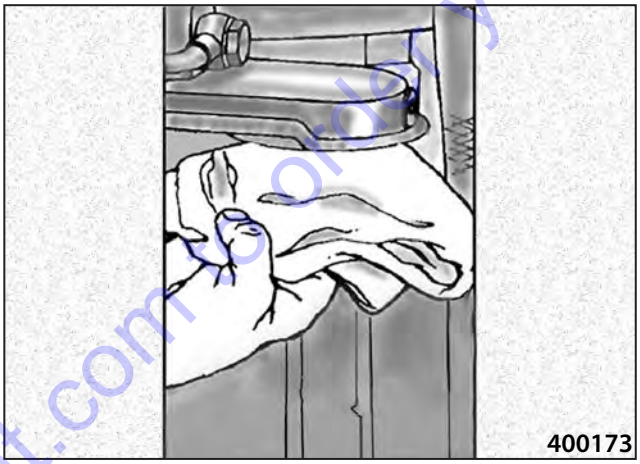


Set of hydraulic oil filters
Order number: 1713717

Pressure filter cartridge replacement

- Remove the filter.

- Clean the seating surface underneath.



- Check the sealing ring for condition.
- Lubricate the ring with clean oil.
- Mount the new filter.

Hydraulic oil filter
Order number: 4–5358520135

Always change the oil and replace the filter when inner parts of the units (hydraulic motors, hydraulic generators) were destroyed, or after a major repair of the hydraulic system. Clean and rinse out the hydraulic tank before mounting the new unit and refill with oil. When the engine is running at a higher speed, test functions of the machine. Check for leakage.

Use only original filter cartridges according to the spare parts catalogue.

Filling the hydraulic circuit:

Fill using the hydraulic unit.

You can order the hydraulic unit from the machine manufacturer.

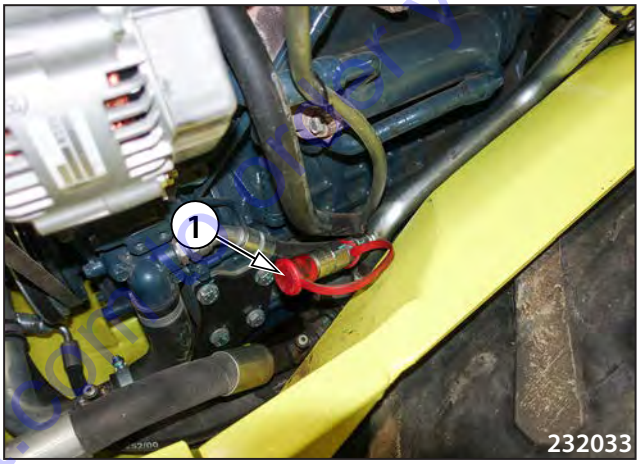
Hydraulic unit 230 V
Order number: 1251998

Hydraulic unit 110 V
Order number: 1255297

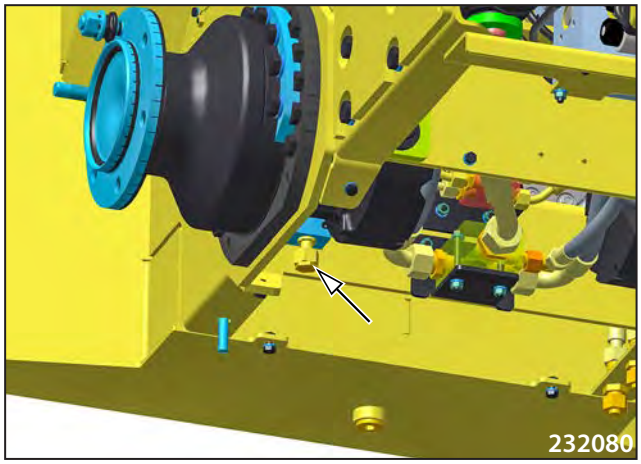
Note

The hydraulic unit 230 V is intended for operation in 230 Volt networks (Europe), the hydraulic unit 110 V is intended for operation in 110 Volt networks (North America).

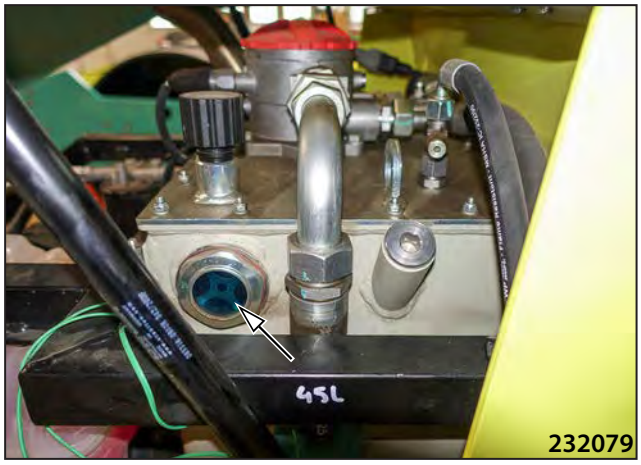
- Remove the cap of the filling end piece and put the quick-coupler of the filling device onto the quick-coupler (1). Fill the hydraulic circuit until the clean oil starts flowing out from the tank. Catch the oil in a clean pan.



- Let drain about 15 l (4 gal US) and mount the plug.

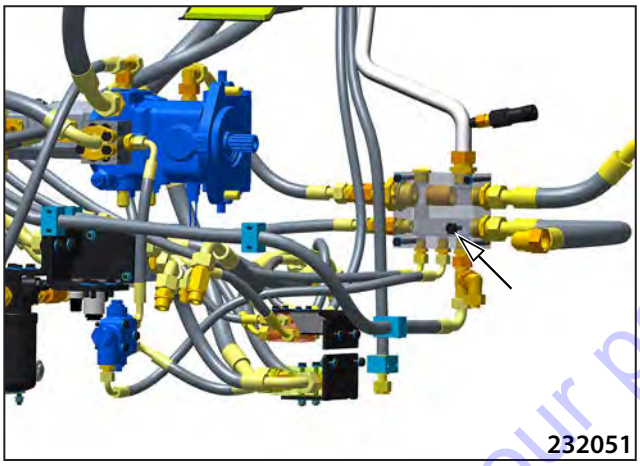


- Fill up the tank with the oil to the maximum level and disconnect the filling device.



Checking the oil thermometer sensor:

- Remove the sensor and clean the contact.
- Immerse the sensor in warm oil of a known temperature and read the temperature on the hydraulic oil thermometer. If the sensor works incorrectly, replace it with the new one.



Fill the hydraulic circuit through the filler neck only in emergency!

When filled in this way, the next change interval must be reduced to half, i.e. 1,000 hours or 1 year.

Maintain cleanliness at work. Avoid contaminating the system with materials that may damage important units! Do not open the hydraulic tank uselessly!

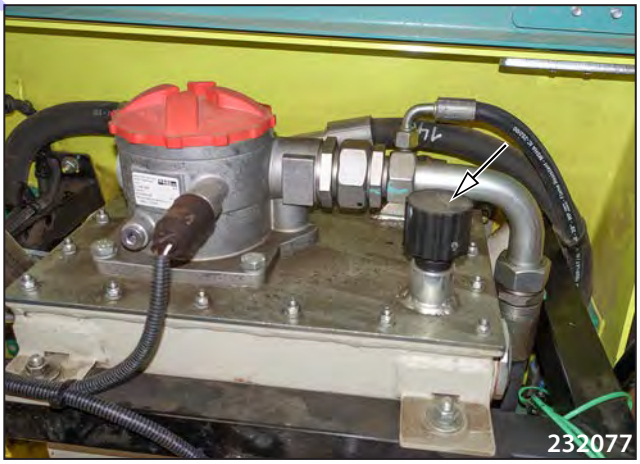
For cleaning the tank, use agents, which do not release fibres, and do not use chemical detergents. Fill with the oil according to Chapter 3.2.4.

- Mount a new ventilation filter.

Ventilation filter
Order number: 1280287

Note:

When the tank is refilled through the neck, a large portion of the old dirty oil remains in the circuit and the life cycle of the hydraulic units will be shorter.



Every 3000 hours of operation

3.6.36 DPF cleaning

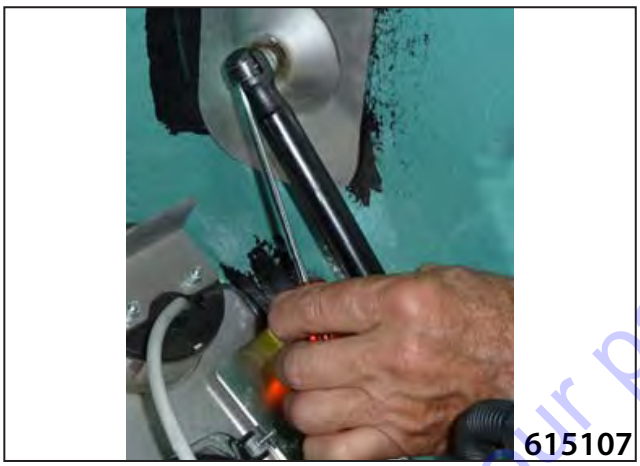
- Contact the Kubota service for cleaning the DPF.

Maintenance as required

3.6.37 Gas strut replacement

The gas struts are maintenance-free. They do not require any maintenance, such as e.g. lubrication. They are designed according to given requirements and work trouble-free for years. As soon as the struts stop performing their function, replace them with new ones.

Gas strut
Order number: 1712933


615107


615108


615109

Before beginning to replace the gas strut, secure the engine bonnet against free fall.

There is a risk of injury!

Removal

- Use a screwdriver to pull out the clamps and release the struts.
- Pull out the gas strut away from the ball stud.

Installation

- Push the new gas strut on the ball stud.
- The clamp then needs to be safely seated.

Do not install the gas strut if it is damaged due to mechanical handling.

Use genuine parts only!

If you do not need the gas struts any more, dispose of them environmentally.

3.6.38 Scraper adjustment

- Adjust the scrapers according to Chap.3.6.22 if required.

3.6.39 Cleaning the machine

- Clean the machine from big impurities after completing the work.
- Clean the whole machine completely on regular basis, at least once a week. When working on cohesive soils, cement and lime stabilizations, clean the machine completely every day.

Before cleaning with pressure water or steam, cover all holes, into which the cleaning agent could penetrate (e.g. intake opening of the engine). After completing the cleaning, remove the end caps.

Do not direct the running water or steam at the electric parts or insulation materials. Always cover such materials (interior of the alternator, etc.).

Disconnect the battery disconnector.

Clean with the engine stopped.

Do not use aggressive or easily ignitable cleaning agents (e.g. petrol and/or easily flammable substances).

Follow environmental standards and regulations when cleaning the machine!

Clean the machine in a workplace equipped with a catching system of cleaning agents to avoid contamination of the soil and water resources!

Do not use forbidden cleaning agents!

3.6.40 Fuel system bleeding

- Bleed the fuel system before the first start in the following cases:
  - When fuel filters have not been filled with fuel – when replacing the filters
  - when replacing the fuel pump
  - when repairing the fuel system
  - during long term shutdown of the machine
  - when the tank is empty.

Low-pressure piping and filter bleeding:

- Prepare a suitable vessel.
- Set the key to position "I".
- Release the bleed screw on the fuel filter.
- Bleed the system and tighten the screw.

Do not bleed when the engine is hot, the leaking fuel can cause a fire.

Follow safety regulations!

Do not smoke and do not use an open flame while working on the fuel system!

Stop the fuel soaking into the ground!

3.6.41 DPF (diesel particulate filter) clogging regeneration

- Perform the DPF (diesel particulate filter) clogging regeneration according to Chapter « 2.7.10 Principles of use of the machine with a DPF (Diesel Particulate Filter) ».

3.6.42 Charging of the battery

- Only use chargers with an appropriate rated voltage. Check that the charger is strong enough to charge the battery not too strong to charge with excessive current.
- Read and observe the operating instructions of the charger manufacturer.

- Check that the ventilation holes in the battery cover are not dirty or clogged and that gases can escape freely.
- Connect the positive terminal (+) of the battery to the positive terminal of the charger.
- Connect the negative terminal (–) of the battery to the negative terminal of the charger.
- Turn on the charger only after connecting the battery.
- Charge the battery with current corresponding to one tenth of the battery capacity.
- After charging, first turn off the charger and then disconnect the cables from the battery.

- The battery is fully charged, if:
  - electric current and voltage remain constant in the case of voltage-controlled chargers,
  - the charging voltage in the case of current-controlled chargers does not increase within two hours, the automatic charger turns off or switches to maintaining charge.

Use rubber gloves and eye protection devices when handling the battery.

Use suitable clothing to protect your skin against contact with the electrolyte.

After eye contact with the battery electrolyte, immediately flush the affected eye thoroughly with running water for several minutes. Then seek medical advice.

After ingestion of the electrolyte drink large quantities of milk, water or suspension of magnesium hydroxide in water.

In case of skin contact with electrolyte, remove your clothing and shoes, wash the affected skin immediately with soap and water or with solution of water and soda. Then seek medical advice.

Do not eat, drink and smoke while working!

After completing the work, wash your hands and face thoroughly with water and soap!

Do not check that a wire is live by touching the machine frame.

When working with the battery always follow instructions of the battery manufacturer!

Never charge a frozen battery or battery with a temperature above 45°C.

Stop charging if the battery is hot or leaking acid.

Check that the ventilation holes in the battery cover are not dirty or clogged and that gases can escape freely. If the ventilation holes are clogged, gases can accumulate inside the battery and irreversibly damage it.

Never make direct conductive connection between both poles of the battery to avoid a short circuit and a risk of explosion of the battery.

Do not turn the battery upside down, the electrolyte can flow out.

If the electrolyte is spilled, wash the affected area with water and neutralize with lime.

Hand over the old inoperative battery for disposal.

3.6.43 Checking the screw connections for tightening

- Check regularly the screw connections for loosening. Use torque spanners for tightening.

	Tightening torque			
	For screws 8.8 (8G)		For screws 10.9 (10K)	
Thread	Nm	lb ft	Nm	lb ft
M6	10	7.4	14	10.3
M8	24	25.0	34	25.0
M8×1	19	14.0	27	19.9
M10	48	35.4	67	49.4
M10×1.25	38	28.0	54	39.8
M12	83	61.2	117	86.2
M12×1.25	66	48.7	94	69.3
M14	132	97.3	185	136.4
M14×1.5	106	78.2	148	109.1
M16	200	147.5	285	210.2
M16×1.5	160	118.0	228	168.1
M18	275	202.8	390	287.6

	Tightening torque			
	For screws 8.8 (8G)		For screws 10.9 (10K)	
Thread	Nm	lb ft	Nm	lb ft
M18×1.5	220	162.2	312	230.1
M20	390	287.6	550	405.6
M20×1.5	312	230.1	440	324.5
M22	530	390.9	745	549.4
M22×1.5	425	313.4	590	435.1
M24	675	497.8	950	700.6
M24×2	540	398.2	760	560.5
M27	995	733.8	1400	1032.5
M27×2	795	586.3	1120	826.0
M30	1350	995.7	1900	1401.3
M30×2	1080	796.5	1520	1121.0

Values given in the table are tightening torques for dry threads (friction coefficient = 0.14). The values are not applicable to lubricated threads.

Table of tightening torques of cap nuts with sealing O-rings – hoses

			Tightening torques of compression nuts with an O ring – hoses					
			Nm			lb ft		
Spanner size	Thread	Pipe	Nominal	Min	Max	Nominal	Min	Max
14	12×1.5	6	20	15	25	15	11	18
17	14×1.5	8	38	30	45	28	22	33
19	16×1.5	8	45	38	52	33	28	38
		10						
22	18×1.5	10	51	43	58	38	32	43
		12						
24	20×1.5	12	58	50	65	43	37	48
27	22×1.5	14	74	60	88	55	44	65
		15						
30	24×1.5	16	74	60	88	55	44	65
32	26×1.5	18	105	85	125	77	63	92
36	30×2	20	135	115	155	100	85	114
		22						
41	36×2	25	166	140	192	122	103	142
46		28						
50	42×2	30	240	210	270	177	155	199
50	45×2	35	290	255	325	214	188	240
	52×2	38	330	280	380	243	207	280
		42						

Tightening torques for necks with sealing edge or flat sealing

	Tightening torques of necks	
G-M	**Nm**	**lb ft**
G 1/8	25	18
G 1/4	40	30
G 3/8	95	70
G 1/2	130	96
G 3/4	250	184
G 1	400	295
G 11/4	600	443
G 11/2	800	590
10 x 1	25	18
12 x 1.5	30	22
14 x 1.5	50	37
16 x 1.5	60	44
18 x 1.5	60	44
20 x 1.5	140	103
22 x 1.5	140	103
26 x 1.5	220	162
27 x 1.5	250	184
33 x 1.5	400	295
42 x 1.5	600	443
48 x 1.5	800	590

Tightening torques for plugs with flat sealing

	Tightening torques of plugs	
G-M	**Nm**	**lb ft**
G 1/8	15	11
G 1/4	33	24
G 3/8	70	52
G 1/2	90	66
G 3/4	150	111
G 1	220	162
G 11/4	600	443
G 11/2	800	590
10 x 1	13	10
12 x 1.5	30	22
14 x 1.5	40	30
16 x 1.5	60	44
18 x 1.5	70	52
20 x 1.5	90	66
22 x 1.5	100	74
26 x 1.5	120	89
27 x 1.5	150	111
33 x 1.5	250	184
42 x 1.5	400	295
48 x 1.5	500	369

3.7 Defects

The defects are usually caused by incorrect operation of the machine. Therefore in case of any defect read carefully instructions given in the operation and maintenance manual for your machine and engine. If you cannot identify a cause of the defect, contact the service department of the authorised dealer or the manufacturer.

The troubleshooting in hydraulic and electric systems requires knowledge of hydraulic and electrical systems; therefore contact the service department of an authorised dealer or the manufacturer for troubleshooting.

Error on the display	Description
50000	Input board circuit error - supply check needed
50001	Fatal input board circuit error
50002	Input pin error - check ECU Timer-Inputs and EMI
50003	PWM output error - check ECU hardware and EMI
50004	CPU core error - check source code and EMI
50005	Memory error
50006	Error during watchdog startup - check watchdog timing constraints
50007	Safety switch error - check wiring and external relays
50008	Application code called safe state
50009	Fatal error caused safe state - replace ECU
50010	BSP error caused safe state - replace ECU
50012	Application execution time reached task time limit
50013	Battery voltage fell below lower threshold
50014	Battery voltage exceeds upper threshold
50015	Temperature at lower threshold
50016	Temperature at upper threshold
50017	Sensor Supply S1 Low
50018	Sensor Supply S1 High
50023	Primary fault page incorrect - second fault page loaded correctly
50024	List load defect
50025	List store defect
50026	DM_LIST_OVERFLOW
50027	CAN Bus off
50028	CAN warning
50029	HW-Buffer overflow send
50030	HW-Buffer overflow send
50031	HW-Buffer overflow send
50032	HW-Buffer overflow send
50033	HW-Buffer overflow send
50034	HW-Buffer overflow send
50035	HW-Buffer overflow receive
50036	HW-Buffer overflow receive
50037	HW-Buffer overflow receive
50038	HW-Buffer overflow receive
50039	HW-Buffer overflow receive
50040	HW-Buffer overflow receive
50041	HW-Buffer overflow receive
50042	HW-Buffer overflow receive
50043	CAN Bus off
50044	CAN warning
50045	HW-Buffer overflow send

The texts are given only in the original language version or as a translation of the original into English.

Error on the display	Description
50046	HW-Buffer overflow send
50047	HW-Buffer overflow send
50048	HW-Buffer overflow send
50049	HW-Buffer overflow send
50050	HW-Buffer overflow send
50051	HW-Buffer overflow receive
50052	HW-Buffer overflow receive
50053	HW-Buffer overflow receive
50054	HW-Buffer overflow receive
50055	HW-Buffer overflow receive
50056	HW-Buffer overflow receive
50057	HW-Buffer overflow receive
50058	HW-Buffer overflow receive
50164	CAN Snd Overflow
50172	DMx protocol error
50180	DB Nv Load Error
50181	DB Nv Store Error
50182	DB Nv Load Error
50183	DB Nv Store Error
50186	DB Nv Load Error
50187	DB Nv Store Error
50190	DB Nv Load Error
50191	DB Nv Store Error
50196	DB Nv Load Error
50197	DB Nv Store Error
50198	DB Nv Load Error
50199	DB Nv Store Error
50200	DB Nv Load Error
50201	DB Nv Store Error
50202	Flashset read error
51016	VibrValve - Short to Power (Voltage High) - HS OpenLoad / Short To Power external
51068	BladeUp - Short to Power (Voltage High) - Output pin connected to power
51069	BladeDown - Short to Power (Voltage High) - Output pin connected to power
51070	BladeFloat - Short to Power (Voltage High) - Output pin connected to power
51115	DrivePumpNeutralSwitch - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51137	ParkingBrakeValve - Short to Power (Voltage High) - HS OpenLoad / Short To Power external
51138	ParkingBrakeReturn - Short to Power (Voltage High) - HS OpenLoad / Short To Power external
51139	ParkingBrakePressure - Signal Very High Critical - Input signal short to power
51140	DriveLeverParkingBrakeSwitch - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51197	SteerPressSwitch - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51200	HWPin_01 - Short to Power (Voltage High) - Short to Power / Openload - Eng Start Command

The texts are given only in the original language version or as a translation of the original into English.

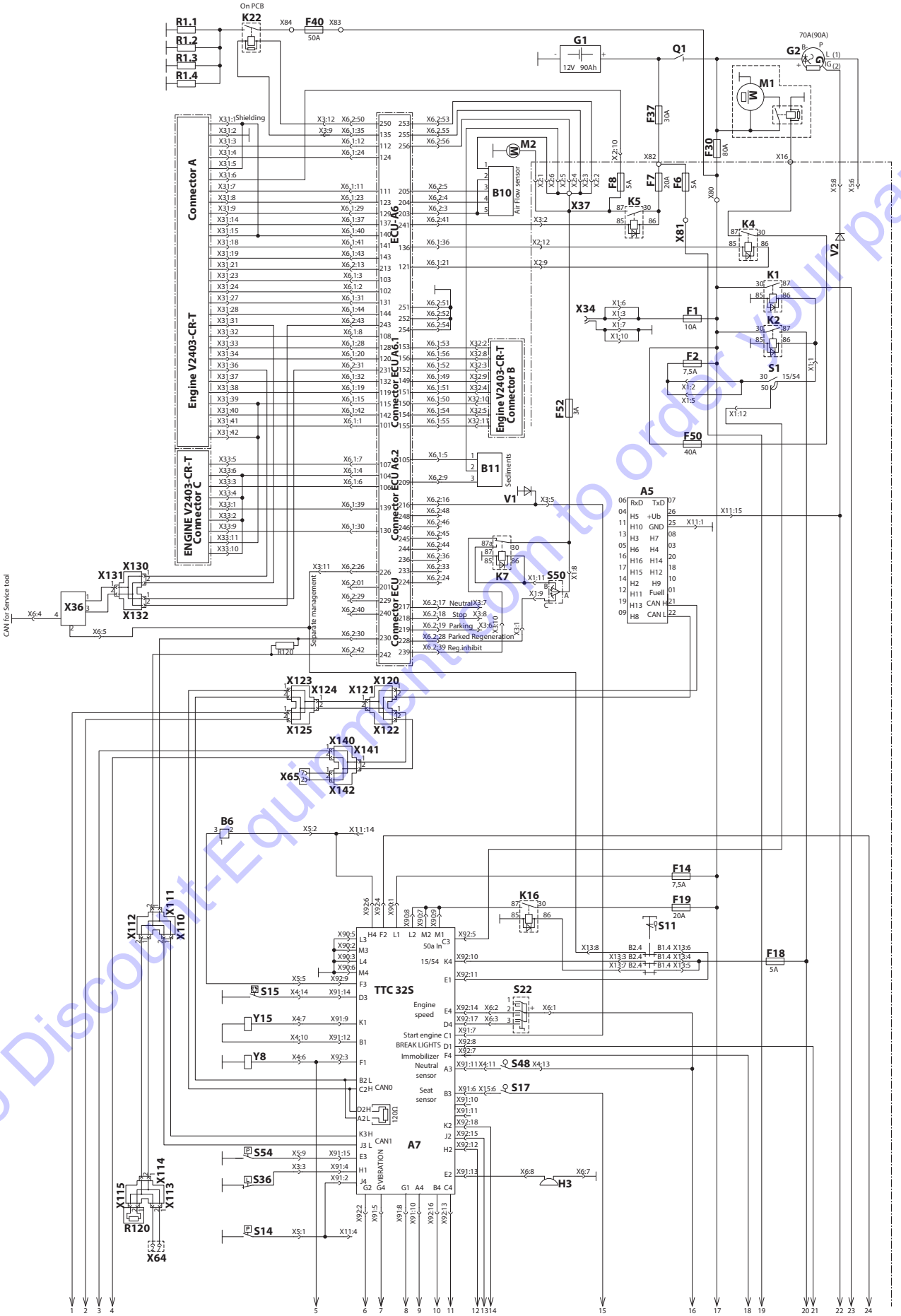
Error on the display	Description
51201	HWPin_01 - Short to Power (Voltage High) - Short to Power / Openload - Eng ECU On
51216	GearboxHeater - Short to Power (Voltage High) - Output pin connected to power
51218	FuelTankLevel - Signal Very High Critical - Input signal short to power
51240	EngSpeedSetpointAReq - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51241	EngSpeedSetpointBReq - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51244	EngStartReq - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51300	SeatSwitch - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51311	TelematicEngineRun - Short to Power (Voltage High) - Output pin connected to power
51312	Immobiliser - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51318	SeatSwitchHorn - Short to Power (Voltage High) - Output pin connected to power
51321	CoolantTankLevel - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51389	HWPin_01 - Short to Power (Voltage High) - Short to Power / Openload - Brake Lights
51400	HydrOilOverTemp - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
51405	HydrOilFilter - Short to Ground (Voltage Low) - An input signal is too low / Short circuit to ground
52001	SF 1.1 Safe Engine Start
52002	SF 2.2 Operator Presence Detection Eng Stop
52003	SF 3.2 Operator Presence Detection Drive Ramp to Stop
52044	SF 2.6 Parking Brake Diagnostics
52045	SF 2.4 Parking Brake Monitoring
52068	SF 2.11 Steer Pressure Monitoring
52119	Error condition exists according to SPN - Safe App / Function init failed
52120	Error condition exists according to SPN - App / Module init failed
52140	Error condition exists according to SPN - Saf App / Function param init failed
52141	Error condition exists according to SPN - App / Module param init failed
52324	Engine not detected
52325	Engine CAN communication lost
52326	Engine oil pressure low
52327	Unknown engine speed setpoint
52328	Engine coolant overheated
52329	Engine speed mismatch
52388	Hydraulic oil overtemperature
52389	Coolant level low
54000	Seat Switch Open
54001	Drive Lever out of ParkingBrake
54002	Telematics Immobiliser Active

3.8 Annexes

3.8.1 Wiring diagram

Legend:

A1 Direction indicator flasher
A4 Travel control lever
A5 Bauser display
A6 Control unit – ECU
A7 TTC32
A10 Radio
A11 Heating – air-conditioning
A12 Front wiper intermittent
A18 Compaction module
A20 Time relay of heating the crankshaft bleeding
A23 ACE Econ display
B1 Vibrator frequency sensor
B6 Fuel level indicator
B10 Air quantity sensor
B11 Sedimentator
C1 Noise suppressing filter
E1, 2 Front parking lights
E3, 4 Tail lights
E5 License plate light
E6, 7 Front headlamps
E8, 9 Rear lights
E14 Lighting in the cab
E15 Beacon
E16, 17 Left direction indicators
E18, 19 Right direction indicators
E20, 21 Brake lights
E22, 23 Road lighting
E25 Green beacon
F1-40 Fuses
G1 Battery 90 Ah
G2 Alternator
H1 Horn
H2 Back signal horn
H3, 4 Loudspeakers
K1 – 28 Relays
K1, -2 Power relay
K3 Locking relay – parking brake, seat switch
K4 Locking relay Kubota – S1/50, parking brake, neutral (only S1/50)
K5 Relay Kubota – ECU, fuel pump power supply
K6 Relay Kubota – neutral position
K7 Relay – neutral position (from the pump sensor)
K8 Relay – reversing horn
K9 Parking brake relay
K10 Air-conditioning coupling relay
K11 Relay Kubota – engine stop
K12 Vibration block relay
K13 Vibration switch relay
K14 Vibration block relay – neutral position
K17 Engine stop relay except for the neutral position
K18 Relay – floating position
K19 Parking brake relay – power supply
K20 Telematics relay
K22 Glowing contactor
K23 Blade – up
K24 Blade – down
K25 Blade – floating position
M1 Starter
M2 Fuel pump
M6 Front windscreen wiper
M7 Rear windscreen wiper
M8 Windscreen washer
M9 Rear washer
Q1 Disconnecter
R1 Glowing
S1 Ignition box
S4 Road lighting switch
S5 Working lighting switch
S7 Beacon switch
S8 Horn switch
S9 Warning lights switch
S10 Direction indicator switch
S11 Emergency brake switch
S14 Pressure parking brake switch
S15 Hydraulic oil temperature switch
S16 Hydraulic oil filter
S17 Seat switch
S22 Engine speed switch
S31 Vibration switch
S32 Blade switch – up
S33 Blade switch – down
S34 Blade switch – floating position
S40 Heater fan switch
S41 Front wiper switch
S42 Rear wiper switch
S43 Washer switch
S46 Air-conditioning switch
S47 Air-conditioning overpressure safety element
S48 Neutral position switch
S50 Regeneration switch
S51 Seat belt switch
S52 Service tools
S53 Service tools
S54 Steering sensor
T1 Antenna
V1-12 Diodes
X1 – 99 Connection
X110 – 133 CAN connectors
X34 Mounting sockets 12 V
X36 Engine diagnostic socket
X64 Diagnostic socket CAN2
X66 Diagnostic socket CAN3
X68 Display diagnostic socket
Y8 Vibration
Y15 Parking brake
Y16 Blade – up
Y17 Blade – down
Y18.1 Blade – floating position
Y18.2 Blade – floating position
Y23 Coupling of air-conditioning compressor
Y24 Water valve



3.8 Appendices

3.8.1 Wiring diagram

Legend:

A1	Direction indicator flasher
A4	Travel control lever
A5	Bauser display
A6	Control unit – ECU
A7	TTC32
A10	Radio
A11	Heating – air-conditioning
A12	Front wiper intermittent
A18	Compaction module
A20	Time relay of heating the crankshaft bleeding
A23	ACE Econ display
B1	Vibrator frequency sensor
B6	Fuel level indicator
B10	Air quantity sensor
B11	Sedimentator
C1	Noise suppressing filter
E1, 2	Front parking lights
E3, 4	Tail lights
E5	License plate light
E6, 7	Front headlamps
E8, 9	Rear lights
E14	Lighting in the cab
E15	Beacon
E16, 17	Left direction indicators
E18, 19	Right direction indicators
E20, 21	Brake lights
E22, 23	Road lighting
E25	Green beacon
F1-40	Fuses
G1	Battery 90 Ah
G2	Alternator
H1	Horn
H2	Back signal horn
H3, 4	Loudspeakers
K1 – 28	Relays
K1, -2	Power relay
K3	Locking relay – parking brake, seat switch
K4	Locking relay Kubota – S1/50, parking brake, neutral (only S1/50)
K5	Relay Kubota – ECU, fuel pump power supply
K6	Relay Kubota – neutral position
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K8	Relay – reversing horn
K9	Parking brake relay
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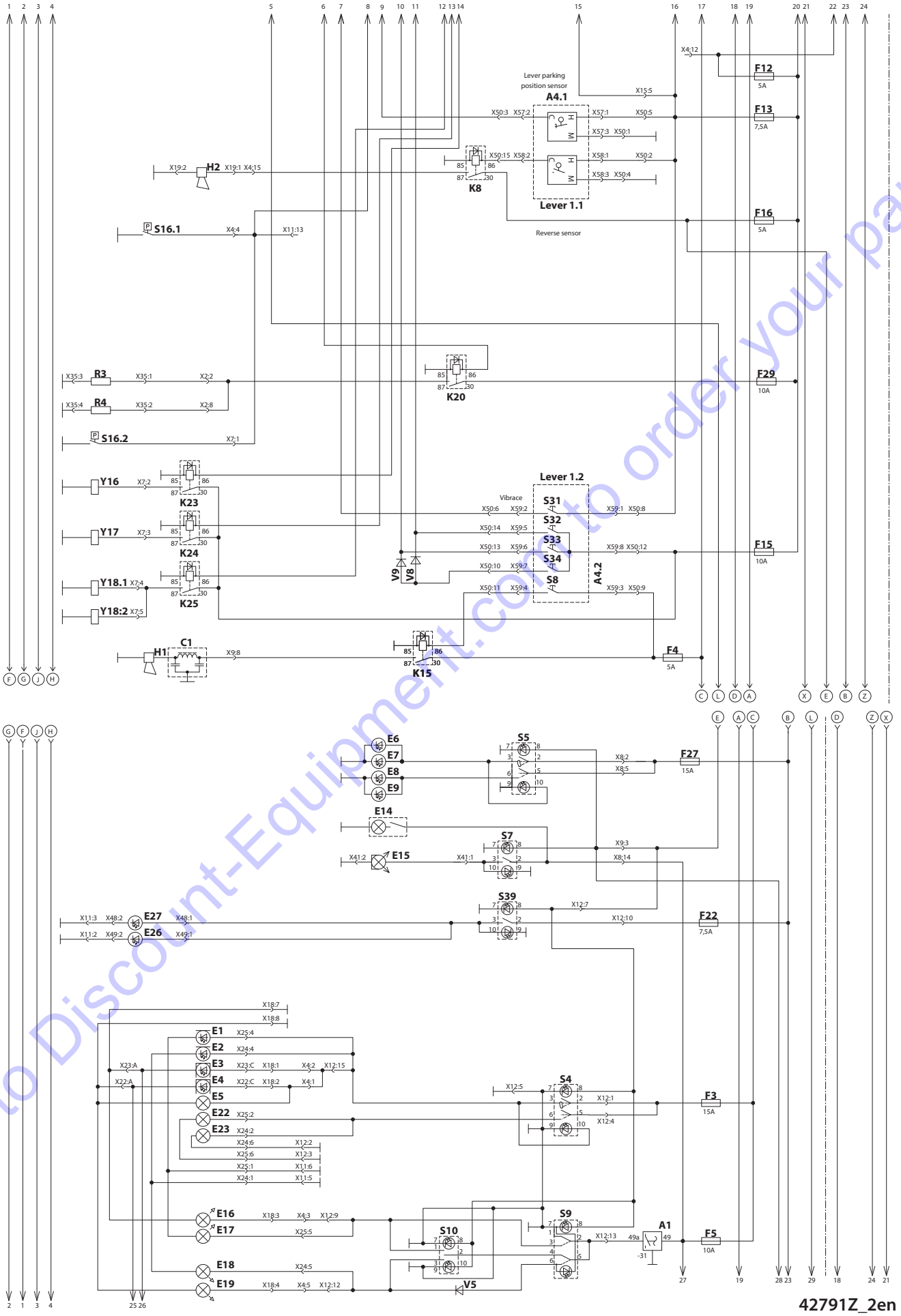
K11	Relay Kubota – engine stop
K12	Vibration block relay
K13	Vibration switch relay
K14	Vibration block relay – neutral position
K17	Engine stop relay except for the neutral position
K18	Relay – floating position
K19	Parking brake relay – power supply
K20	Telematics relay
K22	Glowing contactor
K23	Blade – up
K24	Blade – down
K25	Blade – floating position
M1	Starter
M2	Fuel pump
M6	Front windscreen wiper
M7	Rear windscreen wiper
M8	Windscreen washer
M9	Rear washer
Q1	Disconnecter
R1	Glowing
S1	Ignition box
S4	Road lighting switch
S5	Working lighting switch
S7	Beacon switch
S8	Horn switch
S9	Warning lights switch
S10	Direction indicator switch
S11	Emergency brake switch
S14	Pressure parking brake switch
S15	Hydraulic oil temperature switch
S16	Hydraulic oil filter
S17	Seat switch
S22	Engine speed switch
S31	Vibration switch
S32	Blade switch – up
S33	Blade switch – down
S34	Blade switch – floating position
S40	Heater fan switch
S41	Front wiper switch
S42	Rear wiper switch
S43	Washer switch
S46	Air-conditioning switch
S47	Air-conditioning overpressure safety element
S48	Neutral position switch
S50	Regeneration switch
S51	Seat belt switch
S52	Service tools
S53	Service tools
S54	Steering sensor
T1	Antenna
V1-12	Diodes
X1 – 99	Connection
X110 – 133	CAN connectors
X34	Mounting sockets 12 V
X36	Engine diagnostic socket
X64	Diagnostic socket CAN2
X66	Diagnostic socket CAN3
X68	Display diagnostic socket
Y8	Vibration
Y15	Parking brake
Y16	Blade – up
Y17	Blade – down
Y18.1	Blade – floating position
Y18.2	Blade – floating position
Y23	Coupling of air-conditioning compressor
Y24	Water valve



3.8 Appendices

3.8.1 Wiring diagram

Legend:

A1	Direction indicator flasher
A4	Travel control lever
A5	Bauser display
A6	Control unit – ECU
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A10	Radio
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B1	Vibrator frequency sensor
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K7	Relay – neutral position (from the pump sensor)
K8	Relay – reversing horn
K9	Parking brake relay
K10	Air-conditioning coupling relay
K11	Relay Kubota – engine stop
K12	Vibration block relay
K13	Vibration switch relay
K14	Vibration block relay – neutral position
K17	Engine stop relay except for the neutral position
K18	Relay – floating position
K19	Parking brake relay – power supply
K20	Telematics relay
K22	Glowing contactor
K23	Blade – up
K24	Blade – down
K25	Blade – floating position
M1	Starter
M2	Fuel pump
M6	Front windscreen wiper
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M8	Windscreen washer
M9	Rear washer
Q1	Disconnecter
R1	Glowing
S1	Ignition box
S4	Road lighting switch
S5	Working lighting switch
S7	Beacon switch
S8	Horn switch
S9	Warning lights switch
S10	Direction indicator switch
S11	Emergency brake switch
S14	Pressure parking brake switch
S15	Hydraulic oil temperature switch
S16	Hydraulic oil filter
S17	Seat switch
S22	Engine speed switch
S31	Vibration switch
S32	Blade switch – up
S33	Blade switch – down
S34	Blade switch – floating position
S40	Heater fan switch
S41	Front wiper switch
S42	Rear wiper switch
S43	Washer switch
S46	Air-conditioning switch
S47	Air-conditioning overpressure safety element
S48	Neutral position switch
S50	Regeneration switch
S51	Seat belt switch
S52	Service tools
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S54	Steering sensor
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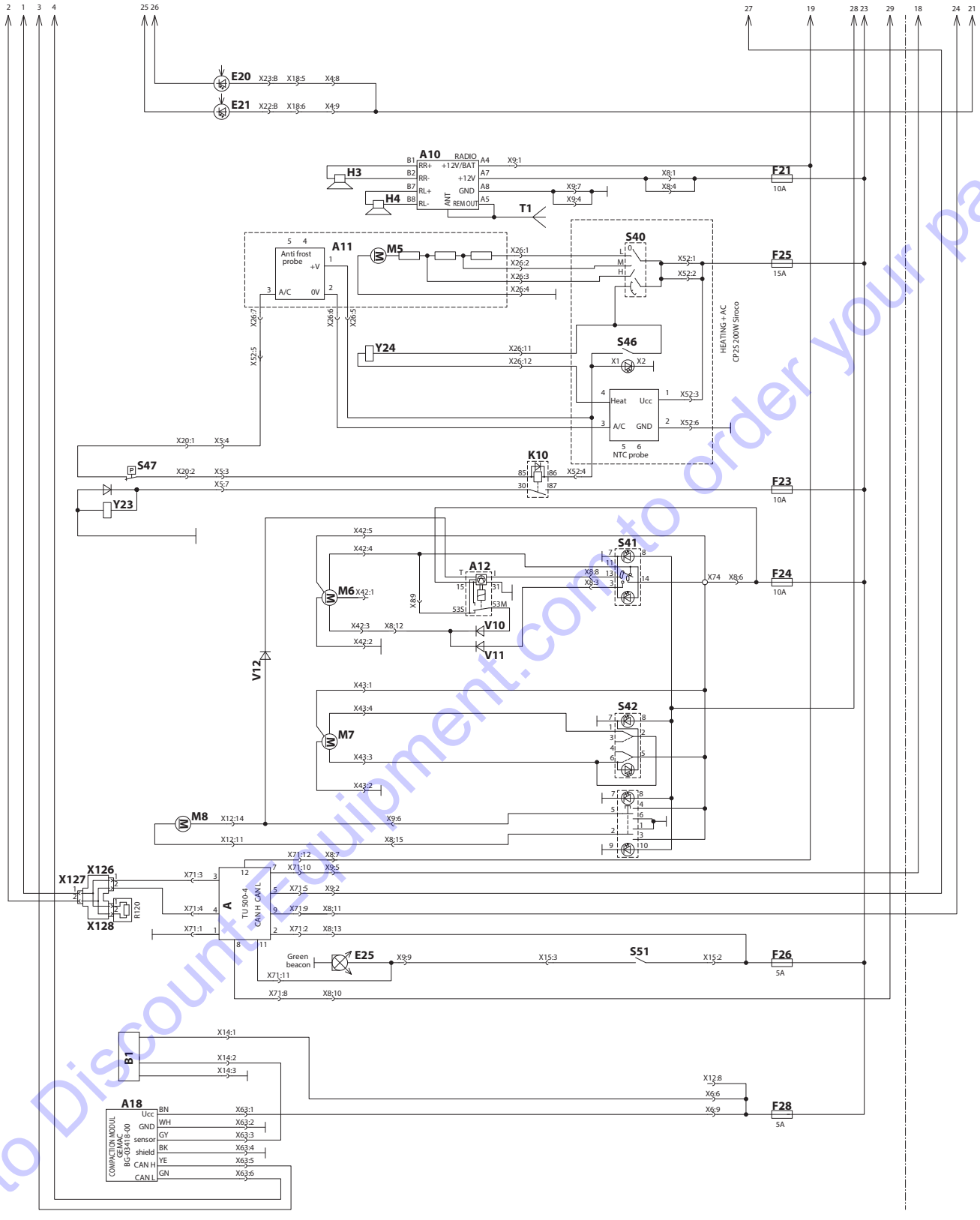
Y15	Parking brake
Y16	Blade – up
Y17	Blade – down
Y18.1	Blade – floating position
Y18.2	Blade – floating position
Y23	Coupling of air-conditioning compressor
Y24	Water valve



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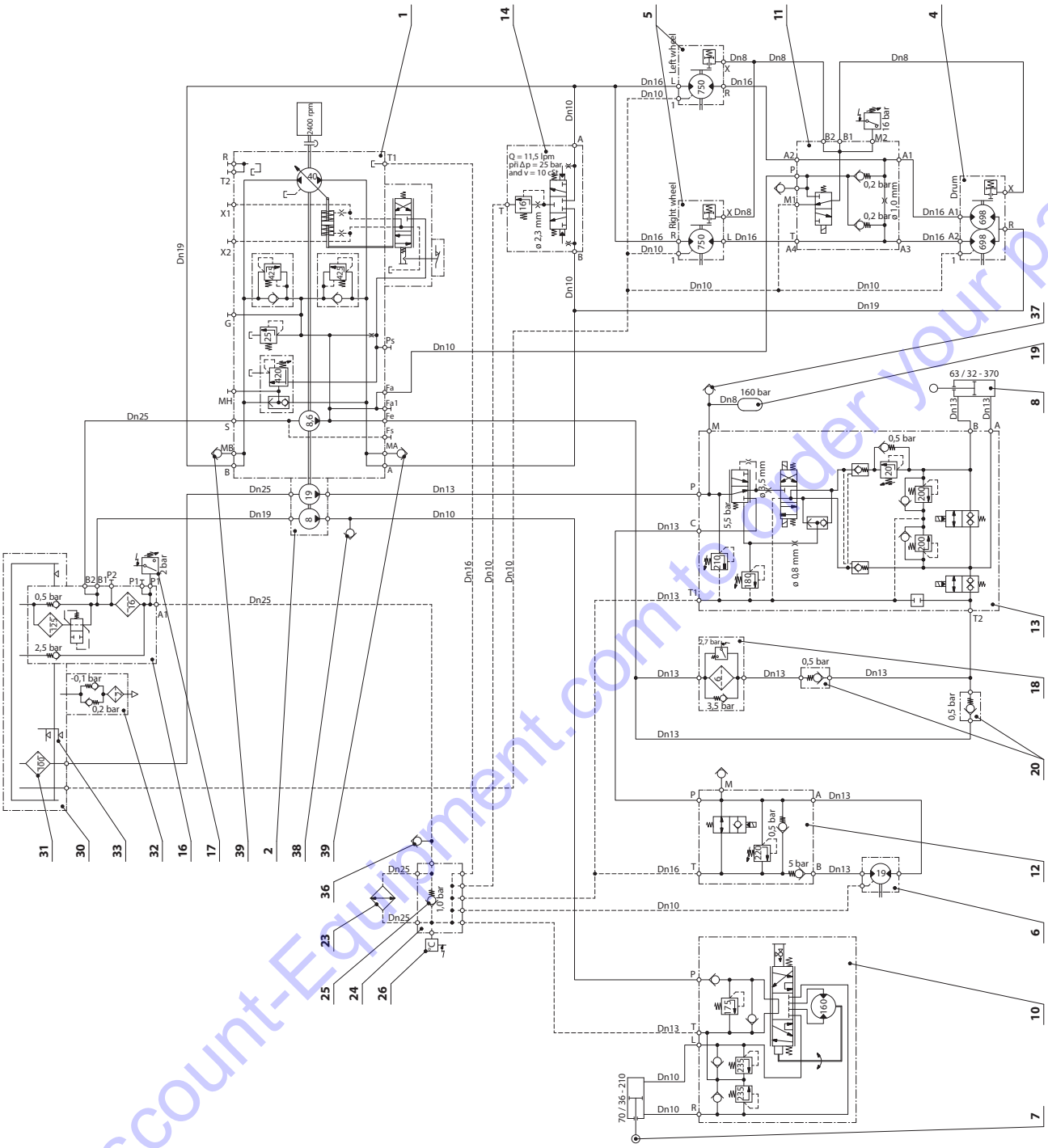
3.8.2 Hydraulic diagram – wheel lock

Legend:

1. Travel pump
2. Vibration pump and steering
4. Travel hydraulic motor
5. Travel hydraulic motor
6. Vibration hydraulic motor
7. Steering hydraulic motor
8. Blade hydraulic motor
10. Power steering
11. Brake block
12. Vibration block
13. Blade block
14. Flushing block
16. Suction flow return filter
17. Dirt indicator
18. Hydraulic filter
19. Hydraulic battery
20. One-way valve (check valve)
23. Hydraulic cooler
24. Leak cube
25. One-way valve (check valve)
26. Hydraulic oil temperature sensor
30. Hydraulic tank
31. Suction strainer
32. Ventilation filter
33. Oil level indicator
36. Filling quick coupler
37. Measuring quick coupler
38. Measuring quick coupler
39. Measuring quick coupler



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3.8.3 Table of spare parts

Chapter	Spare part	Order number
Every 500 hours of operation, but at least once a year		
3.6.19	Fuel filter	1579220
3.6.19	Fuel filter cartridge	1713590
3.6.21	Air filter cartridge (external)	1713581
3.6.22	Engine oil filter	1504183
Every 1000 hours of operation		
3.6.26	Air filter cartridge (external)	1713581
3.6.26	Air filter cartridge (internal)	1713593
3.6.27	Rubber metal element	1669981
3.6.27	Rubber metal element	4–43700
3.6.27	Rubber metal element	1515888
3.6.28	Oil separator cartridge	1521826
Every 2000 hours of operation		
3.6.35	Set of hydraulic oil filters	1713717
3.6.35	Hydraulic oil filter	4–5358520135
3.6.35	Hydraulic unit 230 V	1251998
3.6.35	Hydraulic unit 110 V	1255297
3.6.35	Ventilation filter	1280287
Maintenance as required		
3.6.37	Gas strut	1712933

Content of the filter set after 500 hours (4-760281)

Chapter	Spare part	Number of parts	Order number
3.6.19	Fuel filter	1	1579220
3.6.19	Fuel filter cartridge	1	1713590
3.6.21	Air filter cartridge (external)	1	1713581
3.6.22	Engine oil filter	1	1504183

Content of the filter set after 1,000 hours (4-760282)

Chapter	Spare part	Number of parts	Order number
3.6.19	Fuel filter	1	1579220
3.6.19	Fuel filter cartridge	1	1713590
3.6.22	Engine oil filter	1	1504183
3.6.26	Air filter cartridge (external)	1	1713581
3.6.26	Air filter cartridge (internal)	1	1713593
3.6.28	Oil separator cartridge	1	1521826

Content of the filter set after 2,000 hours (4-760283)

Chapter	Spare part	Number of parts	Order number
3.6.19	Fuel filter	1	1579220
3.6.19	Fuel filter cartridge	1	1713590
3.6.22	Engine oil filter	1	1504183
3.6.26	Air filter cartridge (external)	1	1713581
3.6.26	Air filter cartridge (internal)	1	1713593
3.6.28	Oil separator cartridge	1	1521826
3.6.35	Ventilation filter	1	1280287
3.6.35	Hydraulic oil filter	1	1713717

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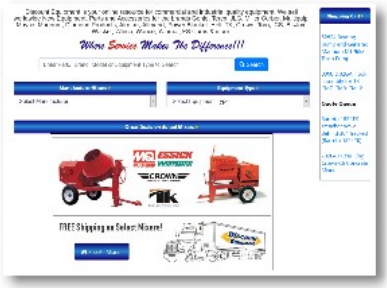

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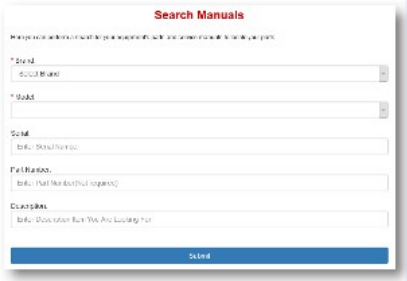

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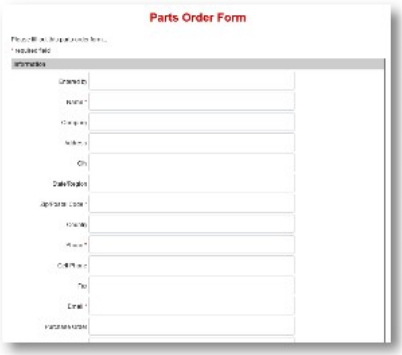

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