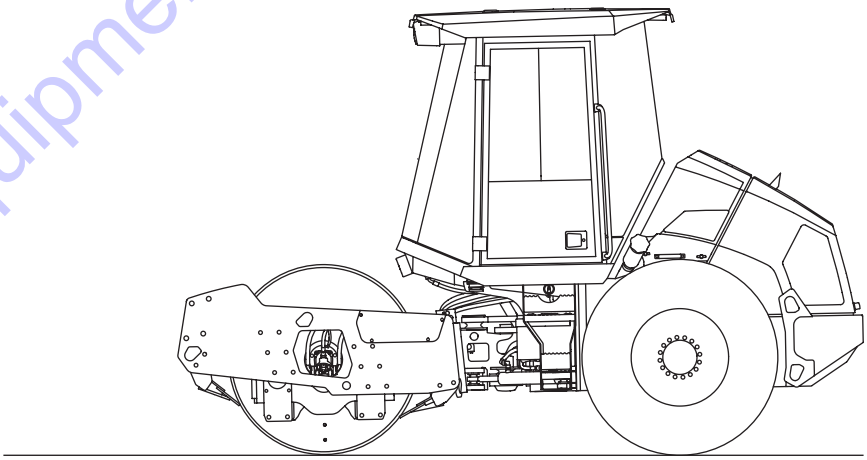
ARS 70

SINGLE DRUM ROLLER
KUBOTA V3307-CR-TE5
EU Stage V / U.S. EPA Tier 4f



OPERATING MANUAL

EDITION 07/2019 EN
From Serial No. 2563013

AMMANN

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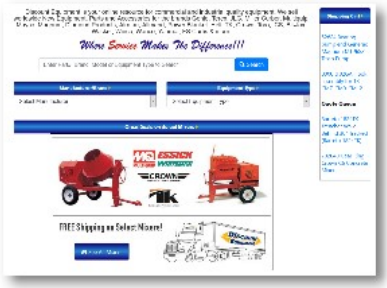

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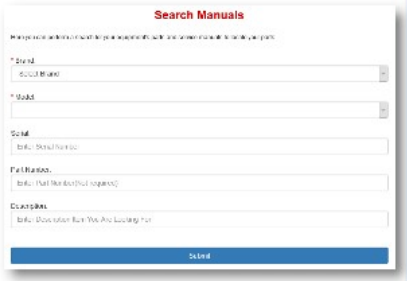

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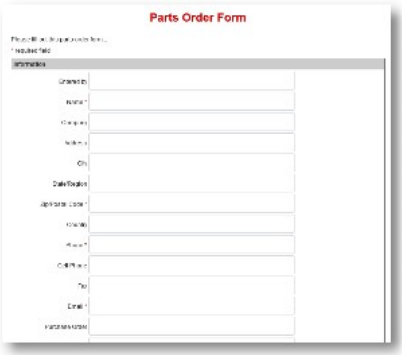

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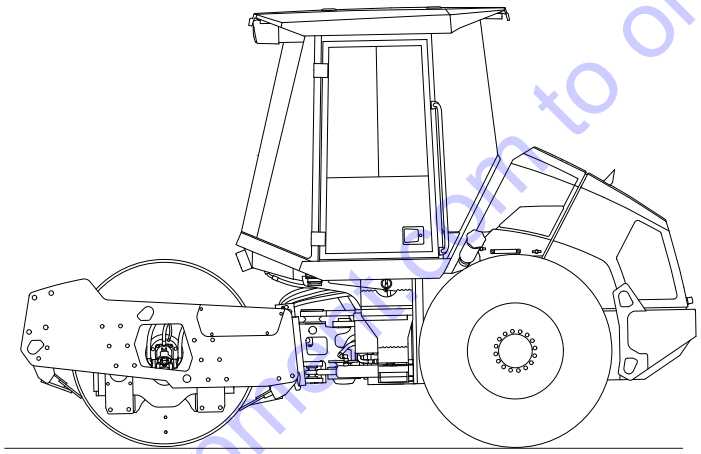
Congratulations on your purchase of the AMMANN compaction machine. This modern compaction machine is characterised by simple operation and maintenance and is the product of many years of experience of the AMMANN company in compaction machines, especially road rollers. In order to avoid faults due to improper operation and maintenance, we request you to read this operating manual 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



256001

This instruction manual is a "translation of the original instruction manual" within the meaning of the paragraph 1.7.4.1 of the Directive of the European parliament and of the Council 2006/42/EC of 17 Mai 2006.

This manual 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:

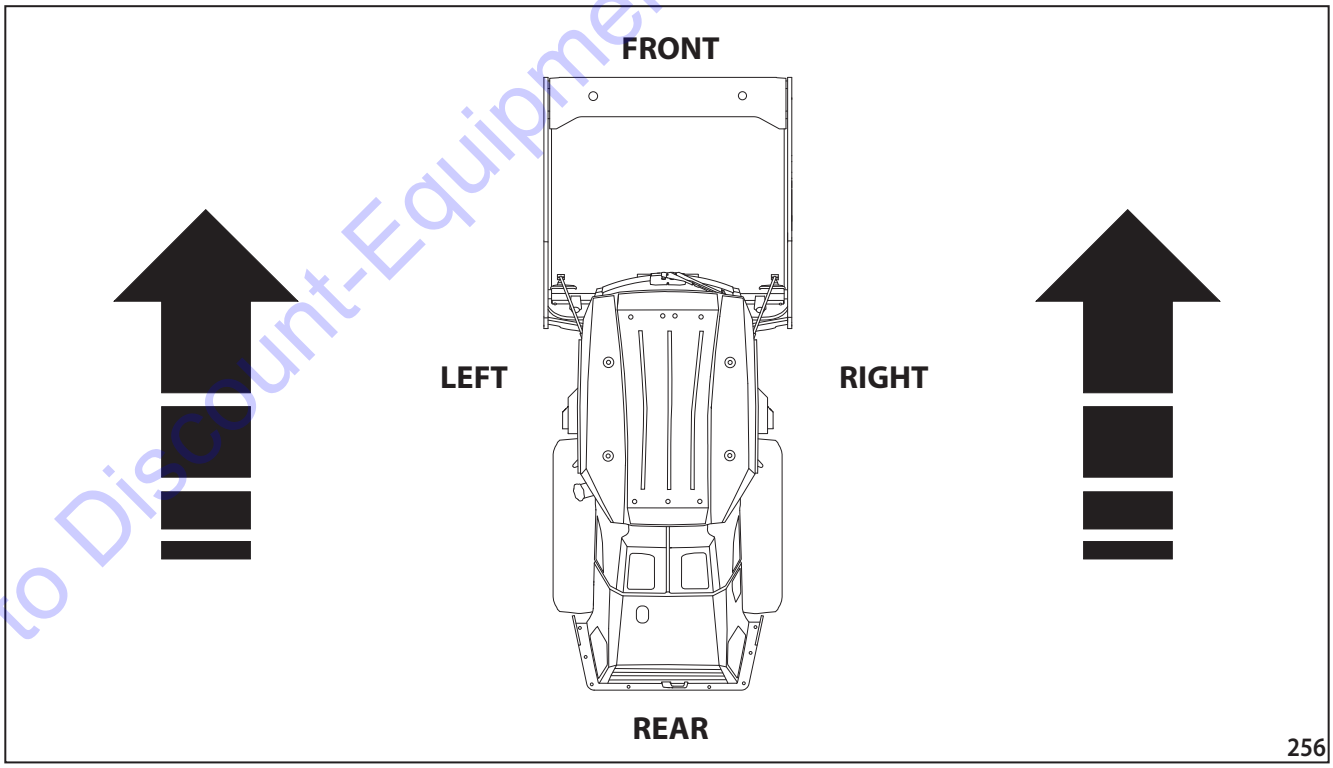
The notice warns of a serious risk of personal injury or other personal hazards.

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.



Contents

Contents

1 SPECIFICATION MANUAL

ARS 70
(Kubota Tier 4 Final)

1.1 Basic data

Machine description

Single drum roller with an articulated frame with a front smooth or padfoot steel driven vibrating drum and driven rear axle with two treaded tyres. Steering using the articulated frame.

Machine application

The **ARS 70** rollers are suitable for medium and small-sized compaction works in transport construction (construction of roads, railways, cart roads, and forest roads) and building construction (industrial zones, embankments), etc.

ARS 70 D roller with a smooth drum is suitable for the compaction of all kinds of soils. It is possible to be used for the compaction of clay soils up to a layer thickness (after compaction) of 15 cm (5.9 in), loam soils up to a layer thickness of 25 cm (9.8 in), mixed soils up to a layer thickness of 35 cm (13.8 in), sandy and gravel materials up to a layer thickness of 45 cm (17.7 in). The roller can also be used for compaction by means of stabilisation.

ARS 70 PD roller with a padfoot drum (synchronous kneading and vibrating effect) is suitable for the compaction of clay soils up to a layer thickness (after compaction) of 20 cm (7.9 in), loam soils up to a layer thickness of 25 cm (9.8 in), and mixed soils up to a layer thickness of 35 cm (13.8 in).

ARS 70 HX roller for permanently difficult conditions and on slopes above 30% – smooth drum.

ARS 70 HXPD roller for permanently difficult conditions and on slopes above 30% – padfoot drum.

The machines are intended for operation in conditions of the following types according to EN 60721-2-1:2014: WT, WDr, MWDr (i.e. mild, warm dry, hot dry with a limited temperature range of from -15 °C (5 °F) to +45 °C (113 °F).

The standard type of the machine is not intended for road traffic. For more information, please contact your dealer.

Please fill in the following data:

(see nameplate and Kubota engine nameplate)

Machine type

.....

Serial number of the machine

.....

Year of manufacture

.....

Engine type

.....

Serial number of the engine

.....

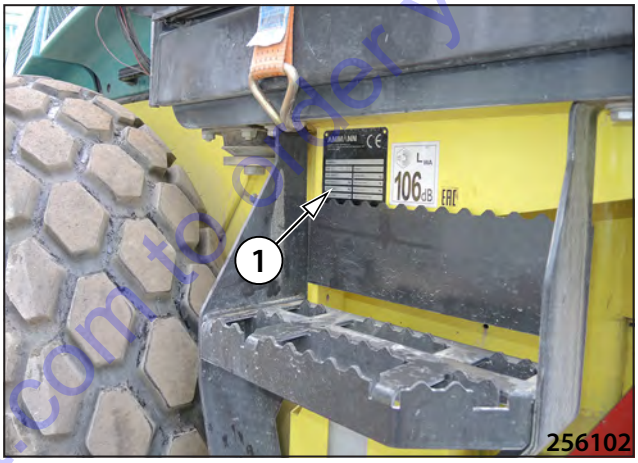
The data mentioned in the table refer always when you contact the dealer or manufacturer.

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

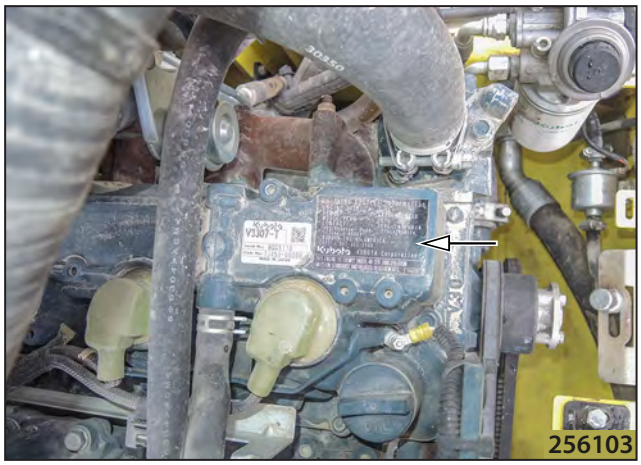
1. Name – always stated only in the English version
2. Type
3. Serial number
4. Operating weight
5. Maximum mass
6. Rated power
7. Version
8. Transport weight
9. Front axle load
10. Rear axle load
11. Year of manufacture

Name plate location

1. Name plate
2. Machine frame number

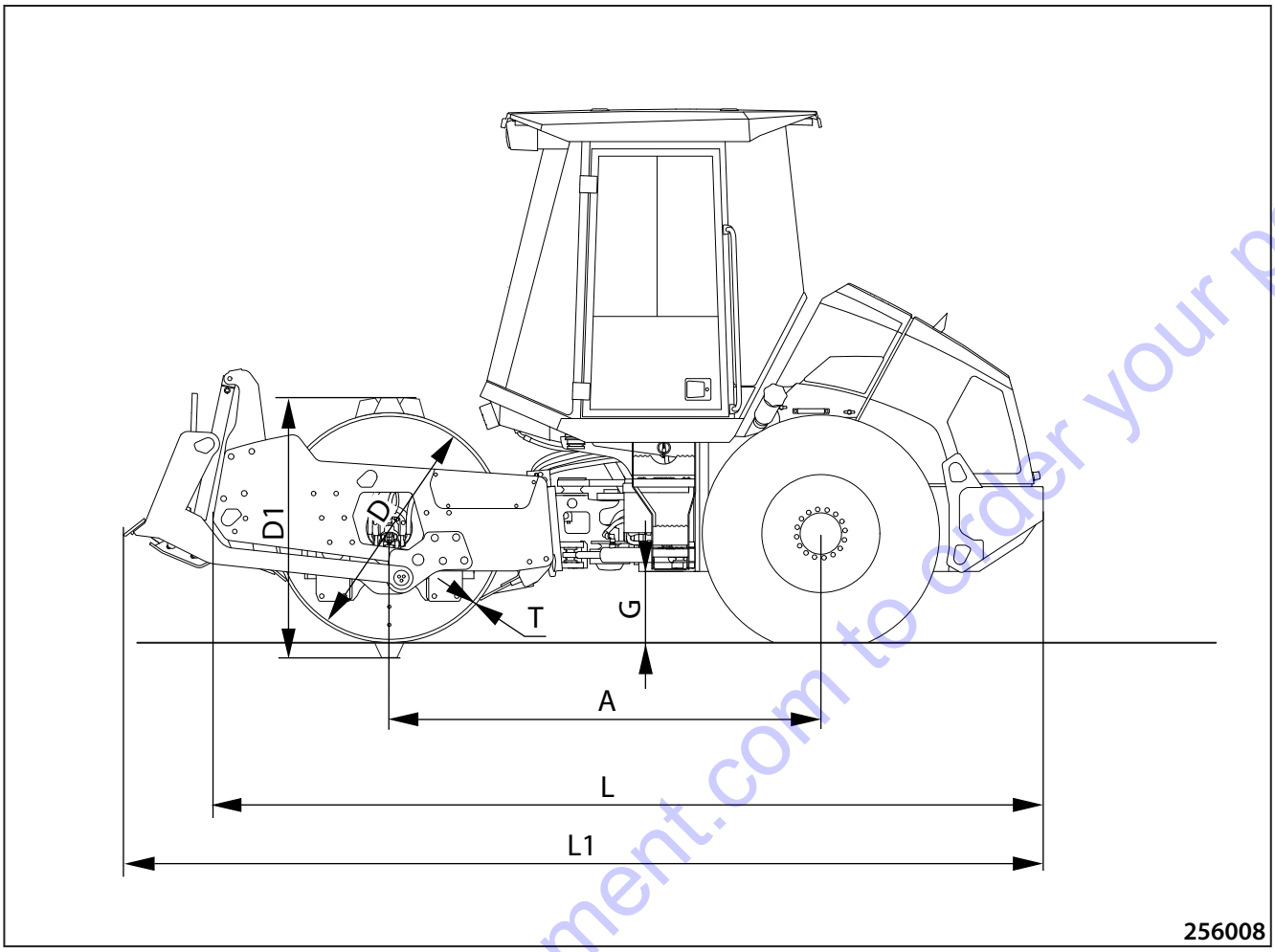


Engine name plate location



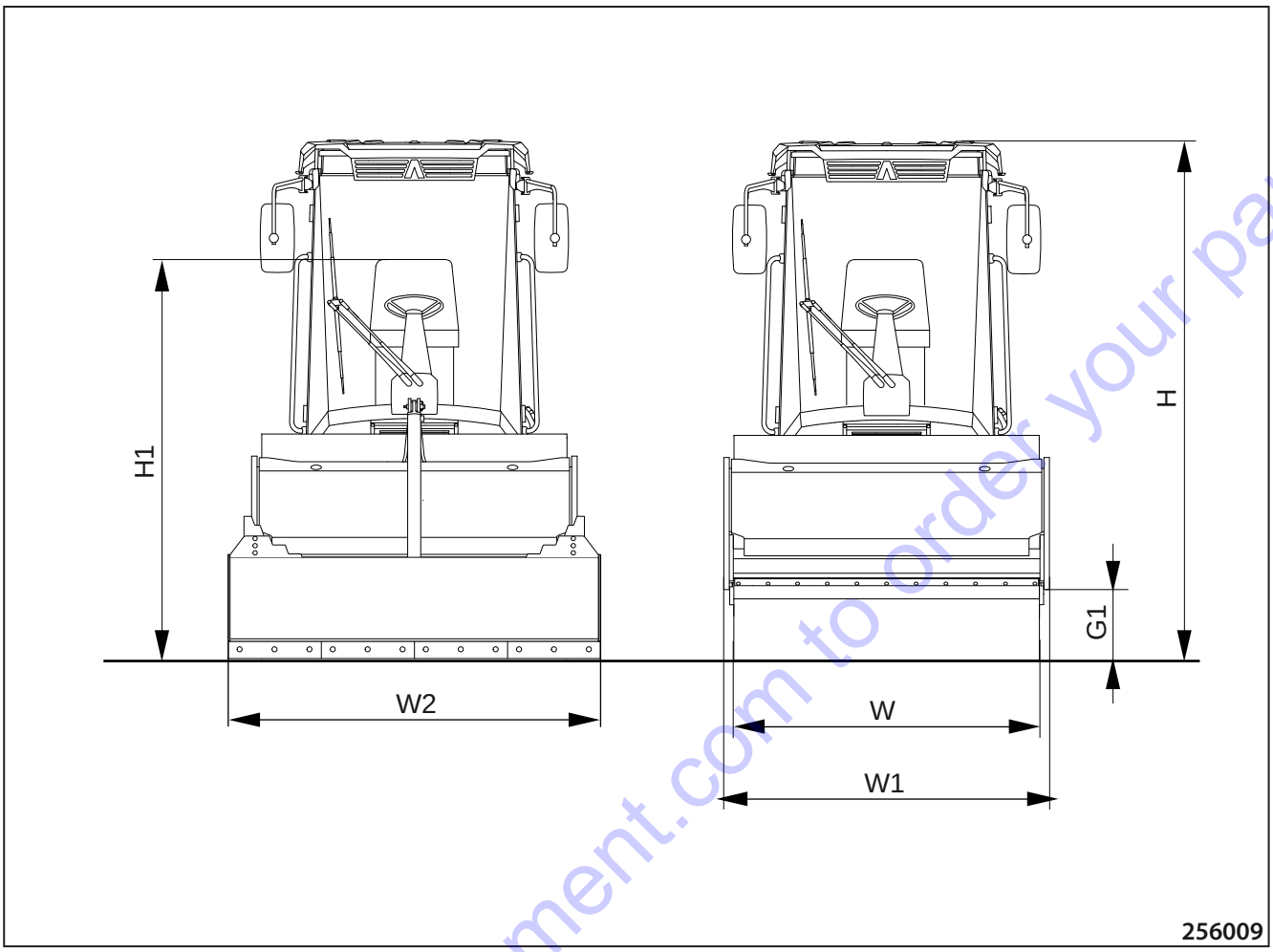
1.2 Dimensional drawing of the machine

Dimensional drawing of the machine ARS 70



mm (in)	A	D	D1	G	G1	H	H1	L	L1	T	W	W1	W2
ARS 70 D	2300	1225		380	382	2860	2285	4425		18	1680	1790	
	(90.6)	(48.2)		(15.0)	(15.0)	(112.6)	(90.0)	(174.2)		(0.7)	(66.1)	(70.5)	
ARS 70 PD	2300	1219	1377	380	382	2860	2285	4425		15	1680	1790	
	(90.6)	(48.0)	(54.2)	(15.0)	(15.0)	(112.6)	(90.0)	(174.2)		(0.6)	(66.1)	(70.5)	
ARS 70 PDB	2300	1219	1377	380	382	2860	2285	4425	4985	15	1680	1790	2077
	(90.6)	(48.0)	(54.2)	(15.0)	(15.0)	(112.6)	(90.0)	(174.2)	(196.3)	(0.6)	(66.1)	(70.5)	(81.8)

Dimensional drawing of the machine ARS 70



mm (in)	A	D	D1	G	G1	H	H1	L	L1	T	W	W1	W2
ARS 70 D	2300	1225		380	382	2860	2285	4425		18	1680	1790	
	(90.6)	(48.2)		(15.0)	(15.0)	(112.6)	(90.0)	(174.2)		(0.7)	(66.1)	(70.5)	
ARS 70 PD	2300	1219	1377	380	382	2860	2285	4425		15	1680	1790	
	(90.6)	(48.0)	(54.2)	(15.0)	(15.0)	(112.6)	(90.0)	(174.2)		(0.6)	(66.1)	(70.5)	
ARS 70 PDB	2300	1219	1377	380	382	2860	2285	4425	4985	15	1680	1790	2077
	(90.6)	(48.0)	(54.2)	(15.0)	(15.0)	(112.6)	(90.0)	(174.2)	(196.3)	(0.6)	(66.1)	(70.5)	(81.8)

1.3 Technical data

		ARS 70			
		EU Stage V / U.S. EPA Tier 4f			
		D	HX	PD	HXPD
Weight					
Operating weight of EN 500-1+A1 (CECE) with cab	kg (lb)	6490 (14310)	6490 (14310)	6910 (15230)	6910 (15230)
Operating weight of EN 500-1+A1 (CECE) with platform, rail	kg (lb)	6360 (14020)	6360 (14020)	6780 (14950)	6780 (14950)
Operating load of EN 500-1+A1 (CECE) with cab, ROPS on front axis	kg (lb)	3900 (8600)	3900 (8600)	4320 (9520)	4320 (9520)
Operating load of EN 500-1+A1 (CECE) with cab, ROPS on rear axis	kg (lb)	2590 (5710)	2590 (5710)	2590 (5710)	2590 (5710)
Weight of half fluid capacities	kg (lb)	55 (120)	55 (120)	55 (120)	55 (120)
Operating weight of ISO 6016 with cab, ROPS	kg (lb)	6545 (14430)	6545 (14430)	6965 (15360)	6965 (15360)
Maximum weight with the cab, ROPS, accessories, weighing	kg (lb)	8400 (18520)	8400 (18520)	8820 (19440)	8820 (19440)
Maximum permitted weight according to ROPS	kg (lb)	10000 (22050)	10000 (22050)	10000 (22050)	10000 (22050)
Static linear load of front drum	kg/cm (lb/in)	23.2 (129.9)	23.2 (129.9)	-	-
Cab weight	kg (lb)	760 (1680)	760 (1680)	760 (1680)	760 (1680)
Weight of ROPS	kg (lb)	460 (1010)	460 (1010)	460 (1010)	460 (1010)
Weight of sheet roof on ROPS	kg (lb)	170 (370)	170 (370)	170 (370)	170 (370)
Weight of blade	kg (lb)	560 (1230)	560 (1230)	560 (1230)	560 (1230)
Weight of 2 padfoot segments	kg (lb)	875 (1930)	875 (1930)	-	-
Weight of tyre filling 0°C	kg (lb)	367 (810)	367 (810)	367 (810)	367 (810)
Weight of tyre filling -25°C	kg (lb)	420 (930)	420 (930)	420 (930)	420 (930)
Driving characteristics					
Number of speeds	-	3 + 1	3 + 1	3 + 1	3 + 1
Loading mode 0	km/h (MPH)	2.5 (1.6)	2.5 (1.6)	2.5 (1.6)	2.5 (1.6)
Working speed 1	km/h (MPH)	2.5 (1.6)	2.5 (1.6)	2.5 (1.6)	2.5 (1.6)
Working speed 2	km/h (MPH)	4 (2.5)	4 (2.5)	4 (2.5)	4 (2.5)
Working speed 3	km/h (MPH)	6 (3.7)	6 (3.7)	6 (3.7)	6 (3.7)
Maximum transport speed	km/h (MPH)	12 (7.5)	12 (7.5)	12 (7.5)	12 (7.5)
Climbing ability	%	59	59	56	56
Climbing ability with vibration	%	54	54	51	51
Theoretical climbing ability of machine	%	67	67	61	61
Lateral static stability	%	53	53	53	53
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)	2580 (101.6)	2580 (101.6)	2580 (101.6)	2580 (101.6)
Turning radius outer (contour)	mm (in)	4340 (170.9)	4340 (170.9)	4340 (170.9)	4340 (170.9)
Front approach slope	%	93	93	93	93
Rear approach slope	%	67	67	67	67
Type of drive	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic
Number of driving axles	-	2	2	2	2
Oscillation angle	°	9	9	9	9
Angle of steering	°	30	30	30	30

		ARS 70			
		EU Stage V / U.S. EPA Tier 4f			
		D	HX	PD	HXPD
Steering					
Type of steering	-	Joint	Joint	Joint	Joint
Steering control	-	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Linear hydraulic motors	-	2	2	2	2
Engine					
Manufacturer	-	Kubota	Kubota	Kubota	Kubota
Type	-	V3307-CR-TE5	V3307-CR-TE5	V3307-CR-TE5	V3307-CR-TE5
Power according to ISO 14396	kW (HP)	55.4 (75)	55.4 (75)	55.4 (75)	55.4 (75)
Number of cylinders	-	4	4	4	4
Cylinder capacity	cm^3 (cu in)	3331 (203)	3331 (203)	3331 (203)	3331 (203)
Nominal speed	min^{-1} (RPM)	2200	2200	2200	2200
Maximum torque	Nm/rpm	259/1500	259/1500	259/1500	259/1500
Average fuel consumption	l/h (gal US/h)	7.3 (1.9)	7.3 (1.9)	7.3 (1.9)	7.3 (1.9)
Engines complies with emission regulations	-	EU Stage V, U.S. EPA Tier 4 Final	EU Stage V, U.S. EPA Tier 4 Final	EU Stage V, U.S. EPA Tier 4 Final	EU Stage V, U.S. EPA Tier 4 Final
Cooling system of engine	-	Liquid	Liquid	Liquid	Liquid
Axle					
Maximum tyre pressure	MPa (PSI)	0.15 (21.8)	0.15 (21.8)	0.15 (21.8)	0.15 (21.8)
Pattern of tyres	-	UK 5 Diamond	UK 5 Diamond	TD-02 Tractor	TD-02 Tractor
Number of tyres	-	2	2	2	2
Number of rear wheels	-	2	2	2	2
Size of tyres	-	14.9x24´´	14.9x24´´	14.9x24´´	14.9x24´´
Type of tyres	-	Tubeless	Tubeless	Tubeless	Tubeless
Number of pads (only PD version)	-	-	-	112	112
Pad contact surface (only PD version)	cm^2 (sq in)	-	-	82.5 (12.8)	82.5 (12.8)
Pad height (only PD version)	mm (in)	-	-	80 (3.1)	80 (3.1)
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)	33 (1980)	33 (1980)	30 (1800)	30 (1800)
Frequency II	Hz (VPM)	36 (2160)	36 (2160)	36 (2160)	36 (2160)
Amplitude I	mm (in)	1.65 (0.065)	1.65 (0.065)	1.6 (0.063)	1.6 (0.063)
Amplitude II	mm (in)	0.7 (0.028)	0.7 (0.028)	0.71 (0.028)	0.71 (0.028)
Centrifugal force I	kN	135	135	146	146
Centrifugal force II	kN	73	73	96	96
Type of drive	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic

1.3 Technical data

		ARS 70			
		EU Stage V / U.S. EPA Tier 4f			
		D	HX	PD	HXPD
Fluid capacities					
Fuel	l (gal US)	130 (34.34)	130 (34.34)	130 (34.34)	130 (34.34)
Engine (oil filling)	l (gal US)	11.2 (2.96)	11.2 (2.96)	11.2 (2.96)	11.2 (2.96)
Cooling system	l (gal US)	26 (6.87)	26 (6.87)	26 (6.87)	26 (6.87)
Hydraulic system	l (gal US)	53 (14)	53 (14)	53 (14)	53 (14)
Drum vibrator	l (gal US)	6 (1.59)	6 (1.59)	6 (1.59)	6 (1.59)
Drum cooling liquid (up to -25°C)	l (gal US)	40 (10.57)	40 (10.57)	40 (10.57)	40 (10.57)
Wheel gearbox	l (gal US)	2x0.8 (2x0.21)	2x0.8 (2x0.21)	2x0.8 (2x0.21)	2x0.8 (2x0.21)
Drum gearbox	l (gal US)	1.8 (0.48)	1.8 (0.48)	1.8 (0.48)	1.8 (0.48)
Washer tank	l (gal US)	3 (0.79)	3 (0.79)	3 (0.79)	3 (0.79)
Wiring					
Voltage	V	12	12	12	12
Battery capacity	Ah	120	120	120	120
Noise and vibration emissions					
Measured sound power level A, L_{pA} at the operator's position (cab) *	dB	78	78	78	78
Uncertainty K_{pA} *	dB	2	2	2	2
Guaranteed sound power level A, L_{WA} **	dB	105	105	105	105
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

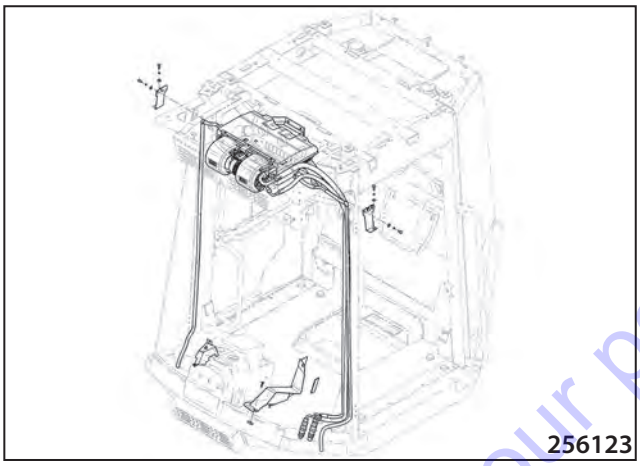
*** measured according to EN 1032+A1 while driving with vibration on gravel foundation

Air-conditioning (see Chap. 1.4.1)
Installation for radio with antenna and loudspeakers
Radio
ROPS 2D
Reversing alarm
Warning beacon (see Chap. 1.4.2)
Holder for licence plate
Road traffic lighting (including direction lights)
Additional working lighting
Additional padfoot segments (recommended with ATC and tractor tyre) (see Chap. 1.4.3)
Blade (see Chap. 1.4.4)
Ballasting of tyres with liquid of up to -25 °C (as standard with HX versions)
ACEecon
ACE Force (see Chap. 1.4.5)
ADS software
GPS
Telematic (see Chap. 1.4.6)
Tachograph (see Chap. 1.4.8)
Tractor tyre (as standard with HX and PD versions)
Triangle for slow-moving vehicles
Fire extinguisher (see Chap. 1.4.7)
Set of filters, 500 h
Set of filters, 2000 h
Biologically degradable hydraulic oil
Additional documentation

1.4 Optional equipment

1.4.1 Air conditioning

The air-conditioning is a special cooling system for the operator's workplace to provide comfort and stable temperature also in extremely hot weather. The operator is able to control and precisely regulate the temperature at the workplace using controls in the upper part of the cab.

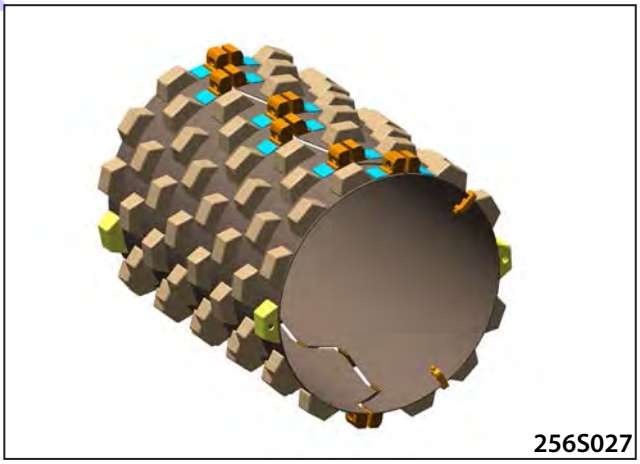


1.4.2 Beacon

The beacon is a safety device used for limiting or preventing potential hazards when working with the machine.

1.4.3 Padfoot segments

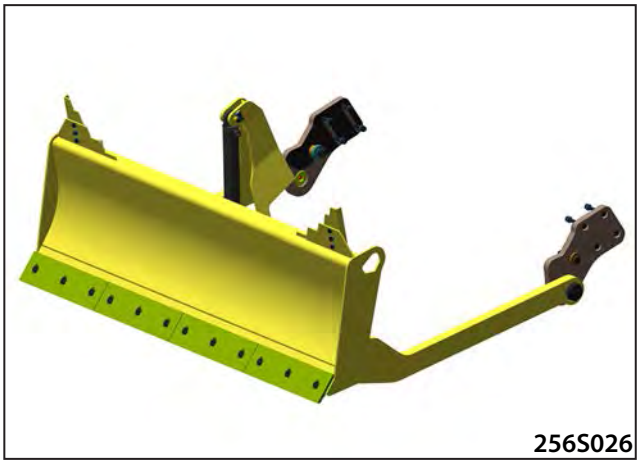
They are used for changing a smooth drum to a padfoot drum. The padfoot drum is suitable for compacting clay soils with simultaneous kneading and vibrating effect.



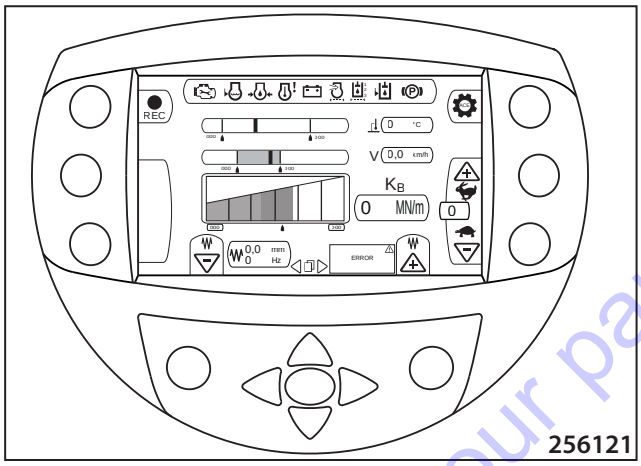
1.4.4 Blade

It is used for spreading brought in materials.

For blade control procedure see Chapter 2.7.9.



1.4.5 ACE FORCE



The unique measuring ACE FORCE system is able to evaluate data in real time and significantly reduces the number of required compaction passes.

The system displays and evaluates rigidity data of the compacted material in real time and displays the increase in compaction. All required information about compacting works, e.g. current stiffness of the compacted layer or current speed of the machine, are displayed on the main operator display in the cab of the operator.

Then the measurements can be saved in the system memory using the ADS function.

1.4.6 Telematic

Global positioning system with telemetry that monitors operating systems of the machine (machine start, diesel engine speed, machine consumption, number of engine hours, etc.) ant its current position.

The system allows to easily find the machine when it was stolen.

The GPS system allows a remote monitoring of the machine which helps finding the machine when it was stolen.

1.4.7 Fire extinguisher

The fire extinguisher is a fire protection tool and is used to smother fire in an early stage of development. The powder is not electrically conductive so it can be used to extinguish live electrical equipment.

Note:

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

1.4.8 Tachograph

The tachograph is a device that records machine operation data. Control duration, passed distance and machine speed data is recorded in the memory of the device. The data is written on the driver's card.

2 OPERATION MANUAL

ARS 70
(Kubota Tier 4 Final)

2.1.1 Safety Measures during Machine Operation

Safety measures given in the individual chapters of Enginering Documentation supplied with the Machine shall be added with Safety Precautions in force within a respective country that uses the Machine at workplace with regard to work organization, work process and personnel involved.

2.1.1.1 Compaction Work Commencement

- Constructional Supplier (Machine User) is liable to issue instructions for driver and maintenance before compaction work is started, that will include requirements on work safety provision during Machine operation.

- He must verify and mark:
  - utility lines
  - underground areas (direction, depth)
  - seepage or escape of hazardous materials
  - soil bearing capacity, slope of travelling plane
  - other obstractions incl. their removal.

  He must make Machine driver, who will carry out earth work, familiar with these conditions.

- He must specify Code of Practice (C.O.P.) part of which is work procedure for a given work operation and this work procedure will specify inter alia:
  - measures when working under extraordinary conditions (work within protective zones, within extreme slopes, etc.)
  - precautions for any natural disaster hazards
  - requirements on work performance while observing job safety principles
  - technical and organizational measures to secure safety of personnel, workplace and environment.

  He must make Machine driver evidently familiar with the Code of Practice.

2.1.1.2 Work Safety Secured by User

- User shall promptly communicate any damage to the utility lines to their operator, and at same time he make measures to prevent unauthorized persons from entering endangered area.
- He must ensure an employee does not work alone at a workplace. Another worker must always be in sight and within an ear-shot, who in case of accident will provide or call for help unless another effective form of monitoring or communication exists.

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 to which the machine is technically capable according to conditions specified by the manufacturer and relevant standards.
- He must ensure that the roller is used only in such manner and on such working places without a danger to damage the close structures, sections, etc.
- He must ensure a regular inspection of operation and technical conditions, regular maintenance of the machine in intervals specified in the manuals for greasing and maintenance work. In case the technical condition of the machine does not meet the requirements to such extent it endangers safety of operation, people and property or it causes a damage and impairment to the environment, the machine 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 during the operation, maintenance and repair of the machine.
- The person (driver) who drives the machine and each person carrying out maintenance and repair of the machine must be acquainted with instructions specified in the operation manual of the machine.
- He must ensure that "Operation manual of the machine" and operational book are kept on specified place to be at disposal for the driver all the time.
- He must assign a workman for permanent supervision over the machine work during its operation on public roads and especially he is obliged to issue instructions to ensure safety of works.
- He must ensure that dangerous substances (such as fuel, oils, coolant, break fluid, etc. must be removed from places of leakage according to their nature to prevent from their adverse impact to 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 on Driver's Qualification

- Only a driver trained under ISO 7130 and other local and national regulations designed for drivers of this group of machines may operate the Roller (Compacter).
- With no licence only the one who learns driving the Machine for the purpose of getting preliminary practice with the approval of User may drive the Machine, and such person has to be under direct and continuous surveillance of professional teacher or trainer.
- Licence holder is liable to take due care of the licence, and when requested, put it forward to the control authorities.
- Licence holder can make no registrations, changes or corrections in the licence card.
- He/she is liable to promptly report his/her licence loss to the authority that issued this licence.
- Driving the Roller alone may be performed by an employee mentally and physically fit, over 18 years old, who is:

  a) assigned by machine manufacturer for the assembly, testing and presentation of the Machine, for training the drivers, whereas he/she must be made familiar with safety work regulations in force at the workplace

  or

  b) assigned by Constructional Supplier to operate (carry out maintenance) and is evidently trained and acquainted with, or owns professional competence to operate and drive under special regulations (machinist licence, etc.).

- Machine driver must undergo training and examination concerning work safety regulations at least 1x every 2 years.

2.1.3 Driver's Liabilities

- Before starting to operate the Machine the driver will be liable to get familiar with the guidelines given in the documentation delivered with the Machine, with safety precautions in particular, and observe these thoroughly. This applies as well to the personnel in charge of maintenance, adjustments and repairs of the Machine.
- Do not drive the Roller unless made familiar with all the Machine functions, working and operating elements, and unless knowing exactly how to control the Machine.
- Follow safety signs located on the Machine, and keep them in legible condition. Replace or add those impaired or missing ones.
- Before work commencement the driver must get familiar with the workplace environment, i.e. with the slopes, utility line system, with necessary types of workplace protections with regard to the environment (noise, etc.).
- When you find out any hazard to health or life of persons, property hazard, failure, or upon technology equipment accident, or when finding any symptoms of such hazards in course of operation, then the driver, unless able to eliminate such hazard by himself/herself, must stop the work and secure the machine against any undesirable start; please attach "MACHINE REPAIR" warning sign onto steering wheel as depicted in Section called "Safety signs used on the machine", report this to the person in charge, and if possible, notify all persons exposed to such danger.
- Before Machine operation startup the driver will be liable to get familiar with the records and operation deviations found out in course of the previous work shift.
- Before work is started he/she must inspect the Machine, its accessories, check up control elements, communication and safety devices, whether these are operable in line with the Manual. When finding out a malfunction that might be hazardous to job safety, and he/she is not able to repair it, then he/she must not start running the machine and instead report such failure to the person accountable.
- During work with the Machine the driver must be fastened with the seat belt. The seat belt and its mounting shall not be damaged!
- When driver finds any defect during operation he/she must immediately stop the Machine, secure it safely against undesired ignition.
- During operation the driver shall follow the Machine run and record any defects found in the Operation Logbook.
- Driver shall keep his/her Operation Logbook designed to maintain records about Machine handover between the drivers, about the defects or repairs in course of operation, to write down major events during work shift.
- 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.
- Indicate each Machine startup via an acoustic or light signal and this always before igniting the Machine engine.
- Confirm brake function and steering function before starting to run the Machine.
- Following the alarm an operator may start the Machine only when all the workers have left the danger area. At close (blind) workplaces it will be possible to start the operation only after a time necessary to leave danger area has elapsed.
- During Machine operation observe safety regulations, make no action that might endanger work safety, give full attention to Machine steering.
- The driver must always sit on the seat while driving the machine considering the restrictions imposed by the seat switch.
- Respect Code of Practice or instructions of a person responsible.
- When rolling (traversing) the Machine within a workplace adapt your speed to a terrain condition, to a work performed and weather conditions. Watch permanently the clearance so to avoid collision with any obstruction.
- Upon completion or stop of the Machine operation during which driver leaves the Machine, he/she must make measures against unauthorized use of the Machine or against spontaneous starting the engine. Remove key from the ignition box, disconnect the wiring via disconnector, lock the cabin, engine bonnet.
- When shutting down the Machine on roads the measures under regulations effective on roads shall be taken.
- When operation is completed, park the Machine at a proper parking place (flat, bearing area) so as not to endanger Machine stability, not to make the Machine interfere with traffic roads, not to expose the Machine to falling objects (rock), and where the Machine is safe against any natural disaster of other kind (floods, landslides, etc.).
- When working with the Machine is ended all the defects, damage to the Machine and any repairs made shall be written down in the Operation Logbook. Upon immediate changing of drivers the driver will be liable to call attention of changing driver to any facts identified.
- Driver shall use personal protective equipment (PPE) - work clothing, safety shoes, the clothing shall not be too loose, impaired, hair protected with proper head piece. During maintenance (lubrication, refilling, replacement of working media) your hands must be protected with proper gloves.
- In the event that the machine has no cab or when the windows are open, the operator must wear ear protectors.
- Driver shall maintain the Machine equipped with fittings and outfit required.
- Maintain the Machine free of oil dirt or flammable materials. Keep the drive's stand, foot rests and runner areas clean.
- When the Machine comes into contact with high voltage observe the following principles:
  - try to leave with the Machine a hazardous zone
  - do not leave driver's stand
  - give warning to others to keep off and not touch the Machine.

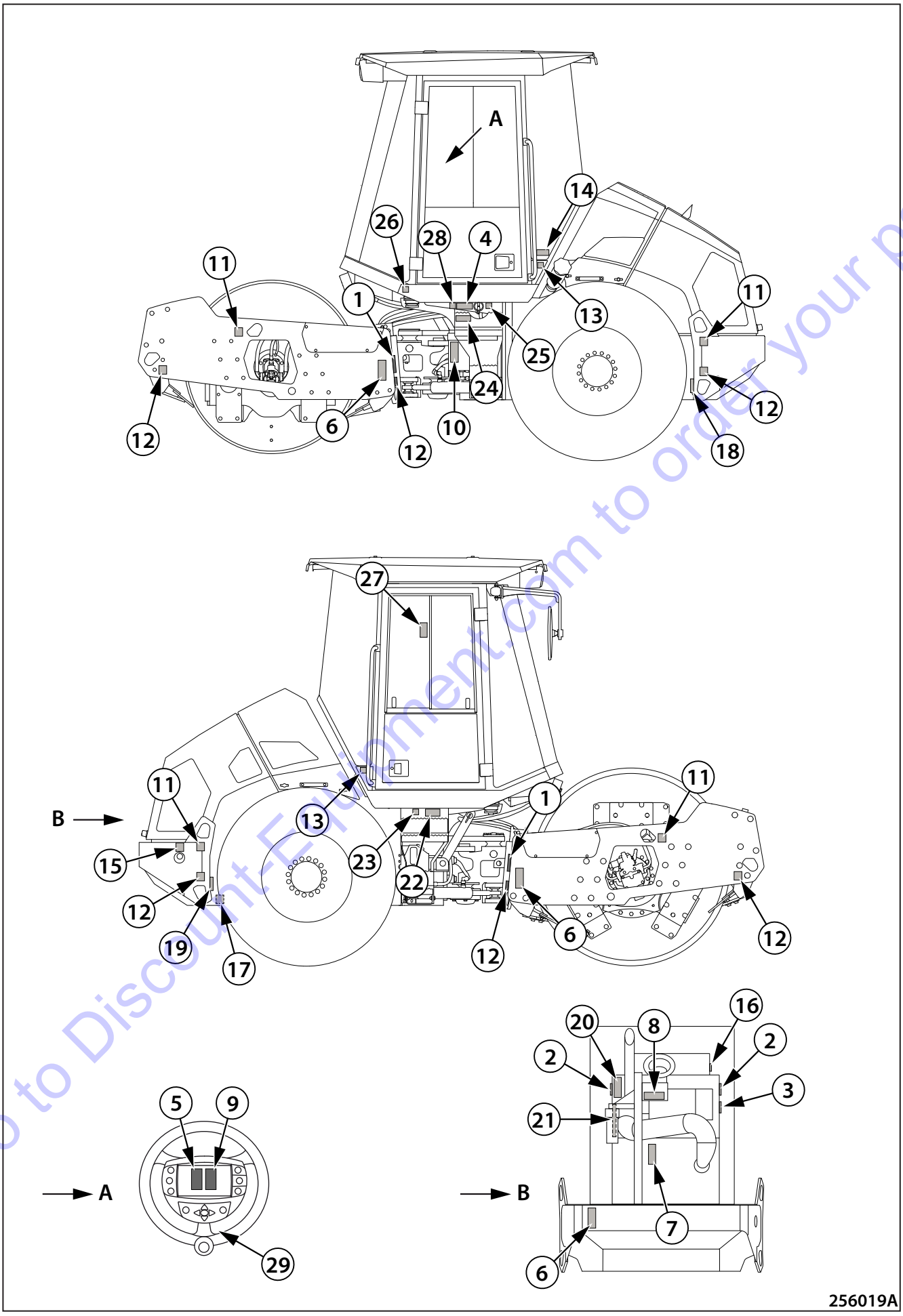
2.1.4 Forbidden activities – safety and guarantee

Banned are the following

- Vibrating on the spot. When it is vibrated on the spot, bearings of the vibrator are not lubricated.
- Filling the hydraulic circuit during the guarantee period in a different way than using the hydraulic unit.
- Changing the vibration amplitude when driving – It is always necessary to stop and only then set a different amplitude.
- Using the service switch for stopping the machine.
- Using the machine in case of an evident defect of the machine.
- Using the machine when any operating fluid level is low.
- Wilful repair of the engine – Except common changes of operating fluids and filters, only the Kubota service department can intervene in the engine, in particular in peripheral components of the engine – alternator, starter, thermostat, electrical installation of the engine.
- Quickly increase and decrease engine speed. It can damage the engine.
- Use the emergency brake for turning off the engine during normal operation of the machine.
- Operate the machine in the explosive environment and underground.
- To use the Machine following ingestion of alcoholic beverages or dopes.
- To use the Machine if its operation might put its technical condition, safety (life, health) of persons, facilities or objects, or road traffic and its continuity, at risk.
- Put into operation and use the Machine when other persons are within its hazardous reach - exception is training a driver by lector.
- 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.
- To roll and compact at such slopes where Machine stability would be disrupted (turning over). Machine's static stability stated will lower by drive's dynamic effects.
- To roll and compact at such angles of slopes where hazard of soil breaking off (dropping) under the Machine exists, or loss of adhesion followed by uncontrolled slip might occur.
- To control the Machine in some other way than stated in Driving Manual.
- To roll and compact per bearing capacity of subsoil at such a distance from the edge of slope or trenches, where hazard of landslide or shoulder breaking off (dropping) together with the Machine would occur
- To roll and compact with vibration at such a distance from the walls, cuts, slopes, where their slip (slide) would happen and the Machine covered in.
- Driving with vibration on hard (frozen, concrete, overcompacted) surface or on bedrock. There is a danger of damage to the machine.
- To compact with vibration at such a distance from buildings or facilities and equipment within which the risk of them being damaged due to vibration transfer impact, would occur.
- To operate the Machine unless driver control stand fixed properly.
- To operate the Machine when engine bay cover is open.
- To move and transport persons on the Machine.
- To operate the Machine when within hazardous reach thereof are other machines or transportation means aside from those that operate in mutual concert with the Machine.
- To operate the Machine at places impossible to see from driver's stand, and where hazard to people or property could occur unless work safety has been secured through some other way like for instance via signalling by duly instructed person.
- To work with the Machine at a protected zone of electric lines or substations.
- To cross electric cables if these are not properly protectedli against mechanical damage.
- To operate the Machine under lowered visibility or at night, unless Machine's working area and workplace are illuminated sufficiently.
- Leaving the seat of the machine driver when the machine is running and the service switch and parking brake are not enabled.
- Boarding or or getting off while on the run, jumping off the Machine.
- Sit or stand on the outside parts of the Machine when driving, or stand on the steps.
- Leave unsecured Machine - move away from the Machine without having prevented its misuse.
- Disable safeguarding, protective or locking systems or alter their parameters.
- Use the Machine with oil, fuel, cooling liquid or other fillings leaking.
- Start the engine through some other way than given in the Driving Manual.
- Locate some other items (tools, accessories) aside from personal needs at driver's stand.
- Lay away material or other objects on the Machine.
- Remove dirt while the Machine is running.

- Perform maintenance, cleaning or repairs with the Machine not secured against spontaneous move or accidental start, and when contact of a person with moving parts of the Machine is not excluded.
- Contact of moving parts of the Machine with human body or objects and tools held in hands.
- Smoke or handle open fire when checking or pumping fuels, refilling oils, lubricating the Machine, or inspecting the accumulator or making up the accumulator.
- Carry rags soaked with flammable materials, or carry flammable liquids in free vessels on the Machine (in engine bay).
- Let the engine run inside confined spaces.
- Drive with open doors.
- Perform any adjustments on the machine without the prior consent of the manufacturer.
- Drive without the seat belt fastened.
- Shift electrical conductors.
- Use other than original spare parts.
- Interfere in the electrical and electronic units in any manner.

Breaching these provisions can influence the judgement of a possible complaint and effectiveness of the engine guarantee period.



2.1.5 Safety inscriptions and signs used on the Machine

1. Squeezing hazard


2941bz

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. Cooling liquid


4048bz

There is a risk of scalding. Do not open the cap until the fluid cools down below 50 °C (122 °F).

4. Adjust while at rest


4003bz

Switch OFF the engine and remove the key from ignition box before carrying out any maintenance or repair.

5. Read Operation Manual


2702bz

Get perfectly familiar with the machine operation and maintenance according to the Operating manual!

6. Danger zone


2942bz

Keep a safe distance from the machine!

7. Risk of injury


4049bz

Imminent risk of hand caught by belt. Imminent risk of burn. Do NOT touch hot parts of the Machine unless you make certain these have cooled out sufficiently.

8. Unplug the wiring


4002bz

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

9. Safety belt


2687bz

Fasten the seat belt before starting to move the Machine.

10. Danger of explosion


3698bz

Imminent danger of explosion while handling the battery. Read the operation manual!

11. Lifting points


2153bz

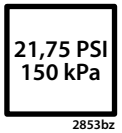
Only use these points to lift the machine.

12. Rigging points


3048bz

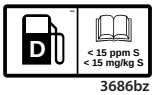
Tie-down the machine for transport at these points only. The maximum permitted force for fastening the machine to a vehicle using rear slings is 5 t.

13. Tyre pressure



2853bz

14. Refuelling

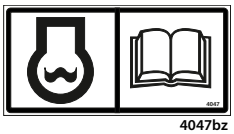


3686bz

15. Hydraulic oil level


2158bz

16. Coolant


4047bz

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

17. Coolant drain plug


3189bz

18. Engine oil drain plug


3212

19. Hydraulic oil drain plug


3960

20. Measuring points

position	funkce / Function / Funktion	max. tlak / press / Druck	rozsah měření messure extent messbereich
1	jízda vzad / forward travel / Fahrt nach vorne	40 MPa (5800 PSI)	0-60 MPa (0-10000 PSI)
2	jízda vpřed / reverse travel / Rückfahrt	40 MPa (5800 PSI)	0-60 MPa (0-10000 PSI)
3	vibrace I / vibration I / vibration I	37 MPa (5365 PSI)	0-60 MPa (0-10000 PSI)
4	vibrace II / vibration II / vibration II	37 MPa (5365 PSI)	0-60 MPa (0-10000 PSI)
5	řízení / steering / lenkung	21 MPa (3045 PSI)	0-25 MPa (0-4166 PSI)
6	tlak plnícího čerpadla / pressure of the feed pump Druck von der Füllpumpe	2,5 MPa (363 PSI)	0-4 MPa (0-666 PSI)

4030bz

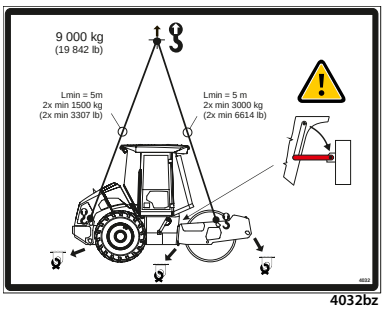
When measuring pressures, use the table. The table contains pressures in the defined measuring points and recommended ranges of measuring instruments.

21. Measuring points


4031bz

reverse travel / forward travel / vibration I / vibration II / steering / filling pump pressure

22. Lifting diagram



4032bz

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

23. California - Proposition 65 Warning

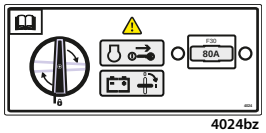
4055bz

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, congenial defects and other reproduction problems.

When handling these substances, abide by relevant safety precautions.

Further information see www.p65warnings.ca.gov

24. Battery switch



4024bz

25. Guaranteed sound power level

2903bz

26. Machine max height

3800bz

Attention when passing through places with height limits.

27. Emergency exit


2884bz

Unless possible to exit the Machine via LH door, please use emergency exit.

28. Expansion tank filling

3691bz

29. Ear protectors


2408bz

Use ear muffs when the Machine has no cab or you work with open windows.

30. Machine repair


2775bz

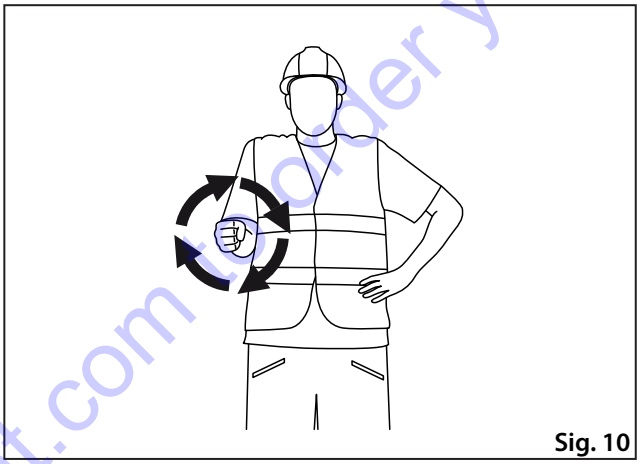
Do NOT start the engine! Hang the sign onto steering wheel. The sign is supplied together with machine accessories and should be kept in documentation locker.

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 conditions in the area 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.

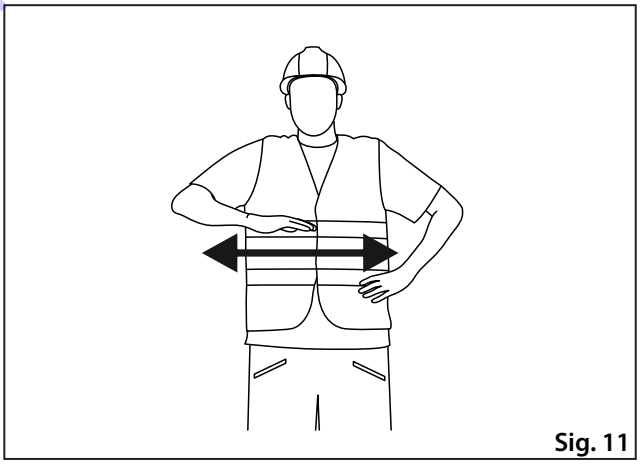
EXAMPLES OF COMMUNICATION SIGNALS:

Engine start



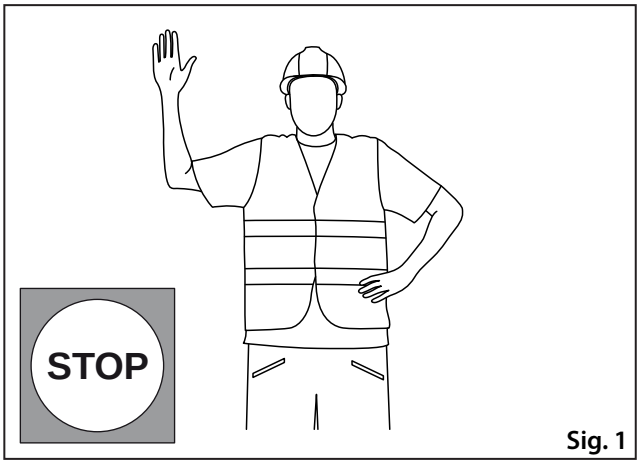
Sig. 10

Turn off the engine



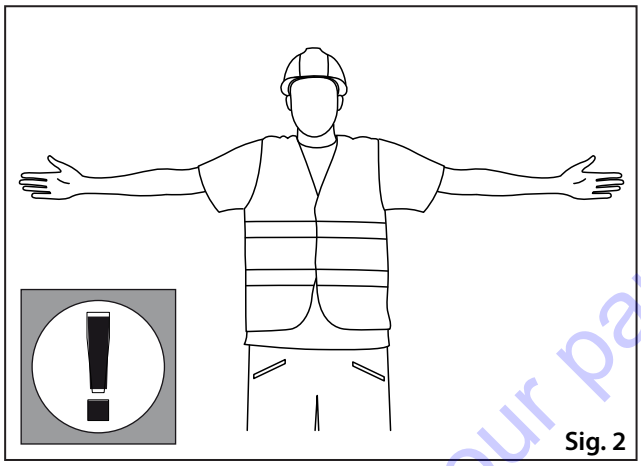
Sig. 11

Stop



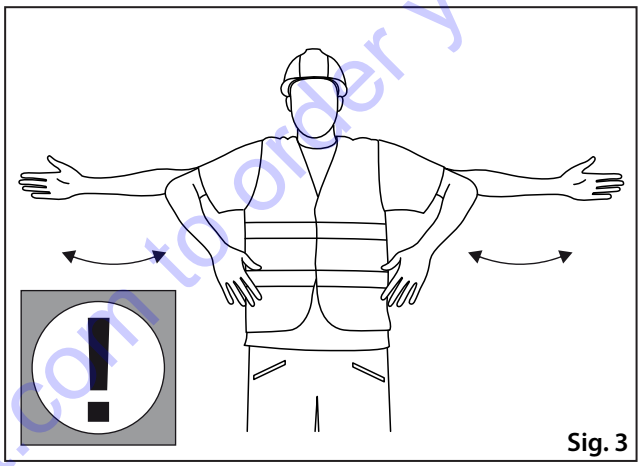
Sig. 1

Watch out



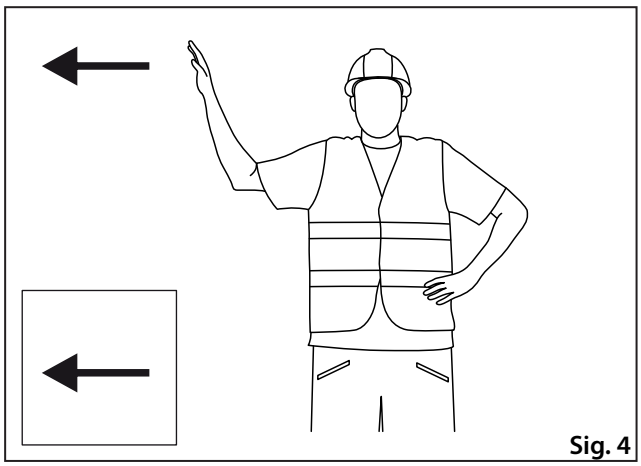
Sig. 2

Watch out, danger



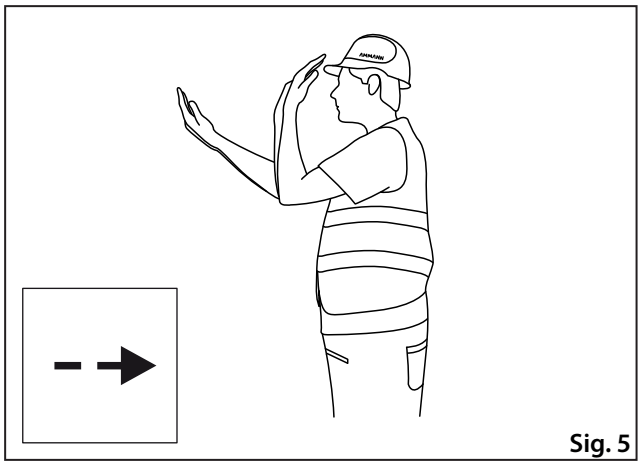
Sig. 3

Drive



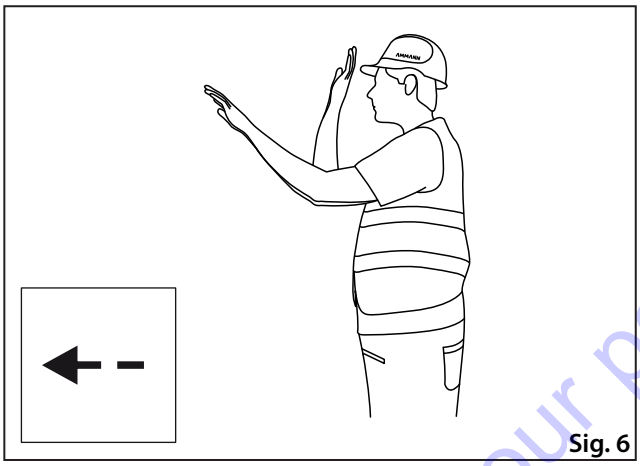
Sig. 4

Drive slowly forwards – towards me



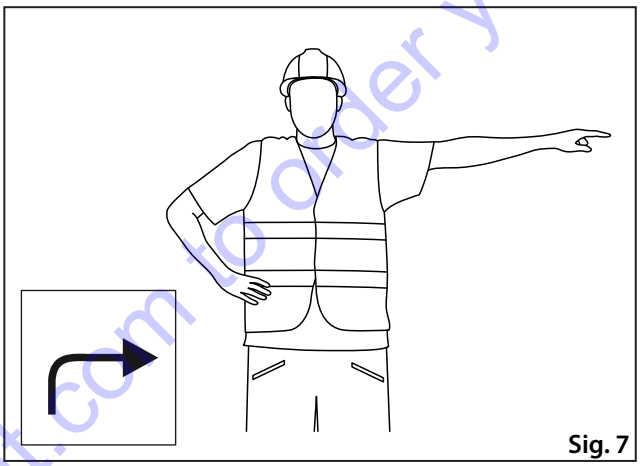
Sig. 5

Drive slowly backwards – away from me



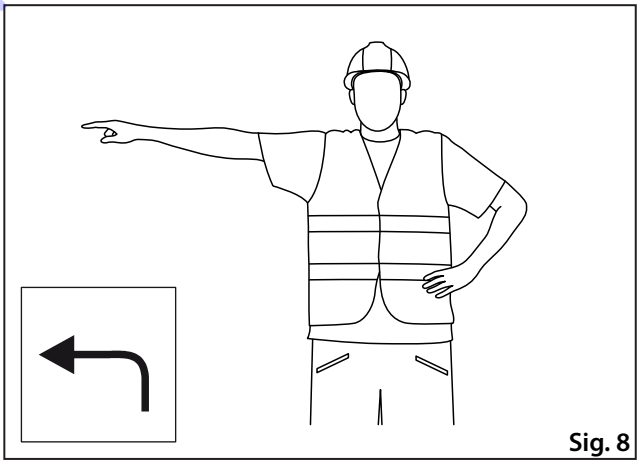
Sig. 6

Drive to the right



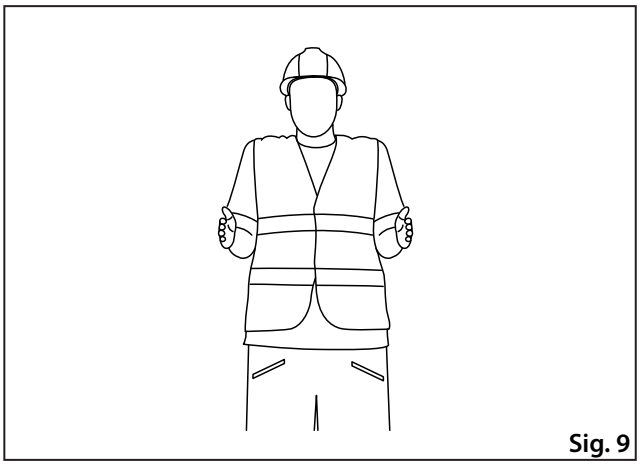
Sig. 7

Drive to the left



Sig. 8

Drive a short distance



Sig. 9

When operating and storing the Machine the User shall be liable to adhere to the general principles of health and environment protection, as well as the laws, regulations, and rules related to this issue, and effective within the territory where the Machine will be used.

2.2.1 Hygienic principles

- Oil products, cooling system media, battery media, and coating compositions incl. thinners are deleterious materials. Persons that come into contact with these products during Machine operation and maintenance shall be liable to follow general principles of own health protection and conform to the safety and hygienic directions from manufacturers of these products.

  Observe the following in particular:

  - Eye and skin protection when handling the batteries
  - Skin protection when handling oil products, coating compositions and cooling liquids
  - Wash your hands thoroughly upon work completion and before meal, treat your hands with proper tissue cream
  - When handling the cooling systems, please observe instructions given in the Operation Manual supplied with the Machine.

- Always store oil products, cooling system media, battery media and coating compositions incl. organic thinners, and the cleaning and preservation agents as well, in their original properly marked packages. Admit no storage of these materials in unidentified bottles or other vessels with regard to the risk of being interchanged. Especially hazardous is the potential of interchanging for eatables or drinks.
- If skin, mucosa or eyes are stained accidentally, or vapours inhaled, promptly apply the first air principles. Get prompt medical attention upon accidental ingestion of these products.
- When operating the Machine in cases of no cab mounted, or cab windows opened, always use ear muffs of proper type and version.

2.2.2 Ecological principles

- When discarded, the media for Machine's individual systems and some of the Machine's parts will become waste of hazardous properties against the environment.

  This waste product category includes the following in particular:

  - Organic and synthetic lubrication materials, oil and fuels,
  - Cooling liquids,
  - Battery media and the batteries themselves,
  - Tyre media
  - Cleaning and preservation agents,
  - All filters and filter elements removed,
  - All used and discarded hydraulic and fuel hoses, metal rubbers or other Machine's elements contaminated by the abovementioned products.

- Manufacturer and Manufacturer-accredited contracting service organizations or dealers take back these used materials or parts without cost:

  - oils
  - batteries
  - tyres

The mentioned materials and parts, when discarded, shall be handled in line with relevant national regulations to protect individual components of environment, and in conformity with the health protection regulations.

2.3 Machine preservation and storage

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

Wash and clean thoroughly the entire Machine. Before shutting down the Machine for preservation and storage, please heat the engine to its operating temperature while running. Park the Machine on paved, flat surface, in safe location with no danger of of damage to the Machine due to natural disasters (floods, landslides, fire origination, etc.).

In addition:

- Repair spots where paint has been impaired,
- Lubricate all lubricating points, actuator cables (cable assemblies), joints of the actuators, etc.,
- Check water media have been drained,
- Confirm cooling liquid has the antifreezing properties required,
- Check condition of the battery charges; let them be recharged if required,
- Spread chromated surfaces of piston rods with preservation fat,
- We recommend to protect your Machine against corrosion through spraying the preservation agent (spray-applied), and this especially in places of corrosion hazard.

The Machine treated like that needs no special preparation (set-up) before its subsequent putting into operation.

- Protect headlamps, external back mirrors and other elements of external wiring through spraying with special agent abd wrapping in PE foil,
- Preserve engine according to the Manufacturer's Directions - mark visibly the engine has been preserved.

Following 6 months we recommend to inspect the condition of preservation and renew it if required.

If storing the Machine under field conditions, please check the parking place is not exposed to any flooding hazard due to deluges, or whether any other type of risk occurs within such area!

NEVER start the engine in course of storage!

2.3.2 Preservation and storage for the period over 2 months long

To shut down the Machine the same principles apply like with short time preservation.

In addition, we recommend the following:

- Remove the batteries, check their condition and store in cold, dry room (recharge the batteries on regular basis),
- Bottom the drum frame up so the damping system has minimal sag,
- Protect rubber elements with paint using special preservation agent,
- Inflate tyres to their required pressure, and protect against sun radiation effects,
- Spread preservation fat over piston rods' chromated surfaces,
- Preserve the Machine through spraying with special agent, and this particularly in places of possible corrosion,
- Blind the induction manifold and exhaust of the engine with double PE foil, attach thoroughly with adhesive tape,

2.3.3 Dewaxing and inspection of a supplied machine

Check the Machine according to the shipping documents.

Check no parts of the Machine have been damaged during transportation, and that no parts are missing. Inform shipper about any deficiencies.

Before restoration of the Machine service, please dewax and wash the preservation agents away with high pressure stream of hot water added with normal degreasers while observing Directions for Use along with ecological principles.

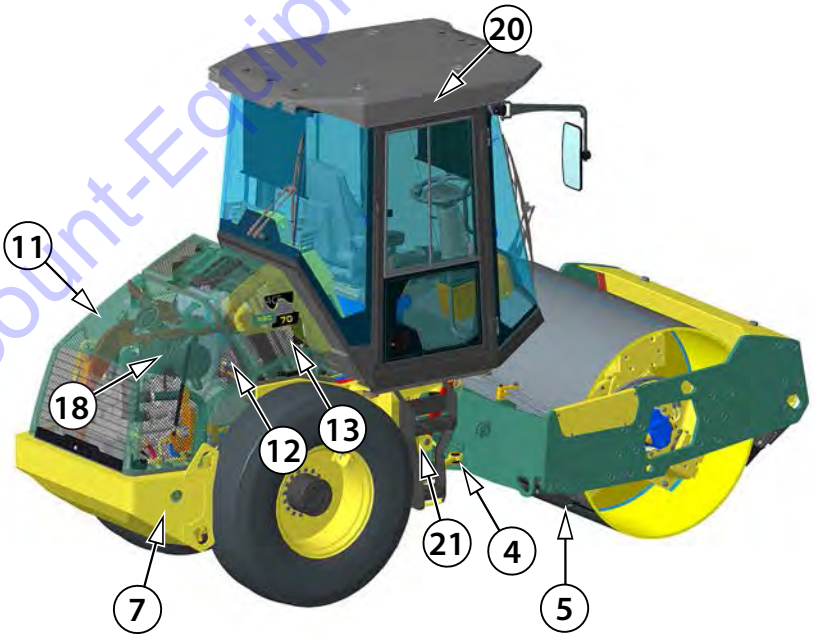
Carry out dewaxing and washing of the Machine at places equipped with collection sumps to catch rinsing water and dewaxing agents.

2.4 Machine disposal following its life cycle end

Upon Machine disposal following its life cycle end the User shall be liable to follow the national regulations, waste acts and environmental policy acts. We therefore recommend to always contact:

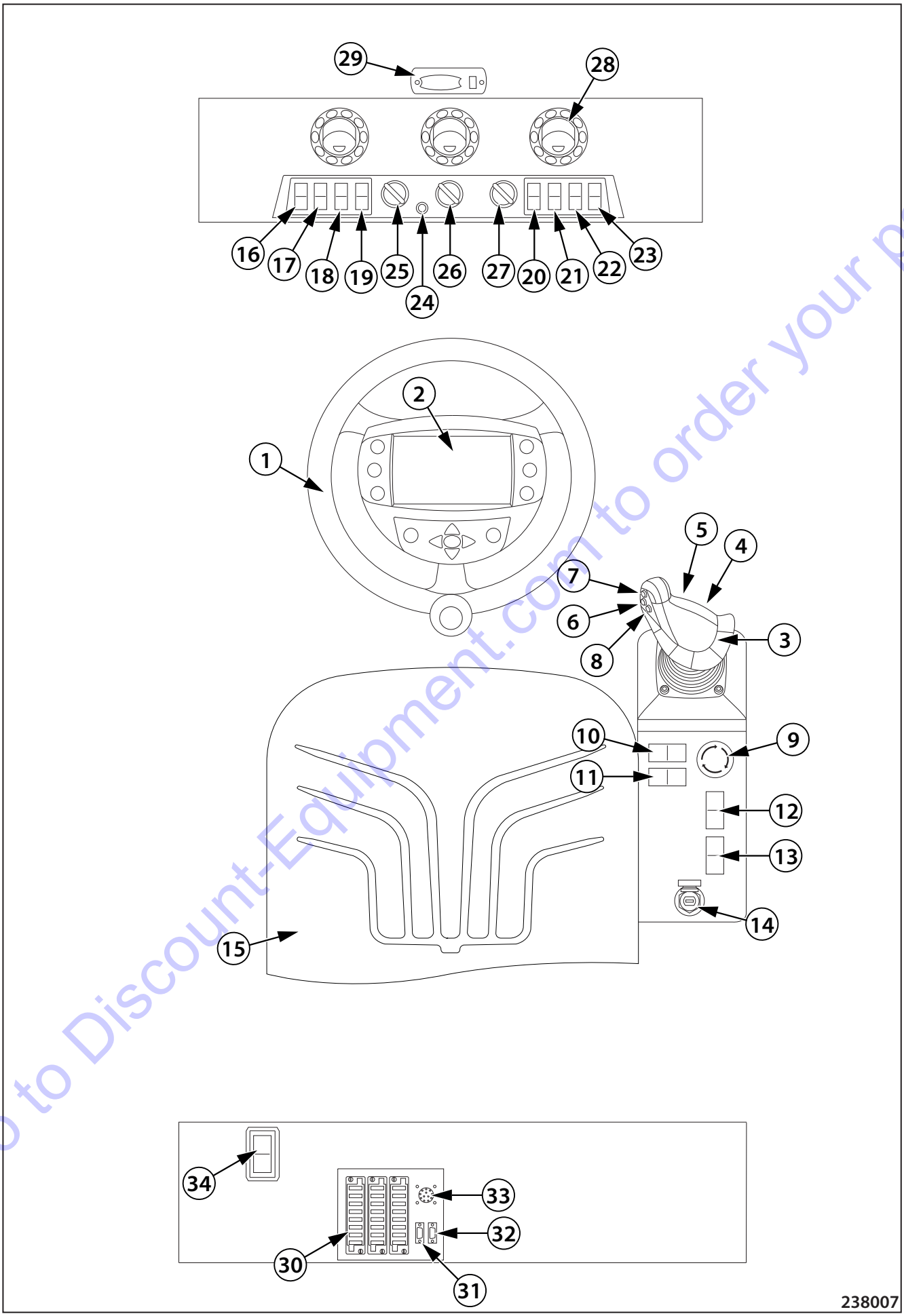
- Specialized companies with relevant authorization to deal with these operations,
- Machine Manufacturer or Manufacturer-appointed accredited contracting service organization.

Manufacturer bears no responsibility for any damage caused to Users' health or for any damage to environment due to non-adherence to the aforementioned warning.



256011

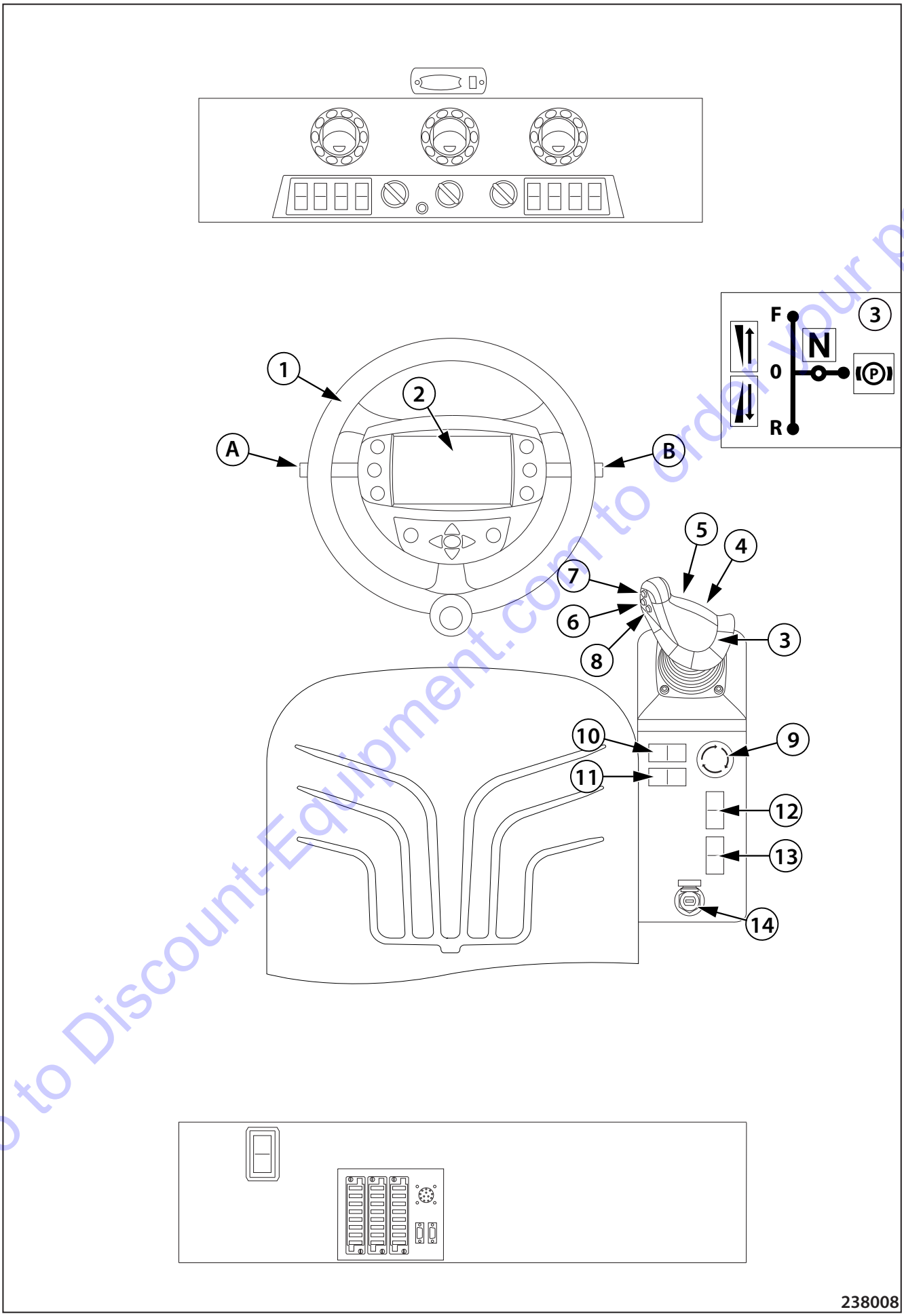
1. Drum frame
2. Tractor frame
3. Vibratory drum
4. Joint
5. Scrapers
6. Axle
7. Hydraulic tank
8. Batteries
9. Cab with integrated ROPS
10. Fuel tank
11. Bonnet
12. Engine
13. Combined cooler
14. Driver's stand
15. Steering hydraulic generator
16. Travel hydraulic generator
17. Vibration hydraulic generator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



Dashboard and control panel

1. Steering wheel
2. Display
3. Travel controller
4. Blade down button (optional)*
5. Blade up button (optional)*
6. Vibration button
7. Speed gear increase button
8. Speed gear decrease button
9. Emergency brake button
10. Warning horn button
11. Turn signal light switch
12. Vibration amplitude selector switch
13. Vibration mode selector switch
14. Ignition box
15. Operator seat
16. Rear window heating switch
17. Windscreen washer switch
18. Rear screen wiper switch
19. Front screen wiper switch
20. Additional lights switch
21. Road lights switch
22. Warning lights switch
23. Warning beacon switch (optional)
24. Air-conditioning switch (optional)
25. Air-conditioning thermostat (optional)
26. Heating temperature control
27. Heater fan speed switch
28. Air-conditioning outlets
29. Cab light
30. Fuse box
31. CAN 2 connector
32. CAN 1 connector (Diagnostics)
33. Engine diagnostics
34. Service switch

* Press the buttons (4) and (5) at the same time to enable the floating position of the blade.



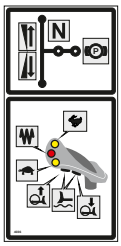
Steering wheel (1)

Lever A – Column tilting forward/backward

Lever B – Steering wheel adjustment up/down

Display (2)

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



4036bz

Travel control (3)

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.

N neutral – the machine is not braked, the function avoiding the downhill driving is enabled, the engine idle speed is set.

0 zero position – the machine is not braked, the function avoiding the downhill driving is disabled, the engine working speed is set.

F Forward travel

R Reverse travel

The machine braking is indicated by lighting up the brake indicator lamp on the display (2).

The travel speed corresponds to the speed selected on the display (2) or to the deflection of the travel control from the zero position (0).

AMN402

Blade button – down (4)

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

AMN403

Blade button – up (5)

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

AMN404

Blade floating position button (4, 5)

Press the buttons (4) and (5) at the same time to enable the floating position of the blade.

2612

Vibration button (6)

Press the button to turn on/off the function.

The function is displayed on the display (2).

AMN467

Speed gear increase button (7)

Press the button to engage the upper speed gear.

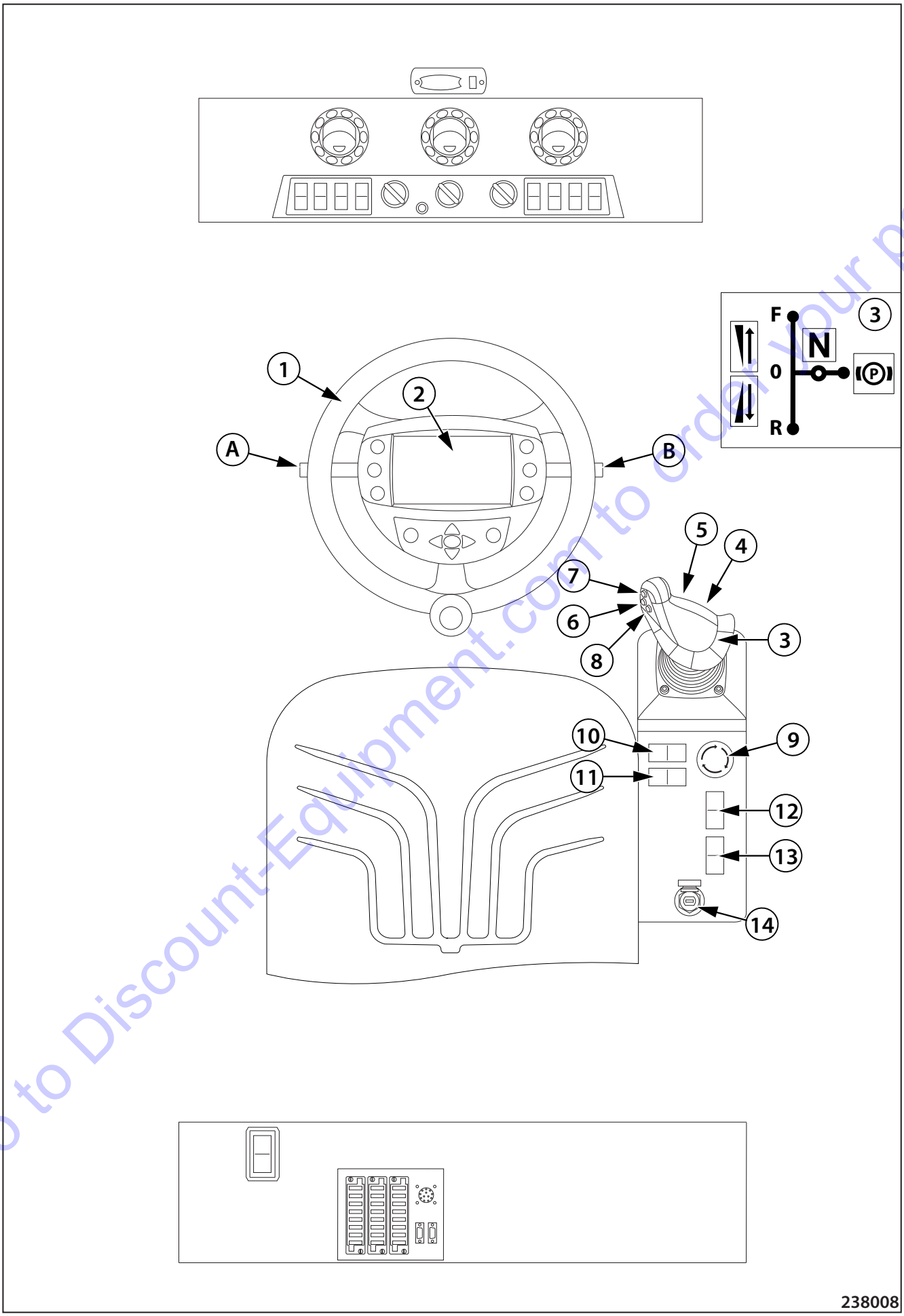
AMN468

Speed gear decrease button (8)

Press the button to engage the lower speed gear.

Do not exceed the 30-minute time limit while driving at the transport speed (speed gear 4). Risk of overheating of machine parts!

The speed gear 0 is adjusted as starting after 15 minutes after the switch box is turned off.




2582

Emergency brake button (9)

Press the button to enable the machine emergency brake, which is indicated by lighting up the brake and charging indicator lamps on the display (2).

The machine stops moving, the parking brake is enabled and the engine stalls!


2246

Warning horn switch (10)


2489

Turn signals switch (11)


2612

Vibration amplitude switch (12)

Left – amplitude II ON

Right – amplitude I ON

3726G

Vibration mode selector switch (13)

It is used for turning on the vibration in the MAN or AUT mode.

MAN – manual vibration mode; the vibration can be turned on even when the machine is not moving.

AUT – automatic mode to turn on/off the vibration.

When it is vibrated on the spot, the vibration will be switched off after 30 seconds automatically. For restarting the vibration, you must drive on with the machine to lubricate the drum bearings.

Ignition box (14)

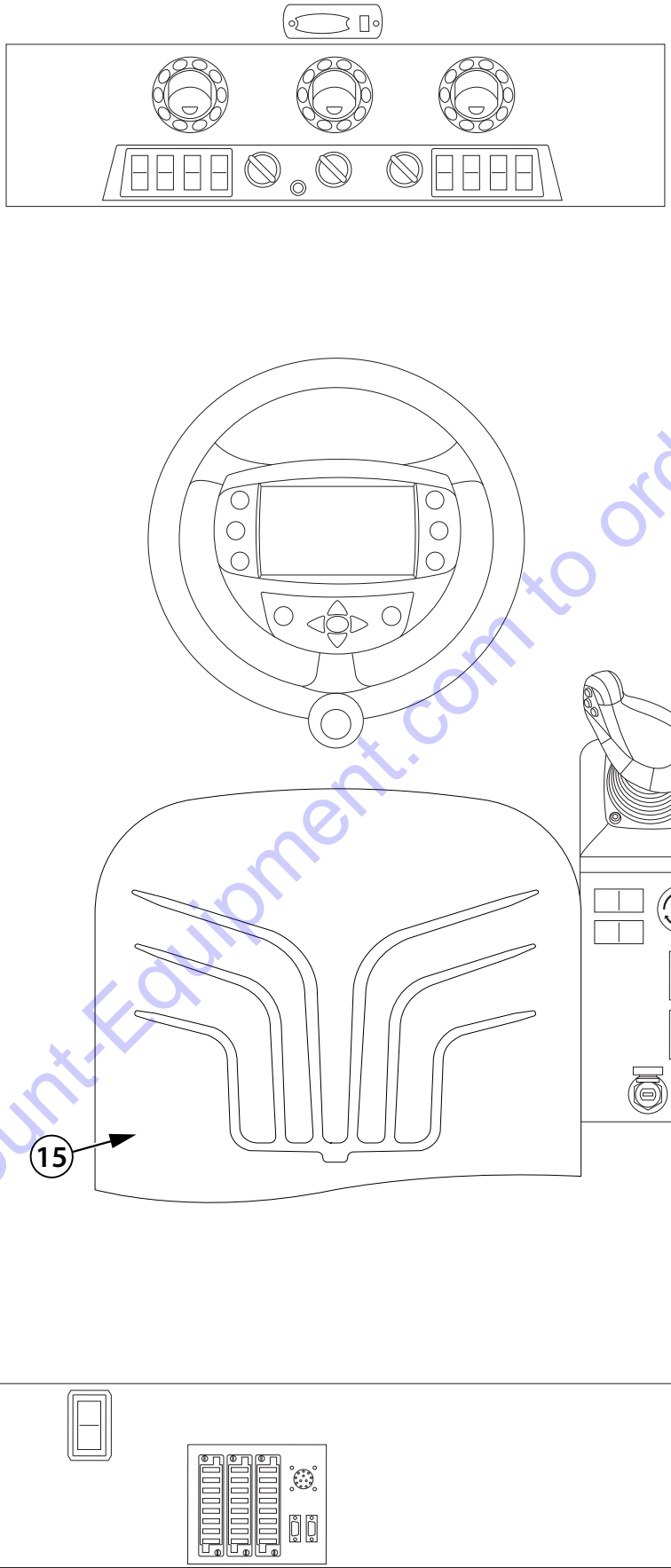
There are three positions "0-I-II" of the ignition box. The key can be inserted and removed in position "0" only.

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.



238009

Operator seat (15)

Seat adjustment:

1. Backrest position
2. Seat shifting
3. Seat angle
4. Seat springing stiffness according to weight indicator
5. Longitudinal seat travel
6. Armrest position
7. Lumbar support

Adjust the seat before driving the machine!

The driver must be fastened with the seat belt while driving!

Seat switch:

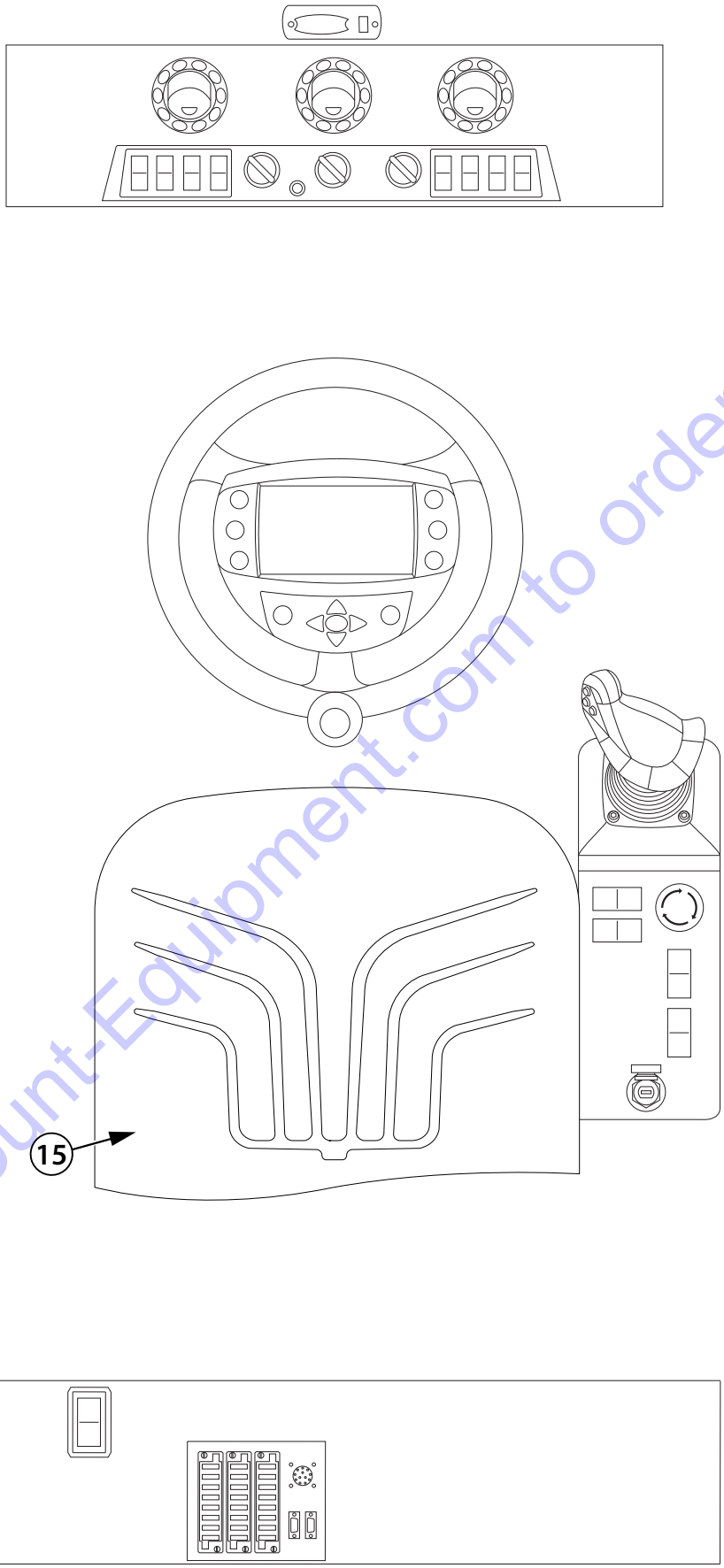
The seat switch is located in the seat cushion.

If the driver does not sit on the seat, one of the following limitations occurs – locking the machine moving-off, stopping the machine or turning off the engine.

The machine reaction differs depending on the position of the travel control, the seat switch activation (if the operator sits or does not sit on the seat) and the time during which the seat switch is disabled.

Travel control in the parking brake position

- the driver can leave the seat when the engine is running provided that no one moves around the machine and the machine is properly secured against misuse or theft.
- if the driver does not sit on the seat and the travel control is tilted out of the parking brake position, the engine will stop working immediately.
- if servicing or maintenance is performed on the machine, the driver must enable the service switch.



238009

Travel control out of the parking brake position

The machine reaction differs depending on the time during which the driver does not sit on the seat, i.e. 0–5 seconds, 5–10 seconds and 10 or more seconds after the switch is disabled.

- 0–5 seconds after the switch is disabled
  - an icon lights up informing that the switch was disabled and an audible intermittent signal is heard
  - the machine continues for the first 5 seconds unlimited in the preset mode
  - the function will be disabled if the driver sits down on the seat within 5 seconds.

- 5–10 seconds after the switch is disabled
  - an orange "Warning" indicator lights up
  - the machine starts to decrease the speed to a complete stop and the parking brake is enabled regardless of the position of the travel control
  - to disable the function, switch the seat switch again. To move off the machine, first move the travel control to the brake position and then select the travel direction

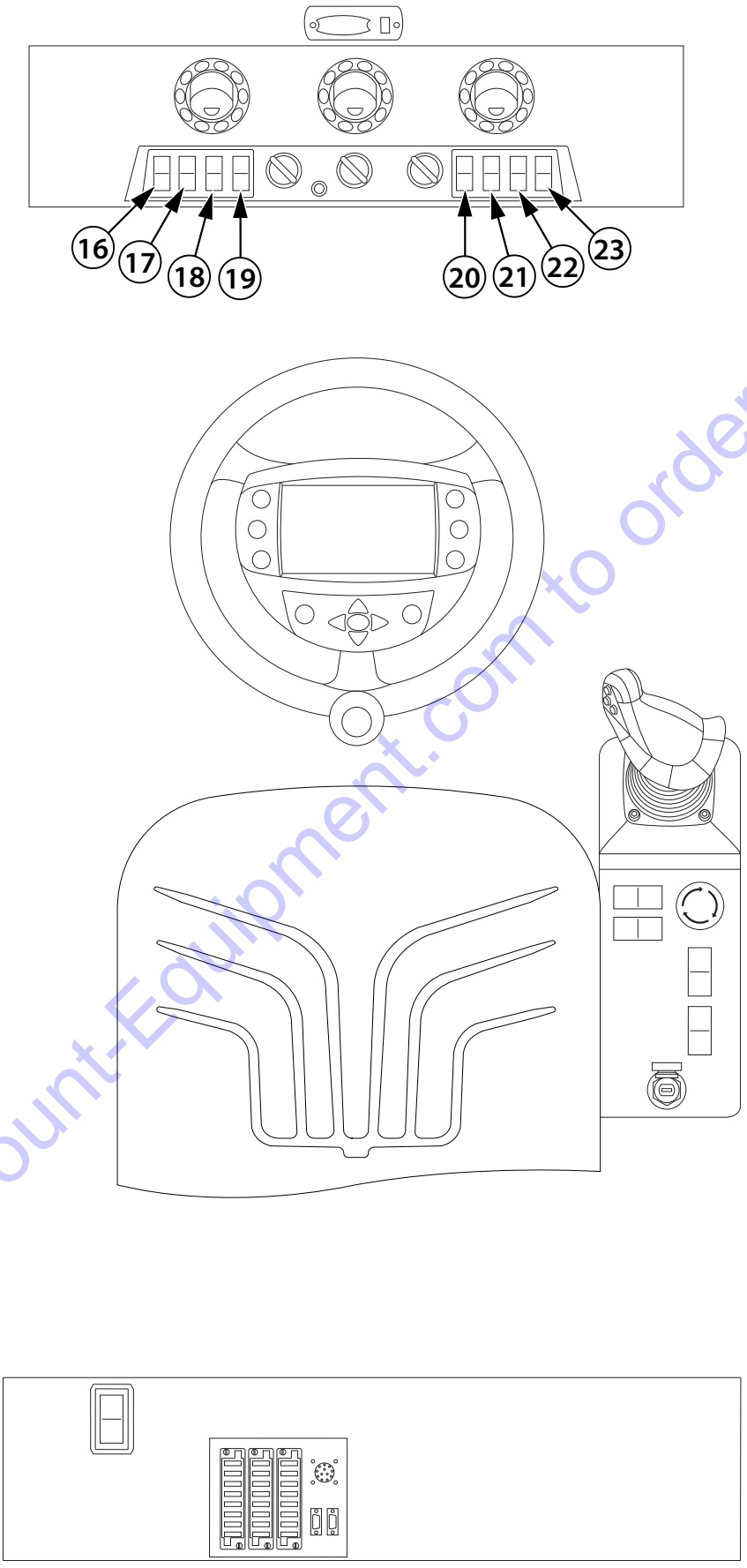
- 10 or more seconds after the switch is disabled
  - a red "Danger " indicator lights up
  - the engine will stop working 10 seconds after the seat is left.
  - to disable the function, move the travel control to the parking brake position. After turning the key to the "0" position, you can start the engine again.

Do not place any items on the seat switch!

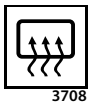
Check regularly the seat switch for correct function.

Document box

There is a document box on the back side of the seat (8).



238010


3708

Rear window heating switch (16)

It is used for turning on the rear window heating; the function is indicated by the indicator lamp in the switch.

The heating runs for 5 minutes after the switch is switched on.

- OFF
- ON


2260

Windscreen washer switch (17)

- Front windscreen washing ON
- OFF
- Rear windscreen washing ON

After the windscreen is sprayed, it is wiped twice.


596307

Rear screen wiper switch (18)

- 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.


596625

Front screen wiper switch (19)

- 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.


AMN450 AMN451

Additional lights switch (20)

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

- OFF
- Front lights
- Front and rear lights


AMN449 AMN448

Road lights switch (21)

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

- OFF
- Outline lights
- Dipped lights


2489

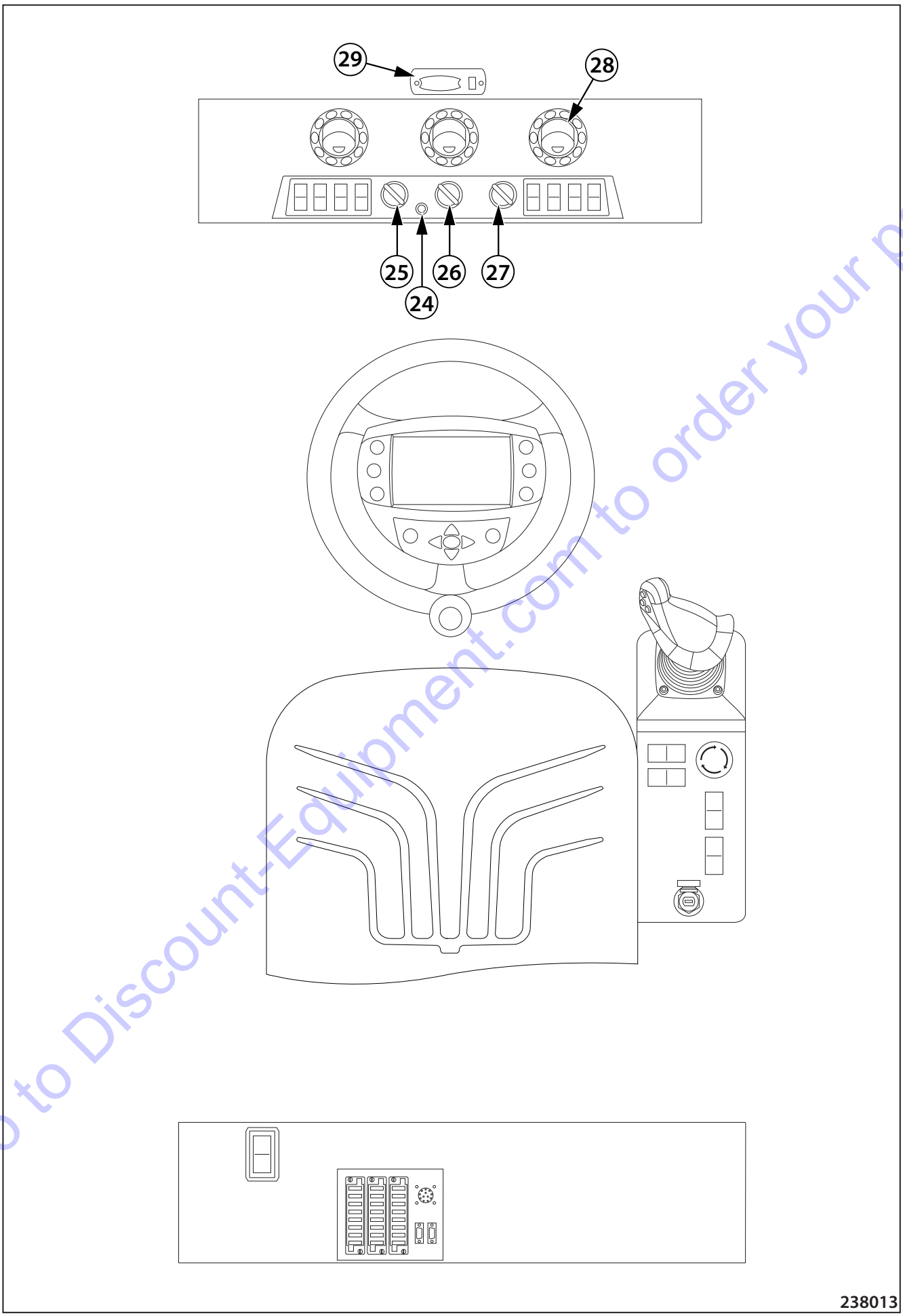
Warning lights switch (22)

It is used for turning on/off the warning lights – the function is indicated by flashing the indicator lamp in the warning light switch.


592348

Warning beacon switch (23) (optional equipment)

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



AMN452

Air-conditioning switch (24)

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


2441

Air-conditioning fan speed switch (optional equipment) (25)

Air flow control.

0 – OFF

1 – minimum

2 – medium

3 – maximum

Heating temperature control (26)

It is used for adjusting the air temperature.


AMN469

Heater fan speed switch (27)

Air flow control.

0 – OFF

1 – minimum

2 – medium

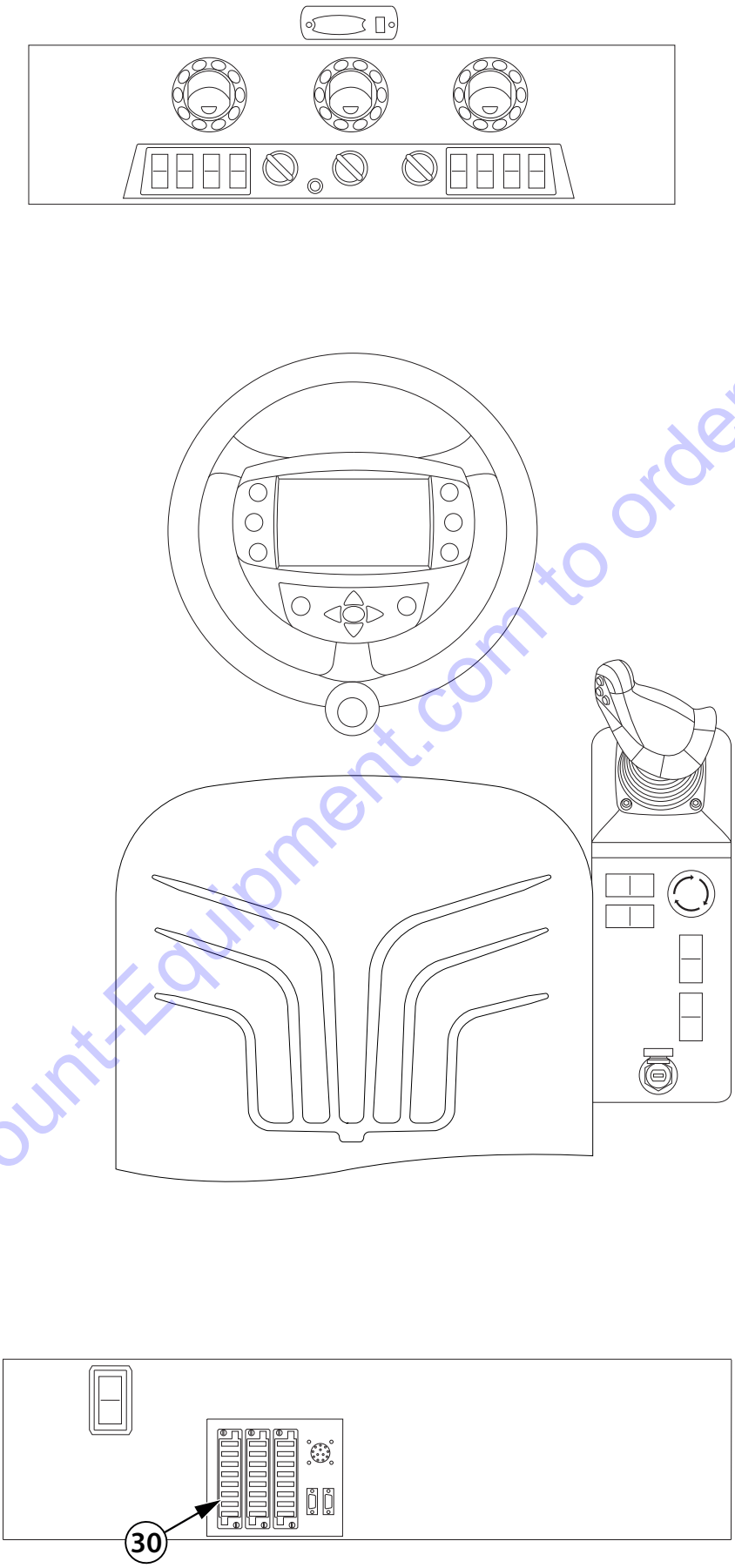
3 – maximum

Air-conditioning outlets (28)

The adjustment and angle of the flaps allows you to change the quantity and direction of the air flow.


592305

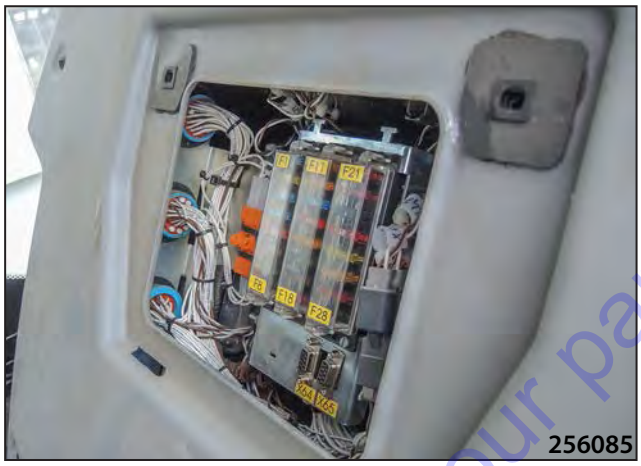
Cab lighting (29)



238014

Fuse box (30)

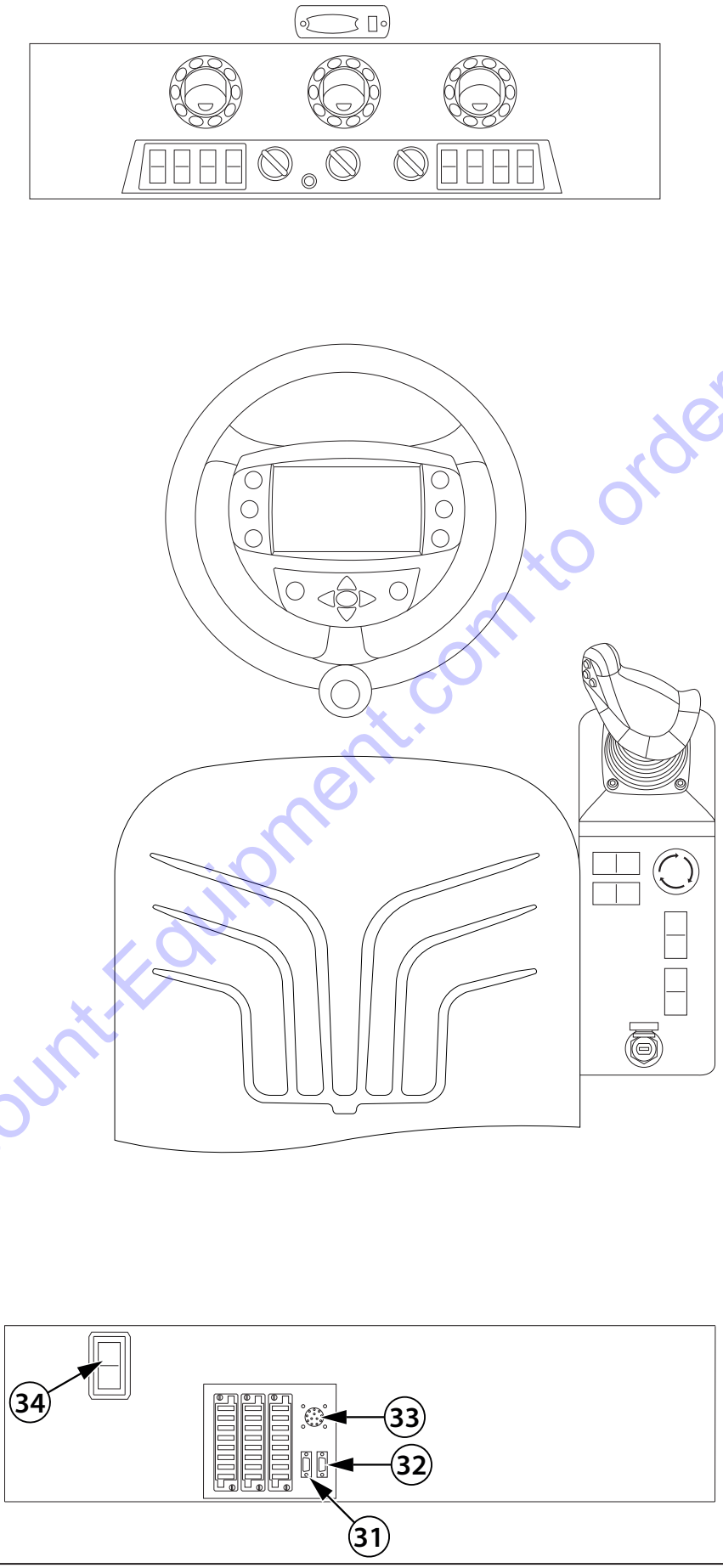
Fuse (F1) – 15 A	mounting sockets
Fuse (F2) – 20 A	ignition box
Fuse (F3) – 15 A	road headlamps, parking lights
Fuse (F4) – 15 A	working headlamps
Fuse (F5) – 10 A	horn, direction lights, beacon, cab lighting, brake lights
Fuse (F6) – 7,5 A	electromagnet of the cooler fan, power supply of the electronics of the control unit
Fuse (F7) – 35 A	power supply of the control unit
Fuse (F8)	reserve
Fuse (F11) – 5 A	signal for starting – engine computer
Fuse (F12) – 5 A	start blocking – engine computer
Fuse (F13) – 5 A	recharging, back signal horn, backlight of instruments
Fuse (F14) – 10 A	vibrator frequency sensors, left hydraulic motor speed sensor, fuel level indicator, water in fuel sensor, vibration electromagnets
Fuse (F15) – 5 A	emergency brake button, service switch
Fuse (F16) – 1 A	key voltage for the control unit
Fuse (F17) – 7,5 A	travel control, display, vibration switches, seat witch, seat rotation switch
Fuse (F18) – 3 A	engine diagnostic socket
Fuse (F21) – 10 A	radio
Fuse (F22) – 10 A	heating
Fuse (F23) – 10 A	air-conditioning relay
Fuse (F24) – 10 A	wipers
Fuse (F25) – 20 A	rear window heating
Fuse (F26) – 5 A	Telematic
Fuse (F27) – 5 A	tachograph
Fuse (F28)	reserve
Fuse (F30) – 80 A	Main fuse
Fuse (F31) – 20 A	air-conditioning
Fuse (F32)	reserve
Fuse (F33)	reserve
Fuse (F34) – 5 A	EGR valve
Fuse (F35) – 20 A	engine computer, fuel pump, air weight
Fuse (F36) – 5 A	memory
Fuse (F40) – 80 A	glowing



256085


256086


256104



238015

Connector CAN 2 (31)

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

Connector CAN 1 (diagnostics) (32)

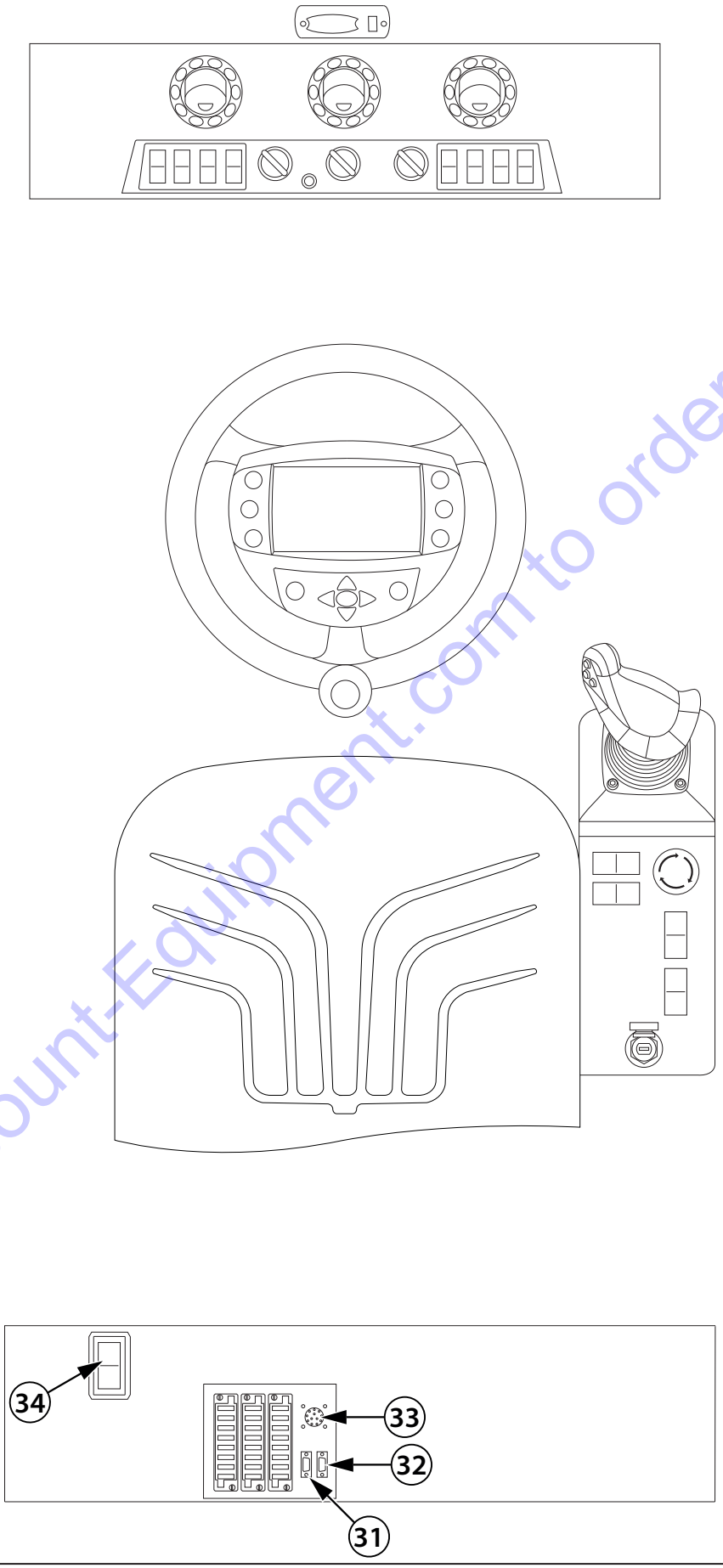
It is used for connecting an external computing unit (notebook) to ensure correct communication between the travel control and RC computer. After connecting to this bus using Bodas software, you can update PC, parameterize, troubleshoot, etc.

Engine diagnostics (33)

It is used for connecting to ECM (Electronic Control Module) – engine control unit and troubleshooting.

Note

ECM processes engine function data and controls the engine. Sensors pick up information about the engine function and its malfunctions and transfer them to ECM. The control unit evaluates inputs and transmits back commands for the engine to function properly. Failures and other engine data are identified and stored in ECM memory. The engine function and failure data are transferred after the service equipment (notebook) is connected to the socket.



238015

Service switch (34)

The service switch is located down on the left in the rear part of the cab.

The service switch locks an unpredictable machine response, allows safe movement around the machine during routine maintenance and servicing of the machine.

When the service switch is enabled and the engine is off:

- a service switch icon lights on the display,
- the engine cannot be started.

When the service switch is enabled and the engine is running:

- a service switch icon lights on the display,
- the machine is always braked independently of the travel control position,
- the engine speed can be increased by moving the travel control to the "F" position,
- power outputs of the control unit are disconnected.

Always enable the service switch after moving the travel control (3) to the brake position (P).

Always use the switch while servicing.

It is forbidden to use the service switch for stopping the machine.

Mounting socket

The mounting 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.

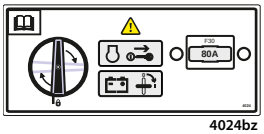
Windscreen washer tank

Fill with standard available media.

Fill with antifreeze or drain before the winter season starts!

Control lever

It is used for controlling the hand pump for releasing the machine brakes.



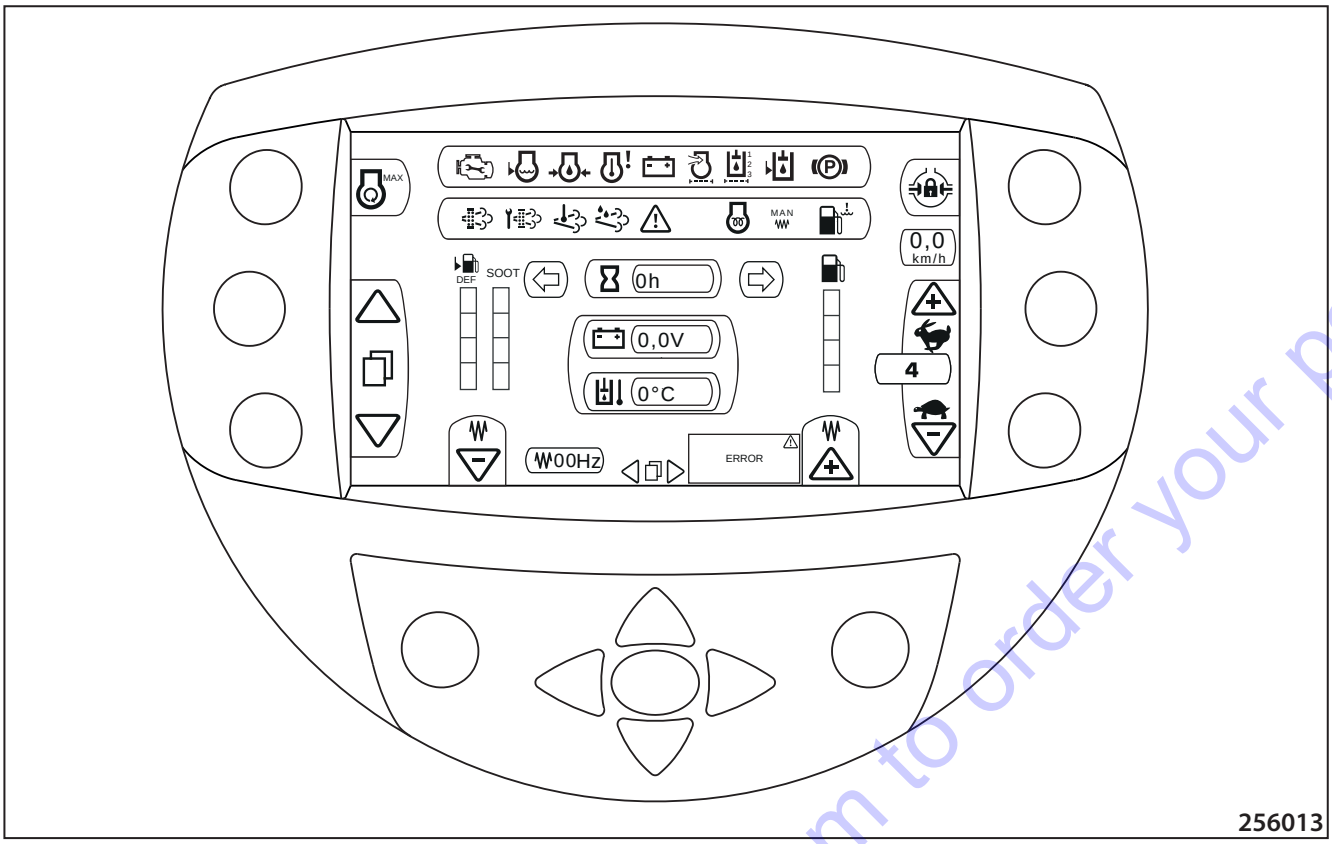
4024bz

Battery disconnector

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

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

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



2.6.1 Display control – operation screen

It is used for controlling the machine and getting information during operation of the machine.

AMN112

Maximum engine speed button

It is used for setting the engine operating speed.

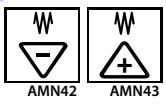
It is used for adjusting the maximum engine speed of 2,200 min^{-1} (RPM).


AMN409

Buttons to browse values

The buttons are used for changing the displaying between eight parameters (coolant temperature, hydraulic oil temperature, engine lubrication pressure, battery voltage, current fuel consumption, engine speed, engine load, vibration frequency).

Each of the buttons displays parameters in a separate field.


AMN42 AMN43

Vibration frequency buttons

The buttons are used for adjusting the vibration frequency.

Frequency I – 30 Hz (1800 VPM)

Frequency II – 36 Hz (2160 VPM)

AMN44

Travel speed buttons

The buttons are used to set the speed gear if the machine is equipped with a blade.

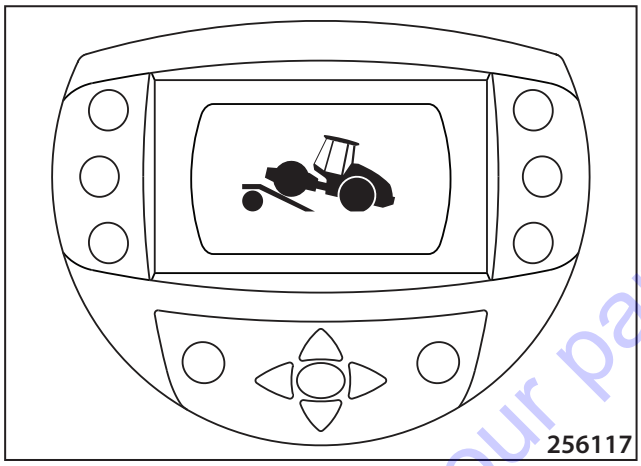
Do not exceed the 30-minute time limit while driving at the transport speed (speed gear 4). Risk of overheating of machine parts!

The speed gear 0 is adjusted as initial 15 minutes after the switch box is turned off.

Loading mode (speed gear 0)

The differential lock and the working (vibration) functions of the machine are locked in the speed gear 0.

The loading mode icon will appear in the middle of the display.



Differential lock button

It is used for turning on the differential lock.

The differential lock prevents the drum from slipping when crossing a difficult terrain.

Speed gear 0

The differential lock button is enabled automatically in the speed gear 0.

Speed gear 1–3

The differential lock can be enabled manually only in the speed gear 1–3.

Speed gear 4

The differential lock button cannot be enabled in the speed gear 4.

Turn the differential lock off after the difficult ground has been overcome!

Engine failure indicator lamp

The indicator lamp indicates an engine failure.

The lighting indicator lamp during operation of the engine indicates a failure.

The engine stalls – the machine stops and the parking brake is enabled.

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


AMN48

Coolant level indicator lamp

The indicator lamp indicates low coolant level.

The lighting indicator lamp during operation of the engine indicates a failure.

The engine stalls – the machine stops and the parking brake is enabled.

The engine can be started only after the failure is repaired and the coolant is refilled to the specified limit!


AMN113

Engine lubrication indicator lamp

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.

Start the engine only after the defect is repaired!


AMN50

Engine overheating indicator lamp

The indicator lamp indicates a high temperature of the engine.

The lighting indicator lamp during operation of the engine indicates a failure.

The engine stalls – the machine stops and the parking brake is enabled.

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


2777

Battery charging indicator lamp

It indicates that the battery charging function is in order. After the key in the ignition box (14) is switched over to the position "I", the indicator lamp must light up and it must go off after the start-up.

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!


AMN51

Air filter clogging indicator lamp

The lighting indicator lamp indicates that the filter element is clogged above the allowed limit.

Stop the machine and replace the cartridge immediately!

Indicator lamp of hydraulic oil filter clogging

The lighting indicator lamp indicates that the filter cartridge is clogged.

Immediately replace the element!

Indicator lamp for hydraulic oil level

The lit indicator lamp indicates a low hydraulic oil level.

The engine stalls – the machine stops and the parking brake is enabled.

Repair the fault and refill the oil to the specified limit.

Parking brake indicator lamp

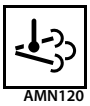
The lighting indicator lamp indicates that the parking brake was enabled.

Indicator lamp of DPF (Diesel Particulate Filter) clogging

The indicator lamp signals that it is required to regenerate DPF.

Indicator lamp of DPF (Diesel Particulate Filter) cleaning

The indicator lamp signals that it is required to replace DPF.



Indicator lamp of high temperature of exhaust gases

The indicator lamp signals the SCR (Selective Catalytic Reduction) regeneration in progress or exceeding of limit temperature of combustion gases at normal operation.


AMN128

DEF (AdBlue) level indicator lamp

The machine is not equipped with a DEF (AdBlue) injecting system.


AMN58

Danger warning

The indicator lamp and an audible signal indicate a diagnostic error of the machine electronics.

In case of a serious failure, the machine changes to the emergency mode (travel gear 0, working functions disabled).

An error message will be displayed. After the machine is turned off with the key, the error will be reset. After turning the key to the "I" position, a test is carried out to determine whether the fault persists.

If an error occurs repeatedly that you are not able to remove, shut down the machine and call the service. After turning the key to the "I" position, a test is carried out to determine whether the fault persists.

If an error occurs repeatedly that you are not able to remove, shut down the machine and call the service. For easier communication with the service team, check error messages on the service screen (3rd screen) and copy down codes of all diagnosed errors of the engine control unit and machine control unit.


AMN453

Engine pre-heating indicator lamp

It indicates the engine warming up before the cold start.

Start the engine after the indicator lamp has gone out!

AMN447

Manual vibration indicator lamp

It indicates that the manual vibration is enabled.


AMN57

Fuel filter indicator lamp

The lighting indicator lamp indicates water in the fuel filter.

If this indicator lamp is lighting, clean the coarse fuel filter!


2489

Direction indicator lamps

595426

DEF (AdBlue) level indicator

The machine is not equipped with a DEF (AdBlue) injecting system.

AMN407

Sooting indicator

It shows the sooting level.


595425

Fuel gauge indicator

The indicator shows the fuel level in the tank.


AMN73

Counter of worked engine hours

AMN64

Vibration indicator

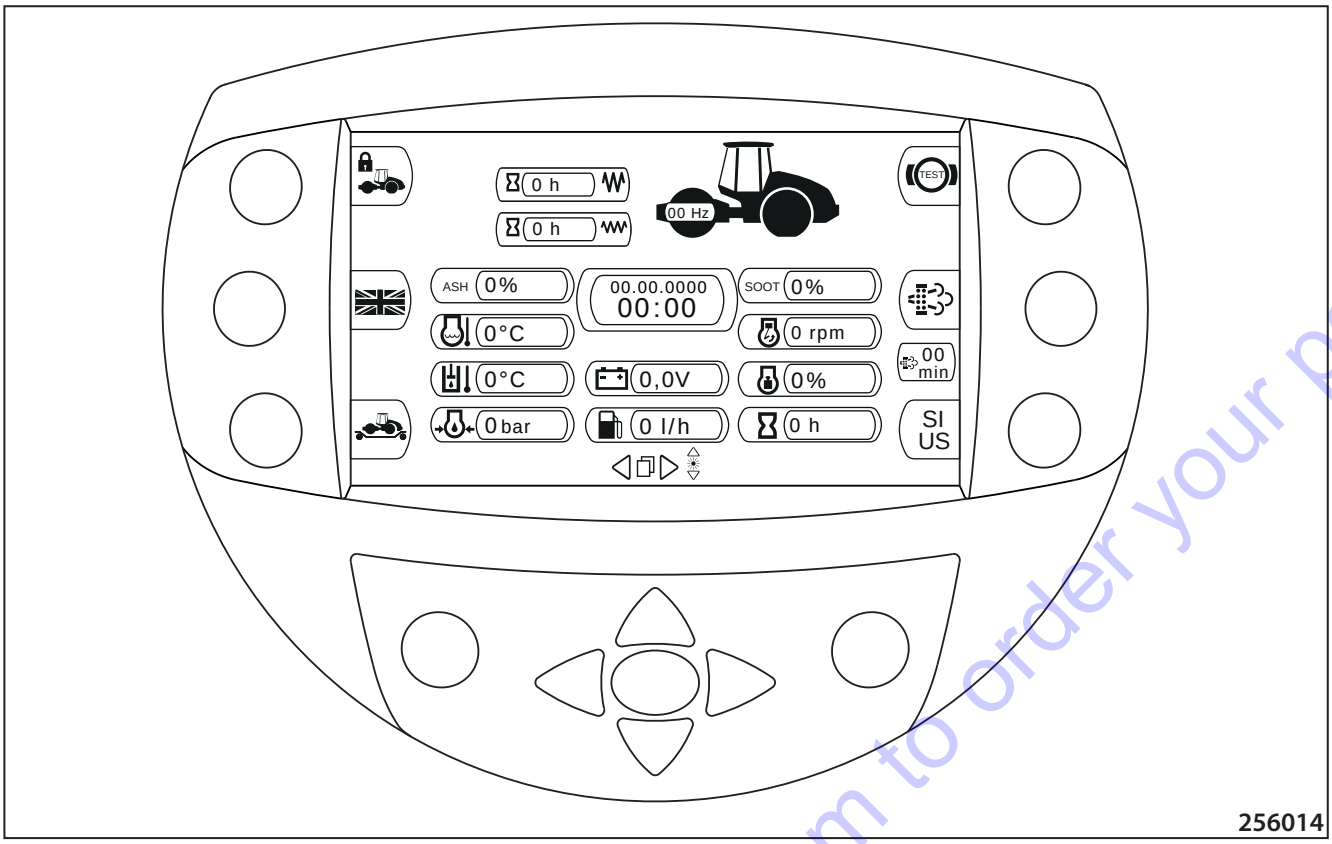
The indicator shows the selected amplitude and frequency.


AMN66

Screen switching

Press the button to view the following screen for 15 seconds.

To set the following screen as the home screen, hold the button for 5 seconds.



256014

2.6.2 Display control – Information screen

It is used for controlling the machine and getting information during operation of the machine.


AMN400

Ignition lock button

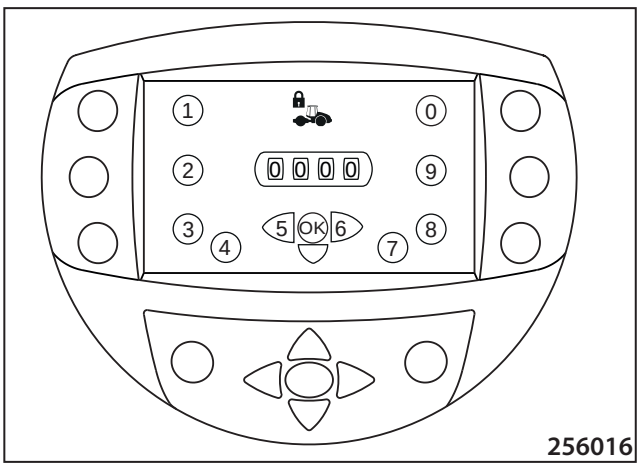
It is used for enabling and disabling the ignition lock.

The ignition lock prevents the engine from starting until PIN is entered.

Procedure:

- Press the ignition lock button (a screen will be displayed to enter the PIN)
- Enter PIN
- Confirm by pressing the OK button for 4 seconds (audible signal will be heard).

After the key is off for more than 15 minutes, entering PIN will be required at the next engine start.



256016


AMN256

Button to switch the display language

It is used for changing the display language.


AMN401

Transport mode button

It is used for enabling and disabling the transport mode. The activation and deactivation is done by entering PIN.

The active transport mode is indicated by the icon on the display.

The transport mode of the machine is set by the manufacturer and is used for shipment and transportation of the machine to a customer.

Only the following functions are enabled in the transport mode:

- differential lock ON,
- speed gear 0 ON – speed 0–3 km/h (0–1.9 MPH).

These functions are disabled in the transportation mode:

- working functions of the machine (vibration),
- speed gear changing.

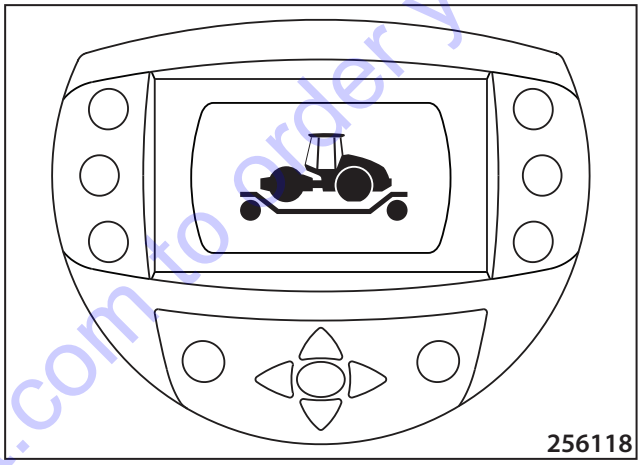
Procedure:

- Press the transport mode button (the screen will be displayed to enter the PIN);
- Enter PIN;
- Confirm by pressing the OK button for 4 seconds (audible signal will be heard).

To enable and disable the ignition lock or transport mode, use the same PIN code.

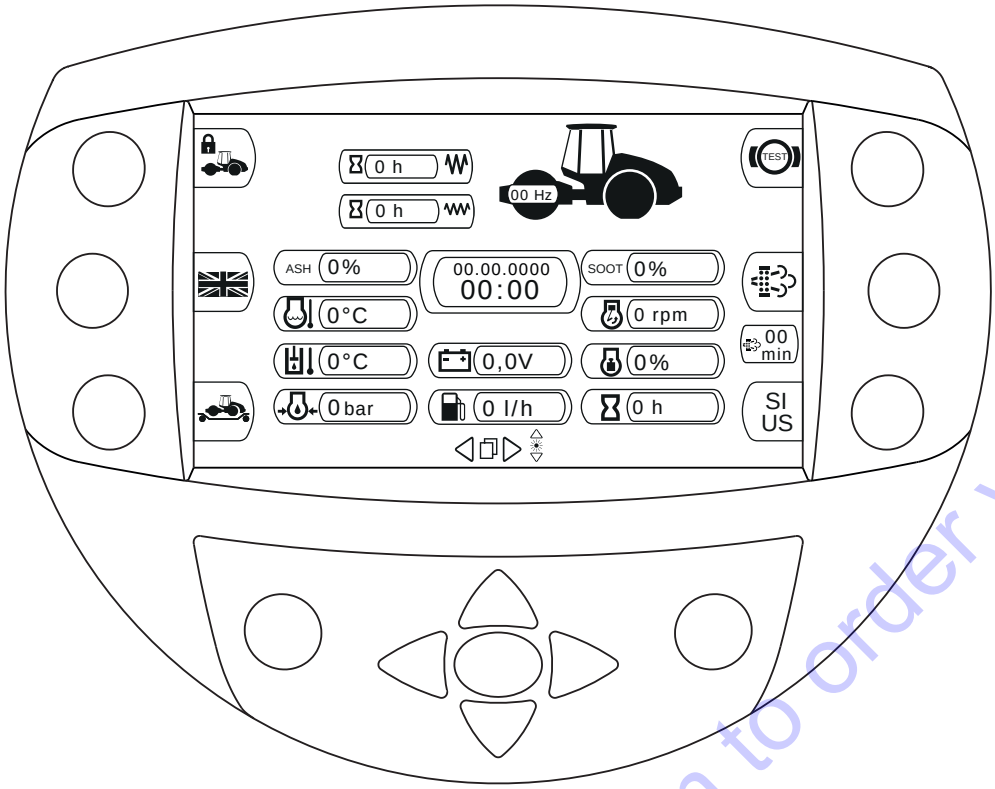
For the PIN code, see the PIN card in the documentation set. There are two PIN cards supplied with the machine.

If you lose the PIN card, you can contact your dealer and get your correct PIN code for your machine.


256118

256018

2.6 Actuators and dashboard instruments



256014

AMN69

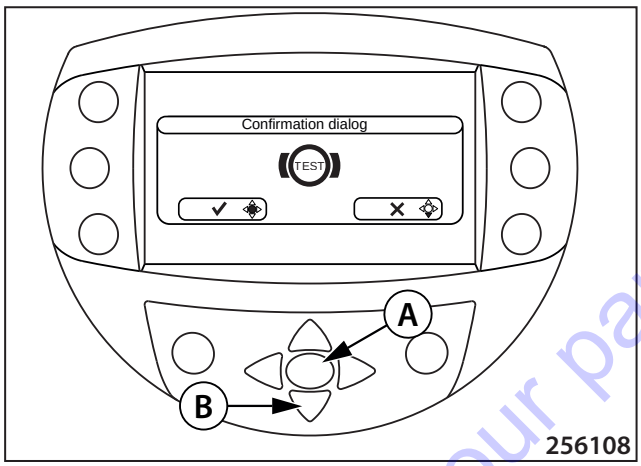
Brake test button

It is used for checking the machine brakes for correct operation (the operator is prompted to check the brakes every 24 hours).

After you press the brake test button, a confirmation dialog will appear.

Press the middle button (A) to confirm the start of the brake test.

Press the lower button (B) to cancel the start of the brake test.



AMN118

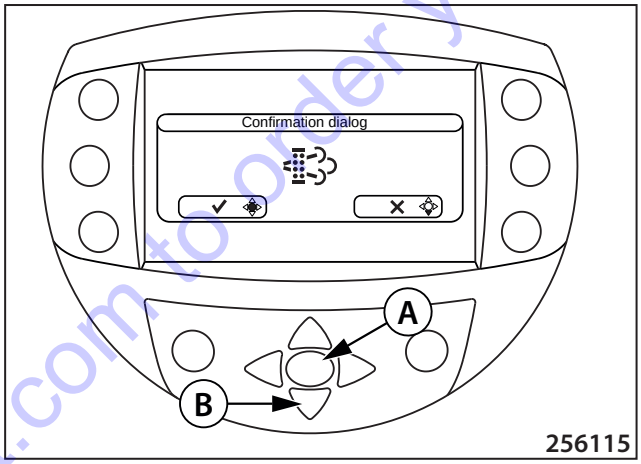
Regeneration button

It is used for enabling the DPF regeneration.

After you press the regeneration button, a confirmation dialog will appear.

Press the middle button (A) to confirm the start of the DPF regeneration.

Press the lower button (B) to cancel the start of the DPF regeneration.



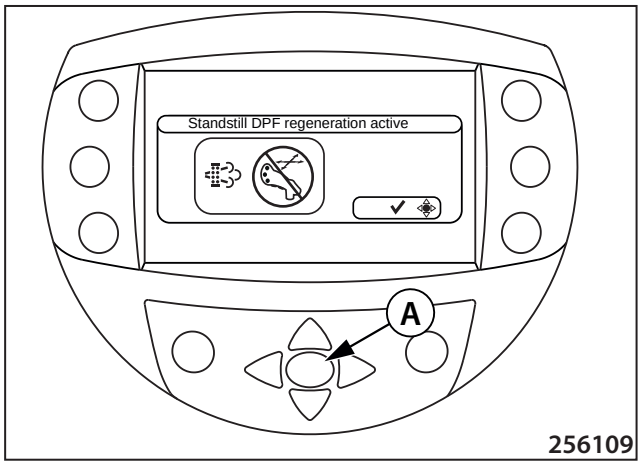
After the start of the DPF regeneration is confirmed, the following information dialog will appear:

- DPF regeneration enabled
- it is forbidden to move with the travel control

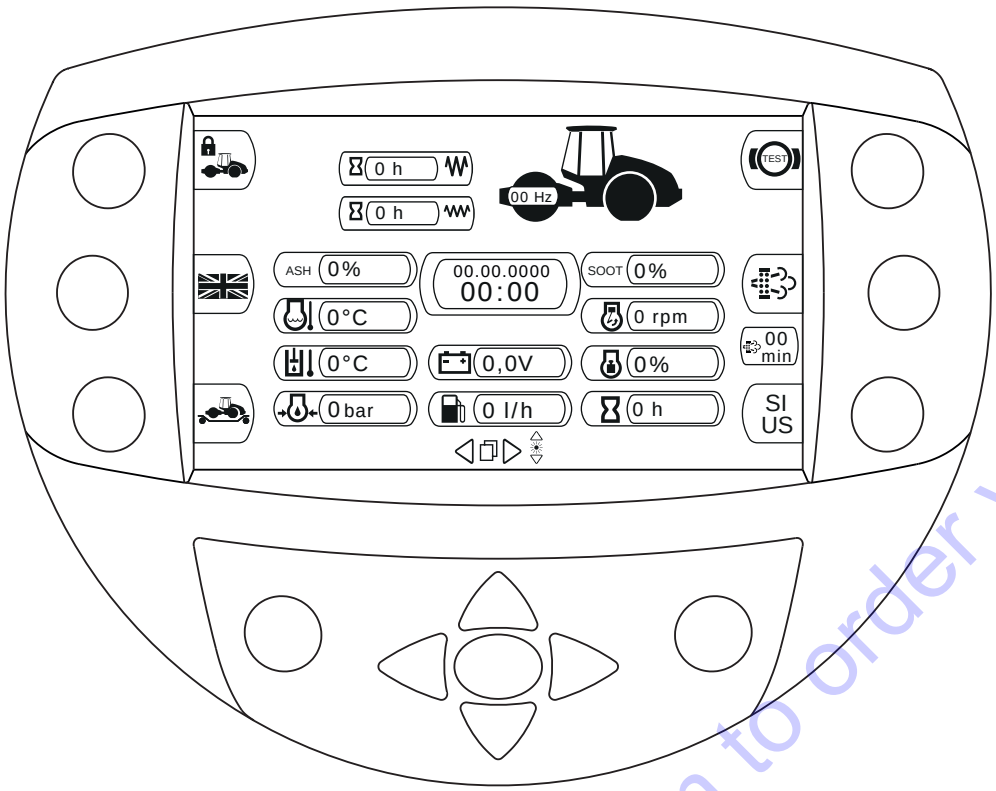
Note

The dialog will appear when the DPF regeneration is started or if the function is enabled and the operator has not pressed any button for more than 60 seconds.

The dialog can be confirmed by pressing the middle button (A).



2.6 Actuators and dashboard instruments



256014

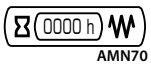

AMN417

Regeneration duration indicator

It serves for displaying the time required for completing the SCR catalyst regeneration.

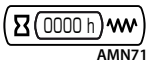
AMN244

Button for switching between SI/US units



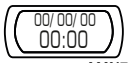
AMN70

Worked hours indicator – amplitude II



AMN71

Worked hours indicator – amplitude I



AMN74

Date and time indicator

Setting:

Hold the OK button pressed for 5 seconds.

AMN114

Set the date and time using the arrows.


AMN76

Coolant temperature indicator


2635

Hydraulic oil temperature indicator

It shows the current hydraulic oil temperature.

Stop the machine and check the oil level, or look for a defect!


AMN113

Engine lubrication pressure

It shows the engine lubrication pressure in kPa.


2777

Current battery voltage indicator


595425

Current fuel consumption indicator

AMN407

Sooting indicator

It shows the sooting level.


AMN77

Motor speed indicator


AMN75

Engine load indicator

It shows the current engine load in %.


AMN73

Counter of worked engine hours


AMN66

Screen switching

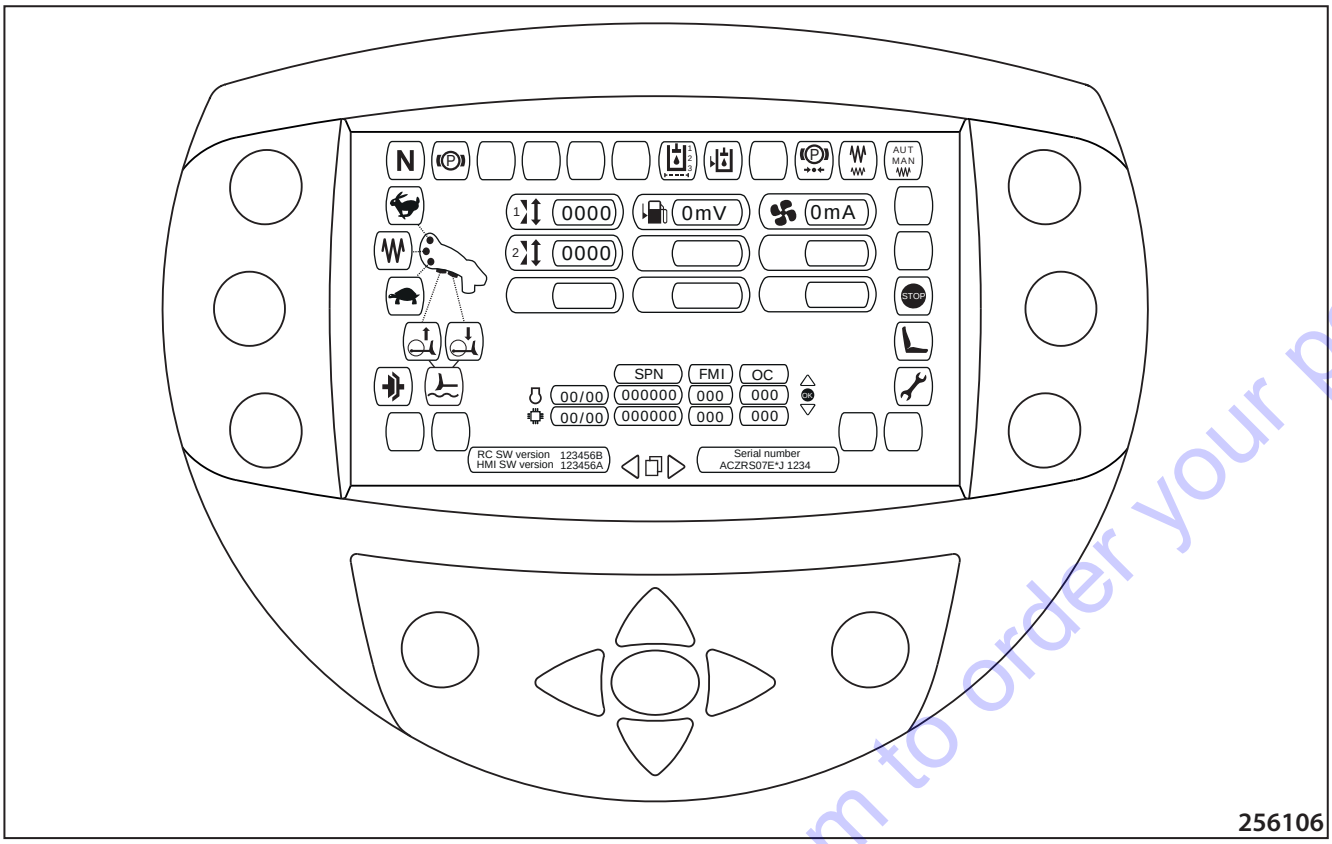
Press the button to view the following screen for 15 seconds.

To set the following screen as the home screen, hold the button for 5 seconds.


AMN105

Display backlight

The display backlight intensity can be adjusted using the buttons.



2.6.3 Display control – Service screen

The screen is used for basic diagnostics of inputs into the machine control unit and for displaying error messages.


AMN132

Start up conditions met


AMN404

Blade floating position


AMN402

Blade button – down


AMN403

Blade button – up


AMN468

Travel speed decrease button


2612

Vibration button


AMN467

Travel speed increase button


AMN82

Lever in the neutral position


2703

Lever in the parking brake position


3349

Switch of indication of hydraulic oil filter clogging


591507

Hydraulic oil level switch

AMN432

Pressure parking brake switch


AMN129

Amplitude II switch

Amplitude I switch

AMN130

Automatic vibration switch

Manual vibration switch

AMN90

Emergency brake switch


AMN92

Seat switch


3701

Service switch

AMN93

AMN94

Travel lever sensor – forward, rearward


AMN98

Fuel level sensor


594701

Output to fan

AMN101

SPN (Suspect Parameter Number)
(Failure source information)

AMN102

FMI (Failure Mode Identifier)
(Failure cause information)

AMN103

OC – Occurrence counter


AMN106

Engine error message


AMN107

Machine error message

AMN243

Error list browsing

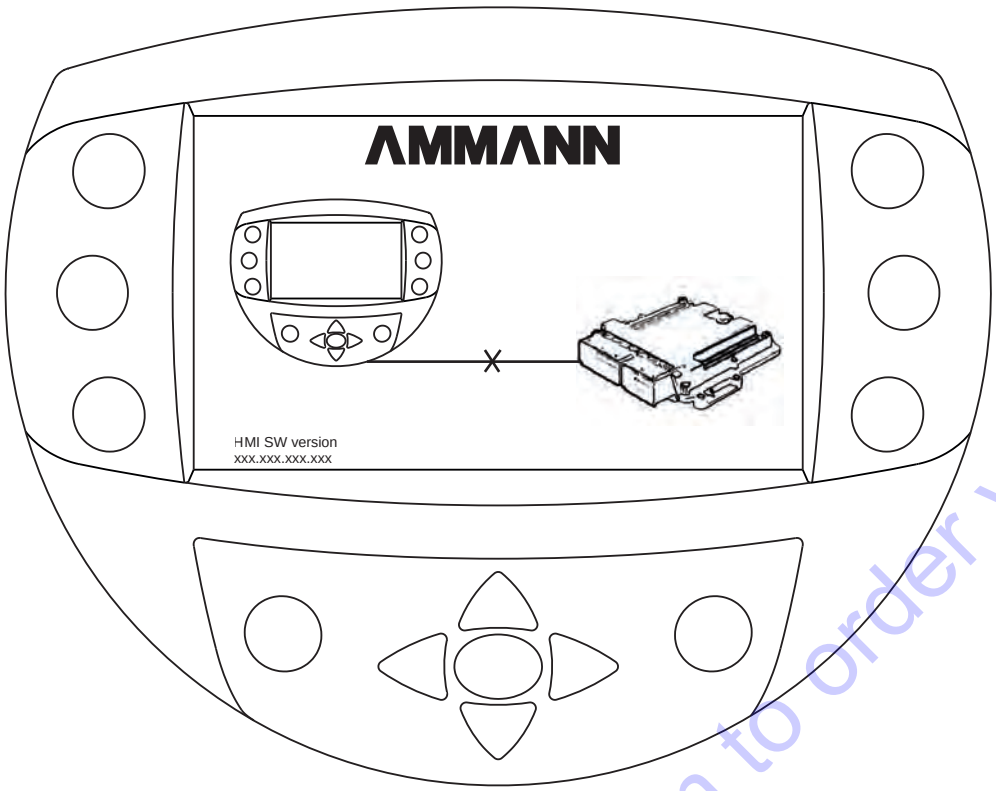
The OK button is used for switching between error lists of the control unit of the engine and of the machine. The arrows are used for scrolling in the error list.


AMN66

Screen switching

Press the arrow to view the following screen for 15 seconds.

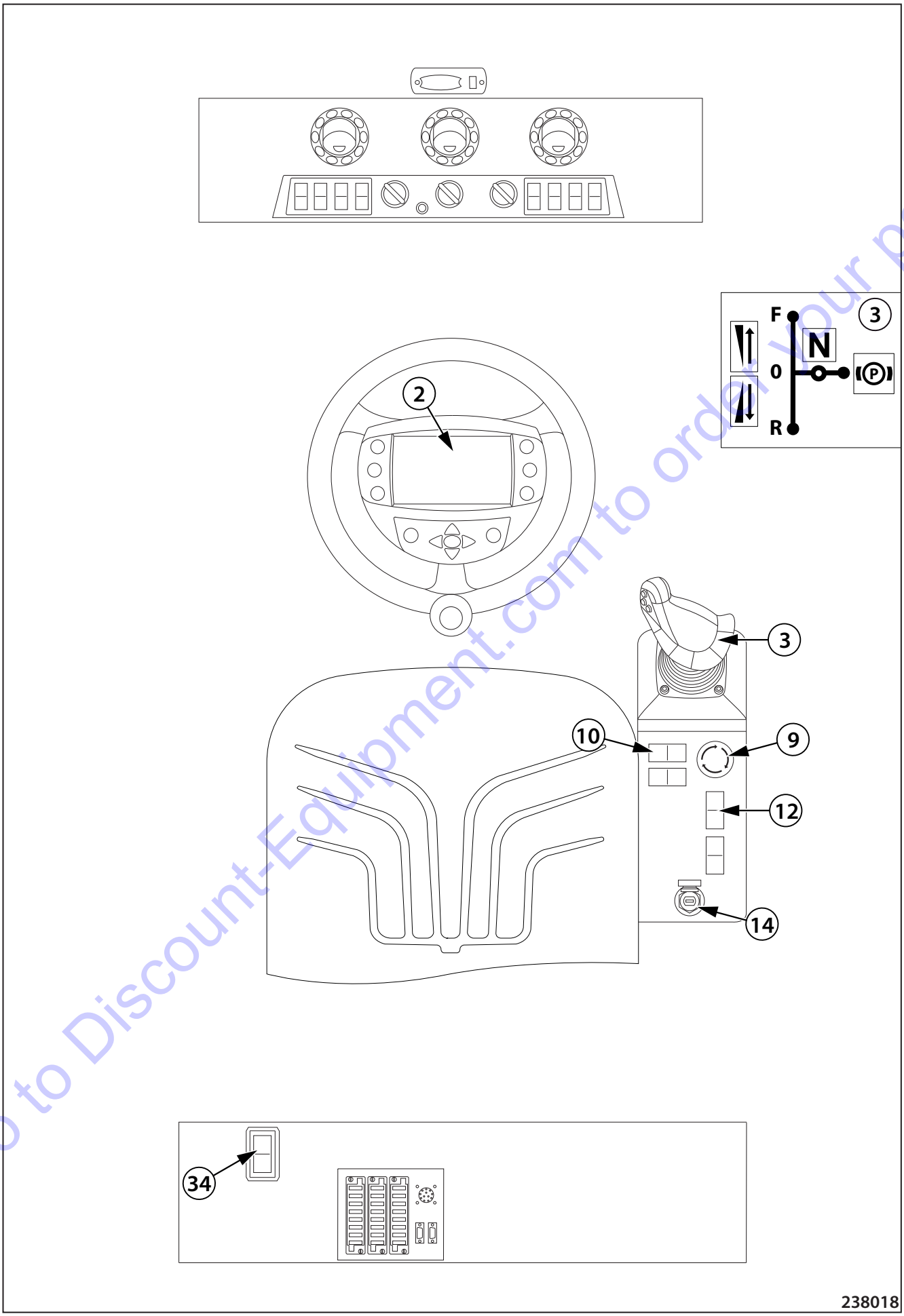
Hold the arrow for 5 seconds to set the following screen as the home screen.



256107

2.6.4 Display disconnected

The screen is shown if the display is not connected to the ECU or a general communication error occurs.



2.7.1 Engine start

- 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 alarm 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 3.6.8.

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,
- the service switch (34) is disabled,
- no fault is detected.

Start-up procedure:

- Turn on the battery disconnector.
- Sit down on the seat.
- Set the travel control (3) to the brake position (P).
- Check that the emergency brake (9) is not activated.
- Check that the service switch (34) is not enabled.
- Insert the key into the ignition box (14) in the position "0" and switch over to the position "I".
- The unlock code prompt appears on the display (2) if the ignition lock function was enabled.
- Enter the unlock code and confirm by holding the OK button until the operation screen is displayed.
- The brake, charging, lubrication and heating indicator lamps will light up on the display.
- Wait until the pre-heating indicator lamp goes out.
- Use the alarm horn (10) to signal that the engine is starting.
- Turn the key to position "II" to start the engine.
- The charging indicator lamp must go out after the starting is completed.
- After the travel control is changed to the neutral position, the brake indicator lamp goes out.

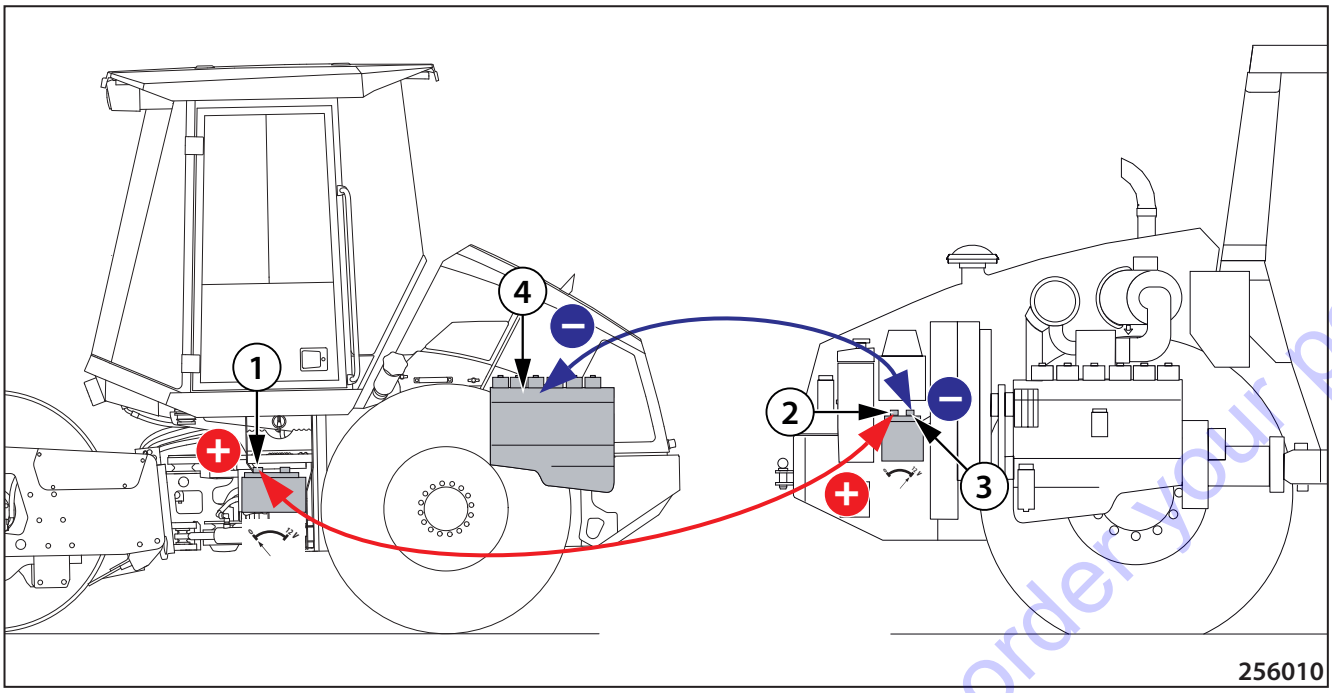
Note

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 30 seconds. Wait for 2 minutes 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 24 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 the part that is attached to the engine (or to the engine block).

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.

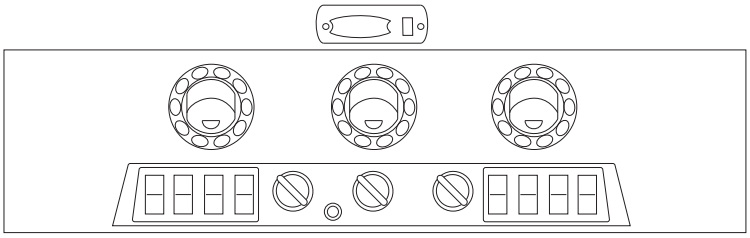
Uninsulated parts of clamps of the jump leads must not touch each other!

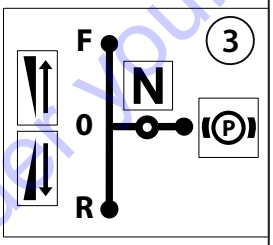
The jump lead connected to the (+) pole of the batteries must not come into contact with electrically conductive parts of the machine – danger of a short circuit!

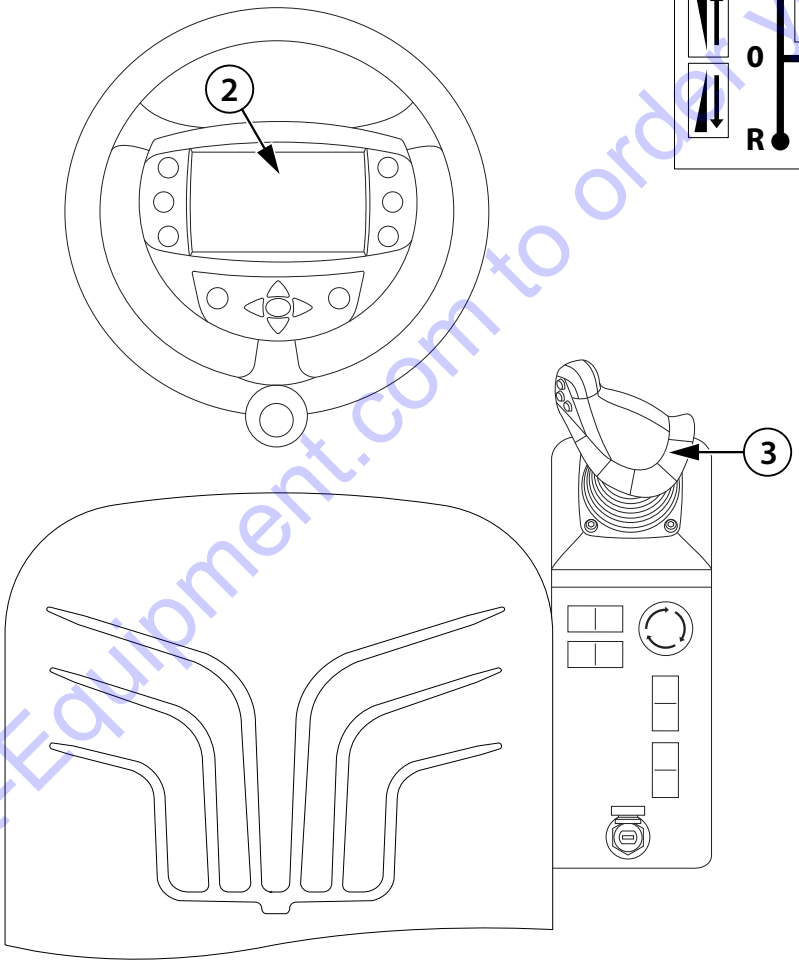
Do not lean over the batteries – possibility of electrolyte burns!

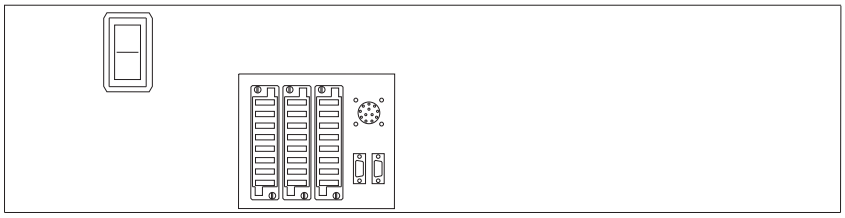
Avoid the presence of ignition sources – open flame, cigarettes, etc.

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









238020

2.7.2 Drive and reverse drive

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!

Machine travel and reversing:

Selection of travel direction:

- Start the engine
- Move the travel control (3) from the parking brake (P) to the neutral position (N) – the brake will be released and the indicator lamp of the parking brake will go out. The engine idle speed is set.
- Move the travel control (3) to the position (0) and select a travel direction (F/R). The engine speed is set automatically according to the current speed of the machine.

Travel speed selection:

- The travel speed corresponds to the deflection of the travel control (3) from the zero position (0).
- The travel speed can be changed by buttons on the display or by travel controls at the range from MIN (turtle) to MAX (rabbit).

Panic response

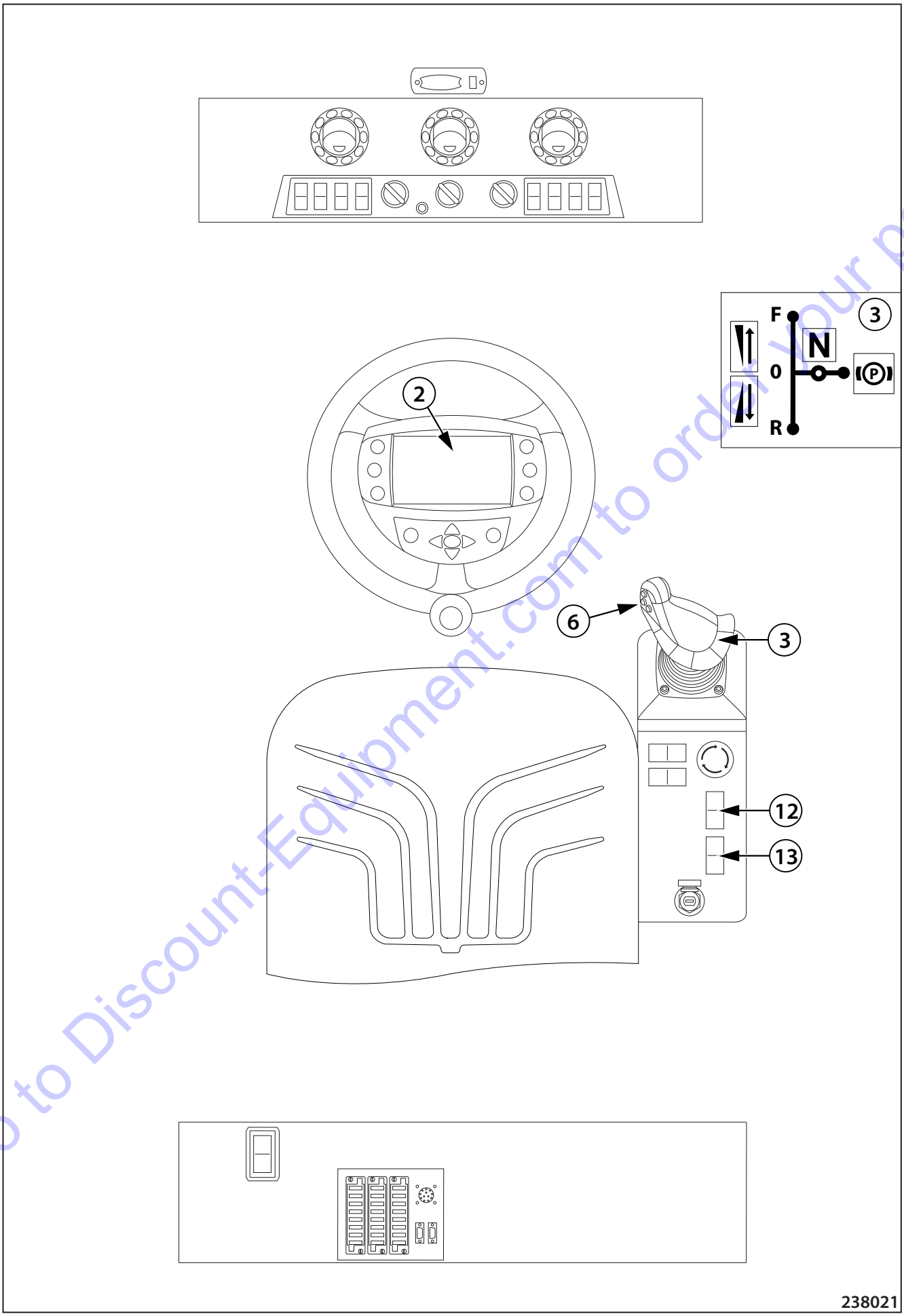
The immediate stop of the machine using the travel control (3) applies to all of the travel modes of the machine. When the travel control (3) is changed to the opposite position through (0) within 1 second, the machine will stop – the parking brake will be enabled, the engine will keep running, i.e. panic response. The machine can start moving again after the travel control (3) is changed to the brake position (P) and the travel direction (F/R) is selected.

Note

The speed gear 0 is adjusted as initial 15 minutes after the switch box is turned off. Working functions of the machine are locked in the speed gear 0.

When driving at the transport speed on 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.

When the traction is lost, the tractive force drops or the engine speed decreases significantly, engage the lower speed gear with the travel control button on the display (2)! If the machine is equipped with the ATC differential lock function, enable the function with the differential lock button on the display (2)!



Travel and reversing with vibration

- Use the switch (12) to select a vibration amplitude.
- Adjust a travel speed on the display (2).
- Use the travel control (3) to select a direction.
- Use the switch (13) to select the MAN mode.

Turning on:

- Press the button (6) on the travel control (3) to turn on the vibration.

Turning off:

- Turn off the vibration by pressing the button (6) on the travel control (3).
- You can turn off the vibration by changing the travel control (3) to the brake position (P).

Note

The MAN mode allows you to turn on the vibration on a standing machine.

Automatic vibration switching ON/OFF mode (AUT):

Turning on:

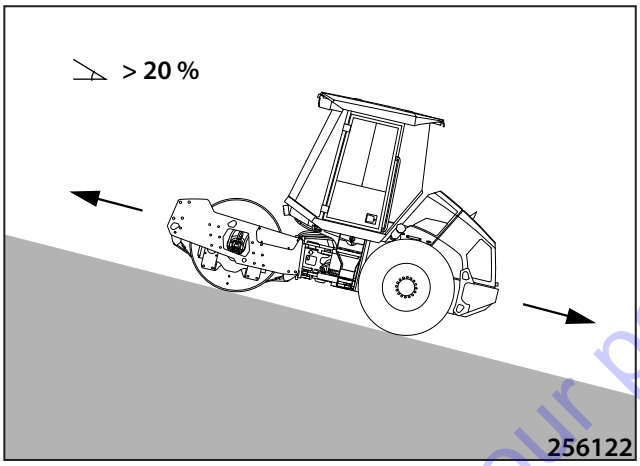
- Use the switch (13) to turn on/off this function.
- Press the button (6) on the travel control (3) to turn on the vibration.
- The vibration will be automatically turned on when the travel speed is more than 1 km/hour (0.6 MPH).
- The vibration will be automatically turned off when the travel speed is less than 1 km/hour (0.6 MPH).
- The automatic vibration function remains enabled even after the travel control (3) has been changed through the position (0).

Turning off:

- Turn off the vibration by pressing the button (6) on the travel control (3).
- You can turn off the vibration by changing the travel control (3) to the brake position (P).

Travel and reversing of the machine on a slope

- Always drive on a slope and select the speed considering your safety, slope gradient and adhesive conditions.
- When driving on a slope and under low adhesion conditions, enable the ATC differential lock function if it is installed in the machine.
- When driving uphill, adjust the speed of the machine so that the machine can drive up the slope.
- When driving downhill, select the speed gear and the driving speed at which the machine can or could drive up the slope.
- Do not use the transport speed on a slope with a gradient higher than 20%.
- On a slope with a gradient higher than 20%, always drive uphill with the drum and downhill with the wheels.



- Use the vibration on a slope only when driving with the drum uphill.
- When driving downhill, the vibration is allowed up to the gradient of 15%.

It is forbidden to vibrate when driving downhill on a slope with a gradient higher than 15%.

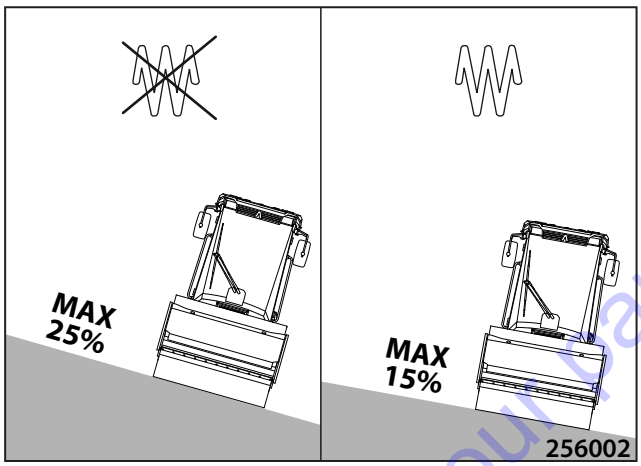
It is forbidden to drive downhill at the transport speed on a slope with a gradient higher than 20%.

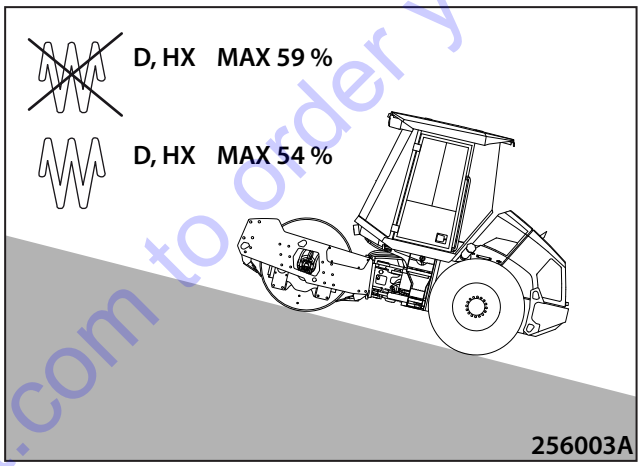
It is forbidden to abruptly change the driving direction (reverse) when driving on a slope.

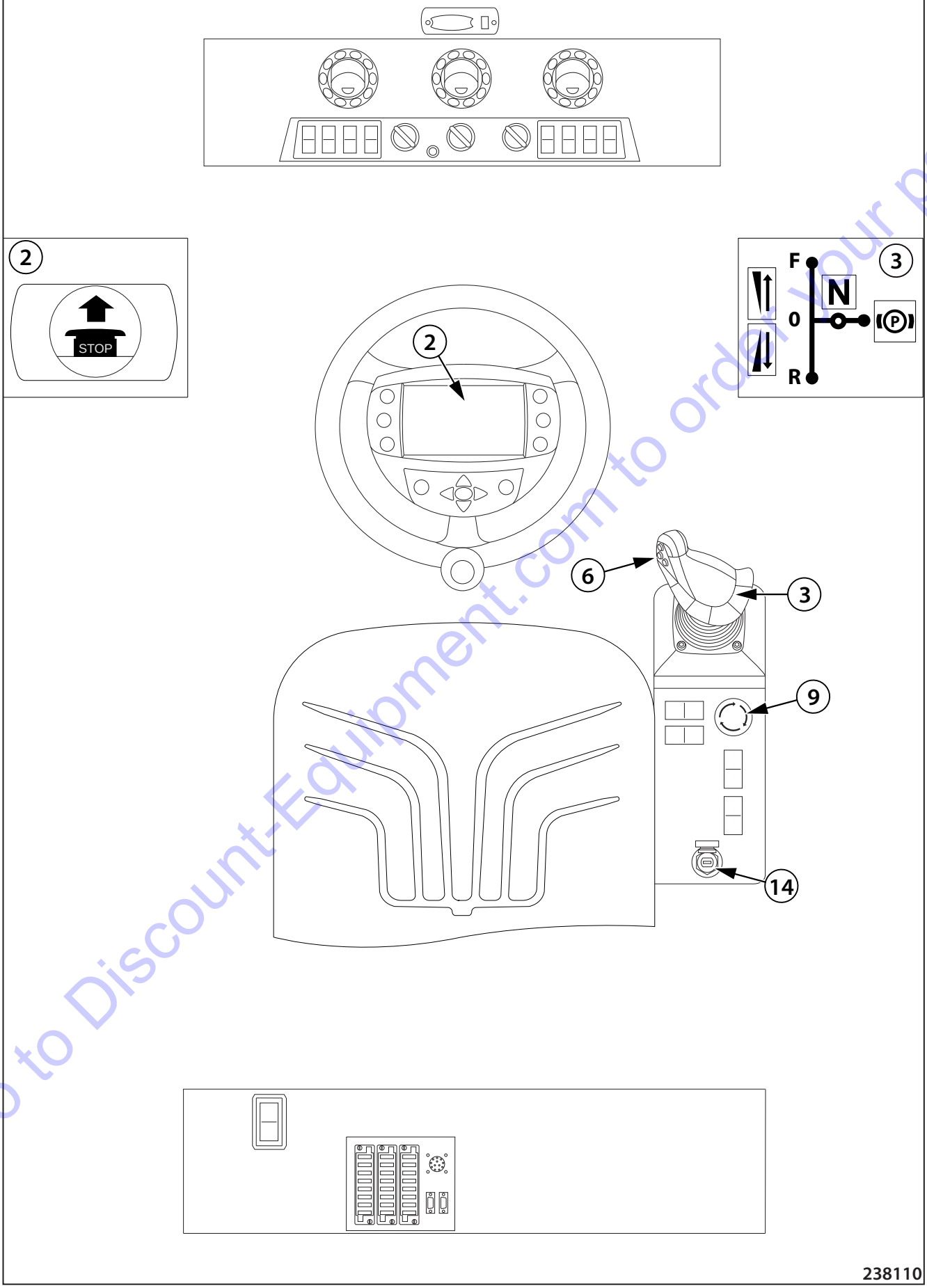
The maximum downhill driving speed is allowed to be the speed at which the machine can or could drive up the slope.

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 (6) on the travel control (3) to switch off the vibration.
- Stop the machine by changing the travel control (3) to the neutral position (N).
- Brake the machine by changing the travel control (3) to the brake position (P).
- Turn the key in the ignition box (14) 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 (3) must be always in the brake position (P)!

Turn off the battery disconnector when shutting down the machine!

2.7.4 Machine emergency stop

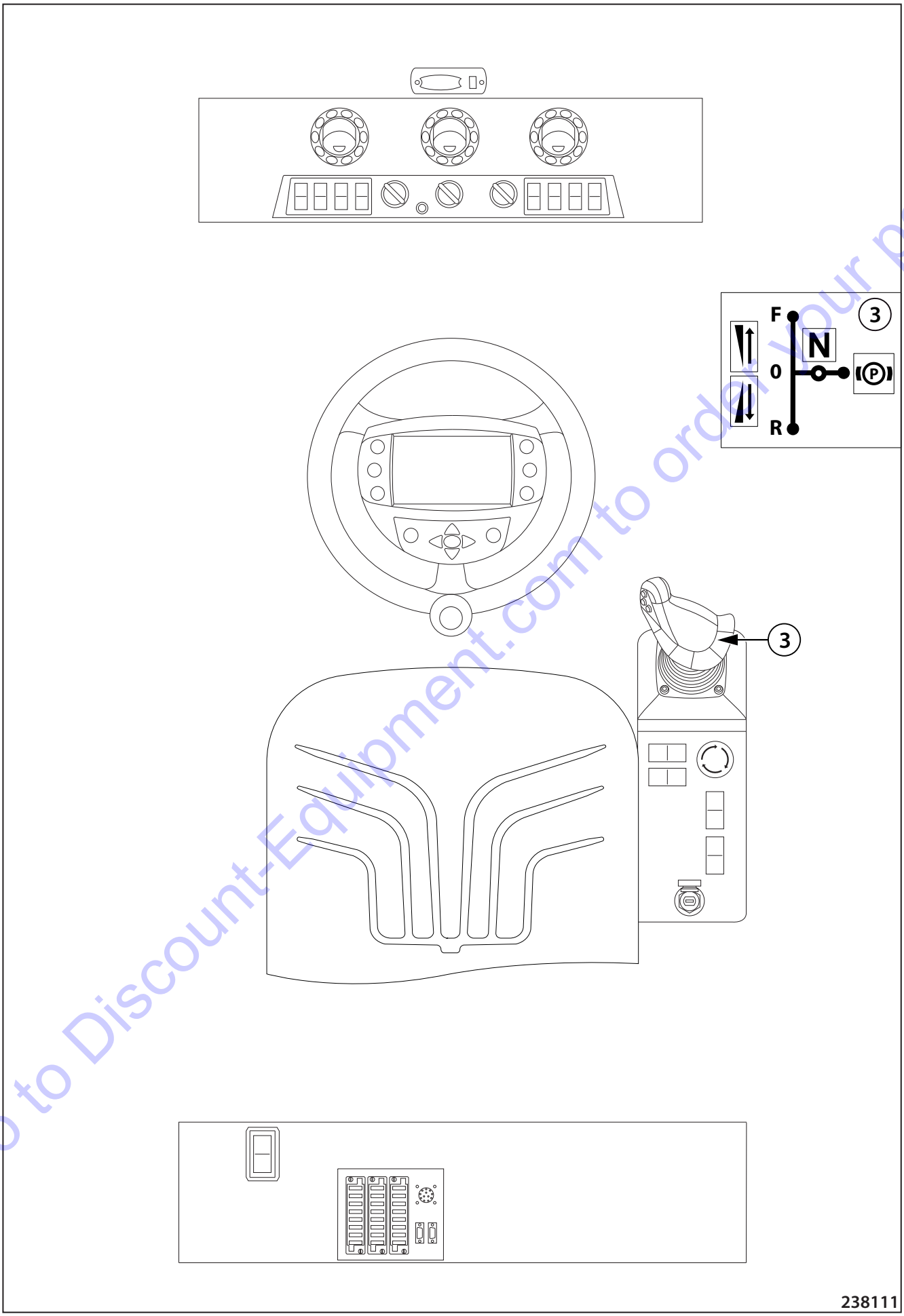
Use if there is a failure and it is impossible to stop the engine with the key in the ignition box by enabling the panic response or by changing the travel control (3) to the brake position (P)!

Turning on:

- After pressing the emergency brake button (9), the machine is braked and the engine stops.
- The emergency brake indicator lamp lights up on the display (2).

Turning off:

- Turn the emergency brake button (9) in the direction of arrows.
- The emergency brake indicator lamp will go off.
- The parking brake indicator lamp keeps lighting on the display.
- Move the travel control (3) to the position (P); you can restart the engine in this position.



2.7.5 Panic response

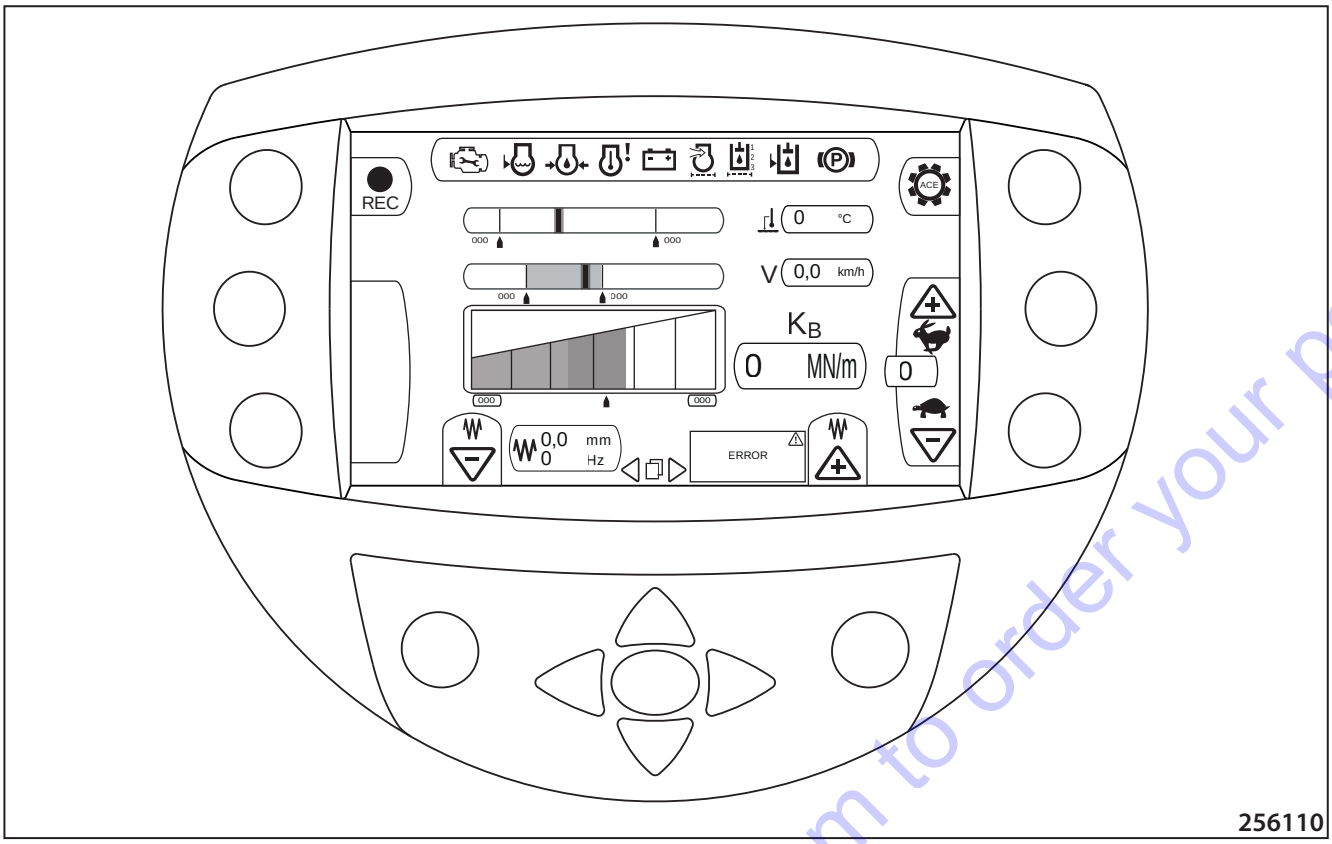
- The immediate stop of the machine using the travel control (3) applies to all of the travel modes of the machine. When the travel control (3) is changed to the opposite position through (0) within 1 second, the machine will stop – the parking brake will be enabled, the engine will keep running, i.e. panic response. The machine can start moving again after the travel control (3) is changed to the brake position (P) and the travel direction (F/R) is selected.
- When the machine vibration is on, the vibration will stop also when the manual vibration mode is selected.

It is forbidden to use the panic response for common stopping the machine. Enable the panic response only in emergency when the machine must be stopped immediately.

2.7.6 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 (3) to the brake position (P).
- 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!



2.7.7 ACE Force

AMN47 **Engine failure indicator lamp**

AMN48 **Coolant level indicator lamp**

AMN113 **Engine lubrication indicator lamp**

AMN50 **Engine overheating indicator lamp**

2777 **Battery charging indicator lamp**

AMN51 **Air filter clogging indicator lamp**

595427 **Indicator lamp of hydraulic oil filter clogging**

591507 **Indicator lamp of hydraulic oil level**

2703 **Parking brake indicator lamp**

AMN42 AMN43 **Vibration frequency buttons**

Note

For description of functions of indicator lamps and buttons see Chap. 2.6.1.

Button to start the ADS record

By pressing the button you turn on/off the compaction recording using the ADS software.

Travel speed buttons

The ACE system functions are enabled only within the range of the working speeds 1–4.

Graphical indicator of the degree of compaction

It displays an increment of Kb units during the compaction process.

If the function is enabled, it is a part of the indicator showing the required Kb value.

The range of values of the indicator of the degree of compaction can be set on the screen for setting parameters (Chap. 2.7.7.1).

Indicator of the degree of compaction

It shows a present value of the degree of compaction Kb in MN/m units.

Parameters setting screen button

After the button is pressed, the ACE system parameters setting screen will appear.

Vibration setting indicator

The pictogram shows the (low/high) vibration amplitude setting.

Amplitude - value in mm

Frequency - preset value in Hz

Graphical indicator of the required speed range

The range of required speeds is automatically calculated depending on the set frequency.

Momentary speed indicator

It shows the momentary speed of the machine.

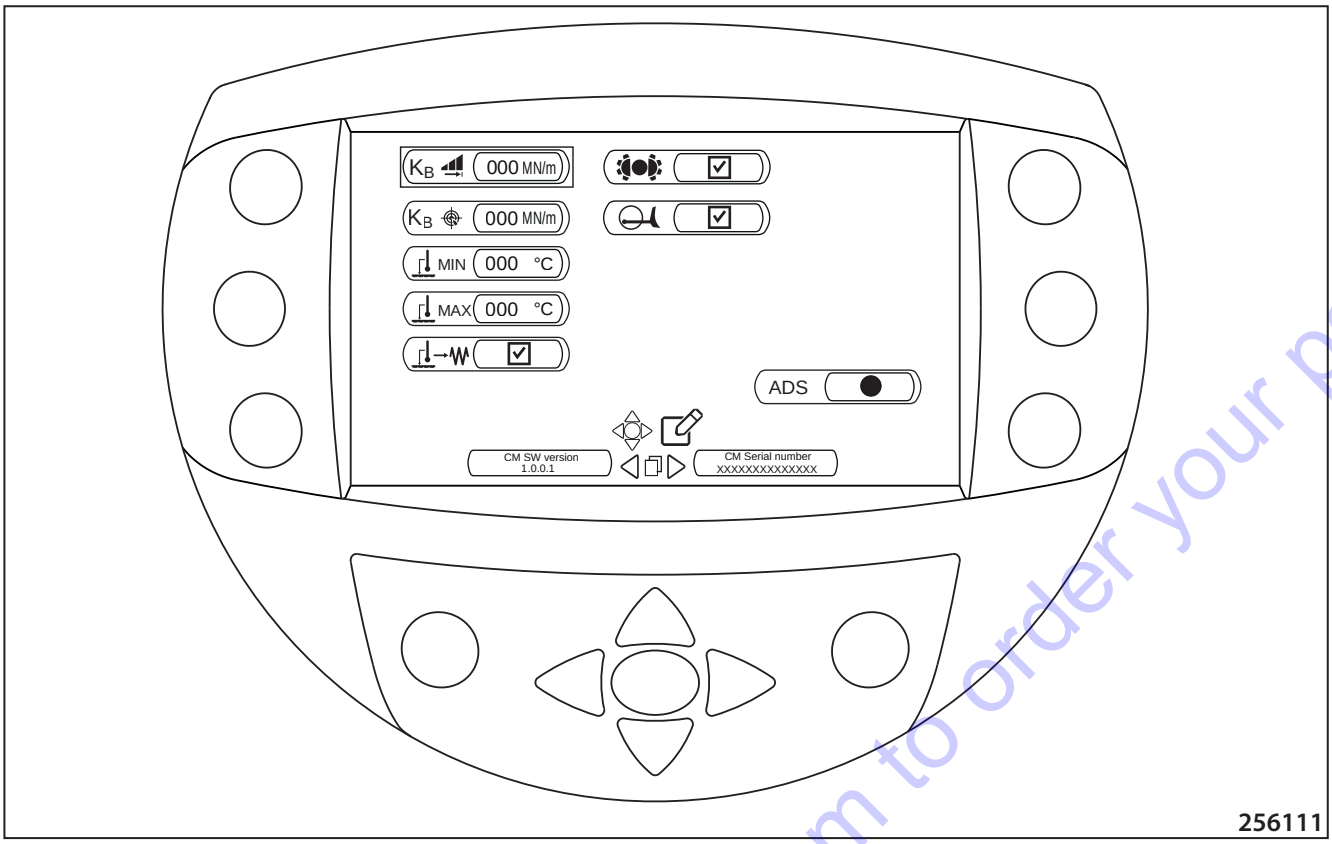
Graphical indicator of the temperature range

It shows the range of preset temperatures.

The temperature range can be set on the parameters setting screen.

Temperature range function:

- Passive
- Active



2.7.7.1 Parameters setting screen

- It is used for displaying and setting parameters of the ACE system.
- The red rectangular is used as a cursor.
- Using the up/down buttons, go through the individual parameters.
- After the middle button is pressed, the cursor starts flashing. You can change the values using the up/down buttons.
- By pressing the middle button, you confirm the readjusted value.
- By pressing the left/right button, you return to the main screen.

Parameters:


AMN455

Upper limit of the degree of compaction Kb

It is used for setting the upper limit of the degree of compaction.


AMN456

The target degree of compaction Kb

It is used for setting the maximum of the degree of compaction.

AMN457

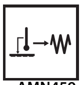
Lower limit of the temperature limit

It is used for setting the minimum surface temperature for the compaction.

AMN458

Upper limit of the temperature limit

It is used for setting the maximum surface temperature for the compaction.


AMN459

Active function of the temperature range control

- On
- Off


AMN460

Pad-foot drum (optional)

For correct function, the setting must correspond to reality.


AMN461

Blade (optional)

For correct function, the setting must correspond to reality.

AMN462

ADS software

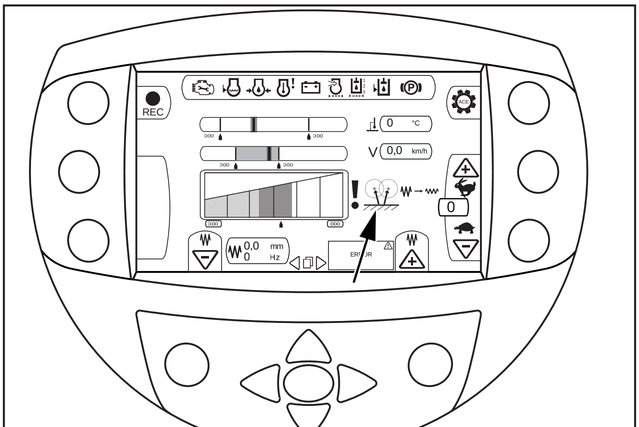
It is used for displaying a status of the ADS software connection.

Red dot – disconnected

Green dot – connected

2.7.7.2 Double drum rebound

- The double drum rebound occurs when the material stiffness exceeds the applicable compaction energy of the compacting element, i.e. drum.
- At the double rebound, the drum jumps aside by more than one completed amplitude of the drum (two revolutions of the drum exciter).
- The double rebound is a potentially dangerous condition at which the machine or the compacted material may get damaged. Therefore the moment this condition occurs, the vibration should be changed over to the low amplitude (when the high amplitude is used), or the vibration should be turned off (when the low amplitude is set).
- The double rebound indicates that the maximum compaction rate is achieved by the given machine.



256112

If a double drum rebound occurs, a warning will appear on the display.

If a double drum rebound takes more than 5 seconds, the acoustic signalling will start.

The graphical warning and the acoustic signalling remains active until the meter evaluates the double rebound end or the machine operator turns off the vibration.

2.7.8 Bonnet raising and lowering

- Open the bonnet.

256082

- Unlock the side bonnet.


256026

- Open the side bonnet.


256027

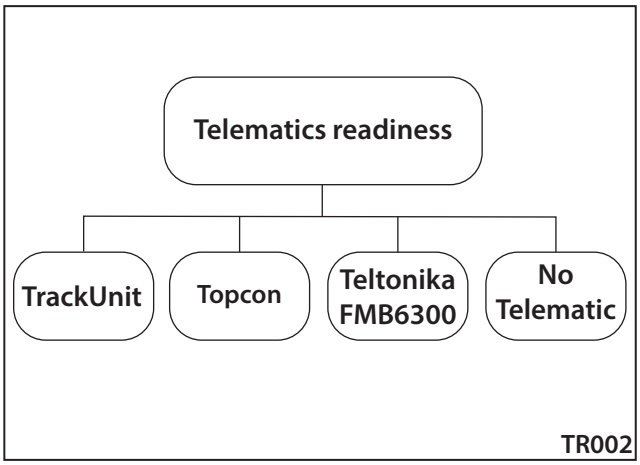
2.7.9 Telematic Readiness

Global positioning system with telemetry that monitors operating systems of the machine (machine start, diesel engine speed, machine consumption, number of engine hours, etc.) ant 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 telematics system.



TR002

2.7.10 Ballasting of tyres with liquid

It is used for lowering the machine gravity centre. The mixing ratios for individual temperature per one tyre are given in the table.

Ballasting of tyres with liquid of up to 0 °C

The inner space of the tyre is filled with the solution of water and 34% calcium chloride $CaCl_2$.

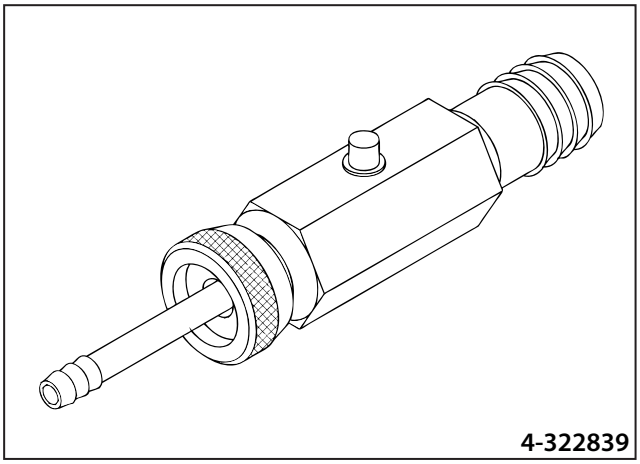
Water	Calcium chloride $CaCl_2$	Added weight
(l) [gal US]	(kg) [lb]	(kg) [lb]
130 [34.3]	53,5 [118]	183,5 [404.5]

Ballasting of tyres with liquid of up to -25 °C

The inner space of the tyre is filled with the solution of water and 34% calcium chloride $CaCl_2$.

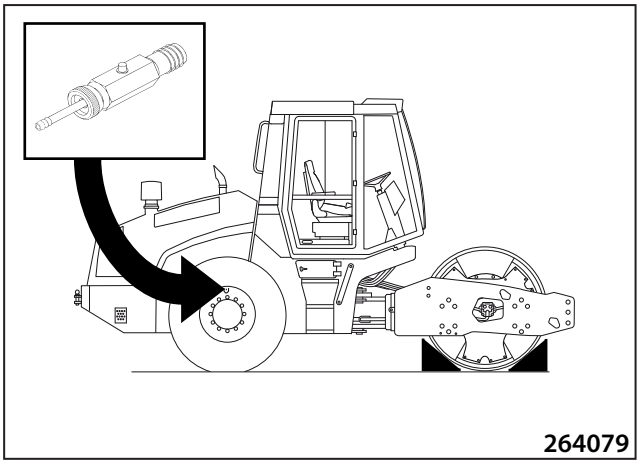
Water	Calcium chloride $CaCl_2$	Added weight
(l) [gal US]	(kg) [lb]	(kg) [lb]
65 [17,2]	145 [320]	210 [463]

A filler neck can be ordered as a replacement part under number 4-5325190009

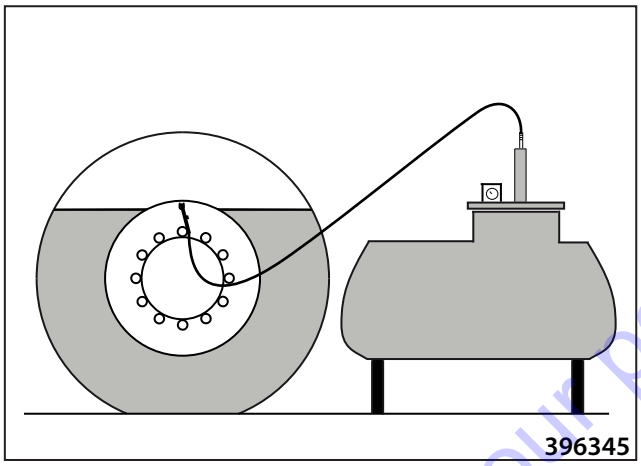


Filling procedure:

- Move the machine to a firm base. The filling valves should be in the extreme upper position. Secure the drum with blocks on both sides.
- Unscrew the removable valve insert and screw on the filler neck.

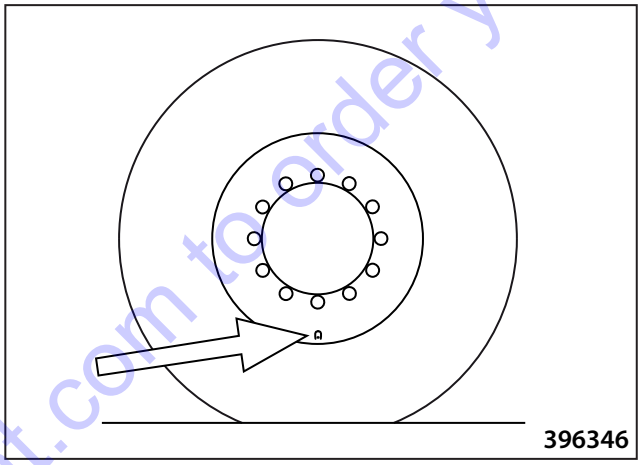


- Mount the hose from the filling equipment (a tank located above, pump, etc.) on the filler neck and fill the tyres with the solution.
- During the filling, air escapes from the tyre through the side opening from the filler neck. The tyre is sufficiently filled (at 75%) when the solution starts flowing out through the opening.
- Unscrew the filler neck, screw the valve insert back on, and inflate the tyre to a pressure of 150 kPa (21,75 PSI).



Draining procedure:

- Move the machine to a firm base. The filling valves should be in the extreme lower position. Secure the drum with blocks on both sides.
- Unscrew the removable valve insert and let the solution flow out.



The solution can spurt out after unscrewing the valve insert.

- As soon as the solution does not flow out due to a decrease in pressure, screw on the filler neck and inflate the tyre to a pressure of 150 kPa (21,75 PSI).
- After the tyre has been inflated, remove the filler neck and screw the valve insert back on.

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

Wash away spilled solution with clean water.

Solution may never come into contact with metal parts and wiring.

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

When moving on the working site, 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.

- When on the road, the machine should be transported on a vehicle.

When transporting the machine on a vehicle, observe the regulations in force in the given territory.

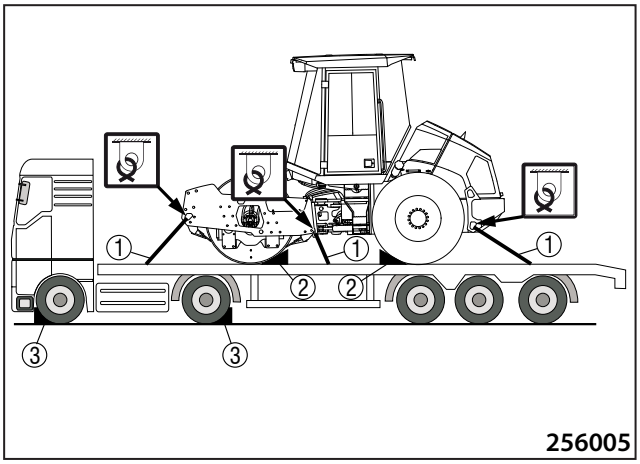
Make sure the transport carrier is braked and mechanically secured against undesired motion with scotch blocks (3) when loading or unloading.

While driving onto a vehicle, switch on the differential lock function. We recommend you to support the drum with rubber belts at the same time.

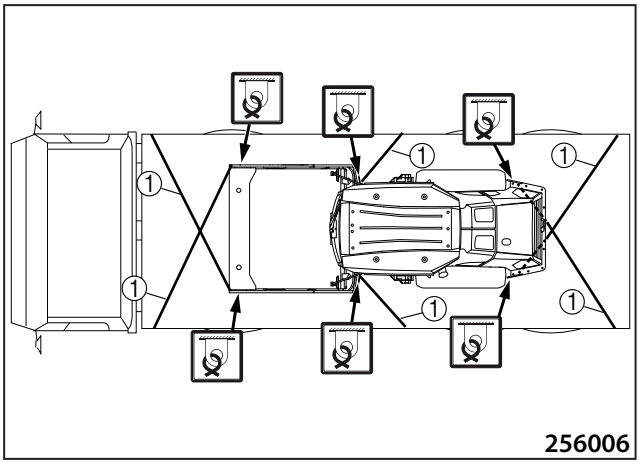
For loading the machine use the function of transport mode (differential lock ON, speed gear 0). Working functions of the machine are locked (vibration).

Place the machine on a transport vehicle in the direction of travel (see figure). In case of the opposite position, blind the engine intake before transporting.

The machine on the vehicle must be properly tied and mechanically secured against longitudinal and lateral displacement as well as against tipping (1). The drums must be secured using scotch blocks (2). The maximum permitted force for fastening the machine to a vehicle using rear slings is 5 t.



256005



256006

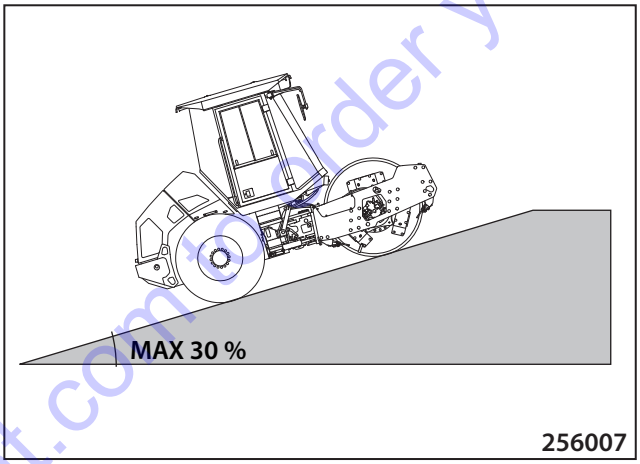
2.8 How to transport the Machine

2.8.1 Loading the machine

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

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 appropriate loading capacity, antislip surface and must be stored on a flat surface. We recommend that you adhere to regulation BGR 233.
- Maximum permissible incline of the ramp is 30 %.



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

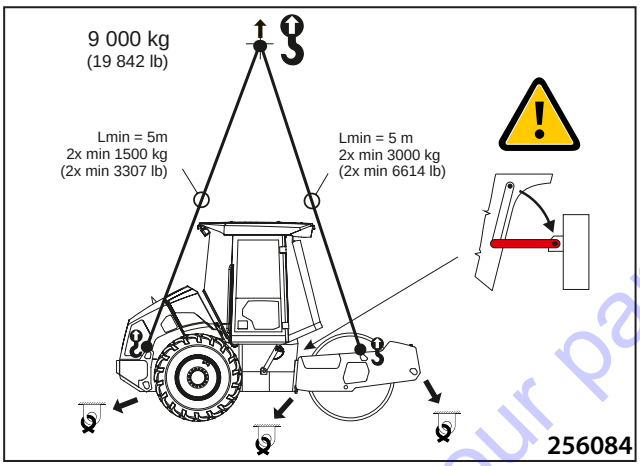
When loading the machine, a second person must be present to signal approach onto the ramp. See the list of hand signals in chapter 2.1.6.

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

While driving onto a vehicle, switch on the differential lock function. We recommend you at the same time to support the drum with rubber belts or wooden boards, etc.

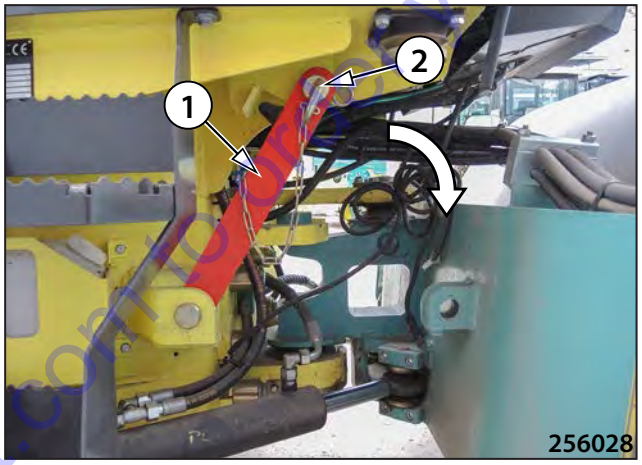
2.8.1.2 Loading the machine using a crane

- When loading with crane the Roller is fitted with lifting lugs.
- When lifting the Roller the Machine's joint shall be secured against turning.



How to secure the joint:

- Fold down the arm (1), lock with safety pin (2)..



Do NOT enter the area under the lifted load!

Observe the relevant national safety measures when loading the machine with a crane.

Upon loading completion, please return the safety arm to its initial position.

Use corresponding, undamaged riggings of sufficient loading capacity.

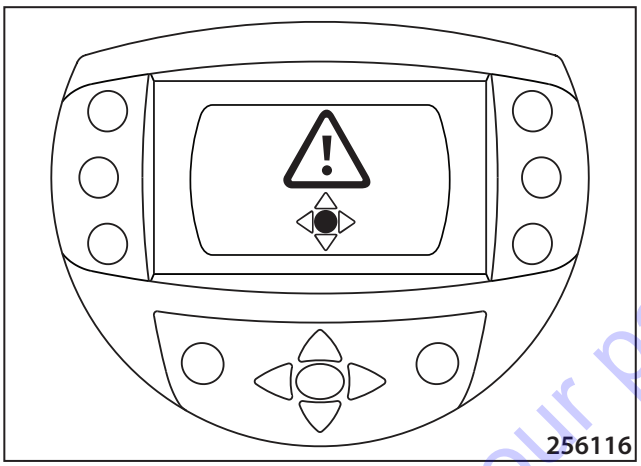
To sling, please use only the lifting lugs on the Machine designed for that purpose.

Only a trained slinger may carry out the slinging.

2.9 Special conditions of the Machine use

2.9.1 Emergency mode

- The electronic system of the machine continuously diagnoses important system. If a serious failure is diagnosed, the machine will stop and brake and the engine will stall.

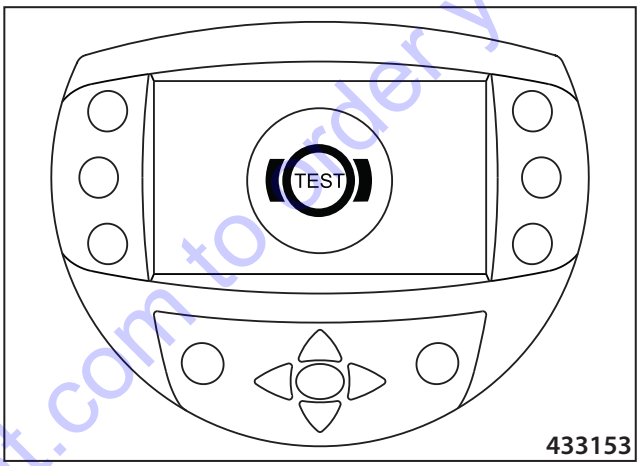


General error

By pressing the confirmation button for more than 3 sec. you change the machine to the emergency mode – the driving speed is limited to 4 km/h. Some functions are locked.

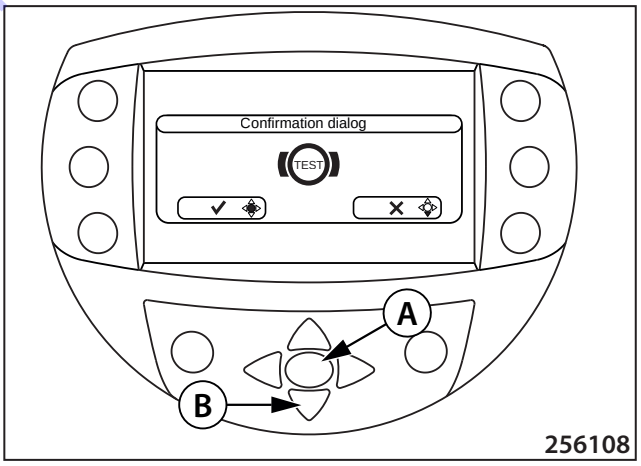
Discrepancy of the bake sensor with the travel control position.

Perform the brake test.

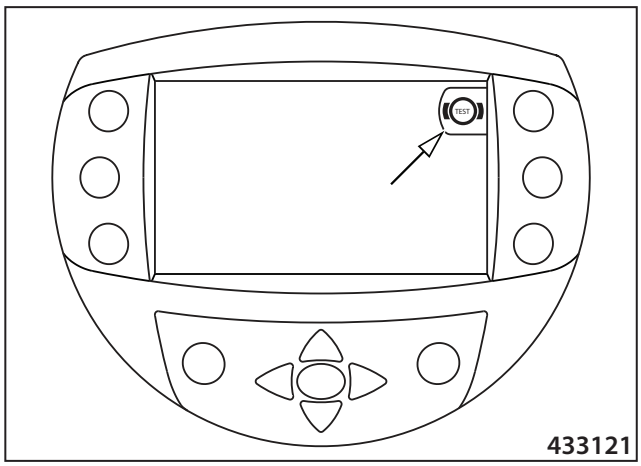


Procedure:

- Set the travel control (3) to the position P (parking brake enabled).
- Display the information screen.
- Turn on the BRAKE TEST – yellow backlight of the symbol, engine speed increased.
- After you press the brake test button, a confirmation dialog will appear.
- Press the middle button (A) to confirm the start of the brake test.
- Press the lower button (B) to cancel the start of the brake test.



- Change the travel control (3) through the neutral position (N) to the forward position (F).
- Successful brake test = message TEST OK.
- Unsuccessful brake test = message TEST NOT OK.



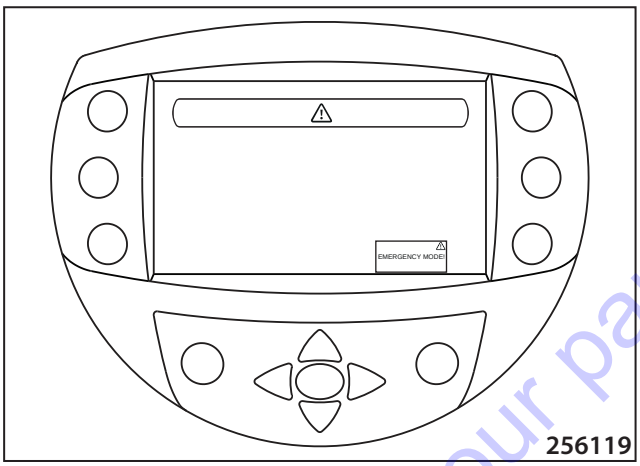
- If the brake test was successful, the work with the machine is possible in full extent.
- If the brake test was unsuccessful, the machine will switch to emergency mode.

Emergency mode

The emergency mode is used only for leaving the workplace, loading/unloading during the transport and repairing the machine. The work is prohibited in the emergency mode.

The emergency mode is indicated by the notice “EMERGENCY MODE!” in the window where errors are displayed and by the flashing indicator lamp “Danger warning”.

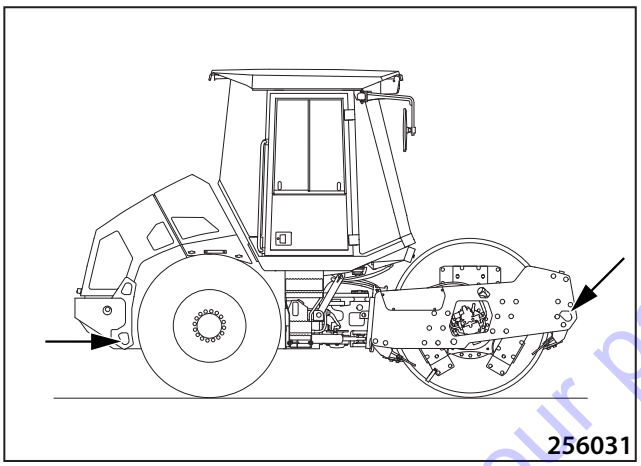
When the machine is switched over to the emergency mode, the display will beep 3×.



Take special care during operation of the machine in the emergency mode. The machine behaviour can be non-standard and unpredictable.

- For reoperation in the normal mode switch off the ignition and restart the machine. If the defect happens again, a service intervention is necessary. For a cause of the defect see the error list on the service screen.

2.9.2 Machine towing



The machine is provided with two towing lugs on the front frame and with two towing lugs on the rear frame.

A stuck machine can be towed for a short distance if the engine is running and the travel drive and steering are working.

When towed the Machine shall be attached with both lugs !

When towing, please use undamaged towing cable or pull rod of sufficient loading capacity 1,5 higher than the weight of hauled Machine. It is forbidden to use a chain for hauling.

It will be necessary to maintain minimal deflection from direct angle of hauling. Max deflection will be possible within angle of up to 30°.

The machine should only be towed for the shortest possible distance – to extricate the machine if it gets stuck or is blocking traffic in case of breakdown. Do not tow the machine for a longer distance than 300 m (0.19 mi).

The hauling machine shall fit with its size the Machine broken. It shall have sufficient hauling force (performance), weight and brake effect.

When hauling downhill with the help of cable it will be necessary to attach next hauling machine to the rear part of the Machine broken. In this way it will be possible to avoid uncontrolled motion of the Machine damaged.

No person may stay on the towed machine!

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

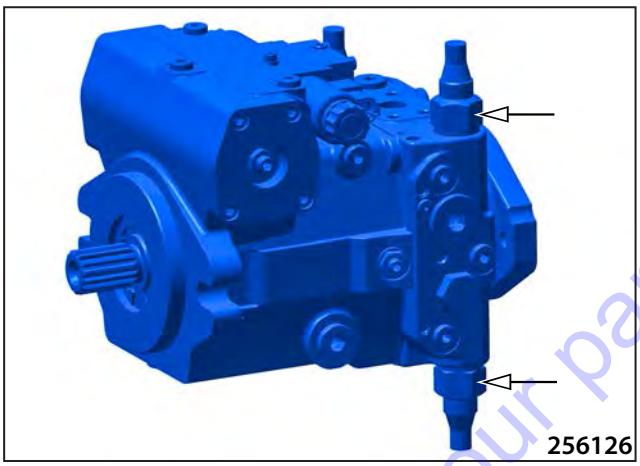
Before releasing the brake, secure the machine with wooden scotch blocks against motion!

The cab (platform) and bonnet must be moved down before the brakes are released.

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

Short-circuiting the travel pump:

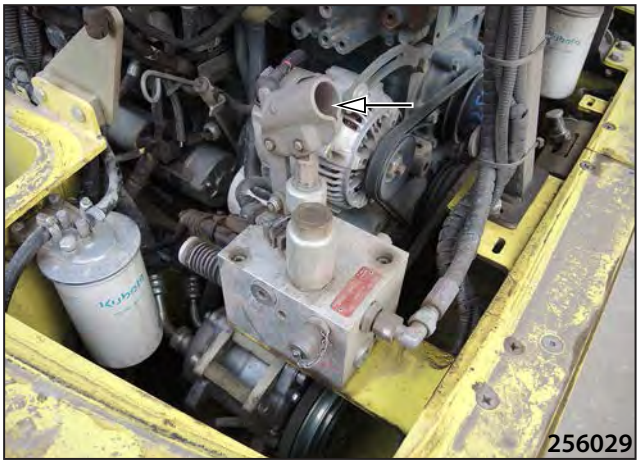
- Short-circuit the hydraulic circuit of the travel by releasing the middle parts of both multiple function valves by 3 revolutions counter-clockwise.



How to brake off:

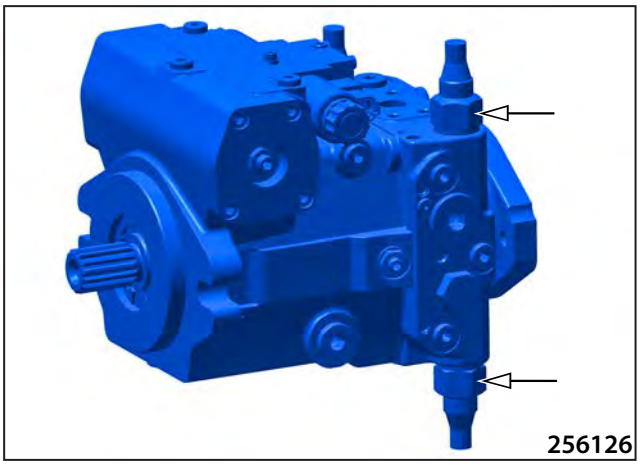
- Press the button on the emergency towing block.

- Pump using the lever in the manual hydrogenerator with 12 full strokes at least (one stroke = lever movement up and down).



How to put into initial state

- Screw in the multiple function valves on the hydraulic generator of the travel.
- By starting the engine, return the machine into its original condition.



2.9.3 Machine operation during running-in

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

2.9.4 Machine operation at low temperatures

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

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

Preparation for work under low temperatures:

- Check concentration of engine cooling liquid.
- Exchange oil in the engine with the recommended one for given range of low ambient temperatures.
- Use hydraulic oil of corresponding cinematic viscosity.
- Oil in drum gearbox, replace with recommended one for given operating temperature range of the gearbox.
- Use winter fuel.
- Check 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).

Min temperature of engine cooling liquid is 60 °C (140 °F). Max temperature of 100 °C (212 °F).

You may use the Machine at its full capacity only after heating the media to their operating temperature (cooler possible to be partially covered).

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

If required to start the Machine at ambient temperatures below -8 °C (18 °F), replace oil in hydraulic system with the oil of HV 46 viscosity class.

At temperatures below -13 °C (9 °F) with oil of HV 32 class.

It is impossible to start the Machine below -23 °C (-9 °C) with no preheating of filling media.

2.9.5 Operating the Machine at high temperatures and humidity

The higher the air temperature and humidity the lower the engine performance is. Both factors reducing the performance are dependent on each other:

- Each 10 °C (18 °F) increase of temperature means capacity drop of up to 4 % (at constant humidity)
- Each 10 % increase of relative humidity means capacity drop of up to 2 % (at constant temperature).

Note

For oil of HV 46 class the max admissible oil temperature will be 90 °C (194 °F), for HV 32 oil the max admissible oil temperature will be 70 °C (158 °F).

In the environment where hydraulic oil temperature stays constantly round 90 °C (194 °F) we recommend to exchange hydraulic oil for oil denser by one class, with HV 100 cinematic viscosity.

2.9.6 Operating the Machine at high altitudes

With higher altitudes the engine capacity will drop due to reduced atmospheric pressure and specific weight of air induced.

If the engine has black smoke at high altitudes (over 1500 m), please contact engine Manufacturer's service centre who will make adjustment to your fuel injection pump for these operating conditions.

The engine power is affected by the environment in which the machine is working.

Without controlling the engine power reduction, the machine may be used up to a maximum altitude of 1,950 m (6,400 ft).

2.9.7 Work of the machine in the dusty environment

When operating in very dusty environment, you must cut short the intervals for cleaning and replacement. Cut the intervals of cleaning the engine cooler, hydraulics, and also of the replacement of cab's dust filter.

The recommended cleaning interval is once a week.

2.9.8 Driving with vibrations on compacted and hard materials

When operating the Machine with vibration on hard materials (e.g. stony loose material), or with high level of compacting the base material, there can be even loss of contact between the drum and the material compacted (so called vibro-hit). This state will show in the increased vibration transfer into the Machine frame and onto the Driver's control stand. Its partial elimination is possible via increasing the travel speed or changing the Machine vibration parameters (with the use of lower amplitude).

When it is necessary to operate the Machine under conditions where the Operator might be exposed to higher vibrations, then the Machine Operator will be liable to adjust the work procedures so as to prevent any injury to Driver's health.

Note

When driving the Machine with vibrations on a different base material than stated in "Specification Manual", the emission figures for vibration acceleration will be different - "Noise and vibration emissions".

The driving with vibration on hard (frozen, concrete, overcompacted) surface or on bedrock is forbidden. There is a danger of damage to the machine.

3 MAINTENANCE MANUAL

ARS 70
(Kubota Tier 4 Final)

3.1 Safety and other measures for machine maintenance

3.1.1 Safety of machine maintenance

Carry out lubrication, maintenance and adjustments:

- By professionally trained personnel
- In line with safety instructions given in the Operation Manual
- According to schedule given in the Lubrication Chart following the hours actually worked
- On the machine located on flat solid surface, secured against self-motion (scotch blocks), and this always with the engine OFF, key removed from ignition box, and the wiring cut off
- Only after **Machine Repair** sign is attached onto steering wheel (the sign is supplied together with machine accessories)
- On machine parts cooled out
- After having cleaned the machine, lubrication points and maintenance locations
- Using proper, undamaged tools
- Through replacement with new original parts as per the Spare Parts Catalogue
- With sufficient lighting of the entire machine in the event of lowered visibility and at night
- so the guards and safety elements are reinstalled again upon work completion
- through retightening bolted connections – with torque specified, and through checking the connection tightness
- with the operation media heated – beware of burns – use recommended media, only.

Upon completion of the adjustment or maintenance, please examine the function of all safeguard equipment!

3.1.2 Fire precautions during operation media exchanges

- In terms of fire hazard the flammable liquids used on the Machine have been divided into three hazard classes:

  IInd Hazard class – Diesel oil

  IVth Hazard class – mineral oils, lube greases
- Oil exchange point shall be located so it does not interfere with the explosion or fire hazard area.
- It shall be identified with notice boards and signs of no smoking and no use of open flame.
- Handling area shall be sized so the capture the amount to flammable liquid equal to the capacity of biggest vessel, transport container.
- It must be equipped with portable fire extinguishers.
- To handle the oil, Diesel oil, please use such vessels like metal barrels, canisters or sheet-metal cans.
- Transport containers shall be properly closed when stored.
- Vessels shall have one opening, be stored with the opening on top, and secured against any flowing out or dripping of their content.
- Vessels shall be designated with indelible inscription indicating the content and flammability class.

3.1.3 Ecological and hygienic principles

When operating or maintaining the Machines the user shall be liable to follow the general principles of health and environment protection according to the laws, ordinances and regulations in individual territories of the Machine use.

Hygienic principles

- Crude oil products, cooling system media, battery media and coating compositions incl. thinners are materials harmful to health. Workers coming into contact with these products during machine operation or maintenance shall be liable to follow the general principles of their own health protection and conform to the safety and hygienic manuals of these products' manufacturers.

  We call your attention to the following in particular:

  - Eye protection and skin protection during work with the batteries
  - Skin protection during work with crude oil products, coating compositions or cooling liquids
  - Proper hand washing upon work completion and before any meal; use adequate reparation cream to treat your hands
  - Adherence to the instructions given in this Manual

- Always store the crude oil products, cooling system media and battery media, and coating compositions incl. organic thinners, and also the cleaners and preserving agents, in the genuine, original and properly labelled packages. Do not admit any storage of these materials in unlabelled bottles or in any other vessels with regard to the hazard of mistaken identification (faulty change).
- When skin, mucosa, eyes are accidentally stained, or vapours inhaled, immediately apply the first aid principles. In the event of accidental use of these products get prompt medical attention.
- When working with the Machine in cases where the Machine has platform fitted, cabin windows are left opened, always use ear protectors of adequate type and version.

Ecological principles

The media of Machine's individual systems, and some of its parts after having been discarded (dismantled, media exchanged) become waste with hazardous properties against the environment.

This category of waste products includes the following in particular

- Organic and synthetic lubricating materials, oils and fuels
- Brake fluids
- Cooling liquids
- Battery media and the batteries themselves
- Cooling system media
- Cleaners & preserving agents
- All dismantled filters and filter elements
- All used and discarded hydraulic or fuel hoses, rubber-metal and Machine's other elements, made dirty due to the abovementioned products.

The given materials and parts, when scrapped, shall be handled compliant to the respective national regulations on environmental protection, and in line with the health protection regulations, as well.

3.2.1 Engine oil

2412

Engine oil has been specified as per its performance classification and viscosity classification.

Performance classification according to

API (AMERICAN PETROLEUM INSTITUTE)

ACEA (ASSOCIATION DES CONSTRUCTEURS EUROPÉENS D'AUTOMOBILE)

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

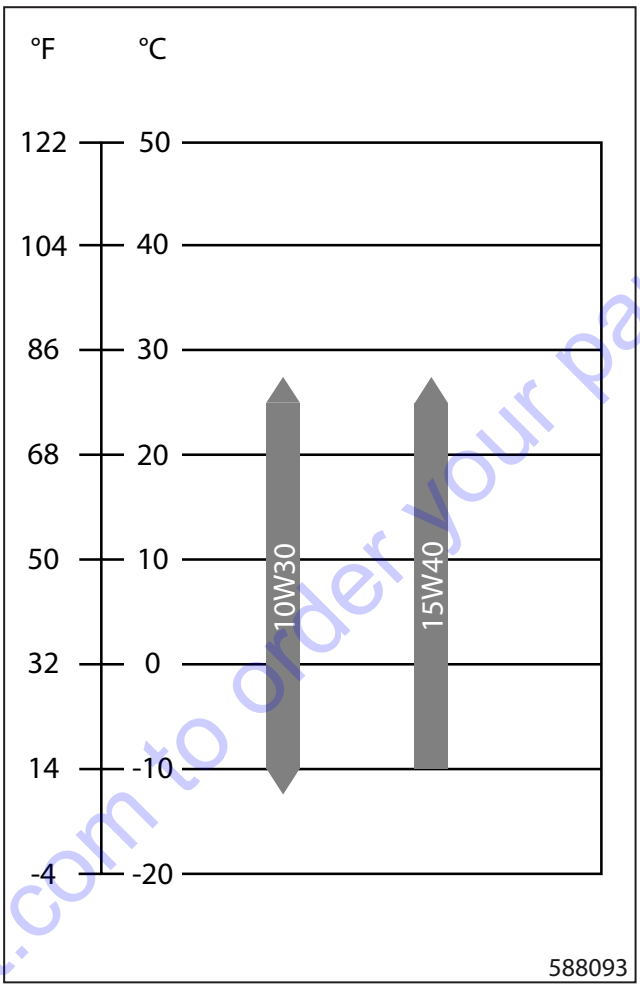
SAE 15W-40 year-round

Note

The exceeding of the lower temperature limit does not result in damage to the engine; however, it can cause some difficulties with starting.

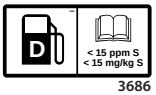
It is recommended to use universal multi-range oils to avoid the necessity of oil changes due to changes of ambient temperature.

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



Exceeding the upper temperature limit, considering the reduced lubricating capabilities of the oil must not last for long.

3.2.2 Fuel



3686

Diesel is used as fuel:

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 based on monoethyleneglycol containing silicates. It does not contain phosphates, nitrates, amines and borates.

There is an Avia NG label placed at the point to fill the coolant 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 and the warranty lost.

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 brings calculus 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 use in the hydraulic system of the machine, only high-quality hydraulic oils of output class according to ISO 6743/4 HV (equal to DIN 51524 part 3 HVLP.

Standardly refill the machines with hydraulic oil of kinematic viscosity 46 mm^2/s at the temperature of 40 °C (104 °F) ISO VG 46. This oil is the most suitable one to use in the broadest range of ambient temperatures.

At high ambient temperatures, when the oil temperature reaches continual 90 °C (194 °F), we recommend replacing the oil with one of kinetic viscosity 100 mm^2/s – HV.

At temperatures below –13 °C (9 °F), replace oil with one of kinetic viscosity 32 mm^2/s - viscosity class HV 32, see Operating Instructions chapt. 2.9.3.

Synthetic hydraulic oil

Hydraulic system can be filled with synthetic oil, that is completely degradable by microorganisms found in water and soil in case of leak.

When changing over from mineral oil to synthetic or when mixing oils of different brands, always consult the procedure with the oil manufacturer or dealer!

3.2.5 Gearbox oil


2186

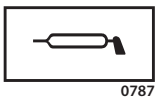
Use high quality oils complying with API GL-5 or EP or MIL-L-2105 C for lubricating the drum gearbox and axle (wheels) drive gearboxes.

Viscosity SAE 80W/90 for outdoor temperature range -10 °C÷ +30 °C (14 °F ÷ 86 °F).

Viscosity SAE 80W/140 for outdoor temperature range +20 °C ÷ +45 °C (68 °F ÷ + 113 °F).

The operating oil temperature must not exceed 85 °C ÷ 90 °C (185 °F ÷ 194 °F).

3.2.6 Lubricating grease


0787

Plastic grease containing lithium in compliance with NLGI-2 regulation (Mobilplex EP-1, Retinax A, Alvania, Grease No 3 etc.) must be used to grease the machine.

ISO 6743/9 CCEB 2

DIN 51 502 KP2K-30

3.2.7 Windshield washer liquid


2260

Water (at temperatures down to 0 °C) and windshield washer agent are used as fills in the washer can.

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

3.2.8 Air-conditioning filling

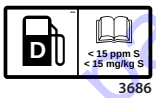
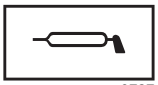

2441

Mixture:

1.2 kg of coolant Halocarbon 134a

0.2 l of oil PAG 150

0.005 l of contrast medium

Fills of...	Type of fill	Quantity l (gal US)	Brand
Engine	Engine oil according to chapter 3.2.1	11,2 (2,96)	 2412
Fuel tank	Diesel according to chapter 3.2.2	130 (34,3)	 3686
Hydrostatic system	Hydraulic oil according to chapter 3.2.4	53 (14)	 2158
Drum gearbox	Gearbox oil according to chapter 3.2.5	1,8 (0,48)	 2186
Axle gearbox	Gearbox oil according to chapter 3.2.5	2x0,8 (2x0,21)	 2186
Joint bearings - joint and steering cylinder	Plastic grease according to chapter 3.2.6	as required	 0787
Engine cooling system - coolant	All year round - anti-freeze liquid according to chapter 3.2.3 for temperatures down to -25 °C (-13 °F)	26 (6,9)	 2152
Vibrating drum	Engine oil, see the engine	6 (1,6)	 2412
Air-conditioning	Mixture according to chapter 3.2.8	-	 2441
Windshield washers	Water and antifreeze - ratio according to outdoor temperature	3 (0,8)	 2260
Tyres	Air or liquid see Operating Instructions chapter 2.7.10		

3.4 Lubrication and Maintenance Chart

Every 20 hours of operation (daily)	
3.6.1	Fuel check
3.6.2	Checking the oil in the engine
3.6.3	Engine cooling liquid level check
3.6.4	Checking the oil in the hydraulic tank
3.6.5	Fan condition check
3.6.6	Checking the dust valve of the air filter
3.6.7	Engine and exhaust pipe intake manifold check
3.6.8	Inspection of warning and checking devices
Every 50 hours of operation	
3.6.9	Engine tightness check
3.6.10	Cleaning of the water separator on the fuel filter
After 50 hours of operation	
3.6.23	Engine oil change
Every 100 hours of operation (weekly)	
3.6.11	Tyre pressure check
After 100 hours of operation	
3.6.27	Wheel bolts tightening check
3.6.34	Oil change in travel gearboxes
Every 250 hours of operation (3 months)	
3.6.12	Check of the fan and engine belt for condition
3.6.13	Check of hose and clip fixation
3.6.14	Cooler inspection
3.6.15	Air filter cleaning
3.6.16	Machine lubrication
3.6.17	Checking the oil in the vibrator
3.6.18	Oil in the travel gearboxes check
3.6.19	Pad foot segments inspection

Every 500 hours of operation (6 months)	
3.6.20	Fuel filter replacement
3.6.21	Electrical installation check
3.6.22	Air filter main cartridge replacement
3.6.23	Engine oil change *
3.6.24	Replacement of the cab ventilation filter and of the heating filter
3.6.25	Engine cooling liquid check
3.6.26	Air filter of the air conditioning system replacement
3.6.27	Wheel bolts tightening check **
After 500 hours of operation	
3.6.37	Oil change in the vibrator
3.6.39	Hydraulic oil and filter replacement
Every 1000 hours of operation (1 year)	
3.6.28	Air filter cartridges replacement
3.6.29	Damping system check
3.6.30	Oil separator cartridge replacement
3.6.31	Fuel tank cleaning
3.6.32	Valve clearance check and adjustment
3.6.33	Battery check
3.6.34	Oil change in travel gearboxes **
3.6.35	Air conditioning compressor mounting check
Every 2000 hours of operation (2 years)	
3.6.36	Coolant change
3.6.37	Oil change in the vibrator ***
3.6.38	Cleaning and checking the air-conditioning system
3.6.39	Hydraulic oil and filter replacement ***
Every 3000 hours of operation (3 years)	
3.6.40	DPF cleaning

3.4 Lubrication and Maintenance Chart

Maintenance - As Needed	
3.6.41	Gas strut replacement
3.6.42	Scrapers adjustment
3.6.43	Machine cleaning
3.6.44	Fuel system venting
3.6.45	DPF (diesel particulate filter) clogging regeneration
3.6.46	Screw connection tightening check

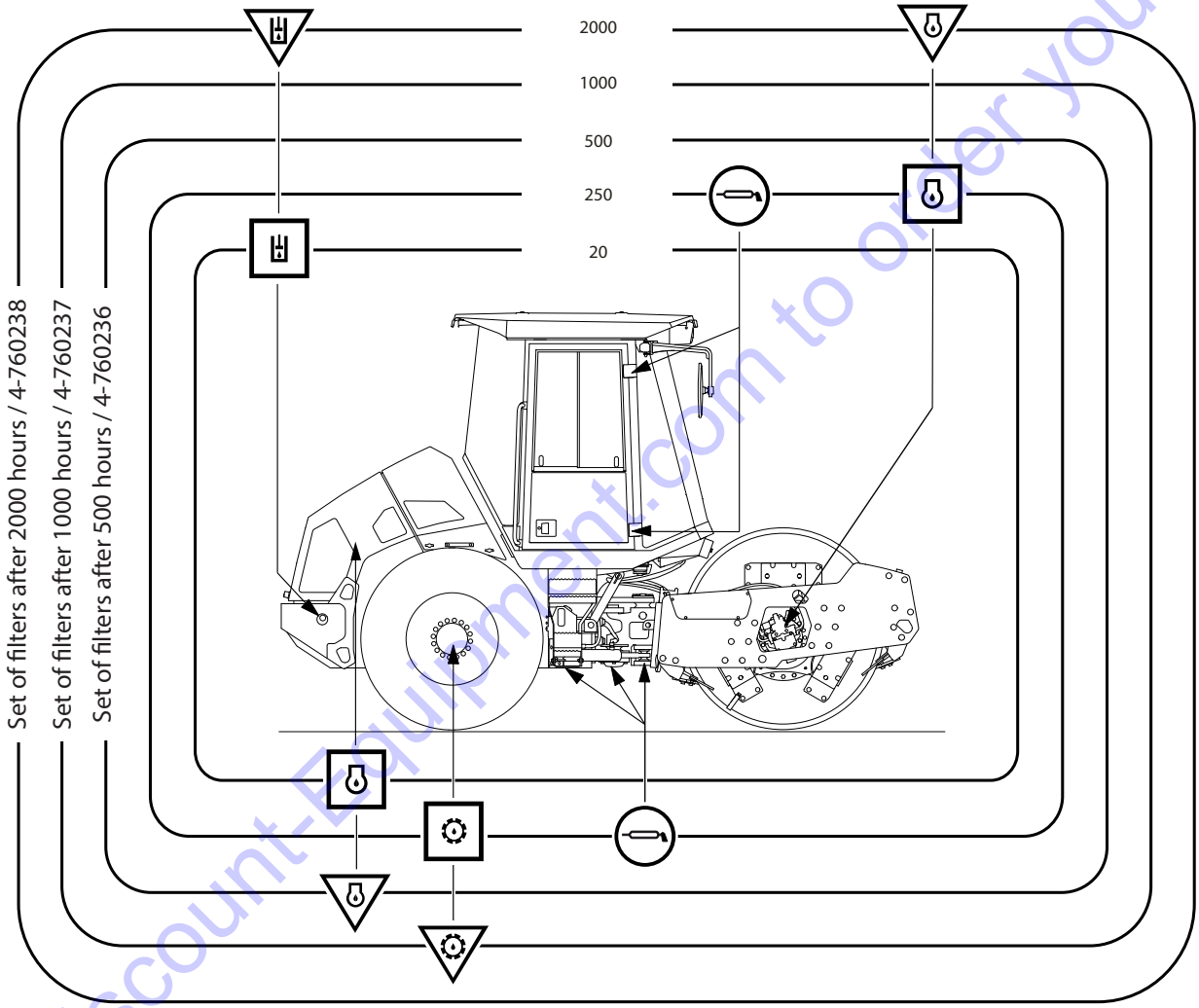
*** First after 50 hours**

**** First after 100 hours**

***** First after 500 hours**

LUBRICATION AND SERVICE PLAN

□	INSPECTION
○	LUBRICATION
▽	REPLACEMENT

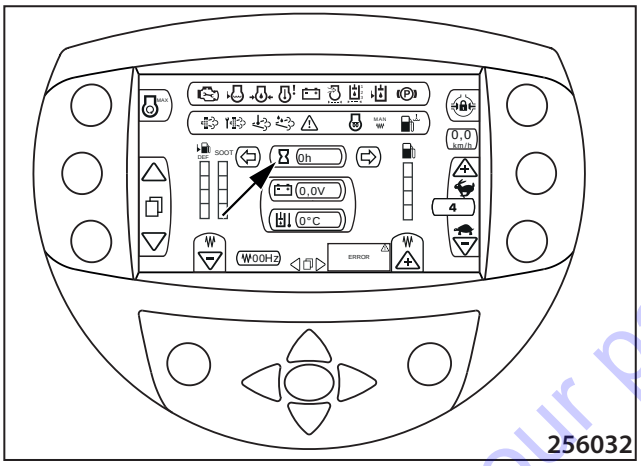


	Engine oil:	API: CJ-4	SAE 15W-40
	Hydraulic oil:	ISO VG 46	ISO 6743/4 HV
	Lubricating grease:	ISO 6743/9	CCEB 2
	Gear oil:	SAE 80W/90 SAE 80W/140	API GL-5 API GL-5

256012

3.6 Individual Operations of Maintenance

Carry out lubrication and maintenance on regular basis and repeatedly in the intervals as per daily reading on the counter of hours actually worked.



This Manual states only the basic information about the engine, other data are given in the Engine Operation and Maintenance Manual which is part of the Documentation supplied with the Machine.

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

Tighten the removed or loosened bolts, plugs, threaded joints of the hydraulics, etc. with tightening torque according to the Chart in par. 3.6.46 unless another value is provided with the respective operation.

Carry out maintenance with the Machine placed on flat, paved surface, and secured against any self-motion, always with the engine off, and key removed from the ignition box and with the wiring cut off (unless otherwise required).

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

If the exhaust pipe with a flexible part between the engine and the catalytic converter shows any leak or damage, the machine cannot be operated until the defect is fixed.

Following the first 50 hours of operation of the new Machine (following a major overhaul) carry out as per:

3.6.23 Engine oil change

Following the first 100 hours of operation of the new Machine (following a major overhaul) carry out as per:

3.6.27 Wheel bolts tightening check

3.6.34 Oil in the travel gearboxes change

Following the first 500 hours of operation of the new Machine (following a major overhaul) carry out as per:

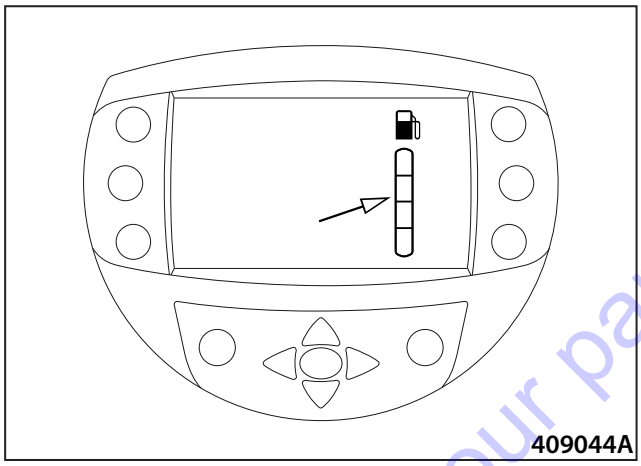
3.6.37 Oil in the vibrator change

3.6.39 Hydraulic oil and filter replacement

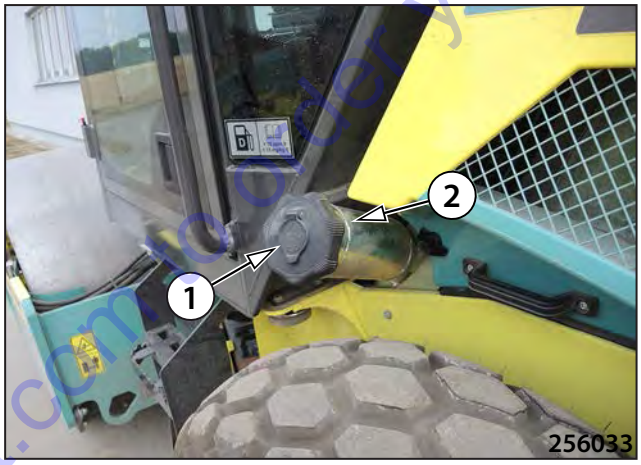
Every 20 hours of operation (daily)

3.6.1 Fuel check

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



- Clean the tank filler cap (1) and the filler neck (2).
- Unlock the lock and remove the cap.
- Refill the tank up to the bottom line of the filler neck.



Note

The fuel tank volume is 130 l (34.3 gal US).

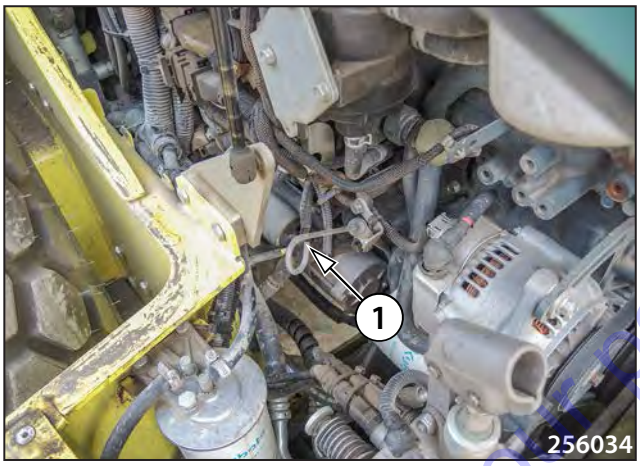
Do not smoke and do not use open fire when working!
Do not refill the fuel when the engine is running.

Do not pump out the tank completely. After the tank is completely pumped out, the whole fuel system must be vented.
Use only recommended clean fuel according to the chapter 3.2.2.
Do not refill the fuel in closed spaces.

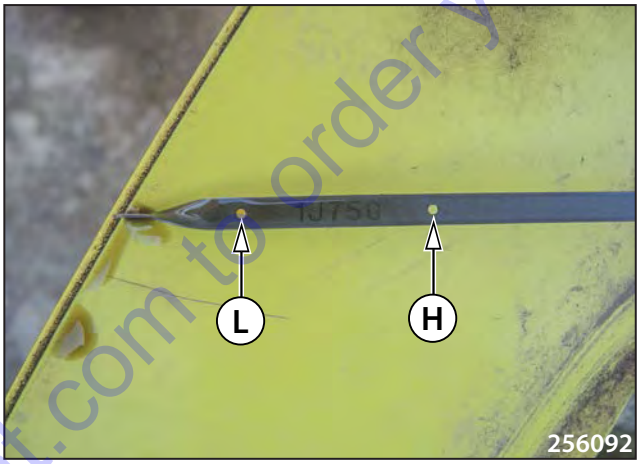
Do not spill the fuel.

3.6.2 Checking the oil in the engine

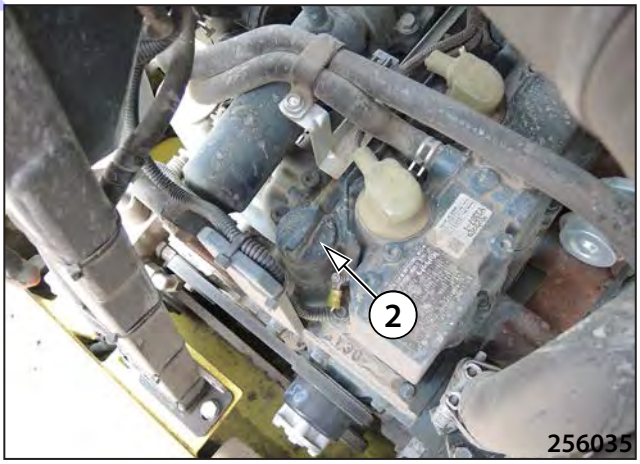
- Wait about 5 minutes until the oil runs down to the engine sump.
- Take out the oil dipstick (1), wipe it, insert fully back and take it out again to read out the oil level.



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



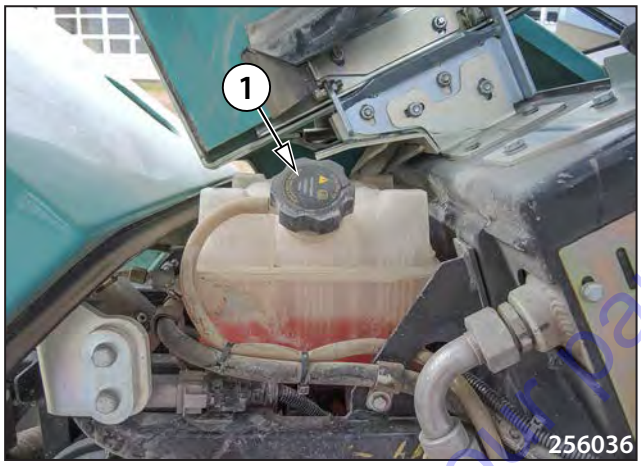
- After removing the filler plug (2), refill the oil through the oil filler. Wait about 1 min. until the level is stable and check again.
- Refill the identical type of oil. Use oils according to chapter 3.2.1.
- Check the engine for leaks and remove the cause.
- Check the engine for damaged and/or missing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



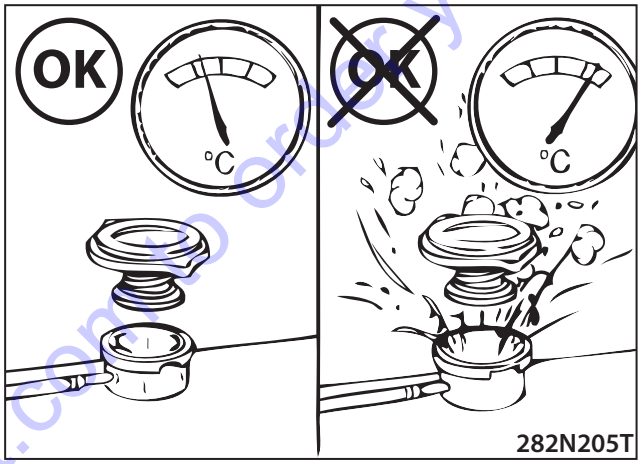
Do not use the engine if the oil level in the engine is not correct.

3.6.3 Engine cooling liquid level check

- Let cooling liquid cool down to less than 50 °C (120 °F).
- Check visually the level.
- Refill coolant through the filler (1).



Dismantle the filling plug only when the temperature of engine cooling liquid falls to less than 50 °C (120 °F). If you open it at higher temperatures, you risk scalding by steam or by cooling liquid due to the inner overpressure.



The level must not fall below the level indicator eyesight.

Add only the coolant according to Chapter 3.2.3.

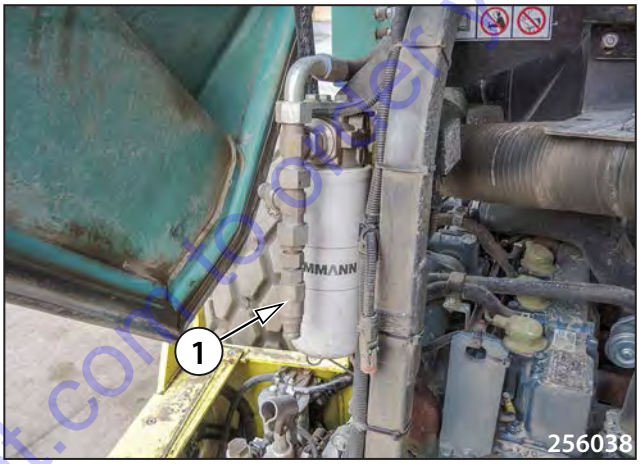
Do not add additives eliminating untightness of the cooling system to the engine cooling liquid!

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

3.6.4 Checking the oil in the hydraulic tank

- Check the oil level in the oil gauge.

- Refill the oil using the filling device through the quick coupling (1), proceed according to chapter 3.6.39.



When the level is below the bottom edge of the oil gauge "MIN", the indicator lamp lights up and the engine stops.

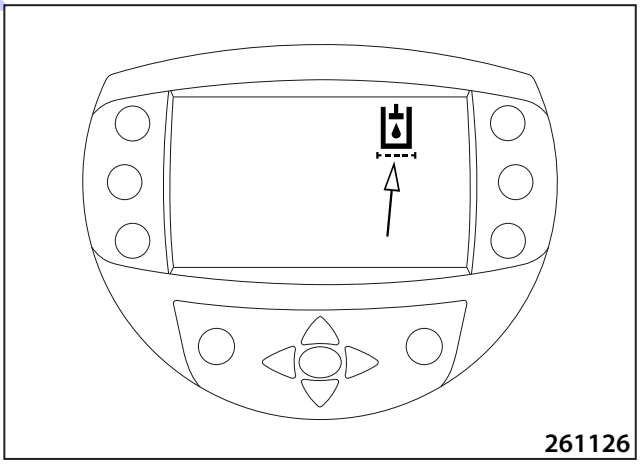
The tank filler neck cap (2) is sealed. If this seal is damaged during the guarantee period of the machine, the guarantee will be cancelled.

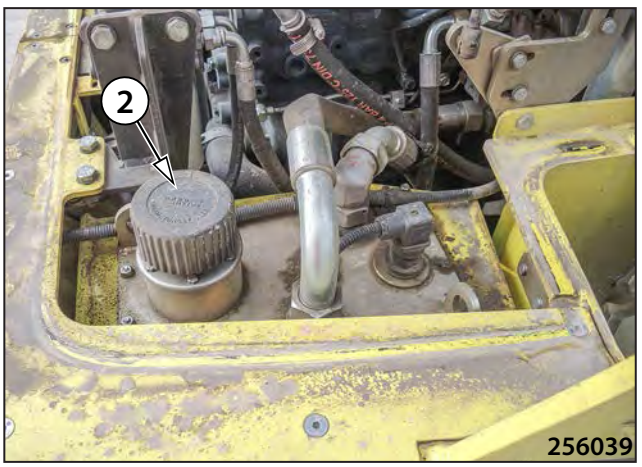
Carry out this refilling method as emergency one – not recommended by the manufacturer!

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 Fan condition check

- Inspect the fans visually. In case of damage, (e.g. a missing part of the material, cracks, shape changes, etc.), replace the fan.

3.6.6 Checking the dust valve of the air filter

- 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.

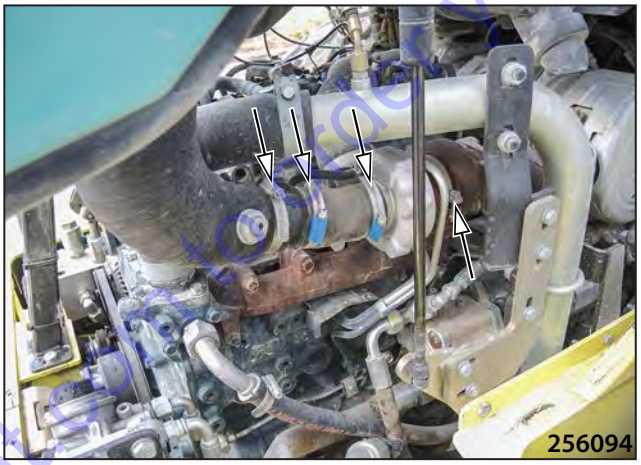
Do not work with the machine if the dust valve is damaged.

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

Dust valve
Order number: 1-952454

3.6.7 Engine and exhaust pipe intake manifold check

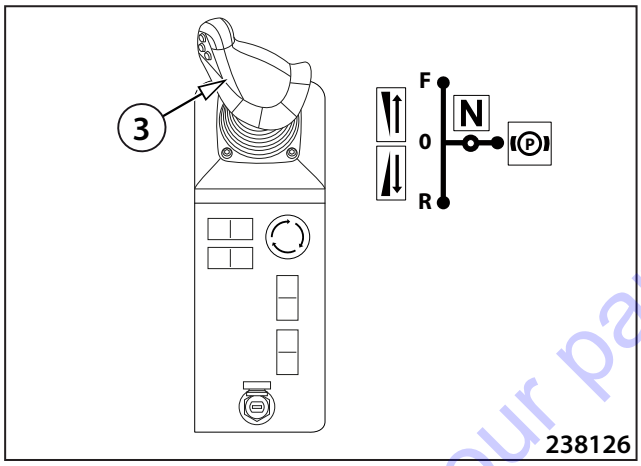
- Check the tightness of the engine intake manifold. Make sure that the hoses are not damaged and that the tightening clips are not missing.



- Check the tightness of the exhaust pipe.
- Make sure that the tightening clips are not missing.

If the exhaust pipe with a flexible part between the engine and the catalytic converter shows any leak or damage, the machine cannot be operated until the defect is fixed.

3.6.8 Inspection of warning and checking devices



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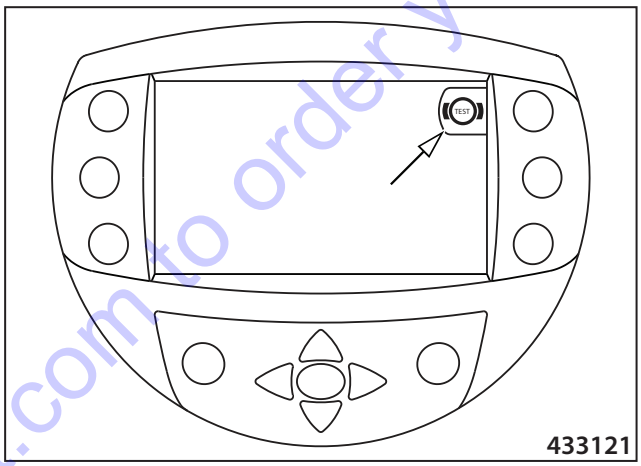
Brake test

- Always after the machine start-up (every 24 hours), the driver is asked for the brake testing.
- The machine can continue in operating even when the brake test is not performed (the test record is stored in the memory of the machine control unit); the brake test can be carried out later.

Procedure:

- Set the travel control (3) to the position P (parking brake enabled).
- Display the information screen.
- Turn on the BRAKE TEST – yellow backlight of the symbol, engine speed increased.



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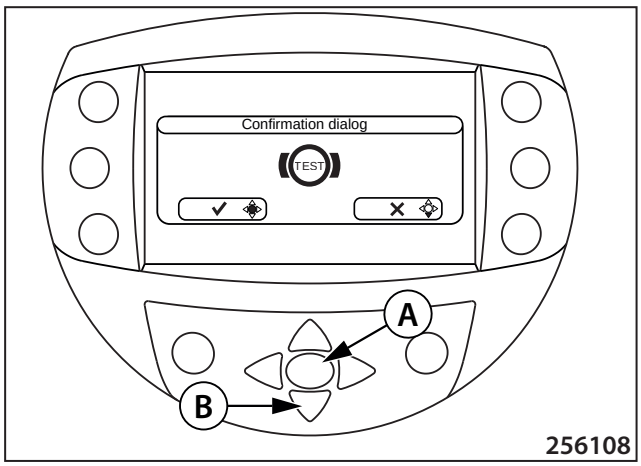
- After you press the brake test button, a confirmation dialog will appear.
- Press the middle button (A) to confirm the start of the brake test.
- Press the lower button (B) to cancel the start of the brake test.
- Change the travel control (3) through the neutral position (N) to the forward position (F).
- Successful test result = message TEST OK
- Unsuccessful test result = message TEST NOT OK Operation possible only in the emergency mode of the machine. Call the service.



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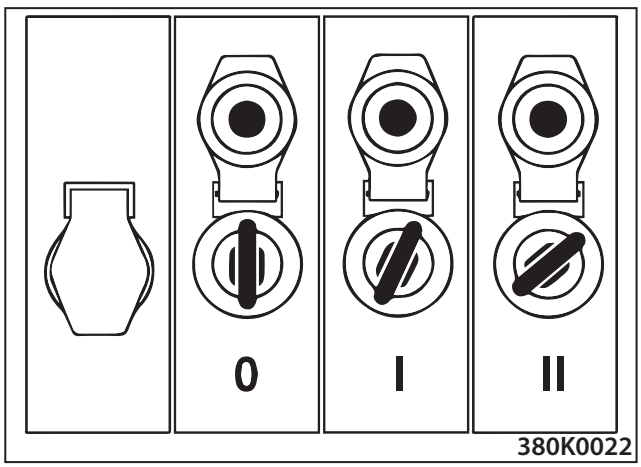
- Turn the key in the ignition box to the position "I".



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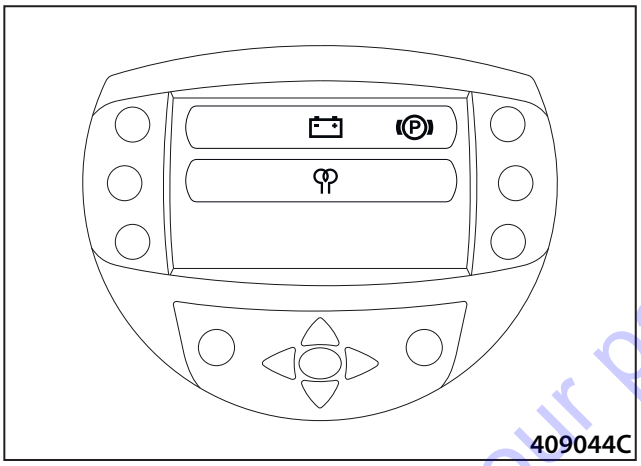
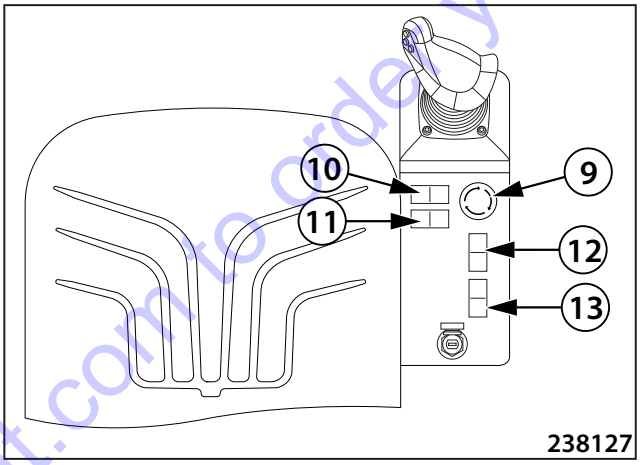
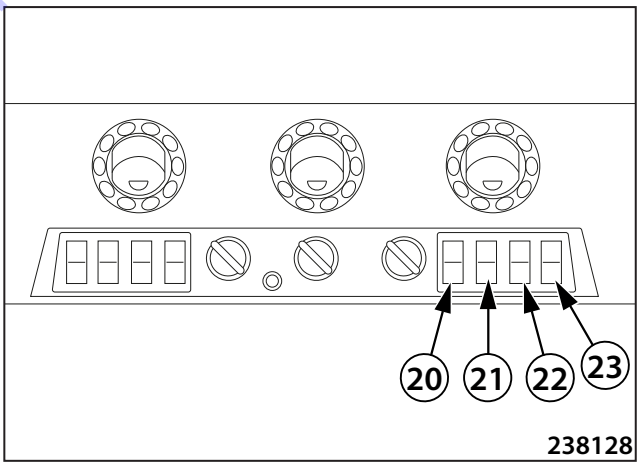
- The brake, charging, lubrication and heating indicator lamps will light up on the display.

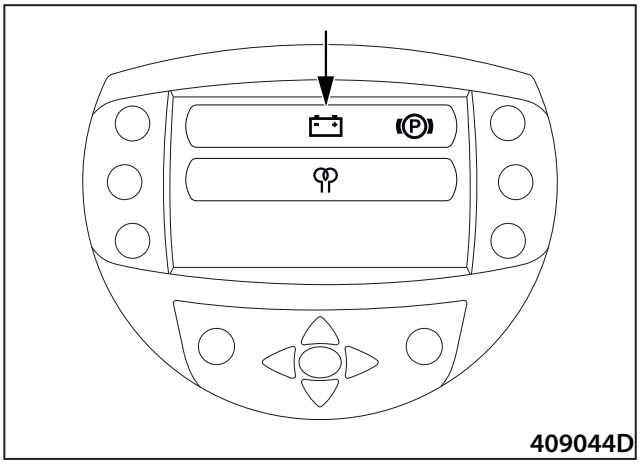


- Then test functions of the switches (9–13, 20–23).

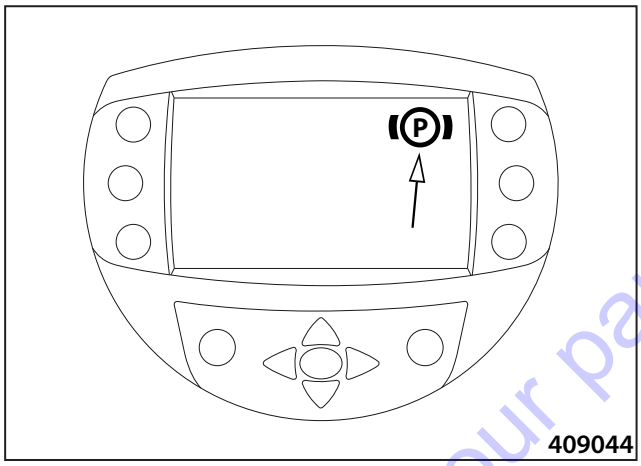




- Turn the key to position "II" to start the engine.
- The charging indicator lamp must go out after the starting is completed.

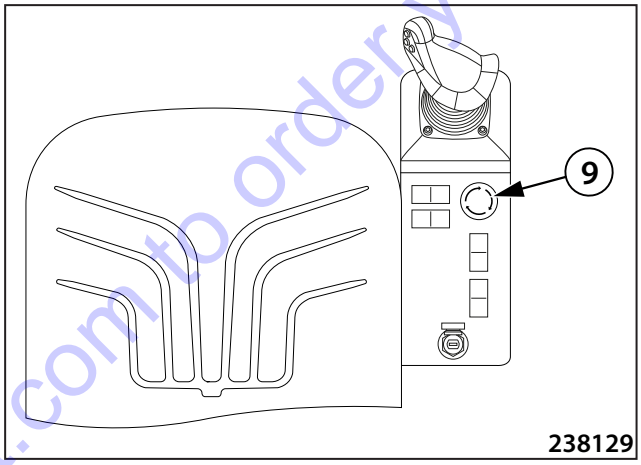


- The brake indicator lamp goes off after the travel control is changed to the neutral position (N).

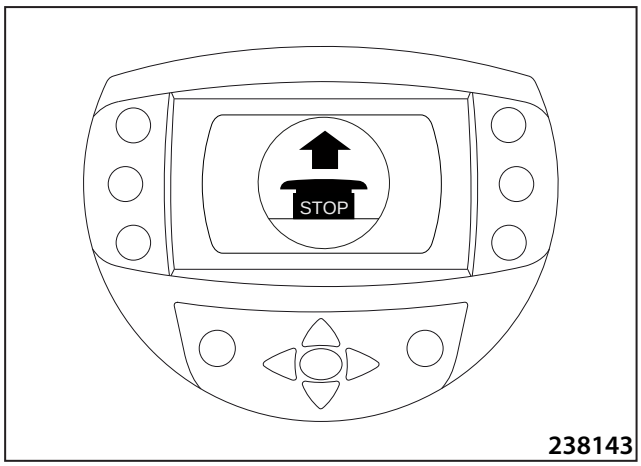


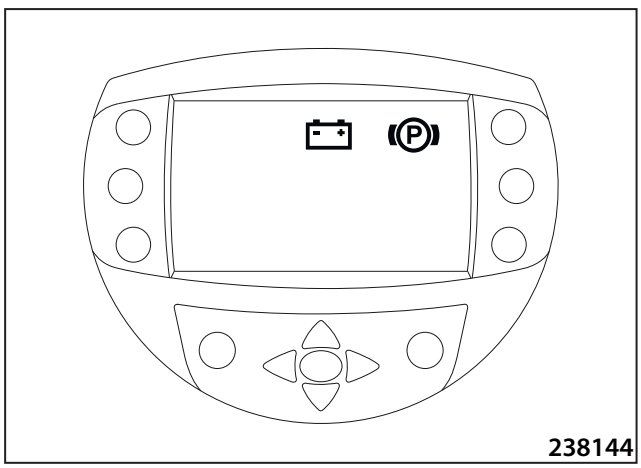
Emergency brake button function:

- Move off the machine at a low speed.
- Press the emergency brake button (9).
- The machine stops moving, the parking brake is enabled and the engine stalls.

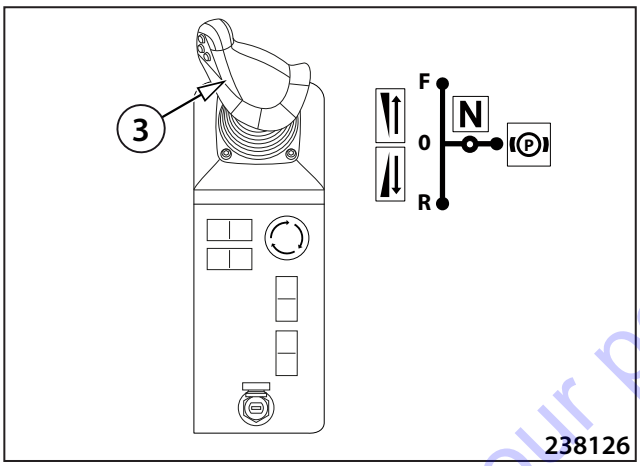


- If the emergency brake, parking brake and charging indicator lamps light up on the display.





- Set the travel control (3) to the brake position (P). Switch over the key in the ignition box to the position "0".
- Now you can start the engine again.



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!

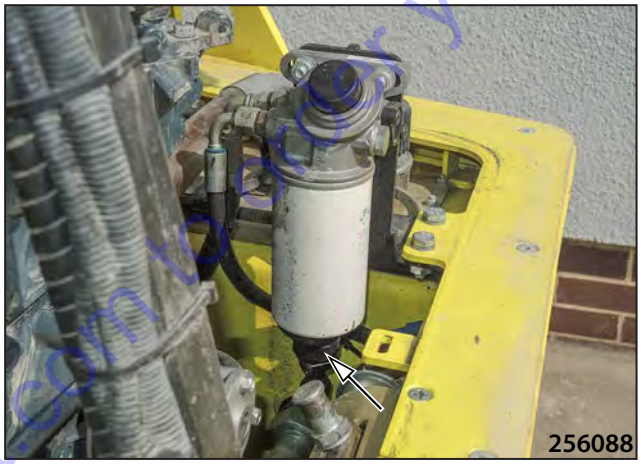
Every 50 hours of operation

3.6.9 Engine tightness check

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

3.6.10 Cleaning of 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.
- Vent the fuel system.



Do not smoke while working!

Check the water separator for leaks.

Stop the fluid soaking into the ground.

Every 100 hours of operation (weekly)

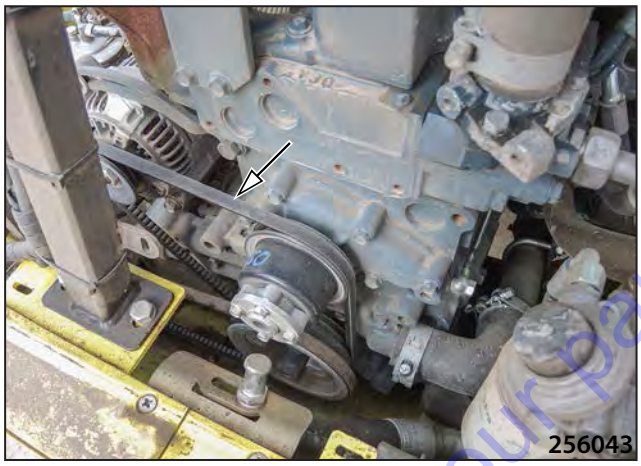
3.6.11 Tyre pressure check

Rotate tyres so that valves are at top positions.

- Check the pressure in cold tyres, by air pressure meter.
- Keep the tyre pressure at 150 kPa (21.8 PSI).

Every 250 hours of operation (3 months)

3.6.12 Check of the fan and engine belt for condition



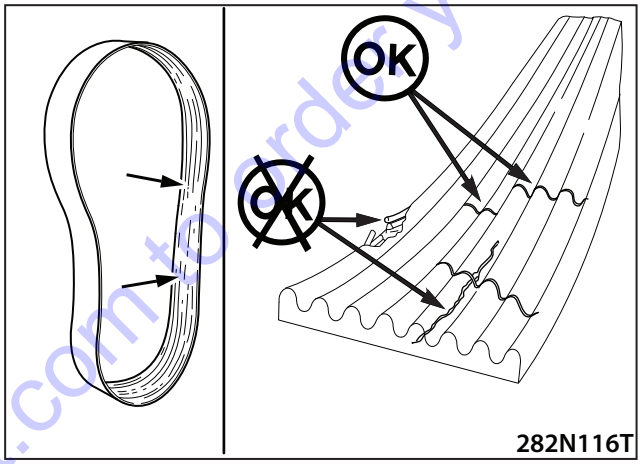
Fan wear check

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

Fan
Order number: 1510573

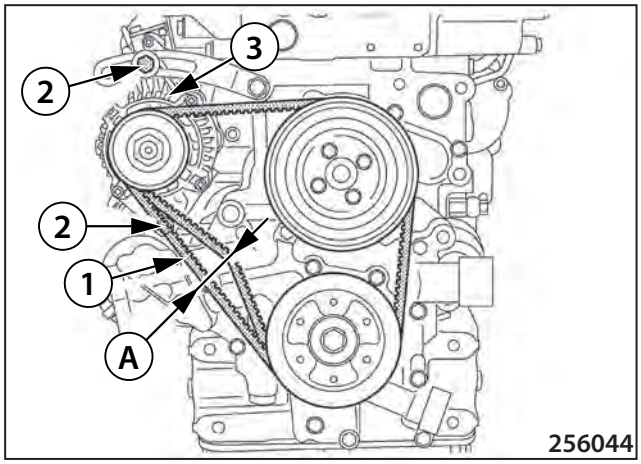
Belt wear check

- 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

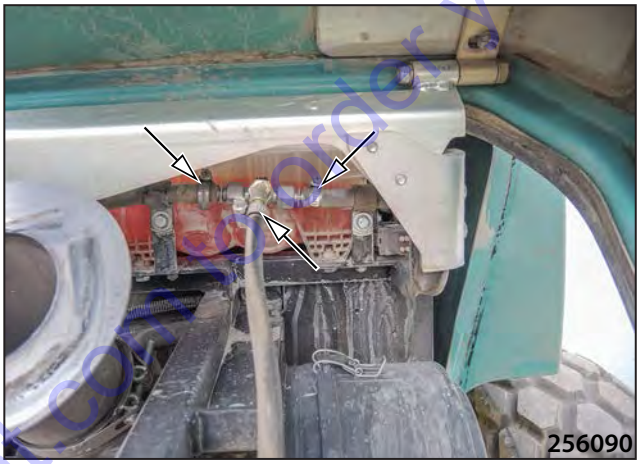
- Press with your thumb at the spot where belt length between pulleys is the longest, using 110 N (25 lb) strength. The max. slack (A) is 10 - 12 mm (0.39 – 0.47 in).
- Tighten the belt (1) by loosening the screws (2) and shifting the alternator (3) if required.
- Check the belt for correct tension.



3.6.13 Check of hose and clip fixation

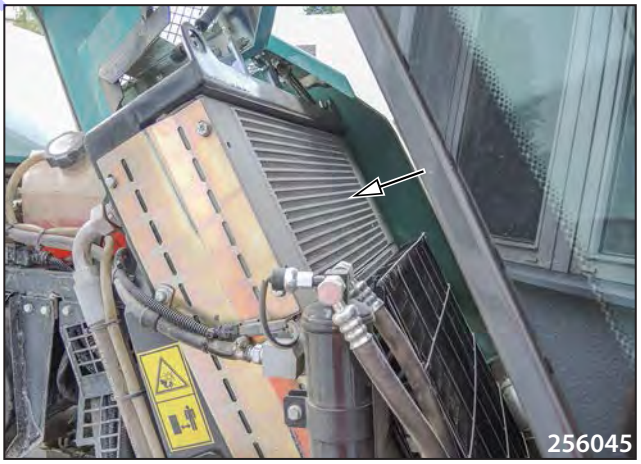
- Check the engine inlet piping for leakage. Check the hose for damage and missing hose clips.

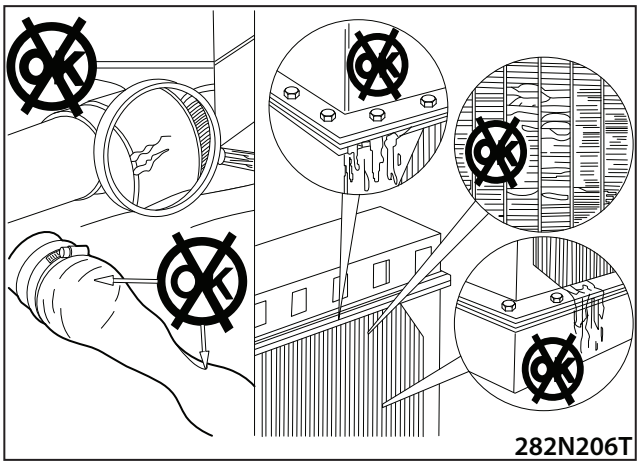
- Check the cooling circuit for leakage. Check the hoses for damage and missing hose clips. When hoses are cracked or hardened, replace them for new ones.



3.6.14 Cooler inspection

- Check tightness of the cooling circuit. Check the circuit for damaged hoses and for 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.

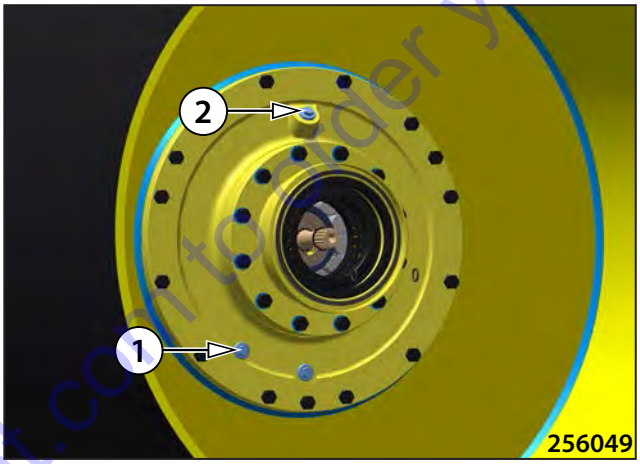
3.6.16 Machine lubrication

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

Door hinges pins

pins 4x

3.6.17 Checking the oil in the vibrator

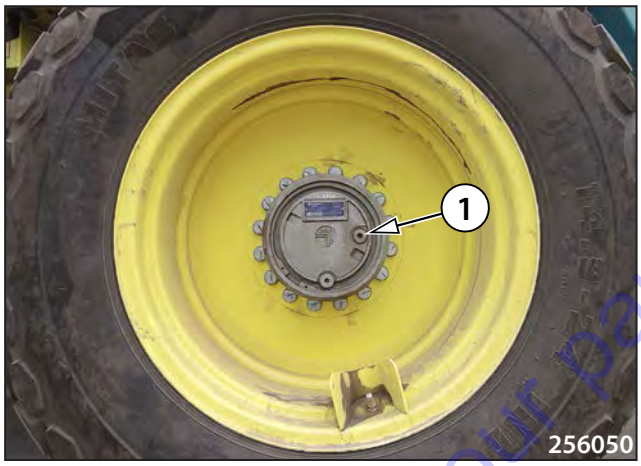


- Stop the machine on a flat and solid surface so that the plugs of the drum on the left side are in the position according to the picture.
- Clean the area around the check plug (1).
- Unscrew the plug (1) and check the oil level. The level must reach to the inspection hole or flow out slightly.
- Unscrew the filler plug (2) and refill the oil.
- Clean the plugs and remount.

Check the oil when it is cooled down.
Refill the same type of oil.

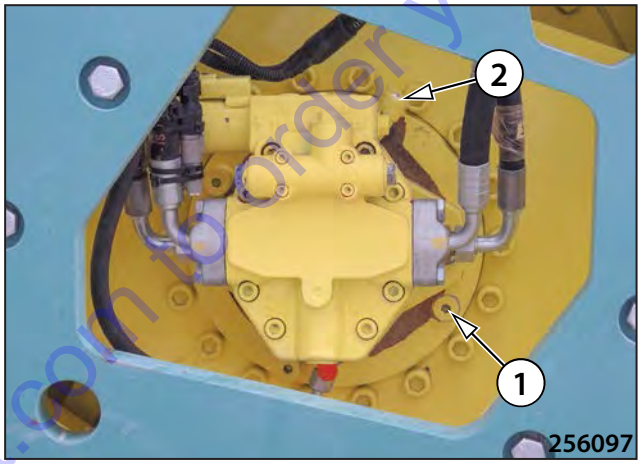
Stop the oil soaking into the ground.

3.6.18 Oil in the travel gearboxes check



Axle gearbox

- Stop the machine on a flat and solid surface so that the plugs of the gearboxes of both wheels are in the position according to the picture. (The check plug (1) is in the horizontal axis.)
- Clean the area around the check plug (1).
- Unscrew the plug (1) and check the oil level. The level must reach to the inspection hole or flow out slightly.
- Refill oil through the check plug (1) if necessary.
- Clean the plugs and remount.



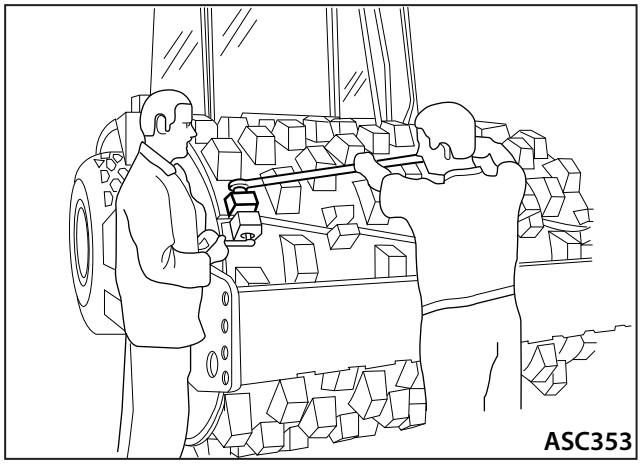
Drum gearbox

- Clean the area around the check plug (1).
- Unscrew the plug (1) and check the oil level. The level must reach to the hole or the oil must flow out slightly.
- Refill oil through the filling plug (2) if necessary.
- Clean the plugs and remount.
- Check tightness of the gearboxes.

Do not touch the gearbox and adjacent parts if they are hot.

The plugs are located on the static part of the gearbox - they do not rotate during driving.

3.6.19 Pad foot segments inspection



- Before inspection is made, clean the segment surface, and mainly round bolted connections. Check overall condition of the segments (any fissures, deformations) and whether M20 8G bolts are tightened with 390 Nm (287.6 lb ft) torque.

Every 500 hours of operation (6 months)

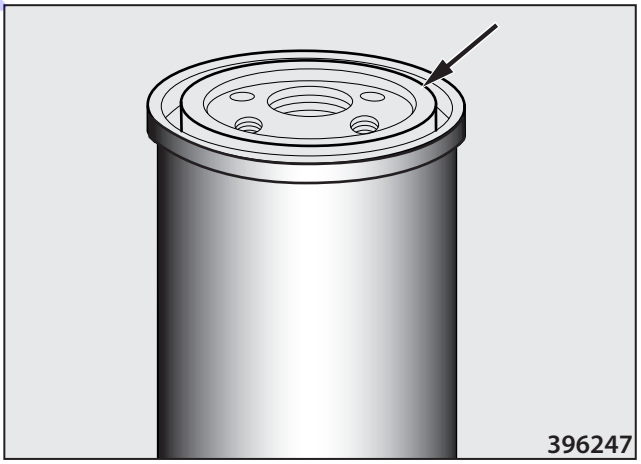
The set of filters after 500 operating hours can be ordered under the order number 4-760236. For the list of all spare parts, see the table in the end of this publication.

3.6.20 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: 1536168

Fuel pre-filter

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

Fuel filter
Order number: 1536169

- 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 vent the system automatically.

Start the engine and then check the filters for leaks

Use original specified filters.

Make no over-tightening of filters, the thread and gasket may get damaged.

Observe fire precautions during replacement!

Replace in ventilated rooms with no fire hazard.

Do not smoke or use open flame when at work.

Catch the drained fuel.

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

3.6.21 Electrical installation check

- 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.

3.6.22 Air filter main cartridge replacement

- Remove the filter cap.

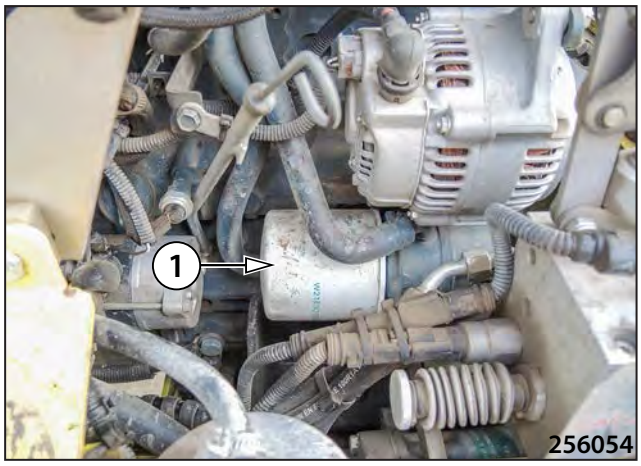
- Take out the main cartridge.
- Mount the new main cartridge of the air filter.
- Check that the cartridge is mounted correctly and is sealing.

3.6.23 Engine oil change

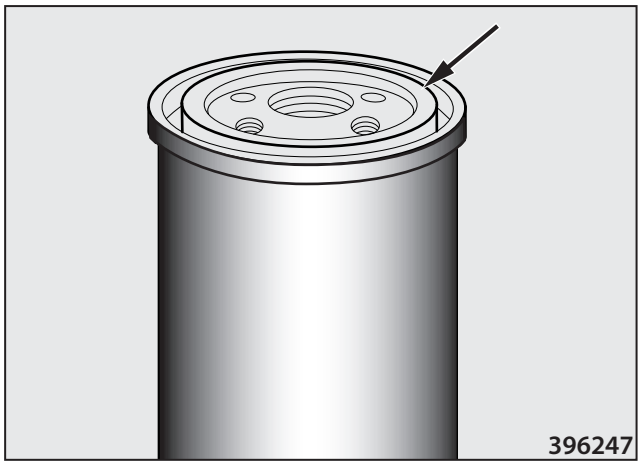
First carry out after 50 hours.

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 11.2 l (2.96 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.

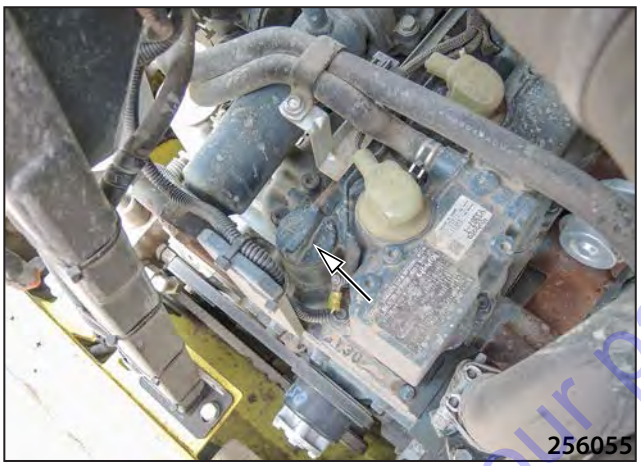


- Lubricate the gasket with oil.
- Mount the new filter.

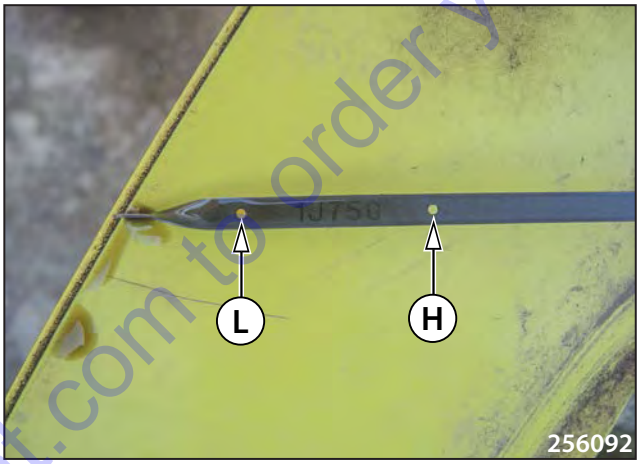
Oil filter
Order number: 1536674

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

- Fill the engine through the filler.



- Refill oil to the upper oil level mark (H).
- Oil charge is 11.2 l (2.96 gal US) inclusive of fill oil filter.



NOTE

- After refilling, start the engine for 2 - 3 min. Check tightness of drain plug and filter.
- Stop the engine, wait for approx. 5 min. until oil runs down to the engine sump. Then check the level with oil dipstick.

Beware of scalding when draining hot oil.

Follow the fire safety measures!

Exchange oil after 6 months at the latest, if 500 hours of operation have not been reached by that time. Exchange oil in the interval that comes first.

Use recommended filters - see Spare parts catalogue. Use recommended oil - see chapter 3.2.1.

Collect drained oil; do not let it soak into the ground.

Used oil and filters are environmentally dangerous waste - have them liquidated.

3.6.24 Replacement of the cab ventilation filter and of the heating filter

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

Air filter
Order number: 1542159

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

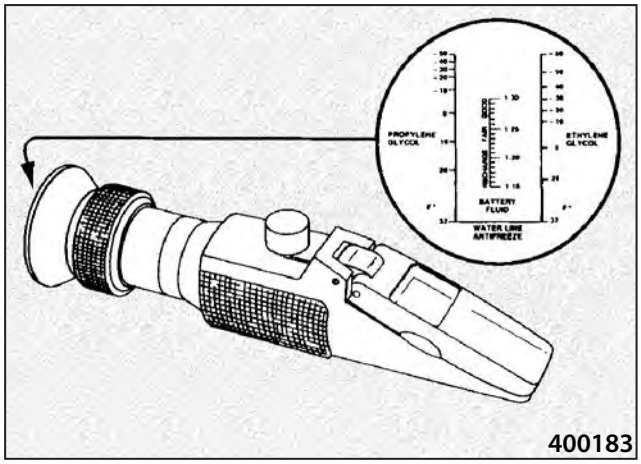
Air filter
Order number: 1542180

3.6.25 Engine cooling liquid check

- Check the concentration of anti-freeze agent in cooling liquid using a refractometer.

Check the coolant always before winter season. If the measured concentration is not suitable for the corresponding temperature, adjust it by adding anti-freeze agent into the coolant or change the coolant.

- Add anti-freeze agent according to chapter 3.2.3.



3.6.26 Air filter of the air conditioning system replacement

- Remove the top grate.
- Replace the filter.

Air-conditioning filter
Order number: 4-32925

3.6.27 Wheel bolts tightening check

First carry out after 100 hours.

- Check tightening bolts of wheel using a torque wrench.
- Tightening torque is 165 Nm (122 lb ft).

Every 1000 hours of operation (1 year)

The set of filters after 1000 operating hours can be ordered under the order number 4-760237. For the list of all spare parts, see the table in the end of this publication.

3.6.28 Air filter cartridges replacement

- The proper maintenance of the air filter and of the whole inlet manifold, the rubber parts in particular, will protect the engine against dust effects significantly and extend the element 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 element 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 elements!

Do not use different elements than required!

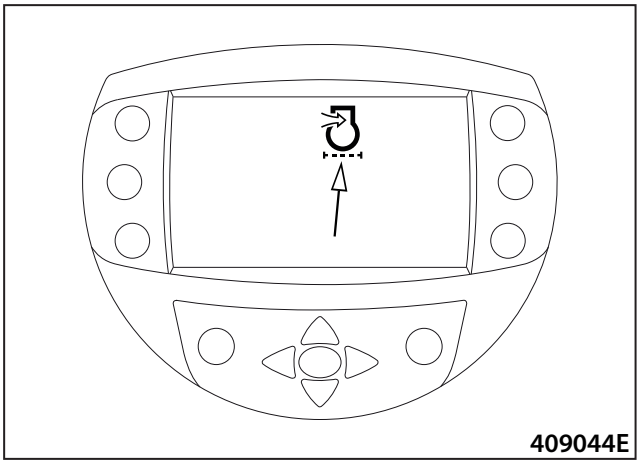
Do not remove the cartridges only for checking purposes!

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 element and a safety element.
- Always replace the main and safety elements when the indicator lamp indicates that the air filter is clogged.
- Check the air cleaner and inlet manifold for fastening and integrity.



409044E

- Open the bonnet.
- Remove the filter cap.

- Take out the main cartridge.

Air filter cartridge (external)
Order number: 54-5970026112

- Take out the safety element.

Air filter cartridge (internal)
Order number: 54-5523126150

- 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.

Dust valve
Order number: 1-952454

Do not clean the inside of the cleaner by pressure air; dust might get into the engine inlet piping.

Use original elements only.

When washing the machine, make sure water cannot pour into the air cleaner.

In case of absorbing water, exchange main element. Dry the cleaner body.

Replace the dust valve immediately if it is damaged!

Do not operate the machine with damaged cleaner body or cover.

3.6.29 Damping system check

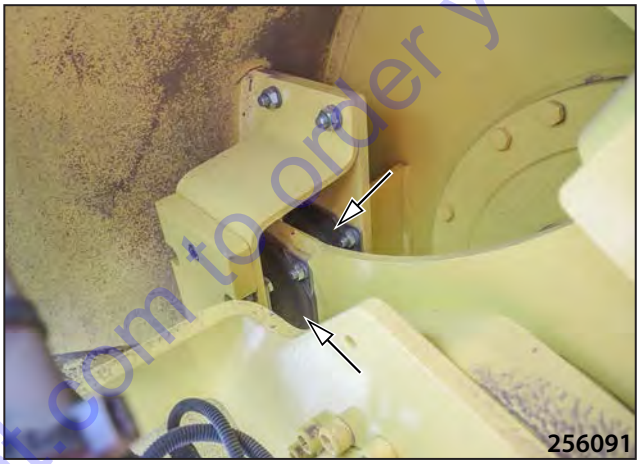
- Check the condition of metal-rubber mountings and bonding of metal with rubber.

Drum damping system - left side;

Rubber metal
Order number: D: 4-920000003

Drum damping system - right side;

Rubber metal
Order number: 4-9200000030

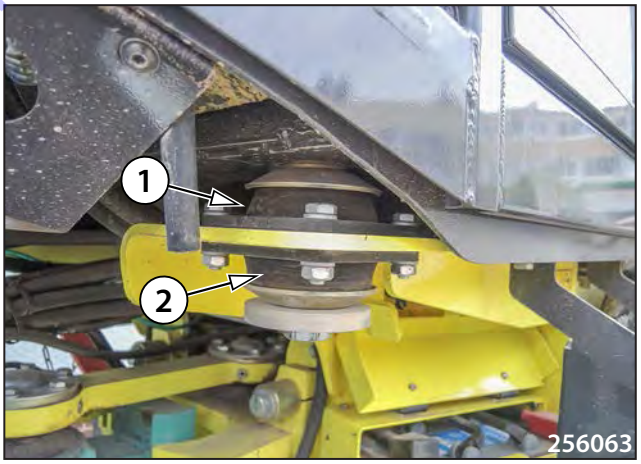


Upper rubber-metals of the driver's stand (1).

Rubber metal
Order number: 1402721

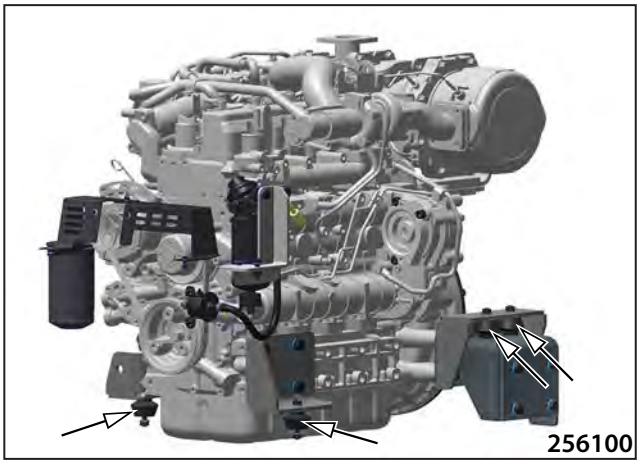
Lower rubber-metals of the driver's stand (2).

Rubber metal
Order number: 1403130



Metal-rubber mountings of the engine

Rubber metal
Order number: 1515888

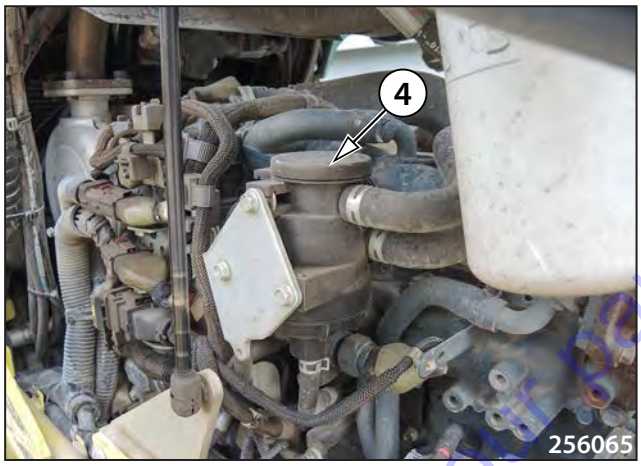


Replace damaged mountings.

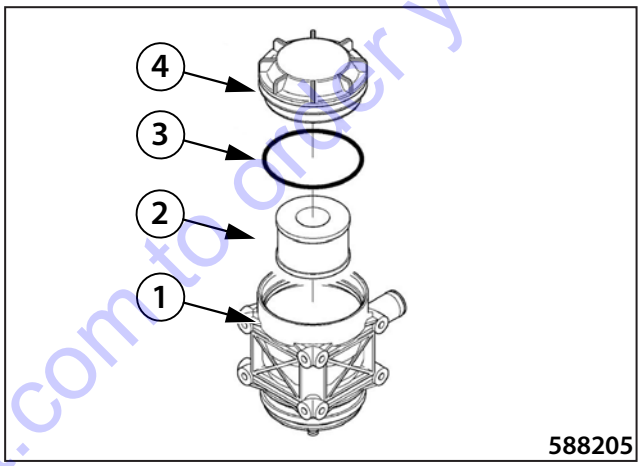
Check again tightening of bolts and nuts.

3.6.30 Oil separator cartridge replacement

- Remove the cap (4).



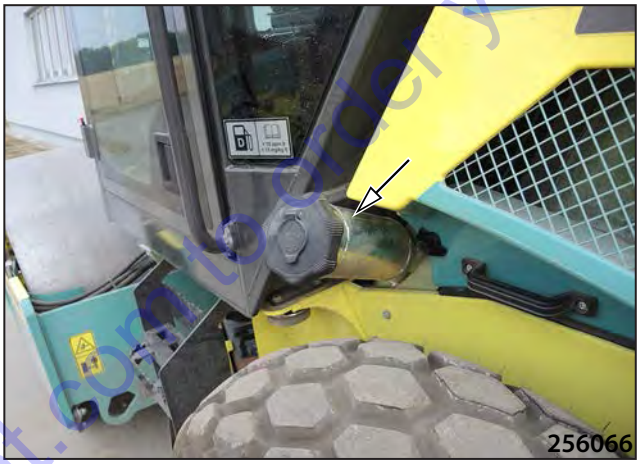
- Replace the filter cartridge (2) and the seal ring (3).
- Clean the internal area of the filter (1).
- Insert a new filter cartridge (2) and a seal ring (3).



3.6.31 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 engine diesel fuel.
- Check and clean the interior of the tank.
- Mount the drain plug.

- Fill the fuel tank with diesel fuel up to the lower edge of the filler neck.



Do not smoke while working!

Catch the drained fuel.

3.6.32 Valve clearance check and adjustment

- Contact the Kubota service for adjusting the engine valves.

3.6.33 Battery check

- Stop the engine and disconnect the electric system using the isolating master switch.
- Clean the surface of batteries.
- Check the condition of poles and terminals and clean them. Slightly wipe terminals with grease.

MAINTENANCE-FREE BATTERY

- In case of a maintenance-free battery (the battery has no freely accessible plugs), only the no-load voltage on terminals is checked. The batteries cannot be replenished. If the no-load voltage is 12.6 V and more, the battery is fully charged. If the no-load voltage is below 12.4 V, the battery should be charged immediately. It is recommended to be mounted 24 hours after charging.

Note:

The no-load voltage is the voltage measured at the terminals of the battery which was at rest for at least 12 hours – was neither charged nor discharged.

Keep the batteries dry and clean.

Do NOT disconnect battery while the engine runs.

When handling with the battery, always follow battery Manufacturer's Manual!

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

Use proper clothing to protect your skin against any electrolyte stain.

When there is eye contact with electrolyte immediately flush affected eye with large amounts of water for a few minutes. Get prompt medical attention.

When there is electrolyte ingestion, drink max amount of milk, water, or solution of calcined magnesia in water. Get prompt medical attention.

During skin contact with electrolyte, remove clothing, including shoes, flush affected points as soon as possible with soap water or solution of soda and water. Get prompt medical attention.

Do NOT eat, drink or smoke while at work! After work is completed, wash your hands and face thoroughly with water and soap!

Do NOT check a wire is energized by touching Machine frame.

Disconnect the battery before its repair, or when about to handle the wires and electric devices within the wiring circuit so to avoid a short circuit.

When disconnecting the battery, please disconnect cable with (-) pole first. When connecting, you must connect (+) pole first.

Making direct conductive connection between battery's both poles you will cause a short circuit with battery explosion hazard.

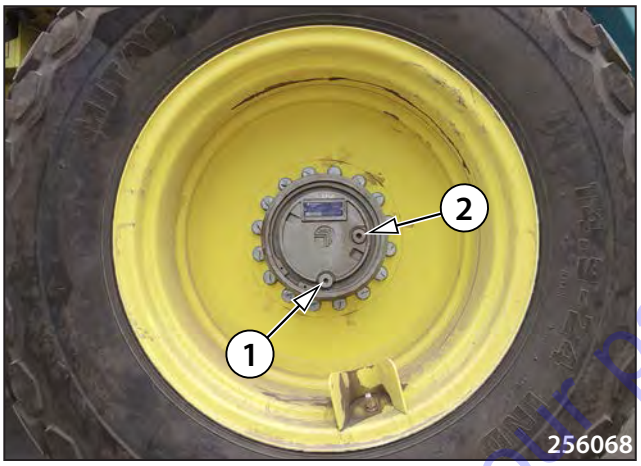
Do NOT turn over the batteries, electrolyte may pour out from degassing batteries.

When there is electrolyte spillage, rinse the affected place with water, and neutralize with lime.

Hand over old batteries that do not work for their disposal.

3.6.34 Oil change in travel gearboxes

First carry out after 100 hours.

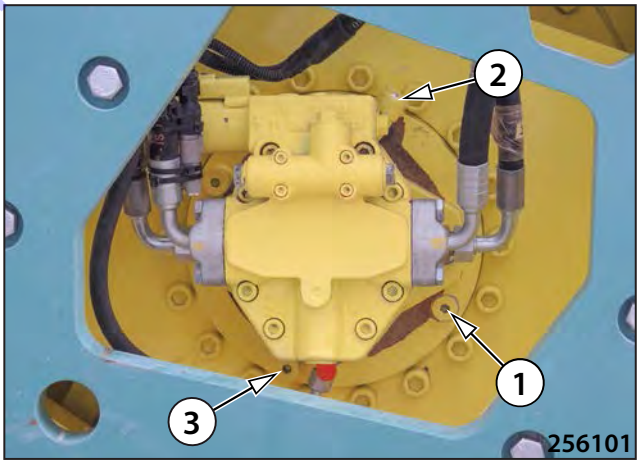


(Wheel) axle gearboxes

- Place the machine horizontally on a flat and solid surface so that the plugs of the gearboxes of the axle are in the position according to the picture.
- Clean surfaces around the plugs.
- Put a suitable pan under the drain plug (1).
- Remove both plugs and clean them, and let the oil drain out.
- After draining drive away with the roller so that the plugs turn to the position according to fig.
- Refill the oil through the upper plug (2) until the level reaches the check hole (2) or the oil starts flowing out.
- Replace both of the plugs, change the plug seals if damaged.

Drum gearbox – right side

- Place the machine onto a flat, solid surface.
- Clean surfaces around the plugs.
- Put a suitable pan under the drain plug (3).
- Unscrew all plugs (1), (2), (3) and let the oil drain out.
- Remount the drain plug (3) after the draining is completed.
- Fill the recommended oil through the filler plug (2).
- Check the oil level in the inspection hole (1). The oil must reach the lower edge of the opening or slightly flow out.
- Mount the plugs (1) and (2), replace damaged plug seals.

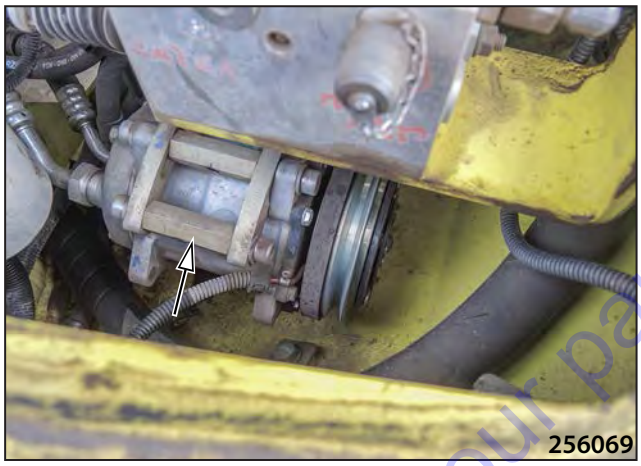


Do not touch the gearbox and adjacent parts if they are hot.

Collect drained oil; do not let it soak into the ground.

3.6.35 Air conditioning compressor mounting check

- Check the strength of the compressor attachment and the compressor bracket. Make sure that the belt does not spin. If necessary, tighten the screws.
- Perform the visual inspection of the belt for any damage. Cracks perpendicular to the width of the belt are not a defect. If there are longitudinal cracks on the belt or the belt edges are ragged or any parts of material are torn out, it is necessary to replace the belt.



Every 2000 hours of operation (2 years)

The set of filters after 2000 operating hours can be ordered under the order number 4-760238. For the list of all spare parts, see the table in the end of this publication.

3.6.36 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).

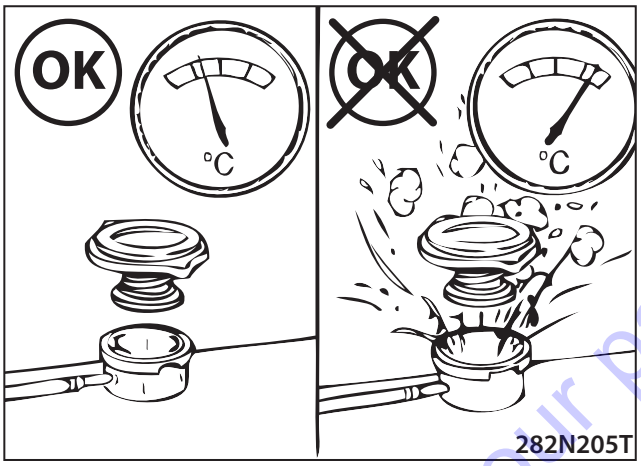
Do not open the pressure plug before the coolant temperature drops below 50 °C (122 °F). Beware of gushing of the coolant and scalding when opening the pressure plug.

- 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 26 l (6.9 gal US).

Note

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



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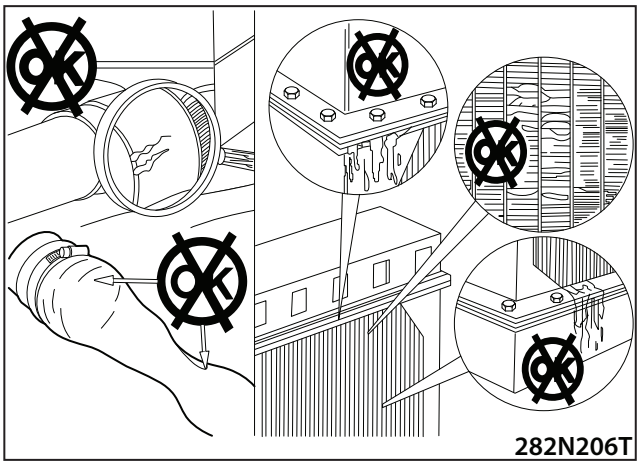

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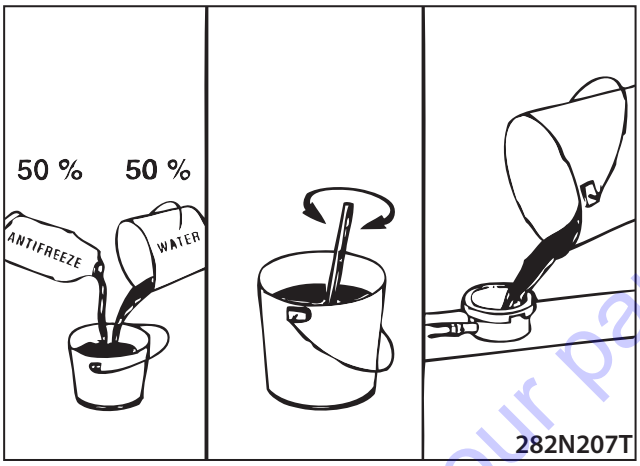
Fill the cooling circuit

- 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!

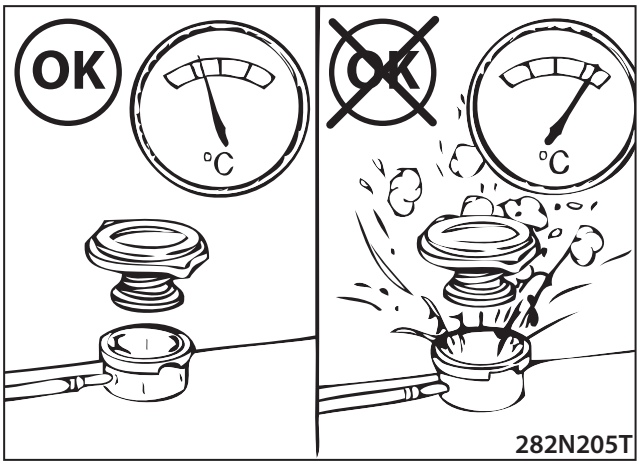
When changing coolant, follow instructions of the anti-freeze manufacturer!

- 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.

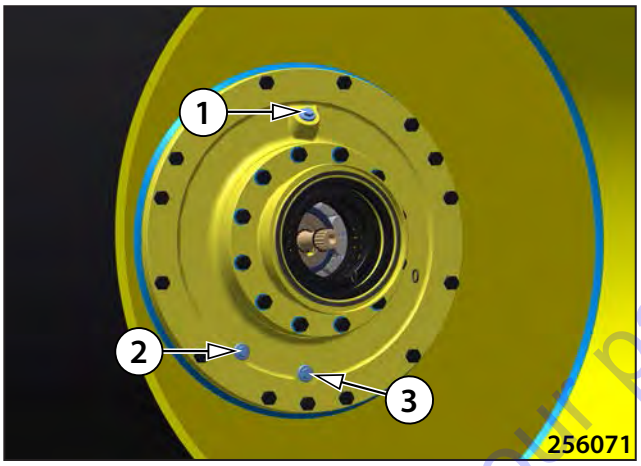
- Stop the engine.
- Check the level on the water gauge. If the level is low, refill the coolant to maximum.

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!

3.6.37 Oil change in the vibrator



First carry out after 500 hours.

- Place the machine horizontally on a solid and flat surface so that the drain plug on the left side of the drum (3) is in the lowest position and the filler plug (1) in the highest position.
- Place a suitable pan under the drain hole.
- Unscrew all the plugs and let the oil flow out.
- Remount the drain plug after the draining is completed.
- Through the filler (1), refill the recommended oil up to the edge of the inspection hole (2).
- Mount the other plugs.

Change the oil when it is warm.
Let the drained oil cool down below 50 °C (122 °F).

Stop the oil soaking into the ground.

3.6.38 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.

3.6.39 Hydraulic oil and filter replacement

First carry out after 500 hours.

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. At the same time, clean the suction filter.

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

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

The used oil is ecologically hazardous waste – hand it over for disposal.

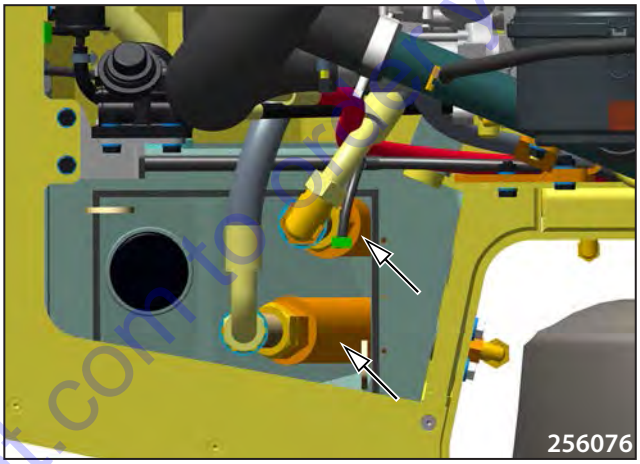
- Remove the plug. Let the hydraulic oil drain out into the prepared pan. The drained volume is 53 l (14 gal US).

- Remove the connector of the level gauge.

- Remove the cap.

- Remove the suction baskets.
- Clean the suction baskets.
- Remount the suction baskets.
- Inspect the interior of the tank.
- If the bottom is dirty, clean and rinse the tank carefully with the new oil.
- Mount the lid back.
- Use the new sealing tape.

Sealing strip
Order number: 4-5422250006

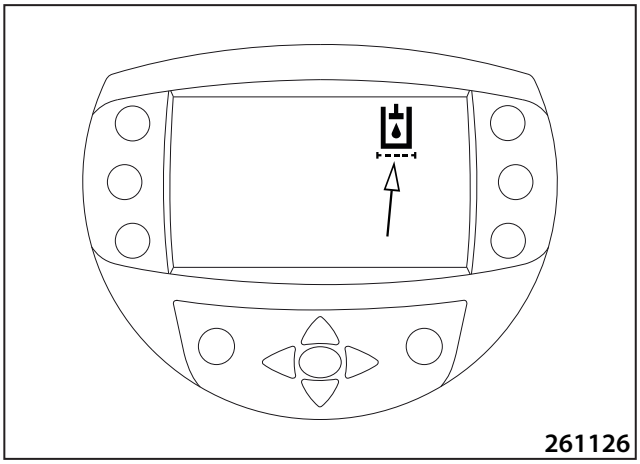


- Remount the connector of the level gauge.
- Remove the ventilation filter. Mount a new ventilation filter.
- Mount the cover back.

Pressure filter element replacement

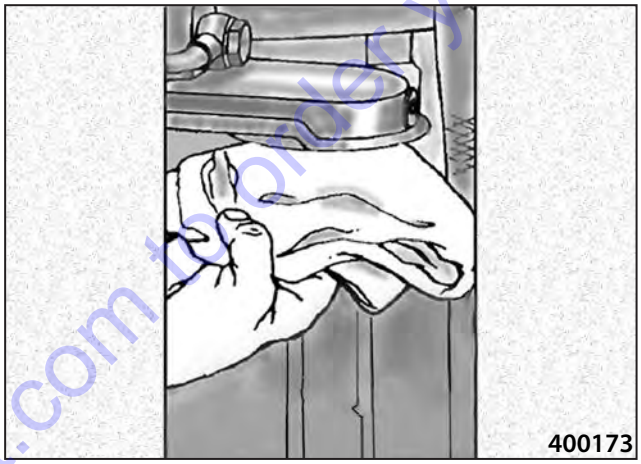
Always carry out the replacement:

- **when changing oil**
- **when the indicator lamp for the pressure filter lights up because the operating temperature of the oil ranges between 50 and 60 °C (122–140 °F).**

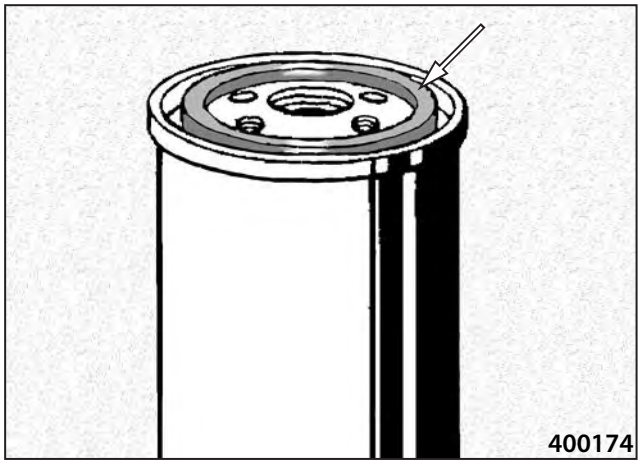


- Remove the filter.

- Clean the seating surface underneath.



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



Hydraulic oil filter
Order number: 4-5358520121

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 elements according to the spare parts catalogue.

Used filter cartridges are ecologically hazardous waste – hand them over for disposal.

Filling the hydraulic circuit:

- Fill using the hydraulic unit.
- You can order the hydraulic unit from the machine manufacturer.

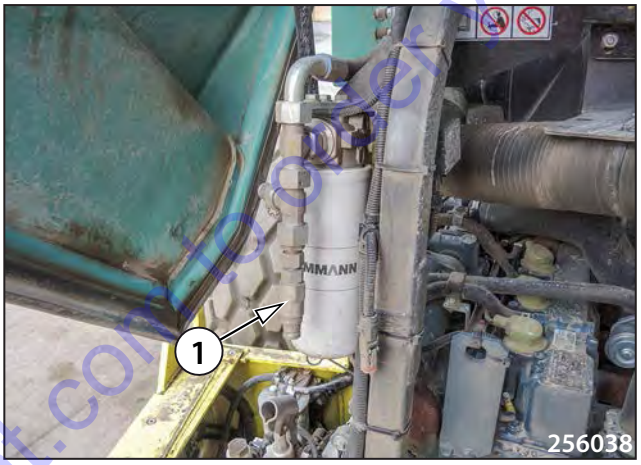
Hydraulic unit 230 V
Order number: 1251998

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.



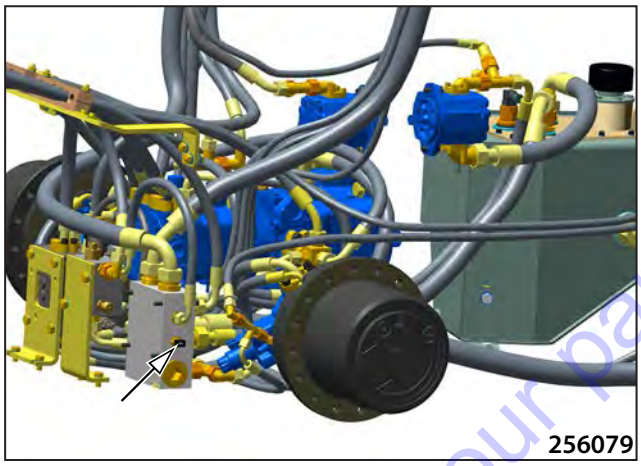
- Let drain about 15 l (4 gal US) and mount the plug.

- 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 into warm oil of a known temperature and read the temperature on the hydraulic oil thermometer; if the sensor operation is incorrect, replace the sensor with a new one.

Temperature sensor
Order number: 1234999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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.

The plug of the tank filler is sealed. If this seal is broken during the guarantee period, the guarantee will expire.

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.


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- Fill the tank with the specified type of oil through the filler neck.
- Mount a new ventilation filter.

Ventilation filter
Order number: 1405919

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 years)

3.6.40 DPF cleaning

- Contact the Kubota service for cleaning the DPF.

Maintenance as required

3.6.41 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: 1520574

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

There is a risk of injury!

Disassembly

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

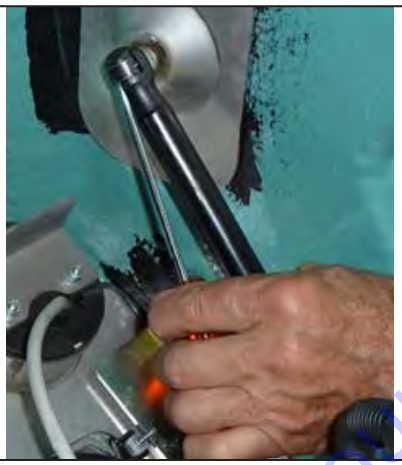
Installation

- 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.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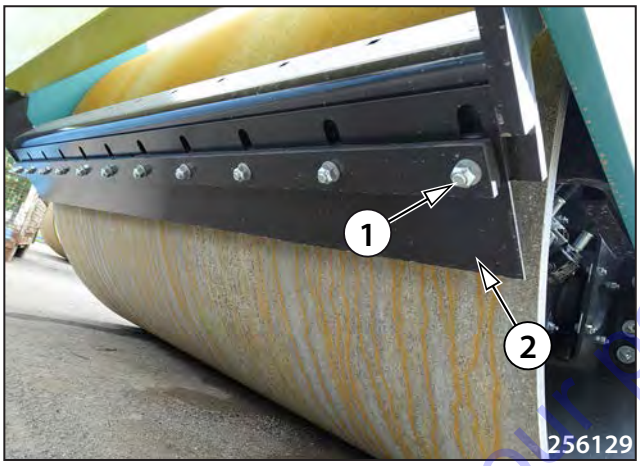
3.6.42 Scrapers adjustment

Scrapers for the smooth drum

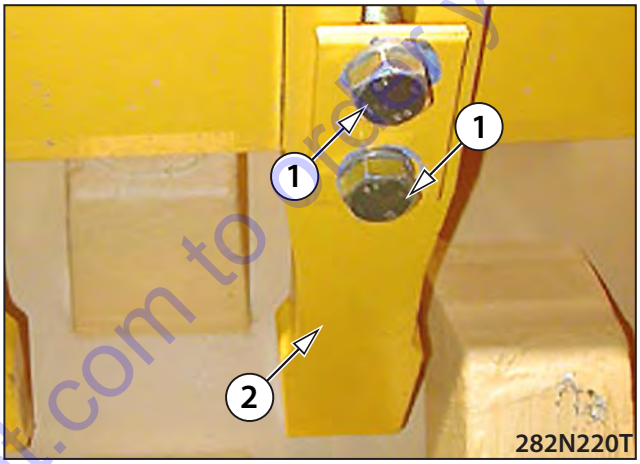
- Loosen bolts (1), see fig., and move scraper (2) towards the drum to the distance of 15 mm (0.6 in) between the scraper and the drum.



Scrapers for the taper foot drum

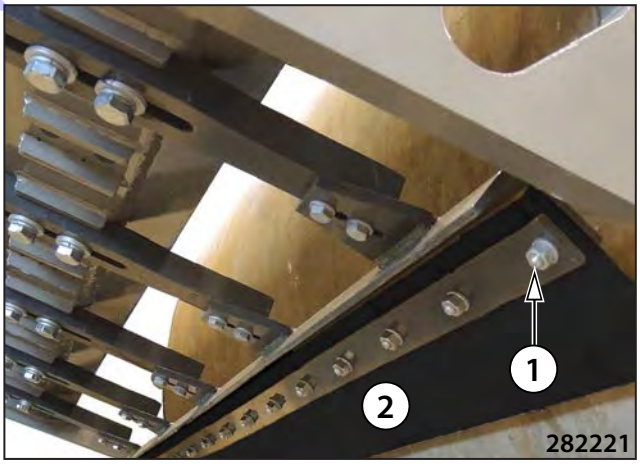
- Loosen bolts (1) and move individual scrapers (2) towards the drum to the distance of 25 mm (1 in).

If you set too short distance between the scraper and drum, they may get into contact when cornering with the machine.



Contact scrapers made of Polytan (OPTION)

- Loosen bolts (1) and move scraper (2) towards the drum.



3.6.43 Machine cleaning

- Clean the machine from major impurities after finishing your work.
- Perform overall cleaning regularly at least once in a week. When working in cohesive soils, cement and lime stabilisation's, the overall cleaning must be performed daily.

Blind all openings into which the cleaning agent might penetrate (e.g. engine inlet opening) prior to pressure water washing. Remove these blinders after washing the machine.

Do not expose electric parts or insulation material to direct water or steam flow. Always cover such materials (inside of the alternator etc.).

Disconnect batteries using the isolating master switch.

Work with stopped engine.

Do not use aggressive and highly inflammable cleaning agents (e.g. petrol or highly inflammable materials).

Follow environmental standards and regulations when cleaning the machine!

Clean the machine in a site equipped with an intercepting system for cleaning agents so that the soil and water sources are not contaminated!

Do not use forbidden cleaning agents!

3.6.44 Fuel system venting

- Vent the fuel system before the first start in the following cases:
  - Unless fuel filters have been filled with fuel - upon filter replacement
  - Upon fuel pump replacement
  - Following fuel system repair
  - Long-term shut-down of the machine
  - When the tank is empty

Low-pressure piping and filter venting:

- 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!

3.6.45 DPF (diesel particulate filter) clogging regeneration

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.
  - Use only the oil recommended by the engine manufacturer.
  - Do not interfere with the DPF, do not tamper with it.
  - Do not interfere with the DPF if it was damaged or hit.

Diesel particulate filter regeneration

- A process in which the diesel particulate filter burns solid particles accumulated inside.
- Diesel particulate filter regeneration can be done in two ways.

A) Passive regeneration

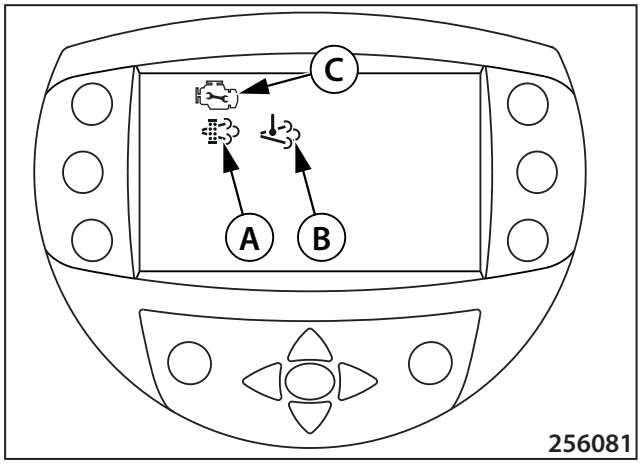
- Occurs due to the high temperature of exhaust gases without any interaction between the operator and the machine.

B) Active regeneration – parking

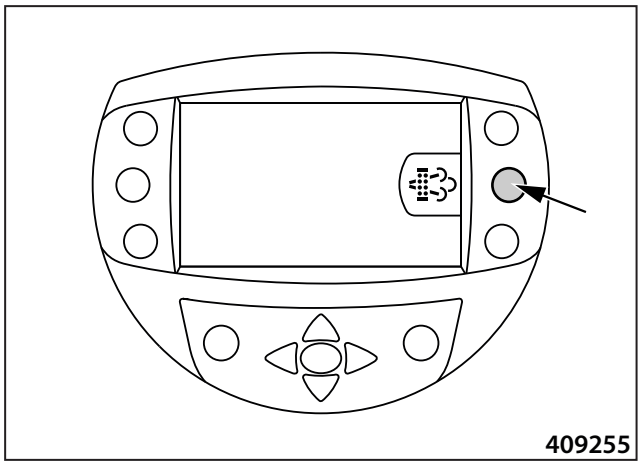
- Regeneration is required if the filter clogging exceeds a limit when it is not possible to clean the filter in the previous way.
- The regeneration requirement is indicated by the flashing indicator lamp (A).
- Before starting regeneration, follow these steps:
- Place the machine on a level and firm surface in an open and well-ventilated area.
- Warm up the machine to the operating temperature. The coolant temperature must be around 50 °C.
- Set the travel lever to the parking brake position "P".
- The fuel tank must be filled to at least ¼ of the maximum capacity.

Note:

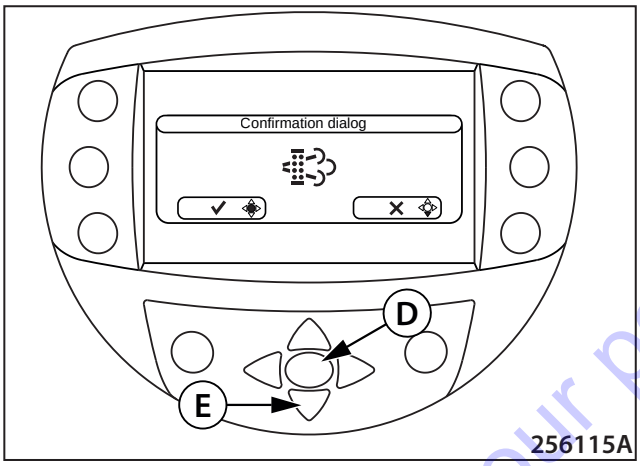
Interfering with any of the above controls during active regeneration will automatically stop the regeneration process.



- To start regeneration, press the DPF regeneration button.



- After you press the regeneration button, a confirmation dialog will appear.
- Press the middle button (D) to confirm the start of the DPF regeneration.
- Press the lower button (E) to cancel the start of the DPF regeneration.

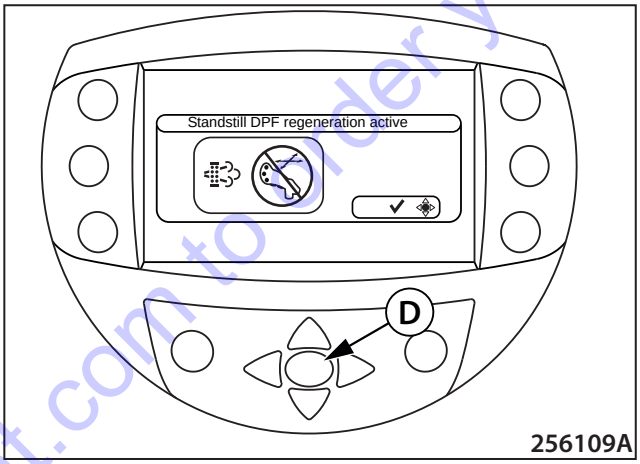


- After the start of the DPF regeneration is confirmed, the following information dialog will appear:
  - DPF regeneration enabled
  - it is forbidden to move with the travel control

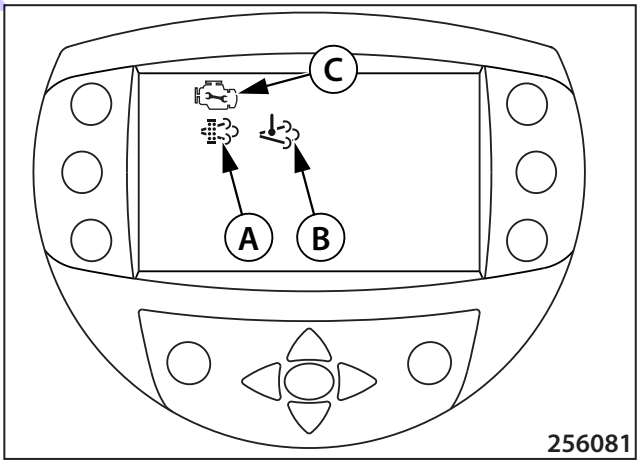
Note

The dialog will appear when the DPF regeneration is started or if the function is enabled and the operator has not pressed any button for more than 60 seconds.

The dialog can be confirmed by pressing the middle button (D).



- The running regeneration is indicated by lighting indicator (A) and (B).
- Once the DPF is cleaned, the process automatically stops.



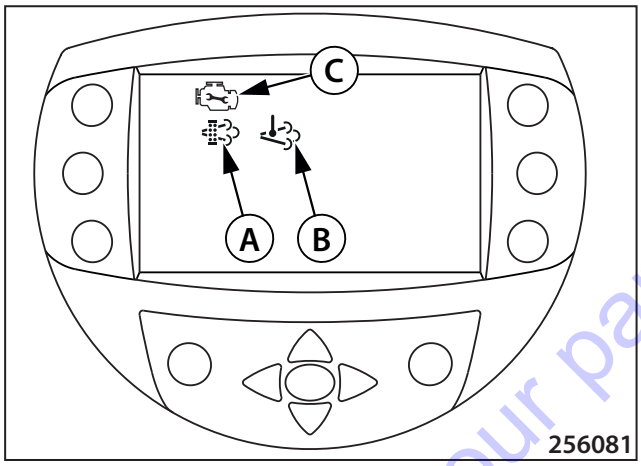
After the regeneration has been completed, let the machine for 10 min at least run at idle to remove excessive heat generated during the process from the engine compartment.

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

Long-term and/or repeated suppression of regeneration results in DPF damage. If a regeneration cycle is interrupted (e.g. during parking regeneration), the whole process must be repeated.

DPF clogging

- If the filter clogging reached the degree when the indicators (A) and (C) light up at the same time, the machine power will be reduced. It is possible that the active parking regeneration cannot be started in this condition. It is necessary in this case to start the cycle using the special diagnostic tool.
- If the filter clogging reached the degree when the indicator (C) lights up and the indicator (A) starts flashing, the engine stops and it is necessary to contact the service shop.



3.6.46 Screw connection tightening check

- Check regularly that no bolted connections have been slackened. Use torque spanners to tighten.

	Torque			
	For 8,8 Bolts (8G)		For 10,9 Bolts (10K)	
Thread	Nm	lb ft	Nm	lb ft
M6	10	7.4	14	10.3
M8	24	25.0	34	25.0
M8x1	19	14.0	27	19.9
M10	48	35.4	67	49.4
M10x1.25	38	28.0	54	39.8
M12	83	61.2	117	86.2
M12x1.25	66	48.7	94	69.3
M14	132	97.3	185	136.4
M14x1.5	106	78.2	148	109.1
M16	200	147.5	285	210.2
M16x1.5	160	118.0	228	168.1
M18	275	202.8	390	287.6

	Torque			
	For 8,8 Bolts (8G)		For 10,9 Bolts (10K)	
Thread	Nm	lb ft	Nm	lb ft
M18x1.5	220	162.2	312	230.1
M20	390	287.6	550	405.6
M20x1.5	312	230.1	440	324.5
M22	530	390.9	745	549.4
M22x1.5	425	313.4	590	435.1
M24	675	497.8	950	700.6
M24x2	540	398.2	760	560.5
M27	995	733.8	1400	1032.5
M27x2	795	586.3	1120	826.0
M30	1350	995.7	1900	1401.3
M30x2	1080	796.5	1520	1121.0

Values given in the Table are the torques at dry tread (at coefficient of friction = 0.14). Such values do NOT apply to a greased thread.

Table of torques used for cap nuts with sealing "O" ring - hoses

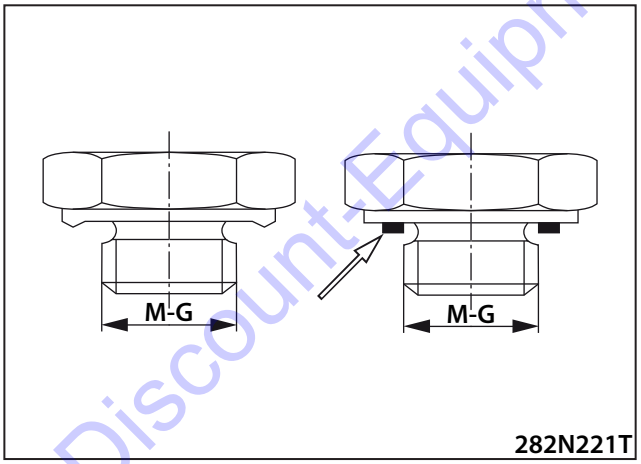
			Torques for cap nuts incl. "O" ring - hoses					
			Nm			lb ft		
Spanner Size	Thread	Pipe	Nominal	Min	Max	Nominal	Min	Max
14	12x1.5	6	20	15	25	15	11	18
17	14x1.5	8	38	30	45	28	22	33
19	16x1.5	8	45	38	52	33	28	38
		10						
22	18x1.5	10	51	43	58	38	32	43
		12						
24	20x1.5	12	58	50	65	43	37	48
27	22x1.5	14	74	60	88	55	44	65
		15						
30	24x1.5	16	74	60	88	55	44	65
32	26x1.5	18	105	85	125	77	63	92
36	30x2	20	135	115	155	100	85	114
		22						
41	36x2	25	166	140	192	122	103	142
46		28						
50	42x2	30	240	210	270	177	155	199
50	45x2	35	290	255	325	214	188	240
	52x2	38	330	280	380	243	207	280
		42						

Chart for torques of necks with sealing edge or with flat gasket

	Neck Torques	
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 x1.5	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

Chart for torques of plugs with flat gasket

	Plug Torques	
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 x1.5	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



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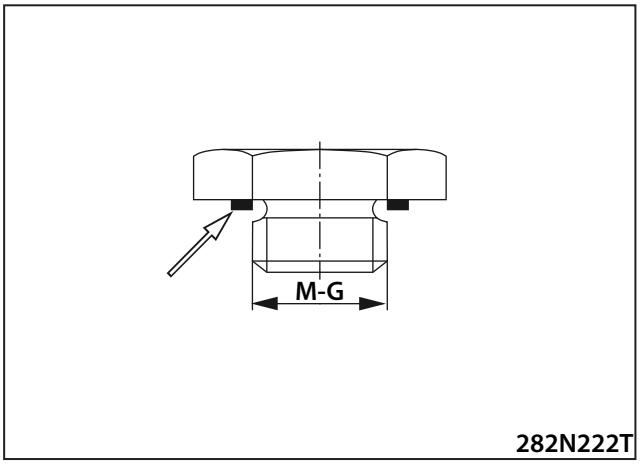

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Usually, defects are caused by incorrect operation of the machine. Therefore, in case of any troubles read again properly through the instructions given in the operation and maintenance manual for the machine and engine. If you cannot identify the cause, contact a service department of an authorised dealer or the manufacturer.

Troubleshooting in hydraulic and electric systems requires knowledge of these systems; therefore a service department of an authorised dealer or the manufacturer should be called to solve these problems.

3.7 Defects

3.7.1 Machine errors

SPN	Error description
8000	Error in data of the CAN diagnostic bus (CAN1 RC)
8001	The battery voltage is higher than the parameter 8.3.1. Bat max operating voltage
8002	The battery voltage is lower than the parameter 8.3.2. Bat min operating voltage
8003	The engine stopped
8006	The voltage Vss1 out of the range from 4.5 V to 5.5 V.
8007	The voltage Vss2 out of the range from 9.5 V to 10.5 V.
8008	The voltage Vss3 out of the range from 4.5 V to 5.5 V.
8009	The voltage VP out of the range from 8 V to 33 V.
800A	The emergency stop button pressed.
800B	Voltage VP2 condition Displayed if VP2 is OFF.
800C	The machine travel is overexcited – the engine speed and current to the pump coil are limitary
800D	The machine travel setting may lead to overexciting – the engine speed and current to the pump coil can reach the limit
8011	No engine speed message comes via the CAN2 core bus.
8012	No travel lever status messages come via the CAN2 core bus.
8013	No engine temperature message comes via the CAN2 core bus.
8014	No travel lever status messages come via the CAN1 diagnostic bus
8015	No display status message comes via the CAN2 core bus.
8016	Inhibit input status (one of inputs of the emergency stop button).
8019	Redundant steering data related to the travel control position differ more than it is specified in the parameter 2.2.8. Lever position safety tolerance.
801A	The lever position and the direction of motion do not agree.
801B	Low hydraulic oil level
801C	Conflict between the brake valve status and brake pressure sensor status
801D	The lever is at neutral but the machine is moving
801E	The standstill current of the travel pump is calibrated incorrectly. It is out of the range from 180 to 250 mA.
8023	Error in data of the CAN core bus (CAN2 RC)
8024	Error in ACE data of the CAN core bus (CAN3 RC)
8025	SW-Inhibit input status (one of inputs of the emergency stop button).
8027	The RC unit is overheated. The limit specified by the parameter 8.3.3. is exceeded. Max operating temperature.
8028	The RC unit temperature is too low. The limit specified by the parameter 8.3.4. is not exceeded. Min operating temperature.
8029	Activated service button

SPN	Error description
802A	Wrong signal from the speed sensor (the machine shall move but the signal is not coming from the sensor).
802B	The fuel tank volume parameterization is checked. If the parameters 4.7.3. to 4.7.8. are not ascending or descending, then they are incorrect.
802E	It identifies that passive errors are deleted
8404	The hydraulic oil temperature sensor voltage is out of range.
8405	The speed sensor voltage is out of range.
8406	The direction sensor voltage is out of range.
8407	The input voltage of the hydraulic oil filter pressure 1 is out of range.
8408	Input voltage of the hydraulic oil level out of range
8409	The input voltage of the parking brake circuit pressure is out of range.
840A	The fuel level sensor voltage is out of range.
840D	The service button input voltage is out of range.
840E	The input voltage of the left direction indicator lamp is out of range.
840F	The input voltage of the right direction indicator lamp is out of range.
8410	The input voltage of the hydraulic oil filter pressure 2 is out of range.
8411	The input voltage of the hydraulic oil filter pressure 3 is out of range.
8412	It detects an incorrect voltage level at the machine speed sensor input. It checks also the logical agreement at the frequency input of the speed sensor.
8600	A failure detected at the high-side output of the forward pump.
8601	A failure detected at the high-side output of the reverse pump.
8602	A failure detected at the low-side output of the reverse pump.
8604	A failure detected at the parking brake valve output.
8605	A failure detected at the brake lights output.
8606	A failure detected at the differential gear lock output.
8607	A failure detected at the reverse horn output.
8608	The high-side and low-side current of the pump outputs are different.
8609	The SAFOUT diagnostics of the pump output reports a failure.
860A	The high-side and low-side output currents of the front hydraulic motor are different
860B	The high-side and low-side output currents of the left rear hydraulic motor are different
860C	The high-side and low-side output currents of the right rear hydraulic motor are different
860D	A failure detected at the high-side output of the front hydraulic motor
860E	A failure detected at the high-side output of the left rear hydraulic motor
860F	A failure detected at the high-side output of the right rear hydraulic motor
8610	The SAFOUT diagnostics of the front hydraulic motor output reports a failure

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3.7 Defects

SPN	Error description
8611	The SAFOUT diagnostics of the left rear hydraulic motor output reports a failure
8612	The SAFOUT diagnostics of the right rear hydraulic motor output reports a failure
8613	A failure detected at the low-side output of the front hydraulic motor
8614	A failure detected at the low-side output of the left rear hydraulic motor
8615	A failure detected at the low-side output of the right rear hydraulic motor
862B	A failure detected at the discharge valve output.
8640	The engine clutch relay output reports a failure.
8641	A failure detected at the fan output.
8642	A failure detected at the high vibration output of the front drum.
8643	A failure detected at the low vibration output of the front drum.
9000	Start condition not fulfilled – low battery voltage
9001	Start condition not fulfilled – low voltage VSS_1, VSS_2 or VSS_3.
9002	Start condition not fulfilled – the RC unit hardware diagnostic test failed
9003	Start condition not fulfilled – safety start condition not fulfilled (seat switch, P level, parking brake status).
9005	Start condition not fulfilled – low engine speed after the start.
9006	Start condition not fulfilled – the RC unit hardware diagnostic test failed.
9007	Start condition not fulfilled – locked by the immobilizer
900A	Start condition not fulfilled – a safety SAFOUT output has a broken cable
900B	Start condition not fulfilled – a safety SAFOUT output is short-circuited.
9010	Start condition not fulfilled – the main switch of power outputs is locked due to a RC unit hardware error – VP voltage.
9011	Start condition not fulfilled – there is no voltage at the power supply inputs of power outputs.
9012	Start condition not fulfilled – the main switch of power outputs cannot be closed.
9013	Start condition not fulfilled – the main switch current flows in opposite direction – the power output connected to the ext. power supply.
9014	Start condition not fulfilled – the emergency stop button is pressed.
9016	Start condition not fulfilled – one or more SAFOUT safety outputs not available.

3.7.2 Engine errors

Error codes	SPN	FMI	Error description
8	132	1	„The air mass flow AFS_dm is greater than or equal to AFS_PhysRng.Min_C. Physical range check is low for air mass flow sensor.“
9	172	2	Air inlet filter temperature, plausibility error.
26	523891	14	„When AirHt_ctDefSRCLoOn_mp is lower than AirHt_ctMaxDef_C. DFC to SRC Low error when heater is on.“
28	523953	2	„Healing takes place if the condition for error detection is not present. Air temprature monitoring plausibility check array.“
30	523955	2	„Healing takes place if the condition for error detection is not present. Air temperature monitoring plausibility check array.“
36	523923	3	
37	523924	3	Short circuit to battery error of actuator relay 2.
38	523925	3	Short circuit to battery of actuator relay 3.
40	523927	3	Short circuit to battery of actuator relay 6.
41	523923	4	„Short circuit to ground error. Detailinformation not available.“
42	523924	4	Short circuit to ground of actuator relay 2.
43	523925	4	Short circuit to ground of actuator relay 3.
44	523926	4	Short circuit to ground of actuator relay 4.
45	168	3	Sensor battery voltage error; signal range check is high.
46	168	4	Sensor battery voltage error; signal range check is low.
47	168	2	High battery voltage; warning threshold is exceeded.
48	168	2	High battery voltage; Shot off threshold exceeded.
55	523910	14	„Air pump doesn´t achieve air mass flow setpoint. Burner Control - burner air pump“
56	524013	7	„Burner does not start after several trials (burner flame lost detection). Burner flame unintentional deleted.“
57	524020	14	„Burner Control: Power reduction due to low lambda. Engine power: Not enough oxygen for regeneration.“
58	523911	0	„Burner dosing valve (DV2); Overcurrent at the end of the injection phase.“
59	523911	12	Burner dosing valve (DV2); Powerstage over temperature.
60	523911	3	Burner dosing valve (DV2); Short circuit to battery.
62	523911	4	Burner dosing valve (DV2); Short circuit to ground.
63	523911	11	„Burner dosing valve (DV2); Short circuit high side powerstage.“
64	523912	2	„Burner dosing valve (DV2) downstream pressure sensor; plausibility error.“
66	523912	0	„Physical range check high for burner dosing valve (DV2) downstream pressure; Shut off regeneration.“
69	523912	1	„Physical range check low for burner dosing valve (DV2) downstream pressure; Shut off regeneration. When burner injector is actuated, the measured pressure does not rise above 1250mbar abs (expected: about 2400mbar).“

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3.7 Defects

Error codes	SPN	FMI	Error description
72	523912	3	„Sensor error burner dosing valve (DV2) downstream pressure sensor; Signal range check high.“
73	523912	4	„For engines < 4l: Throttle valve error, Open load or short cut to battery, blocked valve or wrong control signal for valve. For engines with Burner T4i: Pressure Sensor error after valve (DV2), lower limit reached.“
74	523913	3	„Sensor error glow plug control diagnostic line voltage; Signal range check high.“
75	523913	4	„Sensor error glow plug control diagnostic line voltage; Signal range check low.“
76	523914	5	„Glow plug control; Open load. Water pump control (PWM) only TTCD 6.1/7.8.“
77	523914	12	Glow plug control; Powerstage over temperature.
78	523914	3	„Glow plug control; Short circuit to battery. Water pump control (PWM).“
79	523914	4	„Glow plug control; Short circuit to ground. Water pump control (PWM).“
82	1235	14	„CAN-Bus 2 = CAN_C reports Bus-error (for engines <8L and CV52 it is the engine-CAN@250kbaud). CAN Bus error passive; warning CAN C - engine CAN.“
83	16	0	No detail information.
84	639	14	CAN-Bus 0: „BusOff-Status“
85	1231	14	CAN-Bus 1: „BusOff-Status“
86	1235	14	CAN-Bus 2 = engine bus „BusOff-Status“
87	16	0	BusOff error CAN.
88	102	2	Charged air pressure above warning threshold.
89	102	2	Charged air pressure above shut off threshold.
90	110	2	Defect fault check for absolute plausibility test.
92	110	0	Physical range check high for coolant temperature.
93	110	1	Physical range check low for coolant temperature.
96	110	3	Sensor error coolant temperature; Signal range check high.
97	110	4	Sensor error coolant temperature; Signal range check low.
98	110	0	High coolant temperature; Warning threshold exceeded.
99	110	0	Coolant temperature; System reaction initiated.
101	111	1	Coolant level too low.
106	598	2	Plausibility check for clutch.
121	1109	2	Engine shut off demand ignored.
122	523698	11	Shut off request from supervisory monitoring function.
124	523969	11	Fault entry for override control mode.
125	523717	12	„Timeout error of CAN-transmit-frame AmbCon; Weather environments.“
126	523603	9	„Timeout Error of CAN-receive-frame AMB; Ambient temperature sensor.“
128	3224	9	„Timeout error of CAN-receive-frame AT1IG1; NOX sensor upstream.“
129	3224	2	DLC error of CAN-receive-frame AT1IG1Vol NOX sensor.
130	3224	9	„Timeout error of CAN-receive-frame AT1IG1Vol; NOX sensor.“

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Error codes	SPN	FMI	Error description
133	523938	9	„Timeout error (BAM to packet) for CAN-receive-frame AT1IGCVol1.“
134	523939	9	„Broadcast announce message of the calibration message of the upstream catalytic NOx sensor has failed.“
135	523940	9	„Timeout error (PCK2PCK) for CAN-Receive-Frame AT1IGCVol1.“
136	3234	2	DLC error of CAN-Receive-Frame AT1O1.
137	3234	9	„Timeout error of CAN-Receive-Frame AT1OG1. NOX sensor (SCR-system downstream cat; DPF-system downstream cat).“
138	3234	2	DLC error of CAN-Receive-Frame AT1O1Vol.
139	3234	9	Timeout error of CAN-Receive-Frame AT1OG1Vol.
140	523941	9	„Timeout error (BAM to packet) for CAN-Receive-Frame AT1OGCVol2.“
141	523942	9	„Calibration message 1 of the after catalyst Nox sensor has failed.“
142	523943	9	„Timeout error (PCK2PCK) for CAN-Receive-Frame AT1OGCVol2.“
153	523992	9	Not used.
155	0	0	Not used.
164	523211	9	Timeout error of CAN-Receive-Frame EBC1.
167	523704	12	Timeout error of CAN-Transmit-Frame EEC3.
168	523935	12	„Timeout error of CAN-Transmit-Frame EEC3VOL1. Engine send messages.“
169	523936	12	„Timeout error of CAN-Transmit-Frame EEC3VOL2. Engine send messages.“
171	523212	9	„Timeout error of CAN-Receive-Frame ComEngPrt. Engine Protection.“
172	523741	14	Engine shut off request through CAN.
174	523213	12	Timeout error of CAN-Transmit-Frame ERC1.
178	523706	12	Timeout error of CAN-Transmit-Frame FlEco.
179	523240	9	„Timeout CAN-message FunModCtl. Function Mode Control.“
193	523937	9	Timeout DFC for NOxSensGlbReqTx.
196	3227	2	DFC SAE J1939 error.
198	523216	9	„Timeout error of CAN-Receive-Frame PrHtEnCmd. Pre-heat command, engine command.“
202	523793	9	„Timeout error of CAN-Receive-Frame UAA10. AGS sensor service message.“
203	523794	9	„Timeout error of CAN-Receive-Frame UAA11. AGS sensor data.“
212	523803	9	„Timeout error of CAN-Receive-Message RxEngPres. Status Burner Air Pump.“
273	3219	2	DFC SAE J1939 error.
281	523766	9	Timeout error of CAN-Receive-Frame Active TSC1AE.
282	523767	9	Timeout error of CAN-Receive-Frame Passive TSC1AE.
283	523768	9	Timeout error of CAN-Receive-Frame Active TSC1AR.
284	523769	9	Timeout error of CAN-Receive-Frame Passive TSC1AR.
291	523776	9	Timeout error of CAN-Receive-Frame TSC1TE - active.
292	523777	9	„Passive timeout error of CAN-Receive-Frame TSC1TE. Setpoint.“
293	523778	9	Timeout error of CAN-Receive-Frame TSC1TR.

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3.7 Defects

Error codes	SPN	FMI	Error description
294	523779	9	Passive timeout error of CAN-Receive-Frame TSC1TR.
299	523788	12	„Timeout error of CAN-Transmit-Frame TrbCH. Status Wastegate.“
300	523605	9	„Timeout error of CAN-Receive-Frame TSC1AE. Traction Control.“
301	523606	9	„Timeout error of CAN-Receive-Frame TSC1AR. Retarder.“
305	898	9	„Timeout error of CAN-Receive-Frame TSC1TE. Setpoint.“
306	520	9	„Timeout Error of CAN-Receive-Frame TSC1TR; control signal“
313	523858	12	Timeout error of CAN-Transmit-Frame UAA11.
322	523867	12	„Timeout error of CAN-Transmit-Frame UAA1 on CAN 2. Control burner air pump.“
360	523982	0	„Powerstage diagnosis disabled. High battery voltage.“
361	523982	1	„Powerstage diagnosis disabled. Low battery voltage.“
362	523090	2	„Engine brake Pre-Selection switch. Plausibility error.“
376	630	12	Access error EEPROM memory (delete).
377	630	12	Access error EEPROM memory (read).
378	630	12	Access error EEPROM memory (write).
381	411	4	Physical range check low for EGR differential pressure.
384	2791	12	„Actuator EGR valve. Powerstage over temperature.“
387	523612	12	„Internal software error ECU. Injection cut off.“
388	190	0	„Engine speed above warning threshold. Overspeed detection in component engine protection.“
389	190	0	Engine speed above warning threshold (FOC-Level 1).
390	190	11	Engine speed above warning threshold (FOC-Level 2).
391	190	14	Engine speed above warning threshold (Overrun Mode).
411	108	11	„Ambient air pressure received from a CAN-bus is reported as defective.“
412	108	3	Sensor error ambient air pressure. Signal range check high.
413	108	4	Sensor error ambient air pressure. Signal range check low.
415	171	0	„Environment temperature sensor, temperature above upper physical threshold.“
416	171	1	Environment temperature physical range check low.
417	171	3	„Sensor error SCR-System environment temperature. DPF-System air inlet temperature, signal range check high.“
418	171	4	„Sensor error SCR-System environment temperature. DPF-System air inlet temperature, signal range check low.“
419	190	8	Sensor camshaft speed, disturbed signal.
420	190	12	„Sensor camshaft detection. Out of range, signal disrupted, no signal.“
421	190	2	„Offset angle between crank- and camshaft-sensor is too large.“
422	190	8	„Sensor crankshaft detection. Out of range, signal disrupted or no signal.“
423	190	12	Speed detection, out of range, signal disrupted or no signal.
455	975	5	PWM-Signal fan, open load or short-circuit ground.
457	975	3	PWM-Signal fan, short-circuit to battery.

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Error codes	SPN	FMI	Error description
458	975	4	PWM-Signal fan, open load or short circuit to ground
459	1639	12	„Fan speed sensor, electrical error, signal disturbed or very low fan speed.“
460	1639	0	„Sensor error fan speed. Signal range check high or engine speed resp. fan speed too big.“
461	1639	1	„Sensor error fan speed, signal range check low or fan speed too low.“
462	523602	0	High fan speed, warning threshold exceeded.
463	523602	0	High fan speed, shut off threshold exceeded.
464	97	3	Sensor error water in fuel, signal range check high.
465	97	4	Sensor error water in fuel, signal range check low.
472	94	3	Sensor error low fuel pressure, signal range check high.
473	94	4	Sensor error low fuel pressure, signal range check low.
474	94	1	Low fuel pressure, warning threshold exceeded.
475	94	1	Low fuel pressure, shut off threshold exceeded.
483	174	11	Fuel temperature not plausible.
486	523618	3	„Sensor error gearbox oil temperature, signal range check high.“
487	523618	4	„Sensor error gearbox oil temperature, signal range check low.“
488	523619	2	„Physical range check high for exhaust gas temperature upstrem (SCR-CAT).“
489	523619	2	„Shutoff condition No detail informationen!“
500	523915	0	„HCl dosing valve (DV1); overcurrent at the end of the injection phase“
501	523915	12	HCl dosing valve (DV1): Powerstage overtemperature.
502	523915	3	HCl dosing valve (DV1): Short circuit to battery.
503	523915	3	Short circuit to battery high side, HCl dosing valve (DV1).
504	523915	4	HCl dosing valve (DV1): Short circuit to ground.
505	523915	11	HCl dosing valve (DV1): Short circuit high side powerstage.
506	523916	2	„Sensor HCl dosing valve (DV1) downstream pressure: Plausibility error.“
508	523916	0	„HCl dosing valve (DV1) downstream pressure: Physical range check high. Shut off regeneration.“
511	523916	1	„HCl dosing valve (DV1) downstream pressure: Physical range check low. Shut off regeneration.“
514	523916	3	„Sensor error HCl dosing valve (DV1) downstream pressure: Signal range check high.“
515	523916	4	„Sensor error HCl dosing valve (DV1) downstream pressure: Signal range check low.“
525	523917	4	„Sensor error DV1 & DV2 upstream pressure: Signal range check low.“
534	523918	3	„Sensor error DV1 & DV2 upstream temperature: Signal range check high.“
535	523918	4	„Sensor error DV1 & DV2 upstream temperature: Signal range check low.“
542	1638	2	Hydraulic oil temperature check for Shut off condition.
543	676	11	Cold start aid relay error.
544	676	11	Cold start aid relay: Open load.
545	729	5	Cold start aid relay open load.
547	729	12	Cold start aid relay: Over temperature error.

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3.7 Defects

Error codes	SPN	FMI	Error description
549	729	3	Intake Air Heater Device: Short circuit to battery.
551	729	4	
559	523895	13	„Check of missing injector adjustment value programming (IMA) injector 1.“
560	523896	13	„Check of missing injector adjustment value programming (IMA) injector 2.“
561	523897	13	„Check of missing injector adjustment value programming (IMA) injector 3.“
562	523898	13	„Check of missing injector adjustment value programming (IMA) injector 4.“
563	523899	13	„Check of missing injector adjustment value programming (IMA) injector 5.“
564	523900	13	„Check of missing injector adjustment value programming (IMA) injector 6.“
565	523350	4	Injector cylinder-bank 1: Short circuit.
566	523352	4	Injector cylinder-bank 2: Short circuit.
567	523354	12	Injector powerstage output defect.
568	651	5	Injector 1 (in firing order): Interruption of electric connection.
569	652	5	Injector 2 (in firing order): Interruption of electric connection.
570	653	5	Injector 3 (in firing order): Interruption of electric connection.
571	654	5	Injector 4 (in firing order): Interruption of electric connection.
572	655	5	Injector 5 (in firing order): Interruption of electric connection.
573	656	5	Injector 6 (in firing order): Interruption of electric connection.
575	523756	14	„special pattern for special cases No detail informationen!“
576	523757	14	„special pattern for special cases No detail informationen!“
577	523758	14	„special pattern for special cases No detail informationen!“
578	523759	14	„special pattern for special cases No detail informationen!“
579	523760	14	„special pattern for special cases No detail informationen!“
580	651	3	Injector 1 (in firing order): Short circuit.
581	652	3	Injector 2 (in firing order): Short circuit.
582	653	3	Injector 3 (in firing order): Short circuit.
583	654	3	Injector 4 (in firing order): Short circuit.
584	655	3	Injector 5 (in firing order): Short circuit.
585	656	3	Injector 6 (in firing order): Short circuit.
590	655	4	„High side to low side short circuit in the injector 5 (in firing order)“
591	656	4	„High side to low side short circuit in the injector 6 (in firing order)“
592	523615	5	Metering unit (Fuel-System): Open load.
593	523615	12	Metering unit (Fuel-System): Powerstage over temperature.
594	523615	3	Metering unit (Fuel-System): Short circuit to battery, highside.
595	523615	4	„Metering unit (Fuel-System): Short circuit to ground, high side.“

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Error codes	SPN	FMI	Error description
596	523615	3	Metering unit (Fuel-System): Short circuit to battery, low side.
597	523615	4	Metering Unit (Fuel-System): Short circuit to ground, low side.
598	523615	3	Metering unit, short circuit to battery
599	523615	4	Metering unit, short circuit to ground
605	1323	12	Too many recognized misfires in cylinder 2 (in firing order)
607	1323	12	Too many recognized misfires in cylinder 4 (in firing order)
608	1323	12	Too many recognized misfires in cylinder 5 (in firing order)
609	1323	12	Too many recognized misfires in cylinder 6 (in firing order)
610	1322	12	
611	1346	0	„Misfire detection monitoring No detail informationen!“
612	523612	12	Internal ECU monitoring detection reported error
613	523612	12	„ECU reported internal software error Internal ECU monitoring detection reported error“
614	523612	12	ECU reported internal software error
615	523612	12	ECU reported internal software error.
616	523612	12	ECU reported internal software error
617	523612	12	ECU reported internal software error
618	523612	12	ECU reported internal software error
619	523612	12	Injection system,electrical error injectors
620	523612	12	ECU reported internal software error
621	523612	12	ECU reported internal software error
623	523612	12	ECU reported internal software error
624	523612	12	ECU reported internal software error
625	523612	12	ECU reported internal software error
627	523612	12	ECU reported internal software error
628	523612	12	ECU reported internal software error
629	523612	12	„Diagnostic fault check to report the accelerator pedal position error“
630	523612	12	Diagnostic fault check to report the engine speed error
631	523612	12	Error in the plausibility of the injection energizing time
632	523612	12	Error in the plausibility of the start of energising angles
633	523612	12	„Diagnostic fault check to report the error due to non plausibility in ZFC“
634	523612	12	„Diagnosis fault check to report the demand for normal mode due to an error in the PoI2 quantity“
635	523612	12	„Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI2 shut-off“
636	523612	12	„Diagnosis fault check to report the error to demand for an ICO due to an error in the PoI3 efficiency factor“
637	523612	12	Internal ECU monitoring detection reported error

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3.7 Defects

Error codes	SPN	FMI	Error description
638	523612	12	Monitoring of Fuel Quantity Correction
639	523612	12	„Diagnostic fault check to report the plausibility error in rail pressure monitoring“
640	523612	12	„Diagnostic fault check to report the error due to torque comparison“
641	523612	12	„Diagnosis of curr path limitation forced by ECU monitoring level 2“
642	523612	12	„Diagnosis of lead path limitation forced by ECU monitoring level 2“
643	523612	12	„Diagnosis of set path limitation forced by ECU monitoring level 2.“
644	523612	3	Reported Over Voltage of Supply
646	523612	4	Reported UnderVoltage of Supply
648	523008	1	Manipulation control was triggered
649	523008	2	Timeout error in Manipulation control
654	2634	12	„Early opening defect of main relay No detail informationen!“
656	2634	12	„DFC for stuck main relay error No detail informationen!“
659	3226	2	„Nox feed back fault detection No detail informationen!“
692	523752	0	„Plausibiliti error during Rich to Lean switch over No detail informationen!“
693	523752	0	„Monitoring of Nox signal readyness No detail informationen!“
714	523612	12	„Diagnostic fault check to report WDA active due to errors in query-/response communi-cation“
715	523612	12	„Diagnostic fault check to report ABE active due to undervoltage detection“
716	523612	12	„Diagnostic fault check to report ABE active due to overvoltage detection“
717	523612	12	„Diagnostic fault check to report WDA/ABE active due to unknown reason“
720	98	2	„Plausibility Check No detail informationen!“
732	100	3	Sensor error oil pressure; signal range check high
733	100	4	Sensor error oil pressure sensor; signal range check low
734	100	0	High oil pressure; warning threshold exceeded.
735	100	0	High oil pressure; shut off threshold exceeded
736	100	1	Low oil pressure; warning threshold exceeded
737	100	1	Low oil pressure; shut off threshold exceeded
743	175	3	Sensor error oil temperature; signal range check high
744	175	4	Sensor error oil temperature; signal range check low
745	175	0	High oil temperature; warning threshold exceeded
746	175	0	High oil temperature; shut off threshold exceeded
747	1237	2	Override switch; plausibility error.
750	107	3	„Sensor error airfilter differential pressure; short circuit to battery“
751	107	0	„Sensor error airfilter differential pressure; short circuit to ground“

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Error codes	SPN	FMI	Error description
752	107	0	Air filter differential pressure; air filter cologged.
753	523919	2	DPF burner air pump pressure sensor, plausibility error
755	523919	0	„DPF burner air pump pressure sensor, pressure above upper shutoff threshold“
758	523919	1	„DPF burner air pump pressure sensor, pressure below lower shutoff threshold“
761	523919	3	„DPF burner air pump pressure sensor, short circuit to battery or open load“
762	523919	4	DPF burner air pump pressure sensor, short circuit to ground
763	523920	2	Exhaustgaspressure upstream burner, plausibility error
765	523920	0	„Exhaustgaspressure upstream burner, pressure above upper shutoff threshold“
770	523920	3	„Exhaustgaspressure upstream burner, short circuit to battery or open load“
771	523920	4	Exhaustgaspressure upstream burner, short circuit to ground
772	102	2	Pressure downstream charge air cooler, plausibility error
774	102	1	„Pressure downstream charge air cooler, pressure below lower physical threshold“
776	102	3	„Pressure downstream charge air cooler, short circuit to battery or open load“
777	102	4	„Pressure downstream charge air cooler, short circuit to ground“
780	523699	3	„Boost pressure control; negative governor deviation below limit“
781	523699	4	„learning valu too high No detail informationen!“
785	523889	3	„over teperature of device driver of pressure control valve No detail informationen!“
791	411	0	„signal range check low error of pressure control valve AD-channel delta pressure across venturi in EGR line above physical high limit“
793	411	0	„Plausibility Check fault for deviation of desired and actual EGR-mass flow, where the latter is calculated out of EGR Delta Pressure Sensor“
795	411	3	„Sensor error differential pressure Venturiunit (EGR), signal range check low.“
796	411	4	„Sensor error differential pressure Venturiunit (EGR), signal range check high.“
805	524025	14	„Particulate filter regeneration. Regeneration after time X is not successful (The error occurs when the regeneration times (3x) over the max. has been aborted allowed recovery time).“
806	524058	2	Particulate filter; regeneration not succesful
807	3253	2	Differential pressure DPF, plausibility error
809	3251	0	Differential pressure DPF maximum value is exceeded
810	3251	0	„Differential pressure sensor across DPF exceeds warning high limit“
812	3251	1	„Differential pressure DPF, pressure below lower shutoff threshold.“
813	3251	1	„Differential pressure DPF, pressure below lower warning threshold.“
814	3253	3	„Electrical error differential pressure B58 (DPF). (signal range check high)“
815	3253	4	„Electrical error differential pressure (DPF). signal range check low.“
825	523009	9	„The pressure relief valve (PRV) has reached the number of allowed activations.“
826	523470	2	„Pressure relief valve is forced to open, perform pressure increase.“
827	523470	2	„Pressure Relief Valve (PRV) forced to open. Performed by pressure increase.“
828	523470	12	„Pressure Relief Valve (PRV) forced to open. Shutoff conditions.“

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3.7 Defects

Error codes	SPN	FMI	Error description
829	523470	12	„Pressure Relief Valve (PRV) forced to open. Warning conditions.“
830	523470	14	Open Pressure Relief Valve (PRV)
831	523470	11	„Pressure Relief Valve (PRV) error; Rail pressure out of tolerance range.“
832	523470	11	„Rail pressure out of tolerance range. The PRV can not be opened at this operating point with a pressure shock.“
833	523009	10	„Open time of Pressure Relief Valve (PRV) for wear out monitoring had exceeded“
834	523906	5	Electrical fuel pre - supply pump; open load
835	523906	12	„Electrical fuel pre - supply pump. ECU powerstage over temperature.“
836	523906	3	Electrical fuel pre - supply pump; short circuit to battery
837	523906	4	„Electrical fuel pre - supply pump. Short circuit to ground.“
847	1176	0	„Pressure sensor upstream turbine, Physical Range Check high.“
848	1176	1	„Pressure sensor upstream turbine, Physical Range Check low.“
849	1176	3	„Pressure sensor upstream turbine, signal range check (SRC) high.“
850	1176	4	„Pressure sensor upstream turbine, signal range check (SRC) low.“
856	523613	0	Rail pressure metering unit, Positive governor deviation.
857	523613	0	„Rail pressure metering unit, Rail pressure disrupted. Maximum positive deviation of rail pressure exceeded.“
858	523613	0	„Rail pressure metering unit, Rail pressure disrupted. Maximum positive deviation of rail pressure in metering unit exceeded (RailMeUn1).“
859	523613	0	„Rail pressure metering unit, Rail pressure below the target range .(RailMeUn2) Railsystem leakage detected.(RailMeUn10)“
861	523613	1	„Rail pressure metering unit, Minimum rail pressure exceeded (RailMeUn3) Negative deviation of rail pressure second stage (RailMeUn22)“
862	523613	0	„Rail pressure metering unit, Maximum rail pressure exceeded.“
864	523613	2	„Rail pressure metering unit, Setpoint of metering unit in overrun mode not plausible.“
865	523613	0	Setpoint of metering unit in overrun mode not plausible
874	157	0	„Rail pressure raw value is intermittent No detail informationen!“
875	157	1	„rail pressure raw value is above maximum offset No detail informationen!“
876	523470	7	Maximum rail pressure exceeded (PRV).
877	157	3	„Sensor error rail pressure. Sensor voltage above upper limit.“
878	157	4	„Sensor error rail pressure. Sensor voltage below lower limit.“
881	523633	11	Longterm adaption factor below threshold
882	523633	11	„Nox conversion rate insufficient (SCR-Cat defect, bad DEF quality)“
883	523633	11	„Nox conversion rate insufficient (SCR-Cat defect, bad DEF quality); temperature range 1“
887	3234	11	„DFC for plausibility error Min for NOx sensor downstream of SCR Cat.“
889	3224	1	„DFC for plausibility error Max for NOx sensor upstream of SCR Cat“
892	4345	11	Sensor backflow line pressure (SCR); plausibility error

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Error codes	SPN	FMI	Error description
893	4343	11	„SCR Monitoring; Pressure stabilisation error, general pressure check error (SCR)“
894	4374	13	Pressure stabilisation error dosing valve (SCR)
897	523632	16	Pump pressure SCR metering unit too high.
898	523632	18	Pump pressure SCR metering unit too low
899	523632	0	Pressure overload of SCR-System.
900	523632	1	Pressure build-up error SCR-System.
903	4365	0	DEF tank temperature too high.
905	3241	0	„Sensor SCR catalyst upstream temperature too high; plausibility error.“
908	3361	7	DEF dosing valve blocked (SCR)
914	523720	2	„DEF supply module heater temperature; plausibility error (normal condition).“
915	523720	2	„Sensor DEF supply module heater temperature; plausibility error (cold start condition)“
916	523721	2	„Sensor DEF supply module temperature; plausibility error (normal condition)“
917	523721	2	„Sensor DEF supply module temperature; plausibility error (cold start condition)“
918	523981	11	„SCR plausibility, OBD and diagnosis; Stuck in range check of DEF tank temperature sensor DEF-tank without heating function (heating phase)“
919	523330	14	Immobilizer status; fuel blocked
920	523330	14	„DFC to block the fuel by Sia No detail informationen!“
921	523330	14	„DFC to indicate that TEN-code or UC-code received if ECU is learned. No detail informationen!“
922	523330	14	„DFC to indicate that no code is received via CAN. No detail informationen!“
923	523330	14	„DFC to indicate that wrong code is received. No detail informationen!“
925	523720	8	„DEF supply module heater temperature; duty cycle in failure range.“
926	523720	8	„DEF supply module heater temperature; duty cycle in invalid range.“
927	523721	11	Urea supply module temperature measurement not available.
928	523722	8	DEF supply module PWM signal; period outside valid range.
929	523722	8	Detect faulty PWM signal from Supply Modul.
930	523721	8	DEF supply module temperature; duty cycle in failure range.
931	523721	8	Urea supply module temperature; duty cycle in invalid range.
932	29	3	Handthrottle idle validation switch; short circuit to battery
935	91	3	„Sensor error accelerator pedal. Signal range check high.“
937	29	4	Handthrottle; short circuit to ground
940	91	4	„Sensor error accelerator pedal. Signal is below the range.“
942	523921	3	Sensor error burner temperature; signal range check high
943	3532	3	ensor error DEF tank level; signal range check high
944	523921	4	Sensor error burner temperature; signal range check low
945	3532	4	Sensor error DEF tank level; signal range check low

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Error codes	SPN	FMI	Error description
946	1079	13	Failure of sensor supply voltage 1.
947	1080	13	Failure of sensor supply voltage 2.
948	523601	13	Failure of sensor supply voltage 3.
956	677	3	„Starter relay high side. Short circuit to battery.“
957	677	4	Starter relay high side short circuit to ground.
958	677	5	Starter relay low side no load error.
959	677	12	Starter relay powerstage over temperature.
960	677	3	Starter relay low side short circuit to battery.
961	677	4	Starter relay low side short circuit to ground.
965	523922	3	Burner shut of valve; short circuit to battery
969	624	5	SVS lamp; open load
970	624	12	SVS lamp: powerstage over temperature
971	624	3	SVS lamp; short circuit to battery
972	624	4	SVS lamp; short circuit to ground
973	523612	14	Softwarereset CPU SWReset_0
974	523612	14	Softwarereset CPU SWReset_1
975	523612	14	Softwarereset CPU SWReset_2
976	91	11	„Plausibility error between APP1 and APP2 or APP1 and idle switch.“
978	29	2	„Plausibility error between sensor and idle switch, Acceleration Pedal Detection. In case of Hand Throttle with Low Idle Switch, it is the plausibility check between hand throttle and idle switch.“
980	523550	12	Terminal 50 was operated too long
981	172	3	„Air flow temperature sensor; short circuit to battery or open load.“
982	172	4	„Sensor Luftmengentemperatur; Massekurzschluss Air flow temperature sensor; short circuit to ground“
986	523921	0	„Burner temperature, temperature above upper shutoff threshold“
989	523921	1	„Burner temperature, temperature below lower shutoff threshold“
992	105	1	„Charged Air cooler down stream temperature. Temperature below lower physical threshold.“
994	105	3	„Electrical error charged air temperature. Signal range check high.(SRC)“
995	105	4	„Electrical error charged air temperature. Signal range check low.“
996	105	0	„Charged air cooler temperature. System reaction initiated. High charged air cooler temperature. Warning threshold exceeded.“
997	105	0	„High charged air cooler temperature. Shut off threshold exceeded.“
998	105	11	„Diagnostic fault check for charged air cooler downstream temperature sensor No detail informationen!“
1007	412	3	„Electrical error EGR cooler downstream temperature. Signal range check high.“

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Error codes	SPN	FMI	Error description
1008	412	4	„electrical error EGR cooler downstream temperature. Signal range check low.“
1011	523960	0	„Physical range check high for EGR cooler downstream temperature.“
1012	523960	1	„Physical range check low for EGR cooler downstream temperature.“
1014	51	6	„Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8). Signal range check high.“
1015	520521	5	„Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); signal range check low.“
1016	51	7	„Actuator position for EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8) not plausible.“
1022	51	6	„Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); signal range check high“
1023	51	5	„Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); signal range check low“
1024	51	3	„Position sensor error of actuator EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8). Signal range check high.“
1025	51	4	„Position sensor error actuator EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8). Signal range check low.“
1026	4769	2	Temperature downstream DOC, plausibility error
1029	4766	0	„Temperature downstream DOC, temperature above upper shutoff threshold“
1030	4766	0	„Temperature downstream DOC, temperature above upper warning threshold“
1034	4769	3	„Sensor error exhaust gas temperature downstream (DOC); signal range check high“
1035	4769	4	„Sensor error exhaust gas temperature downstream (DOC); signal range check low“
1036	4768	2	Temperature upstream DOC, plausibility error
1039	4765	0	„Temperature upstream DOC, temperature above upper shutoff threshold“
1040	4765	0	„Temperature upstream DOC, temperature above upper warning threshold“
1044	4768	3	„Electrical error exhaust gas temperature upstream (DOC); signal range check high“
1045	4768	4	„Electrical error exhaust gas temperature upstream (DOC); signal range check low“
1047	3248	4	„Sensor error particle filter downstream temperature; signal range check low“
1067	1180	3	„Sensor error exhaust gas temperature upstream turbine; signal range check high“
1069	4360	0	„Exhaust temperature upstream SCR-Cat, temperature above upper physical threshold“
1070	4360	1	„Sensed exhaust temperature before SCR-Cat is < physical low limit“
1071	4361	2	„Signal error for CAN message Detailinformationen fehlen! Signal error for CAN message No detail informationen!“
1072	4361	3	„Sensor error DEF catalyst exhaust gas temperature upstream; signal range check high“
1073	4361	4	„Sensor error DEF catalyst exhaust gas temperature upstream; signal range check low“
1074	1761	14	DEF tank level; warning threshold exceeded
1075	3361	6	DEF dosing valve; power at the end of injection too high
1077	3361	3	DEF dosing valve; short circuit to battery on low side
1078	3361	3	„DEF dosing valve; short circuit to battery or open load on high side“
1079	3361	4	„Urea dosing valve; short circuit to ground or open load on low side“
1080	3361	4	DEF dosing valve; short circuit on high side

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3.7 Defects

Error codes	SPN	FMI	Error description
1081	4345	5	SCR heater relay DEF returnline sekondary side; open load
1082	4366	5	SCR main relay (secondary side): open load
1083	4343	5	„SCR heater relay DEF pressureline secondary side; open load“
1084	4366	5	SCR main relay (secondary side); Shortcut to battery
1085	4366	5	„SCR main relay (secondary side), heat relay (secondary side), heating elements or heating valve short to ground.“
1086	4341	5	SCR heater relay DEF supplyline secondary side; open load
1087	523719	5	„SCR heater relay DEF supply modul secondary side; open load“
1088	4366	5	SCR Tank heating valve secundary side: open load
1089	4243	11	„SCR system heater diagnostic reports error; shut off SCR-system“
1090	4345	5	SCR heater relay DEF returnline primary side; open load
1092	4345	3	SCR heater DEF returnline; short circuit to battery
1093	4345	4	SCR heater DEF returnline; short circuit to ground
1094	4343	5	SCR heater relay DEF pressureline primary side; open load
1096	4343	3	SCR heater DEF pressureline; short circuit to battery
1097	4343	4	SCR heater DEF pressureline; short circuit to ground
1098	523718	5	tank heating valve; open load
1099	523718	12	SCR main relay (primary side); powerstage over temperature
1100	523718	3	SCR main relay (primary side); short circuit to battery
1101	523718	4	SCR main relay (primary side); short circuit to ground
1102	4341	5	SCR heater relay DEF supply line primary side; open load
1104	4341	3	SCR-heater DEF supplyline; short circuit to battery
1105	4341	4	SCR-heater DEF supply line; short circuit to ground
1106	523719	5	SCR heater relay DEF supplymodule primary side; open load
1108	523719	3	SCR heater DEF supplymodule; short circuit to battery
1109	523719	4	SCR heater DEF supplymodule; short circuit to ground
1110	4366	5	SCR tank heating valve primary side; open load
1112	4366	3	SCR Tank heating valve; short circuit to battery
1113	4366	4	SCR Tank heating valve; short circuit to ground
1117	523632	11	Pump motor not available for actuation
1118	4375	5	Urea pump motor; open load
1120	4375	3	Urea pump motor; short circuit to battery
1121	4375	4	Urea pump motor; short circuit to ground
1122	4334	0	„Supply module DEF, DEF pressure above upper physical threshold“
1123	4334	1	„Urea supply module pressure sensor; physical range check low (defect pressure sensor)“
1124	4334	0	Urea pump pressure sensor; high signal not plausible
1125	4334	1	Urea pump pressure sensor; low signal not plausible

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Error codes	SPN	FMI	Error description
1126	523632	2	„Signal error for CAN message No detail informationen!“
1127	523632	3	Sensor error urea pump pressure; signal range check high
1128	523632	4	Sensor error urea pump pressure; signal range check low
1129	4376	5	SCR reversal valve; open load
1130	4376	12	SCR reversing valve; over temperature
1131	4376	3	SCR reversal valve; short circuit to battery
1132	4376	4	SCR reversing valve; short circuit to ground
1135	3031	0	DEF tank, DEF temperature in DEF tank is to high.
1136	3031	1	DEF tank, DEF temperature below lower physical threshold
1137	4365	2	Tank temperature signal error for CAN message
1138	4365	3	Sensor error urea tank temperature: short circuit to battery
1139	4365	4	Sensor error urea tank temperature; short circuit to ground.
1157	97	12	Water in fuel level prefilter; maximum value exceeded
1158	523946	0	„Zerofuel calibration injector 1 (in firing order); maximum value exceeded“
1159	523947	0	„Zerofuel calibration injector 2 (in firing order); maximum value exceeded“
1160	523948	0	„Zerofuel calibration injector 3 (in firing order); maximum value exceeded“
1163	523951	0	„Zerofuel calibration injector 6 (in firing order); maximum value exceeded“
1164	523946	1	„Zerofuel calibration injector 1 (in firing order); minimum value exceeded“
1165	523947	1	„Zerofuel calibration injector 2 (in firing order); minimum value exceeded“
1166	523948	1	„Zerofuel calibration injector 3 (in firing order); minimum value exceeded“
1167	523949	1	„Zerofuel calibration injector 4 (in firing order); minimum value exceeded“
1168	523950	1	„Zerofuel calibration injector 5 (in firing order); minimum value exceeded“
1170	523612	12	Internal software error ECU
1180	168	0	Physical range check high for battery voltage
1181	168	1	Physical range check low for battery voltage
1183	172	1	Air inlet filter sensor out of physical range check
1187	523980	14	Bad quality of reduction agent detected
1193	1180	0	„Physical range check high for exhaust gas temperature upstream turbine“
1194	1180	1	„Physical range check low for exhaust gas temperature upstream turbine“
1219	524018	14	„HMI engine derate service state DPF wasn´t regenerated, power reduction phase 1 (manuell regeneration request)“
1220	524022	14	„HMI engine derate stop state DPF wasn´t regenerated, power reduction phase 2 (manuell regeneration request)“
1222	190	14	„Camshaft- and Crankshaft speed sensor signal not available on CAN“
1223	51	5	„Actuator EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); open load“
1224	51	6	„Actuator EGR-Valve (2.9;3.6) or Throttle-Valve (6.1,7.8); over current“
1226	51	3	„EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); short circuit to battery“

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3.7 Defects

Error codes	SPN	FMI	Error description
1227	51	3	„EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); short circuit to battery“
1228	51	4	„EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); short circuit to ground“
1229	51	4	„EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); short circuit to ground“
1230	51	6	„Actuator error EGR-Valve (2.9;3.6) or Throttle-Valve (4.1;6.1;7.8); Overload by short-circuit“
1231	51	11	Power stage overtemperature due to high current.
1232	51	4	„actuator AGR valve (2.9;3.6) throttle valve (4.1;6.1;7.8); Voltage below threshold.“
1239	523984	3	UB7; Short circuit to battery error of actuator relay 7
1241	523986	4	UB6; Short circuit to ground actuator relais 6
1242	523987	4	UB7; Short circuit to ground actuator relay 7
1247	524019	11	„Burner Control; Air Line - Blocked Air Pump; air lines blocked“
1248	523910	9	„Burner Control; Air Pump - CAN Lost Air Pump; CAN communication lost“
1249	523910	7	„Air pump;CAN communication interrupted no purge function available“
1250	523910	12	Air Pump; internal error
1252	523910	0	Air Pump; operating voltage error
1254	524014	1	„Air inlet EPV - pressure too low Air pressure glow plug flush line; below limit“
1255	524013	7	„Burner Control; Flame lost max Burner operation is interrupted too often“
1257	523915	7	HCI dosing valve (DV1); blocked open
1258	524016	11	„Burner Control; HFM - Electrical Fault HFM sensor; electrical fault“
1259	524016	2	„Burner Control; HFM - Plausibilitätsfehler 1 Amount of air is not plausible to pump speed“
1261	523910	6	„Burner Control Air Pump; over current Air pump electrically overloaded“
1262	523922	7	„Burner Control; Shut-off Valve - Blocked closed Burner Shut Off Valve; blocked closed“
1263	524021	11	„Burner Control; Fuel line ShutOff downstream - broken Burner fuel line pipe leak behind Shut Off Valve“
1264	523922	7	Burner Shut Off Valve; blocked open
1285	524038	9	„Timeout error of CAN-Receive-Frame ComMS_Sys1TO (error memory Slave); Master-Slave internal CAN message“
1286	524039	9	„Timeout error of CAN-Receive-Frame ComMS_Sys2TO (error memory Slave); Master-Slave internal CAN message“
1287	524040	9	„Timeout error of CAN-Receive-Frame ComMS_Sys3TO (error memory Slave); Master-Slave internal CAN message“
1288	524041	9	„Timeout error of CAN-Receive-Frame ComMS_Sys4TO (error memory Slave); Master-Slave internal CAN message“
1289	524042	9	„Timeout error of CAN-Receive-Frame ComMS_Sys5TO (error memory Slave); Master-Slave internal CAN message“
1290	524043	9	„Timeout error of CAN-Receive-Frame ComMS_Sys6TO (error memory Slave); Master-Slave internal CAN message“
1291	524045	9	„Master Slave, Error of message counter CAN receive message ComMSMoFOvR; ComMS-MoFOvR1CNT“
1292	524046	9	„Master-Slave CAN; Error Checksum of CAN-Receive Message“

Error codes	SPN	FMI	Error description
1293	524047	9	„Master-Slave CAN; Error of message length of CAN receive message ComMSMoFOvR;_ ComMSMoFOvR1DLC“
1294	524048	9	„Timeout error CAN message ComMSMoFOvR1TO error memory Slave“
1299	523788	0	Wastegate plauisibility error off CAN transmit message.
1300	523788	0	„Timeout Error of CAN-Receive-Frame ComTrbChActr; Wastegate“
1302	524024	11	„Deviation of the exhaust gas temperature setpoint to actual value downstream (DOC) too high“
1324	523995	13	„Check of missing injector adjustment value programming (IMA) injector 7 (in firing order)“
1325	523996	13	„check of missing injector adjustment value programming (IMA) injector 8 (in firing order)“
1326	523997	4	Injector cylinder bank 1 slave; short circuit
1327	523998	4	Injector cylinder bank 2 slave; short circuit
1328	523999	12	Injector powerstage output Slave defect
1329	524000	5	Injector 7 (in firing order); interruption of electric connection
1330	524001	5	Injector 8 (in firing order); interruption of electric connection
1333	524000	3	Injector 7 (in firing order); short circuit
1334	524001	3	Injector 8 (in firing order); short circuit
1337	2797	4	„Timeout of Short-Circuit Ground Diagnosis Cyl. Bank 0;_IVDiaShCirGndToutBnk_0“
1338	2798	4	„Timeout of Short-Circuit Ground Diagnosis Cyl. Bank 1;_IVDiaShCirGndToutBnk_1“
1339	2797	4	Injector diagnostic; Short circuit to ground cylinder bank 0
1340	2798	4	Injector diagnostic; Short circuit to ground cylinder bank 1
1341	524035	12	Injector diagnostics; time out error in the SPI communication
1342	524036	12	„Injector diagnostics Slave; time out error in the SPI communication“
1345	524069	9	„Timeout Error of CAN-Receive-Frame MSMon_FidFCCTO; Master-Slave CAN communication faulty“
1357	524052	11	Error memory Slave reports FID MSMonFC2 (collective error)
1368	524052	11	Error memory Slave reports FID MSMonFC3 (collective error)
1378	523919	2	Sensor air pump airpressure; plausibility error
1379	523920	2	Sensor exhaust gas back pressure burner; plausibility error
1380	3253	2	Sensor differential pressure (DPF); plausibility error
1381	164	2	Rail pressure safety function is not executed correctly ()
1389	523922	5	Burner Shut Off Valve; open load
1390	523922	12	Burner Shut Off Valve; powerstage over temperature
1392	523922	4	Burner Shut Off Valve; short circuit to ground
1395	523921	2	„Burner temperature sensor; Plausibility Check for burner temperature sensor Sensor burner temperature; plausibility error“
1398	1136	0	Physical range check high for ECU temperature
1402	4769	2	„Sensor exhaust gas temperature OxiCat downstream (normal operation); plausibility error“
1403	4769	2	„Sensor exhaust gas temperature OxiCat downstream (regeneration); plausibility error“

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3.7 Defects

Error codes	SPN	FMI	Error description
1411	1188	11	Wastegate actuator; internal error
1412	1188	11	Wastegate actuator; EOL calibration not performed correctly
1413	1188	13	„Wastegate actuator calibration deviation too large, recalibration required“
1414	1188	2	Wastegate; status message from ECU missing
1415	1188	7	Wastegate actuator; blocked
1417	1188	11	Wastegate actuator; over temperature (> 135°C)
1418	1188	11	Wastegate actuator; operating voltage error
1423	51	0	„Warning threshold for an internal actuator error exceeded, <4L EGR.actuator und >4L Air Intake Flap“
1424	51	1	„Shut off threshold for an internal actuator error exceeded, <4L EGR.actuator und >4L Air Intake Flap“
1425	172	0	„air temperature within air filter box above maximum physical value“
1431	524028	2	CAN message PROEGRActr; plausibility error
1432	524029	2	„Timeout Error of CAN-Receive-Frame ComEGRActr - exhaust gas recirculation positioner“
1436	524034	5	Disc Separator; open load
1437	524034	12	Disc Separator; powerstage over temperature
1438	524034	3	Disc separator; short circuit to battery
1439	524034	4	Disc separator; short circuit to ground
1440	524030	7	EGR actuator; internal error
1441	524031	13	EGR actuator, calibration error
1442	524032	2	EGR actuator; status message „EGRCust“ is missing
1443	524033	7	EGR actuator; due to overload in Save Mode
1455	3711	12	Temperature during stand-still main phase too low or too high
1458	523960	0	„High exhaust gas temperature EGR cooler downstream; warning threshold exceeded.“
1464	0	0	
1466	0	0	
1467	0	0	
1469	0	0	
1470	0	0	
1471	0	0	
1472	0	0	
1481	524025	5	DPF system; operating voltage error
1482	524044	9	CAN message ComMS_Sys7 not received from slave
1484	524068	2	„Master ECU and Slave ECU have been identified as the same types“
1485	524052	11	„Master ECU and Slave ECU data sets or software are not identical“
1486	523718	5	SCR mainrelay; open load (only CV56B)
1488	523718	3	SCR mainrelay; short circuit to battery (only CV56B)
1489	523718	4	SCR mainrelay; short circuit to ground (only CV56B)

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Error codes	SPN	FMI	Error description
1490	4376	5	SCR reverting valve; open load
1491	4376	12	SCR reverting valve; over temperature
1493	4376	4	SCR reverting valve; short circuit to ground
1505	524057	2	Fuel low pressure pump; error pressure build up
1523	2659	2	Exhaust Gas Recirculation AGS Sensor; signal not plausible
1524	2659	0	„Exhaust Gas Recirculation AGS Sensor; Sensed exhaust mass value above maximum physical value“
1525	2659	1	„Exhaust Gas Recirculation AGS Sensor; Sensed exhaust mass value below miniimum physical value“
1526	2659	12	„Exhaust Gas Recirculation AGS Sensor; plausibility error, AGS sensor has not passed the burn off process“
1527	2659	2	„Exhaust Gas Recirculation AGS Sensor; Temperature of EGR mass not plausible“
1529	524070	2	„(Upstream NOx-Sensor) Diagnostic Fault Check for invalid upstream NOx value (Sensor self diagnostic DFC set by Deutz-SW) NOx-Sensor before SCR-Cat: Invalid upstream NOx value“
1530	524071	2	„(Downstream NOx-Sensor) Diagnostic Fault Check for invalid downstream lambda value (Sensor self diagnostic DFC set by Deutz-SW)“
1531	524072	2	„(Upstream NOx-Sensor) Diagnostic Fault Check for invalid upstream lambda value (Sensor self diagnostic DFC set by Deutz-SW)“
1532	524073	2	„(Downstream NOx-Sensor) Diagnostic Fault Check for invalid downstream NOx value (Sensor self diagnostic DFC set by Deutz-SW)“
1533	524074	9	„NOx sensor downstream SCR-CAT, sensor internally open load“
1534	524075	11	„NOx sensor downstream SCR-CAT, sensor internally short circuit“
1535	524076	9	NOx sensor upstream SCR-CAT, sensor internally open line
1536	524077	11	„NOx sensor upstream SCR-CAT, sensor internally short circuit“
1537	524078	9	„NOx sensor downstream SCR-CAT, lambda value above upper physical threshold“
1538	524079	9	„NOx sensor downstream SCR-CAT, lambda value below lower physical threshold“
1539	524080	9	„NOx sensor upstream SCR-CAT, lambda value above upper physical threshold“
1540	524081	9	„NOx sensor upstream SCR-CAT, lambda value below lower physical threshold“
1541	524082	9	„(Downstream NOx-Sensor) Diagnostic Fault Check for downstream NOx value over maximum limit (DFC set by Deutz-SW)“
1542	524083	9	„NOx-Sensor downstream SCR-CAT, NOx value below minimum value.“
1543	524084	9	„NOx-Sensor upstream SCR-CAT, NOx value above maximum value.“
1544	524085	9	„NOx sensor upstream SCR-CAT, NOx value below lower physical threshold“
1545	524149	2	„Plausibility error between pressure downstream turbine (PTrbnDs) and ambient air pressure (EnvP)“
1555	524063	5	„Relay Urea backflow line heater: broken wiring detected (open load) in-line engine: SCR-backflow line (K29) V-engine: Master: SCR-suction / backflow line (K32.1) Slave: SCR-suction / backflow line (K32.2)“
1556	524063	5	SCR main relay not connected
1557	524063	5	SCR heater pressureline; open load

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3.7 Defects

Error codes	SPN	FMI	Error description
1558	524063	3	SCR heater mainrelay; short circuit to battery
1559	524063	4	„SCR heater main relay load side (K31) on heating valve (Y31), Short cut to ground.“
1560	524063	5	„Relay Urea suction line: broken wiring detected (open load) Row engine: SCR suction line (K28) V-engine: Master: common SCR-suction line (K28) Slave: commoon SCR backflow line (K29)“
1561	524063	5	SCR heater supply module; open load
1562	524063	5	SCR heater tank; open load
1565	524065	0	„Pressure sensor upstream SCR-CAT, pressure above upper physical threshold“
1566	524065	1	„Pressure sensor upstream SCR-CAT, pressure below lower physical threshold“
1569	524065	3	„Pressure sensor upstream SCR-CAT; short circuit battery or open load“
1570	524065	4	Pressure sensor upstream SCR-CAT; short circuit ground
1579	524066	3	„SCR measurement heater output stage; short circuit battery or open load“
1581	524067	0	„DEF supply module, heater temperature above upper physical threshold“
1582	524067	1	„DEF supply module, heater temperature below lower physical threshold“
1585	524067	0	„DEF supply module, temperature above upper physical threshold“
1586	524067	1	„DEF supply module, temperature below lower physical threshold“
1593	1761	0	DEF tank, DEF level above upper physical threshold
1594	1761	1	DEF tank, DEF level below lower physical threshold
1597	524149	2	Pressure downstream turbine, plausibility error
1598	524065	2	Pressure sensor upstream SCR-CAT, plausibility error
1617	3699	2	„Passive regeneration of DPF; DOC error Temperature sensor us. and ds. DOC simultaneously defect“
1619	524087	5	Urea Error Lamp; open load
1620	524087	12	Urea Error Lamp; temperatur over limit
1621	524087	3	Urea Error Lamp; short circuit battery
1622	524087	4	Urea Error Lamp; short circuit ground
1630	524132	2	„Fuel low pressure upstream fuel low pressure pump not plausible“
1631	524132	0	„Fuel low pressure upstream fuel low pressure pump, pressure above maximum warning threshold“
1632	524132	0	„Fuel low pressure upstream fuel low pressure pump, pressure above maximum shut off threshold“
1633	524132	1	„Fuel low pressure upstream fuel low pressure pump, pressure below minimum shut off threshold“
1634	524132	1	„Fuel low pressure upstream fuel low pressure pump, pressure below minimum warning threshold“
1635	3699	0	„Maximum standstill time reached; oil exchange request ignored“
1639	524147	13	SCR System,pressure build up not possible
1646	524063	12	DEF supply modul, time for defrosting too long
1647	524063	12	DEF tank, time for defrosting too long

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Error codes	SPN	FMI	Error description
1654	1761	14	„Urea Tank Signal to HMI for indicating the Urea Tank-Level (Urea tank volume ratio low threshold 1)“
1655	1761	14	DEF tank, DEF level below first warning threshold
1656	1761	14	DEF tank, DEF level below second warning threshold
1658	524096	14	„Control of the SCR system; If the start stop counter (EPA-Counter) exceeds the threshold SCRCtl_ctEngStrtStopThresh_C. This counter will increment only once in each driving cycle in case of an SCR error. If the counter reaches the threshold, the DFC will be set to inhibit the engine start Engine will not be started, because of EPA-Counter“
1659	524114	9	Timeout error of CAN-Transmit-Frame A1DOC
1660	524115	9	Timeout error of CAN-Transmit-Frame AT1S
1661	524116	9	Timeout error of CAN-Transmit-Frame SCR2“
1662	524117	9	Timeout error of CAN-Transmit-Frame SCR3“
1663	524097	9	Timeout error of CAN-Transmit-Frame DPFBrnAirPmpCtl
1664	524098	9	Timeout error of CAN-Transmit-Frame ComDPFBrnPT
1665	524099	9	Timeout error of CAN-Transmit-Frame ComDPFC1
1666	524100	9	Timeout error of CAN-Transmit-Frame ComDPFHisDat.
1667	524101	9	Timeout error of CAN-Transmit-Frame ComDPFTstMon
1668	524105	9	„Timeout error of CAN-Transmit-Frame ComEGRMsFlw (EGR Steller)“
1669	524108	9	„Timeout error of CAN-Transmit-Frame ComEGRTVActr (EGR actuator)“
1670	524110	9	Timeout error of CAN-Transmit-Frame ComETVActrTO.
1671	524112	9	Timeout ComIntake Throttle Valve Actr.
1672	524118	9	Timeout error of CAN-Receive-Frame ComRxCM1
1675	524103	9	Timeout error of CAN-Receive-Frame ComRxDPFBrnAirPmp
1676	524104	9	Timeout error of CAN-Receive-Frame ComRxDPFCtl.
1677	524106	9	„Timeout error of CAN-Receive-Frame ComRxEGRMsFlw1 (EGR actuator)“
1678	524107	9	„Timeout error of CAN-Receive-Frame ComRxEGRMsFlw2 (EGR actuator)“
1679	524109	9	„Timeout error of CAN-Receive-Frame ComRxEGRTVActr (EGR actuator)“
1680	524111	9	Timeout error of CAN-Receive-Frame ComRxETVActr
1681	524113	9	Timeout error of CAN-Receive-Frame ComRxITVActr
1682	524120	9	Timeout error of CAN-Receive-Frame ComRxSCRHtDiag“
1683	524121	9	„Timeout error of CAN-Receive-Frame ComRxTrbChActr (wastegate actuator)“
1684	524122	9	„Timeout error of CAN-Receive-Frame ComRxUQSens (Urea quality)“
1685	524123	9	Timeout error of CAN-Receive-Frame ComSCRHtCtl“
1686	524124	9	Timeout error of CAN-Receive-Frame ComTxAT1IMG“
1687	524125	9	„Timeout error of CAN-Receive-Frame ComTxTrbChActr (Wastegate actuator)“
1698	524133	2	HMI system; set if restore button blocked
1699	524134	0	DPF, ash load exceeds the shutoff threshold
1700	524134	0	DPF, ash load exceeds the warning threshold

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3.7 Defects

Error codes	SPN	FMI	Error description
1701	524135	0	DPF, soot load exceeds the shutoff threshold
1702	524135	14	DPF, soot load exceeds the service request threshold
1703	524135	0	DPF, soot load exceeds the warning threshold
1705	524156	9	Timeout error of CAN-Receive-Frame ComRxEBC2.
1706	524157	9	Fancontrol; time out for fan governing
1708	524159	0	Fan; short circuit battery or open load
1709	524159	1	Fan; short circuit ground
1710	524160	5	Fan; in/outlet valve 1; open load
1712	524160	3	Fan; in/outlet valve 1; short circuit battery
1713	524160	4	Fan; in/outlet valve 1; open load ground
1714	524161	5	Fan; in/outlet valve 2; open load
1716	524161	3	Fan; in/outlet valve 2; short circuit battery
1717	524161	4	Fan; in/outlet valve 2; open load ground
1718	524162	12	Fan; fancontrol; angle sensor defect
1719	524163	12	Fan; fancontrol; fan or valve defect
1752	2791	7	EGR actuator, actuator blocked
1753	2791	2	EGR actuator, CAN error
1754	2791	13	EGR actuator, EOL calibration error
1755	2791	12	EGR Actuator, internal electrical fault
1756	2791	13	EGR actuator, learning process aborted
1757	2791	6	EGR actuator current is above maximum threshold
1758	2791	3	„EGR actuator supply voltage is above the maximum threshold“
1759	2791	4	EGR actuator supply voltage is below minimum threshold.
1760	2791	13	EGR actuator, learning process out of range
1761	2791	7	EGR actuator, broken spring detected.
1762	2791	16	EGR actuator, temperature high.
1763	2791	0	EGR actuator, temperature critical high
1788	1188	7	Turbocharger wastegate, mechanical blocking detected.
1789	1188	2	Turbocharger wastegate, CAN Error
1790	1188	13	Turbocharger wastegate, EOL calibration error.
1791	1188	12	Turbocharger wastegate, internal electrical error
1792	1188	13	Turbocharger wastegate, learning process aborted.
1793	1188	6	Turbocharger wastegate, current above maximum threshold.
1794	1188	3	„Turbocharger wastegate, supply voltage above maximum threshold.“
1795	1188	4	„Turbocharger wastegate, supply voltage below minimum threshold.“
1796	1188	13	Turbocharger wastegate, learning process out of range.
1797	1188	7	Turbocharger wastegate, broken spring detected.

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Error codes	SPN	FMI	Error description
1799	1188	0	Turbocharger wastegate, temperature critical high.
1827	524141	7	DEF dosing valve, dosing valve blocked
1857	523612	12	Engine starter, plausibility error of starter release condition
1858	524147	7	SCR-System, reverting valve blocked
1859	524175	0	SCR-CAT, Nox emissions above maximum threshold
1860	524074	2	„NOx-Sensor after SCR-Cat: Nox-Sensor dew point problem or plausibility problem“
1861	524076	2	„NOx-Sensor before SCR-Cat: Nox-Sensor dew point problem or plausibility problem“
1863	524177	7	SCR System, DEF suction line blocked
1864	524178	7	SCR System, DEF pressure out of range
1865	4360	2	Exhaust temperature sensor upstream SCR, plausibility error
1866	4334	2	DEF supply module pressure, plausibility error
1867	524067	2	Supply module heater temperature, plausibility error
1868	524067	2	Supply module temperature, plausibility error
1869	1761	2	DEF tank level, plausibility error
1870	3031	2	Urea tank temperature outside of plausible thresholds
1874	524152	2	Urea Quality Sensor; Timeout CAN message
1875	524153	2	„Urea tank level & urea tank temperature via CAN bus, timeout of CAN message“
1880	1761	14	DEF tank, DEF level below third warning threshold
1881	4768	2	„exhaust gas temperature sensors up- and downstream DOC are physically swapped“
1882	524025	14	„The standstill-regeneration mode time exceeds the long-limit. Vehicle was too long or too often in standstill mode. Make oil change and reset counter.“
1883	524025	14	„The standstill-regeneration mode time exceeds the short-limit. Vehicle was too long or too often within a short time in standstill mode. Make oil change and reset counter.“
1884	524184	9	
1889	524189	9	Master / Slave Can disturbed.
1891	524190	14	1 Inducement level 1 activ
1892	524191	14	2 Inducement level 2 activ
1893	524193	8	„The standstill-regeneration mode time exceeds the long limit threshold. Vehicle was too long or too often in standstill mode. Change oil and reset counter.“
1894	524194	8	„The standstill-regeneration mode time exceeds the short-limit. Vehicle was too long or too often within a short time in standstill mode. Change oil and reset counter.“
1895	3519	12	DEF tank temperature, temperature too high
1896	3520	3	DEF quality sensor, short circuit to battery or open load
1897	3520	4	DEF quality sensor, short circuit to ground
1898	3519	3	„DEF quality sensor, internal temperature sensor short circuit to battery or open load“
1899	3519	4	„DEF quality sensor, internal temperature sensor short circuit to ground“

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3.7 Defects

Error codes	SPN	FMI	Error description
1900	524195	14	Standstill request due to crystalisation ignored too long
1901	524196	13	Variant handling, address error
1902	524196	2	Variant handling, Synchronisation error
1904	3520	2	„DEF quality sensor, Significantly diluted DEF or another liquid than DEF in the tank.“
1905	3520	8	„DEF quality sensor, DEF quality cannot be measured within a certain time frame.“
1907	3520	13	Urea quality at UQS invalid
1908	3519	13	Temperature at UQS invalid
1909	4365	12	Urea Tank Temperature is above the warning threshold
1910	3532	13	„DEF qualitysensor, tank level; DEF level out of physial range“
1911	3532	3	The DEF Level at UQS out of max. physical range
1912	3532	4	Quality at UQS out of min. physical range
1913	4365	13	„DEF qualitysensor, tank temperatur; Temperature out of physial range“
1914	4365	3	„DEF qualitysensor, tank temperatur; Short circuit to battery or open load“
1915	4365	4	DEF qualitysensor, tank temperatur; Short circuit to ground
1917	3936	14	Standstill request ignored too long.
1918	3936	14	Standstill time based escalation requests Inducement step 2
1921	51	5	„Intake Throttle Flap, H-Bridge, wiring harness broken at connected actuator“
1922	51	6	„Intake Throttle Flap, H-Bridge, current above maximum threshold“
1924	51	3	Intake Throttle Flap, H-Bridge, short circuit to battery (A02)
1925	51	3	Intake Throttle Flap, H-Bridge, short circuit to battery (A67)
1926	51	4	Intake Throttle Flap, H-Bridge, short circuit to ground (A02)
1927	51	4	Intake Throttle Flap, H-Bridge, short circuit to ground (A67)
1931	51	7	„Intake Throttle Flap, H-Bridge, position of actuator not plausible (deviation from setpoint more than 7%)“
1935	51	3	„Intake Throttle Flap, H-Bridge, short circuit to battery oder broken wiring harness“
1936	51	4	Intake Throttle Flap, H-Bridge, short circuit to ground
1943	524202	11	SCR error code in master ECU active.
1944	524203	11	DEF tank level failure is in master ECU active.
1945	524204	11	SCR afterrun failure is in master ECU active.
1946	524205	11	SCR Co2Off failure is in master ECU active.
1947	524206	11	SCR disable DEF dosing failure is in master ECU active.
1971	524230	11	Inducement HW Failure Slave.
1972	524231	11	Inducement SCR Tamp. Slave
1973	524232	11	Inducement DEF Qualitity in Slave ECU
1974	524233	11	Urea Level Error Slave
1975	524234	11	Urea Temp. Error Slave
1976	524235	11	Urea Level Replace Slave

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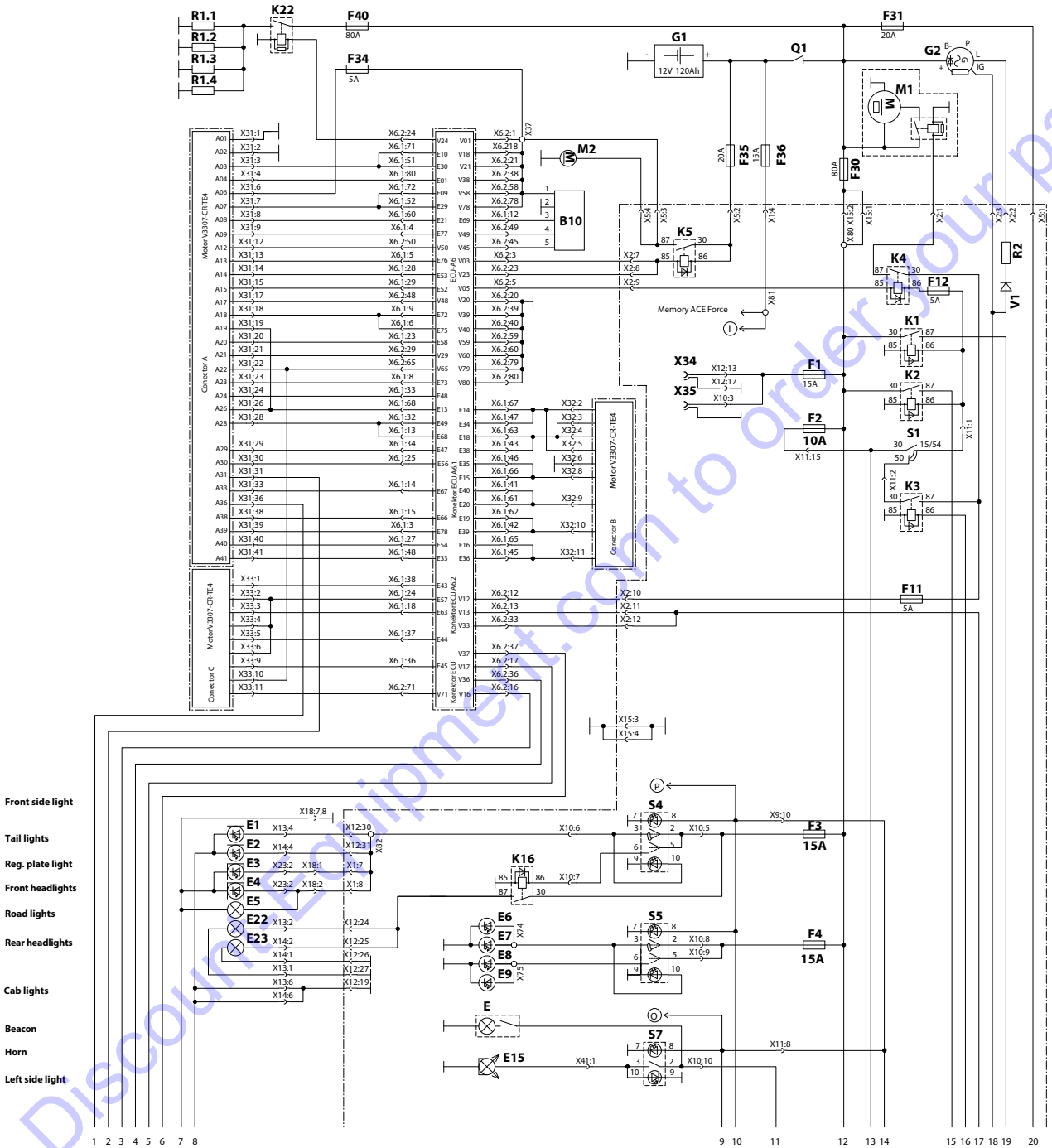
Error codes	SPN	FMI	Error description
1977	524236	11	SCR System Afterrun Slave
1978	524237	11	NSwitch Off SCR System Slave
1979	524238	11	Disable SCR Dosing Slave
1980	524239	11	SCR regeneration failure is in slave ECU active.
1983	524242	11	Urea CONC Replace Slave
1984	524243	11	Urea Quality Error Slave
1989	524248	11	NOX sensor downstream error in slave ECU
1990	524249	11	DEF dosing valve error in slave ECU
1992	524251	11	DEF pressure problems in slave ECU
1993	524252	11	Reverting valve error in slave ECU
1994	524253	11	DEF back flow line heater error on slave ECU
1995	524254	11	Error NOx-Tailpipe emissions exceeded on Slave ECU
1996	524255	11	DEF suction line heater error on slave ECU
1997	524256	11	DEF supply module heater error on slave ECU
1998	524257	11	Error Exhaust pressure upstream SCR on Slave ECU.
1999	524258	11	Error Exhaust temperature upstream SCR on Slave ECU
2000	524259	11	DEF pressure line heater error on slave ECU
2001	524260	11	Error Urea pump temperature on Slave ECU
2002	524261	11	Error DEF heater relais on Slave ECU.
2003	524262	8	
2007	524267	14	Announcement triggers the Inducement Level 2
2008	524025	8	Max. launch time for stand still exceeded (60min).
2011	4171	2	Dynamic temperatur check of temp before SCR
2013	524147	13	„Set together with DFC_SCRCoBldUpLoPres. DFC_SCRCoBldUpLoPresRst is only used for inducement purposes. It ensures that legal inducement is working correctly.“
2014	3520	1	„Diluted DEF in the tank.

Wiring diagram

Seat switch; Motor Tier 4f; ATC module; Murphy – Power view (the diagram represents the machine with maximum number of control elements and accessories)

Legend:

A1	Direction light interrupter
A2	Control unit
A4	Gessmann lever
A5	Display
A6	Engine computer - ECU
A7	Air-conditioning
A8	Time relay - rear window heating
A10	Autoradio
A11	Heating
A12	Front wiper intermittent
A13	Rear wiper intermittent
A20	Telematic
A21	Tachograph
B1	Vibrator frequency sensor
B3	Left hydraulic motor speed sensor
B6	Fuel level indicator
B10	Air weight
C1	Interference suppression filter
E1, E2	Front outline lights
E3, E4	Tail lights
E5	Number plate lighting
E6, E7	Front working headlamps
E8, E9	Rear working headlamps
E14	Lighting in the cab
E15	Beacon
E16, E17	Left direction lights
E18, E19	Right direction lights
E20, E21	Brake lights
E22, E23	Road headlamps
F1-40	Flat safety fuses
G1	Battery 120Ah
G2	Alternator
H1	Horn
H2	Back signal horn
K1-20	Relay
K22	Engine heating contactor
M1	Starter
M2	Fuel pump
M6	Front windscreen wiper
M7	Rear windscreen wiper
M8	Front windscreen washer
M9	Rear windscreen washer
Q1	Battery disconnector
R1	Engine pre-heating
R2, R5	Resistor
R6	Rear window heating
R8	Horn switch
S1	Ignition box
S4	Road lighting switch
S5	Working lighting switch
S7	Beacon switch
S8	Horn button
S9	Direction lights switch
S10	Warning lights switch
S11	Emergency brake button
S12	Service switch
S13	Hydraulic tank float
S14	Parking brake switch
S15	Hydraulic oil temperature sensor
S16	Hydraulic oil filter pressure switch
S17	Seat switch
S18	Vibration switch Small/Big
S19	Vibration switch Manual/Automatic
S36	Coolant level
S37	Air filter
S38	Water in fuel sensor
S40	Heater fan switch
S41	Front wiper switch
S42	Rear wiper switch
S43	Windscreen washer switch
S44	Rear window heating switch
S47	Air-condition overpressure safety element
V1, V10-13	Diodes
X1-99	Connections
X34, X35	Mounting socket
X36	Engine Kubota diagnostics socket
X64	CAN2 diagnostics socket
X65	CAN1 diagnostics socket
X68	Display diagnostic socket
Y5	Cooling fan
Y6	RTM differential lock
Y8	Small vibration
Y9	Big vibration
Y10	Fast travel – drum
Y11	Fast travel – left wheel
Y12	Fast travel – right wheel
Y13	Reverse travel
Y14	Forward travel
Y15	Park brake
Y23	Coupling of the air-conditioning compressor



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Wiring diagram

Seat switch; Motor Tier 4f; ATC module; Murphy – Power view (the diagram represents the machine with maximum number of control elements and accessories)

Legend:

A1	Direction light interrupter
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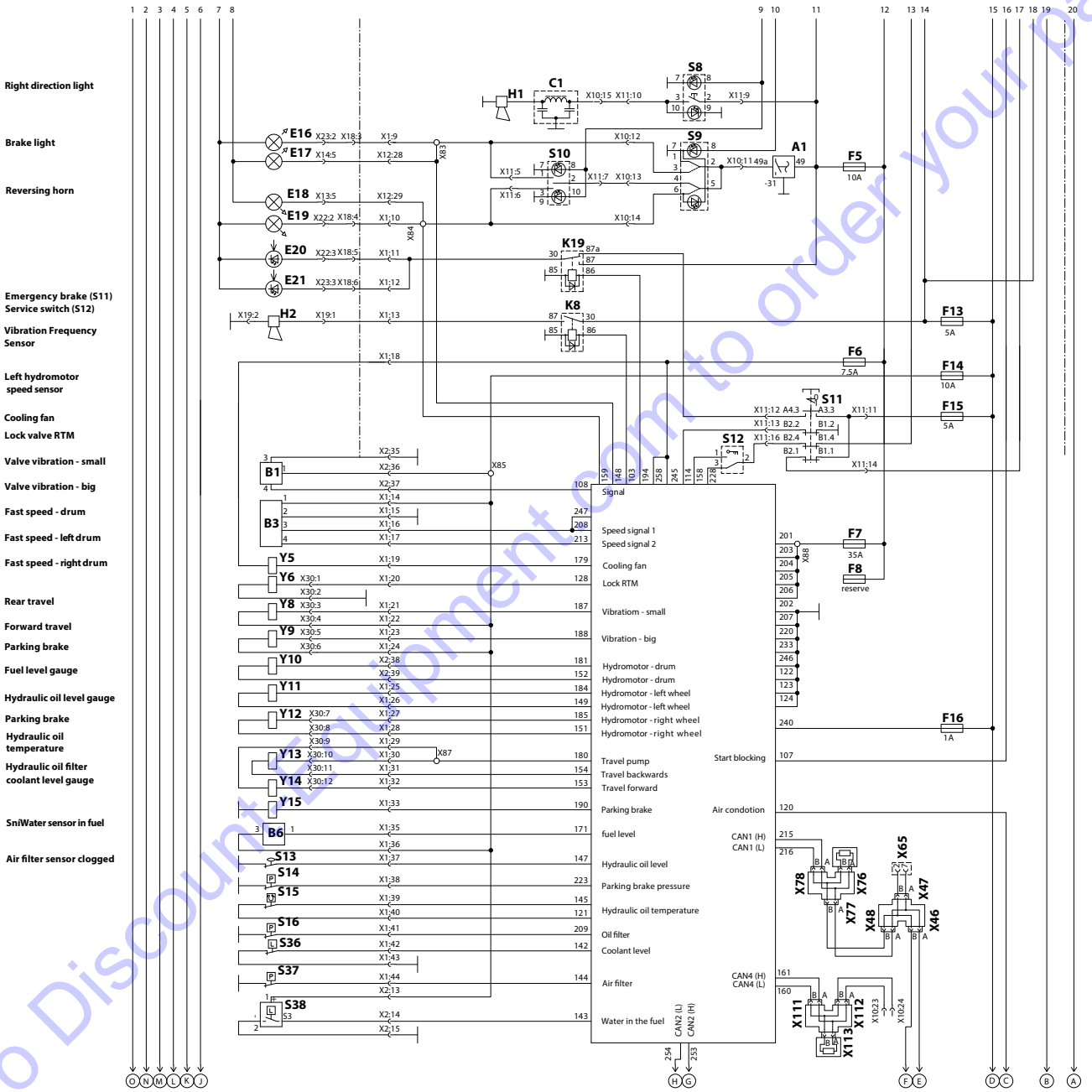
A4	Gessmann lever
A5	Display
A6	Engine computer - ECU
A7	Air-conditioning
A8	Time relay - rear window heating
A10	Autoradio
A11	Heating
A12	Front wiper intermittent
A13	Rear wiper intermittent
A20	Telematic
A21	Tachograph
B1	Vibrator frequency sensor
B3	Left hydraulic motor speed sensor
B6	Fuel level indicator
B10	Air weight
C1	Interference suppression filter
E1, E2	Front outline lights
E3, E4	Tail lights
E5	Number plate lighting
E6, E7	Front working headlamps
E8, E9	Rear working headlamps
E14	Lighting in the cab
E15	Beacon
E16, E17	Left direction lights
E18, E19	Right direction lights
E20, E21	Brake lights
E22, E23	Road headlamps
F1-40	Flat safety fuses
G1	Battery 120Ah
G2	Alternator
H1	Horn
H2	Back signal horn
K1-20	Relay
K22	Engine heating contactor
M1	Starter
M2	Fuel pump
M6	Front windscreen wiper
M7	Rear windscreen wiper
M8	Front windscreen washer
M9	Rear windscreen washer
Q1	Battery disconnector
R1	Engine pre-heating
R2, R5	Resistor
R6	Rear window heating
R8	Horn switch
S1	Ignition box
S4	Road lighting switch
S5	Working lighting switch
S7	Beacon switch
S8	Horn button
S9	Direction lights switch
S10	Warning lights switch
S11	Emergency brake button
S12	Service switch
S13	Hydraulic tank float
S14	Parking brake switch
S15	Hydraulic oil temperature sensor
S16	Hydraulic oil filter pressure switch
S17	Seat switch
S18	Vibration switch Small/Big
S19	Vibration switch Manual/Automatic
S36	Coolant level
S37	Air filter
S38	Water in fuel sensor
S40	Heater fan switch
S41	Front wiper switch
S42	Rear wiper switch
S43	Windscreen washer switch
S44	Rear window heating switch
S47	Air-condition overpressure safety element
V1, V10-13	Diodes
X1-99	Connections
X34, X35	Mounting socket
X36	Engine Kubota diagnostics socket
X64	CAN2 diagnostics socket
X65	CAN1 diagnostics socket
X68	Display diagnostic socket
Y5	Cooling fan
Y6	RTM differential lock
Y8	Small vibration
Y9	Big vibration
Y10	Fast travel – drum
Y11	Fast travel – left wheel
Y12	Fast travel – right wheel
Y13	Reverse travel
Y14	Forward travel
Y15	Park brake
Y23	Coupling of the air-conditioning compressor



108026_2en

Wiring diagram

Seat switch; Motor Tier 4f; ATC module; Murphy – Power view (the diagram represents the machine with maximum number of control elements and accessories)

Legend:

A1	Direction light interrupter
A2	Control unit
A4	Gessmann lever
A5	Display
A6	Engine computer - ECU
A7	Air-conditioning
A8	Time relay - rear window heating
A10	Autoradio
A11	Heating
A12	Front wiper intermittent
A13	Rear wiper intermittent
A20	Telematic
A21	Tachograph
B1	Vibrator frequency sensor
B3	Left hydraulic motor speed sensor
B6	Fuel level indicator
B10	Air weight
C1	Interference suppression filter
E1, E2	Front outline lights
E3, E4	Tail lights
E5	Number plate lighting
E6, E7	Front working headlamps
E8, E9	Rear working headlamps
E14	Lighting in the cab
E15	Beacon
E16, E17	Left direction lights
E18, E19	Right direction lights
E20, E21	Brake lights
E22, E23	Road headlamps
F1-40	Flat safety fuses
G1	Battery 120Ah
G2	Alternator
H1	Horn
H2	Back signal horn
K1-20	Relay
K22	Engine heating contactor
M1	Starter
M2	Fuel pump
M6	Front windscreen wiper
M7	Rear windscreen wiper
M8	Front windscreen washer
M9	Rear windscreen washer
Q1	Battery disconnector
R1	Engine pre-heating
R2, R5	Resistor
R6	Rear window heating
R8	Horn switch
S1	Ignition box
S4	Road lighting switch
S5	Working lighting switch
S7	Beacon switch
S8	Horn button
S9	Direction lights switch
S10	Warning lights switch
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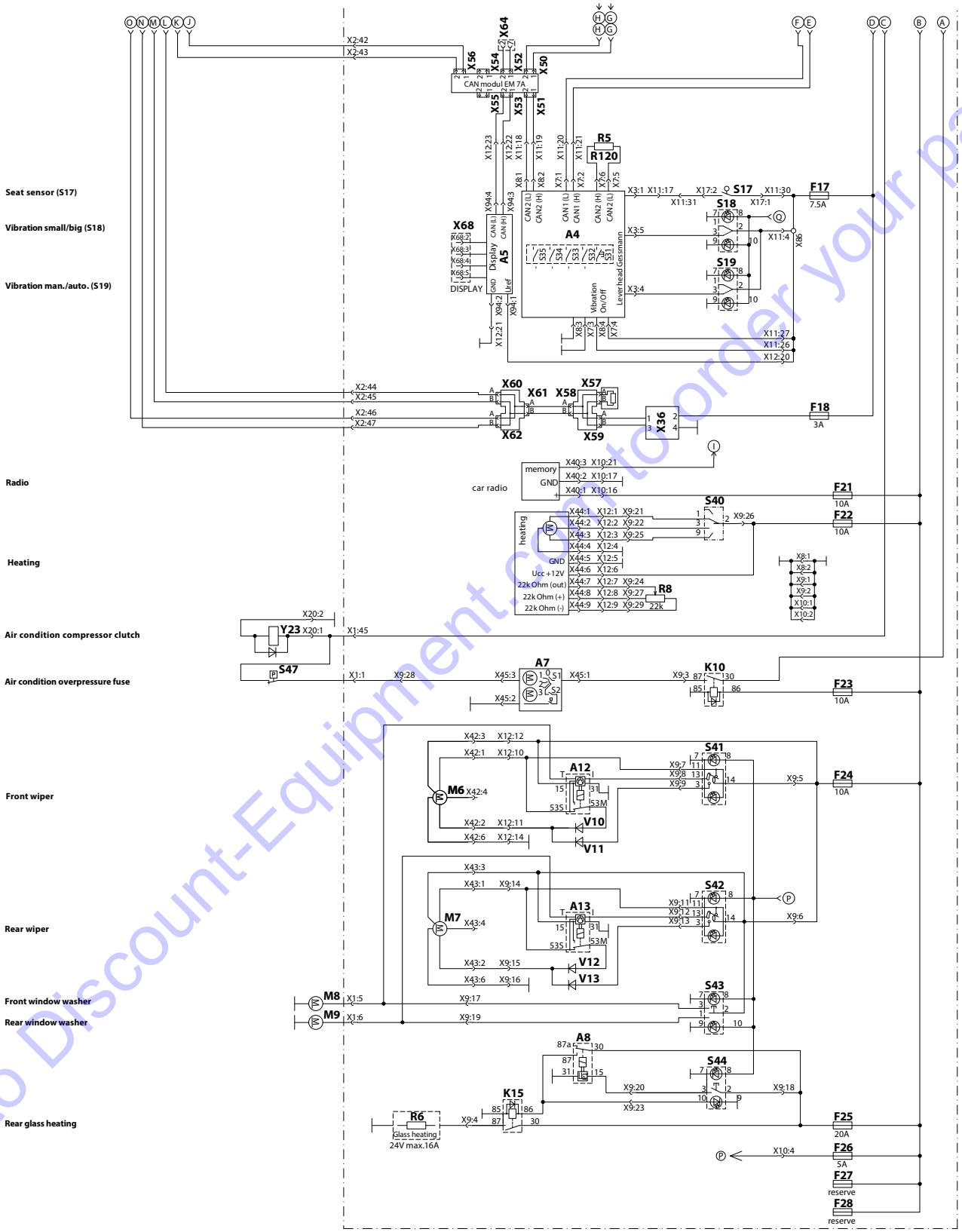
Y14	Forward travel
Y15	Park brake
Y23	Coupling of the air-conditioning compressor



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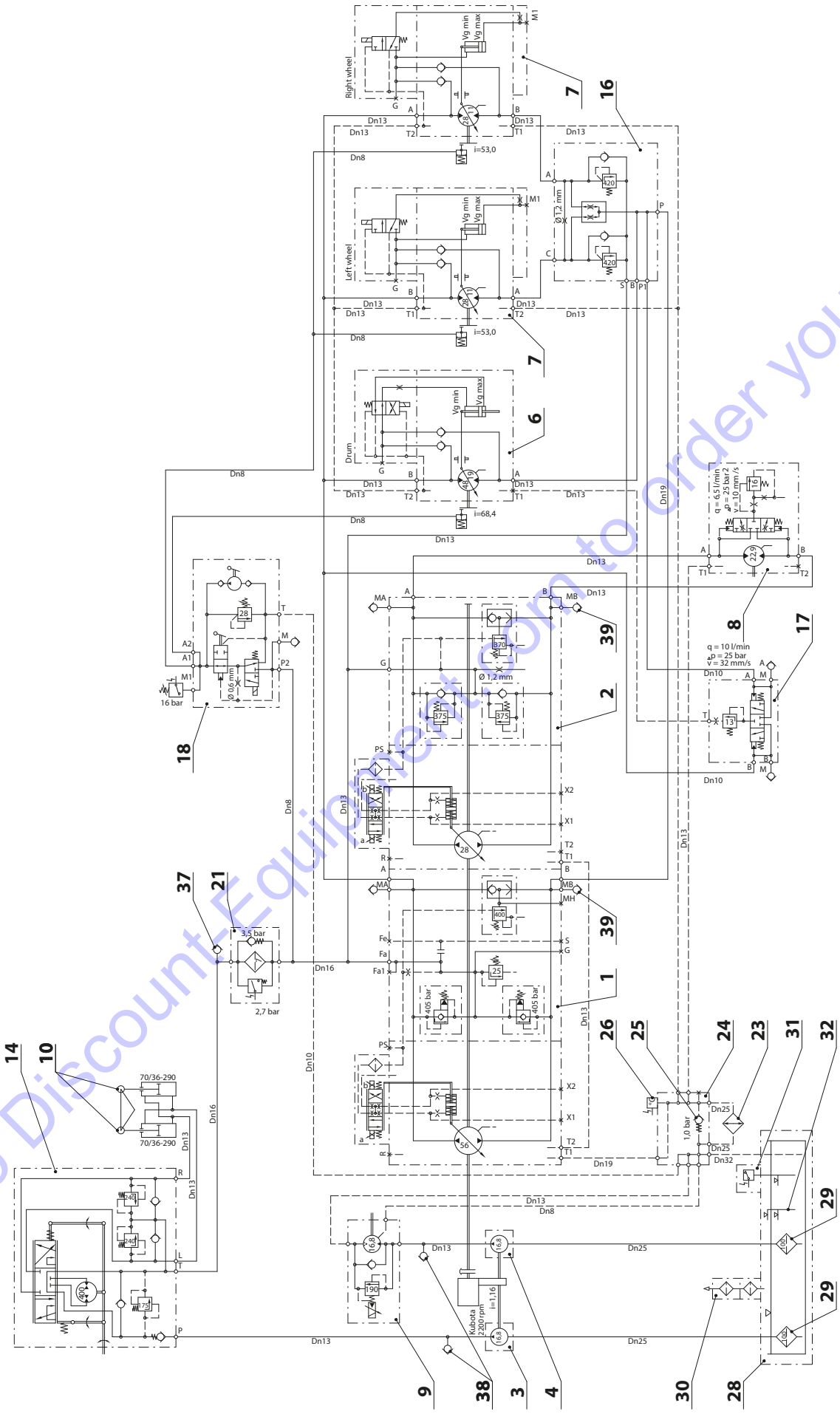
Hydraulic diagram – wheel lock

Legend:

1 Travel pump
2 Vibration pump
3 Steering and refilling pump
4 Cooling pump
6 Drum travel hydraulic motor
7 Wheel travel hydraulic motor
8 Vibration hydraulic motor
9 Cooling hydraulic motor
10 Steering hydraulic motor
14 Power steering
16 Flow divider block
17 Flushing block
18 Brake block
21 Hydraulic filter
23 Cooler
24 Return block
25 One-way valve (check valve)
26 Hydraulic oil temperature sensor
28 Hydraulic tank
29 Suction strainer
30 Filler neck
31 Level indicator
32 Oil level gauge
37 Filling quick coupler
38 Measuring quick coupler
39 Measuring quick coupler



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Hydraulic diagram – ATC inter-axle lock

Legend:

1 Travel pump
2 Vibration pump
3 Steering and refilling pump
4 Cooling pump
6 Drum travel hydraulic motor
7 Wheel travel hydraulic motor
8 Vibration hydraulic motor
9 Cooling hydraulic motor
10 Steering hydraulic motor
14 Power steering
16 Flow divider block
17 Flushing block and RTM control
18 Brake block
21 Hydraulic filter
23 Cooler
24 Return block
25 One-way valve (check valve)
26 Hydraulic oil temperature sensor
28 Hydraulic tank
29 Suction strainer
30 Filler neck
31 Level indicator
32 Oil level gauge
37 Filling quick coupler
38 Measuring quick coupler
39 Measuring quick coupler

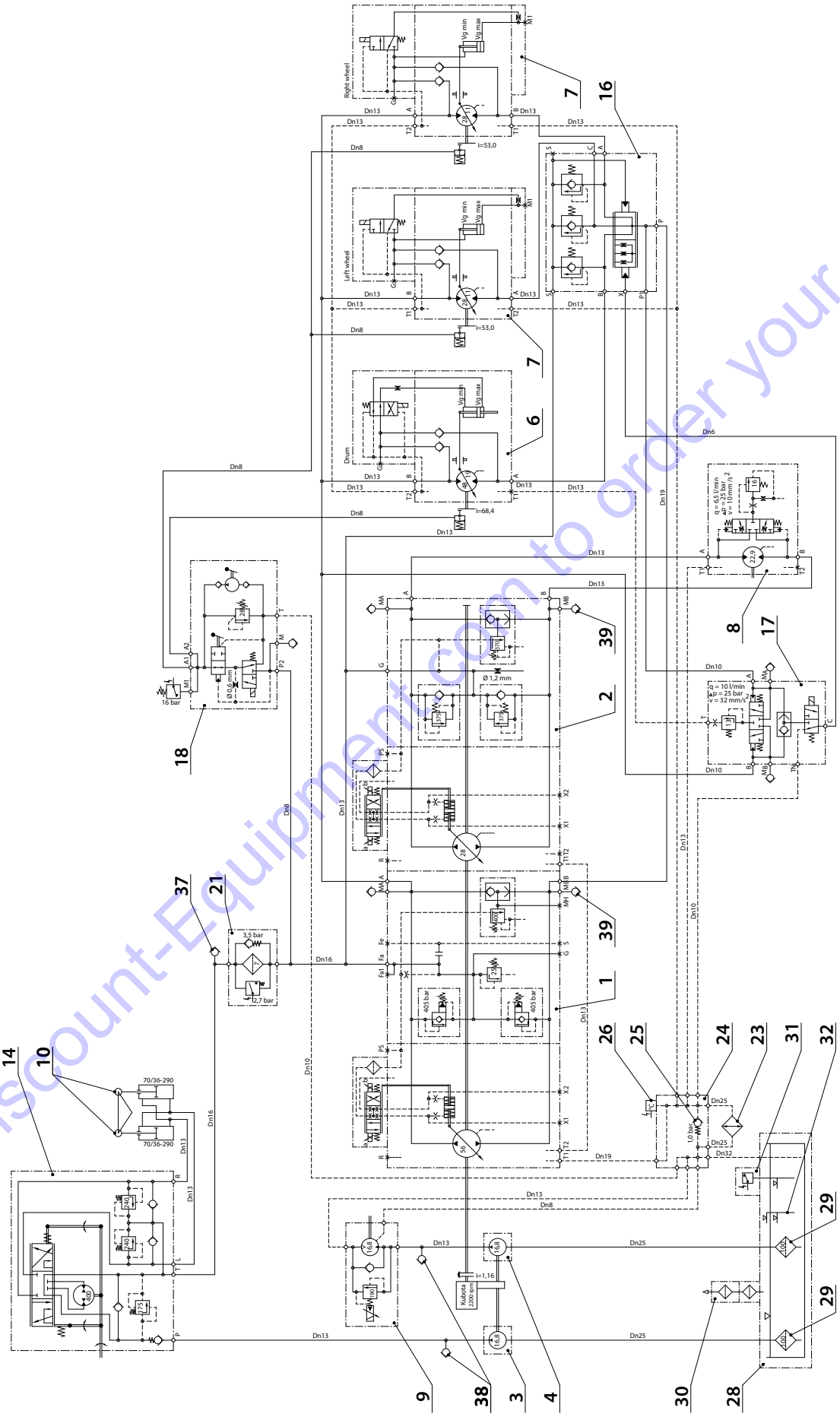

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Table of spare parts

Chapter	Spare part	Order number
Every 20 hours of operation (daily)		
3.6.6	Dust valve	1-952454
Every 250 hours of operation (every 3 months)		
3.6.12	Fan	1510573
Every 500 hours of operation (6 months)		
3.6.20	Fuel filter	1536168
3.6.20	Fuel filter	1536169
3.6.23	Oil filter	1536674
3.6.24	Air filter	1542159
3.6.24	Air filter	1542180
3.6.26	Air-conditioning filte	4-32925
Every 1000 hours of operation (1 year)		
3.6.28	Air filter cartridge (external)	54-5970026112
3.6.28	Air filter cartridge (internal)	54-5523126150
3.6.28	Dust valve	1-952454
3.6.29	Rubber metal element	4-9200000030
3.6.29	Rubber metal element	1402721
3.6.29	Rubber metal element	1403130
3.6.29	Rubber metal element	1515888
Every 2000 hours of operation (2 years)		
3.6.39	Sealing tape	4-5422250006
3.6.39	Hydraulic oil filter	4-5358520121
3.6.39	Hydraulic unit 230 V	1251998
3.6.39	Hydraulic unit 110 V	1255297
3.6.39	Temperature sensor	1234999
3.6.39	Ventilation filter	1405919
Maintenance as required		
3.6.41	Gas strut	1520574

Content of the set of filters after 500 operating hours (4-760236)

Chapter	Spare part	Number of parts	Order number
3.6.20	Fuel filter	1	1536168
3.6.20	Fuel filter	1	1536169
3.6.23	Oil filter	1	1536674
3.6.24	Air filter	1	1542159
3.6.24	Air filter	1	1542180
3.6.26	Air-conditioning filte	1	4-32925

Content of the set of filters after 1000 operating hours (4-760237)

Chapter	Spare part	Number of parts	Order number
3.6.20	Fuel filter	1	1536168
3.6.20	Fuel filter	1	1536169
3.6.23	Oil filter	1	1536674
3.6.24	Air filter	1	1542159
3.6.24	Air filter	1	1542180
3.6.26	Air-conditioning filte	1	4-32925
3.6.28	Air filter cartridge (external)	1	54-5970026112
3.6.28	Air filter cartridge (internal)	1	54-5523126150

Content of the set of filters after 2000 operating hours (4-760238)

Chapter	Spare part	Number of parts	Order number
3.6.20	Fuel filter	1	1536168
3.6.20	Fuel filter	1	1536169
3.6.23	Oil filter	1	1536674
3.6.24	Air filter	1	1542159
3.6.24	Air filter	1	1542180
3.6.26	Air-conditioning filte	1	4-32925
3.6.28	Air filter cartridge (external)	1	54-5970026112
3.6.28	Air filter cartridge (internal)	1	54-5523126150
3.6.39	Ventilation filter	1	1405919
3.6.39	Hydraulic oil filter	1	4-5358520121

PARTS FINDER

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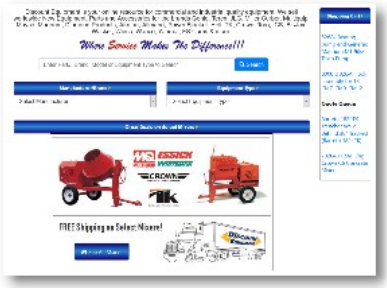

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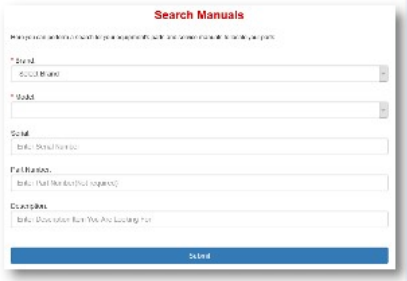

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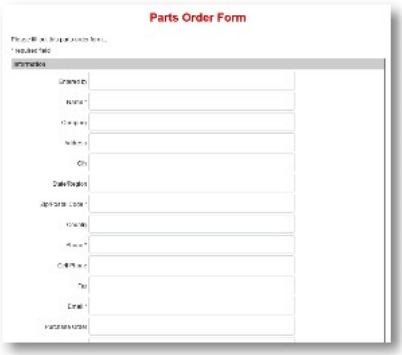

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