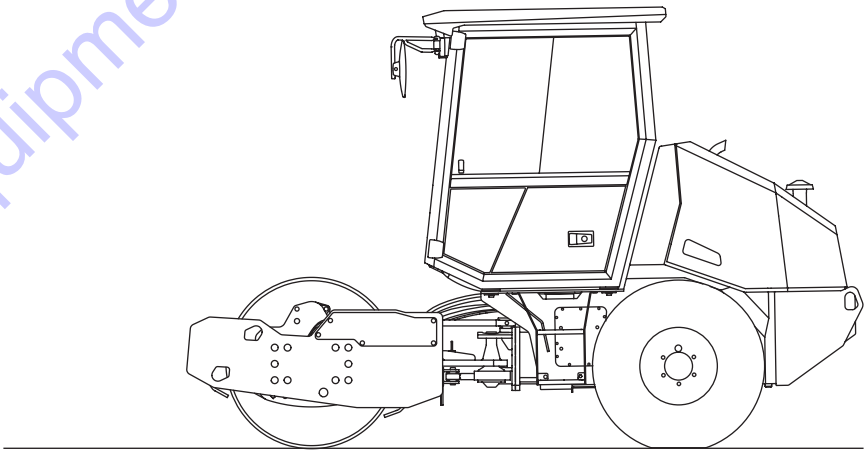
# ARS 50

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





# OPERATING INSTRUCTIONS

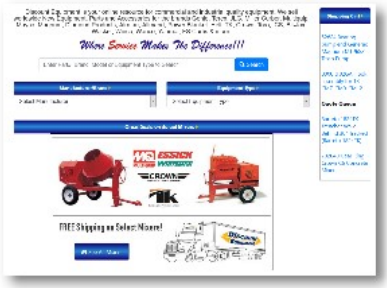
EDITION 10/2024 EN
Product Identification Number 3096872 -

AMMANN

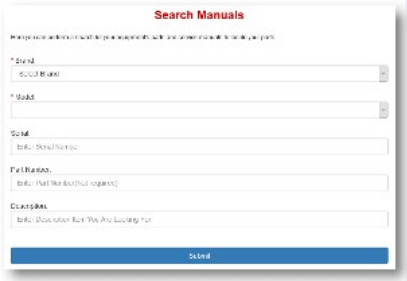
# PARTS FINDER

**Search Website by Part Number**

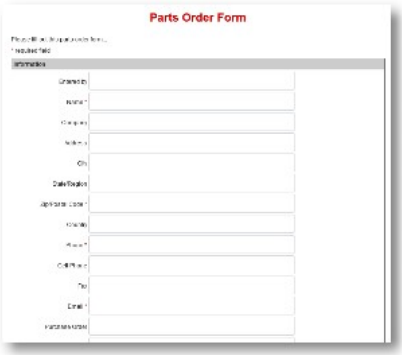
Discount Equipment



**Search Manual Library For Parts Manual & Lookup Part Numbers – Purchase or Request Quote**




**Can't Find Part or Manual? Request Help by Manufacturer, Model & Description**




**Discount-Equipment.com is your online resource for quality parts & equipment.**

Florida: 561-964-4949 Outside Florida TOLL FREE: 877-690-3101

## Need parts?

Click on this link: http://www.discount-equipment.com/category/5443-parts/ and choose one of the options to help get the right parts and equipment you are looking for. Please have the machine model and serial number available in order to help us get you the correct parts. If you don't find the part on the website or on one of the online manuals, please fill out the request form and one of our experienced staff members will get back to you with a quote for the right part that your machine needs.

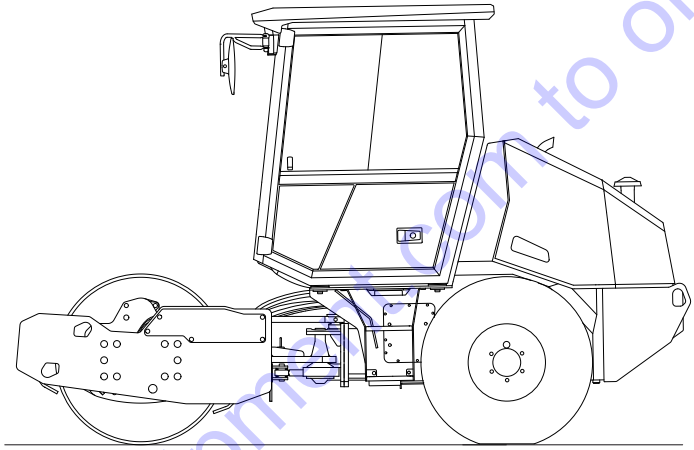
We sell worldwide for the brands: Genie, Terex, JLG, MultiQuip, Mikasa, Essick, Whiteman, Mayco, Toro Stone, Diamond Products, Generac Magnum, Airman, Haulotte, Barreto, Power Blanket, Nifty Lift, Atlas Copco, Chicago Pneumatic, Allmand, Miller Curber, Skyjack, Lull, Skytrak, Tsurumi, Husquvarna Target, Stow, Wacker, Sakai, Mi-T-M, Sullair, Basic, Dynapac, MBW, Weber, Bartell, Bennar Newman, Haulotte, Ditch Runner, Menegotti, Morrison, Contec, Buddy, Crown, Edco, Wyco, Bomag, Laymor, EZ Trench, Bil-Jax, F.S. Curtis, Gehl Pavers, Heli, Honda, ICS/PowerGrit, IHI, Partner, Imer, Clipper, MMD, Koshin, Rice, CH&E, General Equipment ,Amida, Coleman, NAC, Gradall, Square Shooter, Kent, Stanley, Tamco, Toku, Hatz, Kohler, Robin, Wisconsin, Northrock, Oztec, Toker TK, Rol-Air, APT, Wylie, Ingersoll Rand / Doosan, Innovatech, Con X, Ammann, Mecalac, Makinex, Smith Surface Prep,Small Line, Wanco, Yanmar

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

With kind regards,

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

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



**233001**

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

**These operating instructions consists of:**

I. Specification manual

II. Operating manual

III. Maintenance manual

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

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

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

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

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

## Preface

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

Ammann Czech Republic s. r. o. 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:

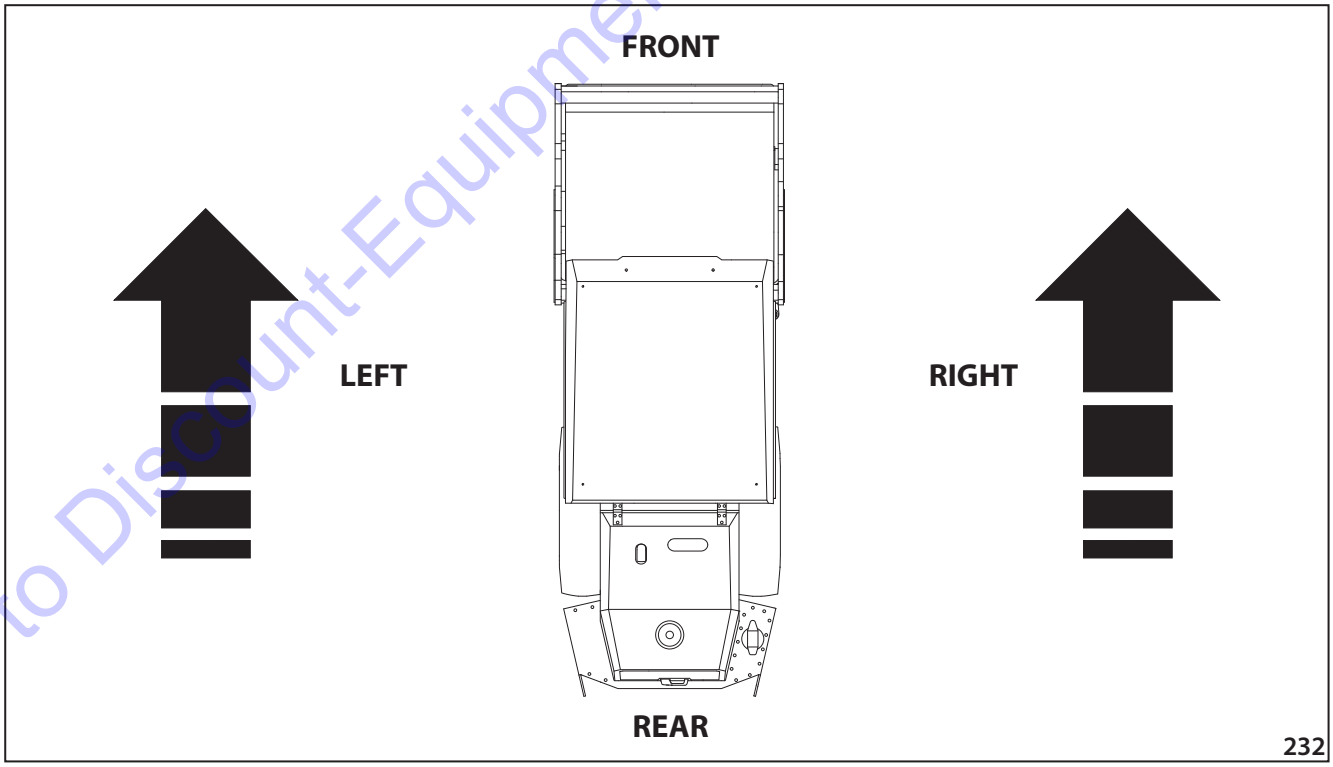
**The notice warns of a serious risk of personal injury or other personal hazards.**

**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 50
# (Kubota Tier 4 Final)

# 1.1 Basic data

## Machine description

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

## Specification of the expected use of the machine

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

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

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

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

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

Machine type

.....

Product Identification Number

.....

Year of manufacture

.....

Engine type

.....

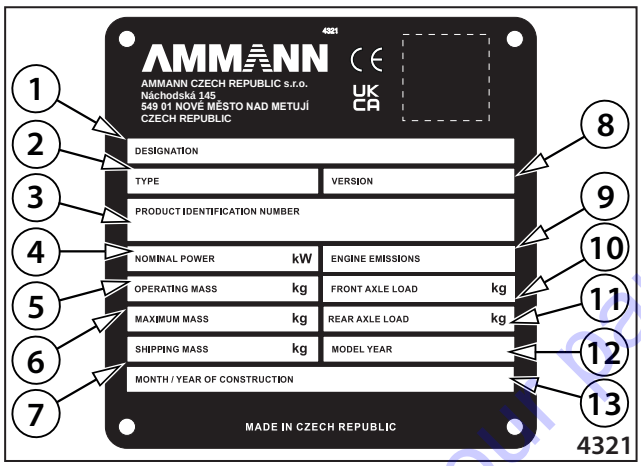
Serial number of the engine

.....

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

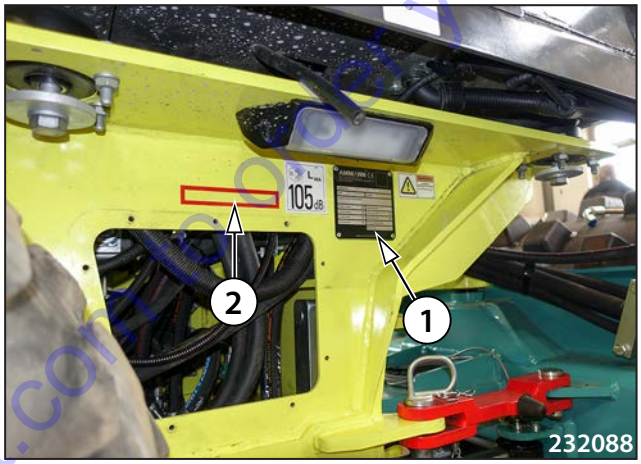
The machine that complies with the health and safety requirements is provided with a nameplate with CE marking.

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

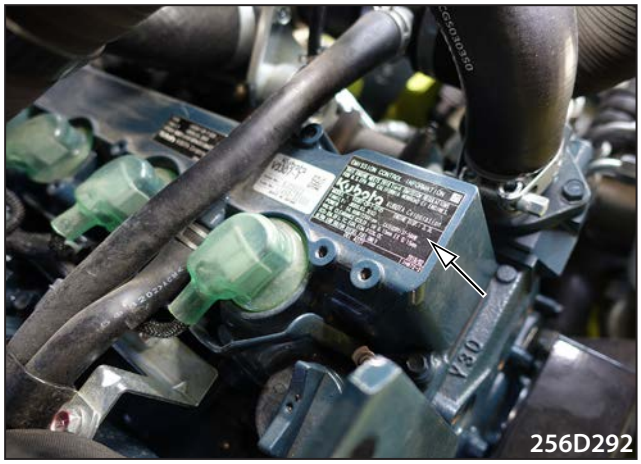



Nameplate position

1. Nameplate
2. Machine frame number

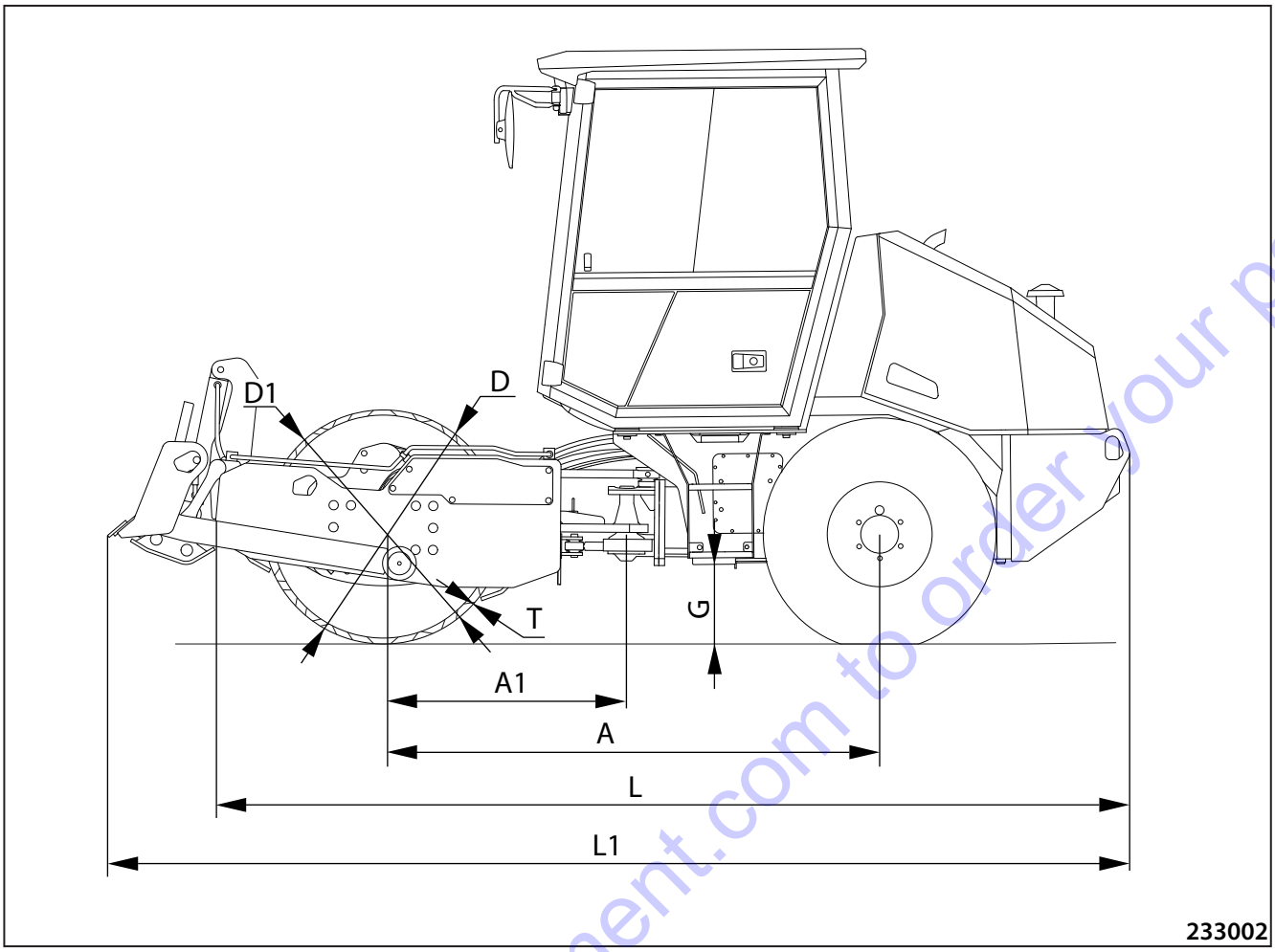



Engine nameplate position



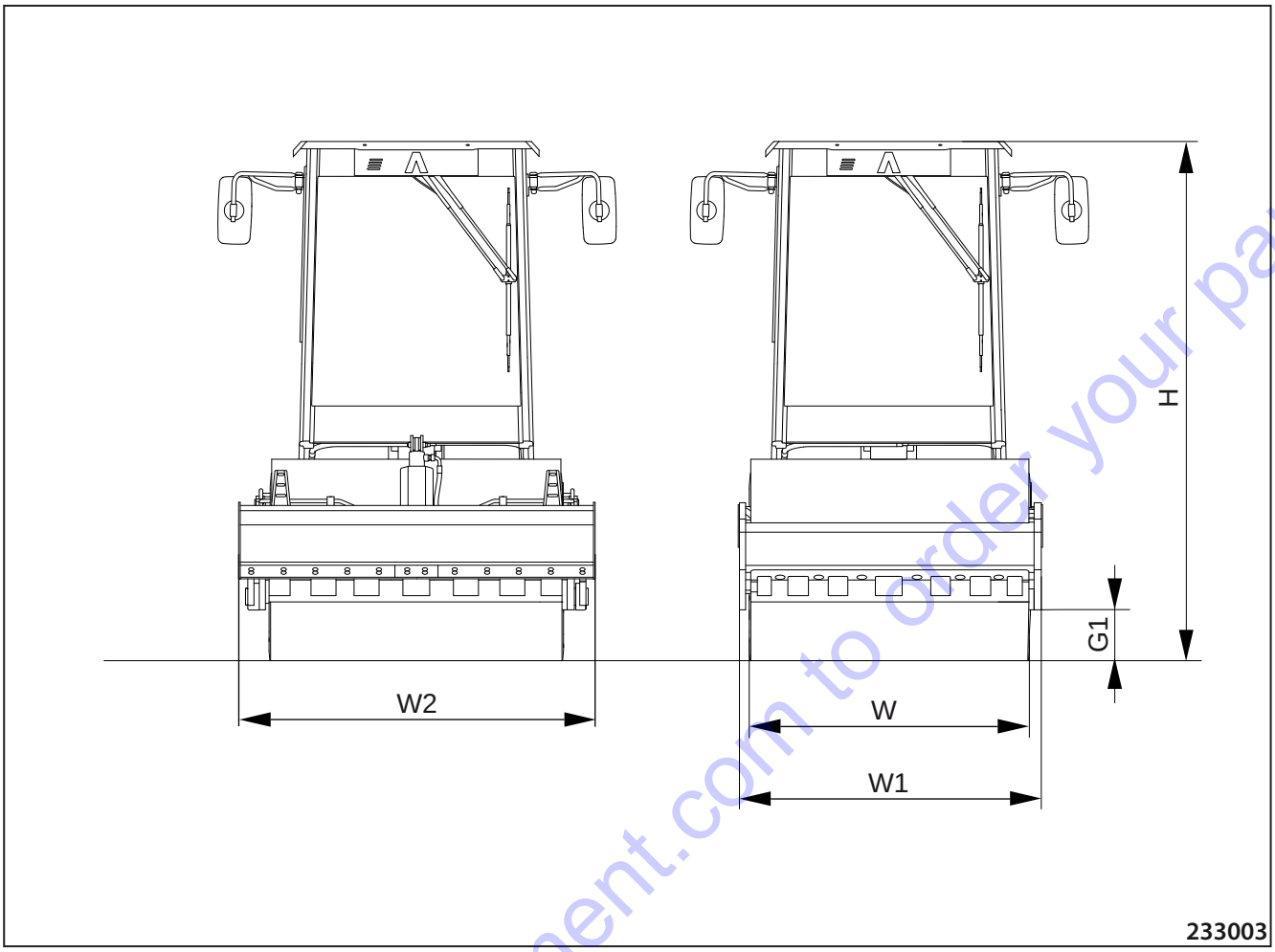
## 1.2 Dimensioned drawing of the machine

**Dimensional drawing of the machine ARS 50**




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

**Dimensional drawing of the machine ARS 50**




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

## 1.3 Technical data

| | | ARS 50 | | | |
|---|---|---|---|---|---|
| | | EU Stage V / U.S. EPA / CARB Tier 4 | | | |
| | | D | PD | HXD | HXPD |
| **Weight** | | | | | |
| Operating weight EN 500-1+A1 (CECE) with ROPS cab | kg (lb) | 4190 (9240) | 4200 (9260) | 4250 (9370) | 4260 (9390) |
| Operating weight EN500-1+A1 (CECE) with ROPS platform | kg (lb) | 4070 (8970) | 4080 (8990) | 4130 (9110) | 4140 (9130) |
| Operating load EN500-1+A1 (CECE) with ROPS cab on front axis | kg (lb) | 2250 (4960) | 2260 (4980) | 2310 (5090) | 2320 (5110) |
| Operating load EN500-1+A1 (CECE) with ROPS cab on rear axle | kg (lb) | 1940 (4280) | 1940 (4280) | 1940 (4280) | 1940 (4280) |
| Weight of half fluid capacities | kg (lb) | 40 (90) | 40 (90) | 40 (90) | 40 (90) |
| Operating weight ISO 6016 with ROPS cab | kg (lb) | 4230 (9330) | 4240 (9350) | 4290 (9460) | 4300 (9480) |
| Maximum weight with ROPS cab, accessories, added weight | kg (lb) | 4450 (9810) | 5240 (11550) | 4290 (9460) | 5300 (11680) |
| Maximum permitted weight according to ROPS | kg (lb) | 5500 (12130) | 5500 (12130) | 5500 (12130) | 5500 (12130) |
| Static linear load of front drum | kg/cm (lb/in) | 16,07 | - | 16,50 | - |
| Weight of blade | kg (lb) | 250 (550) | 250 (550) | - | 250 (550) |
| Weight of 3 smooth drums | kg (lb) | - | 530 (1170) | - | 530 (1170) |
| Weight of tyre filling (only for BKT IMPLEMENT-AS 504) | kg (lb) | 220 (490) | 220 | 0 | 220 |
| Deduction for the transport weight to the EN 500-1+A1 (CECE) operating weight. | kg (lb) | 110 (240) | 110 (240) | 110 (240) | 110 (240) |
| **Driving characteristics** | | | | | |
| Number of speeds | - | 1 | 1 | 1 | 1 |
| Working speed | km/h (MPH) | 9,5 (5,9) | 9,5 (5,9) | 7,6 (4,7) | 7,6 (4,7) |
| Maximum speed | km/h (MPH) | 12 (7,5) | 12 (7,5) | 9,6 (6) | 9,6 (6) |
| Climbing ability | % | 40 | 40 | 45 | 45 |
| Climbing ability with vibration | % | 30 | 30 | 35 | 35 |
| Lateral static stability | % | 46 | 44 | 46 | 44 |
| Lateral stability during driving without vibration | % | 25 | 25 | 25 | 25 |
| Lateral stability during driving with vibration | % | 15 | 15 | 15 | 15 |
| Maximum gradient when towing machine on slope | % | 60 | 60 | 60 | 60 |
| Turning radius inner (edge) | mm (in) | 3270 (128,7) | 3270 (128,7) | 3270 (128,7) | 3270 (128,7) |
| Turning radius outer (contour) | mm (in) | 4800 (189) | 4800 (189) | 4800 (189) | 4800 (189) |
| Front approach slope | % | 90 | 90 | 90 | 90 |
| Rear approach slope | % | 80 | 80 | 80 | 80 |
| Type of drive | - | Hydrostatic | 0 | Hydrostatic | Hydrostatic |
| Number of driving axles | - | 2 | 2 | 2 | 2 |
| Oscillation angle | ° | ± 10 | ± 10 | ± 10 | ± 10 |
| Angle of steering | ° | ± 30 | ± 30 | ± 30 | ± 30 |

| | | ARS 50 | | | |
|---|---|---|---|---|---|
| | | EU Stage V / U.S. EPA / CARB Tier 4 | | | |
| | | D | PD | HXD | HXPD |
| **Steering** | | | | | |
| Type of steering | - | Joint | Joint | Joint | Joint |
| Steering control | - | Hydraulic | Hydraulic | Hydraulic | Hydraulic |
| Linear hydraulic motors | - | 1 | 1 | 1 | 1 |
| **Engine** | | | | | |
| Manufacturer | - | Kubota | Kubota | Kubota | Kubota |
| Type | - | V2403-CR-TE5B | V2403-CR-TE5B | V2403-CR-TE5B | V2403-CR-TE5B |
| Power according to SAE J1995 | kW (HP) | 43,2 (58) | 43,2 (58) | 43,2 (58) | 43,2 (58) |
| Number of cylinders | - | 4 | 4 | 4 | 4 |
| Cylinder capacity | $cm^3$ (cu in) | 2434 (149) | 2434 (149) | 2434 (149) | 2434 (149) |
| Nominal speed | $min^{-1}$ (RPM) | 2400 | 2400 | 2400 | 2400 |
| Maximum torque | Nm/rpm | 198,5 / 1500 | 198,5 / 1500 | 198,5 / 1500 | 198,5 / 1500 |
| Average fuel consumption | l/h (gal US/h) | 5,4 (1,4) | 5,4 (1,4) | 5,4 (1,4) | 5,4 (1,4) |
| Engines complies with emission regulations | - | EU Stage V, U.S. EPA 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 |
| Maximum permitted speed during engine braking | $min^{-1}$ (RPM) | 2600 | 2600 | 2600 | 2600 |
| **Axle** | | | | | |
| Maximum tyre pressure | MPa (PSI) | 0,6 (87) | 0,35 (50,8) | 0,6 (87) | 0,35 (50,8) |
| Pattern of tyres | - | ASCENSO EXB 380 8.25 – 20 | BKT IMPLE-MENT-AS 504 | ASCENSO EXB 380 8.25 – 20 | BKT IMPLE-MENT-AS 504 |
| Number of tyres | - | 2 | 2 | 2 | 2 |
| Number of rear wheels | - | 2 | 2 | 2 | 2 |
| Size of tyres | - | 8,25-20 | 12,5/80-18 | 8,25-20 | 12,5/80-18 |
| Type of tyres | - | Tube type | Tubeless | Tube type | Tubeless |
| Number of pads (only PD version) | - | - | 63 | - | 63 |
| Pad contact surface (only PD version) | $cm^2$ (sq in) | - | 75 (11,6) | - | 75 (11,6) |
| Pad height (only PD version) | mm (in) | - | 60 (2,4) | - | 60 (2,4) |
| **Brakes** | | | | | |
| Operating | - | Hydrostatic | Hydrostatic | Hydrostatic | Hydrostatic |
| Parking | - | Multiple-disc spring brake | Multiple-disc spring brake | Multiple-disc spring brake | Multiple-disc spring brake |
| Emergency | - | Multiple-disc spring brake | Multiple-disc spring brake | Multiple-disc spring brake | Multiple-disc spring brake |
| **Vibration** | | | | | |
| Frequency I | Hz (VPM) | 29 (1740) | 29 (1740) | 29 (1740) | 29 (1740) |
| Frequency II | Hz (VPM) | 37 (2220) | 37 (2220) | 37 (2220) | 37 (2220) |
| Amplitude I | mm (in) | 1,6 (0,06) | 1,5 (0,06) | 1,6 (0,06) | 1,5 (0,06) |
| Centrifugal force I | kN | 53 | 53 | 53 | 53 |
| Centrifugal force II | kN | 85 | 85 | 85 | 85 |
| Type of drive | - | Hydrostatic | 0 | Hydrostatic | Hydrostatic |

## 1.3 Technical data

| | | ARS 50 | | | |
|---|---|---|---|---|---|
| | | EU Stage V / U.S. EPA / CARB Tier 4 | | | |
| | | D | PD | HXD | HXPD |
| **Fluid capacities** | | | | | |
| Fuel | l (gal US) | 98 (25,9) | 98 (25,9) | 98 (25,9) | 98 (25,9) |
| Engine (oil filling) | l (gal US) | 9,5 (2,5) | 9,5 (2,5) | 9,5 (2,5) | 9,5 (2,5) |
| Cooling system | l (gal US) | 13 (3,4) | 13 (3,4) | 13 (3,4) | 13 (3,4) |
| Hydraulic system | l (gal US) | 45 (11,9) | 45 (11,9) | 45 (11,9) | 45 (11,9) |
| Washer tank | l (gal US) | 2,5 (0,7) | 2,5 (0,7) | 2,5 (0,7) | 2,5 (0,7) |
| **Wiring** | | | | | |
| Voltage | V | - | - | 12 | 12 |
| Battery capacity | Ah | - | - | 90 | 90 |
| **Noise and vibration emissions** | | | | | |
| Measured sound power level A, $L_{pA}$ at the operator's position (cab) * | dB | 80 | 80 | 80 | 80 |
| Uncertainty $K_{pA}$ * | dB | 2 | 2 | 2 | 2 |
| Guaranteed sound power level A, $L_{WA}$ ** | dB | 106 | 106 | 106 | 106 |
| Declared highest weighted effective value of vibration acceleration transmitted to the whole body (cab) *** | $m/s^2$ ($ft/s^2$) | <0,5 (<1,6) | <0,5 (<1,6) | <0,5 (<1,6) | <0,5 (<1,6) |
| Declared total value of vibration acceleration transmitted to hands (cab) *** | $m/s^2$ ($ft/s^2$) | <2,5 (<8,2) | <2,5 (<8,2) | <2,5 (<8,2) | <2,5 (<8,2) |

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

**Optional equipment**

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

# 2 OPERATING MANUAL

# ARS 50
# (Kubota Tier 4 Final)

### 2.1.1 Safety measures during machine operation

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

#### 2.1.1.1 Before compacting works are started

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

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

#### 2.1.1.2 Work in the dangerous area

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

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

#### 2.1.1.3 Ensurance of safety measures by the owner

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

### 2.1.1.4 Cab with integrated ROPS

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

## 2.1.2 Requirements for the driver´s qualification

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

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

  or

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

### 2.1.3 Driver's obligations

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

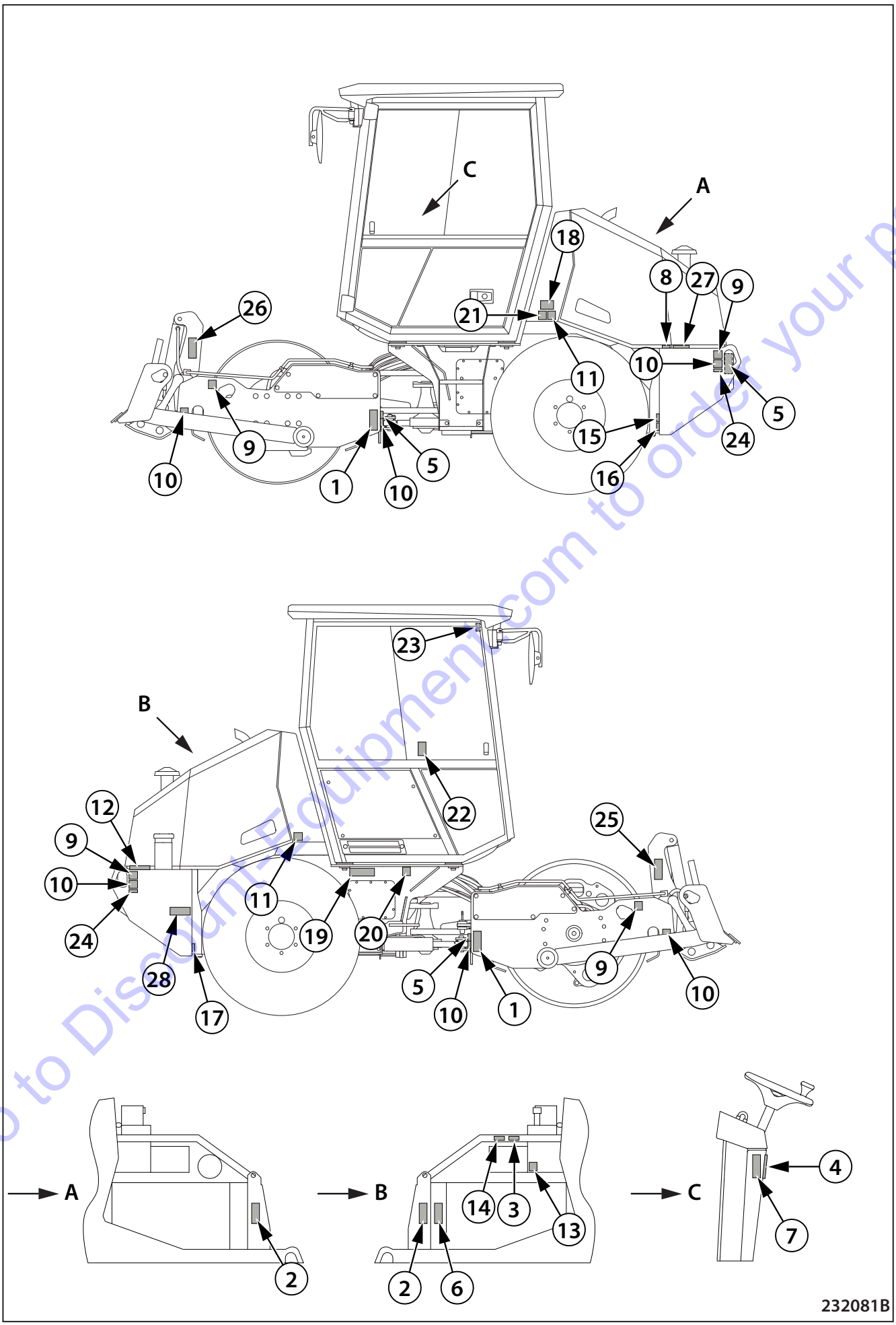
### 2.1.4 Forbidden activities – safety and guarantee

**The following is forbidden**

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

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

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



## 2.1.5 Safety notices and signs applied on the machine

| | | | |
|---|---|---|---|
| 1 | Risk of pressing |  4209bz | Keep a safe distance from the machine, there is a danger of squeezing by the machine between the front and rear frame. |
| 2 | Risk of injury |  4331bz | There is a risk of injury! Do not touch rotating parts while the engine is running. |
| 3 | Coolant |  4211bz | There is a risk of scalding Do not open the cap until the fluid cools down below 50 °C (122 °F). |
| 4 | Carry out adjustments calmly |  2584bz | Turn off the engine and remove the key from the ignition box before performing maintenance or repairs. |
| 5 | Dangerous area |  4210bz | Keep a safe distance from the machine. |
| 6 | Risk of burns |  2586bz | There is a risk of burns. Do not touch hot parts of the machine unless you make sure that they are sufficiently cold. |

7 Unplug the wiring


4119bz

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

8 Risk of explosion


3698bz

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

9 Suspension points


2153bz

Only use these points to lift the machine.

10 Sling points


3048bz

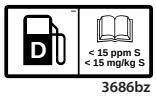
Tie-down the machine for transport at these points only. The maximum allowable force to fasten the machine to the vehicle using the rear lifting eyes is 1.5 t.

11 Tyre pressure

4213bz

4220bz

12 Refuelling

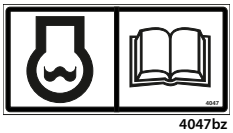


3686bz

13 Hydraulic oil level


2158bz

14 Coolant


4047bz

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

15 Coolant drain plug

3189bz

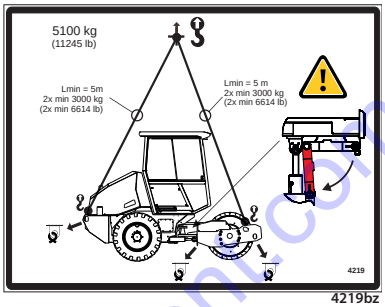
16 Engine oil drain plug

3212

17 Hydraulic oil drain plug

3960

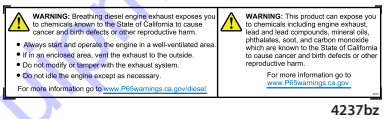
18 Suspension diagram




4219bz

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

19 California – Proposition 65 Warning



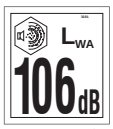

4237bz

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

When handling these substances, abide by relevant safety precautions.

For further information see www.p65warnings.ca.gov

20 Guaranteed sound power level




3191bz

21 Maximum machine height


4221bz

Pay attention when passing through areas with height limitations.

22 Emergency exit


2884bz

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

23 Ear protectors


2408bz

Use ear protectors when operating a machine without a cab.

24 Maximum load

4212bz

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

25 Risk of injury


3553bz

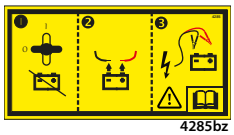
Before switching off the engine, lower the blade to the ground.

26 Securing the blade


4228bz

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

27 Charging the battery


4285bz

Risk of electric shock! Charge the battery according to the operating manual!

28 Ballasted tyres


4307bz

The tyres of the machine are ballasted with liquid. The sticker is only attached to machines with ballasted tyres. Read the operating manual!

29 Machine under repair

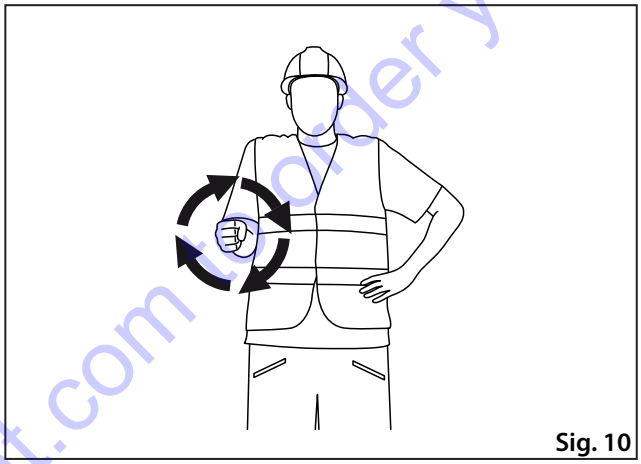

Do not start the engine! Hang the tag on the steering wheel. The tag is delivered together with machine accessories and should be kept in the document box.

### 2.1.6 Hand signals

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

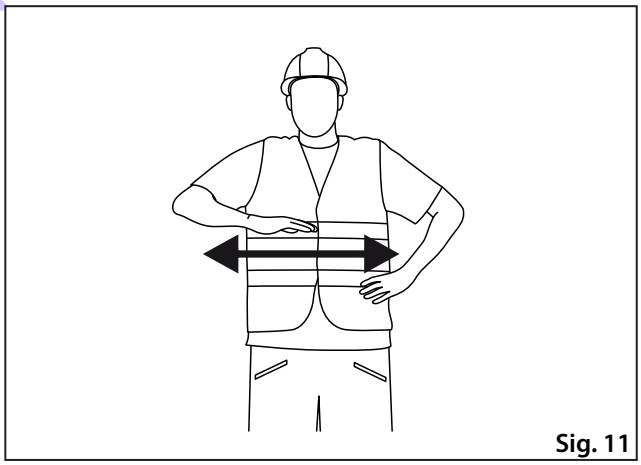
**EXAMPLES OF COMMUNICATION SIGNALS:**

**Engine start**



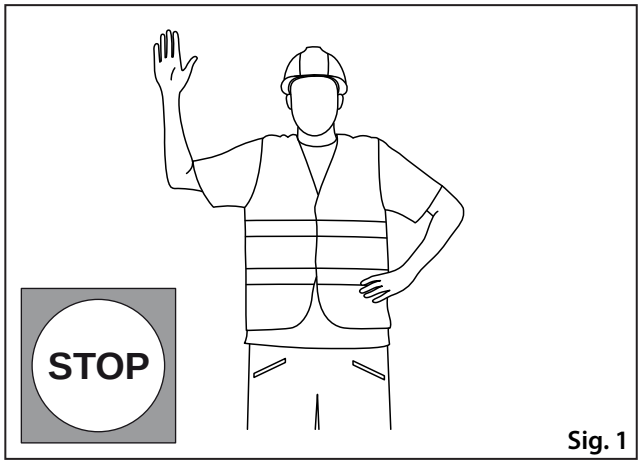
Sig. 10

**Engine shutdown**



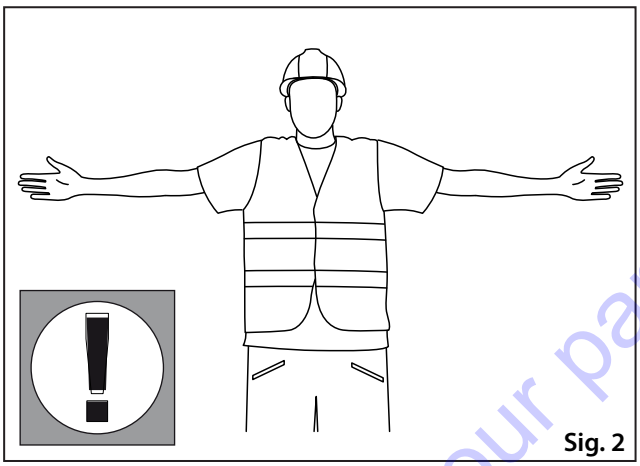
Sig. 11

**Stop**



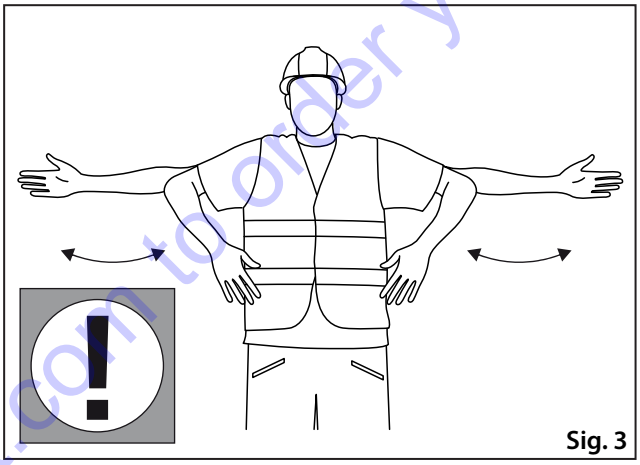

Sig. 1

**Watch out**



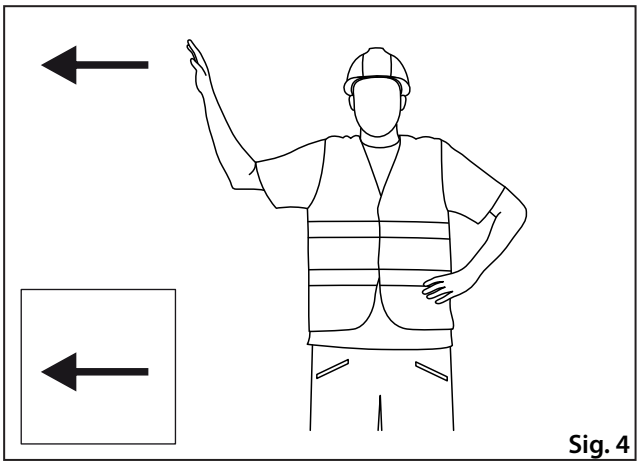
Sig. 2

**Watch out, danger**



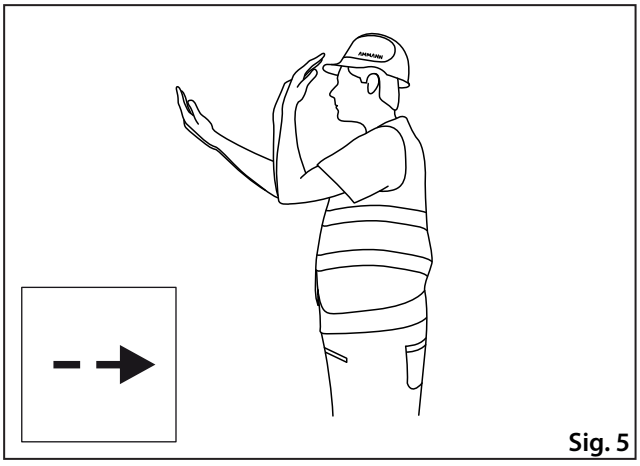
Sig. 3

**Travel**



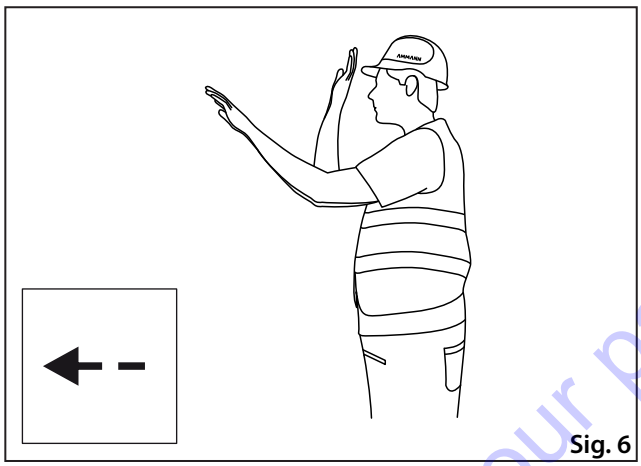
Sig. 4

**Slow forward travel – towards me**



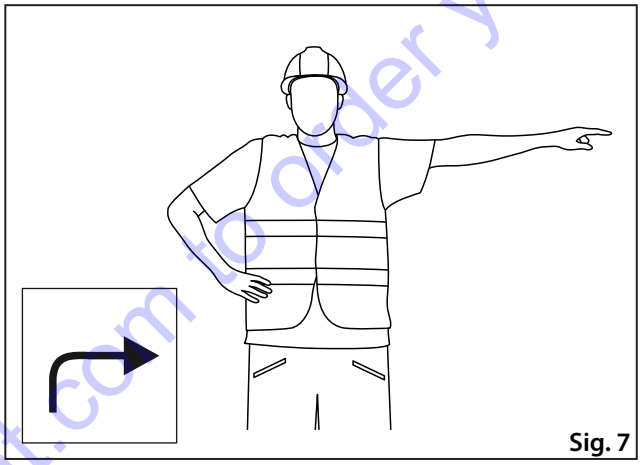
Sig. 5

**Slow reverse travel – away from me**



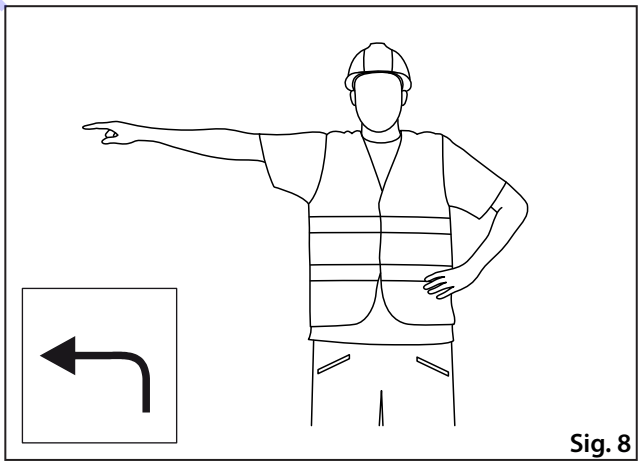
Sig. 6

**Drive to the right**



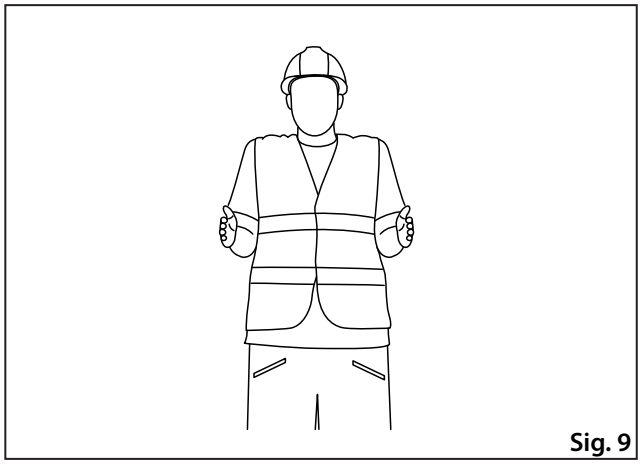
Sig. 7

**Drive to the left**



Sig. 8

**Short distance travel**



Sig. 9

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

### 2.2.1 Hygiene principles

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

  In particular we draw your attention to the following:

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

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

### 2.2.2 Environmental principles

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

  This category of waste products includes in particular:

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

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

  - Oils
  - Batteries
  - Tyres

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

## 2.3 Machine preservation and storage

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

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

**In addition:**

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

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

### 2.3.2 Preservation and storage for more than 2 months

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

In addition it is recommended to:

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

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

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

**Never start the engine during storage!**

### 2.3.3 Removal of preservation and inspection of the delivered machine

Check the machine according to transport documents.

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

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

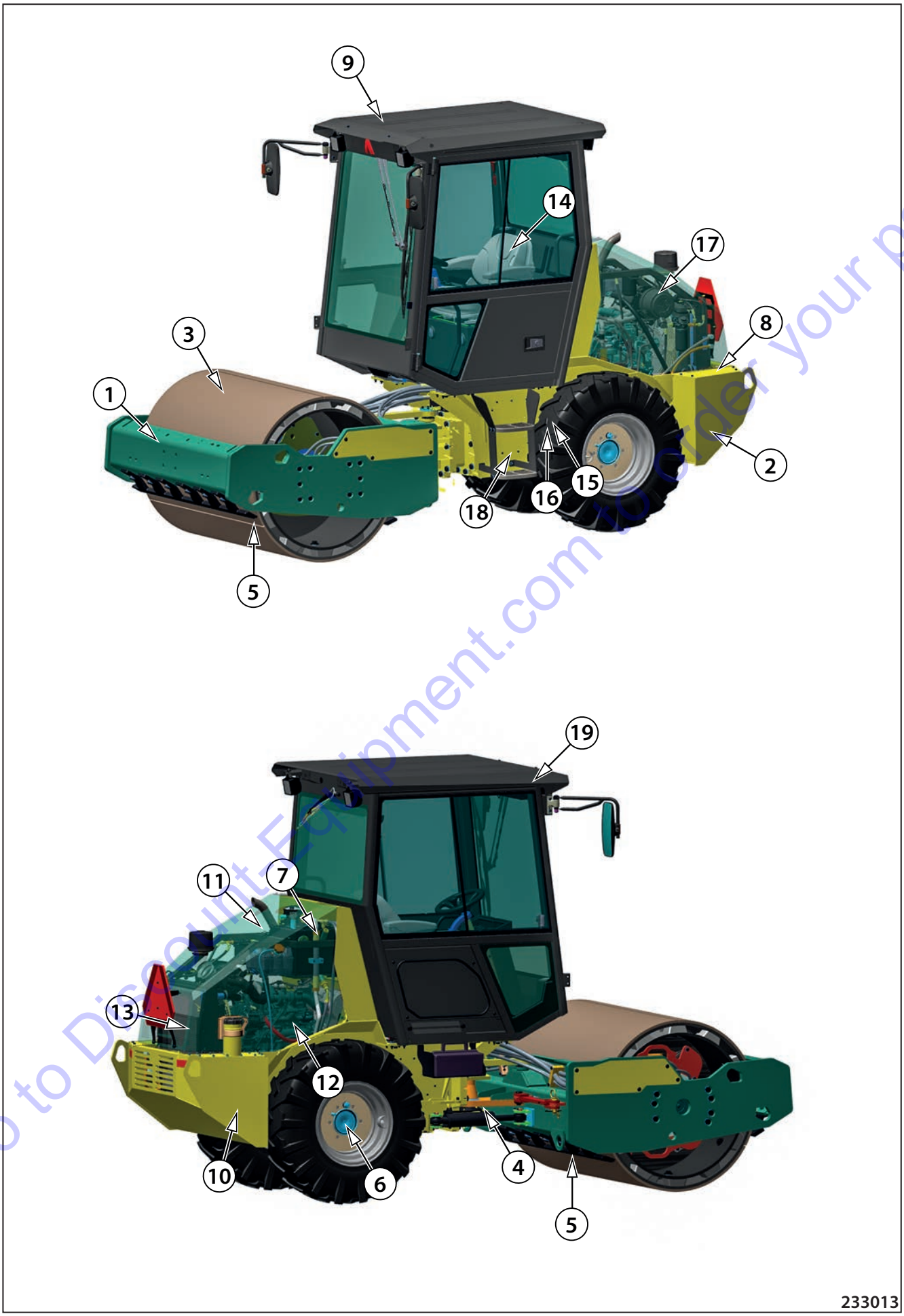
**Remove the preservation agents and wash the machine in places provided with intercepting sumps to trap the rinsing water as well as de-preservation agents.**

## 2.4 Machine disposal after its service life

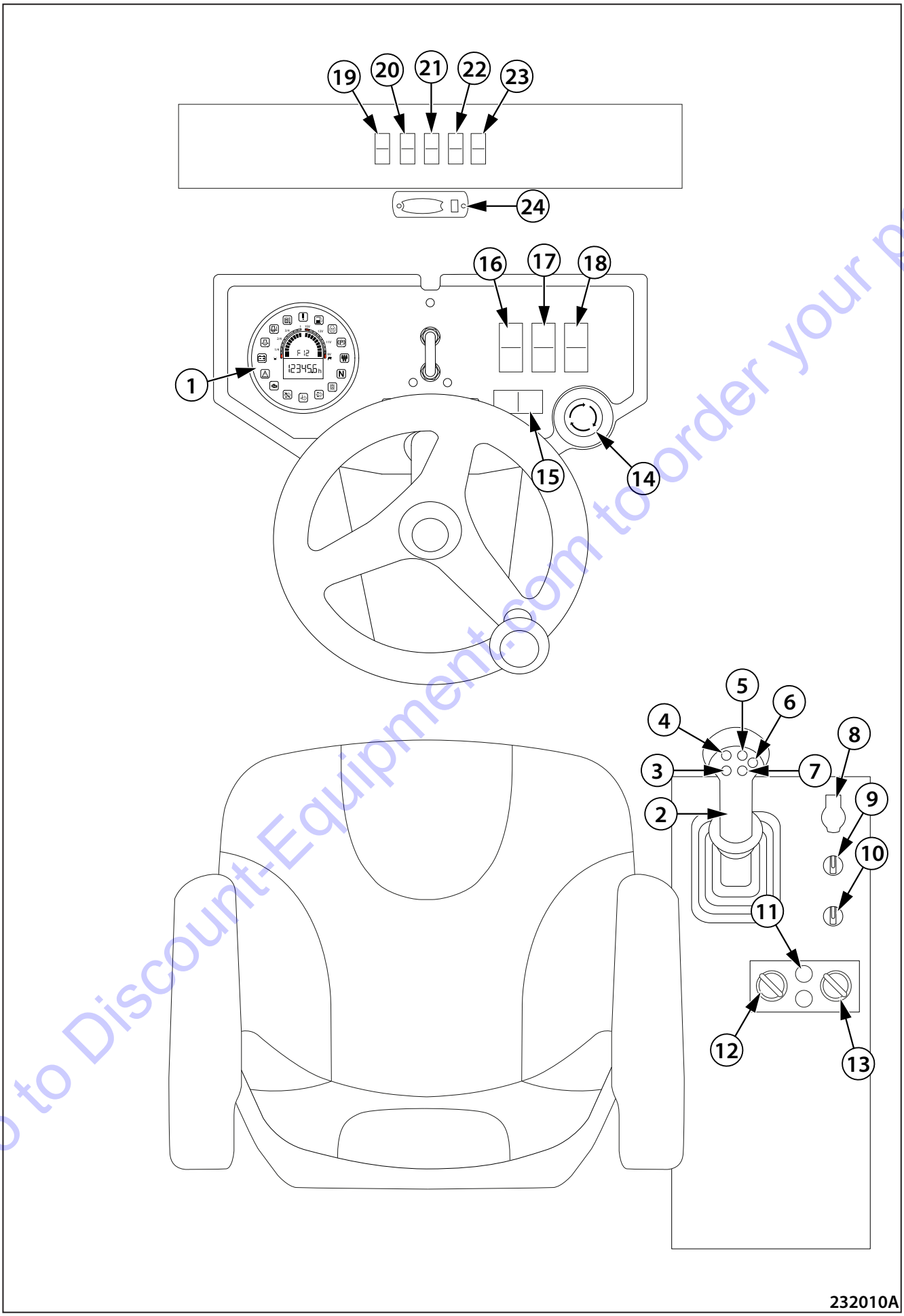
When disposing the machine following its service life, the user is obliged to follow national waste and environmental regulations and acts. In the above cases, we recommend you to always contact:

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

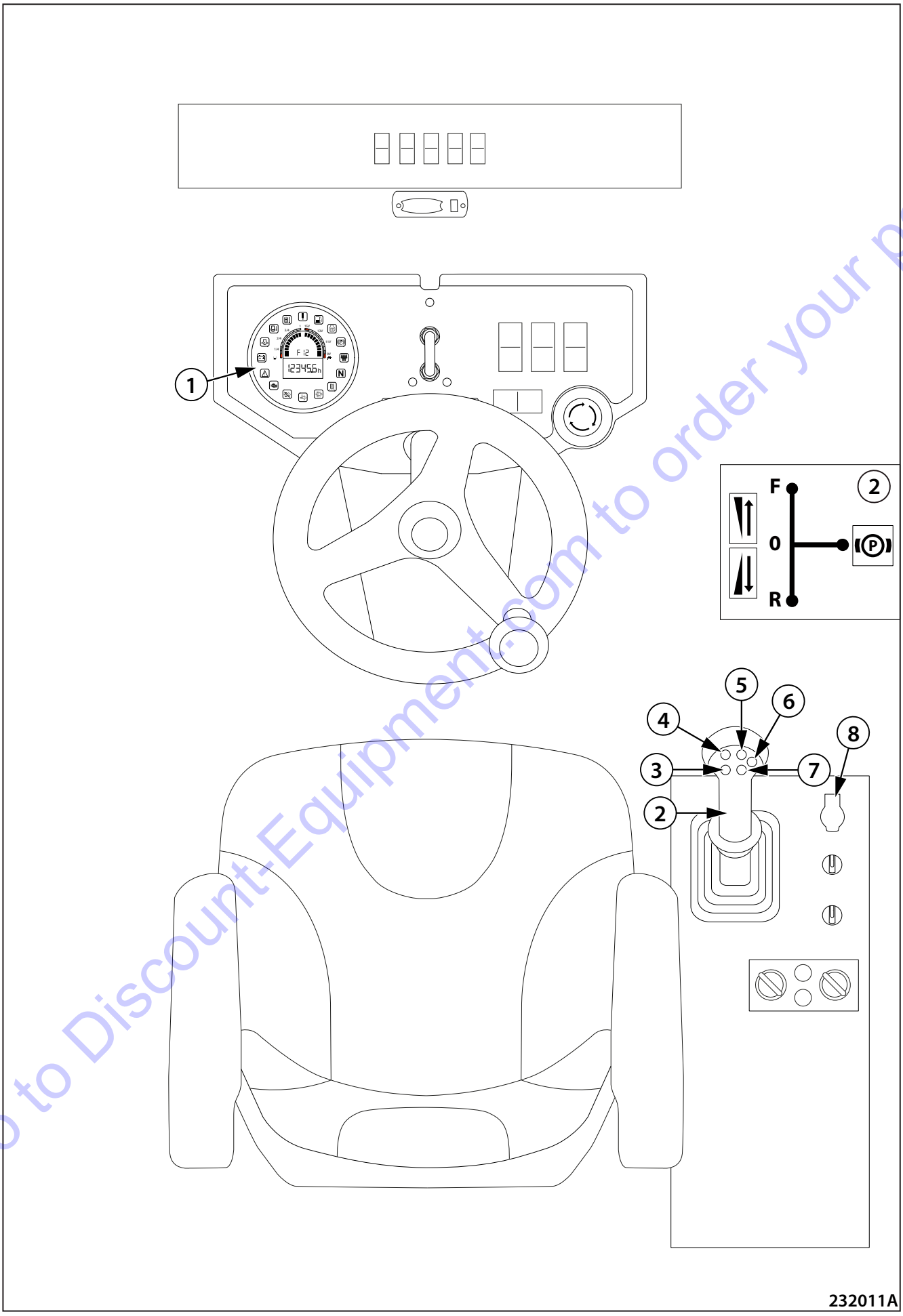
**The manufacturer shall not be responsible for damage to the health of users or environmental damage caused by the non-compliance with the above mentioned rules.**



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

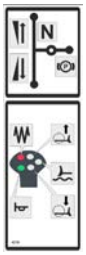


1. Display
2. Travel control
3. Warning horn button
4. Vibration button
5. Blade button – up (optional equipment)
6. Blade button – floating position (optional equipment)
7. Blade button – down (optional equipment)
8. Ignition box
9. Regeneration switch
10. Engine speed selector switch
11. Air-conditioning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



**Display (1)**

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




**Travel control (2)**

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

**Travel control positions:**

P – parking brake – parking brake of the machine enabled

0 – zero position – the machine is not braked

F – forward travel

R – reverse travel

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

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

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


**Warning horn button (3)**


**Vibration button (4)**

Press the button to turn on/off the function.

**It is forbidden to vibrate on the spot!**


**Blade button – up (5)**

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


**Blade button – floating position (6)**

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


**Blade button – down (7)**

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

**Ignition box (8)**

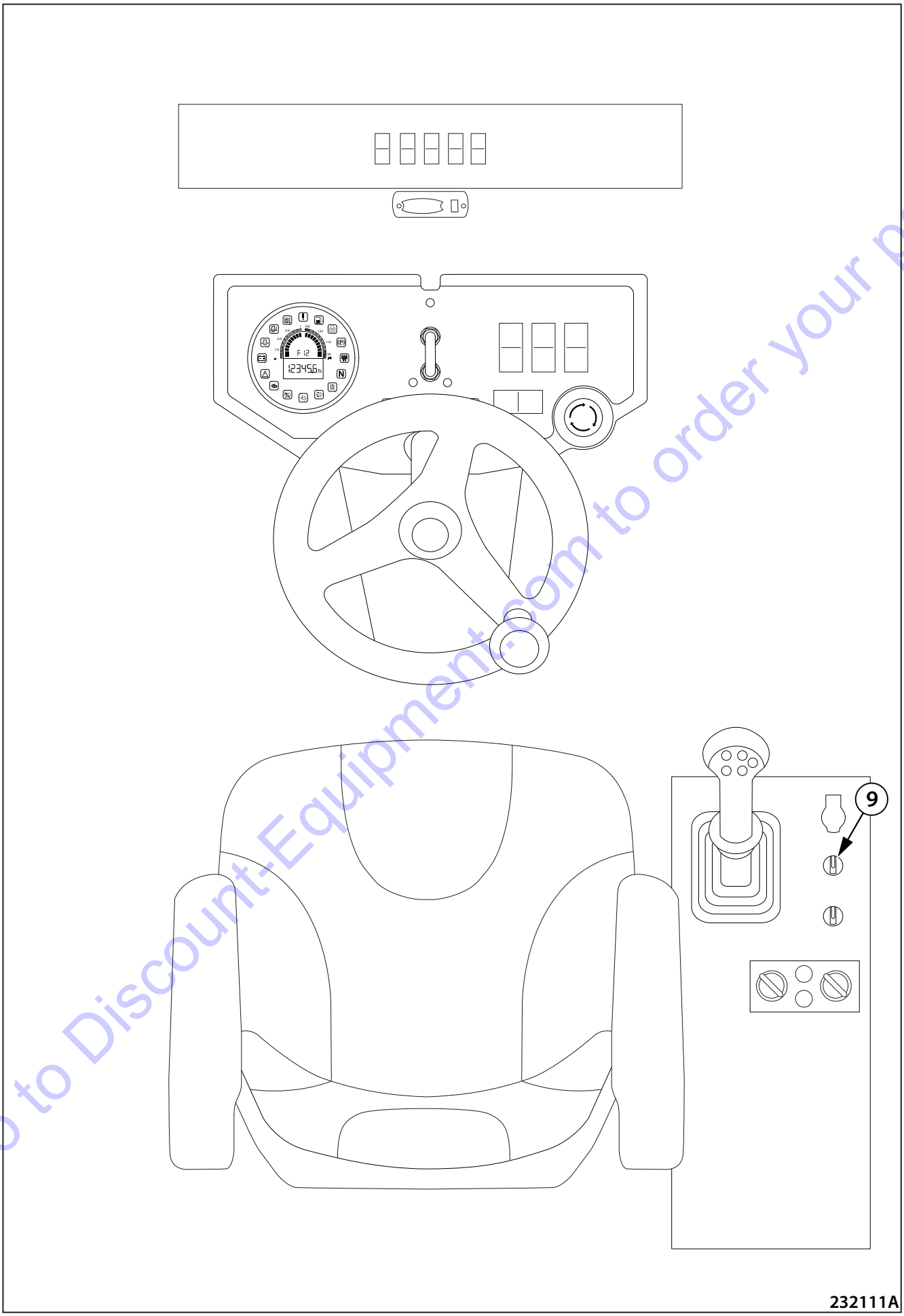
There are three positions "0-I-II" of the ignition box. The key can be inserted and removed in position "0" only.

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

The "I" position is used for connecting instruments.

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

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



**Regeneration switch (9)**

It is used for enabling the DPF regeneration.

Left position – regeneration OFF

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

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

**Centre position – AUTO**

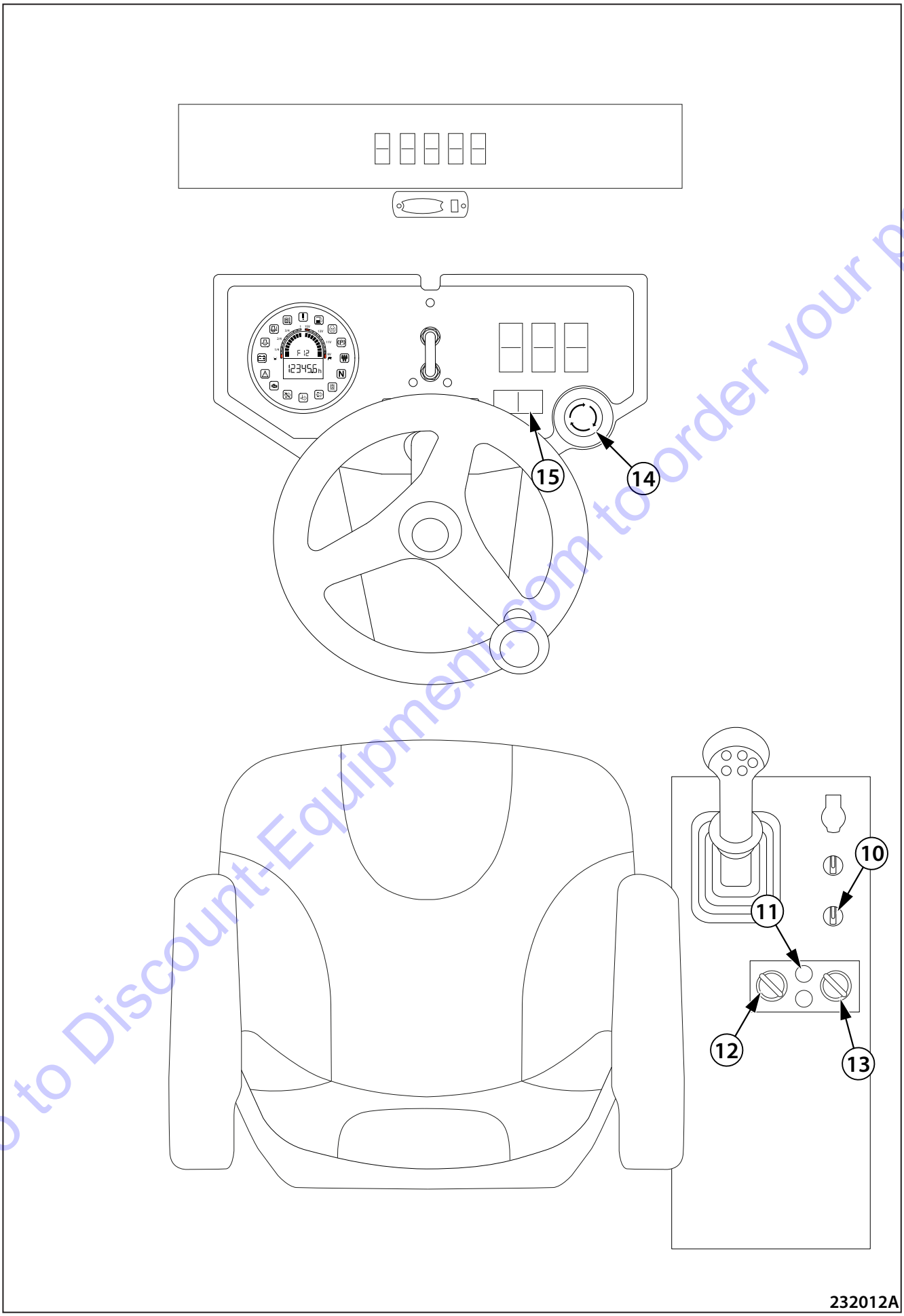
Active regeneration is automatic without operator input (according to Chapter 2.7.10.2.2).

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

**Right position – parking active regeneration ON**

It is used to activate parking active regeneration.

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



**Engine speed selector switch (10)**

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


2441

**Air-conditioning switch (11)**

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


AMN469

**Heater fan speed switch / Air conditioning (12)**

It is used for air flow control.

0 – OFF

1 – minimum

2 – medium

3 – maximum

**Heating temperature control / Air conditioning (13)**

It is used for adjusting the air temperature.

The cab can only be heated to a sufficient temperature at maximum engine speed.

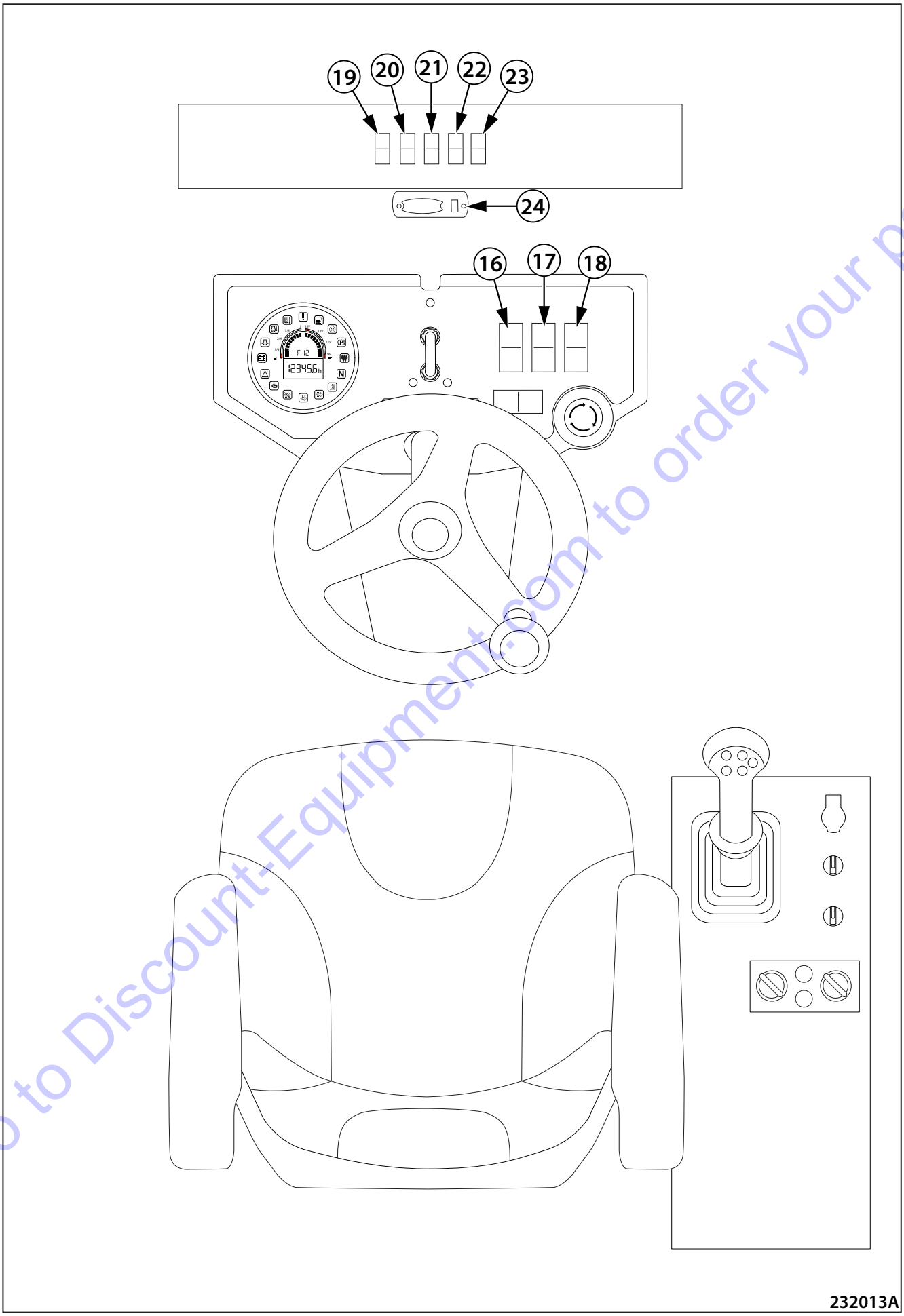

2582

**Emergency brake button (14)**

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


2489

**Direction indicators switch (15)**




AMN448

AMN449

**Road lights switch (16)**

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

- Off
- Parking lights
- Low beam lights


595417

**Warning lights switch (17)**


AMN450

**Additional lights switch (18)**


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.


596307

**Rear screen wiper switch (20)**

- Off
- Continuous wiping


2260

**Washer switch (21)**

- Windscreen washing ON
- Off
- Rear window washing ON

Windscreen spraying is followed by two wipe cycles.


AMN450

AMN451

**Working lights switch (22)**

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

- Off
- Headlamps
- Front and rear lights


592348

**Warning beacon switch (23)**

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


592305

**Cab lighting (24)**

**Fuse box (25)**

Fuse (F1) – 10 A ..... Service sockets 12 V

Fuse (F2) – 7.5 A ..... Ignition box

Fuse (F3) – 15 A ..... Headlamps, rear lights, license plate lights, road lights

Fuse (F4) – 5 A ..... Horn

Fuse (F5) – 10 A ..... Direction indicators

Fuse (F6) – 5 A ..... Memories

Fuse (F7) – 15 A ..... ECU power supply circuit

Fuse (F8) – 5 A ..... ECU

Fuse (F9) – 7.5 A ..... Beacon, cab lighting

Fuse (F10) – 15 A ..... Working lights

Fuse (F11) – Reserve

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

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

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

Fuse (F15) – 3 A ..... Lever – blade control

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

Fuse (F17) – 10 A ..... Blade

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

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

Fuse (F21) – 10 A ..... Radio

Fuse (F22) – 7.5 A ..... Lights 360°

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

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

Fuse (F25) – 15 A ..... Heating

Fuse (F26) – 7.5 A ..... Telematic, green beacon, beacon

Fuse (F27) – Reserve

Fuse (F28) – 5 A ..... CM, vibration sensor

Fuse (F29) – 10 A ..... Power supply for the crankshaft vent preheat circuit

Fuse (F30) – 80 A ..... Main fuse

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

Fuse (F40) – 50 A ..... Pre-heating

Fuse (F50) – 30 A ..... Start circuit

Fuse (F51) – 7,5 A ..... Fuel pump

Fuse (F52) – 3 A ..... Regeneration

Fuse (FA) – 40 A ..... Main fuse

Fuse (FB) – 50 A ..... Main fuse



**CAN 1 connector (26)**

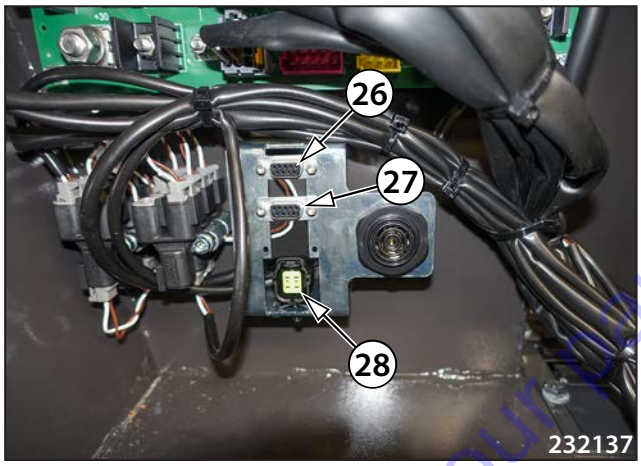
It is used for connecting an external computing unit (laptop) to ensure correct communication between the engine and TTC computer.

**Connector CAN 0 (diagnostics) (27)**

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

**Engine diagnostics (28)**

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




**Note**

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


**Service socket**

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

**Fire extinguisher (optional equipment)**

Place to install a fire extinguisher.


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

**Windscreen washer tank**

Fill with standard available media.


**Fill with antifreeze or drain before the winter season starts!**

**Battery disconnector**

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

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

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


**Relays in the machine**

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


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

K4 .....Start blocking

K5 .....Engine relay

K7 .....Regeneration relay

K8 .....Reversing horn relay

K10.....Air-conditioning relay

K15.....Horn relay

K16.....TTC32 power supply switching relay

K20.....Crankshaft heating relay

K22.....Glowing contactor

K23.....Blade valve control electronic relay – upwards

K24.....Blade valve control electronic relay – downwards

K25.....Blade valve control electronic relay – floating position

A1 .....Direction indicator flasher

A12.....Front wiper intermittent

**Seat**

**Seat adjustment**

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


**Seat springing stiffness**

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

**Adjust the seat before driving the machine.**

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

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

**Longitudinal seat travel**

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

**Seat switch**

The seat switch is located in the seat cushion.

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

These restrictions vary depending on:

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

**Engine start blocking**

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

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

**Movement blocking**

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

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

**Machine stop**

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

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

**Engine shutdown**

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

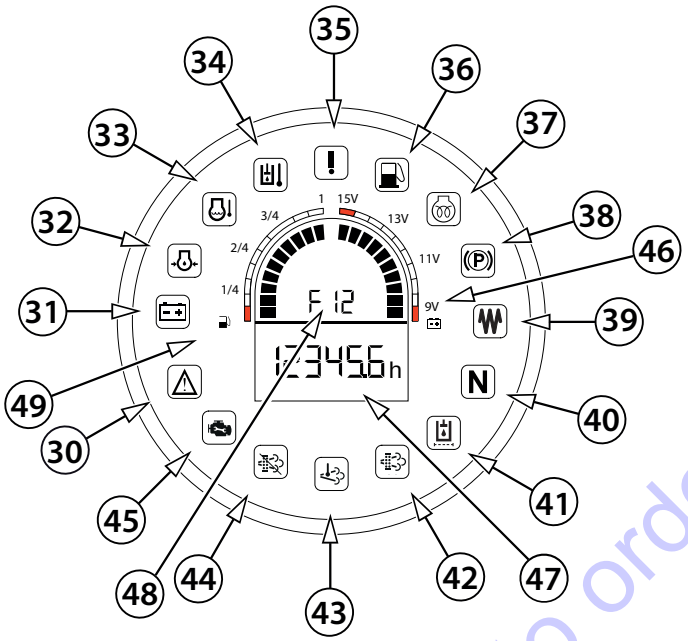
To re-enable engine start, sit on the seat and set the travel control to the parking brake position (P). The engine cannot be started again only by the momentum of the machine.

**Dashboard cover**

The cover protects the dashboard from:

- weather effects
- vandalism
- handling by others

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




232022A

**Indicator lamps**

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


AMN58

**Error message indicator lamp (30)**

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

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

**If the indicator lamp remains lighting, contact the service!**

See Annex 3.7 Defects


2777

**Battery charging indicator lamp (31)**

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

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


AMN113

**Engine lubrication indicator lamp (32)**

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

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

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

**Start the engine only after the defect is repaired!**


AMN76

**Engine overheating indicator lamp (33)**

The indicator lamp indicates a high temperature of the engine.

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


2635

**Hydraulic oil temperature indicator lamp (34)**

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

An error code will be displayed on the display.


592520

**Emergency stop indicator lamp (35)**

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

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

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

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


595425

**Fuel indicator lamp (36)**

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

Refill the fuel!


3518

**Engine glowing indicator lamp (37)**

It indicates the engine warming up before cold start.

**Start the engine after the indicator lamp goes out!**


2703

**Parking brake indicator lamp (38)**

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


**Vibration indicator lamp (39)**

The indicator lamp indicates active vibration.


**Travel control in neutral position indicator lamp(40)**

The indicator lamp indicates that the travel control is in the neutral position.


**Indicator lamp for hydraulic oil filter clogging (41)**

The indicator lamp indicates that the filter cartridge is clogged.

**Replace the clogged filter cartridge immediately!**


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

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

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


**Indicator lamp of high temperature of exhaust gases (43)**

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

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


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

The indicator lamp signals blocked start of DPF regeneration.

Prolonged operation of the machine with suppressed regeneration is prohibited.

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


**Engine failure indicator lamp (45)**

The indicator lamp indicates an engine failure.

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

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

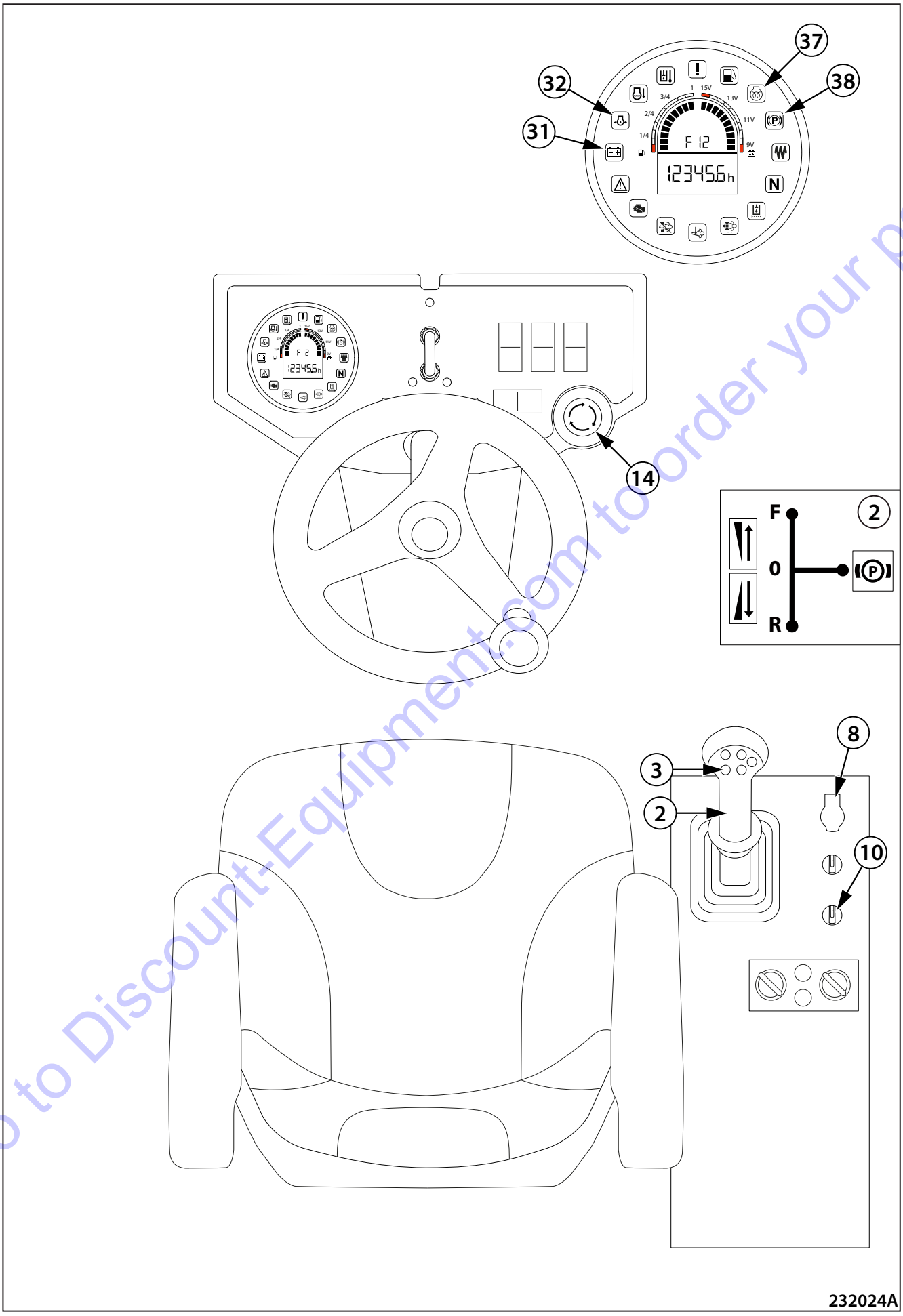

**Battery voltage indicator (46)**


**Worked hours indicator (47)**

**Error message indicator (48)**


**Fuel level indicator (49)**

The indicator shows the fuel level in the tank.



### 2.7.1 Starting up the engine

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

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

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

**Conditions to start the engine:**

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

**Start-up procedure:**

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

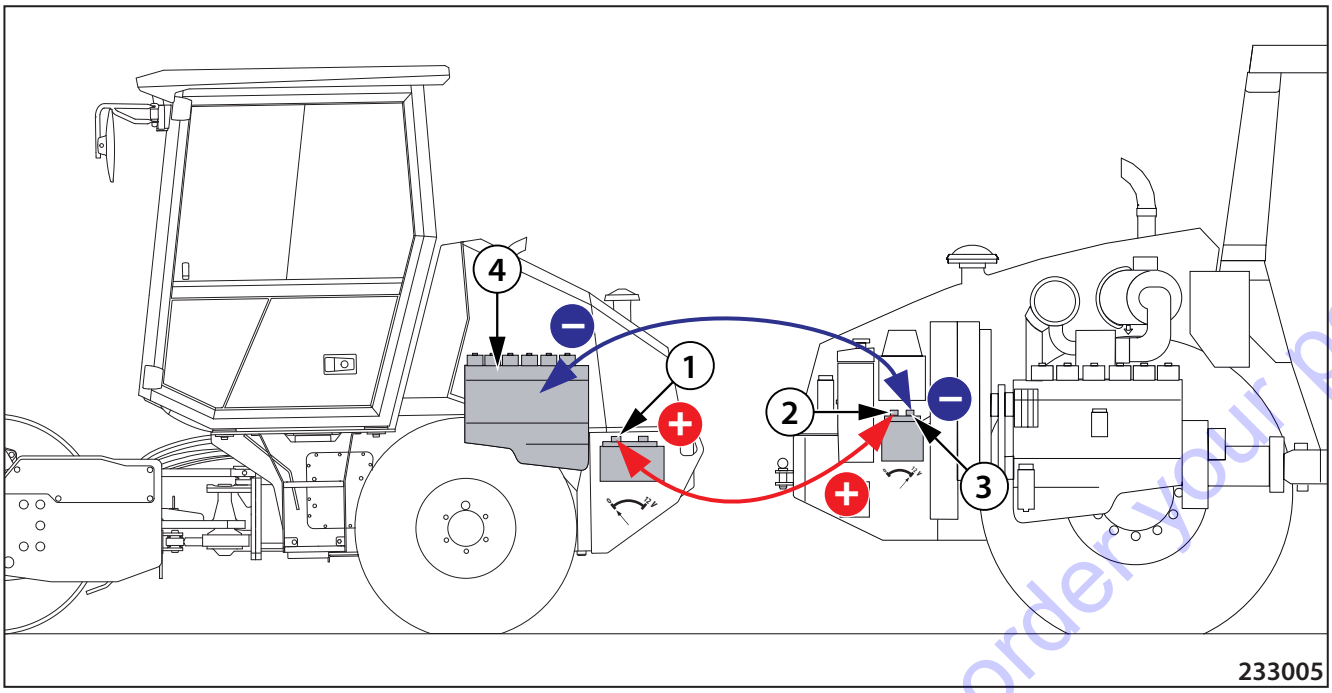
**Note**

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

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

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

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



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

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

**Always follow the undermentioned operation sequence.**

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

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

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

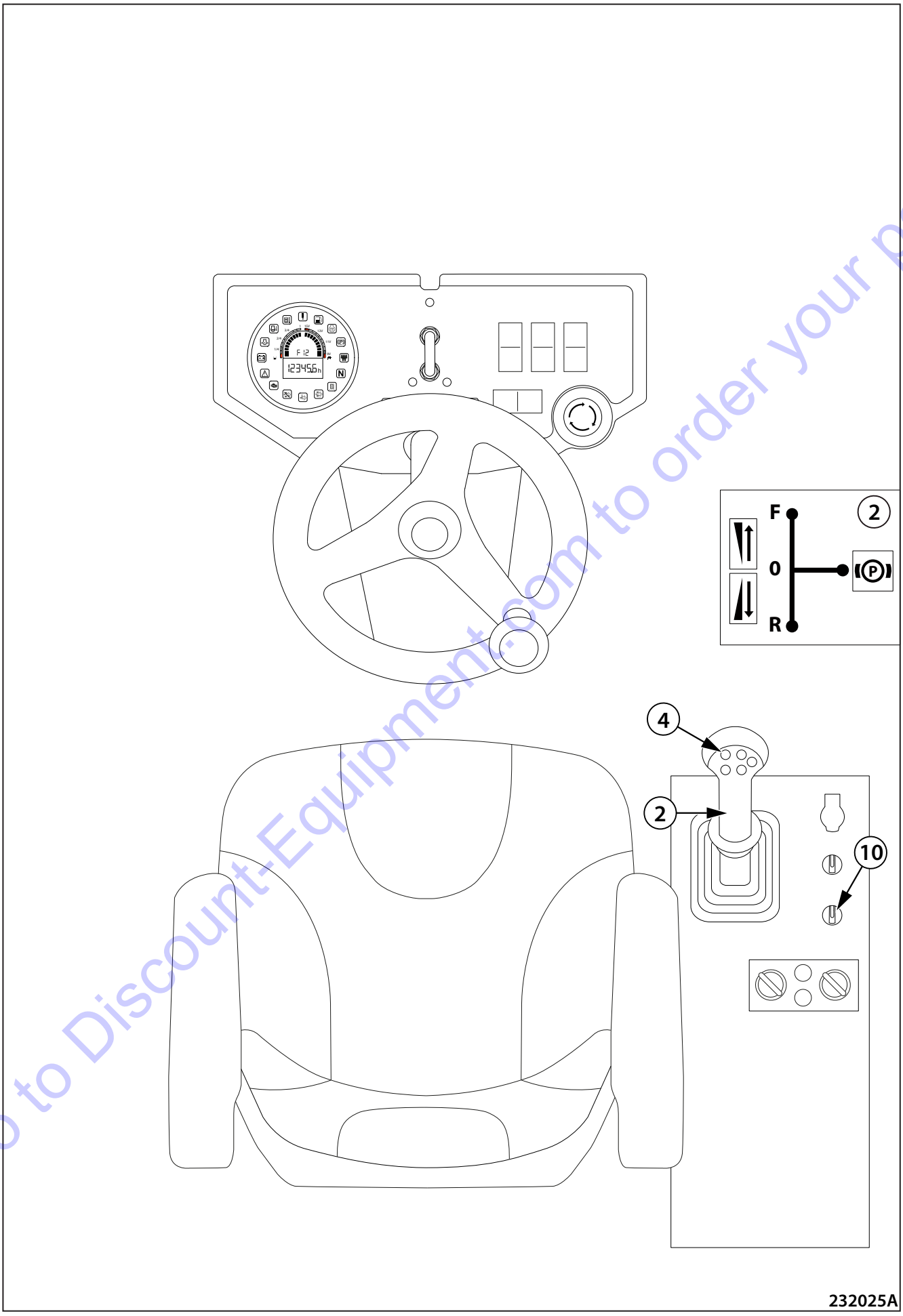
**Uninsulated parts of clamps of the jump leads must not touch each other!**

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

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

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

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



### 2.7.2 Travel and reversing

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

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

**Before moving off, check that the articulation joint of the machine is not locked!**

**Machine travel and reversing:**

**Selection of travel direction:**

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

**Travel speed selection:**

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

**Travel and reversing with vibration**

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

**Turning on:**

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

**Turning off:**

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

**It is forbidden to vibrate on the spot!**

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

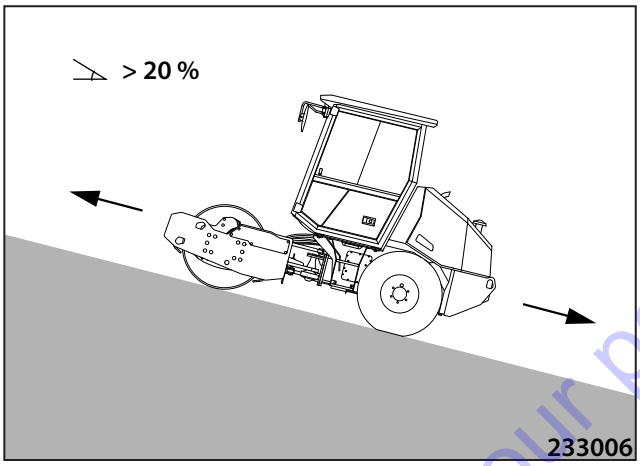
When driving up a slope, adjust your speed so that the machine is able to overcome the slope.

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

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

Use vibration when driving with the drum up the slope.

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




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

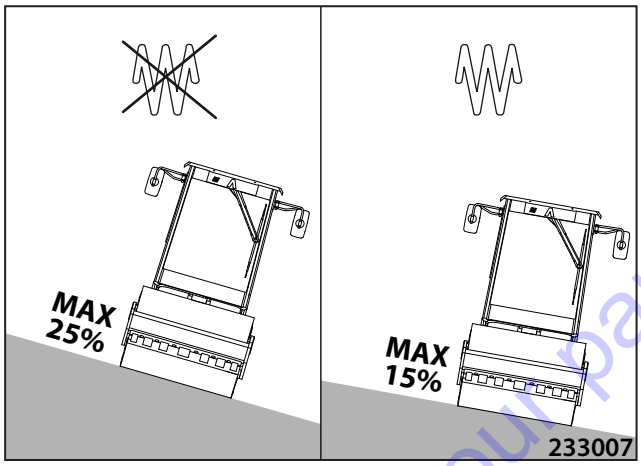
**It is prohibited to drive in speed 2 down a slope over 20%.**

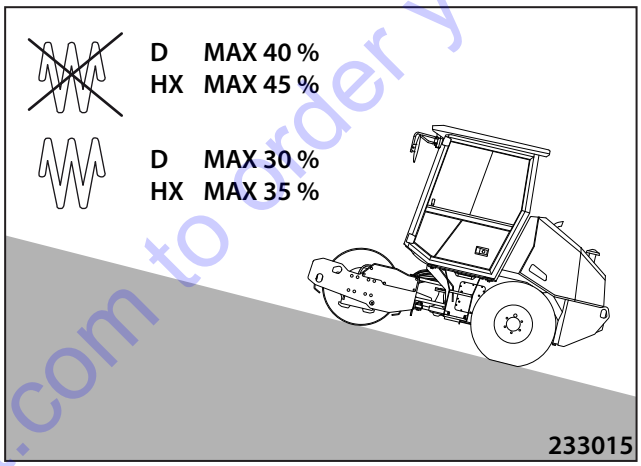
**It is prohibited to abruptly change the driving direction (reverse) when driving on a slope.**

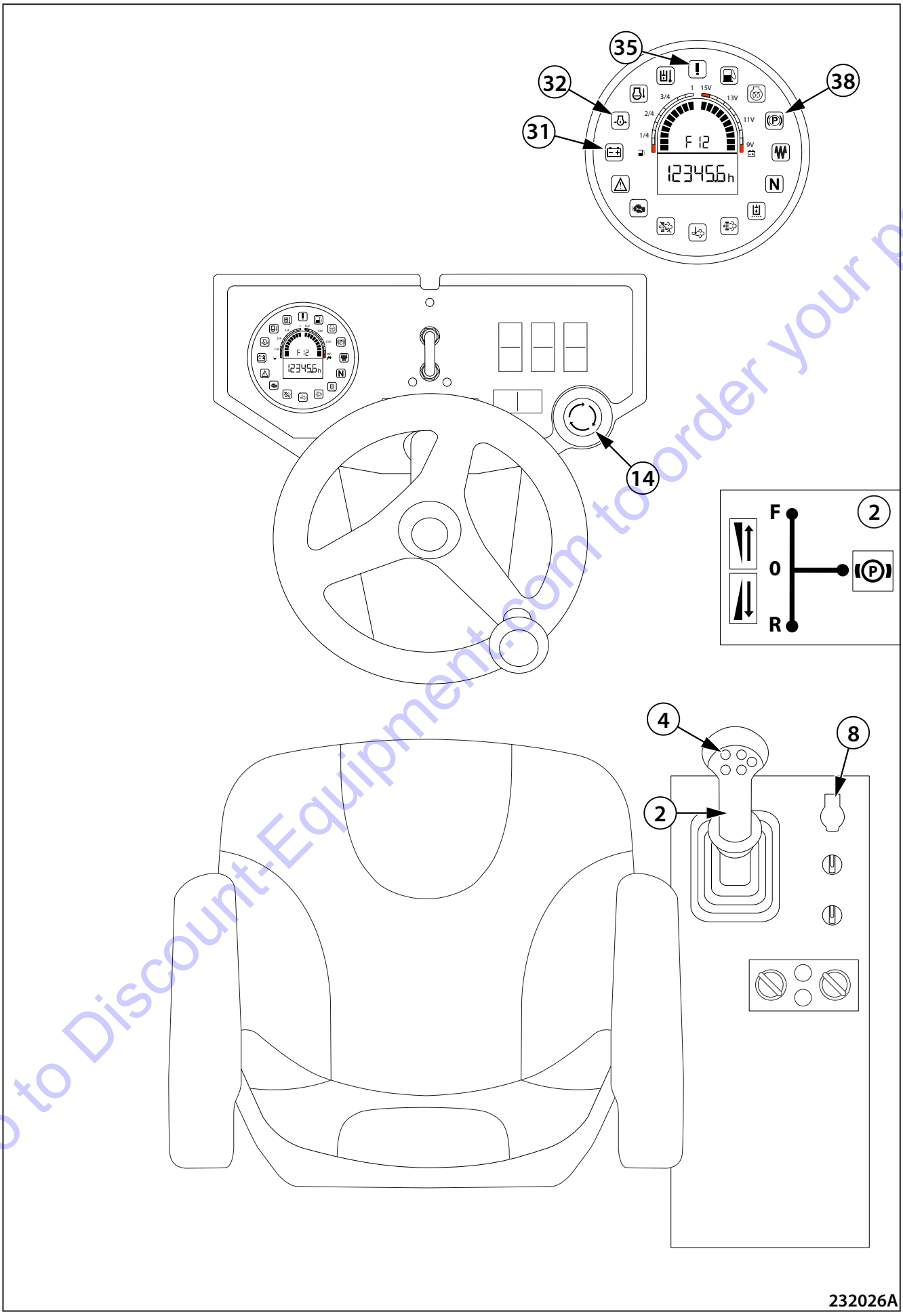
**Driving down a slope is only allowed up to such a speed in which the machine was able to get up the slope or would be able to do so.**

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

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





### 2.7.3 Stopping the machine and engine

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

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

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

**Turn off the battery disconnector when shutting down the machine!**

### 2.7.4 Machine emergency stop

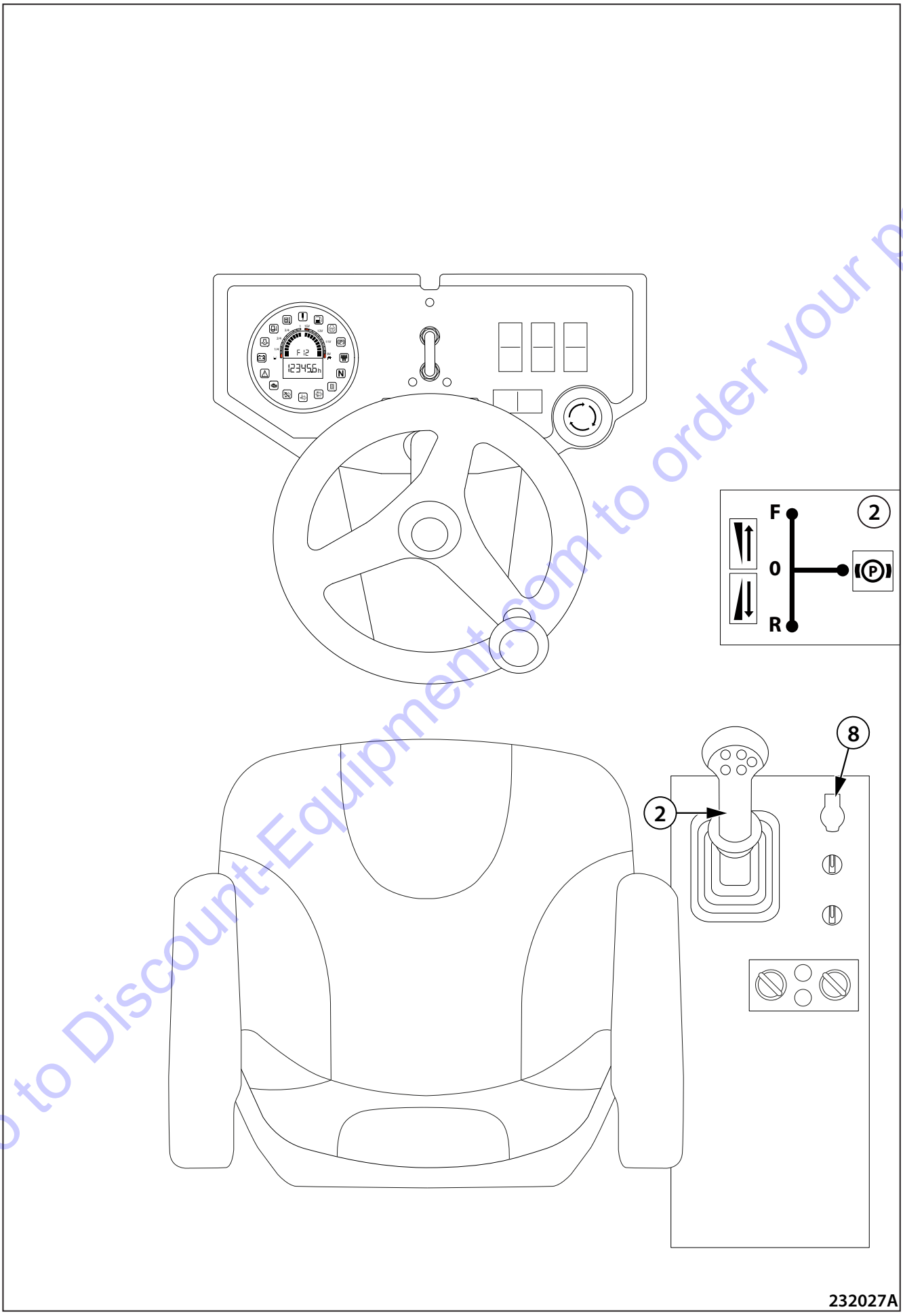
**Use in case of a failure when it is impossible to stop the engine with the key in the ignition box or by changing the travel control (2) to the brake position (P)!**

**Turning on:**

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

**Turning off:**

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



### 2.7.5 Machine parking

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

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

### 2.7.6 Telematics Readiness

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

**Note**

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

### 2.7.7 Tyre ballasting with liquid

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

**Tyre ballasting with liquid up to 0°C**

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

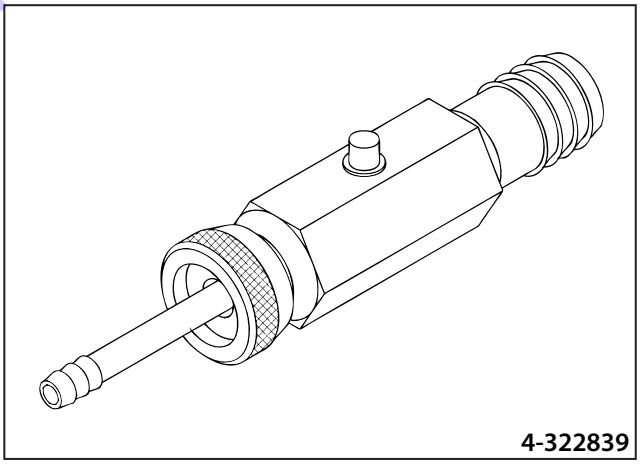
| water | calcium chloride $CaCl_2$ | additional weight |
|---|---|---|
| (l) [gal US] | (kg) [lb] | (kg) [lb] |
| 160 [42.3] | 66 [145.5] | 226 [498] |

**Tyre ballasting with liquid up to -25°C**

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

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

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



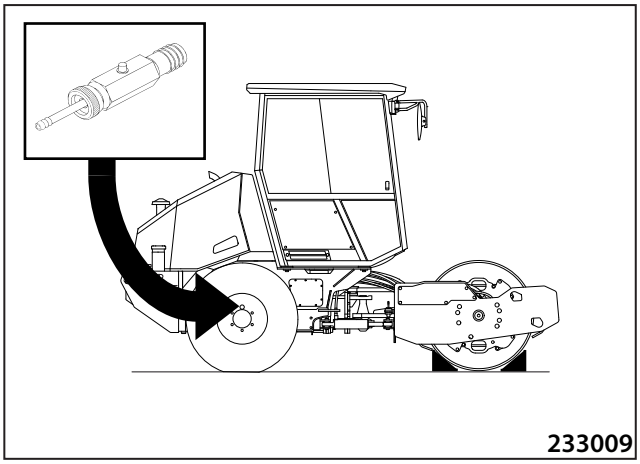
4-322839

**Filling process**

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

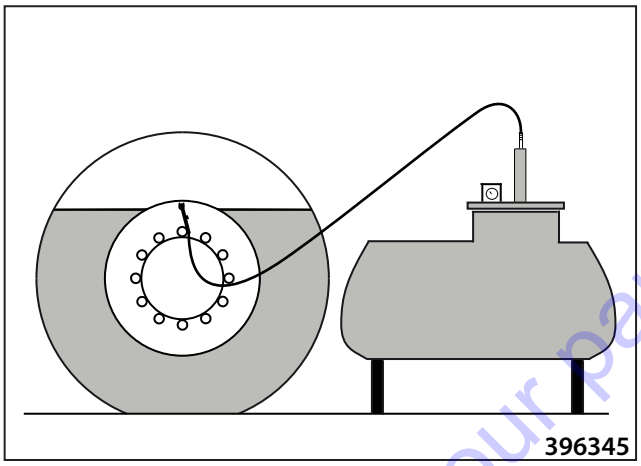
**Note**

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



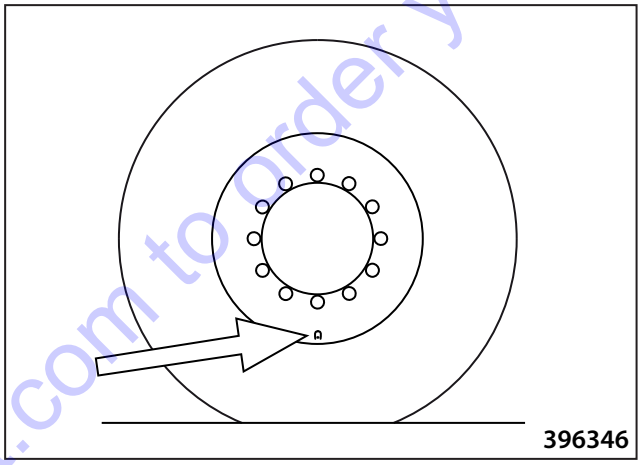
233009

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




**Draining procedure:**

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




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

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

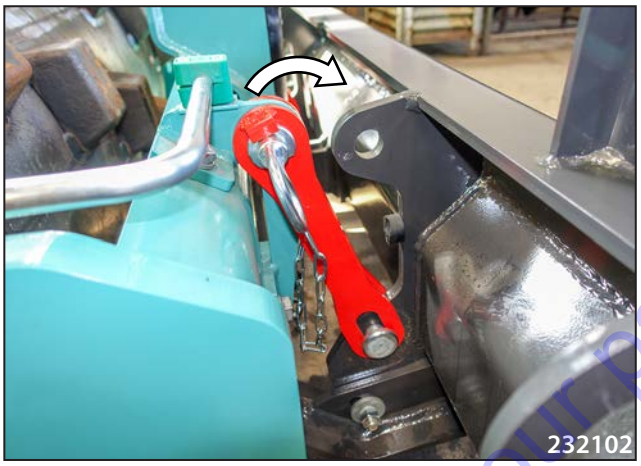
**Protect your eyes with glasses (protective shield) and hands with rubber gloves!**

**Wash the spilt solution with clean water.**

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

### 2.7.8 Blade

Unlock the blade on both sides.



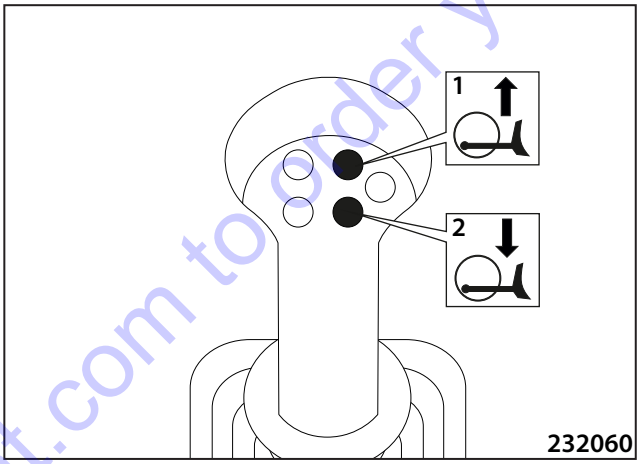

The blade is controlled using the buttons on the travel control.

Button 1 – blade – up

Button 2 – blade – down

Button 3 – floating position of the blade

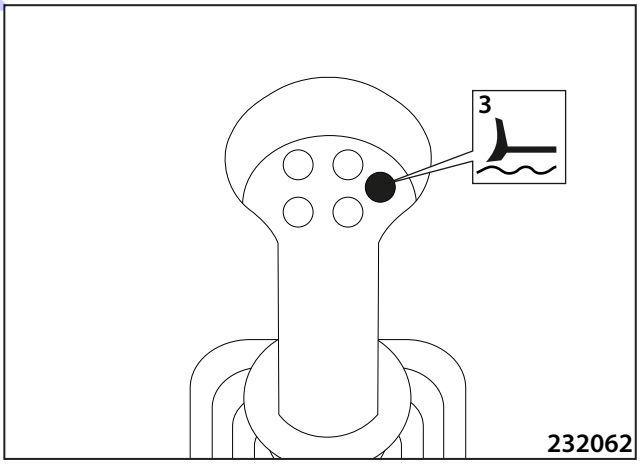
When moving at transport speed or when the vibration function is active, only upward movement of the blade is possible.




**Floating position:**

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

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



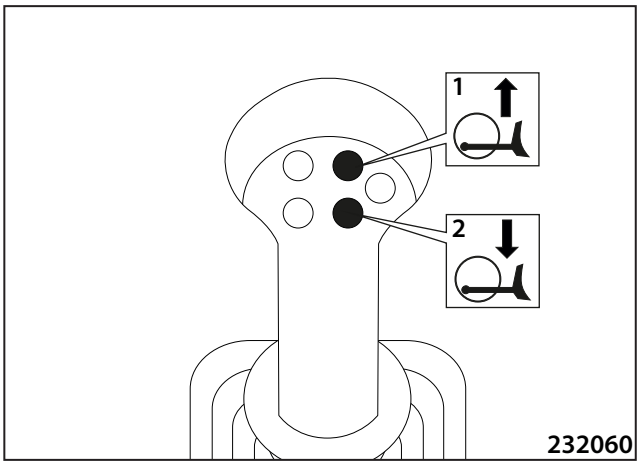

End the floating position using the blade – up button (1).

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

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

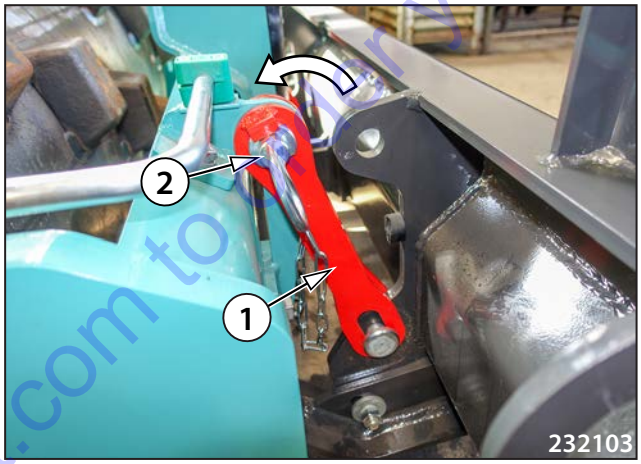
The blade can be lowered to the ground when the engine is turned off by pressing the blade button – down (2).

If the floating position is active or the blade is moving downwards, vibration cannot be activated.



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


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




**Note**

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

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

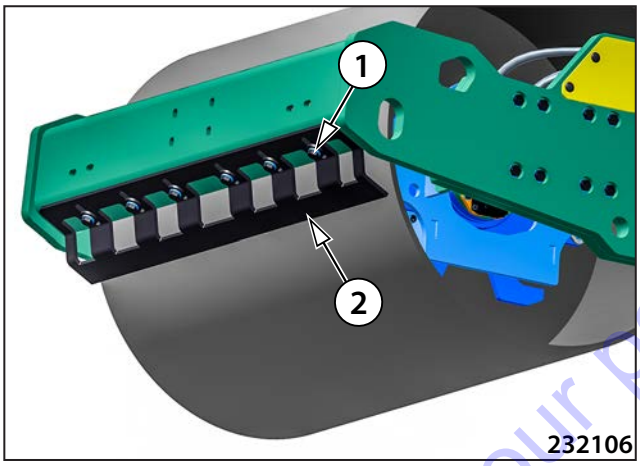
**Do not work with the blade if it is locked.**

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

### 2.7.9 Scraper adjustment

**Scrapers for smooth drum**

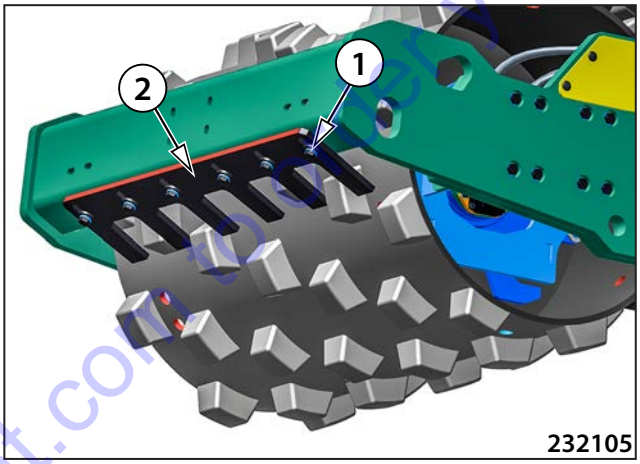
- Loosen the screws (1) and move the scraper (2) to the drum at the distance of 20 mm (0.79 in) between the scraper and the drum.




**Scrapers for pad-foot drum**

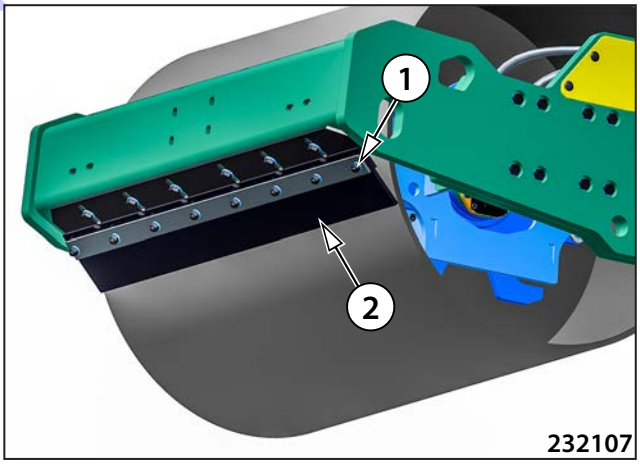
- Loosen the screws (1) and move the scrapers (2) to the drum at the distance of 25 mm (0.98 in).

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




**Polytane contact scrapers (optional equipment)**

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



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

### 2.7.10.1 Diesel particulate filter (DPF)

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

Conditions for maintaining the DPF in a fully functional state. Use fuels with low sulphur content (according to Chapter 3.2.2).

- Use only the oil recommended by the engine manufacturer (according to Chapter 3.2.1).
- Do not interfere with the DPF, do not tamper with it.
- When operating the machine, do not leave the switch in the DPF regeneration suppression position. Operate the machine only when the switch is in the AUTO position.
- Replace the DPF after 6000 hours or after 5 years at the latest.
- Avoid short engine operating times and low engine load (long engine idling times).

### 2.7.10.2 Diesel particulate filter (DPF) regeneration

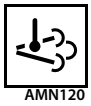
A process in which accumulated solid particles burn in the diesel particulate filter.

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

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

- passive regeneration
- automatic active regeneration
- active parking regeneration

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

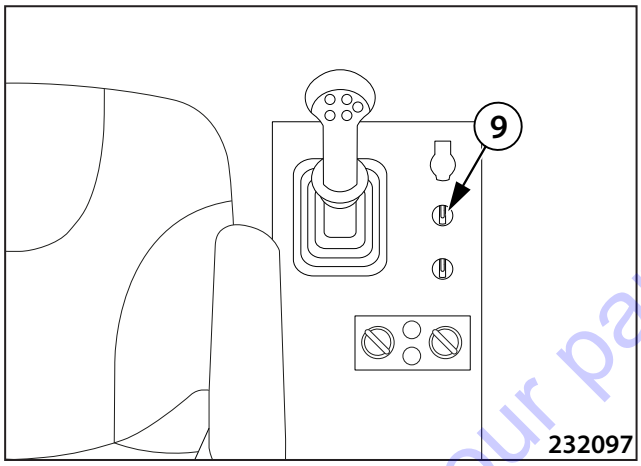
| **Before the start of regeneration** | | | |
|---|---|---|---|
|  AMN120 **Indicator lamp of high exhaust gas temperature** |  AMN118 **DPF clogging indicator lamp** | **Description** | **Procedure** |
| Off | Off | DPF does not require regeneration | |
| Lighting | Lighting/flashing | Automatic active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

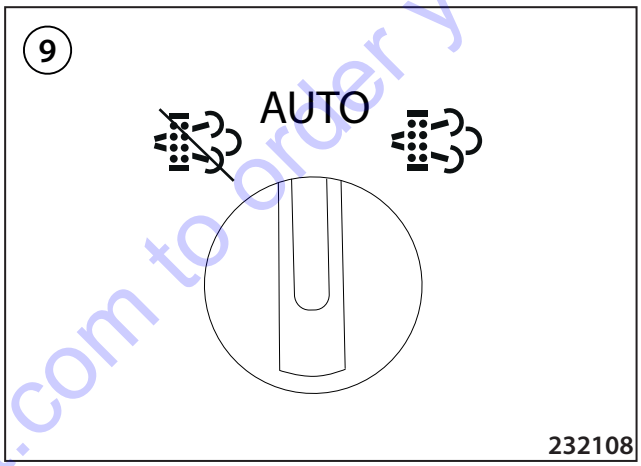
| **Regeneration progress** | | | |
|---|---|---|---|
|  AMN120 **Indicator lamp of high exhaust gas temperature** |  AMN118 **DPF clogging indicator lamp** | **Description** | **Procedure** |
| Lighting | Lighting/flashing | Active automatic regeneration in progress<br>Active parking regeneration in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

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

### 2.7.10.2.1 Passive regeneration

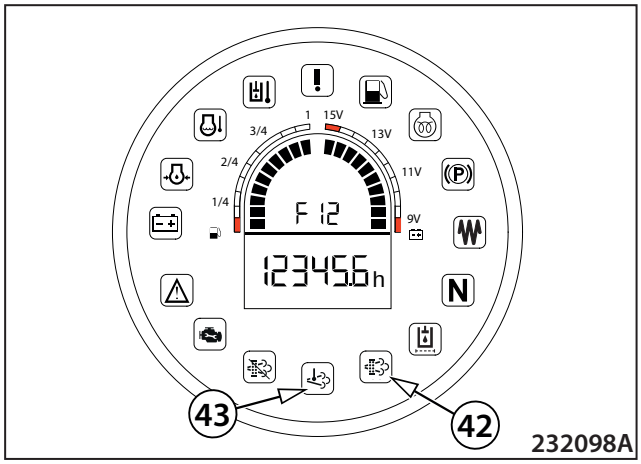
- Occurs due to high exhaust gas temperature independently of the degree of DPF clogging.
- To enable the start of regeneration, the switch (9) must be in the AUTO position.
- The regeneration starts and stops without any interaction between the operator and the machine.




### 2.7.10.2.2 Automatic active regeneration

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

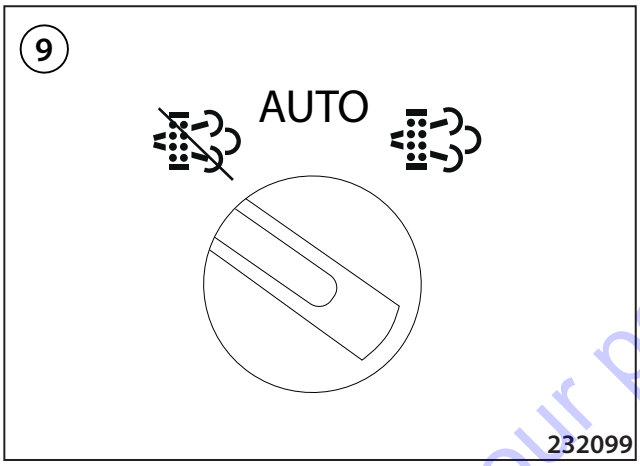



**The duration of automatic regeneration depends on the conditions of use and the engine temperature.**

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

### 2.7.10.2.2.1 Suppression of DPF regeneration

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

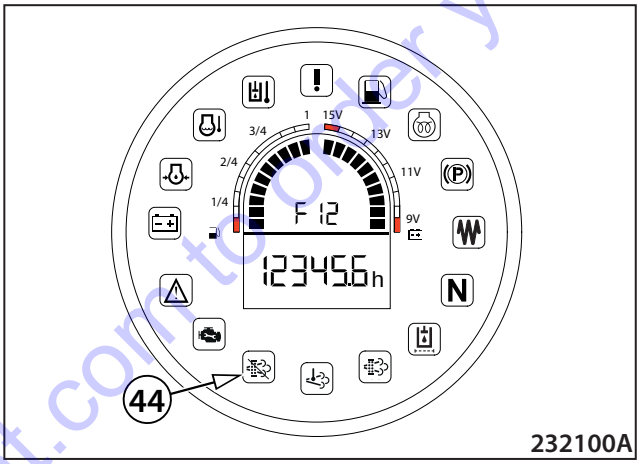



**The regeneration suppression can be switched off:**

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

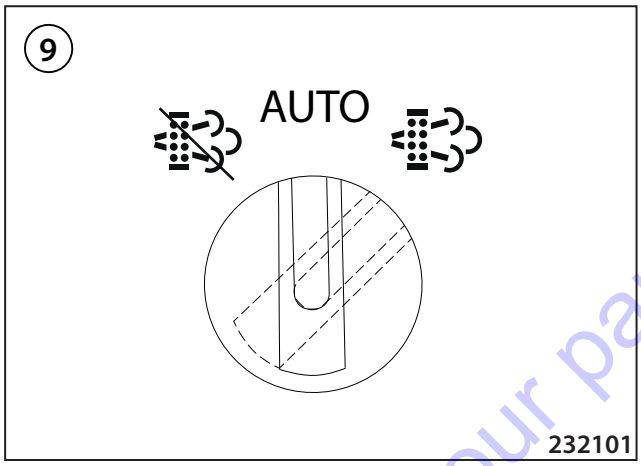
**After the regeneration has been completed, let the machine run for at least 10 minutes at idle speed to remove excessive heat generated during the process from the engine compartment.**

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



### 2.7.10.2.3 Active parking regeneration

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




**Before starting regeneration, follow these steps:**

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

**Note**

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

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

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

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

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

**Note**

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

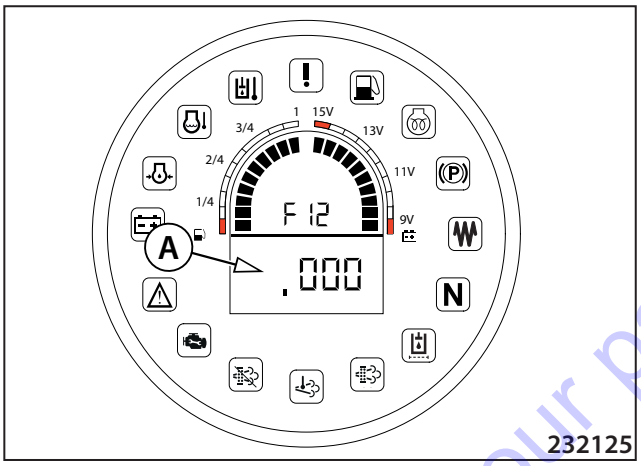
**After the regeneration has been completed, let the machine run for at least 10 minutes at idle speed to remove excessive heat generated during the process from the engine compartment.**

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

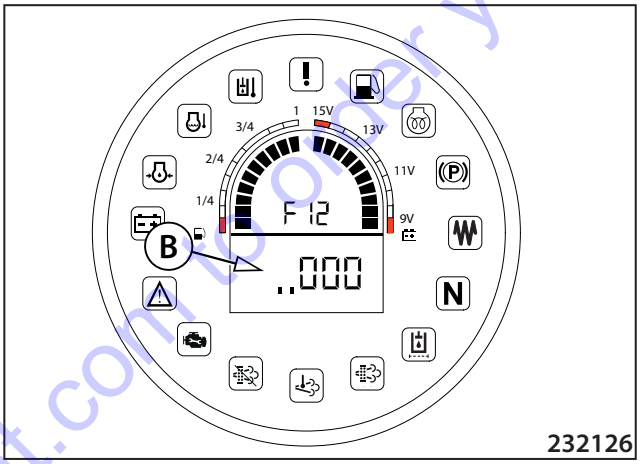
**Risk of burns. Keep away from flammable or explosive materials.**

### 2.7.10.3 Diesel particulate filter (DPF) clogging

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




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



## 2.8 Transporting the machine

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

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

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

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

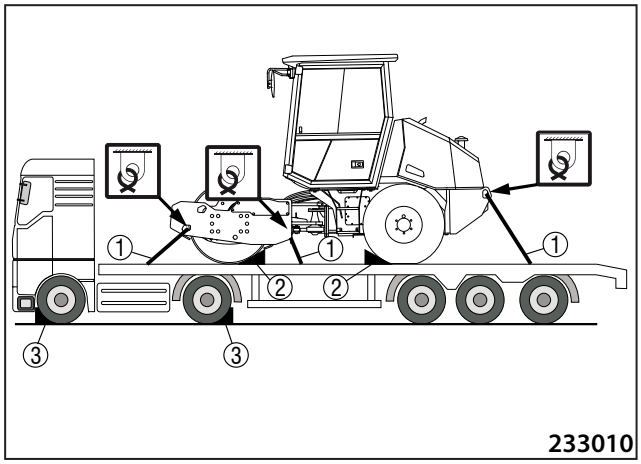
**When transporting the machine on a vehicle, observe regulations applicable to the given territory.**

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

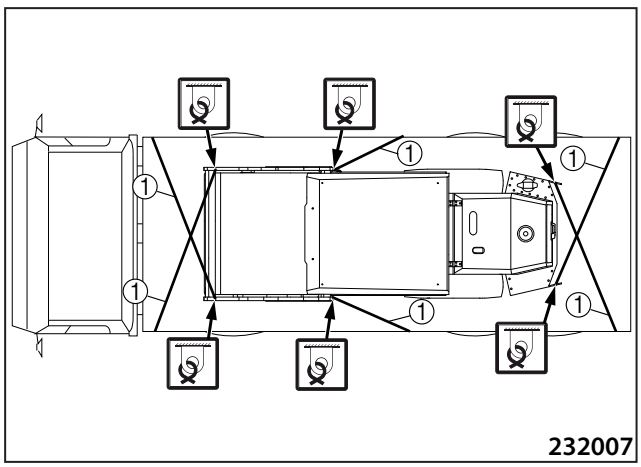
**While driving onto a vehicle, it is recommended to support the drum with rubber belts or wooden boards etc.**

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

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



233010



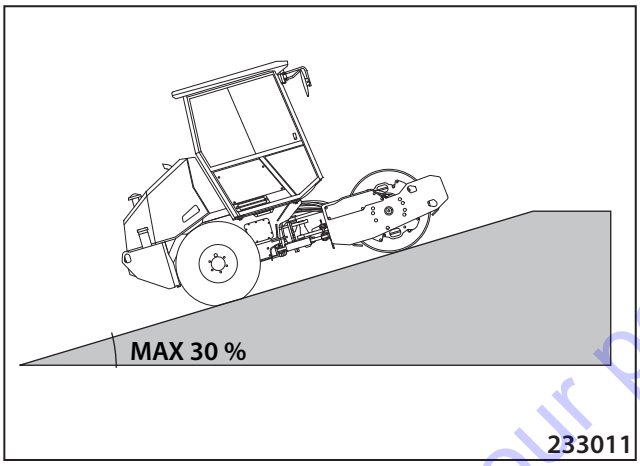
232007

### 2.8.1 Loading the machine

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

#### 2.8.1.1 Loading the machine using a ramp

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



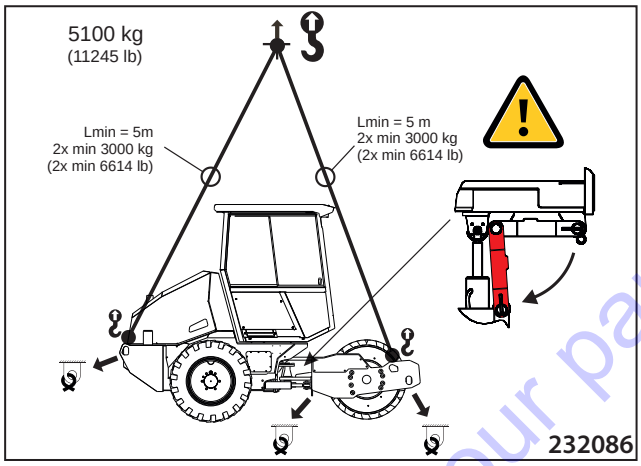

**Non-adherence to the prescribed parameters of the access ramp may result in damage to the machine.**

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

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

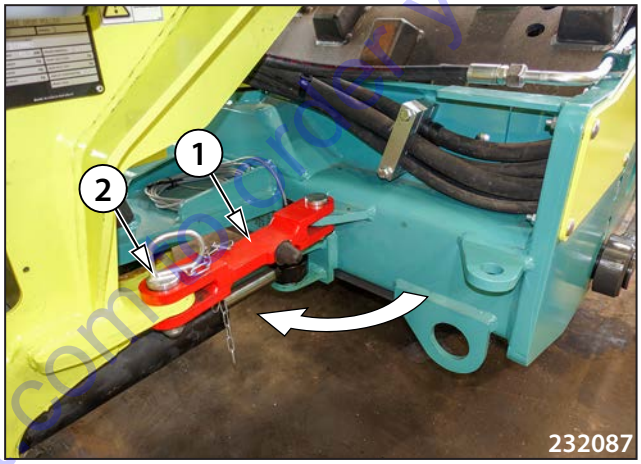
### 2.8.1.2 Loading the machine with a crane

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




**Locking the articulation joint:**

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




**Do not enter under the lifted load!**

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

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

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

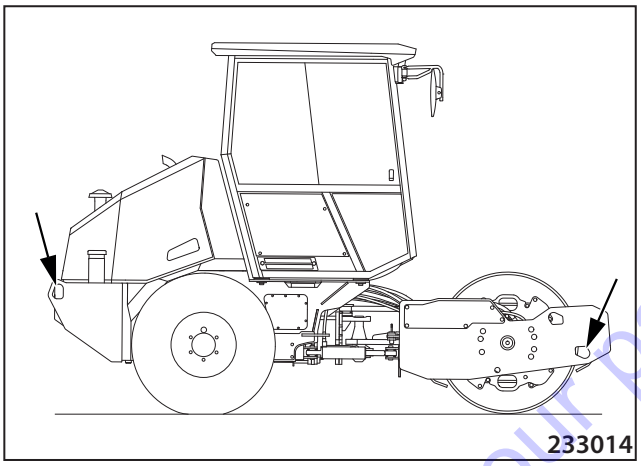
**To sling, use only lifting lugs on the machine designed for that purpose.**

**Only a trained slinger may carry out the slinging.**

## 2.9 Special conditions to use the machine

### 2.9.1 Towing the machine

- If the engine does not work, or there is a defect in the hydraulic system, then you must short-circuit the hydraulic circuit and release the brake of the machine. Then the machine can be towed.
- For towing, the machine is provided with two towing lugs on the drum frame and with two towing lugs on the rear frame.




**The towed machine must be attached to both tow lugs.**

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

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

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

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

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

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

**No person may be on the towed machine!**

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

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

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

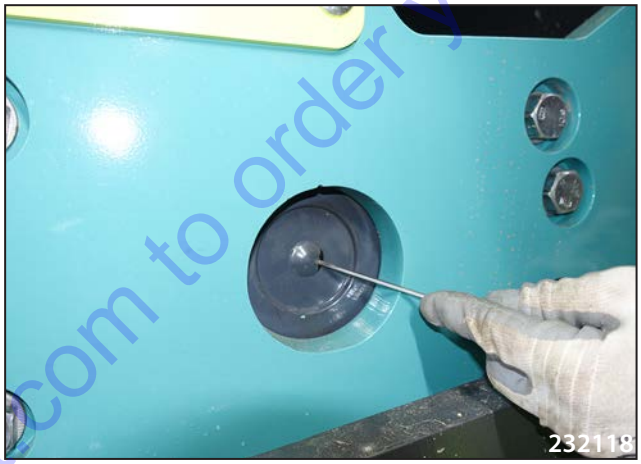
**Do not touch hot parts of the machine, there is a burn hazard!**

**Releasing the machine brake**

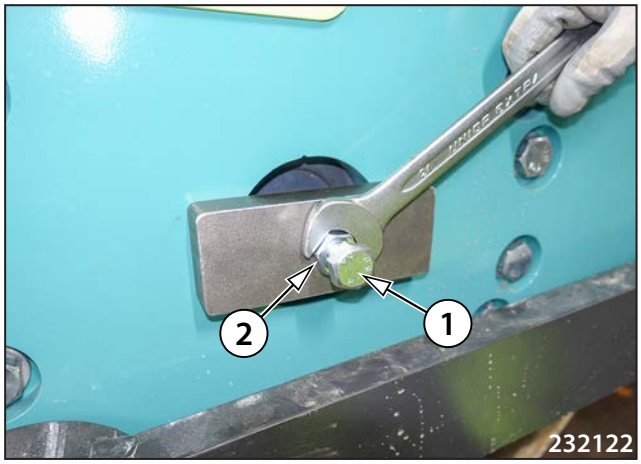
**Check the drum or tyres in the towed machine for braking or skidding.**

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

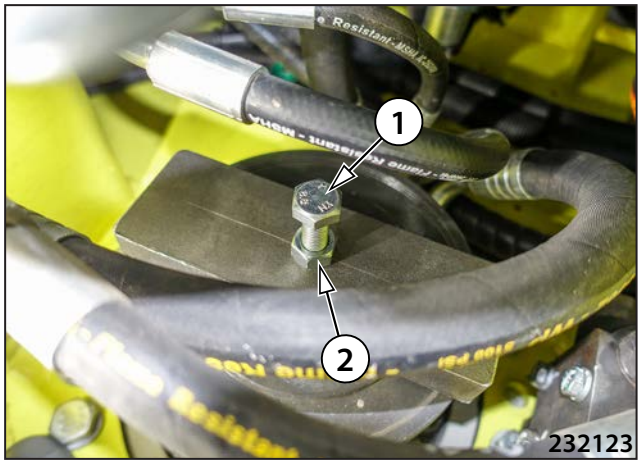
- Remove the rubber cover on the drum travel hydraulic motor.



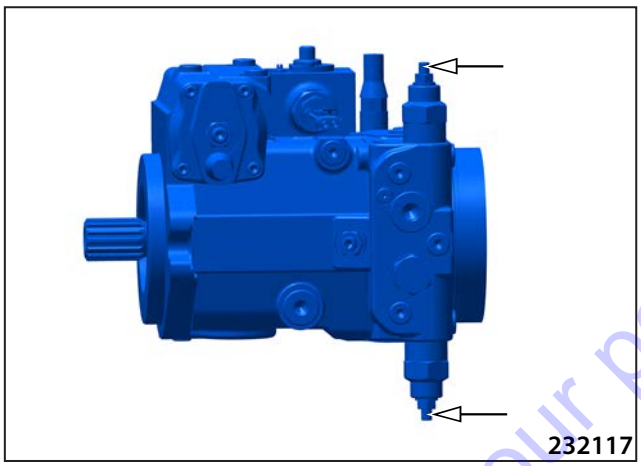

- Install the plate to the drum travel hydraulic motor using the screw (1). Tighten the screw as far as it will go.
- Tighten the nut (2).




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



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




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

### 2.9.2 Operating the machine during running-in period

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

### 2.9.3 Operating the machine at low temperatures

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

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

Preparation for work under low temperatures:

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

**Note**

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

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

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

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

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

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

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

### 2.9.4 Machine operation under high temperatures and humidity

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

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

**Note**

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

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

### 2.9.5 Machine operation at high altitudes

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

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

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

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

### 2.9.6 Machine operation in a very dusty environment

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

**The recommended cleaning interval is once a week.**

### 2.9.7 Driving with vibration on compacted and hard materials

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

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

**Note**

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

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

# 3 MAINTENANCE MANUAL

# ARS 50
# (Kubota Tier 4 Final)

## 3.1 Safety and other measures during maintenance of the machine

### 3.1.1 Safety during maintenance of the machine

**Carry out lubrication, maintenance and adjustment as follows:**

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

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

### 3.1.2 Fire protection when operating fluids are changed

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

  II hazard class – diesel fuel

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

### 3.1.3 Environmental and hygienic principles

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

## Hygiene principles

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

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

## Environmental principles

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

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

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

### 3.2.1 Engine oil

2412

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

**Performance classification according to**

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

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

**Viscosity classification**

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

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

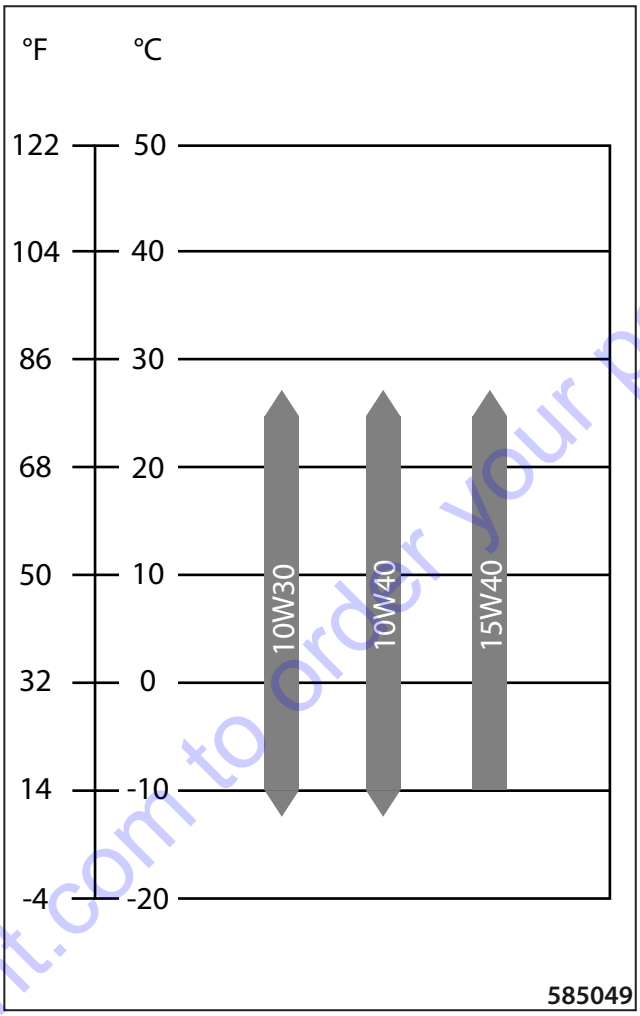
SAE 15W-40 year-round

**Note**

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

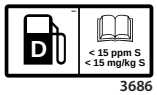
It is recommended that universal multi-range oils are used to avoid the necessity of oil changes due to changes of ambient temperature.

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




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

## 3.2.2 Fuel



3686

Diesel fuel is used as fuel for the engine:

EN590

ASTM D975: 1D S15, 2D S15

**Note**

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

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

**Mixing diesel with special additives is forbidden.**

**Use of HVO fuel**

The EN15940 standard approves the use of hydrotreated vegetable oil (HVO) with no guarantee on the performance level due to the characteristics of the fuel (lower density and calorific value).

### 3.2.3 Coolant


The coolant specification must meet requirements of:

SAE J1034

SAE J814c

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

**Change the coolant every 2 years at the latest.**

**Note**

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

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

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

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

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

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

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

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

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

**Water quality**

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

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

The maximum content of compounds of chlorine is 40 milligrams.

The maximum content of compounds of sulphur is 100 milligrams.

**Safety instructions:**

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

### 3.2.4 Hydraulic oil


2158

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

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

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

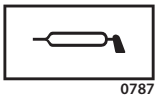
**At temperatures below -13°C (9°F), replace it with an oil with the kinematic viscosity of 32 $mm^2/s$ – class of viscosity HV 32; see Operating manual, Chapter 2.9.3.**

**Synthetic hydraulic oil**

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

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

### 3.2.5 Lubricating grease


0787

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

ISO 6743/9 CCEB 2

DIN 51 502 KP2K-30

### 3.2.6 Windscreenwasherfluid


2260

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

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

### 3.2.7 Air-conditioning fluid

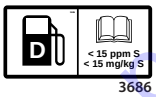
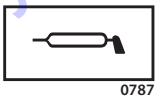

2441

Mixture:

0.9 kg coolant Halocarbon 134a

0.04 l of oil PAG 150

## 3.3 Operating fluids

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

## 3.4 Lubrication and maintenance chart

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

## 3.4 Lubrication and maintenance chart

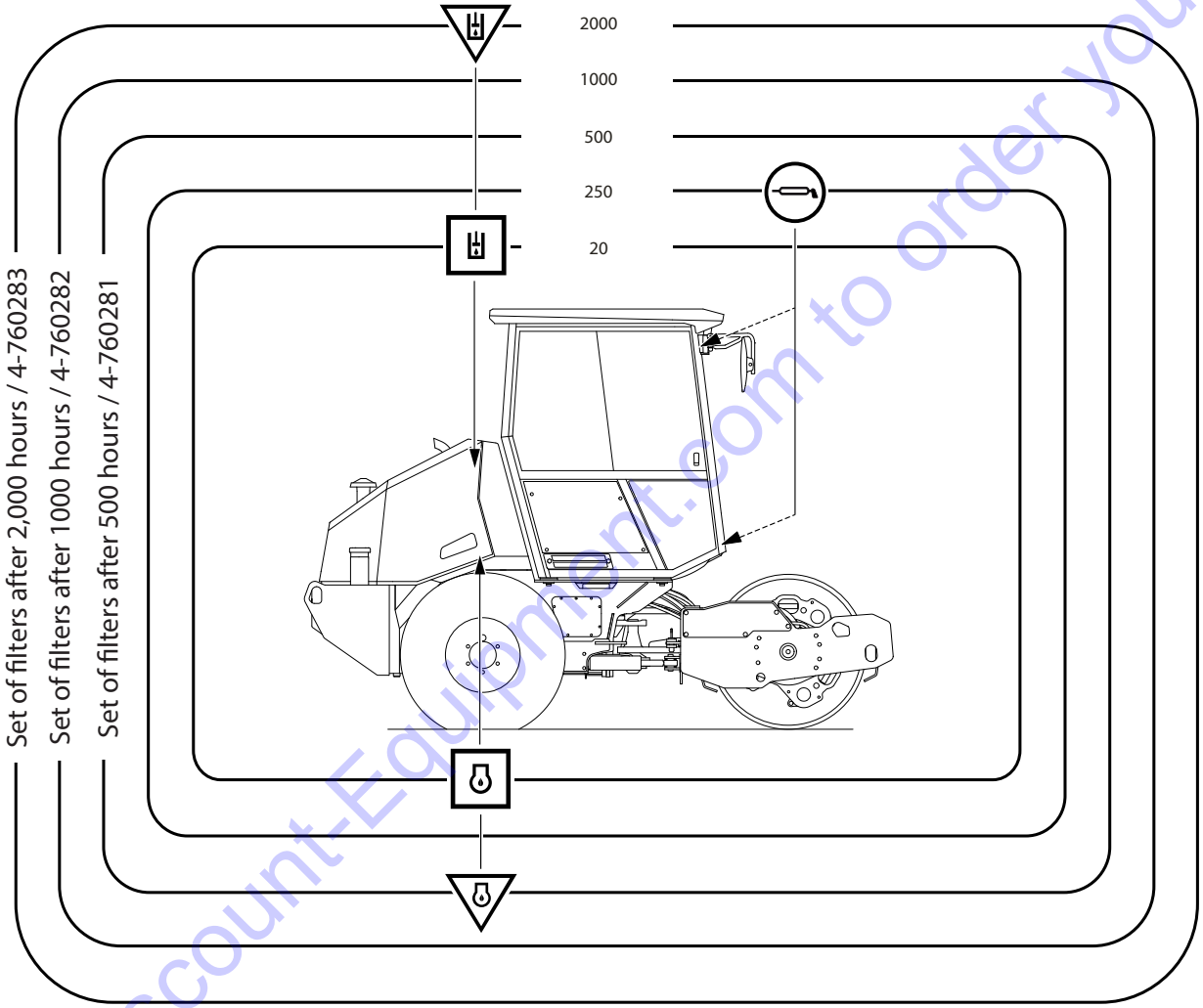
| | |
|---|---|
| **Every 500 hours of operation, but at least once a year** | |
| 3.6.19 | Fuel filter replacement |
| 3.6.20 | Electrical installation inspection |
| 3.6.21 | Replacement of the main cartridge of the air filter |
| 3.6.22 | Engine oil change * |
| 3.6.23 | Cab ventilation filter replacement |
| 3.6.24 | Engine coolant check |
| 3.6.25 | Checking wheel screws for tightening ** |
| **Every 1000 hours of operation** | |
| 3.6.26 | Replacement of air filter cartridges |
| 3.6.27 | Damping system check |
| 3.6.28 | Oil separator cartridge replacement |
| 3.6.29 | Fuel tank cleaning |
| 3.6.30 | Valve clearance check and adjustment |
| 3.6.31 | Battery inspection |
| 3.6.32 | Inspection of the air-conditioning unit compressor mounting |
| **Every 2000 hours of operation** | |
| 3.6.33 | Engine coolant change |
| 3.6.34 | Cleaning and checking the air conditioning system |
| 3.6.35 | Hydraulic oil change and filter replacement |
| **Every 3000 hours of operation** | |
| 3.6.36 | DPF cleaning |
| 3.6.37 | Changing the lubricant of the vibrator bearings |

| Maintenance as required | |
|---|---|
| 3.6.38 | Gas strut replacement |
| 3.6.39 | Scraper adjustment |
| 3.6.40 | Cleaning the machine |
| 3.6.41 | Fuel system bleeding |
| 3.6.42 | DPF (diesel particulate filter) clogging regeneration |
| 3.6.43 | Rear-view mirrors |
| 3.6.44 | Charging of the battery |
| 3.6.45 | Checking the screw connections for tightening |

*** First after 50 hours**
**** First after 100 hours**

# LUBRICATION AND SERVICE PLAN

| | |
|---|---|
| □ | INSPECTION |
| ○ | LUBRICATION |
| ▽ | REPLACEMENT |

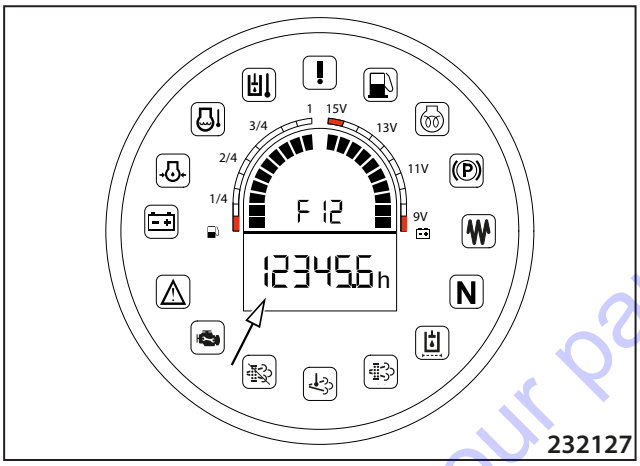



| | | | |
|---|---|---|---|
| | Engine oil: | **API: CJ-4, CK-4** | **SAE 15W-40** |
| | Hydraulic oil: | **ISO VG 46** | **ISO 6743/4 HV** |
| | Lubricating grease: | **ISO 6743/9** | **CCEB 2** |

**232009A**

## 3.6 Lubrication and maintenance operations

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




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

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

Tighten removed or loosened bolts, plugs, threaded joints in the hydraulic system, etc. with the tightening torque specified in tables in Chapter 3.6.45 unless a different value is given for the respective operation.

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

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

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

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

3.6.22 Engine oil change

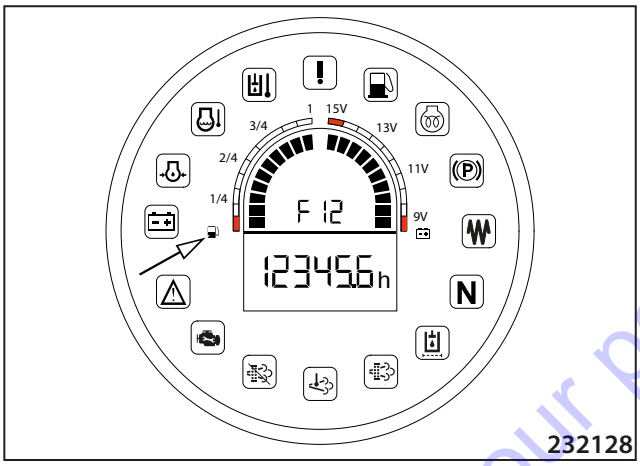
### After the first 100 hours of operation of the new machine (or after a general overhaul), carry out the following operations according to:

3.6.25 Checking the wheel screws for tightening

## Every 20 hours of operation (daily)

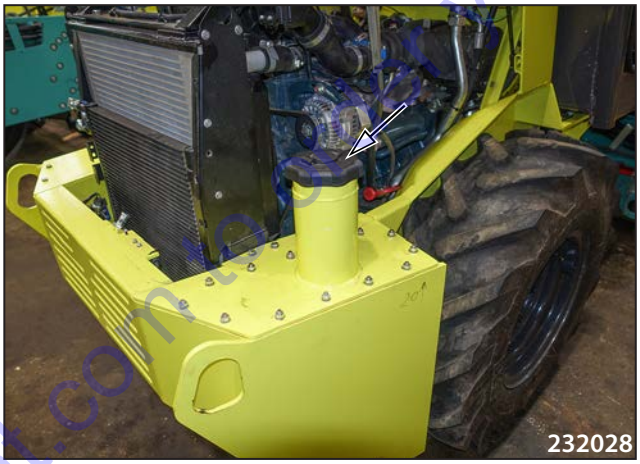
### 3.6.1 Fuel check

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



232128

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


232028

**Note**

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

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

**Do not refill the fuel when the engine is running.**

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

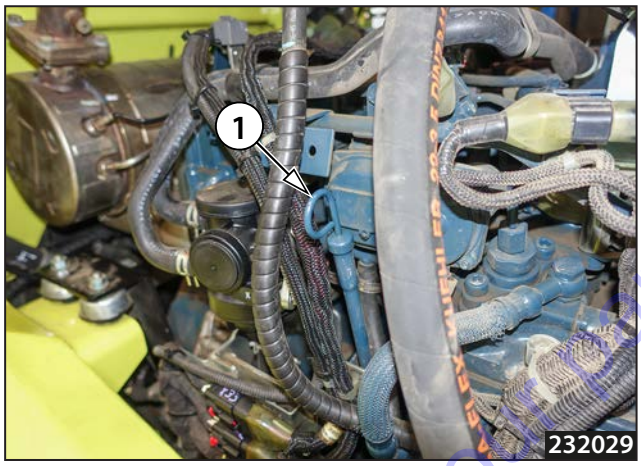
**Use only recommended clean fuel according to Chapter 3.2.2.**

**Do not refill the fuel in closed spaces.**

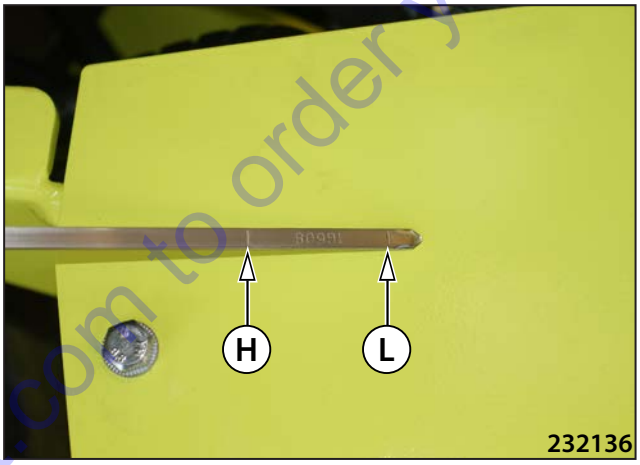
**Do not spill the fuel.**

### 3.6.2 Engine oil check

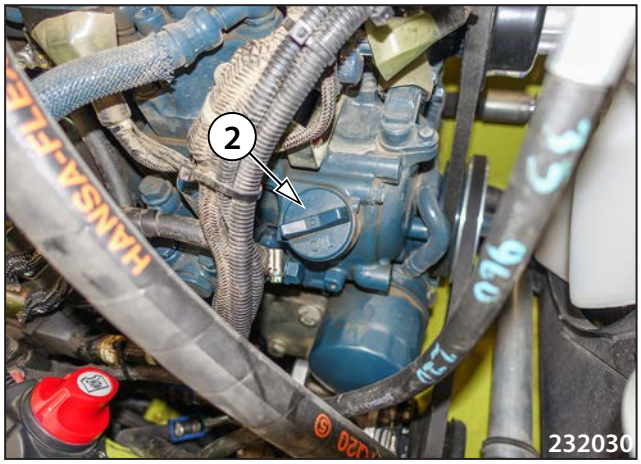
- Wait for about 5 min. until the oil flows down into the engine sump.
- Take out the oil dipstick (1), wipe it, insert fully back and take it out again to read out the oil level.




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



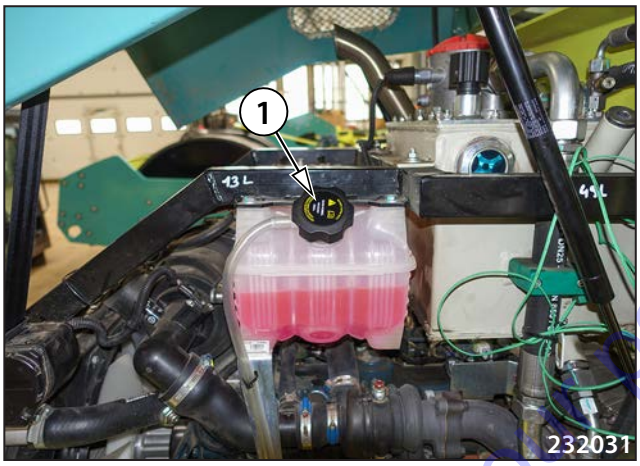

- After removing the filler cap (2), refill the oil through the oil filler. Wait about 1 min. until the level is stable and check again.
- Refill the identical type of oil. Use oils according to Chapter 3.2.1.
- Check the engine for leaks and remove the cause.
- Check the engine for damaged and/or missing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



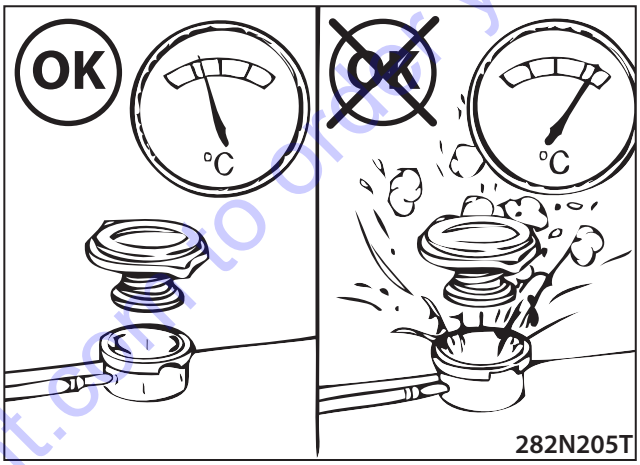

**Do not use the engine unless the oil level in the engine is correct.**

### 3.6.3 Engine coolant check

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




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




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

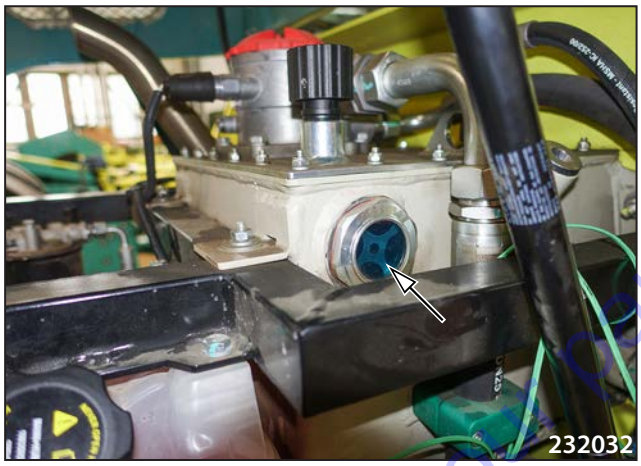
**Fill up only with the coolant according to Chapter 3.2.3.**

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

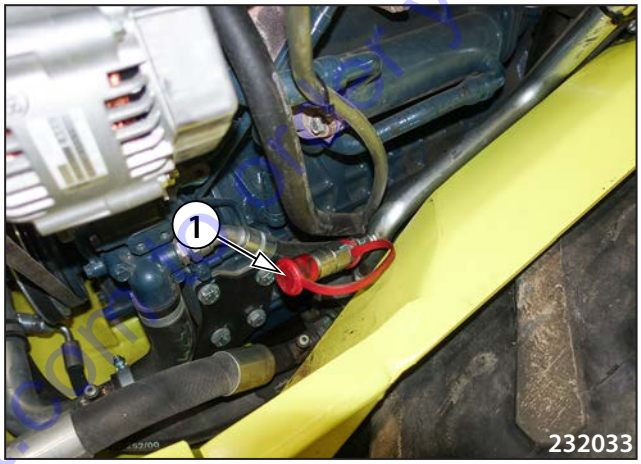
**In case of larger losses, find out where the cooling system leaks and repair the cause.**

### 3.6.4 Check of the oil in the hydraulic tank

- Check the oil level in the oil gauge.




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




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

**Fill with the specified oil according to Chapter 3.2.4.**

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

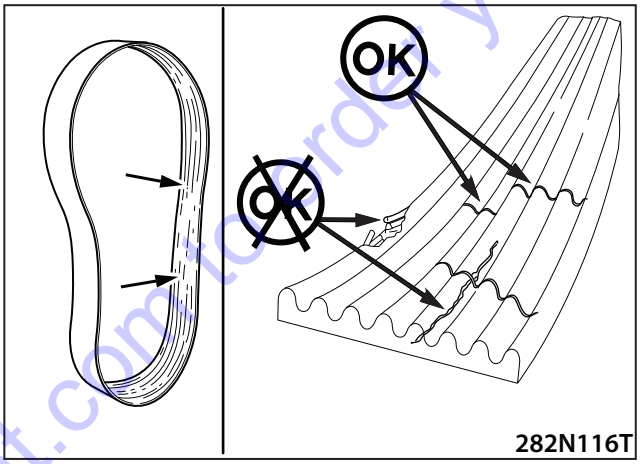
### 3.6.5 Checkofthefanandenginebeltforcondition

**Fan wear check**

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

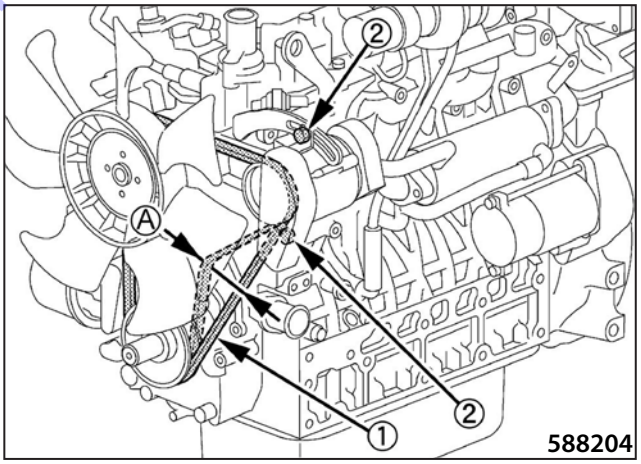

**Belt wear check**

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



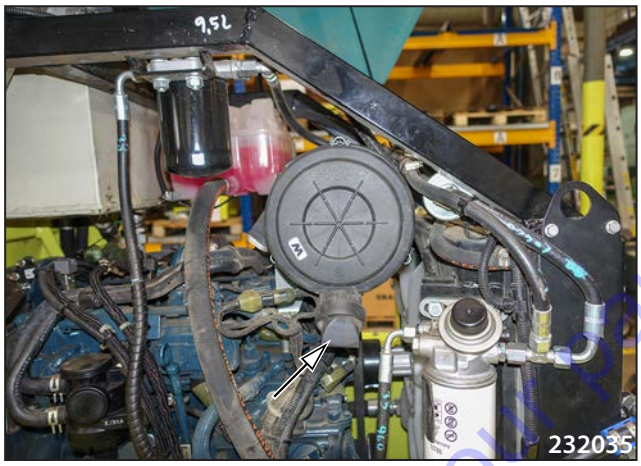

**Belt tension check**

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



### 3.6.6 Air filter check

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




- If the red ring appears on the contamination indicator (1) during operation, you must:
  - replace the air filter cartridge according to Chapter 3.6.26.


**Note**

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

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

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

### 3.6.7 Engine intake piping and exhaust pipe inspection

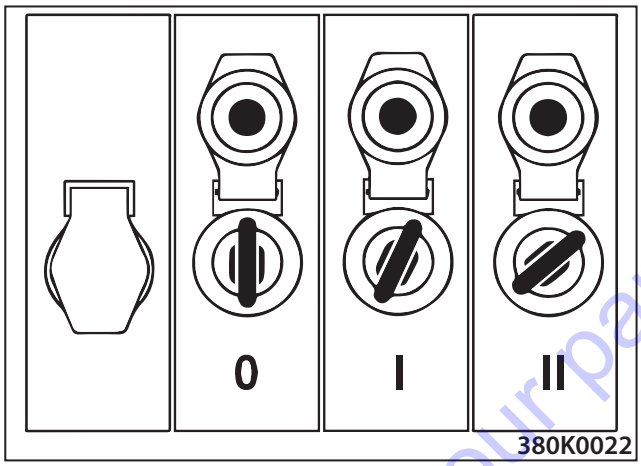
- Check the engine intake piping for leakage. Check the hoses for damage and missing hose clips.


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

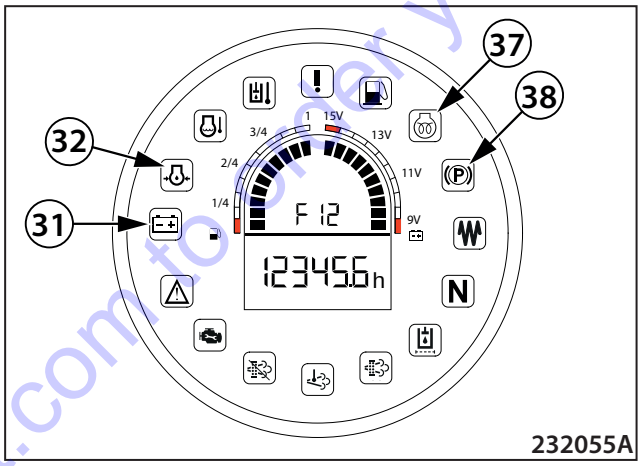

**If the exhaust piping with the flexible piece between the engine and the catalytic converter leaks or is damaged, the machine must not be operated until the defect is repaired.**

### 3.6.8 Inspection of warning and checking devices

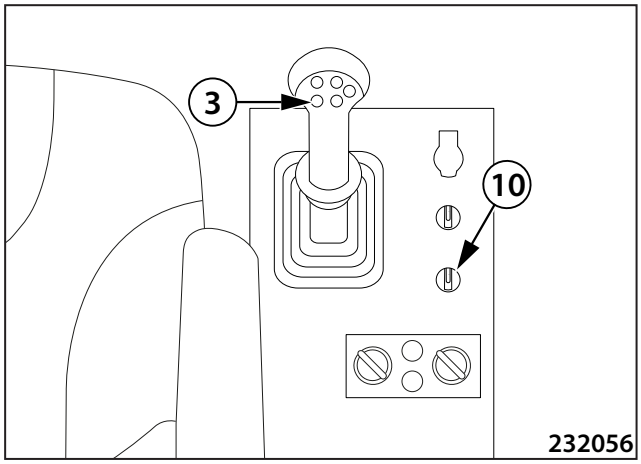
- Turn the key in the ignition box to position "I".

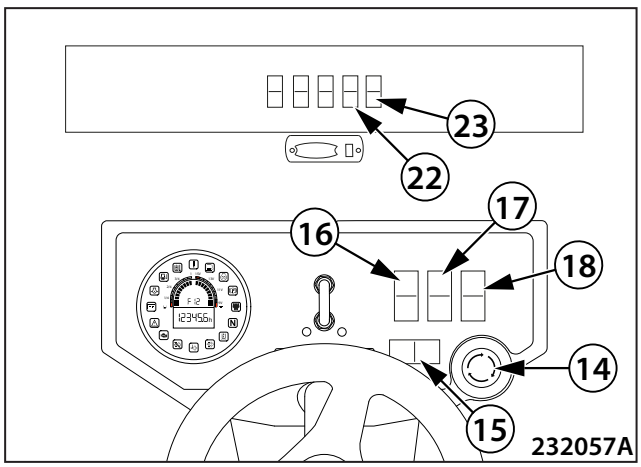



- The brake, charging, engine lubrication and glowing indicator lamps will light up on the display.

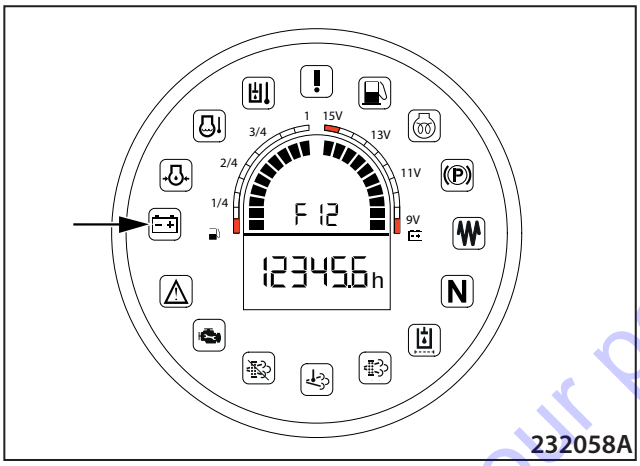



- Then check the switches (3, 10, 14 – 18, 22 – 23) for operation.



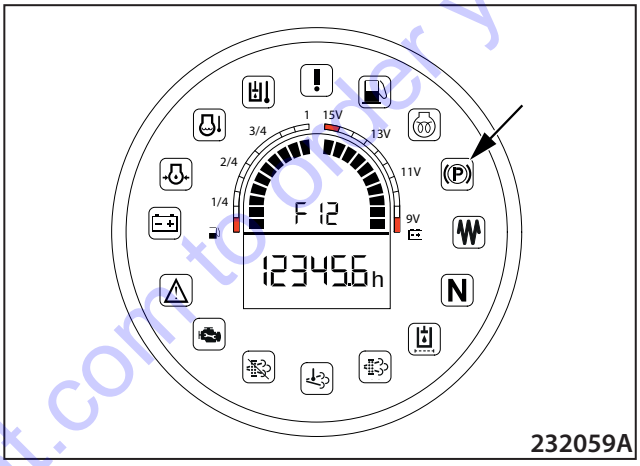



- Turn the key to position "II" to start the engine.
- The charging indicator lamp must go out after the starting is completed.



232058A

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



232059A

**Use the audible alarm to announce the engine start!**

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

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

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

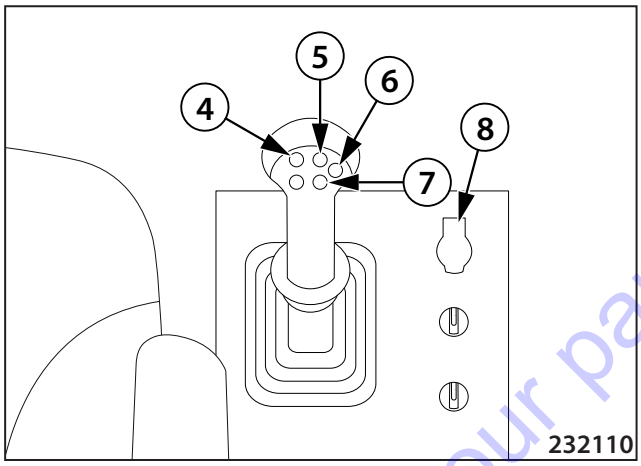
**During operation, check the instruments and indicator lamps continuously.**

**Promptly repair any failures!**

### 3.6.9 Brake test

#### 3.6.9.1 Check of the parking brake

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




**Perform the test on a level and solid surface.**

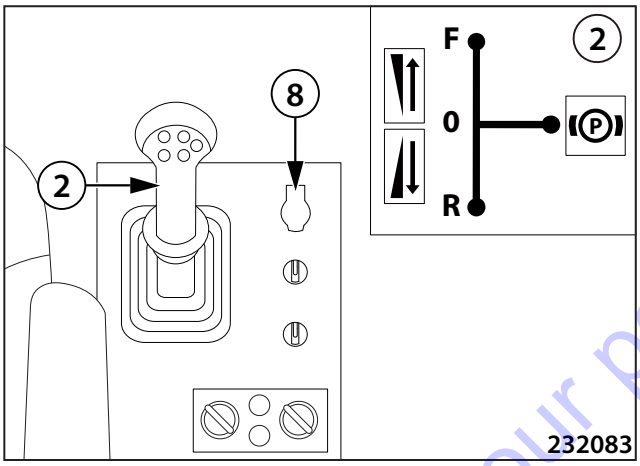
**Check that the area in front of and behind the machine is empty and that there are no persons or obstacles there! Ensure a suitable safe distance in front of the machine, behind the machine as well as on its sides.**

**Procedure**

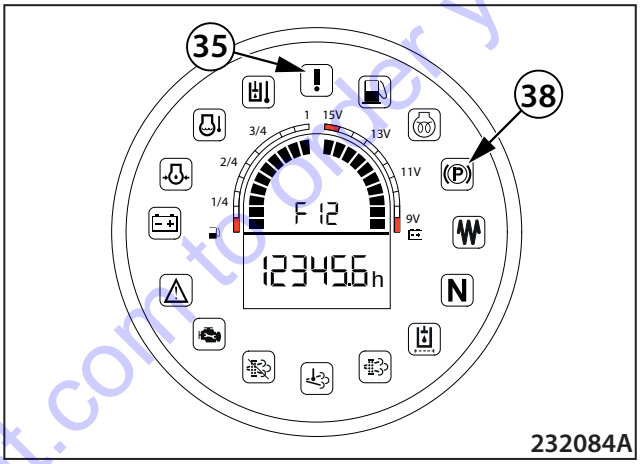
- Place the machine on a flat and solid surface.
- Sit on the driver's position.
- Turn the key in the ignition box (8) to position "I".
- Go to the service menu by pressing button (6) for 5 sec.
- Using buttons (5) and (7), browse the service menu and select "Brake test". Confirm the selection by pressing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

### 3.6.9.2 Check of the emergency brake

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

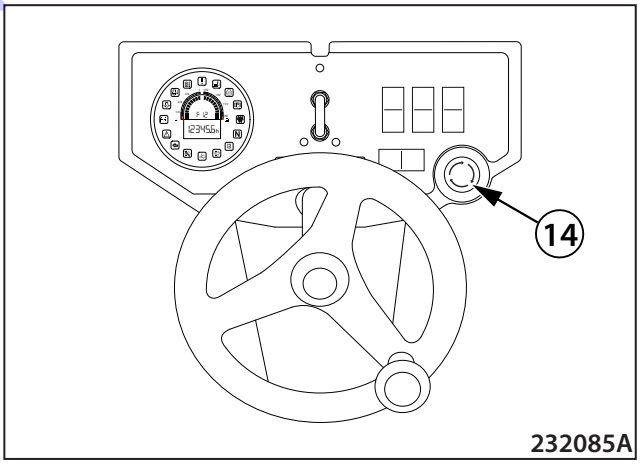



**Check that the area in front of and behind the machine is empty and that there are no persons or obstacles there! Ensure a suitable safe distance in front of the machine, behind the machine as well as on its sides.**




**Procedure:**

- Place the machine on a flat and solid surface.
- Sit on the driver's position and start the engine according to Chapter 3.2.3.
- Set the travel control (2) to the zero position (0).
- The parking brake indicator lamp (38) goes off.
- The machine is unbraked.
- Press the emergency brake button (14). The engine of the machine stops and the parking brake indicator lamp (38) and the emergency stop indicator lamp (35) light up.
- If the engine does not shut down, turn it off using the key in the ignition box (8), secure the machine against spontaneous movement using wedges on a level and solid surface and contact service.
- To start the machine again, move the key in the ignition box (8) to the "0" position and turn the emergency brake button (14) slightly to release it.

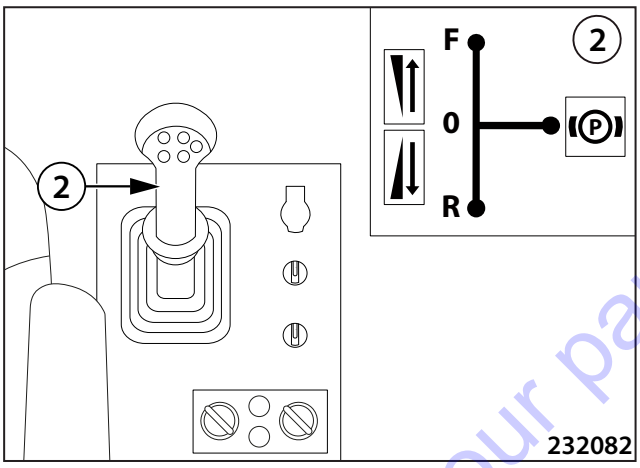



**Note**

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

### 3.6.9.3 Check of the service brake

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




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

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

**Procedure:**

- Place the machine on a flat and solid surface.
- Sit on the driver's position and start the engine according to Chapter 3.2.3.
- Move off the machine by setting the travel control (2) to the forward travel position "F".
- Set the travel control to the zero position (0).
- The machine will stop and the parking brake will not activate.
- To move off again or control the brake during braking, move the travel control (2) back to the forward travel position "F".
- If the machine does not stop, activate the emergency brake, secure the machine against spontaneous movement using wedges on a level and solid surface and contact service.

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

## Every 50 hours of operation

### 3.6.10 Engine leakage check

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


### 3.6.11 Cleaningthewaterseparatoronthefuelfilter

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


**Do not smoke while working!**
**Check the water separator for leaks.**

**Prevent the fluid from soaking into the ground.**

**Every 100 hours of operation**

### 3.6.12 Tyre pressure check

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


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

  Tractor tyres: 350 kPa (51 PSI)

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

## Every 250 hours of operation

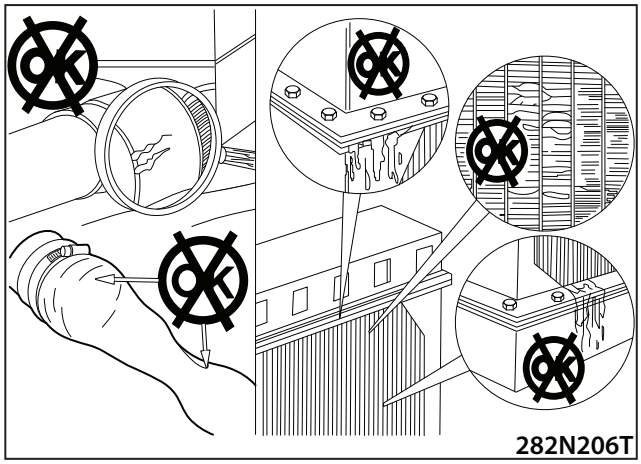
### 3.6.13 Checking the hoses and clips for mounting

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


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


### 3.6.14 Cooler inspection

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

### 3.6.15 Air filter cleaning

- Remove the filter cap.


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


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


**Never use compressed air to clean the filter interior.**

### 3.6.16 Machine lubrication

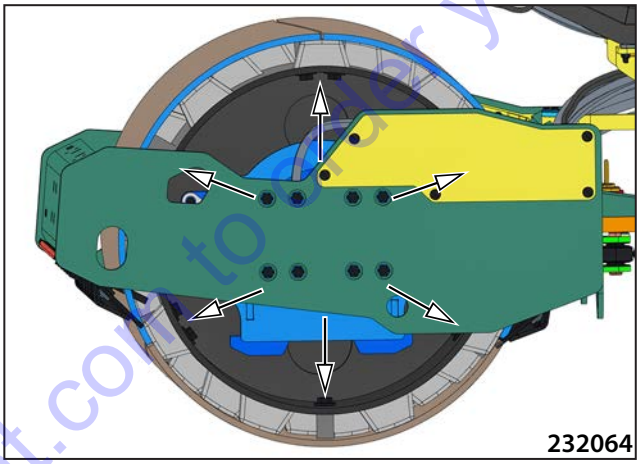
- Remove the caps on the grease nipples.
- Put on the grease nipple of the high-pressure press gradually and lubricate until the old grease starts flowing out.
- Replace the oil grease nipple caps.

**Door hinges pins**

Pins 2×

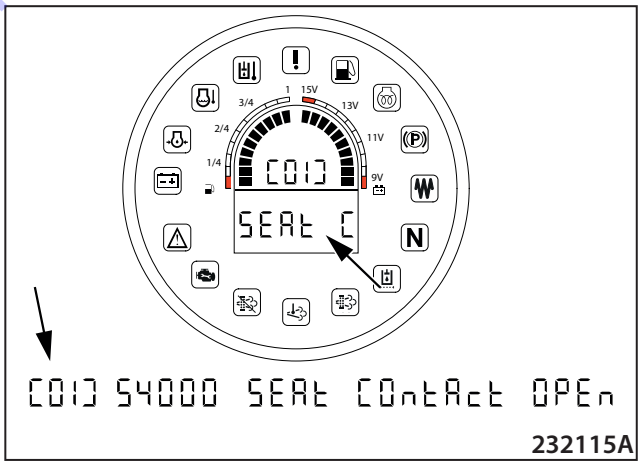

### 3.6.17 Checking the smooth segments

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




### 3.6.18 Seat switch check

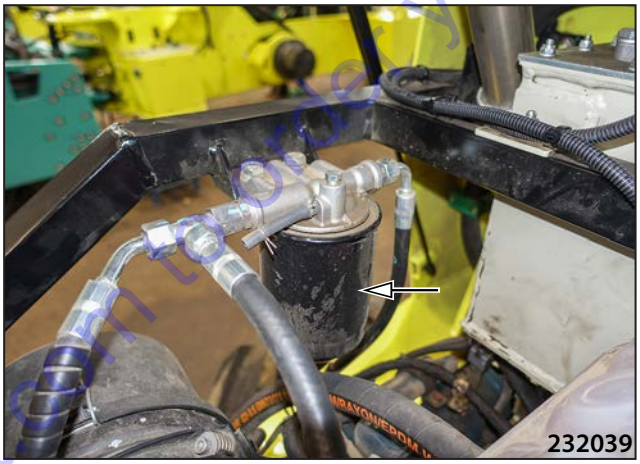
- Sit on the seat.
- Turn the key in the ignition box to the "I" position.
- Stand up from the seal.
- The "(01) 54000 SEAT CONTACT OPEN" message must be shown on the display.
- The message must disappear after you sit on the seat again.



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

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

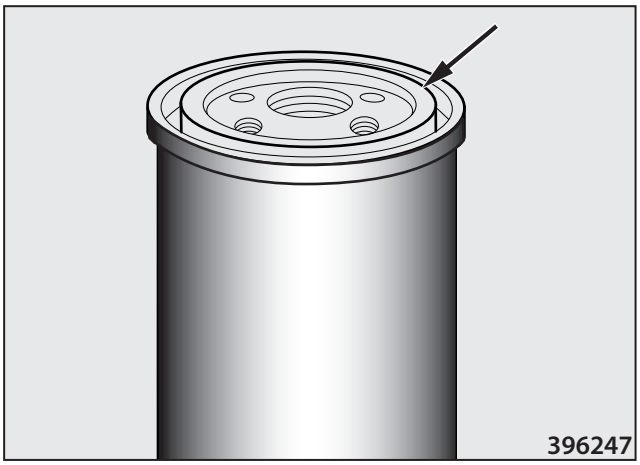
### 3.6.19 Fuel filter replacement




**Fuel filter**

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

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




**Fuel filter**
Order number: 1579220

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


**Fuel filter cartridge**
Order number: 1713590

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

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

**Start the engine and then check the filters for leaks.**

**Use original filters specified by the manufacturer.**

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

**During the replacement, observe fire protection measures!**

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

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

**Catch the drained fuel.**

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

### 3.6.20 Electrical installation inspection

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

### 3.6.21 Replacement of the main cartridge of the air filter

- Remove the filter cap.


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

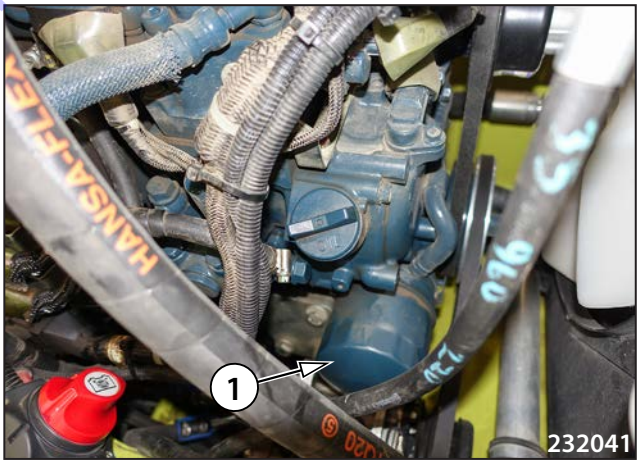

**Air filter cartridge (external)**
Order number: 1713581

### 3.6.22 Engine oil change

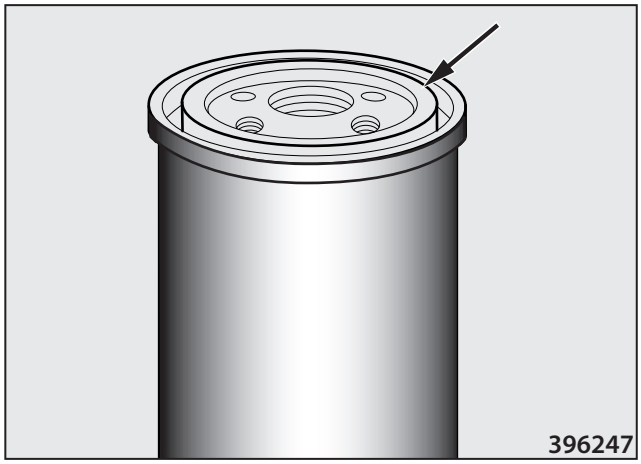
**Check for the first time after 50 hours.**

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


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




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



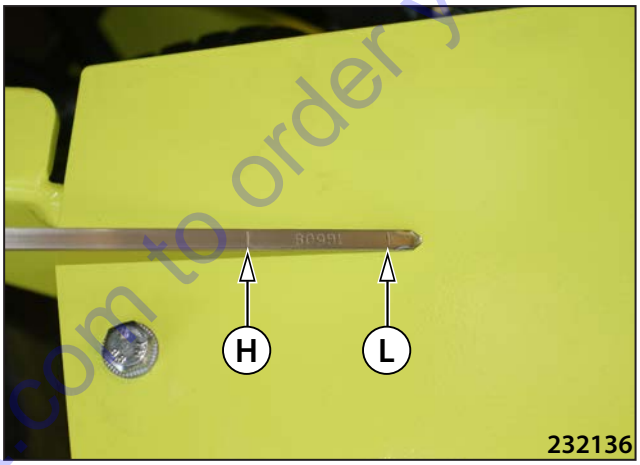

- Lubricate the gasket with oil.
- Mount the new filter.

**Engine oil filter**
Order number: 1504183

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

- Fill the engine through the filler neck.


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




**Note**

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

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

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

**Follow the fire-fighting measures!**

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

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

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

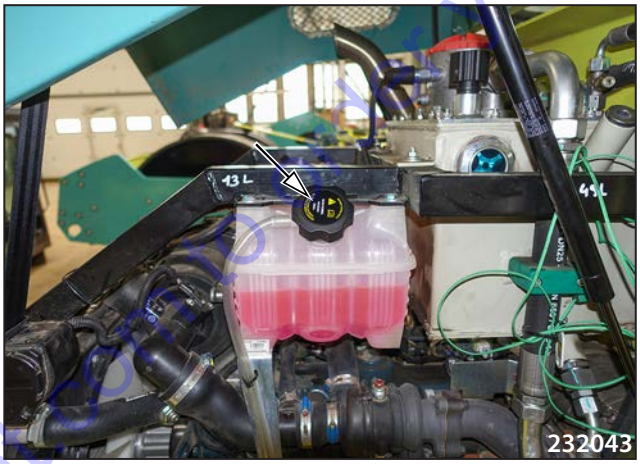
**Used oil and filters are environmentally hazardous waste – hand it over for disposal.**

### 3.6.23 Cab ventilation filter replacement


**Cab**

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

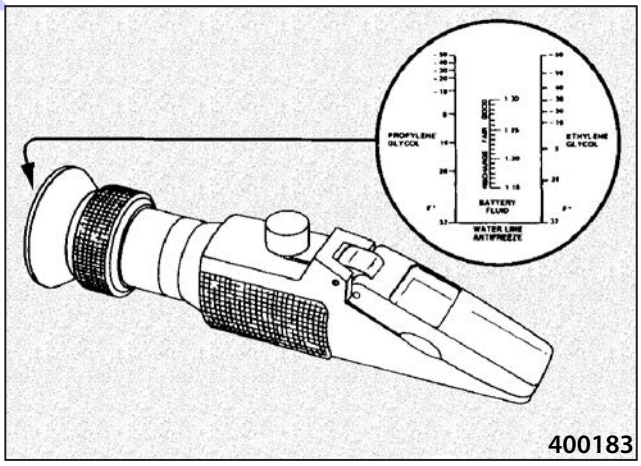
### 3.6.24 Engine coolant check




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

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

- Add anti-freeze agent according to Chapter 3.2.3.




### 3.6.25 Checking the wheel screws for tightening


**Check for the first time after 100 hours.**

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

## Every 1000 hours of operation

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

### 3.6.26 Replacement of air filter cartridges

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

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

**Never use damaged cartridges!**

**Do not use different cartridges than required!**

**Do not remove the cartridges only for checking purposes!**

**The filter must not be open longer than necessary!**

**Never operate the machine with the damaged filter body!**

**Air filter cartridge replacement:**

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

- Open the bonnet.
- Remove the filter cap.


- Take out the main cartridge.

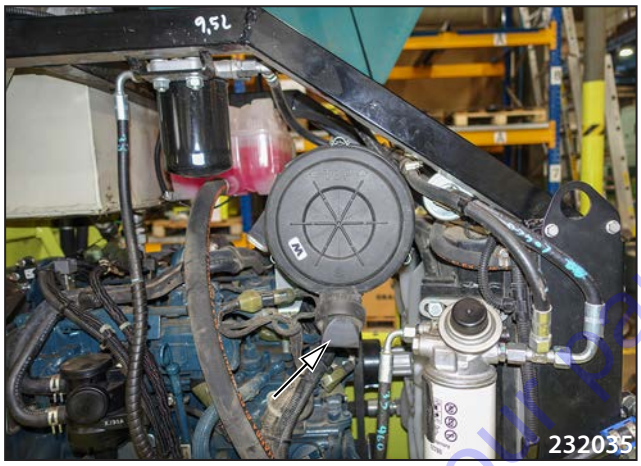
**Air filter cartridge (external)**
Order number: 1713581


- Take out the safety cartridge.

**Air filter cartridge (internal)**
Order number: 1713593


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

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




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

**Use original cartridges, only.**

**Take care not to splash water into the air filter.**

**Replace the dust valve immediately if it is damaged!**

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

### 3.6.27 Inspection of the shock-absorbing system

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

Shock-absorbing system of the drum.

**Rubber-metal element**
Order number: 1669981



Rubber-metal elements of the driver's stand

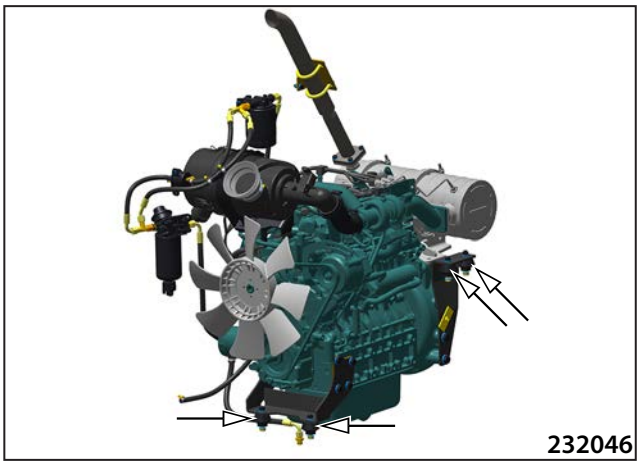
**Rubber-metal element**
Order number: 4–43700


Rubber-metals elements of the engine 6x

**Rubber-metal element**
Order number: 1515888

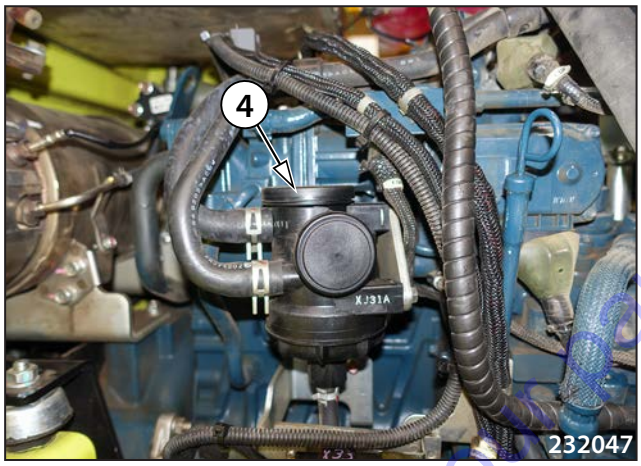
**Replace if damaged.**

**Recheck screws and nuts for tightening.**



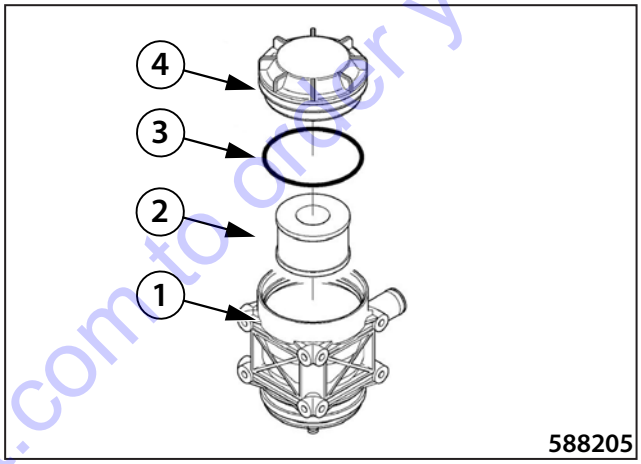
### 3.6.28 Oil separator cartridge replacement

- Remove the cap (4).



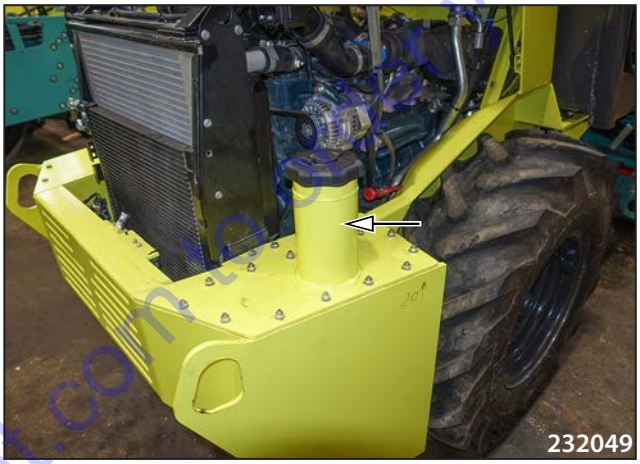

- Replace the filter cartridge (2) and the seal ring (3).
- Clean the internal area of the filter (1).
- Insert a new filter cartridge (2) and a seal ring (3).

**Oil separator cartridge**
Order number: 1521826



### 3.6.29 Fuel tank cleaning


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




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

**Do not smoke while working!**

**Catch the drained fuel.**

### 3.6.30 Valve clearance check and adjustment

- Contact the Kubota service for adjusting the engine valves.

### 3.6.31 Battery inspection

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

**MAINTENANCE-FREE BATTERY**

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

**Note**

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


**Keep the battery dry and clean.**

**Do not disconnect the battery when the engine is running.**

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

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

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

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

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

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

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

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

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

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

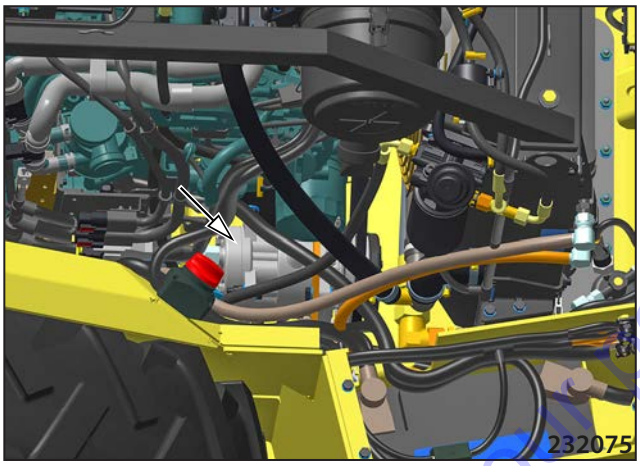
**Never make direct conductive connection between both poles of the battery to avoid a short circuit and a risk of explosion of the battery.**

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

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

**Hand over the old inoperative battery for disposal.**

### 3.6.32 Inspection of the air-conditioning unit compressor mounting




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

## Every 2000 hours of operation

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

### 3.6.33 Engine coolant change

**Draining the cooling circuit:**

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

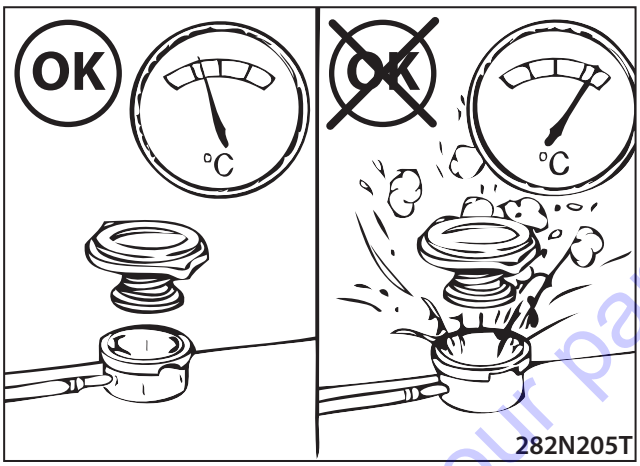
**Do not open the pressure plug before the coolant temperature drops below 50°C (122°F). Beware of gushing of the coolant and scalding when opening the pressure plug.**

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

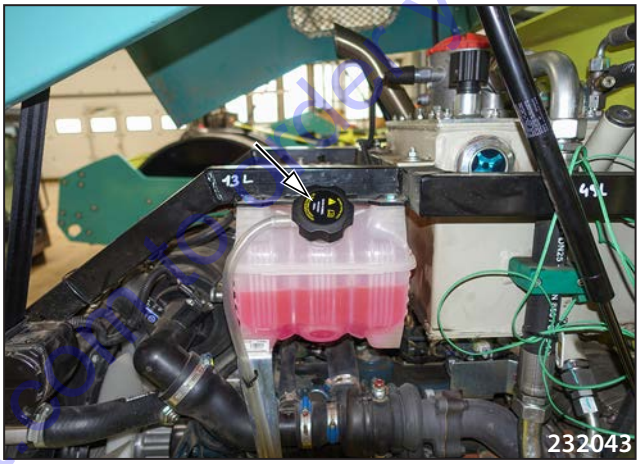
- Stop the engine.
- Remove the drain plug.
- Let the fluid drain into the prepared pans.
- The drained volume is about 13 l (3.4 gal US).

**Note**

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

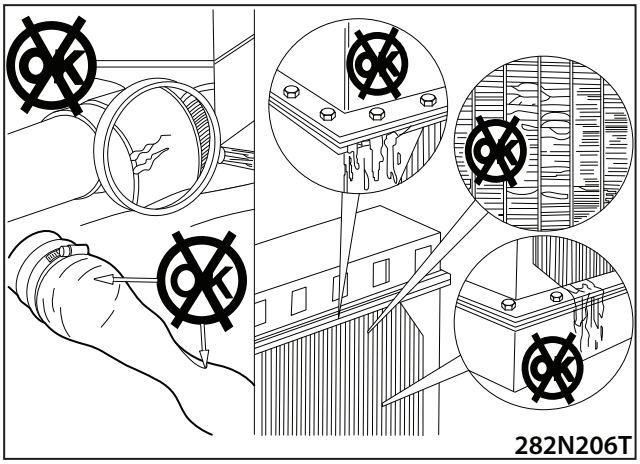


282N205T



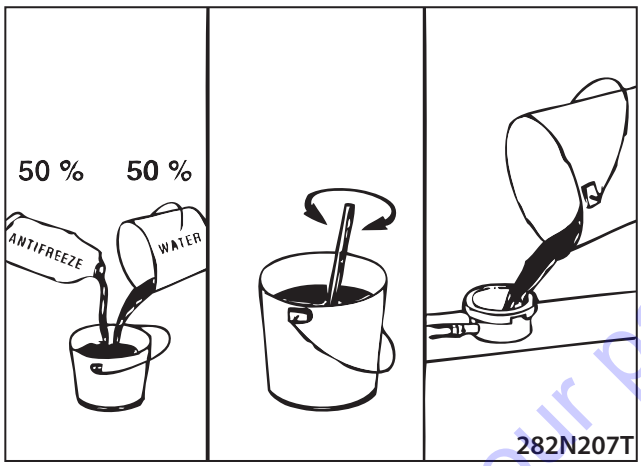
232043


232076


282N206T

**Fill the cooling circuit**

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




**Wear gloves to protect your hands!**

**Protect your eyes with safety glasses or face shield!**

**Fill with the coolant according to Chapter 3.2.3!**

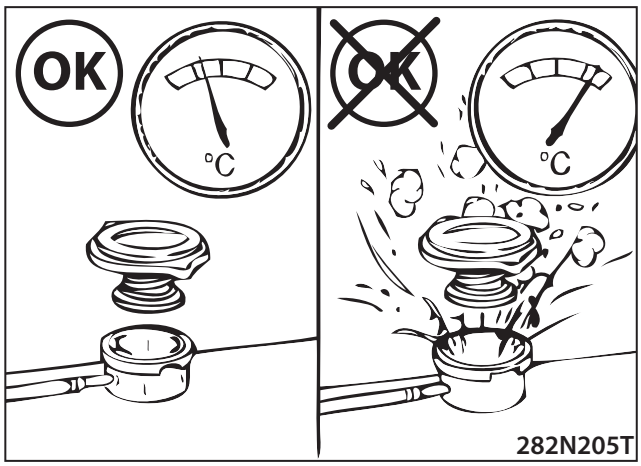
**When changing coolant, follow instructions of the anti-freeze manufacturer!**

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

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

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


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




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

### 3.6.34 Cleaning and checking the air conditioning system

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

### 3.6.35 Hydraulic oil change and filter replacement

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

**Follow the fire-fighting measures!**

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

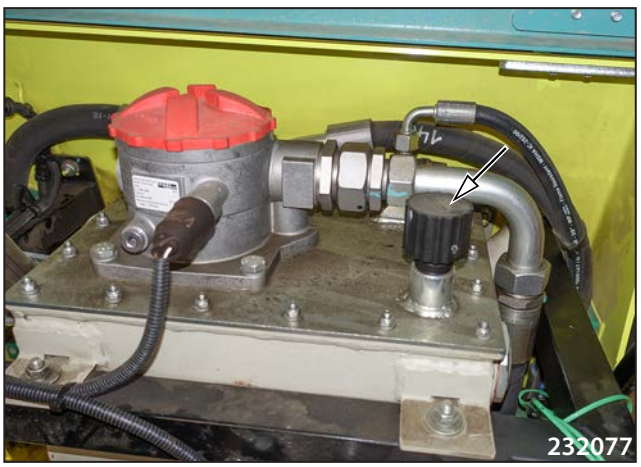
**When disconnecting the hydraulic circuits, blind all of holes with plugs.**

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

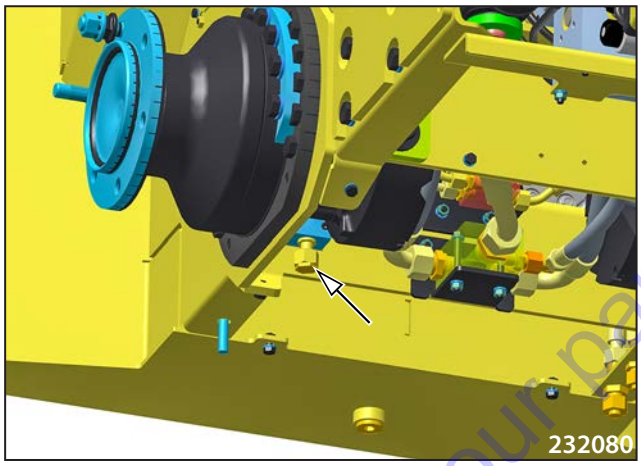
**Used oil and filter cartridges are environmentally dangerous waste – hand them over for disposal.**

**Hydraulic oil draining**

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

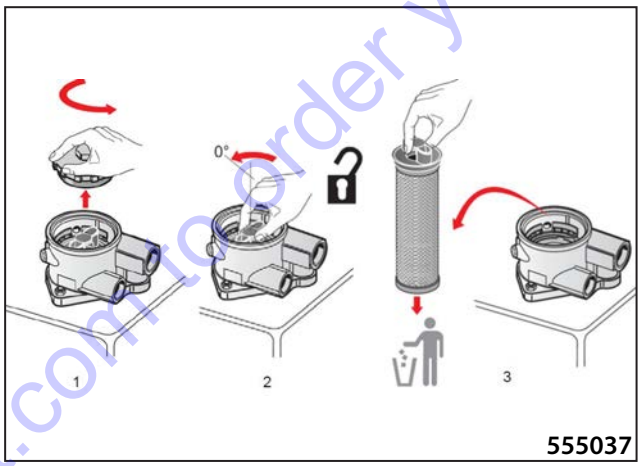


- Remove the drain plug.
- Let the oil flow out into the vessel.

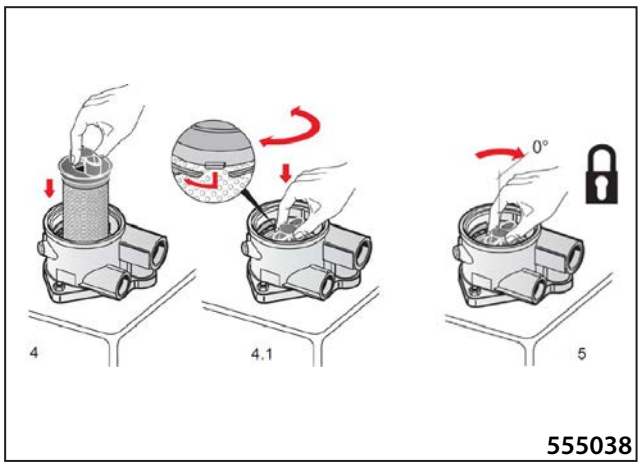



**Hydraulic oil filter replacement**

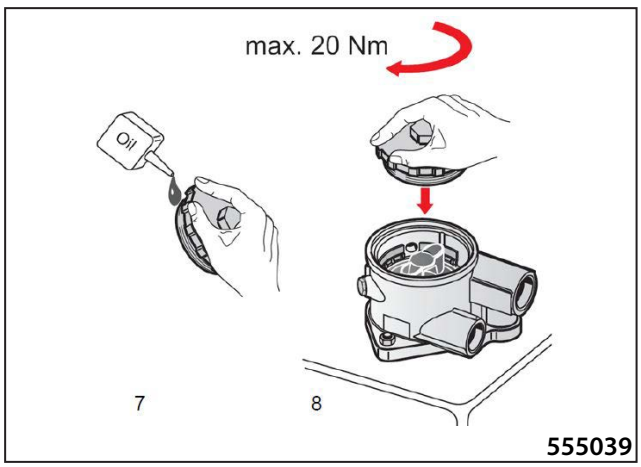
- Take off the filter cap.
- Unlock the filter cartridge.
- Pull out the filter cartridge from the filter housing.
- Dispose of the filter cartridge environmentally.




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




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




**Set of hydraulic oil filters**
Order number: 1713717

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

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

**Filling the hydraulic circuit:**

Fill using the hydraulic unit.

You can order the hydraulic unit from the machine manufacturer.

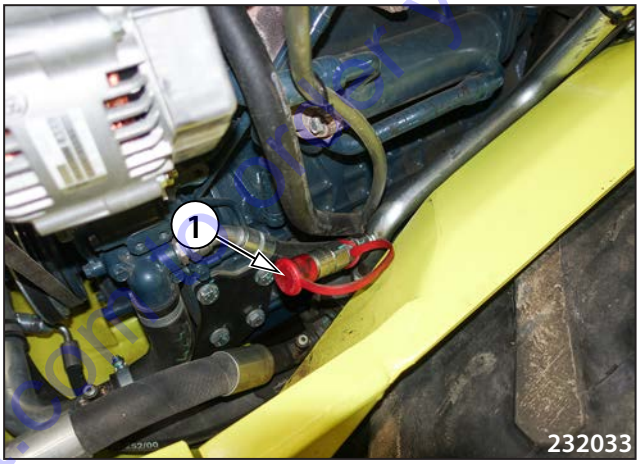
**Hydraulic unit 230 V**
Order number: 1251998

**Hydraulic unit 110 V**
Order number: 1255297

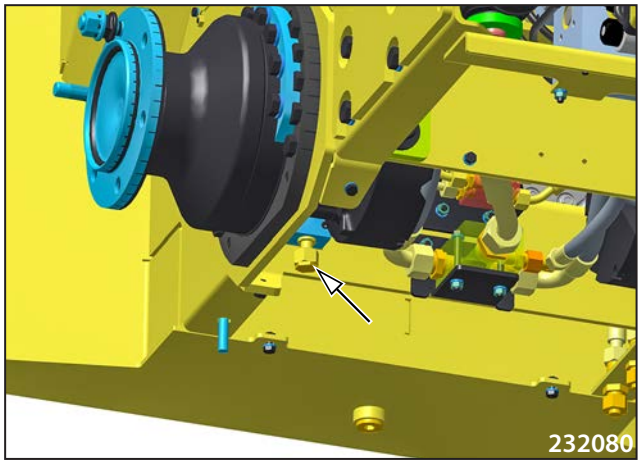

**Note**

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

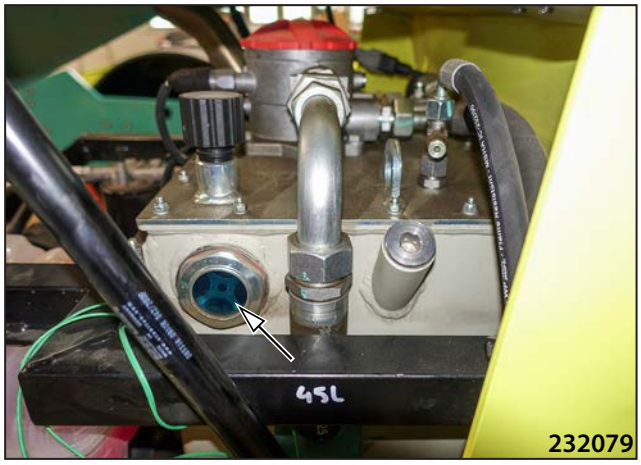
- Remove the cap of the filling end piece and put the quick-coupler of the filling device onto the quick-coupler (1). Fill the hydraulic circuit until the clean oil starts flowing out from the tank. Catch the oil in a clean pan.




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

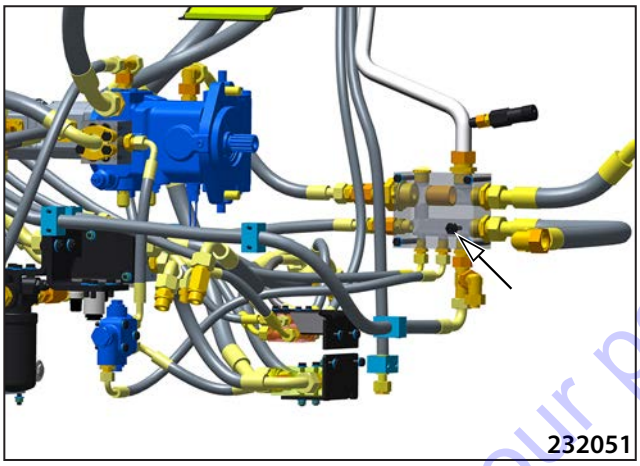



- Fill up the tank with the oil to the maximum level and disconnect the filling device.



**Checking the oil thermometer sensor:**

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




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

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

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

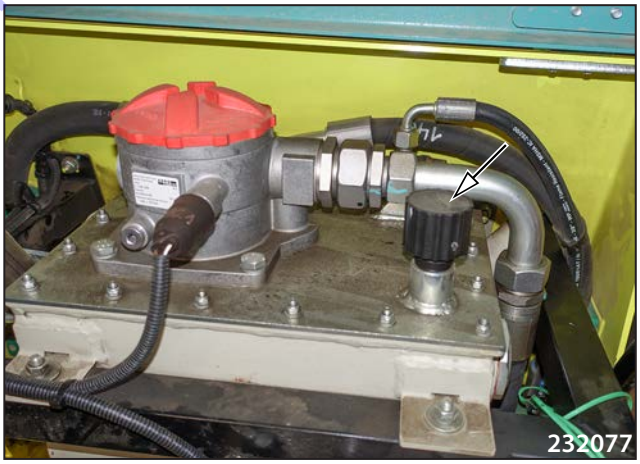
**For cleaning the tank, use agents, which do not release fibres, and do not use chemical detergents. Fill with the oil according to Chapter 3.2.4.**

- Mount a new ventilation filter.

**Ventilation filter**
Order number: 1280287

**Note**

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



**Every 3000 hours of operation**

### 3.6.36 DPF cleaning

- Contact the Kubota service for cleaning the DPF.

### 3.6.37 Changing the lubricant of the vibrator bearings

- Contact Ammann Service to change the lubricant of the vibrator bearings.

**Maintenance as required**

## 3.6.38 Gas strut replacement

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

**Gas strut**
Order number: 1712933


615107


615108


615109

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

**There is a risk of injury!**

**Removal**

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

**Installation**

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

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

**Use genuine parts only!**

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

### 3.6.39 Scraper adjustment

- Adjust the scrapers according to Chap. 2.7.9 if required.

### 3.6.40 Cleaning the machine

- Clean the machine from big impurities after completing the work.
- Clean the whole machine completely on regular basis, at least once a week. When working on cohesive soils, cement and lime stabilizations, clean the machine completely every day.
- Check the anti-slip strips of the machine platform for dirt or wear. Keep the strips clean. Replace worn strips.

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

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

**Disconnect the battery disconnector.**

**Clean with the engine stopped.**

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

**Follow environmental standards and regulations when cleaning the machine!**

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

**Do not use forbidden cleaning agents!**

### 3.6.41 Fuel system bleeding


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

**Low-pressure piping and filter bleeding:**

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

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

**Follow safety regulations!**

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

**Stop the fuel soaking into the ground!**

### 3.6.42 DPF (diesel particulate filter) clogging regeneration

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

### 3.6.43 Rear-view mirrors

Before driving the machine, the machine operator (driver) must clean and adjust the external rear view mirrors so that they can clearly see the area behind the machine even when the machine is moving.

**It is forbidden to operate the machine without the external rear view mirrors!**

**Always clean and adjust the external rear view mirrors when the machine is stationary and secured against unintentional movement!**

**Clean and adjust the external rear view mirrors from the ground or from the driver's stand!**

### 3.6.44 Charging of the battery

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

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

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

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

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

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

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

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

**Do not eat, drink and smoke while working!**

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

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

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

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

**Stop charging if the battery is hot or leaking acid.**

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

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

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

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

**Hand over the old inoperative battery for disposal.**

### 3.6.45 Checking the screw connections for tightening

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

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

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

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

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

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

**Tightening torques for necks with sealing edge or flat sealing**

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

**Tightening torques for plugs with flat sealing**

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

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

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

## 3.7 Troubleshooting

| Error on the display | Description | Check, measures |
|---|---|---|
| 50000 | Input board circuit error | Check the battery |
| 50001 | Severe input board circuit error | Contact technical support |
| 50002 | Input pin error | Contact technical support |
| 50003 | PWM output error | Contact technical support |
| 50004 | CPU core error | Contact technical support |
| 50005 | Memory error | Contact technical support |
| 50006 | Watchdog start-up error | Contact technical support |
| 50007 | Safety switch error | Contact technical support |
| 50008 | Application code triggered safe condition | Contact technical support |
| 50009 | Severe error caused safe condition | "ECU replacement required Contact technical support" |
| 50010 | BSP error caused safe condition | "ECU replacement required Contact technical support" |
| 50012 | Application execution time has reached task time-out | Contact technical support |
| 50013 | Battery voltage has dropped below lower threshold | Check battery charging, the battery |
| 50014 | Battery voltage is above upper threshold | Check battery charging, the battery |
| 50015 | Temperature at lower threshold | - |
| 50016 | Temperature at upper threshold | Machine overheating |
| 50017 | Low supply voltage of sensor S1 | Contact technical support |
| 50018 | High supply voltage of sensor S1 | Contact technical support |
| 50023 | Main fault page not correct – second fault page loaded correctly | Contact technical support |
| 50024 | List loading error | Contact technical support |
| 50025 | List saving error | Contact technical support |
| 50026 | DM_LIST_OVERFLOW | Contact technical support |
| 50027 | CBUS0 – CAN bus off | "Problem on CAN0 bus (X65) Contact technical support" |
| 50028 | CBUS0 – CAN warning | "Problem on CAN0 bus (X65) Contact technical support" |
| 50029 | CBUS0 – HW send buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50030 | CBUS0 – HW send buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50031 | CBUS0 – HW send buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50032 | CBUS0 – HW send buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50033 | CBUS0 – HW send buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50034 | CBUS0 – HW send buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50035 | CBUS0 – HW receive buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50036 | CBUS0 – HW receive buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |

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

| Error on the display | Description | Check, measures |
|---|---|---|
| 50037 | CBUS0 – HW receive buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50038 | CBUS0 – HW receive buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50039 | CBUS0 – HW receive buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50040 | CBUS0 – HW receive buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50041 | CBUS0 – HW receive buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50042 | CBUS0 – HW receive buffer overflow | "Problem on CAN0 bus (X65) Contact technical support" |
| 50043 | CBUS1 – CAN bus off | "Problem on CAN1 bus (X64) Contact technical support" |
| 50044 | CBUS1 – CAN warning | "Problem on CAN1 bus (X64) Contact technical support" |
| 50045 | CBUS1 – HW send buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50046 | CBUS1 – HW send buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50047 | CBUS1 – HW send buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50048 | CBUS1 – HW send buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50049 | CBUS1 – HW send buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50050 | CBUS1 – HW send buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50051 | CBUS1 – HW receive buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50052 | CBUS1 – HW receive buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50053 | CBUS1 – HW receive buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50054 | CBUS1 – HW receive buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50055 | CBUS1 – HW receive buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50056 | CBUS1 – HW receive buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50057 | CBUS1 – HW receive buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50058 | CBUS1 – HW receive buffer overflow | "Problem on CAN1 bus (X64) Contact technical support" |
| 50164 | MST – CAN send buffer read | Contact technical support |
| 50172 | MST – DMx protocol error | Contact technical support |
| 50180 | NV_PAR – DB Nv loading error | Contact technical support |

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

## 3.7 Troubleshooting

| Error on the display | Description | Check, measures |
|---|---|---|
| 50181 | NV_PAR – DB Nv saving error | Contact technical support |
| 50182 | NV_OPT – DB Nv loading error | Contact technical support |
| 50183 | NV_OPT – DB Nv saving error | Contact technical support |
| 50186 | NV_PAR – DB Nv loading error | Contact technical support |
| 50187 | NV_PAR – DB Nv saving error | Contact technical support |
| 50190 | NV_PAR – DB Nv loading error | Contact technical support |
| 50191 | NV_PAR – DB Nv saving error | Contact technical support |
| 50196 | VerExtended – DB Nv loading error | Contact technical support |
| 50197 | VerExtended – DB Nv saving error | Contact technical support |
| 50198 | NV_MEM_EngineControl – DB Nv loading error | Contact technical support |
| 50199 | NV_MEM_EngineControl – DB Nv saving error | Contact technical support |
| 50200 | NV_MEM_Machine – DB Nv loading error | Contact technical support |
| 50201 | NV_MEM_Machine – DB Nv saving error | Contact technical support |
| 50202 | Flashset loading error | Contact technical support |
| 51016 | Valve vibration – short circuit to power supply (high voltage) – HS load disconnect / short circuit to power supply, external | Contact technical support |
| 51068 | Blade up – short circuit to power supply (high voltage) – output pin connected to power supply | "Machine PCB fault (Electronic relay)<br>Contact technical support" |
| 51069 | Blade down – short circuit to power supply (high voltage) – output pin connected to power supply | "Machine PCB fault (Electronic relay)<br>Contact technical support" |
| 51070 | Blade in floating position – short circuit to power supply (high voltage) – output pin connected to power supply | "Machine PCB fault (Electronic relay)<br>Contact technical support" |
| 51115 | Drive pump neutral switch – short circuit to ground (low voltage) – input signal too low / short circuit to ground | "Fault in the circuit of the lever-out-of-PB-position switch<br>Contact technical support" |
| 51137 | Parking brake valve (HighSide) – load disconnection / short circuit to power supply | "Fault in the parking brake coil circuit<br>The machine cannot start<br>Contact technical support" |
| 51138 | Parking brake valve (LowSide) – load disconnection / short circuit to power supply | "Fault in the parking brake coil circuit<br>The machine cannot start<br>Contact technical support" |
| 51139 | Parking brake pressure – voltage too high – short circuit of input signal to power supply | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51140 | Travel lever position switch – lever in parking brake position – input voltage too low / short circuit to ground | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51200 | HWPin_01 – request for engine start – short circuit to power supply / disconnected load | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51201 | HWPin_01 – activation of the engine control unit – short circuit to power supply / disconnected load | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51216 | Heating of crankshaft exhaust air – short circuit to power supply – output pin connected to power supply | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51218 | Fuel tank level – signal very high, critical – short circuit of input signal to power supply | "Check if the connector from the diesel tank level sensor is plugged in.<br>Contact technical support" |

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

| Error on the display | Description | Check, measures |
|---|---|---|
| 51240 | Set speed of engine A – short circuit to ground (low voltage) – input signal too low / short circuit to ground | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51241 | Set speed of engine B – short circuit to ground (low voltage) – input signal too low / short circuit to ground | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51244 | Engine start requested – short circuit to ground (low voltage) – input signal too low / short circuit to ground | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51300 | Seat switch – short circuit to ground (low voltage) – input signal too low / short circuit to ground | "Likely short circuit on machine wiring<br>Contact technical support" |
| 51311 | Telematics engine running – short circuit to power supply (high voltage) – output pin connected to power supply | "Check the telematics unit connection<br>Contact technical support" |
| 51312 | Immobilizer – short circuit to ground (low voltage) – input signal too low / short circuit to ground | "Check the telematics unit connection<br>Contact technical support" |
| 51318 | Seat switch horn – short circuit to power supply (high voltage) – output pin connected to power supply | - |
| 51389 | Brake lights – short circuit to power supply / disconnected load | - |
| 52001 | SF 1.1 Safe engine start | "The lever is tilted out of the parking brake position, so the engine start is blocked<br>Move the control lever to the parking brake position" |
| 52002 | SF 2.2 Detection of operator presence, engine stop | "The lever is tilted out of the parking brake position and at the same time the operator is not sitting on the seat<br>Move the control lever to the parking brake position" |
| 52003 | SF 3.2 Detection of operator presence, the machine stops | "The lever is tilted out of the parking brake position and at the same time the operator is not sitting on the seat<br>Indicated by an intermittent sound signal<br>Move the control lever to the parking brake position" |
| 52044 | SF 2.6 Parking brake diagnostics | "Fault in the parking brake electrical circuit<br>The machine stops the engine" |
| 52045 | SF 2.4 Parking brake monitoring | "Fault in the parking brake hydraulic circuit<br>Contact technical support" |
| 52068 | SF 2.11 Steering pressure monitoring | "Low pressure in the hydraulic circuit of the machine<br>Check the hydraulic oil level<br>Contact technical support" |
| 52119 | Safe App / Function initialization failed | Contact technical support |
| 52120 | App / Module initialization failed | Contact technical support |
| 52140 | Safe App / Function parameter initialization failed | Contact technical support |
| 52141 | App / Module parameter initialization failed | Contact technical support |
| 52324 | Engine not detected | Contact technical support |
| 52325 | Engine CAN communication lost | Contact technical support |
| 52326 | Low engine oil pressure | "Check the engine oil level<br>Contact engine manufacturer's technical support" |
| 52327 | Unknown engine speed setpoint | "Check the engine speed selector switch<br>Contact technical support" |
| 52328 | Engine coolant overheating | "Machine overheated<br>Check and refill the coolant" |
| 52329 | Engine speed inconsistency | "Check the fuel filter and air intake filter<br>Can be caused by excessive engine load" |

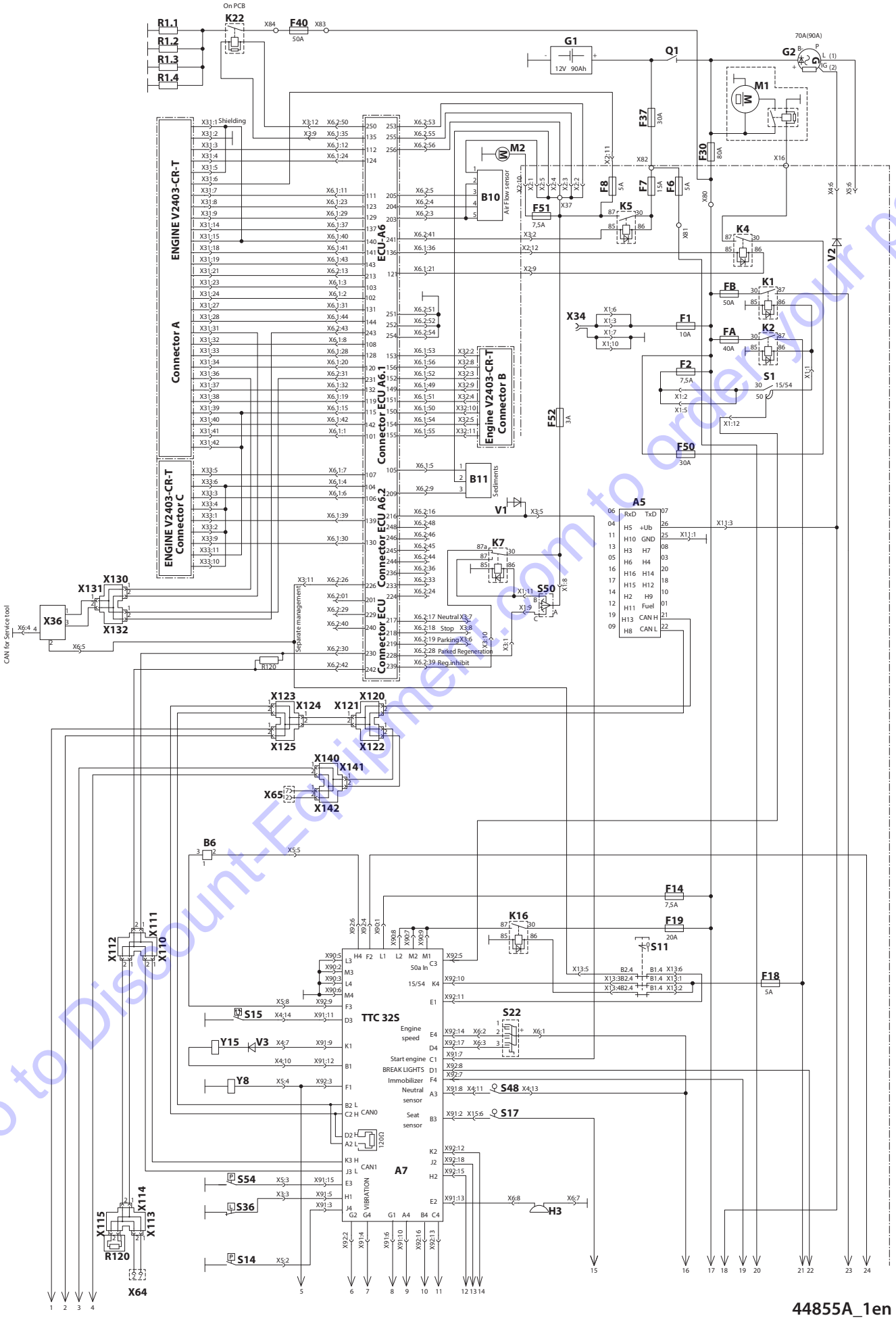
| Error on the display | Description | Check, measures |
|---|---|---|
| 52388 | Excessive hydraulic oil temperature | "Machine overheated<br>The function limits the vibration function" |
| 52389 | Low coolant level | Also indicated by an indicator lamp on the display. Add coolant. |
| 54000 | Seat switch disconnected | "Sit down / check the seat<br>Contact technical support" |
| 54001 | Travel lever not in parking brake position | Move the control lever to the parking brake position |
| 54002 | Immobilizer active | "Immobilizer active<br>Enter the authorization code / contact the machine administrator." |

# 3.8 Annexes

## 3.8.1 Wiring diagram

**Legend:**

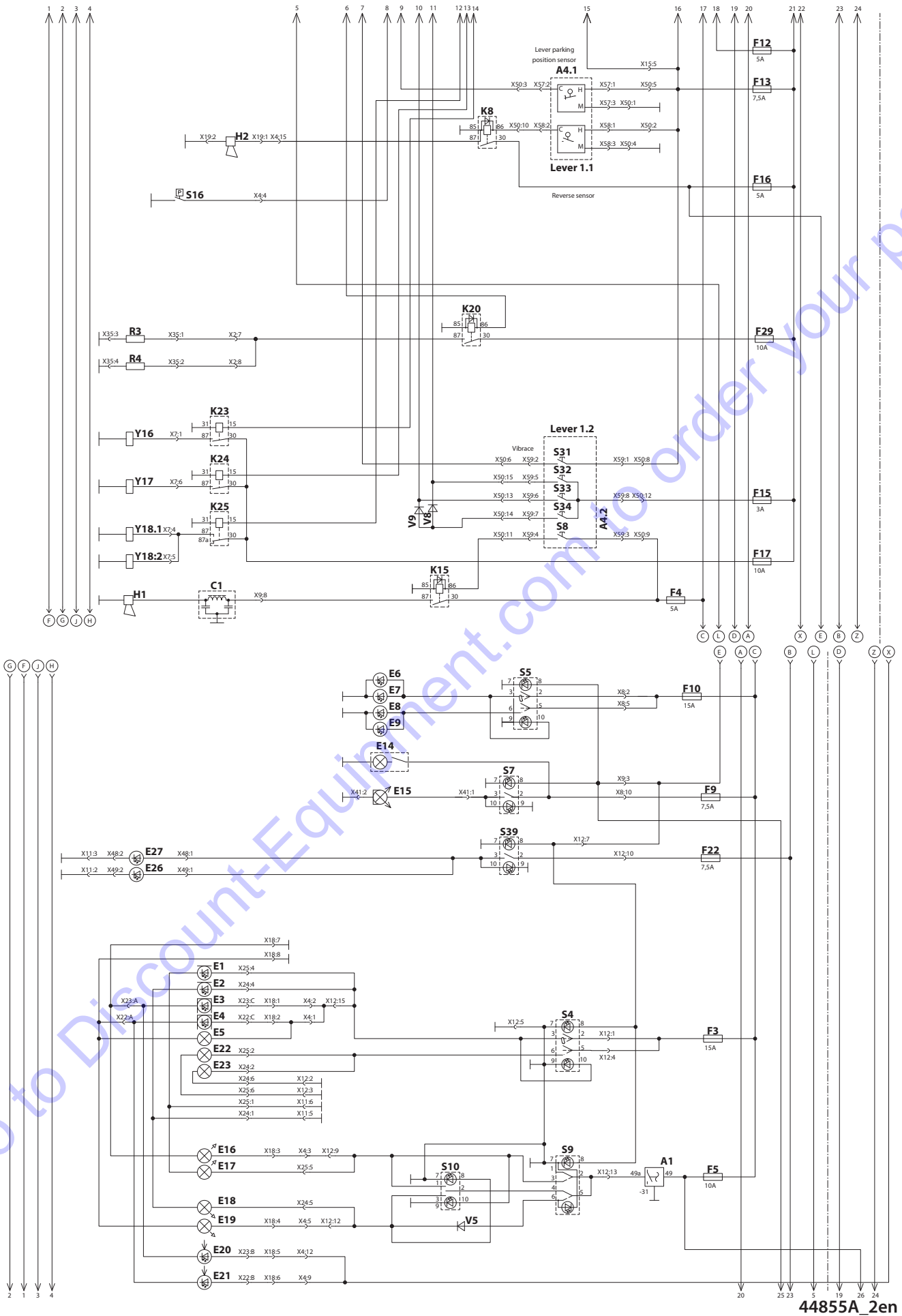
| | |
|---|---|
| A1 | Direction indicator flasher |
| A4 | Travel control lever |
| A5 | Bauser display |
| A6 | Control unit – ECU |
| A7 | TTC32 |
| A10 | Radio |
| A11 | Heating – air-conditioning |
| A12 | Front wiper intermittent |
| A18 | Compaction module |
| A20 | Time relay of heating the crankshaft bleeding |
| A23 | ACE Econ display |
| B1 | Vibrator frequency sensor |
| B6 | Fuel level indicator |
| B10 | Air quantity sensor |
| B11 | Sedimentator |
| C1 | Noise suppressing filter |
| E1, 2 | Front parking lights |
| E3, 4 | Tail lights |
| E5 | License plate light |
| E6, 7 | Front headlamps |
| E8, 9 | Rear lights |
| E14 | Lighting in the cab |
| E15 | Beacon |
| E16, 17 | Left direction indicators |
| E18, 19 | Right direction indicators |
| E20, 21 | Brake lights |
| E22, 23 | Road lighting |
| E25 | Green beacon |
| F1-40 | Fuses |
| G1 | Battery 90 Ah |
| G2 | Alternator |
| H1 | Horn |
| H2 | Back signal horn |
| H3, 4 | Loudspeakers |
| K1 – 28 | Relays |
| K1, -2 | Power relay |
| K3 | Locking relay – parking brake, seat switch |
| K4 | Locking relay Kubota – S1/50, parking brake, neutral (only S1/50) |
| K5 | Relay Kubota – ECU, fuel pump power supply |
| K6 | Relay Kubota – neutral position |
| K7 | Relay – neutral position (from the pump sensor) |
| K8 | Relay – reversing horn |
| K9 | Parking brake relay |
| K10 | Air-conditioning coupling relay |
| K11 | Relay Kubota – engine stop |
| K12 | Vibration block relay - hydraulic oil overheating |
| K13 | Vibration switch relay |
| K14 | Vibration block relay – neutral position |
| K17 | Engine stop relay except for the neutral position |
| K18 | Relay – floating position |
| K19 | Parking brake relay – power supply |
| K20 | Crankshaft vent heating relay |
| K22 | Glowing contactor |
| K23 | Blade – up |
| K24 | Blade – down |
| K25 | Blade – floating position |
| M1 | Starter |
| M2 | Fuel pump |
| M6 | Front windscreen wiper |
| M7 | Rear windscreen wiper |
| M8 | Windscreen washer |
| M9 | Rear washer |
| Q1 | Disconnecter |
| R1 | Glowing |
| S1 | Ignition box |
| S4 | Road lighting switch |
| S5 | Working lighting switch |
| S7 | Beacon switch |
| S8 | Horn switch |
| S9 | Warning lights switch |
| S10 | Direction indicator switch |
| S11 | Emergency brake switch |
| S14 | Pressure parking brake switch |
| S15 | Hydraulic oil temperature switch |
| S16 | Hydraulic oil filter |
| S17 | Seat switch |
| S22 | Engine speed switch |
| S31 | Vibration switch |
| S32 | Blade switch – up |
| S33 | Blade switch – down |
| S34 | Blade switch – floating position |
| S40 | Heater fan switch |
| S41 | Front wiper switch |
| S42 | Rear wiper switch |
| S43 | Washer switch |
| S46 | Air-conditioning switch |
| S47 | Air-conditioning overpressure safety element |
| S48 | Neutral position switch |
| S50 | Regeneration switch |
| S51 | Seat belt switch |
| S52 | Service tools |
| S53 | Service tools |
| S54 | Steering sensor |
| T1 | Antenna |
| V1-12 | Diodes |
| X1 – 99 | Connection |
| X110 – 133 | CAN connectors |
| X34 | Mounting sockets 12 V |
| X36 | Engine diagnostic socket |
| X64 | Diagnostic socket CAN1 |
| X65 | Diagnostic socket CAN0 |
| X68 | Display diagnostic socket |
| Y8 | Vibration |
| Y15 | Parking brake |
| Y16 | Blade – up |
| Y17 | Blade – down |
| Y18.1 | Blade – floating position |
| Y18.2 | Blade – floating position |
| Y23 | Coupling of air-conditioning compressor |
| Y24 | Water valve |



### 3.8.1 Wiring diagram

**Legend:**

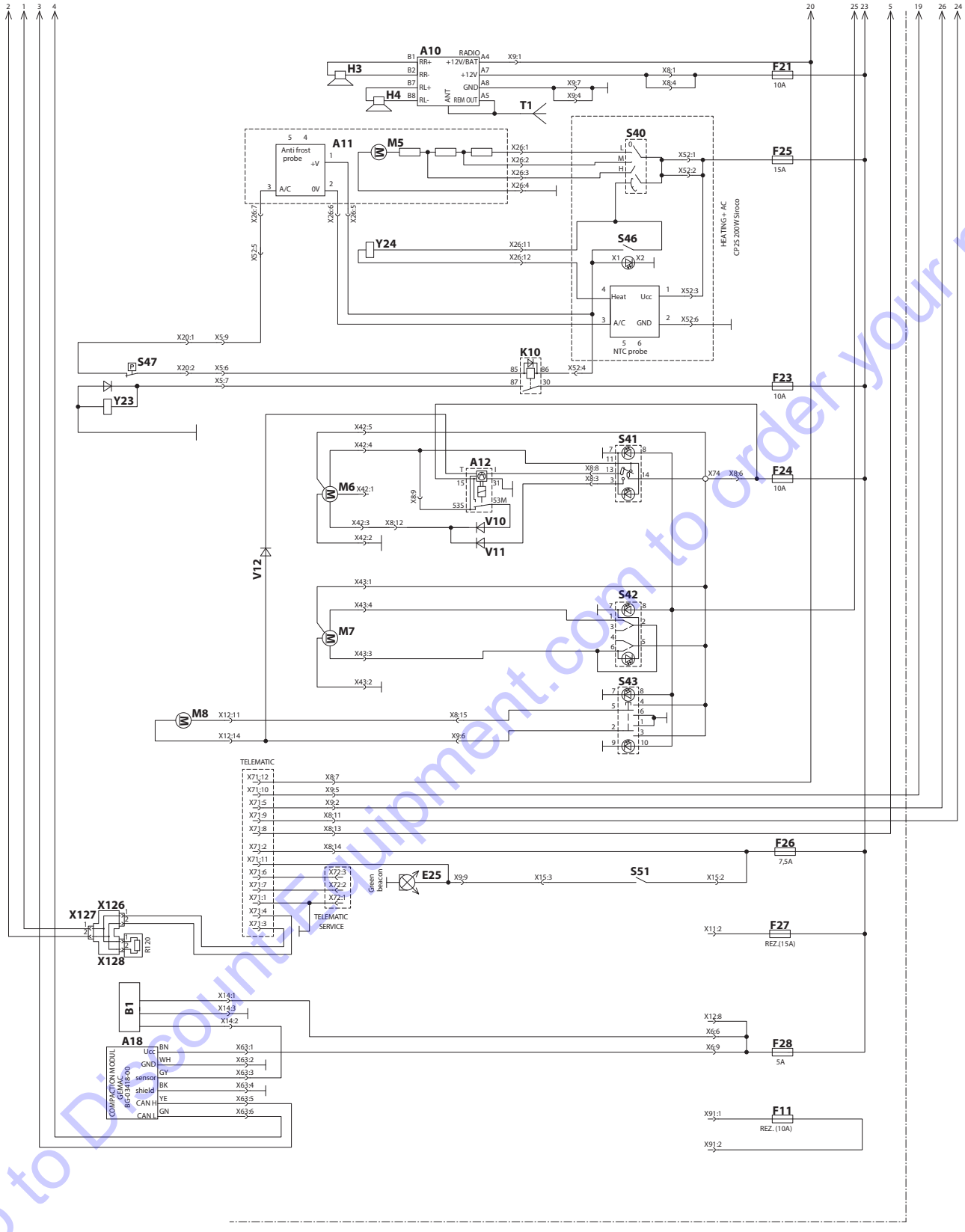
| | |
|---|---|
| A1 | Direction indicator flasher |
| A4 | Travel control lever |
| A5 | Bauser display |
| A6 | Control unit – ECU |
| A7 | TTC32 |
| A10 | Radio |
| A11 | Heating – air-conditioning |
| A12 | Front wiper intermittent |
| A18 | Compaction module |
| A20 | Time relay of heating the crankshaft bleeding |
| A23 | ACE Econ display |
| B1 | Vibrator frequency sensor |
| B6 | Fuel level indicator |
| B10 | Air quantity sensor |
| B11 | Sedimentator |
| C1 | Noise suppressing filter |
| E1, 2 | Front parking lights |
| E3, 4 | Tail lights |
| E5 | License plate light |
| E6, 7 | Front headlamps |
| E8, 9 | Rear lights |
| E14 | Lighting in the cab |
| E15 | Beacon |
| E16, 17 | Left direction indicators |
| E18, 19 | Right direction indicators |
| E20, 21 | Brake lights |
| E22, 23 | Road lighting |
| E25 | Green beacon |
| F1-40 | Fuses |
| G1 | Battery 90 Ah |
| G2 | Alternator |
| H1 | Horn |
| H2 | Back signal horn |
| H3, 4 | Loudspeakers |
| K1 – 28 | Relays |
| K1, -2 | Power relay |
| K3 | Locking relay – parking brake, seat switch |
| K4 | Locking relay Kubota – S1/50, parking brake, neutral (only S1/50) |
| K5 | Relay Kubota – ECU, fuel pump power supply |
| K6 | Relay Kubota – neutral position |
| K7 | Relay – neutral position (from the pump sensor) |
| K8 | Relay – reversing horn |
| K9 | Parking brake relay |
| K10 | Air-conditioning coupling relay |
| K11 | Relay Kubota – engine stop |
| K12 | Vibration block relay - hydraulic oil overheating |
| K13 | Vibration switch relay |
| K14 | Vibration block relay – neutral position |
| K17 | Engine stop relay except for the neutral position |
| K18 | Relay – floating position |
| K19 | Parking brake relay – power supply |
| K20 | Crankshaft vent heating relay |
| K22 | Glowing contactor |
| K23 | Blade – up |
| K24 | Blade – down |
| K25 | Blade – floating position |
| M1 | Starter |
| M2 | Fuel pump |
| M6 | Front windscreen wiper |
| M7 | Rear windscreen wiper |
| M8 | Windscreen washer |
| M9 | Rear washer |
| Q1 | Disconnecter |
| R1 | Glowing |
| S1 | Ignition box |
| S4 | Road lighting switch |
| S5 | Working lighting switch |
| S7 | Beacon switch |
| S8 | Horn switch |
| S9 | Warning lights switch |
| S10 | Direction indicator switch |
| S11 | Emergency brake switch |
| S14 | Pressure parking brake switch |
| S15 | Hydraulic oil temperature switch |
| S16 | Hydraulic oil filter |
| S17 | Seat switch |
| S22 | Engine speed switch |
| S31 | Vibration switch |
| S32 | Blade switch – up |
| S33 | Blade switch – down |
| S34 | Blade switch – floating position |
| S40 | Heater fan switch |
| S41 | Front wiper switch |
| S42 | Rear wiper switch |
| S43 | Washer switch |
| S46 | Air-conditioning switch |
| S47 | Air-conditioning overpressure safety element |
| S48 | Neutral position switch |
| S50 | Regeneration switch |
| S51 | Seat belt switch |
| S52 | Service tools |
| S53 | Service tools |
| S54 | Steering sensor |
| T1 | Antenna |
| V1-12 | Diodes |
| X1 – 99 | Connection |
| X110 – 133 | CAN connectors |
| X34 | Mounting sockets 12 V |
| X36 | Engine diagnostic socket |
| X64 | Diagnostic socket CAN1 |
| X65 | Diagnostic socket CAN0 |
| X68 | Display diagnostic socket |
| Y8 | Vibration |
| Y15 | Parking brake |
| Y16 | Blade – up |
| Y17 | Blade – down |
| Y18.1 | Blade – floating position |
| Y18.2 | Blade – floating position |
| Y23 | Coupling of air-conditioning compressor |
| Y24 | Water valve |



### 3.8.1 Wiring diagram

**Legend:**

| | |
|---|---|
| A1 | Direction indicator flasher |
| A4 | Travel control lever |
| A5 | Bauser display |
| A6 | Control unit – ECU |
| A7 | TTC32 |
| A10 | Radio |
| A11 | Heating – air-conditioning |
| A12 | Front wiper intermittent |
| A18 | Compaction module |
| A20 | Time relay of heating the crankshaft bleeding |
| A23 | ACE Econ display |
| B1 | Vibrator frequency sensor |
| B6 | Fuel level indicator |
| B10 | Air quantity sensor |
| B11 | Sedimentator |
| C1 | Noise suppressing filter |
| E1, 2 | Front parking lights |
| E3, 4 | Tail lights |
| E5 | License plate light |
| E6, 7 | Front headlamps |
| E8, 9 | Rear lights |
| E14 | Lighting in the cab |
| E15 | Beacon |
| E16, 17 | Left direction indicators |
| E18, 19 | Right direction indicators |
| E20, 21 | Brake lights |
| E22, 23 | Road lighting |
| E25 | Green beacon |
| F1-40 | Fuses |
| G1 | Battery 90 Ah |
| G2 | Alternator |
| H1 | Horn |
| H2 | Back signal horn |
| H3, 4 | Loudspeakers |
| K1 – 28 | Relays |
| K1, -2 | Power relay |
| K3 | Locking relay – parking brake, seat switch |
| K4 | Locking relay Kubota – S1/50, parking brake, neutral (only S1/50) |
| K5 | Relay Kubota – ECU, fuel pump power supply |
| K6 | Relay Kubota – neutral position |
| K7 | Relay – neutral position (from the pump sensor) |
| K8 | Relay – reversing horn |
| K9 | Parking brake relay |
| K10 | Air-conditioning coupling relay |
| K11 | Relay Kubota – engine stop |
| K12 | Vibration block relay - hydraulic oil overheating |
| K13 | Vibration switch relay |
| K14 | Vibration block relay – neutral position |
| K17 | Engine stop relay except for the neutral position |
| K18 | Relay – floating position |
| K19 | Parking brake relay – power supply |
| K20 | Crankshaft vent heating relay |
| K22 | Glowing contactor |
| K23 | Blade – up |
| K24 | Blade – down |
| K25 | Blade – floating position |
| M1 | Starter |
| M2 | Fuel pump |
| M6 | Front windscreen wiper |
| M7 | Rear windscreen wiper |
| M8 | Windscreen washer |
| M9 | Rear washer |
| Q1 | Disconnecter |
| R1 | Glowing |
| S1 | Ignition box |
| S4 | Road lighting switch |
| S5 | Working lighting switch |
| S7 | Beacon switch |
| S8 | Horn switch |
| S9 | Warning lights switch |
| S10 | Direction indicator switch |
| S11 | Emergency brake switch |
| S14 | Pressure parking brake switch |
| S15 | Hydraulic oil temperature switch |
| S16 | Hydraulic oil filter |
| S17 | Seat switch |
| S22 | Engine speed switch |
| S31 | Vibration switch |
| S32 | Blade switch – up |
| S33 | Blade switch – down |
| S34 | Blade switch – floating position |
| S40 | Heater fan switch |
| S41 | Front wiper switch |
| S42 | Rear wiper switch |
| S43 | Washer switch |
| S46 | Air-conditioning switch |
| S47 | Air-conditioning overpressure safety element |
| S48 | Neutral position switch |
| S50 | Regeneration switch |
| S51 | Seat belt switch |
| S52 | Service tools |
| S53 | Service tools |
| S54 | Steering sensor |
| T1 | Antenna |
| V1-12 | Diodes |
| X1 – 99 | Connection |
| X110 – 133 | CAN connectors |
| X34 | Mounting sockets 12 V |
| X36 | Engine diagnostic socket |
| X64 | Diagnostic socket CAN1 |
| X65 | Diagnostic socket CAN0 |
| X68 | Display diagnostic socket |
| Y8 | Vibration |
| Y15 | Parking brake |
| Y16 | Blade – up |
| Y17 | Blade – down |
| Y18.1 | Blade – floating position |
| Y18.2 | Blade – floating position |
| Y23 | Coupling of air-conditioning compressor |
| Y24 | Water valve |

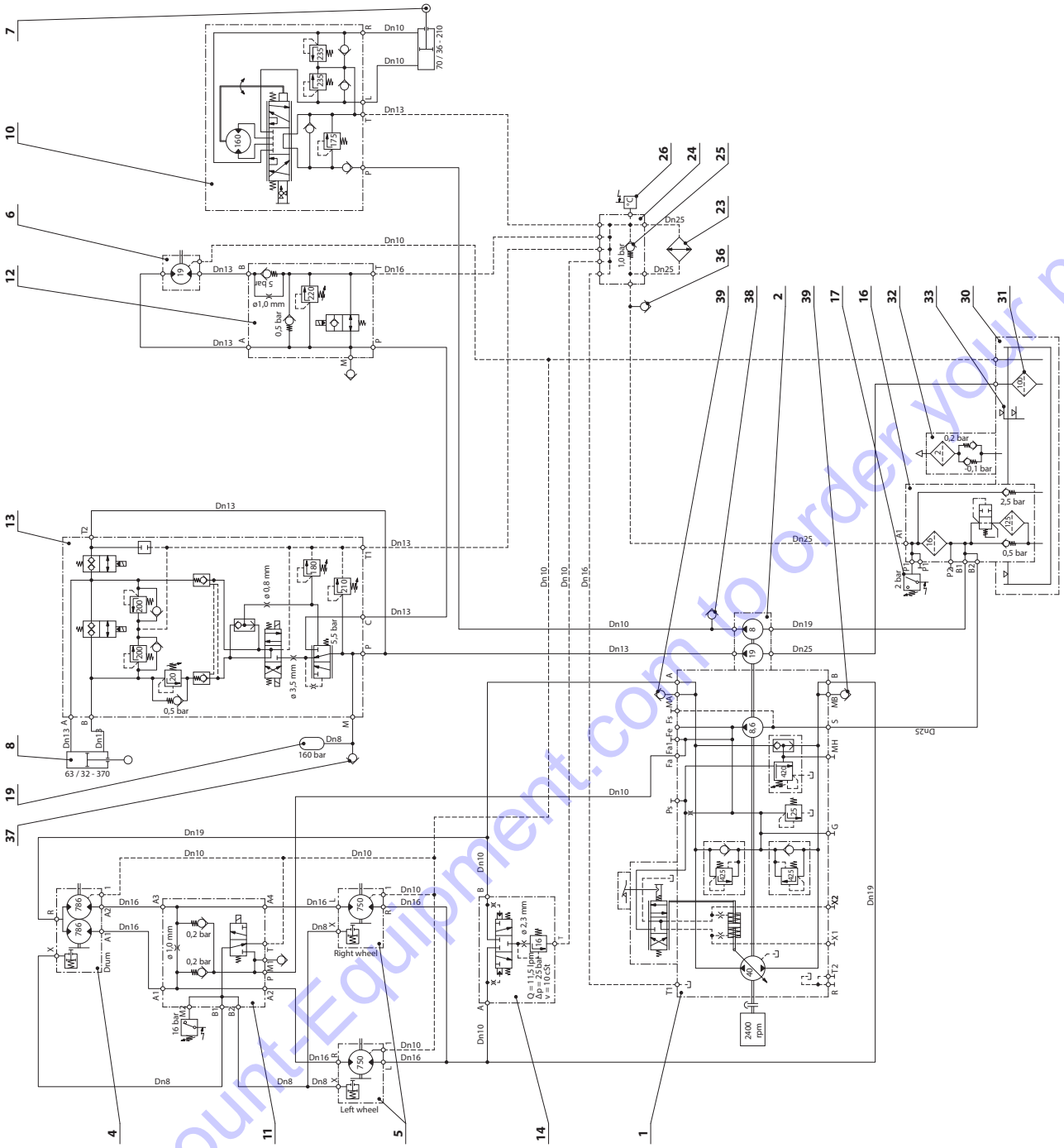



44855A_3en

### 3.8.2 Hydraulic diagram ARS 50 D

**Legend:**

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

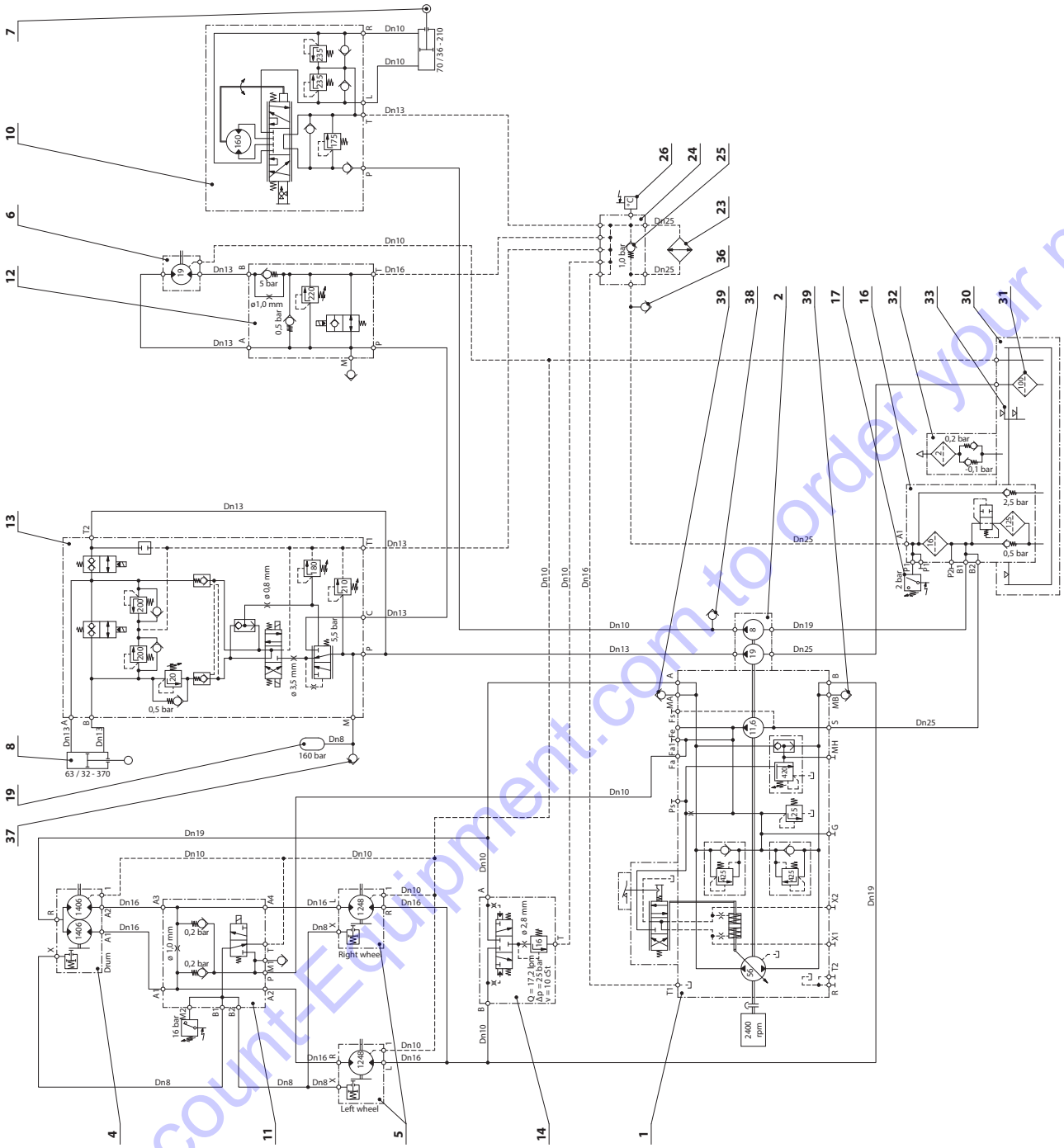


43558Cen

### 3.8.3 Hydraulic diagram ARS 50 HX

**Legend:**

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






43559Cen

### 3.8.4 Table of spare parts

| Chapter | Spare part | Order number |
|---|---|---|
| **Every 500 hours of operation, but at least once a year** | | |
| 3.6.19 | Fuel filter | 1579220 |
| 3.6.19 | Fuel filter cartridge | 1713590 |
| 3.6.21 | Air filter cartridge (external) | 1713581 |
| 3.6.22 | Engine oil filter | 1504183 |
| **Every 1000 hours of operation** | | |
| 3.6.26 | Air filter cartridge (external) | 1713581 |
| 3.6.26 | Air filter cartridge (internal) | 1713593 |
| 3.6.27 | Rubber metal element | 1669981 |
| 3.6.27 | Rubber metal element | 4–43700 |
| 3.6.27 | Rubber metal element | 1515888 |
| 3.6.28 | Oil separator cartridge | 1521826 |
| **Every 2000 hours of operation** | | |
| 3.6.35 | Set of hydraulic oil filters | 1713717 |
| 3.6.35 | Hydraulic oil filter | 4–5358520135 |
| 3.6.35 | Hydraulic unit 230 V | 1251998 |
| 3.6.35 | Hydraulic unit 110 V | 1255297 |
| 3.6.35 | Ventilation filter | 1280287 |
| **Maintenance as required** | | |
| 3.6.38 | Gas strut | 1712933 |

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

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

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

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

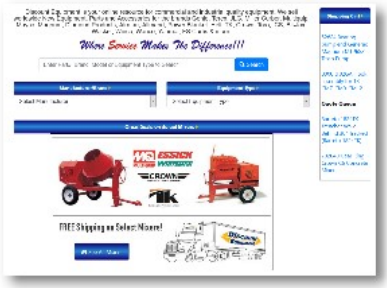
**Content of the filter set after 2,000 hours (4-760283)**

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

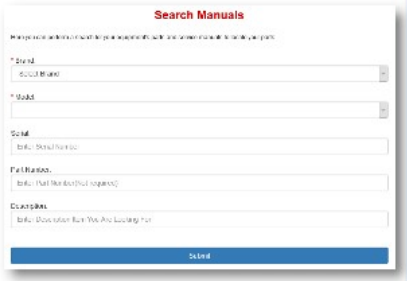
# PARTS FINDER

**Search Website by Part Number**

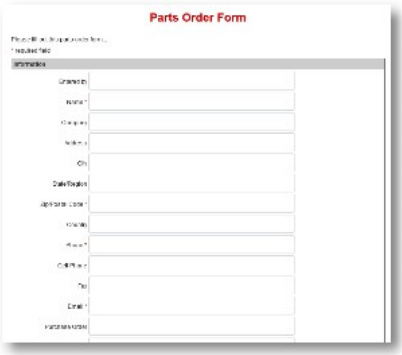
Discount Equipment



**Search Manual Library For Parts Manual & Lookup Part Numbers – Purchase or Request Quote**




**Can't Find Part or Manual? Request Help by Manufacturer, Model & Description**




**Discount-Equipment.com is your online resource for quality parts & equipment.**

Florida: 561-964-4949 Outside Florida TOLL FREE: 877-690-3101

## Need parts?

Click on this link: http://www.discount-equipment.com/category/5443-parts/ and choose one of the options to help get the right parts and equipment you are looking for. Please have the machine model and serial number available in order to help us get you the correct parts. If you don't find the part on the website or on one of the online manuals, please fill out the request form and one of our experienced staff members will get back to you with a quote for the right part that your machine needs.

We sell worldwide for the brands: Genie, Terex, JLG, MultiQuip, Mikasa, Essick, Whiteman, Mayco, Toro Stone, Diamond Products, Generac Magnum, Airman, Haulotte, Barreto, Power Blanket, Nifty Lift, Atlas Copco, Chicago Pneumatic, Allmand, Miller Curber, Skyjack, Lull, Skytrak, Tsurumi, Husquvarna Target, Stow, Wacker, Sakai, Mi-T-M, Sullair, Basic, Dynapac, MBW, Weber, Bartell, Bennar Newman, Haulotte, Ditch Runner, Menegotti, Morrison, Contec, Buddy, Crown, Edco, Wyco, Bomag, Laymor, EZ Trench, Bil-Jax, F.S. Curtis, Gehl Pavers, Heli, Honda, ICS/PowerGrit, IHI, Partner, Imer, Clipper, MMD, Koshin, Rice, CH&E, General Equipment ,Amida, Coleman, NAC, Gradall, Square Shooter, Kent, Stanley, Tamco, Toku, Hatz, Kohler, Robin, Wisconsin, Northrock, Oztec, Toker TK, Rol-Air, APT, Wylie, Ingersoll Rand / Doosan, Innovatech, Con X, Ammann, Mecalac, Makinex, Smith Surface Prep,Small Line, Wanco, Yanmar