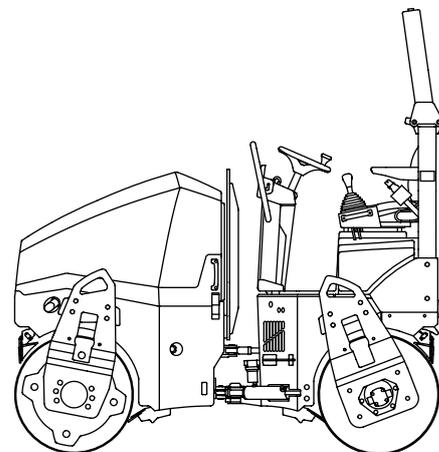


ARX 23-2 ARX 26-2

TANDEM ROLLER
KUBOTA D1803-M-DI-E3B
EU Stage IIIA, US EPA Tier 4i



OPERATING MANUAL

EDITION 04/2019 EN

ARX 23-2 KU St IIIA / T4i From Serial No. 5932003

ARX 26-2 KU St IIIA / T4i From Serial No. 5942005

AMMANN

ES / EU Prohlášení o shodě

(Původní ES/EU prohlášení o shodě / Original EC/EU Declaration of conformity / Ursprüngliche EG-/EU-Konformitätserklärung)

EC / EU Declaration of conformity / EG-/EU-Konformitätserklärung

(Překlad původního ES/EU prohlášení o shodě / Translation original EC/EU Declaration of conformity / Übersetzung der ursprünglichen EG-/EU-Konformitätserklärung)

Originální ES/EU prohlášení o shodě je dodané s dokumenty během expedice stroje. / The original EC/EU Declaration of Conformity is supplied with documents during expedition of machine. / Das Original der EG-/EU-Konformitätserklärung wird mit den Unterlagen während des Versands der Maschine mitgeliefert.

Výrobce / Manufacturer / Hersteller:	Ammann Czech Republic a.s.
Adresa / Address / Adresse:	Náchodská 145, CZ-549 01 Nové Město nad Metují, Czech Republic
IČ / Identification Number / Ident.-Nr.:	000 08 753
Jméno a adresa osoby pověřené sestavením technické dokumentace podle 2006/42/ES a jméno a adresa osoby, která uchovává technickou dokumentaci podle 2000/14/ES / Name and address of the person authorised to compile the technical file according to 2006/42/EC and name and address of the person, who keeps the technical documentation according to 2000/14/EC / Name und Adresse der mit der Zusammenstellung der technischen Dokumentation beauftragten Person gemäß 2006/42/EG und Name und Adresse der mit der Aufbewahrung der technischen Dokumentation beauftragten Person gemäß 2000/14/EG:	Ing. Radek Ostrý Ammann Czech Republic a.s. Náchodská 145, CZ-549 01 Nové Město nad Metují, Czech Republic
Popis strojního zařízení / Description of the machinery / Beschreibung der Maschineneinrichtung:	
Označení / Designation / Bezeichnung:	Tandemový válec / Tandem roller / Tandemwalze
Typ / Type / Typ:	ARX 23-2 T4i
Verze / Version / Version:	
Výrobní číslo / Serial number / Maschinenummer:	
Motor / Engine / Motor:	Kubota D1803-CR-E3B, vznětový, jmenovitý výkon (SAE J1995): 24,8 kW, jmenovitě otáčky: 2400 min-1. / Kubota D1803-CR-E3B, Diesel, nominal power (SAE J1995): 24,8 kW, rated speed: 2400 RPM. / Kubota D1803-CR-E3B, Dieselmotor, Nennleistung (SAE J1995): 24,8 kW, Nenndrehzahl: 2400 min-1.
Prohlašujeme, že strojní zařízení splňuje všechna příslušná ustanovení uvedených směrnic / We declare, that the machinery fulfils all the relevant provisions mentioned Directives / Wir erklären, dass die Maschineneinrichtung sämtliche entsprechenden Bestimmungen aufgeführter Richtlinien erfüllt:	Strojní zařízení – směrnice 2006/42/ES / Machinery Directive 2006/42/EC / Maschineneinrichtung – Richtlinie 2006/42/EG Elektromagnetická kompatibilita – směrnice 2014/30/EU / Electromagnetic Compatibility Directive 2014/30/EU / Elektromagnetische Kompatibilität – Richtlinie 2014/30/EU Emise hluku – směrnice 2000/14/ES / Noise Emission Directive 2000/14/EC / Lärmemissionen – Richtlinie 2000/14/EG
Harmonizované technické normy a technické normy použité k posouzení shody / The harmonized technical standards and the technical standards applied to the conformity assessment / Harmonisierte technische Normen und für die Beurteilung der Konformität verwendete Normen:	ČSN EN ISO 12100, ČSN EN 500-1+A1, ČSN EN 500-4, ČSN EN ISO 4413, ČSN EN 13309
Osoby zúčastněné na posouzení shody / Bodies engaged in the conformity assessment / An der Konformitätsbeurteilung beteiligte Personen:	Notifikovaná osoba č. 1016 / Notified Body No.: 1016 / Notifizierte Stelle Nr.: 1016 Státní zkušebna strojů a.s., Třanovského 622/11, 163 04 Praha 6-Řepy, ČR. / The Government Testing Laboratory of Machines J.S.C., Třanovského 622/11, 163 04 Praha 6-Řepy, Czech Republic / Staatliche Prüfstelle für Maschinen AG, Třanovského 622/11, 163 04 Praha 6-Řepy, Tschechische Republik.
Použitý postup posouzení shody / To the conformity assessment applied procedure / Verwendetes Vorgehen der Konformitätsbeurteilung:	Na základě směrnice 2000/14/ES příloha VI / Pursuant to the Noise Emission Directive 2000/14/EC, Annex VI / Aufgrund der Richtlinie 2000/14/EG, Anlage VI
Naměřená hladina akustického výkonu / Measured sound power level / Gemessener Schallleistungspegel:	L _{WA} = 103 dB
Garantovaná hladina akustického výkonu / Guaranteed sound power level / Garantierter Schallleistungspegel:	L _{WA} = 104 dB

Místo a datum vydání / Place and date of issue / Ort und Datum der Ausgabe: Nové Město nad Metují,

Osoba zmocněná k podpisu za výrobce / Signed by the person entitled to deal in the name of manufacturer / Zeichnungsberechtigter für den Hersteller:

Jméno / Name / Name: Bc. Martin Čerovský
Funkce / Grade / Stelle: Quality Control Manager
Podpis / Signature / Unterschrift:

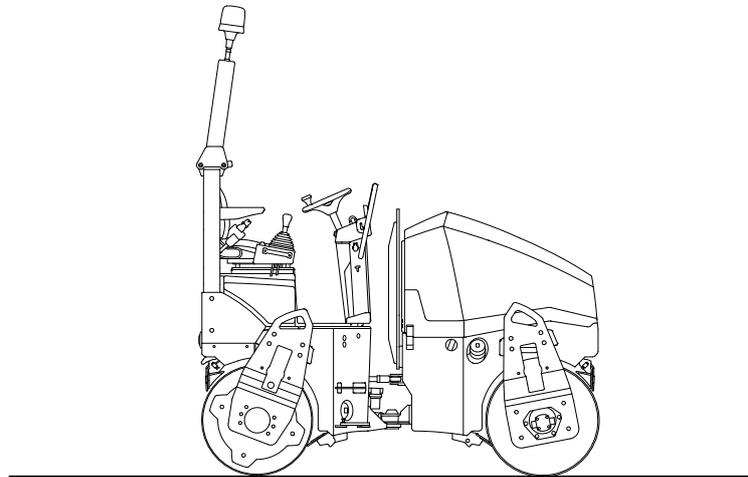
Congratulations on your purchase of the AMMANN compaction machine. This modern compaction machine is characterised by simple operation and maintenance and is the product of many years of experience of the AMMANN company in compaction machines, especially road rollers. In order to avoid faults due to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

With kind regards,

AMMANN

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

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



588026

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.

This operating manual consists of:

I. Specification manual

II. Operating manual

III. Maintenance manual

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

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

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

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

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

Preface

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

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

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SAFETY NOTICE SIGNS



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



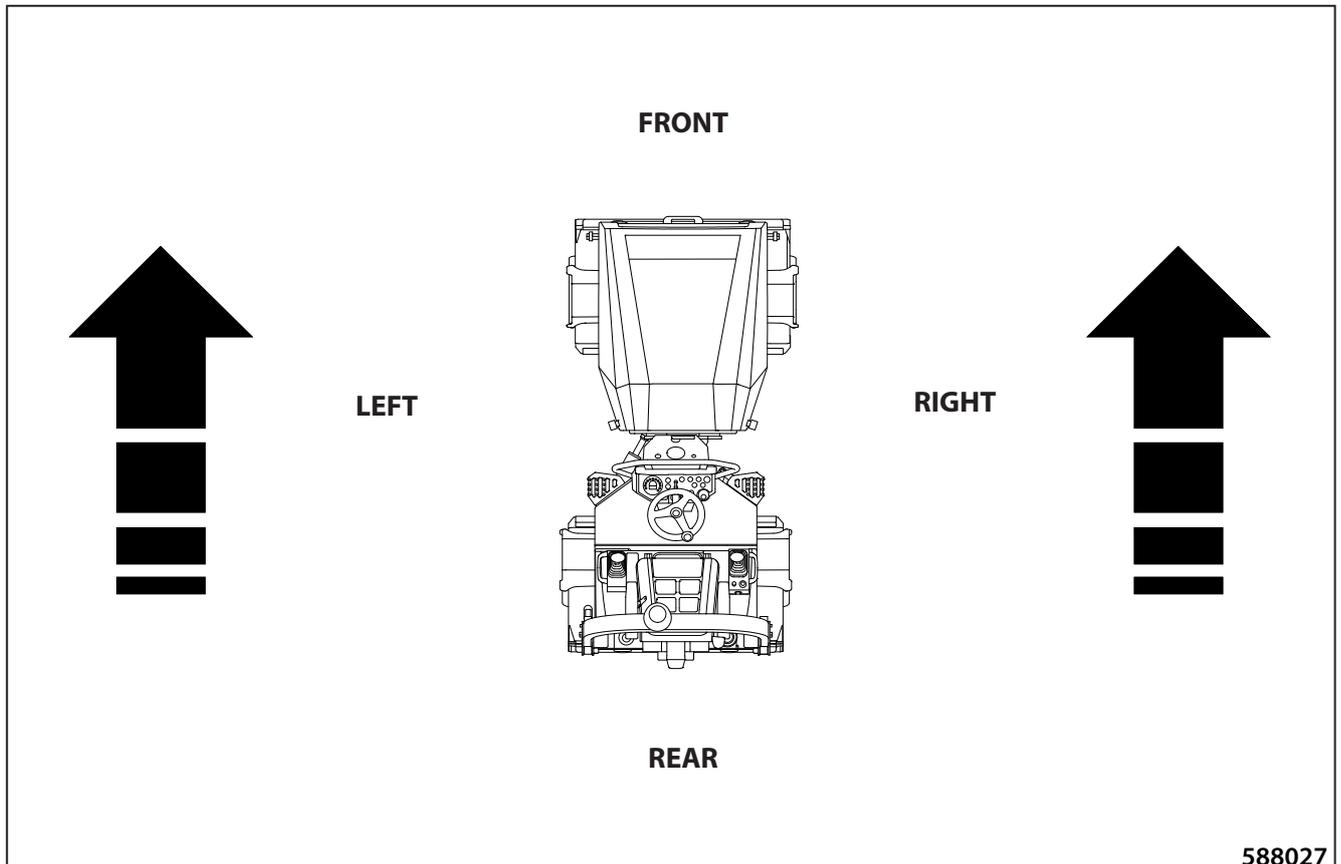
The notice warns of possible damage to the machine or its parts.



The notice warns of the necessity of environmental protection.

! CAUTION!

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



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1 SPECIFICATION MANUAL

ARX 23-2

ARX 26-2

(Kubota Tier 4i)

1.1 Basic data

Machine description

Tandem machine with an articulated frame and two smooth drums. Both drums are hydrostatic-driven and vibrating. The rear drum vibration is switchable. The concept of the frame allows compacting close to the walls and elevated kerbs on both sides of the machine. It is convenient for works within constrained areas due to its small dimensions and short turning radius. The operator's post provides perfect control of both edges of the drums.

Combined machines have only a front smooth vibrating drum. The rear axle consists of tyres with smooth shoes (compactor).

Specification of the expected use of the machine

The machine is designed for small compaction works in road construction (building local roads, cycle paths, pavements, parking areas and garage driveways) and in building construction (small industrial areas).

The machine is suitable for compacting asphalt mixes up to the (compacted) layer thickness of 120 mm (4.7"), hydraulically consolidated mixtures up to the layer thickness of 150 mm (5.9"), mixed soils up to the layer thickness of 200 mm (7.9") or sandy and gritty materials up to the layer thickness of 300 mm (11.8").

The machine is not suitable for compacting rock fill, loam and clay materials.

The machine is designed for operation under conditions according to EN 60721-2-1:2014: WT, WDr, MWDr (i.e. mild climate zone, warm dry zone or hot dry zone with a limited ambient temperature range from -15 °C (5 °F) to 45 °C (113 °F). Storage temperature from -25 °C (-12 °F) to + 45 °C (113 °F).

The standard version of the machine is not designed for operation on roads. For more information, please contact your dealer.

The machine that complies with the requirements as to health protection and safety is provided with a nameplate with CE certification.

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

Nameplate position

Nameplate

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

Machine type
.....

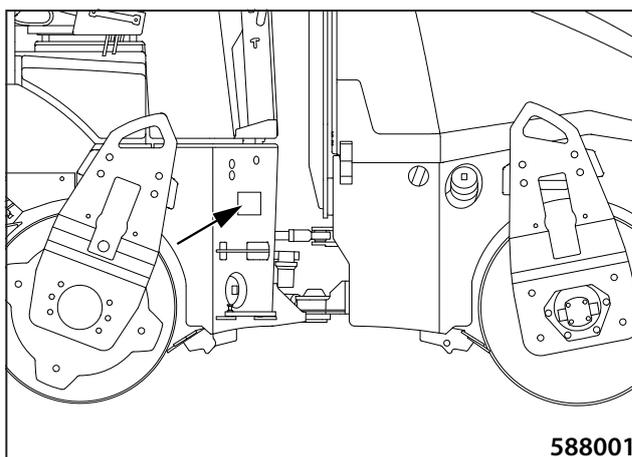
Serial number of the machine
.....

Year of manufacture
.....

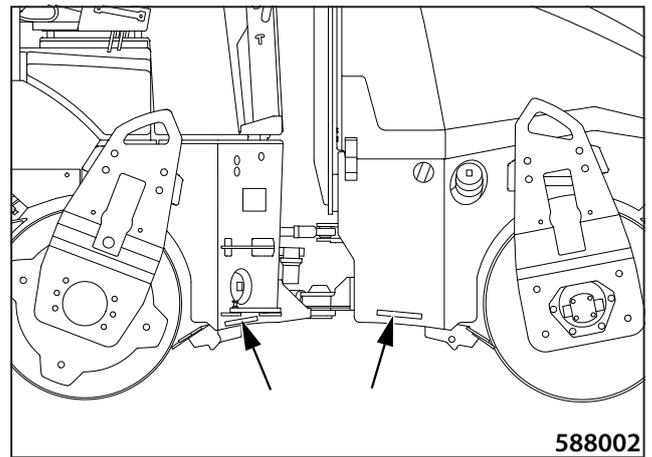
Engine type
.....

Serial number of the engine
.....

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

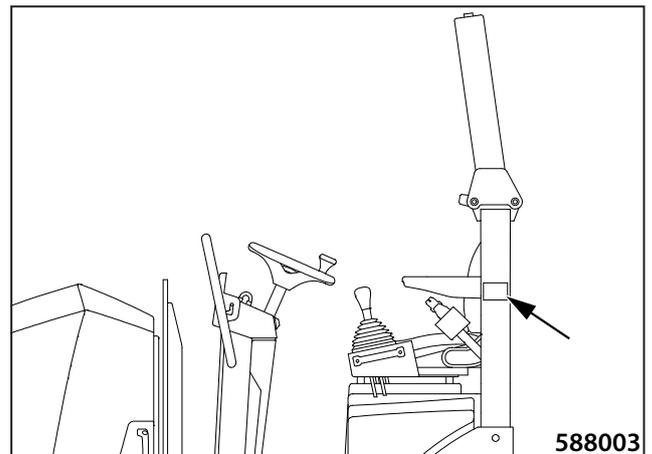


Serial number of the machine frame



588002

Position of the ROPS nameplate
ROPS nameplate



588003

Engine nameplate position
Serial number of the Kubota engine

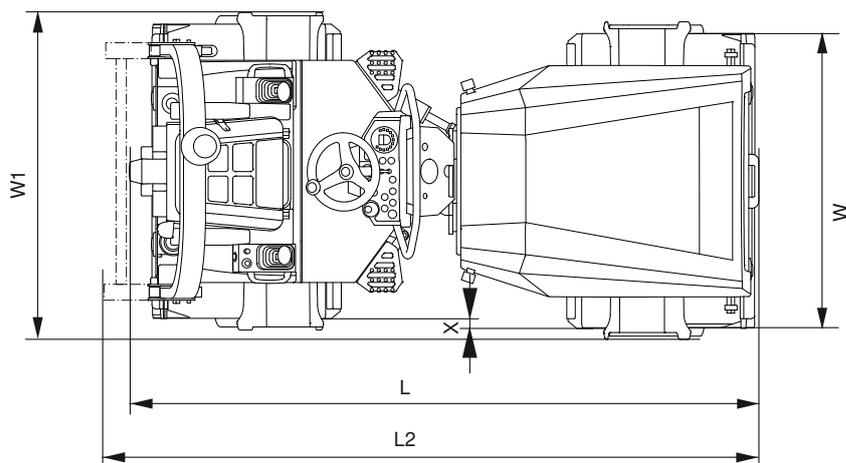
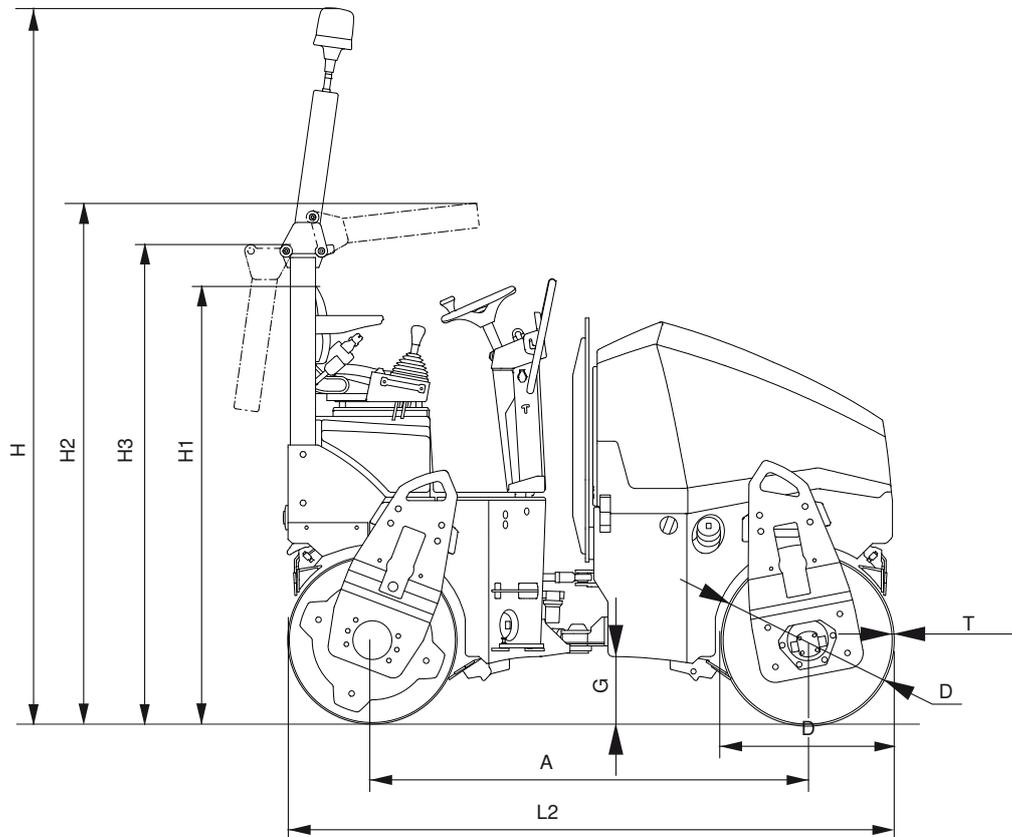


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1.2 Dimensional drawing of the machine



588004A

mm (in)	ARX 23-2	ARX 23-2C	ARX 26-2	ARX 26-2C
	EU Stage IIIA / US EPA Tier 4i			
A	1740 (68.5)	1755 (69.1)	1740 (68.5)	1755 (69.1)
D	695 (27.4)	695/635 (27.7/25.0)	695 (27.4)	695/635 (27.7/25.0)
G	280 (11)	280 (11)	280 (11)	280 (11)
H	2550 (100.4)	2550 (100.4)	2550 (100.4)	2550 (100.4)
H1	1815 (71.5)	1815 (71.5)	1815 (71.5)	1815 (71.5)
H2	2140 (84.3)	2140 (84.3)	2140 (84.3)	2140 (84.3)
H3	1935 (76.2)	1935 (76.2)	1935 (76.2)	1935 (76.2)
L	2500 (98.4)	2500 (98.4)	2500 (98.4)	2500 (98.4)
L1	2585 (101.8)	2585 (101.8)	2585 (101.8)	2585 (101.8)
L2	2430 (95.7)	2420 (95.3)	2430 (95.7)	2420 (95.3)
W	1000 (39.4)	1000 (39.4)	1200 (47.2)	1200 (47.2)
W1	1130 (44.5)	1120 (44.1)	1350 (53.1)	1295 (51)
X	40 (1.6)	-	40 (1.6)	-
T	13 (0.5)	13 (0.5)	13 (0.5)	13 (0.5)

1.3 Technical data

		ARX 23-2	ARX 23-2C	ARX 26-2	ARX 26-2C
		EU Stage IIIA / US EPA Tier 4i			
Weight					
Operating weight EN 500-1+A1 (CECE)	kg (lb)	2230 (4920)	2085 (4600)	2515 (5540)	2350 (5180)
Operating load EN 500-1+A1 (CECE) on the front axis	kg (lb)	1075 (2370)	1090 (2400)	1240 (2730)	1220 (2690)
Operating load EN 500-1+A1 (CECE) on the rear axis	kg (lb)	1155 (2550)	995 (2190)	1275 (2810)	1130 (2490)
Weight of the half volume of operating fluids	kg (lb)	110 (240)	115 (250)	110 (240)	115 (250)
Operating weight ISO 6016	kg (lb)	2245 (4950)	2100 (4630)	2530 (5580)	2365 (5210)
Maximum weight with accessories	kg (lb)	2425 (5350)	2285 (5040)	2710 (5970)	2550 (5620)
Maximum permitted weight according to ROPS	kg (lb)	2850 (6280)	2850 (6280)	2850 (6280)	2850 (6280)
Static linear load of front drum	kg/cm (lb/in)	10,8 (20)	10,9 (20)	10,3 (20)	10,2 (20)
Static linear load of rear drum	kg/cm (lb/in)	11,6 (30)	-	11 (20)	-
Canopy weight	kg (lb)	35 (80)	35 (80)	35 (80)	35 (80)
Weight of Ammann edge cutter	kg (lb)	50 (110)	50 (110)	50 (110)	50 (110)
Allowance for transport weight to operating weight EN 500-1+A1 (CECE)	kg (lb)	180 (400)	185 (410)	180 (400)	185 (410)
Riding qualities					
Maximum transport speed	km/h (mph)	11 (6.8)	11 (6.8)	11 (6.8)	11 (6.8)
Climbing ability without vibration	%	30	35	30	35
Gradeability with vibration	%	30	35	30	35
Theoretical machine gradeability	%	55	53	55	53
Lateral static stability	%	55	46	62	53
Lateral stability during driving without vibration	%	25	20	25	20
Lateral stability during driving with vibration	%	15	10	15	10
Turning radius, inner (edge)	mm (in)	2630 (103.5)	2630 (103.5)	2540 (100)	2540 (100)
Turning radius, outer (contour)	mm (in)	3750 (147.6)	3750 (147.6)	3910 (153.9)	3910 (153.9)
Drive type	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic
Number of driving axles	-	2	2	2	2
Oscillation angle	°	6.5	6.5	6.5	6.5
Steering angle	°	30	30	30	30
Steering					
Steering type	-	Joint	Joint	Joint	Joint
Steering control	-	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Linear hydraulic motors	-	1	2	1	1

		ARX 23-2	ARX 23-2C	ARX 26-2	ARX 26-2C
		EU Stage IIIA / US EPA Tier 4i			
Engine					
Manufacturer	-	Kubota	Kubota	Kubota	Kubota
Type	-	D1803-M-DI-E3B	D1803-M-DI-E3B	D1803-M-DI-E3B	D1803-M-DI-E3B
Power according to SAE J1995	kW	24.8	24.8	24.8	24.8
Number of cylinders	-	3	3	3	3
Cylinder capacity	cm ³ (cu in)	1826 (111)	1826 (111)	1826 (111)	1826 (111)
Nominal speed	min-1 (RPM)	2100/2400	2100/2400	2100/2400	2100/2400
Maximum torque	Nm (ft lb)/rpm	115.6/1600	115.6/1601	115.6/1602	115.6/1603
Fuel consumption in common operation	l/h (gal US/h)				
The engine complies with emission regulations	-	EU Stage IIIA, U.S. EPA Tier 4 Interim	EU Stage IIIA, U.S. EPA Tier 4 Interim	EU Stage IIIA, U.S. EPA Tier 4 Interim	EU Stage IIIA, U.S. EPA Tier 4 Interim
Engine cooling system	-	Liquid	Liquid	Liquid	Liquid
Brakes					
Operating	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic
Parking	-	Mechanical multi-disc	Mechanical multi-disc	Mechanical multi-disc	Mechanical multi-disc
Emergency	-	Mechanical multi-disc	Mechanical multi-disc	Mechanical multi-disc	Mechanical multi-disc
Vibration					
Frequency I	Hz (vpm)	58 (3480)	58 (3480)	58 (3480)	58 (3480)
Frequency II	Hz (vpm)	66 (3960)	66 (3960)	66 (3960)	66 (3960)
Amplitude I	mm (in)	0.5 (0.02)	0.5 (0.02)	0.5 (0.02)	0.5 (0.02)
Amplitude II	mm (in)	0.5 (0.02)	0.5 (0.02)	0.5 (0.02)	0.5 (0.02)
Centrifugal force I	kN	33.4	33.4	38.8	38.8
Centrifugal force II	kN	39.9	39.9	46.5	46.5
Drive type	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic
Sprinkling					
Sprinkling type	-	Pressure	Pressure	Pressure	Pressure
Number of pumps	-	1	1	1	1
Number of filtrations	-	2	2	2	2
Operating fluids					
Fuel	l (gal US)	35 (9.2)	35 (9.2)	35 (9.2)	35 (9.2)
Water for drum sprinkling	l (gal US)	190 (50.2)	190 (50.2)	190 (50.2)	190 (50.2)
Engine (oil filling)	l (gal US)	7 (1.8)	7 (1.8)	7 (1.8)	7 (1.8)
Cooling system	l (gal US)	6.7 (1.8)	6.7 (1.8)	6.7 (1.8)	6.7 (1.8)
Hydraulic system	l (gal US)	28.5 (7.5)	28.5 (7.5)	28.5 (7.5)	28.5 (7.5)
Sprinkling emulsion	l (gal US)	-	12 (3.2)	-	12 (3.2)

1.3 Technical data

		ARX 23-2	ARX 23-2C	ARX 26-2	ARX 26-2C
		EU Stage IIIA / US EPA Tier 4i			
Electrical installation					
Voltage	V	12	12	12	12
Battery capacity	Ah	77	77	77	77
Noise and vibration emissions					
Measured sound pressure level A, LpA at the operator's position (platform) *	dB	85	85	85	85
Uncertainty KpA *	dB	2	2	2	2
Guaranteed sound power level A, LWA **	dB	104	104	104	104
Highest weighted effective value of vibration acceleration transmitted to the whole body (platform)***	m/s ² (ft/s ²)	<0,5 (<1,6)	<0,5 (<1,6)	<0,5 (<1,6)	<0,5 (<1,6)
Total value of vibration acceleration transmitted to hands (platform)***	m/s ² (ft/s ²)	<2,5 (<8,2)	<2,5 (<8,2)	<2,5 (<8,2)	<2,5 (<8,2)
Optional equipment					
Additional lights Direction indicators Working lights Beacon Back signal horn Licence plate holder One-point lifting lug Battery disconnecter 2 nd travel control lever Arm rest Water tank lock Infra thermometer ACE Force ATC inter-axle lock Edge cutter Fixed scrapers Hinged scrapers Set of filters, 500 h FOPS roof (mounted on the ROPS) Canopy Seat heating Special colour design Additional documentation set Certificate of Origin Audible brake warning Rear-view mirrors Telematic Green LED beacon					

* measured according to EN 500-4

** measured according to DIRECTIVE 2000/14/EC

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

2 OPERATING MANUAL

ARX 23-2

ARX 26-2

(Kubota Tier 4i)



2.1.1 Safety precautions during operation of the machine

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 operators and maintenance workers that include requirements to provide for safe operation of the machine.
- 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.

He must make the machine operator 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 operators provably familiar with the technological procedure.

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 Main safety precautions

2.1.1.3 Ensurance of safety measures by the provider

- He must ensure that the machine is operated only under conditions and only for purposes it is technically capable of according to conditions specified by the manufacturer and respective standards.
- He must ensure that the machine is used only in such a way and in such a workplace where there is no risk of transmission of dangerous vibrations and 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.
- Every person who drives the machine or performs maintenance and repairs of the machine must be familiarised with instructions stated in the operating manual of the machine.
- He must ensure that the fire extinguisher is checked on regular basis.
- He must ensure that the "Operating manual" is available at a designated location in the machine.
- 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 (fuel, oils, coolant, etc.) must be removed from places of leakage according to their nature to avoid their adverse impact on the environment, safety of operation and human health.

2.1.1.4. Protective ROPS frame

When the ROPS protection frame is used:

- the machine frame must not be damaged (broken, bent, etc.) in the connection point
- the protective ROPS frame itself must not show corrosion, cracks or breaks
- the protective ROPS frame must not be loose during operation of the machine
- all bolted connections must meet requirements of the specification and must be tightened to the specified torque
- bolts must not be damaged, distorted and must not show rust marks.
- Additional modifications must not be carried out on the protective ROPS frame without the approval of the manufacturer because they can result in decrease of its strength (e.g. holes, welding, etc.).
- The weight of the machine with the protective frame must not exceed the permitted weight for which the protective ROPS frame was approved.
- The machine weight must not exceed the maximum permissible weight according to the protective ROPS frame.

2.1.2 Requirements for the qualification of machine operators

Only a person having been trained according to ISO 7130 and other local and national instructions and standards specified for operators of this group of machines, is allowed to operate the machine.

2.1 Main safety precautions

2.1.3 Driver's obligations

- Before starting operation of the machine, the machine operator 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. (In case you do not understand some parts of the manuals, contact the nearest dealer or the manufacturer.)
- He may drive the machine only if he is fully familiarized with all functions of the machine and working and operating elements and knows precisely 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 operator must get familiar with the workplace environment, i.e. with obstructions, slopes, utility line system and with necessary types of workplace protections with respect to the surroundings (noise, vibration, etc.).
- The operator while working with the machine must be fastened with the safety belt.
- The safety belt and its brackets must not be damaged.
- When there is a risk to health, human life, property, failures, during hardware accidents, or there are symptoms of such risks during operation, the operator must stop his work and secure the machine against undesired starting, communicate this to a responsible worker and to a possible extent notify all the persons exposed to such hazard.
- Before starting operation of the machine, the operator is obliged to get familiar with the records and operating deviations found out 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.
- If the operator finds a defect during operation, he must immediately stop the machine and secure it safely against undesirable starting.
- During operation the operator must watch the machine run and record any detected defects into the operation logbook.
- The operator must maintain an operation logbook which is meant for records of machine acceptances and take-overs carried out between operators, of defects and repairs done during operation and keeping files of serious events during the work shift.
- Before putting the machine into operation, he must check the brakes and steering for functioning.
- Before the engine is put into operation, the controls must be in zero positions and no persons are allowed to be in the danger zone 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.
- After a warning alarm, the operator may put the machine into operation only when all workers have left 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 work safety; the operator must be fully engaged in driving the machine. He must always sit on the seat while driving the machine.
- 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. He must watch continuously the clearance to avoid collision with any obstruction.
- If the operator finishes or interrupts operation of the machine and leaves the machine, he must carry out safety measures against unauthorized use of the machine and undesired start up. The operator must remove the key from the ignition box, lock the cab or dashboard cover and disconnect the electrical installation using the disconnecter.
- 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 the operation logbook. When the operators take turns, one operator is obliged to report any identified facts to the other operator.
- The operator must use personal protective equipment – work clothes, work shoes, protective helmet and protective goggles.
- He must equip the machine with accessories and equipment as prescribed.
- He must keep the operator's stand, foot rests and walkways clean.
- Keep the machine free of oil contaminants and inflammable materials.
- 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 operator's stand;
 - warn the others to keep off and not touch the machine.

2.1.4 Forbidden activities – safety and guarantee

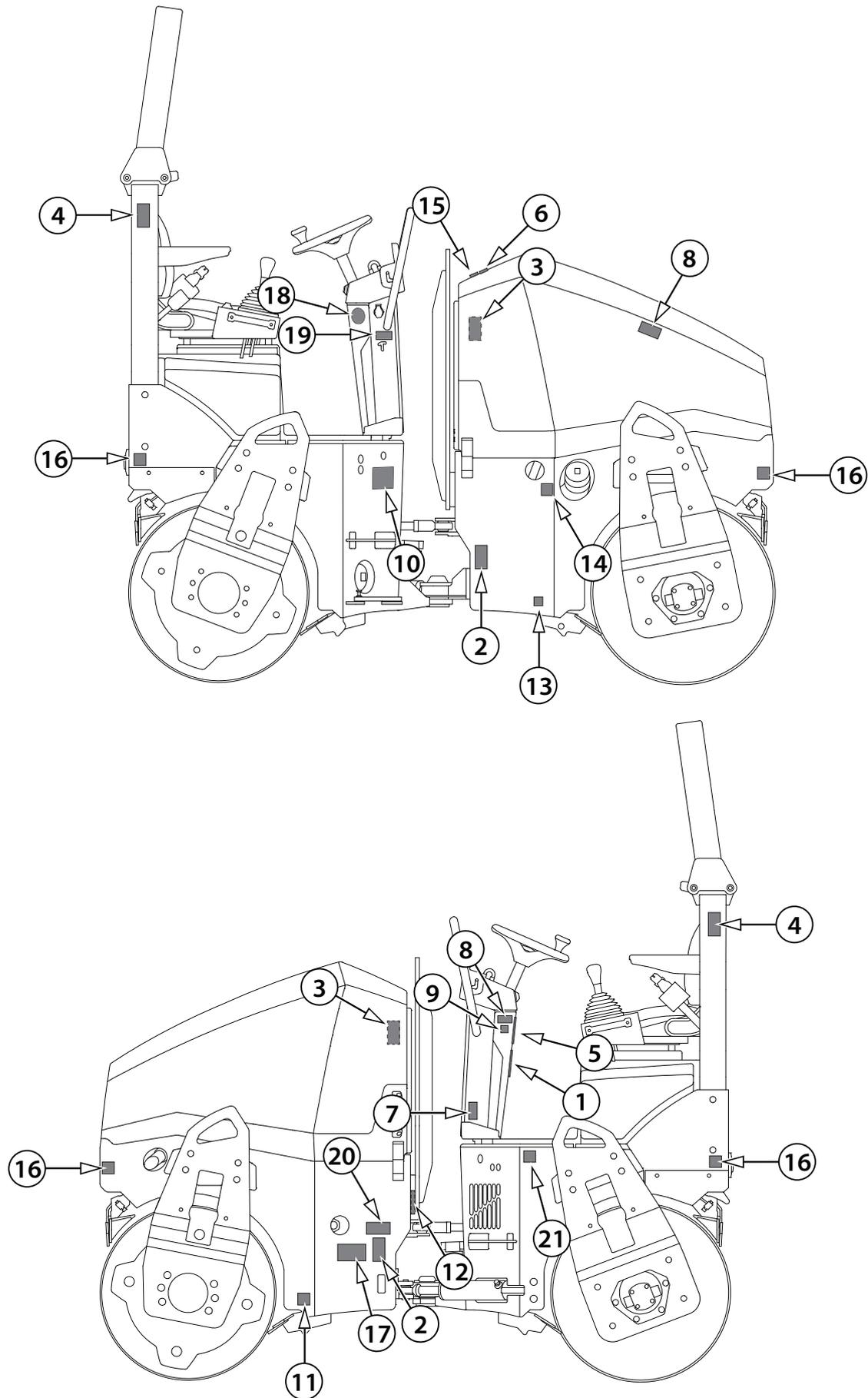
The following is forbidden

- 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 an authorized service organization is allowed to intervene in the engine, including the peripheral components of the engine (for example, the alternator, the starter, the thermostat, the 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.
- Operating the machine in the explosive environment and underground.
- 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 a training of a driver by an instructor.
- Putting the machine into operation and using the machine when a safety device (emergency brake, hydraulic locks, 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 operating 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.
- 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 operator's stand is not properly attached.
- Working with the machine when the bonnet, cab or platform 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 operator's stand and where hazard to people or property could occur unless the occupational safety is ensured through some other way, e.g. by a duly instructed signalling 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 operator when the machine is running.
- Getting in or off on the run, jumping down from the machine.
- Sitting on the railing or external parts of the machine during a drive.
- 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 oil, fuel, coolant or other operating fluid is leaking.
- Starting the engine in a different way than given in the operating manual.
- Placing other items (tools, accessories) than items for personal use on the operator'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.
- Conveying rags saturated with inflammable materials and inflammable liquids in loose vessels on the machine (in the engine compartment).
- Letting the engine run in closed spaces. Exhaust fumes are dangerous to life.
- 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.
- Using the pressure washing near the control unit of the machine.
- Filling the hydraulic circuit during the guarantee period in a different way than using the hydraulic unit.
- Working long-term in the vibro stroke mode!



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

2.1 Main safety precautions



588005B

2.1.5 Safety notices and signs applied on the machine

- 1 Read the operating manual



2946bz

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

- 2 Pinch points



3865

Maintain a safe distance from the machine; there is a danger of squeezing by the machine between the front and rear frames.

- 3 Risk of injury



3866

There is a risk of injury. Do not touch rotating parts while the engine is running. There is a risk of burns. Do not touch hot parts of the machine unless you make sure that they are sufficiently cold.

- 4 Risk of injury



3864bz

There is a risk of fatal injury. Do not operate the machine when the ROPS is lowered.

- 5 Using the parking and emergency brakes



3867bz

Use the parking brake only when the machine is stopped. Use the emergency brake only for stopping the machine in emergency.

2.1 Main safety precautions

6 Safety belt



Fasten the safety belt before the machine starts moving.

7. Keep calm and adjust



Turn off the engine and remove the key from the ignition box before performing maintenance or repairs.

8 Washing the machine with water



Dangerous situation. Prevent water from entering electric and electronic parts of the machine as it may result in damage of the equipment and personal injury. Read the operation manual!

9 Hearing protection



Dangerous noise level! Use hearing protection.

10 Guaranteed sound power level



11 Hydraulic oil drain plug



12 Engine oil drain plug



13 Fuel drain plug



14 Fuelling



15 Lifting point



When lifting, suspend the machine only in these holes.

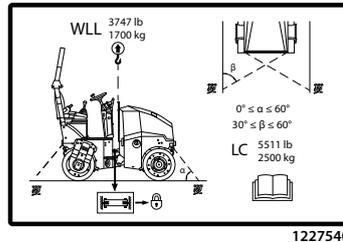
2.1 Main safety precautions

- 16 Fastening hole



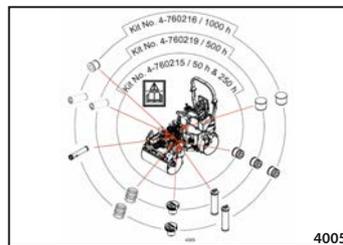
When transporting, fasten the machine only in these holes.

- 17 Suspension diagram



To lift the machine, use slings with a sufficient lifting capacity according to chapter Loading the machine. Before hanging, lock the articulation of the machine.

- 18 Set of filters



- 19 Adjusting the engine speed

- 20 California Proposition 65



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.

Further information see www.p65warnings.ca.gov

21. Emulsion sprinkling tank



2.1.6 Hand signals

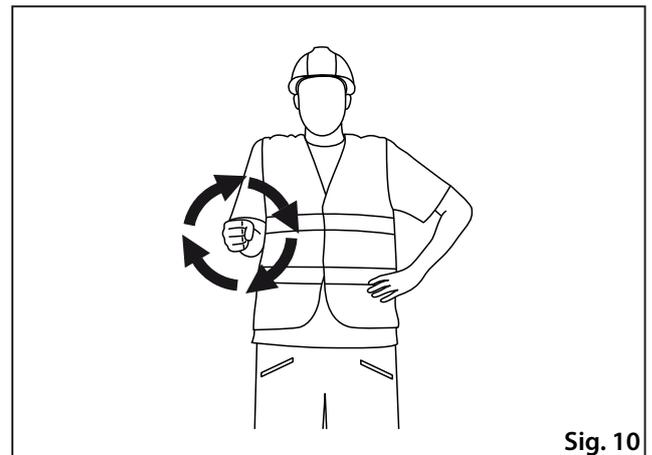
Signals given by an assistant operator if the operator cannot see the travelling or working area or work devices of the machine.

The following principles must be observed:

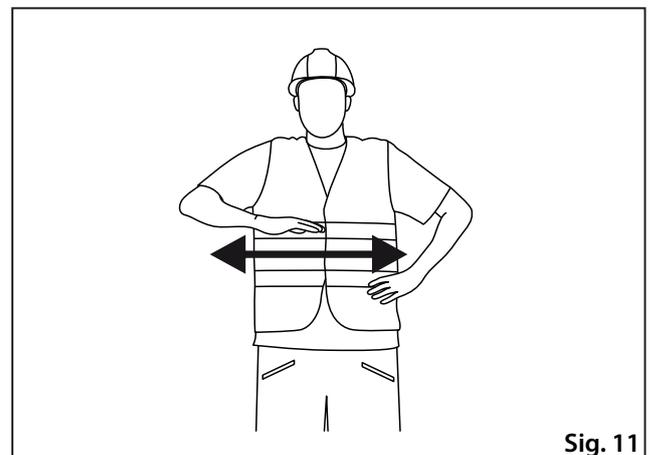
- For communication purposes, only a limited number of signals must be used.
- The signals must be clearly distinguishable to prevent any misunderstanding.
- Hand signals can only be used when ambient conditions allow clear communication between persons.
- Hand signals must be as similar as possible to intuitive movements.
- Single-handed signals can be done with any hand.

SIGNALS FOR GENERAL COMMANDS

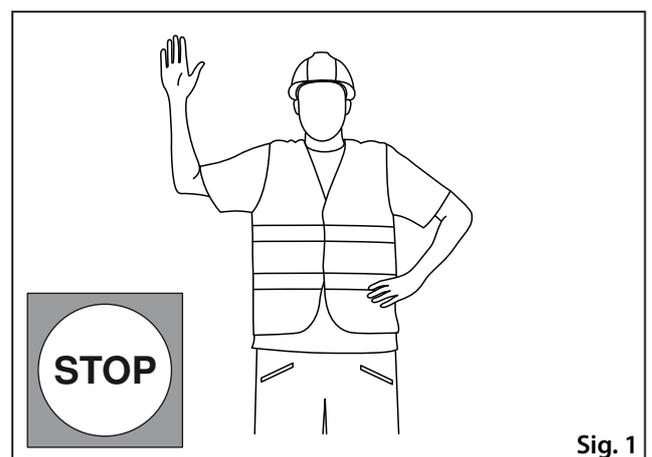
Engine start



Engine OFF



Stop



2.1 Main safety precautions

Watch out!

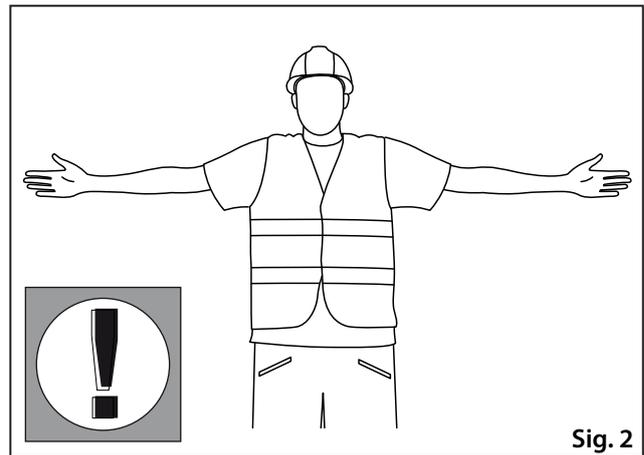


Fig. 2

Watch out, danger!

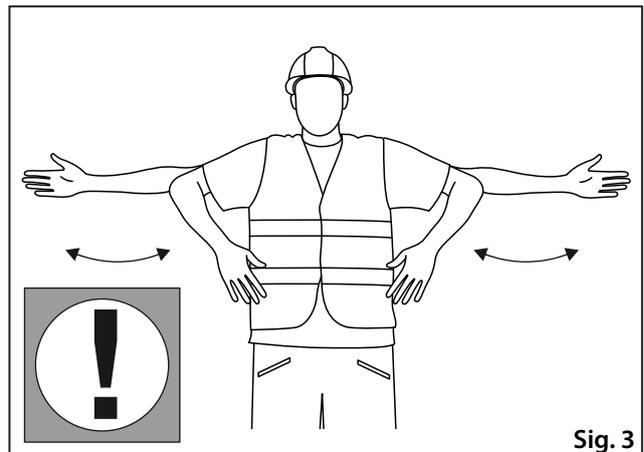


Fig. 3

SIGNALS FOR DRIVE

Travel

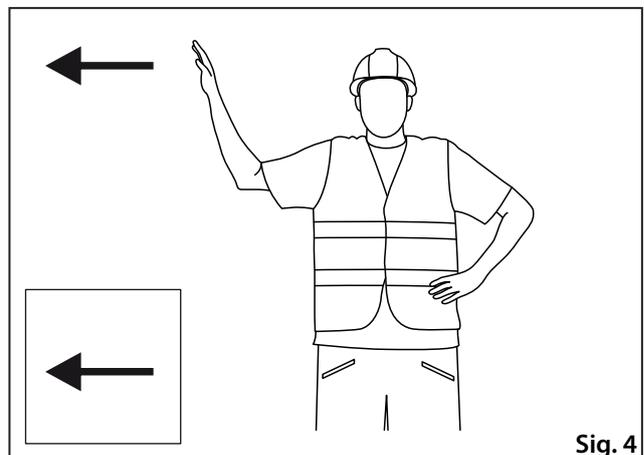


Fig. 4

Slow forward travel – towards me

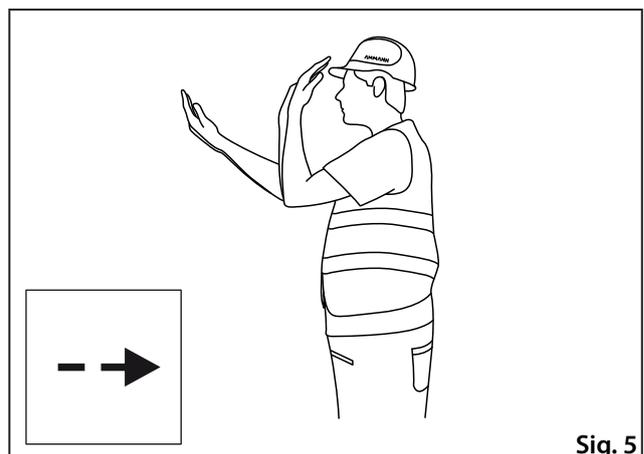
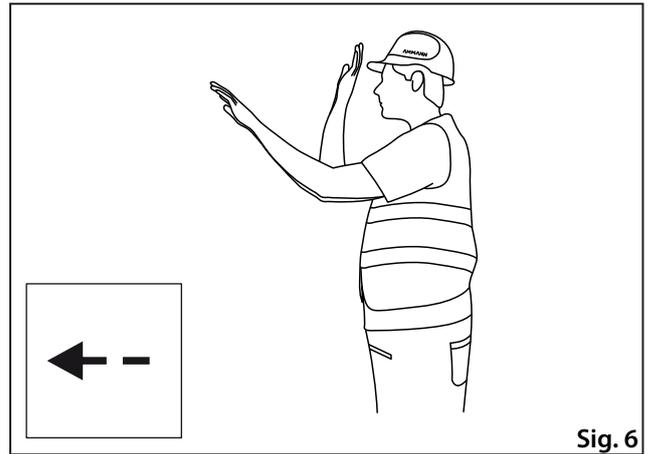
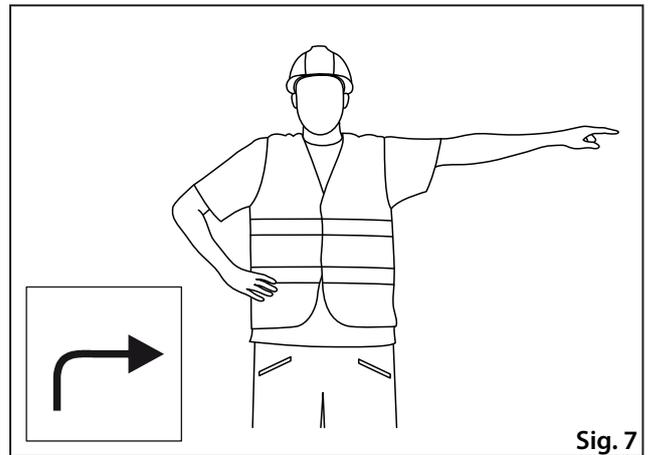


Fig. 5

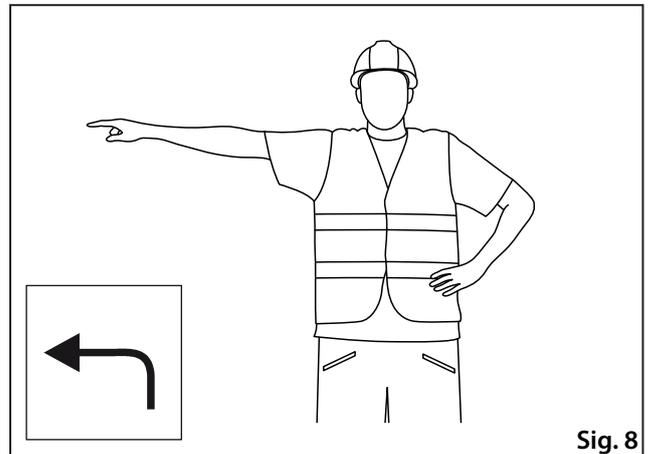
Slow reverse travel – away from me



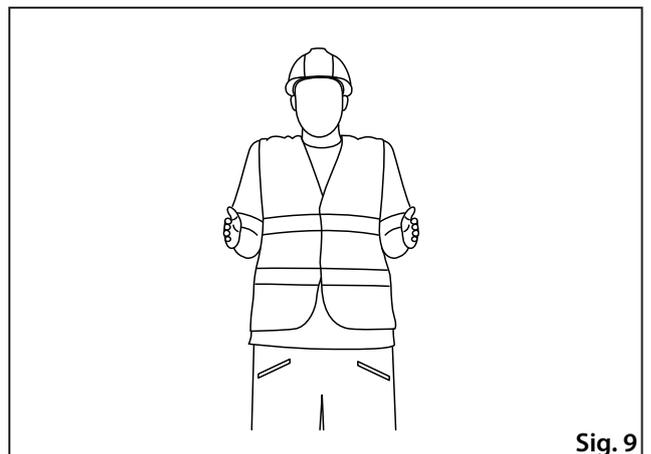
Drive to the right



Drive to the left



Short distance travel



2.2 Environmental and hygiene principles

2.2.1 Hygiene principles



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 within the territory where the machine is used.

- 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 manuals supplied with the machine.
- Always store petroleum products, cooling system fluids, battery cartridges and coating compounds including organic thinners, and also cleaners and preserving agents in 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 immediately the principles of the first aid. 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, oils and fuels;
- coolants;
- battery fluids and batteries;
- cleaning and preservative agents;
- all dismantled 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 applicable to environmental and health protection.

2.3 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 lubrication points
- confirm that water fillings 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.

2.3.2 Preservation and storage of the machine for a period over 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 (charge the batteries regularly)
- support the drum frame so that the shock-absorbing system shows minimal sag
- protect the rubber elements by coating with special preservative agent
- cover the suction and exhaust pipe of the engine with double PE foil and tighten it carefully with sealing tape
- spray a special liquid on the headlights, external rear-view mirrors and other elements of the external electrical installation and wrap in 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.

Never start the engine during storage!

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 (landslip etc.)!

2.3 Preservation and storage

2.3.3 Machine depreservation

- Check all parts of the machine for damage during storage and for missing parts.



Before operating the machine, wash the preservative agents:

Wash off the preservative agents using high pressure stream of hot water with common degreasers while observing the operation manual and the ecological principles.

Remove the preservation and wash the machine in places with intercepting sumps to catch the water and de-preservation agents.

Remove the preservation according to the manufacturer's manual.



Before putting the machine into operation, check the operating fluids.

2.4 Machine disposal after its service life

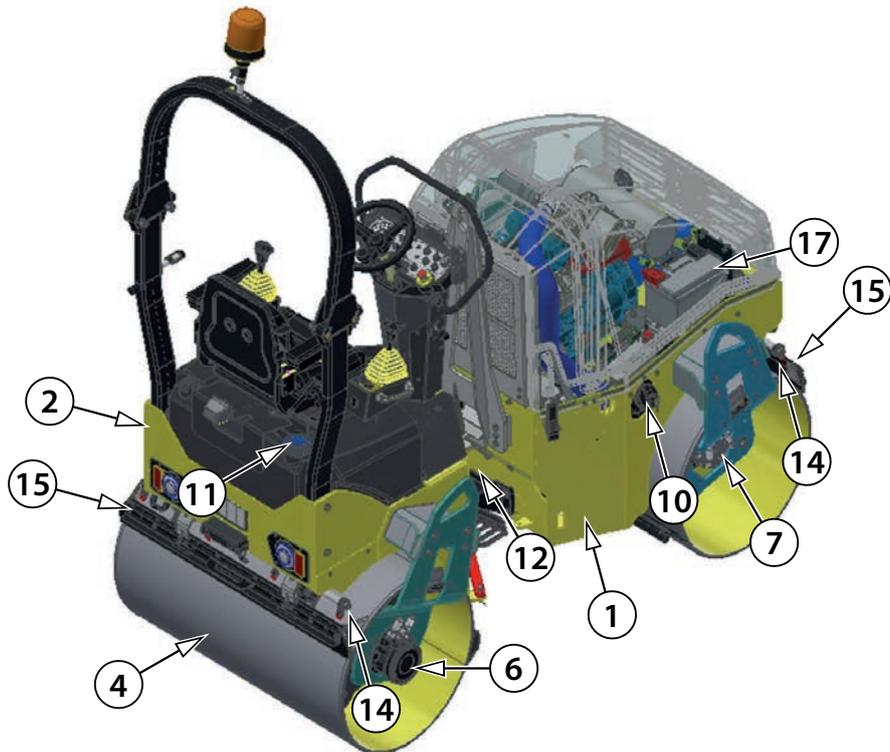
When disposing the machine following its service life, the user is obliged to follow national waste and environmental regulations and acts. In the above cases, we recommend you to always contact:

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



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

2.5 Machine description

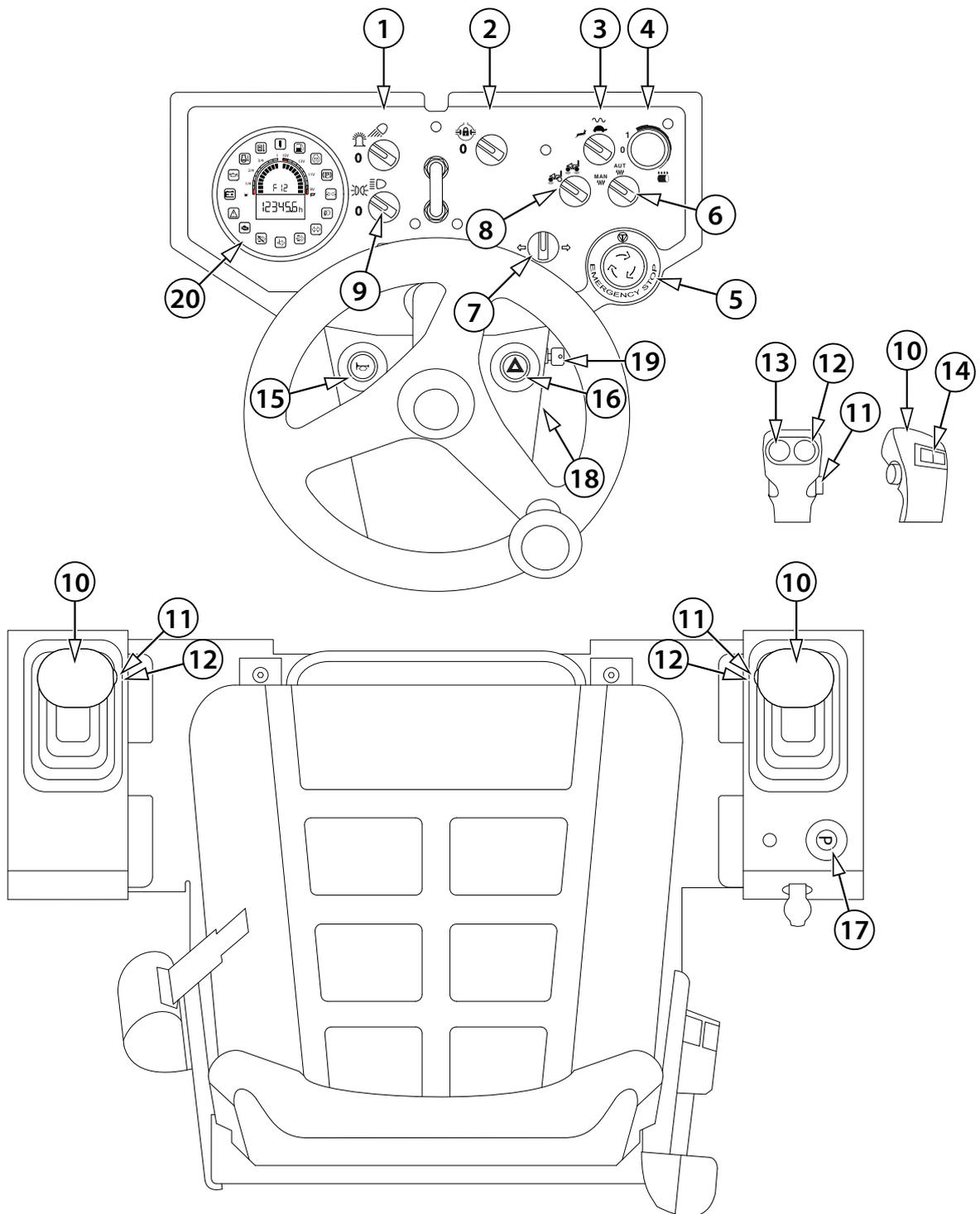


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Legend:

- 1 - Front frame
- 2 - Rear frame
- 3 - Front drum
- 4 - Rear drum
- 5 - Engine
- 6 - Travel hydraulic motor
- 7 - Vibration hydraulic motor
- 8 - Steering joint
- 9 - Hydraulic oil level indicator
- 10 - Fuel tank
- 11 - Sprinkling tank
- 12 - Sprinkling filter
- 13 - Operator's stand
- 14 - Drum sprinkling
- 15 - Drum scraper
- 16 - Exhaust pipe
- 17 - Battery
- 18 - Hydraulic oil cooler
- 19 - Air filter

2.6 Controls and checking instruments



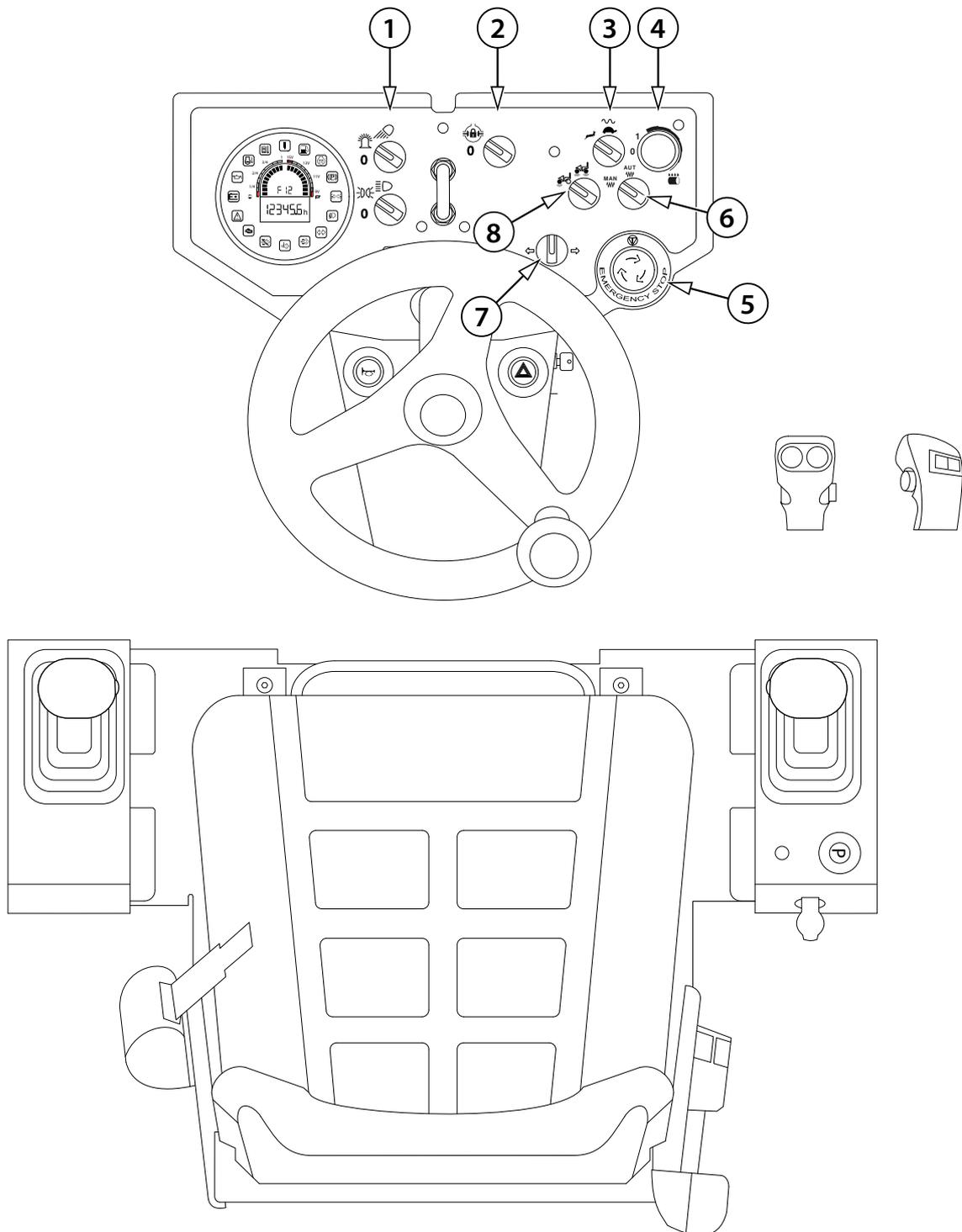
593001

2.6.1 Dashboard and control panels

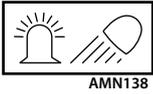
Legend:

- 1 - Beacon and rear light change-over switch
- 2 - Differential lock button
- 3 - Transport and working speed change-over switch
- 4 - Sprinkling potentiometer
- 5 - Emergency brake button
- 6 - Vibration mode selector switch (manual mode / automatic mode)
- 7 - Directions lights switch
- 8 - Vibrating drum selector switch
- 9 - Lights switch (parking lights / headlamps)
- 10 - Travel control
- 11 - Vibration switch
- 12 - Sprinkling switch
- 13 - Edge cutter sprinkling switch
- 14 - Edge cutter button (up/down)
- 15 - Warning horn switch
- 16 - Warning lights
- 17 - Parking brake switch
- 18 - Engine speed selector
- 19 - Ignition box

2.6 Controls and checking instruments



593002



Beacon and rear light change-over switch (1)

- To the gear 1: The beacon is ON.

It is possible that the machine is equipped with a beacon but the corresponding change-over switch is missing. In such a case, the beacon will start in continuous operation as soon as the ignition key is set to the position II.



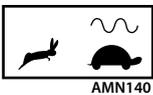
Differential lock button (2)

It is used for turning on the differential lock.

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



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



Transport and working speed change-over switch (3)

- Transport speed
- Working speed and vibration mode



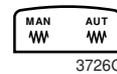
Sprinkling potentiometer (4)

OFF in the position "0". Turn the sprinkling potentiometer from the position "1" to the position "MIN" to smoothly control the sprinkling intensity of the drums.



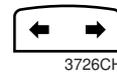
Emergency brake button (5)

When the button is pressed, the machine brake is enabled, which is indicated by lighting up the indicator lamps for emergency stop, battery charging and parking brake.



Vibration mode selector switch (manual mode / automatic mode) (6)

- manual vibration mode – the vibration can be switched on when the machine is standing or during a drive
- automatic vibration mode – the vibration is automatically switched on when the machine starts moving and automatically switched off when the machine is stopped.



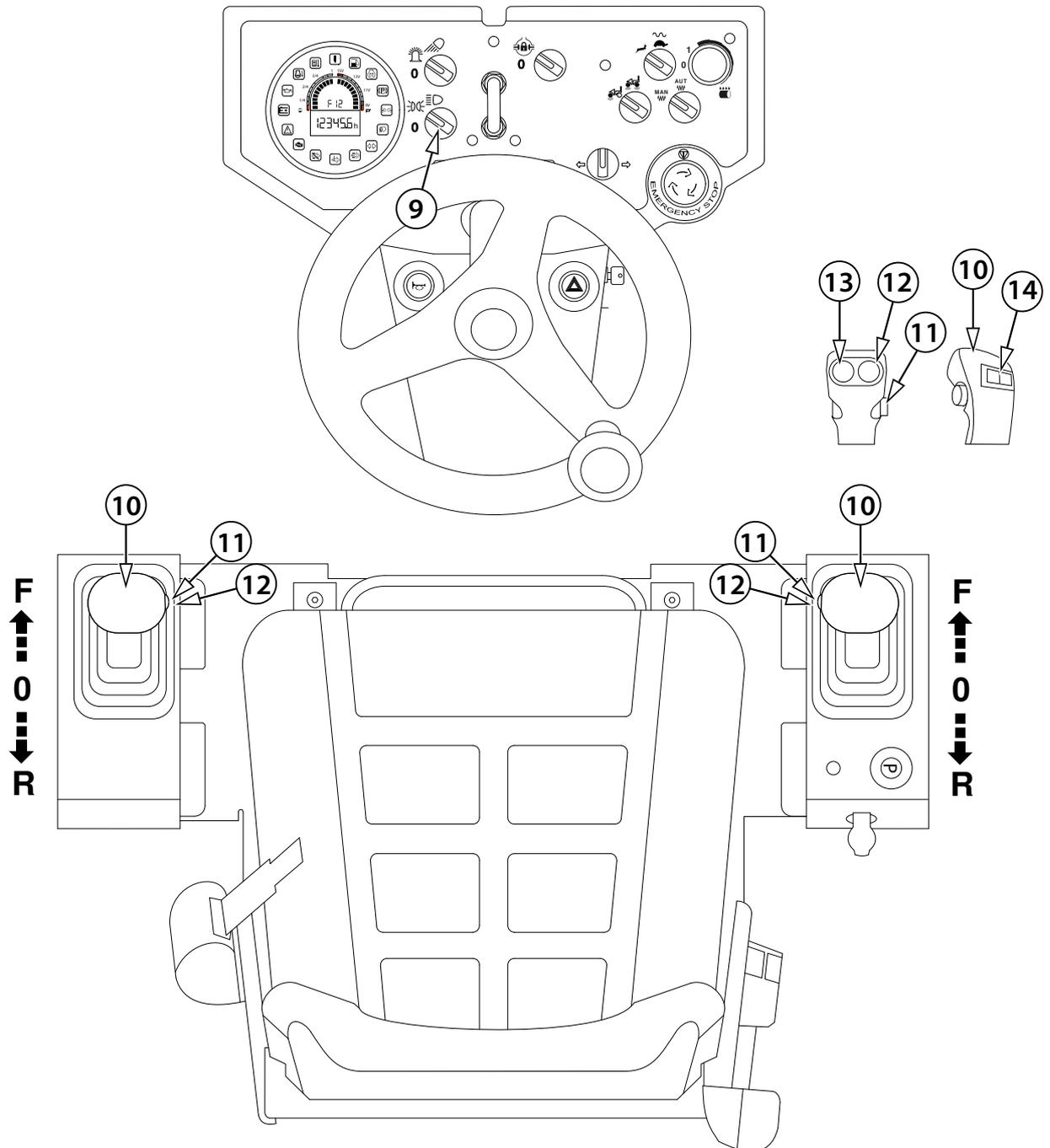
Direction lights switch (7)



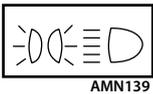
Vibrating drum selector switch (8)

- front drum
- front and rear drum

2.6 Controls and checking instruments



593003



Lights switch (parking lights / headlamps) (9)

- parking lights headlamps

Travel control – right (standard) (10)

Use the travel control to set the (Forward/Reverse) direction and the travel speed of the machine. The travel speed of the machine corresponds to the deflection of the travel control from its zero position. The travel control is fixed in the set position. The zero position of the control is indicated by lighting up the parking brake indicator lamp. There is a vibration switch and a sprinkling switch on the travel control.

F - forward travel

0 - zero position

R - reverse travel

Travel control – left (optional)

Use the travel control to set the direction and the travel speed of the machine. The travel speed of the machine corresponds to the deflection of the travel control from its zero position. The travel control is fixed in the set position. The zero position of the control is indicated by lighting up the parking brake indicator lamp. There is a vibration switch and a sprinkling switch, edge cutter sprinkling switch, edge cutter button on the travel control.

F - forward travel

0 - zero position

R - reverse travel

Note

The machine can be operated with only one travel control.

If requested by the customer, the machine can be equipped with the second travel control (10) placed on the left armrest.

For the machine travel using one of the controls (the active one), the inactive control must be set to the zero position (0). If the inactive control is deflected from the zero position, the machine will stop. When the machine is stopped, move both of the travel controls (10) to the zero position and then select the driving direction.



Vibration switch (11)

Press the switch to turn on/off the vibration function.



Sprinkling switch (12)

Press the switch to turn on/off the drum sprinkling function.



Edge cutter sprinkling switch (13)

Press the switch to turn on/off the edge cutter sprinkling function.

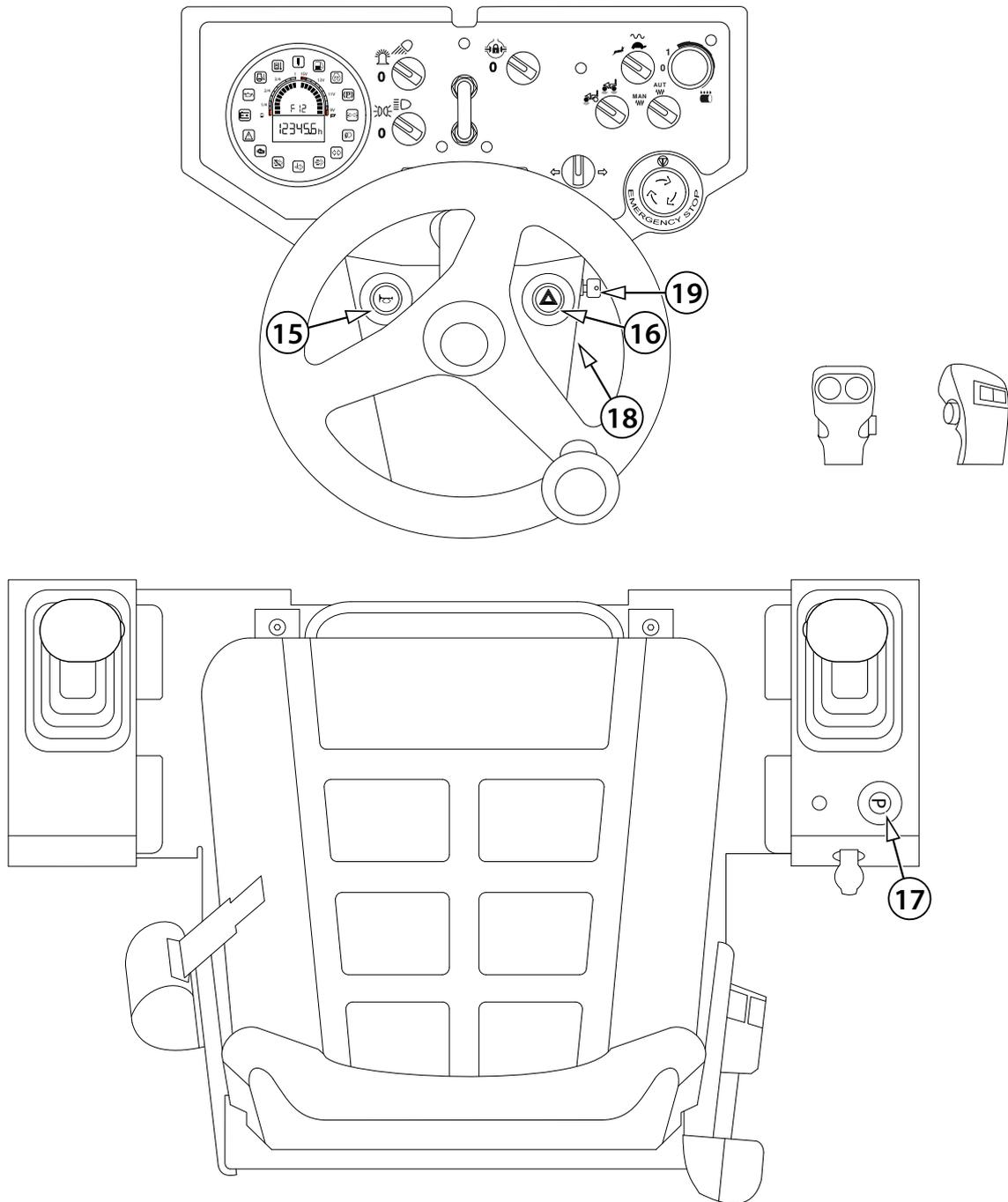


Edge cutter button – up/down (14)

To the left – Press the button to set the edge cutter to the working position.

To the right – Press the button to set the edge cutter to the transport position.

2.6 Controls and checking instruments



593004



Warning horn button (15)



Warning lights switch (16)



Parking brake switch (17)

The parking brake is enabled by the switching.

Engine speed control (18)

The control setting allows you to better adjust the speed and the vibration power to the given soil conditions.

Idle speed: Set the control to the first position.

Small working speed: Set the control to the position I (85%).

Big working speed: Set the control to the position II (100%).

Small working speed:

Frequency I

85% vibration capacity

85% travel speed (depending on the transport and working speed change-over switch)

85% engine speed

Big working speed:

Frequency II

100% vibration capacity

100% travel speed (depending on the transport and working speed change-over switch)

100% engine speed

Ignition box (19)

P - You can turn on warning lights in this position. Other electrical devices are not powered.

0 - OFF

I - ON

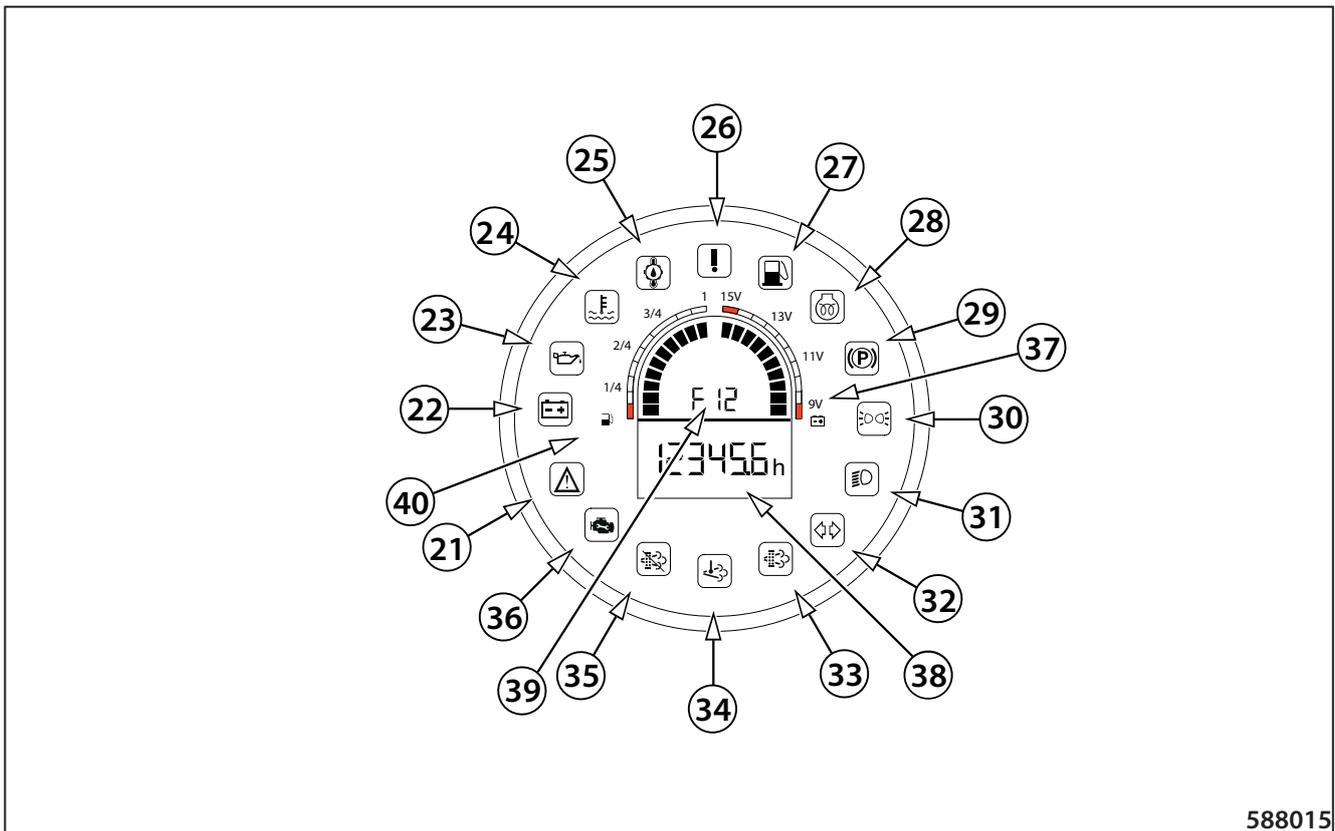
II - Engine glowing

III - Engine starting

Display (20)

Instrument to display parameters and functions of the engine and of the machine.

2.6 Controls and checking instruments



588015

Indicator lamps

- | | |
|---|--|
| 21 - Error message indicator lamp | 31 - Low beam lights indicator lamp |
| 22 - Battery charging indicator lamp | 32 - Indicator lamp for direction indicators |
| 23 - Engine oil pressure indicator lamp | 33 - DPF clogging indicator lamp |
| 24 - Coolant temperature indicator lamp | 34 - Indicator lamp of high temperature of exhaust gases |
| 25 - Hydraulic oil temperature indicator lamp | 35 - Suppression of DPF regeneration indicator lamp |
| 26 - Emergency stop indicator lamp | 36 - Engine failure indicator lamp |
| 27 - Fuel reserve indicator lamp | 37 - Battery voltage indicator |
| 28 - Engine glowing indicator lamp | 38 - Engine hour counter |
| 29 - Brake indicator lamp | 39 - Error message indicator |
| 30 - Outline lights indicator lamp | 40 - Fuel tank indicator |

The warning indicator lamps for engine oil pressure, battery charging and brakes must light up when the ignition is ON. As soon as you start the engine, the indicator lamps must go off.



Error message indicator lamp (21)

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, call the service!



Battery charging indicator lamp (22)

When the battery charging indicator lamp lights up during operation or it does not go off after the engine is started, carry out the undermentioned steps:

- Stop the engine.
- Check the V-belt of the engine for damage and loosening. If the indicator lamp remains lighting, call the service!



Engine lubrication indicator lamp (23)

When the engine lubrication indicator lamp lights up during operation or does not go off after the engine is started up, you must stop the machine immediately and turn off the engine!

- Check the engine for oil leaks and for correct oil level.
- If the oil level in the engine is correct, call the service!



Engine overheating indicator lamp (24)

When 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.



Hydraulic oil temperature indicator lamp (25)

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

If the oil temperature exceeds 95 °C, the error F32 will appear.



Emergency stop indicator lamp (26)

The emergency stop indicator lamp lights if the emergency brake button (5) 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!



Fuel indicator lamp (27)

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

Refill the fuel!



Engine glowing indicator lamp (28)

It indicates the engine warming up before the cold start.

2.6 Controls and checking instruments



Parking brake indicator lamp (29)

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



Outline lights indicator lamp (30)

The indicator lamp indicates that the parking lights are ON.



Headlamps indicator light (31)

The indicator lamp indicates that the headlamps are ON.



Indicator lamp for direction indicators (32)

The indicator lamp indicates that the directions indicators are ON.



Indicator lamp of DPF (Diesel Particulate Filter) clogging (33)

The machine is not equipped with a DPF.



Indicator lamp of high temperature of exhaust gases (34)

The function is not activated.



Indicator lamp of DPF (diesel particulate filter) regeneration suppression (35)

The machine is not equipped with a DPF.



Engine failure indicator lamp (36)

The indicator lamp indicates an engine failure.

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

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



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



Battery voltage indicator (37)



Worked hours indicator (38)

Error message code indicator (39)



Fuel level indicator (40)

Seat

Seat adjustment

- 1 Backrest inclination adjustment
- 2 Seat springing stiffness
- 3 Longitudinal seat travel
- 4 Seat cross travel



AMN147

Backrest inclination adjustment

Push the lever (1) to tilt the backrest smoothly as necessary.



AMN148

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.

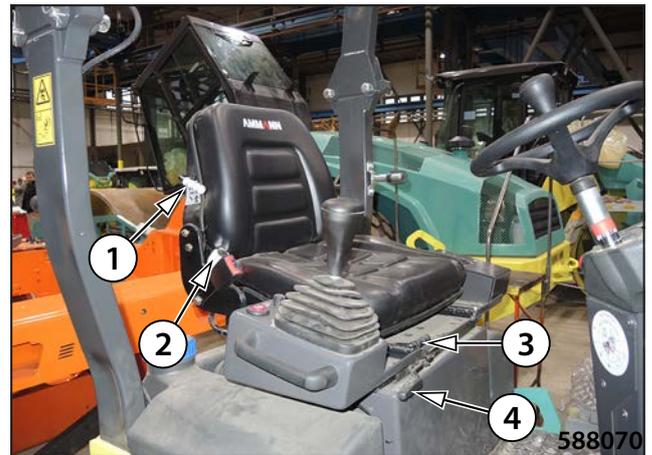
The driver must be fastened with the safety belt while driving.

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

During travel of the machine, the driver must have his legs on the machine platform; there is a risk of injury when the machine turns.



615025



588070

2.6 Controls and checking instruments

Longitudinal seat travel

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

Seat cross travel

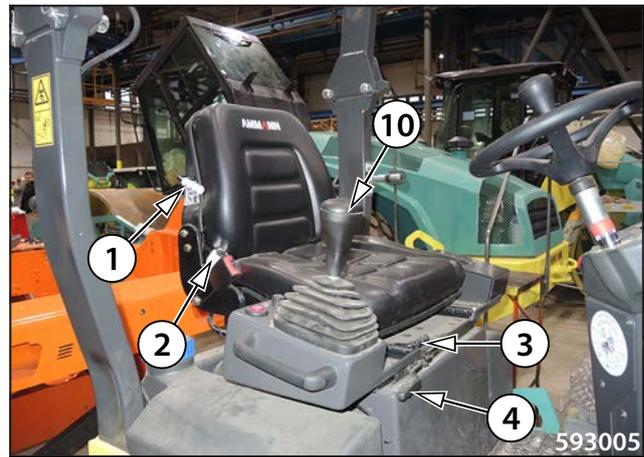
- After raising the lever (4), it is possible to move the seat in the cross direction to the left and right.

Seat switch

The seat switch is located in the seat cushion.

It is used for locking the engine starting or for stopping the engine if the operator does not sit on the seat.

If the operator stands up from the seat when driving, the machine will stop after 7 seconds.



Moving off the machine

If the travel locking is activated by enabling the seat switch while driving, the operator must sit down on the seat and move the travel control (10) to the zero position (0) and then select the driving direction.



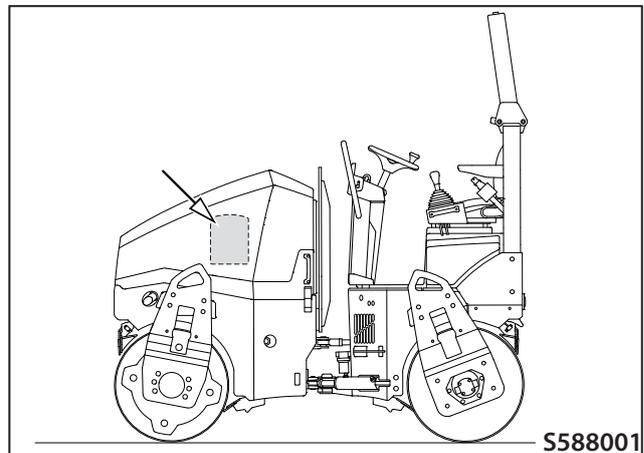
It is forbidden to load the seat switch with other items!

Document box

The storage box situated on the inner left side of the bonnet is used to store the Operating Manual and other documents related to the operation of the machine.

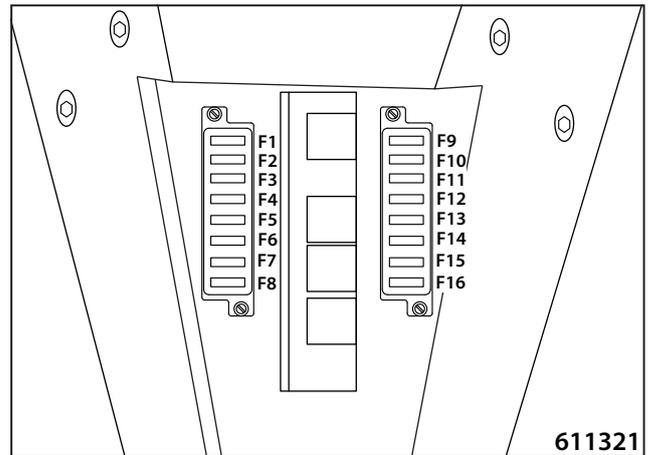


The Operating Manual must always be kept in the machine in an appropriate place to be always available for the driver of the machine for viewing.



Fuse box

- F1 - 7.5 A Front parking lights
- F2 - 7.5 A Tail lights, licence plate lighting
- F3 - 15 A Front headlamps
- F4 - 20 A Rear headlamp, beacon, ROPS working lights
- F5 - 7.5 A Direction indicators
- F6 - 7.5 A Horn
- F7 - 10 A Display, direction indicators
- F8 - 1 A Option ACE
- F9 - 10 A Seat heating
- F10 - 10 A Flow divider horn, flow divider, edge cutter
- F11 - 25 A Hydraulic oil cooler
- F12 - 10 A Vibrations, engine speed switch
- F13 - 15 A Travel control lever, seat switch, sprinkling pumps
- F14 - 3 A Control unit
- F15 - 10 A Control unit
- F16 - 1 A Pressure brake switch, infra-red thermometer



Battery disconnecter fuses

- F20 - 70 A Main fuse
- F30 - 50 A Glowing
- F21 - 1 A Additional glowing fuse
- F22 - 5 A Fuel pump
- F23 - 5 A Time relay fuse



2.6 Controls and checking instruments

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.



Engine bonnet

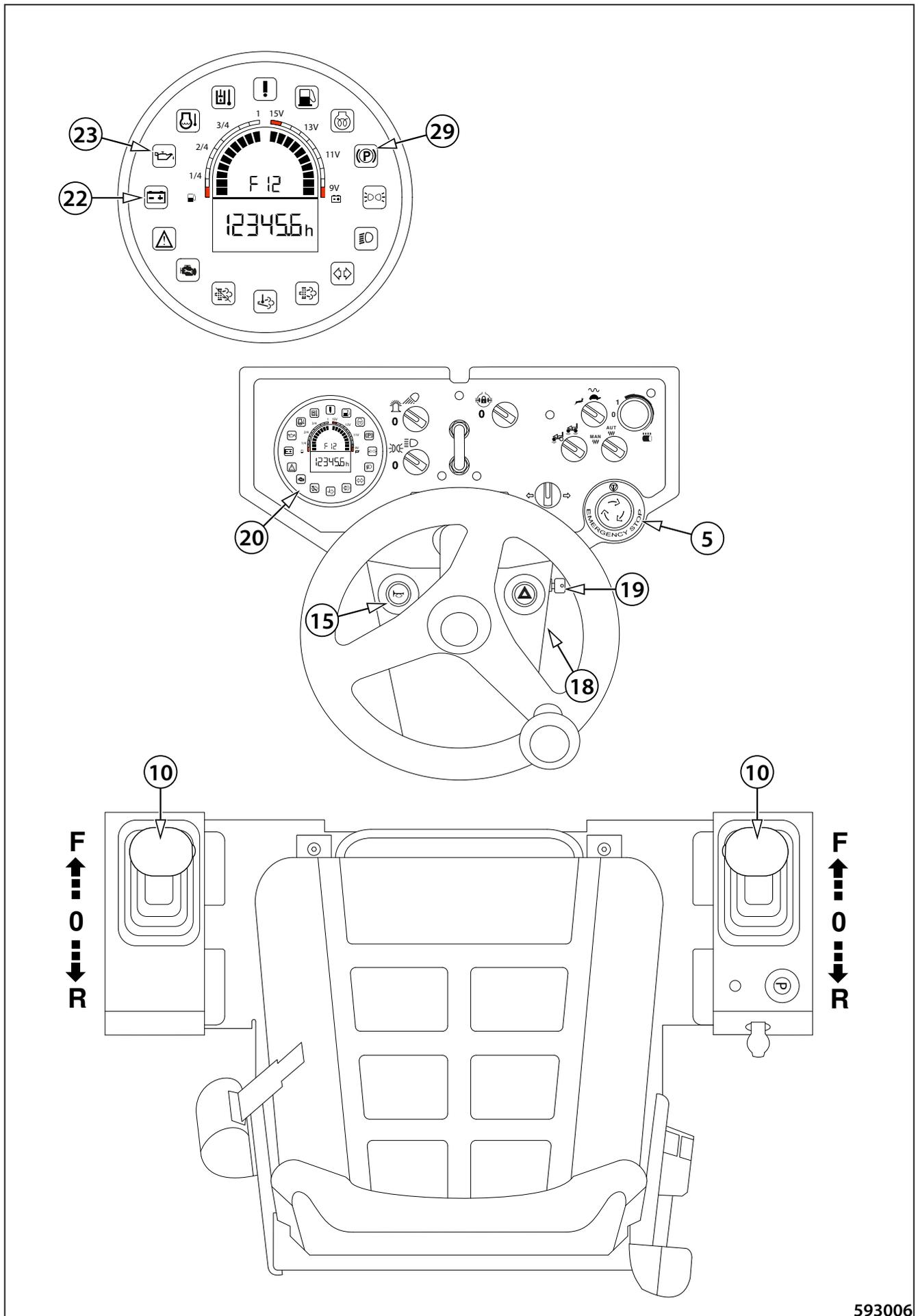
The bonnet protects the engine from:

- weather effects
- vandalism
- handling by others

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



2.7 Machine operation and use



593006

2.7.1 Starting the engine

Daily before starting the engine, check the oil level in the engine and in the hydraulic tank, fuel level in the fuel tank and water level in the water 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!

Starting the engine:

Turn on the battery disconnecter.

Sit down on the seat.

Set the engine speed switch (18) to the idling speed position.

Set the travel control (10) to the zero position.

Check that the emergency brake (5) is not enabled.

Insert the key into the ignition box (19) in the position "0" and switch over to the position "I".

The indicator lamps for battery charging (22), engine lubrication (23) and parking brake (29) will light up on the display (20).

Use the warning horn (15) to signal that the engine is starting.

Switch over with the key to position "II". Be careful; if the outdoor temperature decreases under 0 °C, hold the key in the position "II" for 15 seconds!

Start the engine by switching the key to the position "III"; as soon as the engine is started up, release the key.

After the start-up, the indicator lamps for battery charging (22), engine lubrication (23) and parking brake (29) must go off on the display (20).



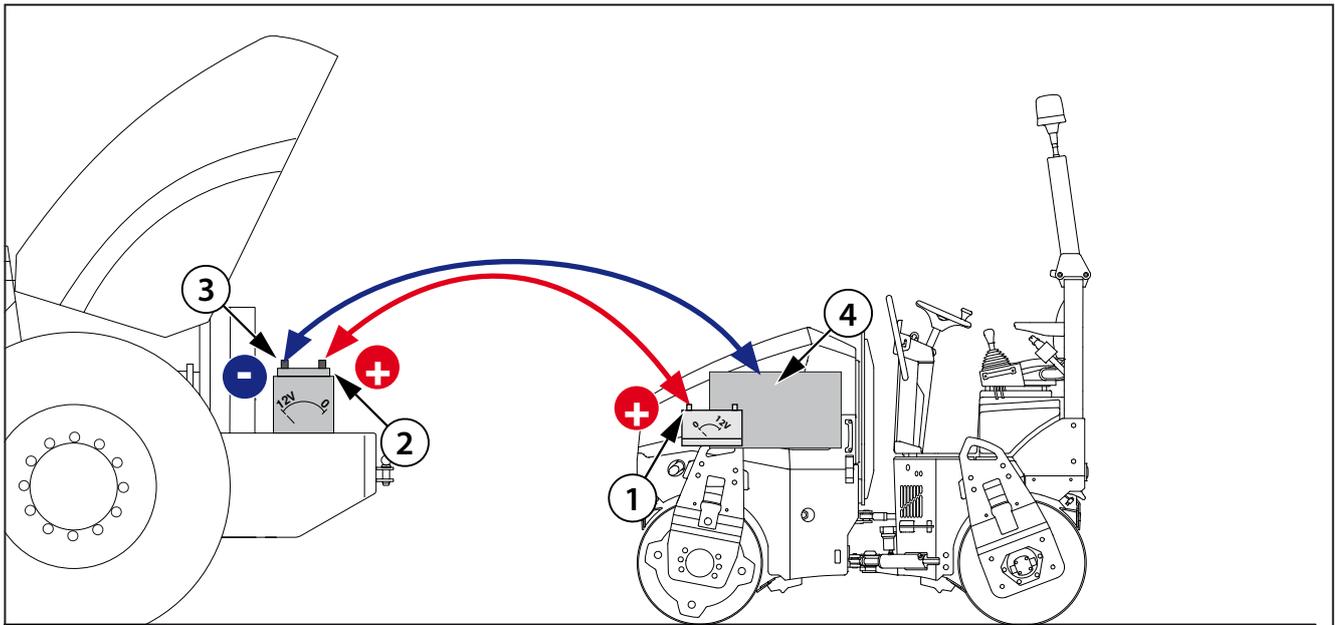
When starting and driving with a cold engine and cold hydraulic oil, the braking distances are longer than when the oil has reached its operating temperature.

Do not start the engine for more than 30 seconds. Wait for 2 minutes before starting again.

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

If the coolant temperature does not reach at least 40 °C (104 °F), do not load the engine at full power!

2.7 Machine operation and use



593007

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

**The starting supply 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 other 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 other end of the (-) pole of the cable to any part of the started machine, which is attached to the engine (or with 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!

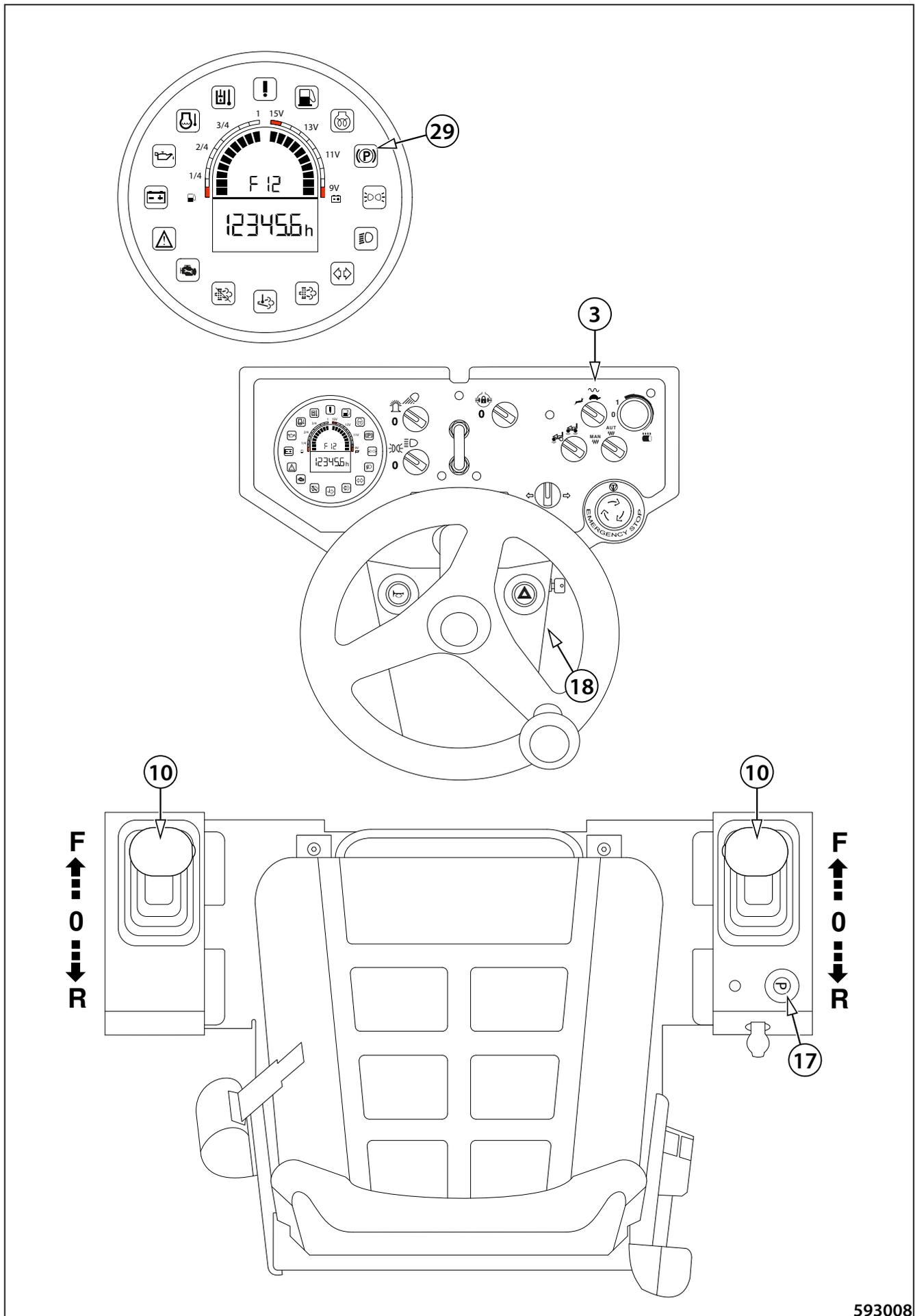
The jump lead connected to the (+) pole of the batteries must not come into contact with electrically conductive parts of the machine – danger of a short circuit!

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

Remove flammable sources (open flame, burning cigarettes, etc.)

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

2.7 Machine operation and use



593008

2.7.2 Drive and reverse drive



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

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!

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!

The operator must sit on the seat before the machine starts moving! If the operator stands up from the seat while driving for more than 3 seconds, the machine will stop and the brake will be engaged.

Start the engine

- The engine speed control (18) must be in its lower position.
- Turn off the parking brake switch (17) if the parking brake indicator lamp (29) lights.

Selection of the working engine speed

- The machine is provided with two working speed positions.
- Small working speed: Set the control to the position I (85%).
- Big working speed: Set the control to the position II (100%).

Small working speed:

- 85% travel speed (depending on the transport and working speed change-over switch)
- 85% engine speed

Big working speed:

- 100% travel speed (depending on the transport and working speed change-over switch)
- 100% engine speed

Selection of the travel direction

- Using the travel control (10) select the forward (F) or reverse (R) travel direction from the zero position (0).

When the driver releases the travel control (10), it does not return to the zero position automatically. The travel control remains in the selected position.

When the driver moves the travel control (10) through the zero position (0) from the selected direction of the machine travel, e.g. due to a dangerous situation, the machine will stop (panic response).

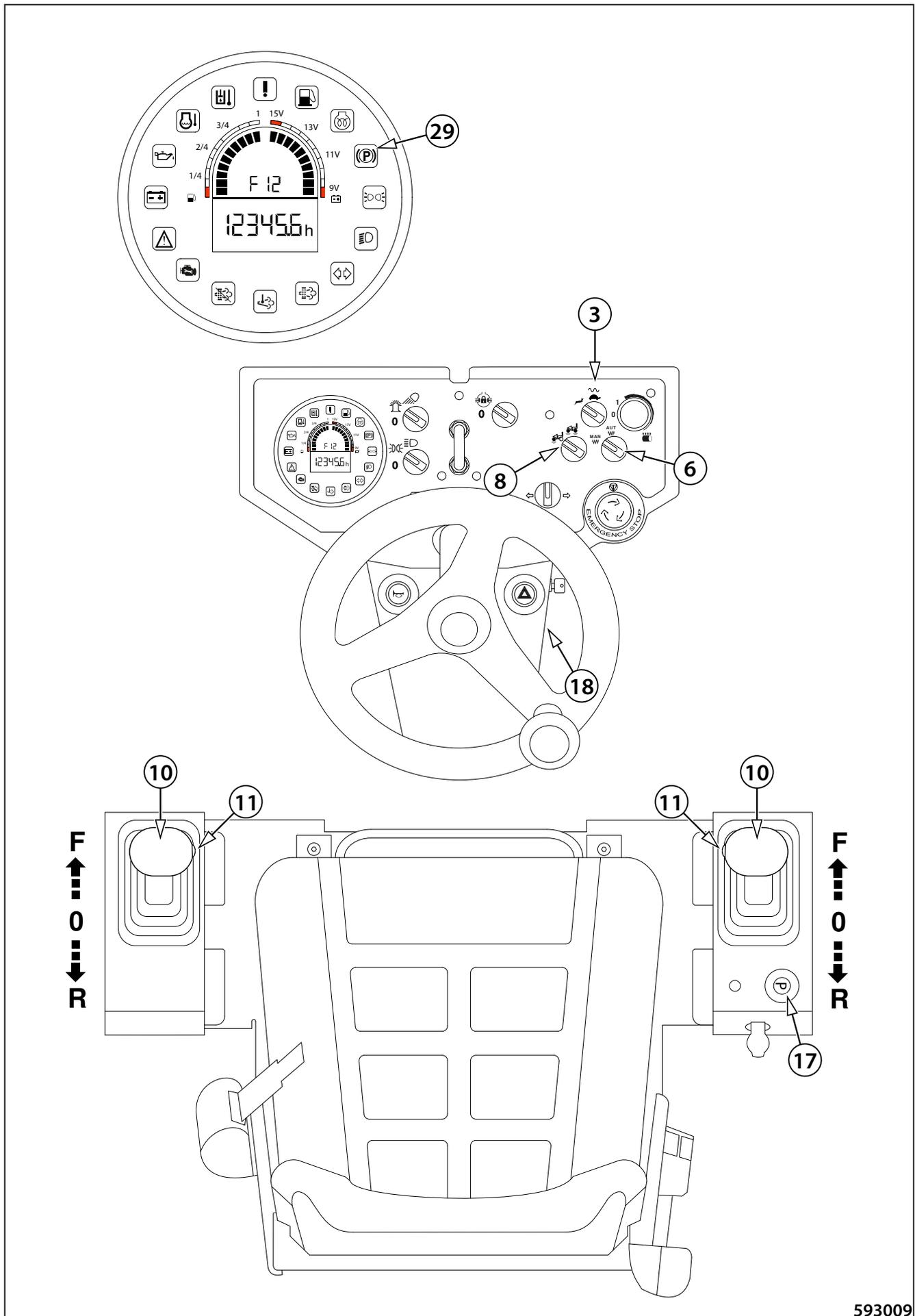
Travel speed selection

- The travel speed corresponds to the deflection of the travel control (10) from the zero position (0) at the given engine speed (18) and mode of operation (3) of the machine.
- The travel speed can be changed with the transport and working speed switch (3).
- The travel speed can be changed by selecting the working speed of the engine (18).

Panic response

The immediate stop of the machine using the travel control (10) applies to all of the travel modes of the machine. When the travel control (10) is changed to the opposite position through (0) within 1 second, the machine will stop – the parking brake will be engaged and the engine will keep running, i.e. panic response. When the machine vibration is on, the vibration will stop also when the manual vibration mode is selected. When the machine is equipped with two travel controls, the panic response can be enabled also on the inactive travel control. The machine can start moving again after the travel control (10) is changed to the neutral position (0) and the travel direction (F/R) is selected.

2.7 Machine operation and use



593009

Machine travel and reversing with vibration



It is forbidden to operate the machine if the engine speed control (19) is set at the idle speed.

It is forbidden to enable the vibration when the machine is standing.

Turn off the parking brake switch (17) if the parking brake indicator lamp (29) lights.

Manual mode

- Use the vibration mode switch (6) to set the manual mode.
- Use the engine speed control (18) to set the working engine speed I or II.
- Use the vibrating drum selector (8) to select the front drum vibration or front and rear drum vibration.
- Use the transport and working speed (3) switch to set the working speed and the vibration mode.
- Using the travel control (10) select the forward (F) or reverse (R) travel direction.

Turning on

- Turn on the vibration with the switch (11).

Turning off

- Turn off the vibration with the switch (11).

Automatic mode

- Use the vibration mode switch (6) to set the automatic mode.
- Use the engine speed control (18) to set the working engine speed I or II.
- Use the vibrating drum selector (8) to select the front drum vibration or front and rear drum vibration.
- Use the transport and working speed (3) switch to set the working speed and the vibration mode.
- Using the travel control (10) select the forward (F) or reverse (R) travel direction.

Turning on

- Press the vibration switch (11).
- The vibration will be automatically turned on when the travel speed is more than 1–2 km/h (0.6–1.2 mph).
- The vibration will be automatically turned off when the travel speed is less than 1–2 km/h (0.6–1.2 mph).
- The automatic mode remains enabled even after the travel control (10) has been shifted through the zero position (0).

Turning off

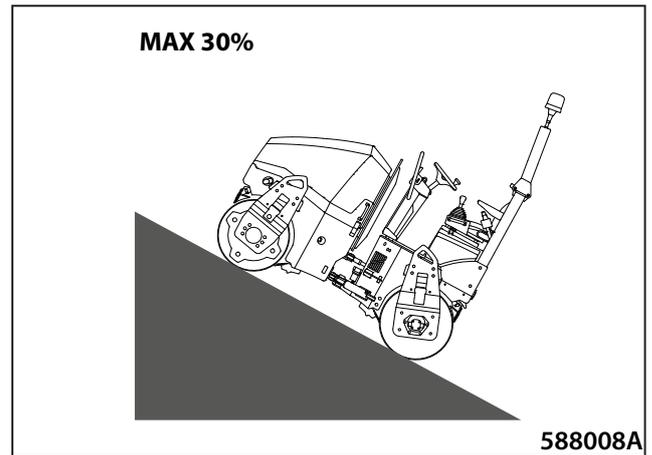
- Press the vibration switch (11).

Panic response

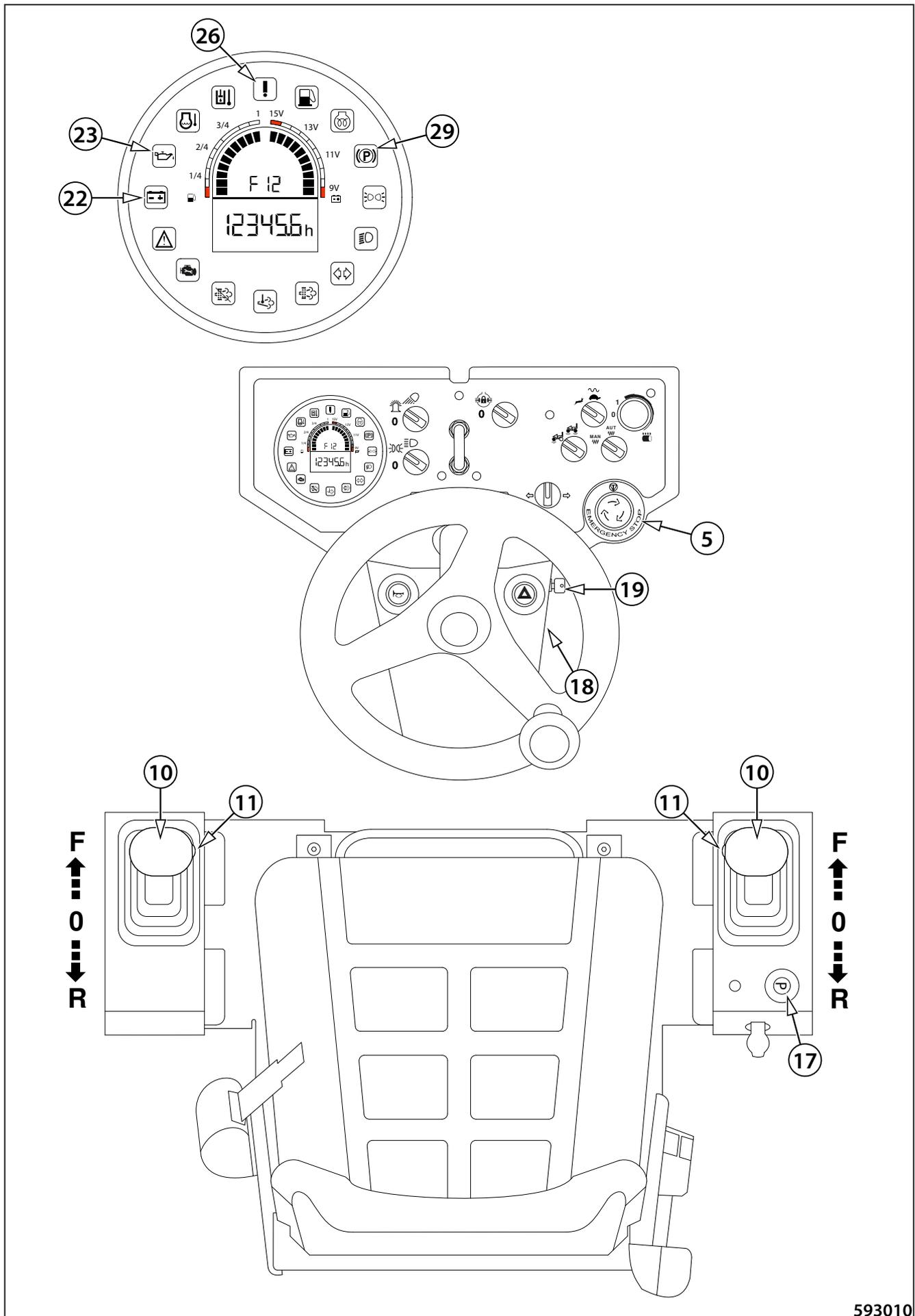
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For the maximum permissible slope gradient when driving uphill and across the slope gradient, see figures. The given values will be lower depending on adhesive conditions and the instantaneous weight of the machine!



2.7 Machine operation and use



2.7.3 Stopping the machine and turning off the engine

Turn off the vibration with the vibration switch (11).

Set the travel control (10) to the zero position (0).

Use the parking brake switch (17) to enable the parking brake.

Set the engine speed control (18) to the idle speed.

Switch over the key in the ignition box (19) to the position "0", take out the key from the ignition box and close the lid.

Turn off the battery disconnecter when shutting down the machine.

2.7.4 Machine emergency stop



In case of a dangerous situation which requires the immediate stop of the machine press the emergency brake button (6).

The machine will stop moving immediately, the engine will stop working and the parking brake will be enabled.

Turning on:

Press the emergency brake button (5) to brake the machine immediately, turn off the engine and apply the parking brake.

The indicator lamps for battery charging (22), engine lubrication (23), parking brake (29) and emergency stop (26) will light up on the display.

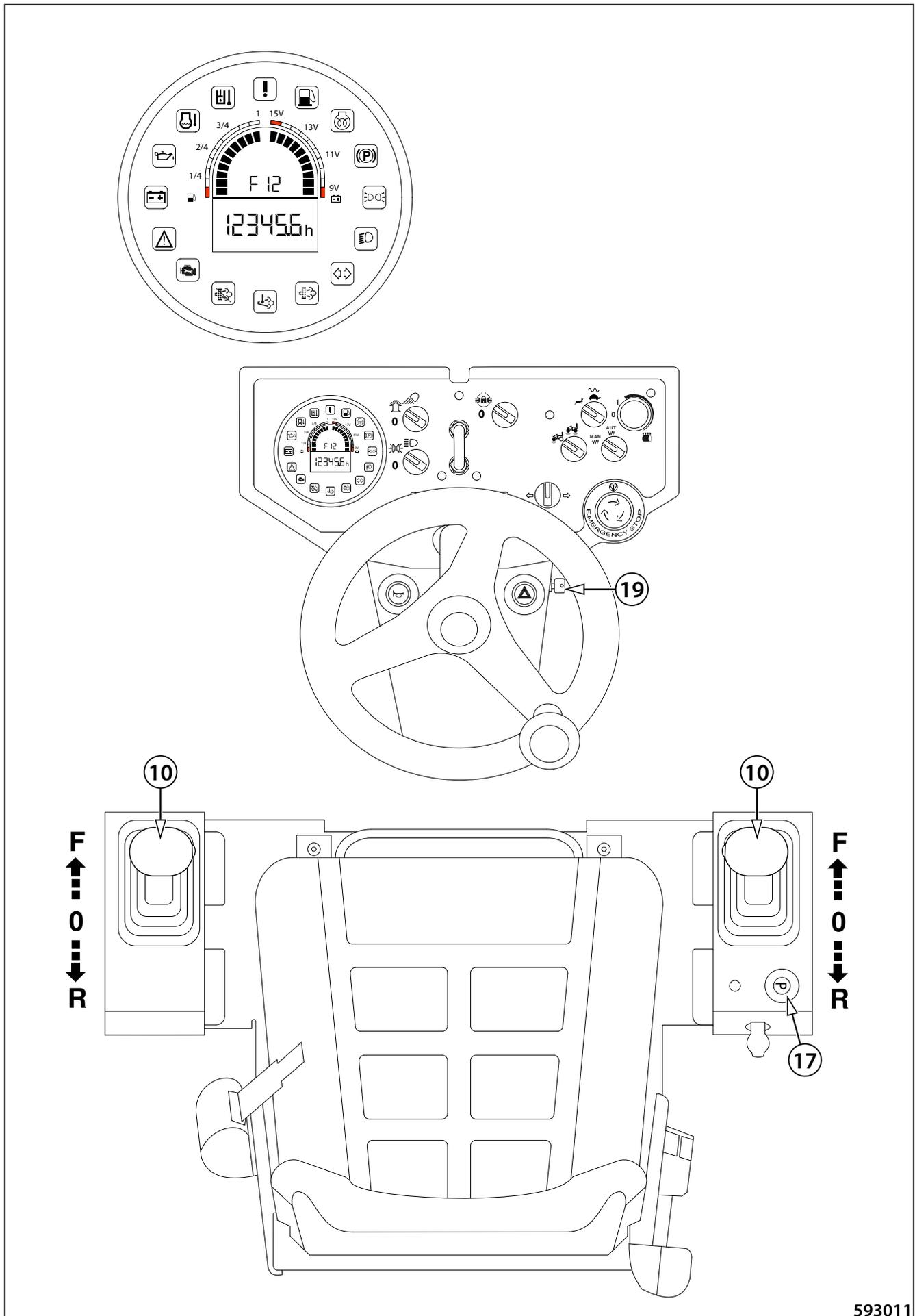
Turning off:

Turn the emergency brake button (5) in the direction of arrows.

The indicator lamps for battery charging (22) and engine lubrication (23) will light on the display.

Move the travel control (10) to the zero position (0) and the engine speed control (18) to the idle speed position; now start the engine.

2.7 Machine operation and use



593011

2.7.5 Machine parking

Shut down the machine on a flat and solid surface where there is no potential natural hazard (e.g. landslides, flooding).

Set the travel control (10) to the zero position (0).

Use the parking brake switch (17) to enable the brake.

Switch over the key in the ignition box (19) to the position "0", take out the key from the ignition box and close the lid.

Turn off the battery disconnecter if it is installed in the machine.

Clean the machine from dirt.

Check the whole machine and repair defects that occurred during operation.

Lock the cover of the dashboard and the engine bonnet with a padlock.

Note

The padlock is not delivered in the machine equipment.

Protect the dashboard and the engine compartment from unauthorized access of others by locking the dashboard cover and the engine bonnet.



It is forbidden to use the parking brake for bringing the machine to a stop.

2.7.6 Panic response

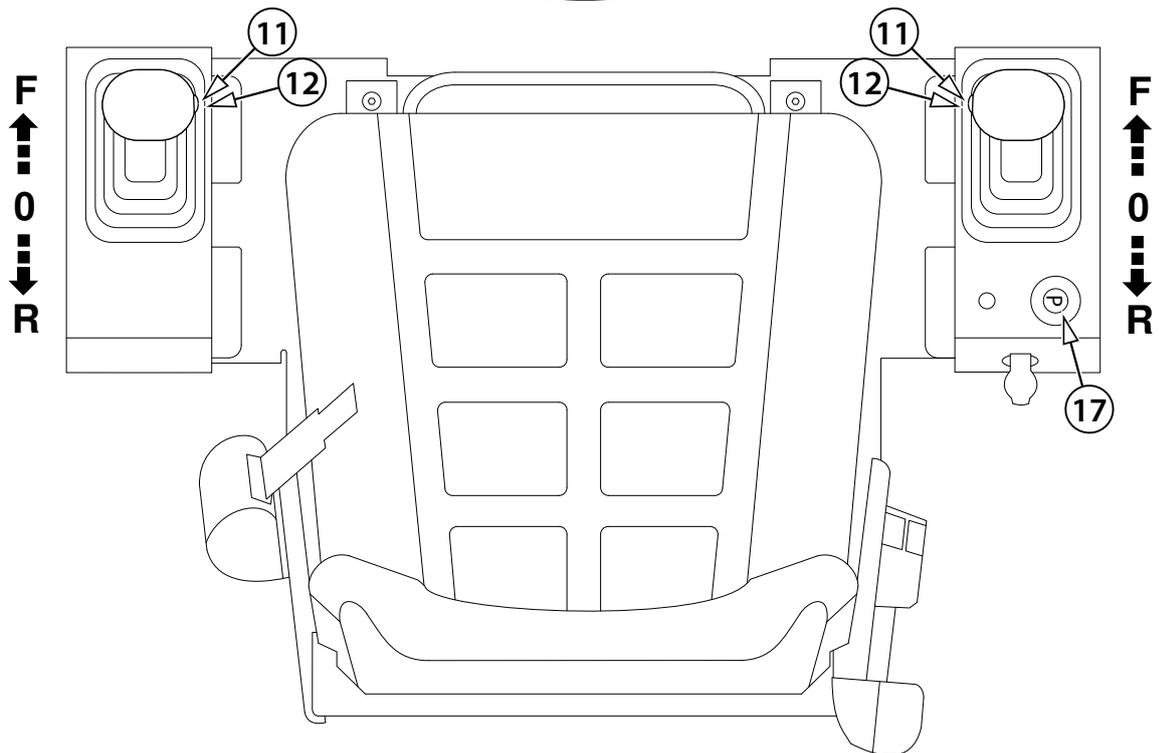
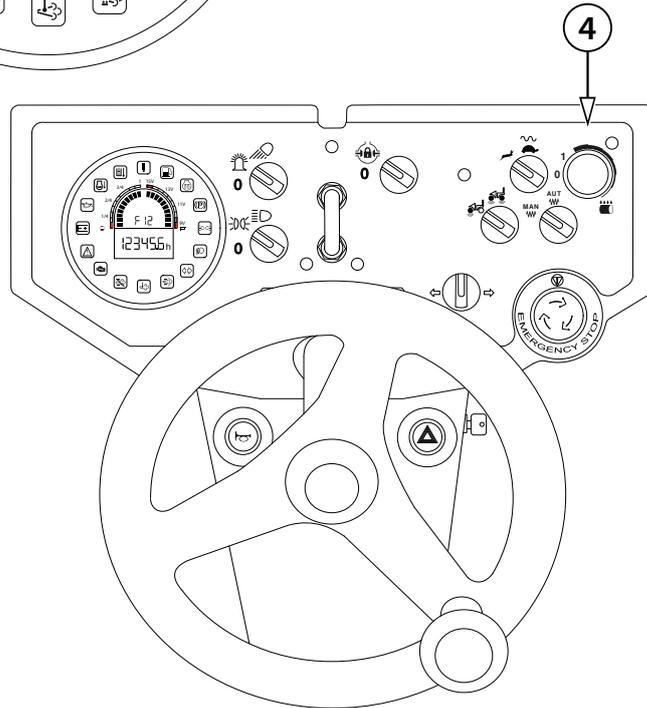
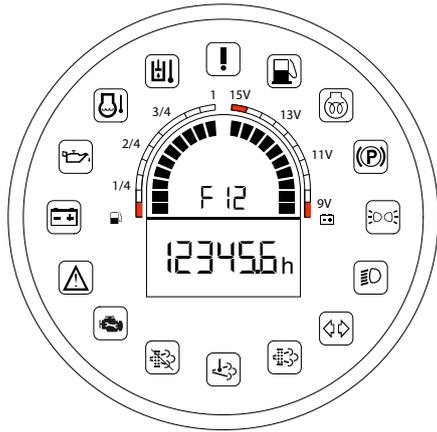
The immediate stop of the machine using the travel control (10) applies to all of the travel modes of the machine. When the travel control (10) is changed to the opposite position through (0) within 1 second, the machine will stop – the parking brake will be engaged and the engine will keep running, i.e. panic response. The machine can start moving again after the travel control (10) is changed to the neutral position (0) and the travel direction (F/R) is selected.

When the machine is equipped with two travel controls, the panic response can be enabled also on the inactive travel control.

When the machine vibration is on, the vibration will stop also when the manual vibration mode is selected.



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



593012

2.7.7 Sprinkling

The water level in the tank is shown on the indicator (1).

Hole to fill the water tank (2).

Check the water level in the tank before putting the machine into operation.

Turn on the sprinkling with the sprinkling potentiometer (4).

Position 0 – sprinkling OFF

Position 1 – sprinkling ON

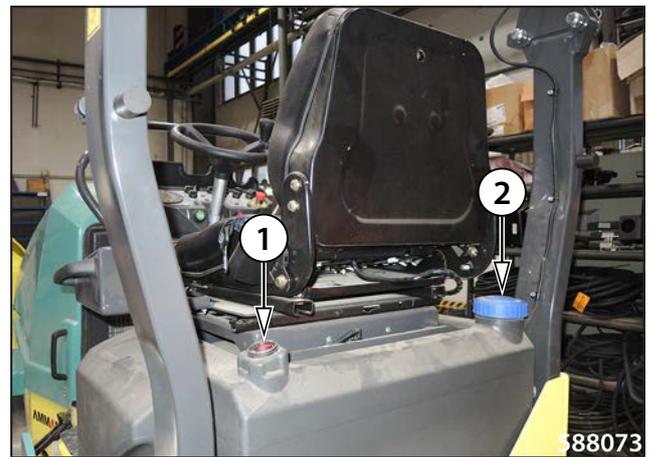
Turning from the position 1 to the right to turn on the interval sprinkling.

In the interval sprinkling mode you can continuously control the sprinkling break interval.

Using the sprinkling switch (12), it is possible to turn on the sprinkling at any time, e.g. before driving on a compacted bitumen surface.

Note

At a combined machine, the sprinkling switch (12) is used for sprinkling the tyres and the sprinkling potentiometer (4) is used for sprinkling the drum.



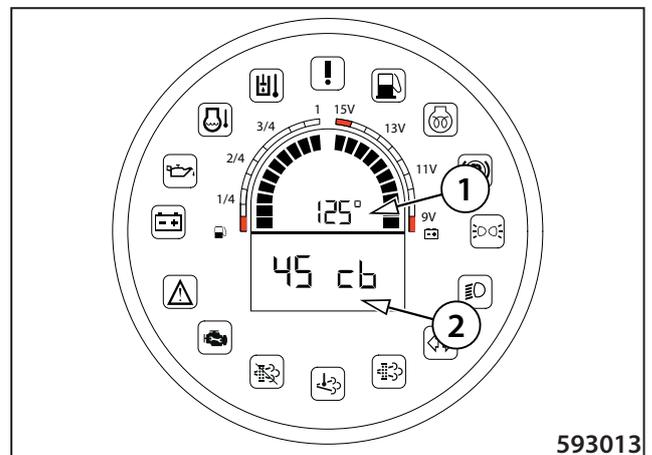
2.7.8 ACE Force (optional equipment)

The ACE Force system measures current surface compaction at the front drum and shows the value of compaction in the unit of cb (MN/m) on the multifunctional display.

1 - surface temperature

2 - compaction value

ACE Force is switched on and off by pressing the vibration switch (11). Values are not saved or printed.



2.7 Machine operation and use

2.7.9 Infrathermometer (optional equipment)

It is activated by turning on the key in the ignition box (20) and it displays the temperature of the bitumen surface being rolled. The measured temperature in °C is indicated on the display.

Procedure to set the units of measure °C or °F

After setting the required parameters on the display of the infra thermometer, the values are saved automatically.

Remove the cover.



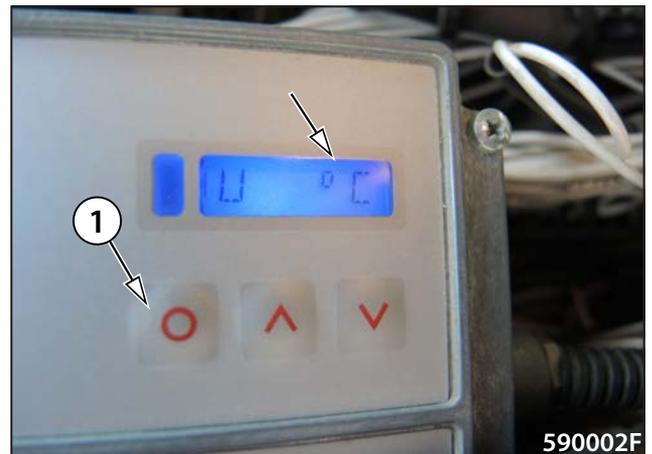
Turn the key in the ignition box to the "I" position.



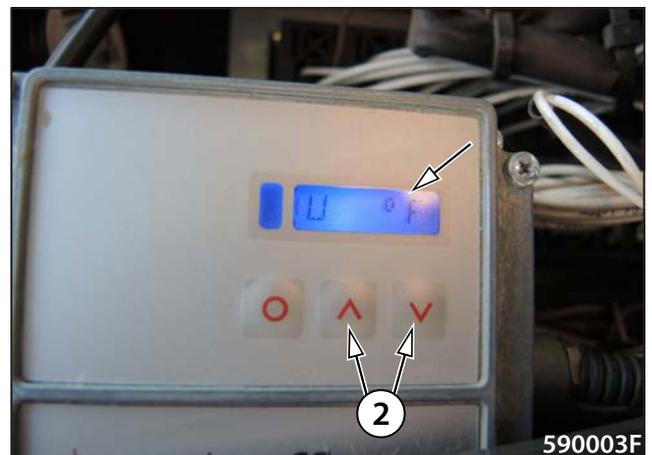
The infra thermometer display will light up.



Switch over with the MODE button (1) until °C appears on the display.

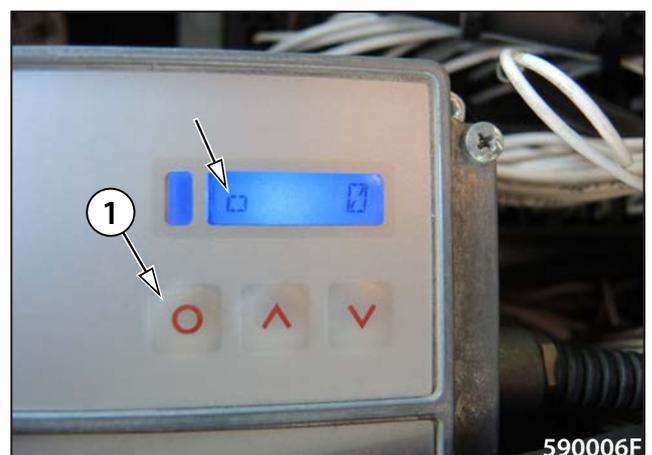


Switch over with the UP and DOWN arrows (2) until °F appears on the display.



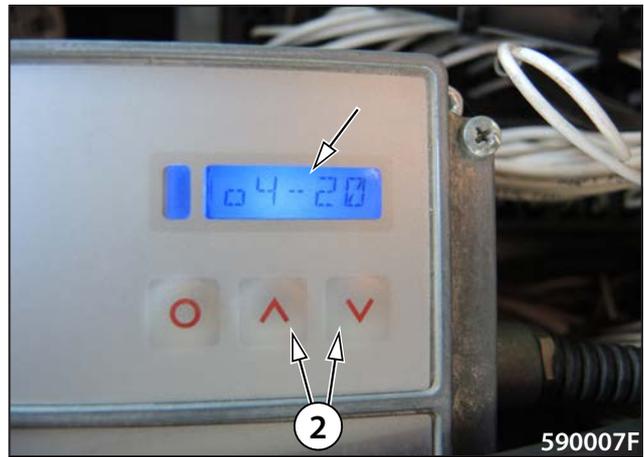
Set the current output of the infra thermometer.

- Switch over with the MODE button (1) until the "o" symbol appears on the display.



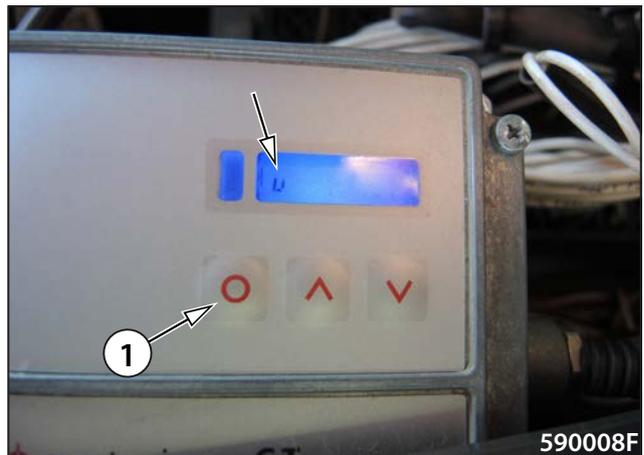
2.7 Machine operation and use

- Switch over with the UP and DOWN arrows (2) until 4–20 mA appears on the display.

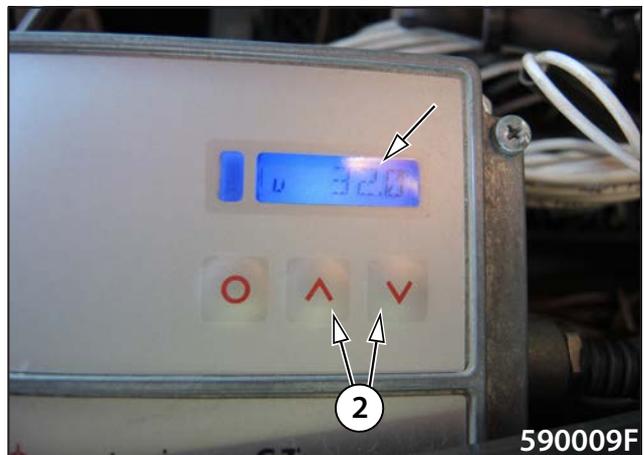


Set the minimum temperature.

- Switch over with the MODE button (1) until the “u” symbol appears on the display.

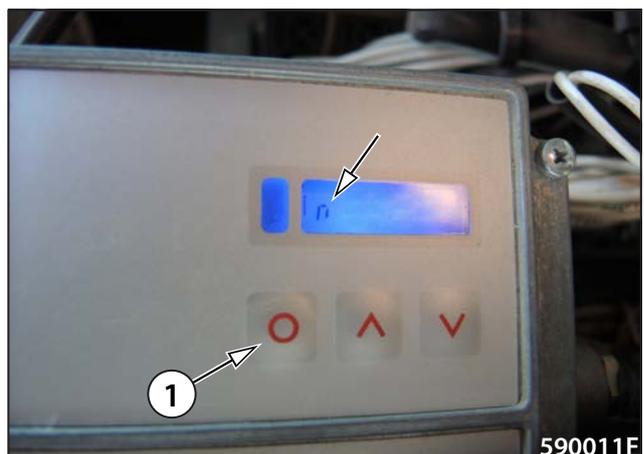


- Switch over with the UP and DOWN arrows (2) until the value of 32.0 °F appears on the display.

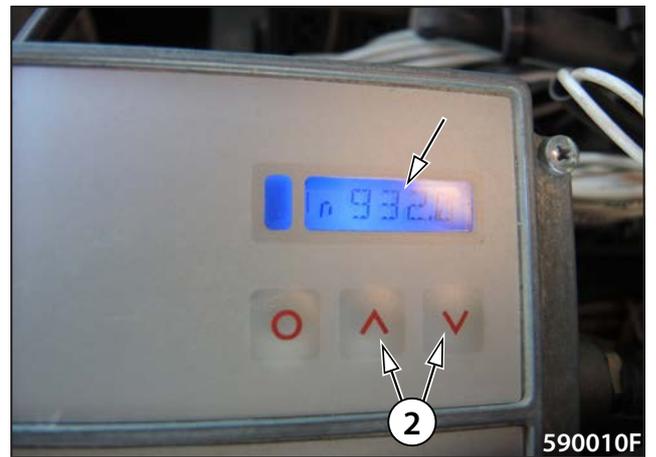


Set the maximum temperature.

- Switch over with the MODE button (1) until the “n” symbol appears on the display.



- Switch over with the UP and DOWN arrows (2) until the value of 932.0 °F appears on the display.



- Mount the cover.



Remove the cover.



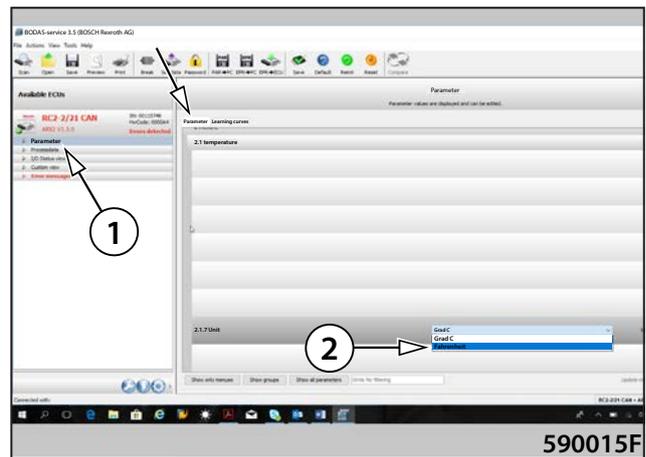
Connect the computer to the machine using a cable.



2.7 Machine operation and use

Change degrees Celsius to degrees Fahrenheit in the BODAS-Service software.

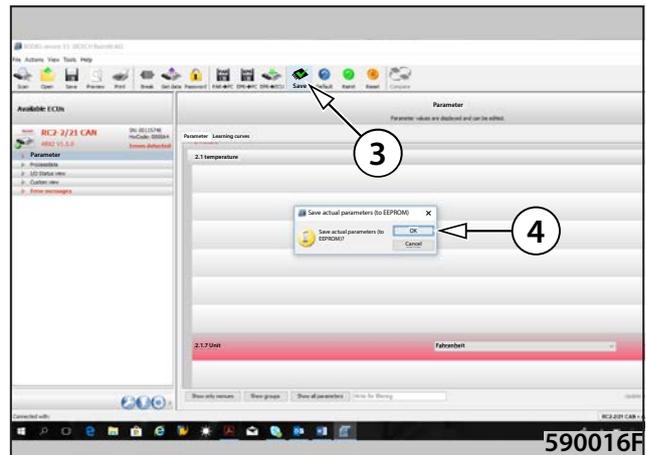
- Select "parameters" in the left column (1).
- Select the measuring unit "Fahrenheit" (2).



- Save the completed changes. (3)
- Save the data by confirming with the "OK" button. (4)



If you do not save the changes carried out in the BODAS-Service software, the values return back to degrees Celsius after the switching off. Then it is necessary to repeat the setting.



Start the engine. The measured value in degrees Fahrenheit will be displayed on the display.



Disconnect the computer from the machine.



Mount the cover.



2.7 Machine operation and use

2.7.10 ROPS lifting and lowering

ROPS lifting

Lift the ROPS to the vertical position and mount the front screws of the ROPS on the left and right side.



Mount the cotter pins.



ROPS lowering

Remove the split pins.



589D011

Dismount the front frame screws on the left and right sides.



589D012

Tilt the ROPS safety frame to the back and secure it in a suitable way.



**Tilt and lift the ROPS with the help of another person.
There is a risk of injury from the falling ROPS.
Do not operate the machine when the ROPS is lowered.
There is a risk of fatal injury.
Lower the ROPS only during the transport.**



589D013A



The tightening torque of the ROPS screws is 147 Nm.

2.7 Machine operation and use

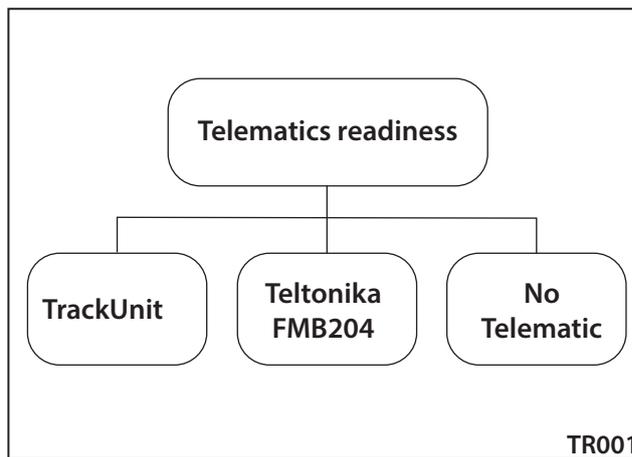
2.7.11 Telematics readiness

Global positioning system with telemetry that monitors operating systems of the machine (machine start, engine speed, fuel 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 telematics system.



Turn off the battery disconnecter before installation or maintenance.



Installation shall only be carried out by trained personnel according to the wiring diagram.

In case of a failure, contact your dealer or Ammann Technical Support.

2.7.12 Edge cutter (optional equipment)

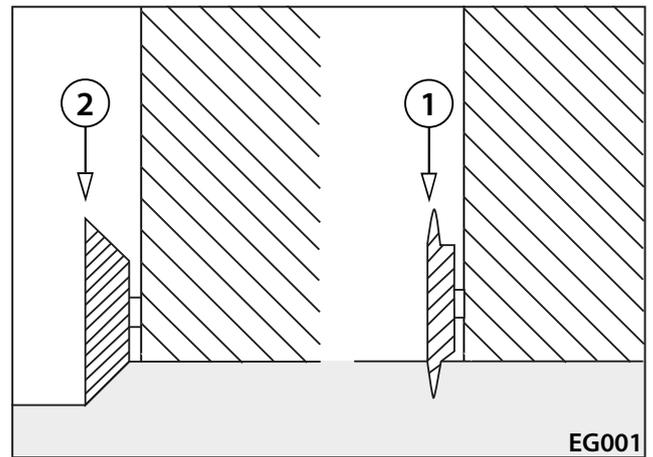
The edge cutter set contains a cutting and compaction disc.

The cutting disc (1) is used to cut the road at the desired location and align the road edges.

The compaction disc (2) is used to finish the compaction of road edges.

Note

If one of the discs is not in use, attach it to the holder provided.



Edge cutter pre-adjustment

Before working with the edge cutter, set the vibrating drum selector (9) to the left (front drum).

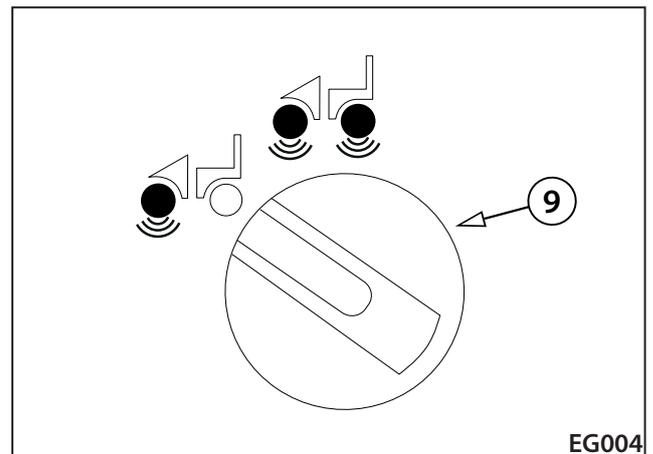
Note

The edge cutter only works flawlessly with a pre-adjusted edge cutter.

Control procedure

Set the desired height of the edge cutter using its up/down button (15).

- To the left – press the button to set the edge cutter to the working position.
- To the right – press the button to set the edge cutter to the transport position.



Make sure nobody is endangered when the edge cutter is started.

Turn on drum sprinkling using the sprinkling button (13).

Turn on edge cutter sprinkling using the edge cutter sprinkling button (14).

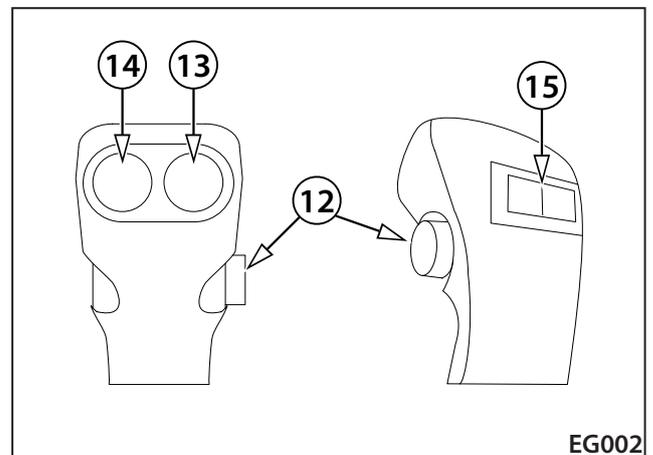
Note

The water inlet of edge cutter sprinkling only works when continuous drum sprinkling is on.

Turn on vibration with the vibration switch (12).

Note

After turning on vibration, the edge cutter automatically rises and is inoperative.



2.8 Machine transport

- The machine can move on its own within the work site.



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

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



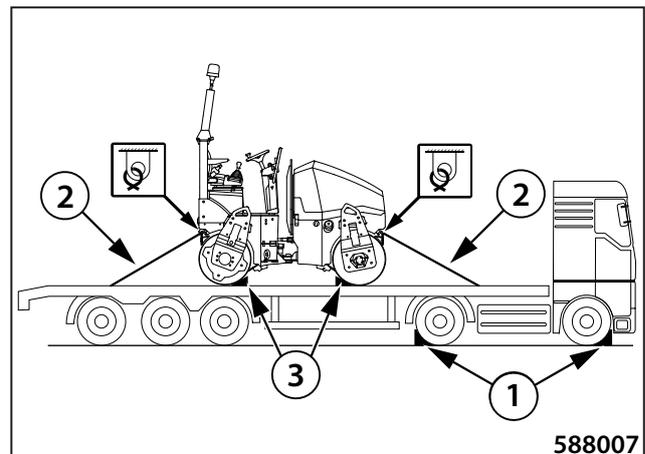
When transporting the machine on a vehicle, observe regulations applicable to the given territory.



When loading and unloading, the vehicle transporting the machine must be braked and mechanically protected against accidental movement using wedges (1).

The articulation joint of the machine must be secured with a strut against tilting on the vehicle.

The machine on the vehicle must be properly anchored and mechanically secured with the slings (2) in tie-down holes against longitudinal and lateral displacement as well as against overturning. The machine drums must be secured against accidental movement using wedges (3).



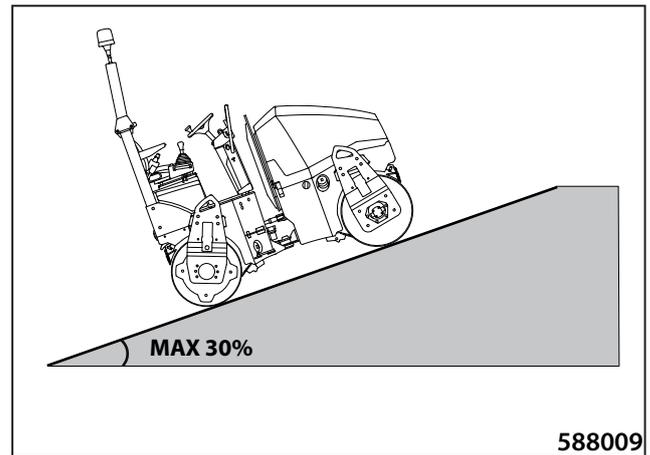
2.8.1 Loading the machine

Use a loading ramp or a crane to load the machine onto a means 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%.



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.



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

2.8 Machine transport

2.8.1.2 Loading the machine using a crane

For loading with a crane, the machine is provided with a 1-point or 4-point suspension.

Use a crane with a sufficient load capacity.

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



Before lifting, the articulation joint of the machine must be secured with the strut 1 against tilting and secured with the pin 2 and the lock 3.



Observe safety regulations while loading and unloading!

Use a crane with a sufficient load capacity!

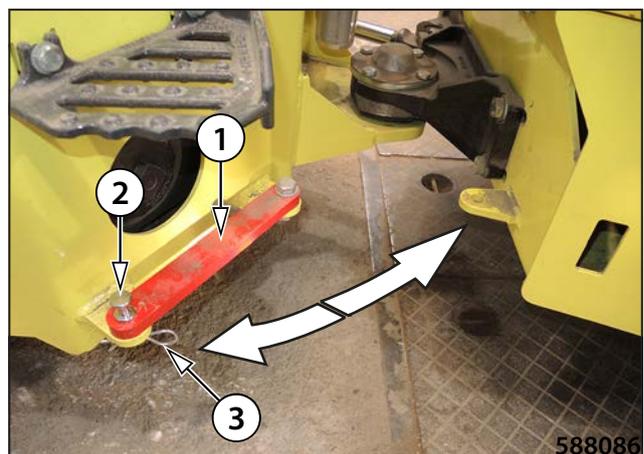
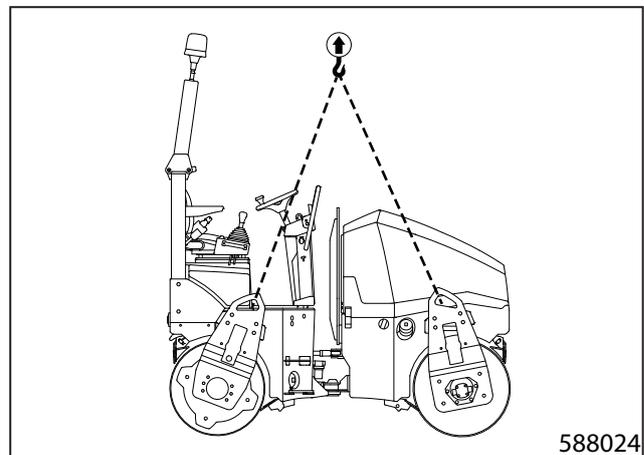
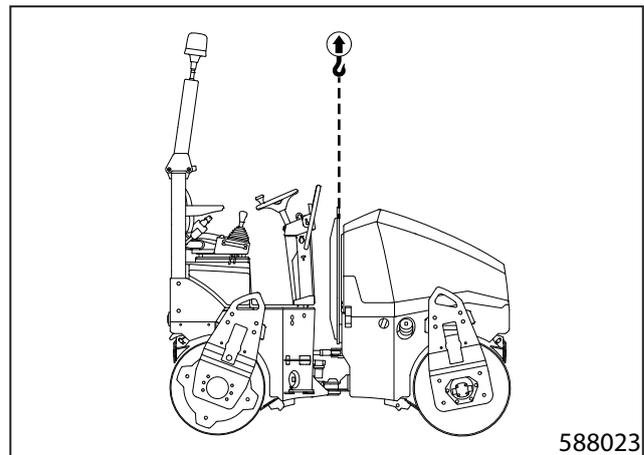
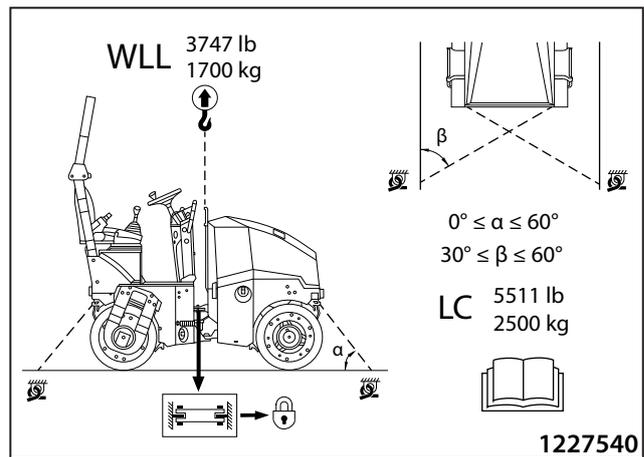
Use corresponding and unbroken hoisting slings with a sufficient load capacity!

The machine must be tied to the 4-point or 1-point suspension!

The maximum permissible working load for the one-point suspension is 2.7 tons.

Only a trained person (slinger) may carry out the tying of the machine!

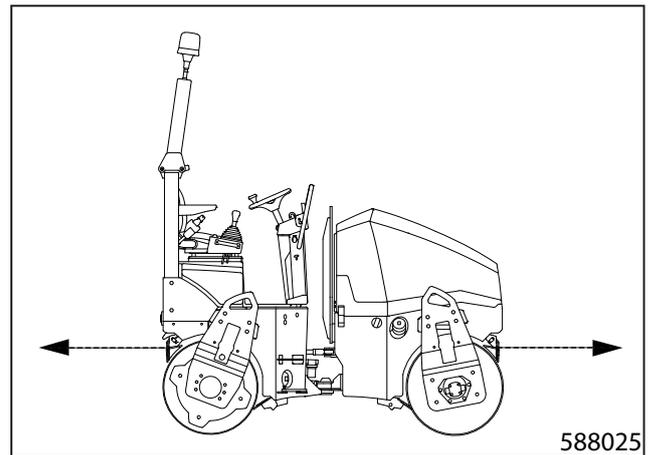
Do not enter under the lifted load!



2.9 Special conditions to use the machine

2.9.1 Towing the machine

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



Releasing the machine brake

Secure the articulation joint of the machine against tilting.



Remove the brake discs.



Dismount protective lids on the front and rear travel hydraulic motor.



2.9 Special conditions to use the machine

Mount a brake disc on the front drum travel hydraulic motor.
Tighten the screw by half a turn.

Note

Repeat the same procedure for the hydraulic motor of the rear drum travel.



When the towing is completed, return the machine into its original shape using the reverse procedure.



Towing procedure

- Secure the articulation joint of the machine against tilting.
- Attach the tow ropes or tow bars.
- Pull out the machine from the danger area.



The towed machine must be attached to both tow lugs.

For towing, use undamaged tow ropes or tow bars of a sufficient capacity $1.5 \times$ 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° .

The towing movement must be smooth. Do not exceed the towing speed by more than 1 km/hour (0.6 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 10 m (11 yd).

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!

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

2.9.2 Drum offset

In-line position (Y)

In the in-line position, the machine drums are aligned in the same plane.

To adjust the drum from the offset position to the in-line position:

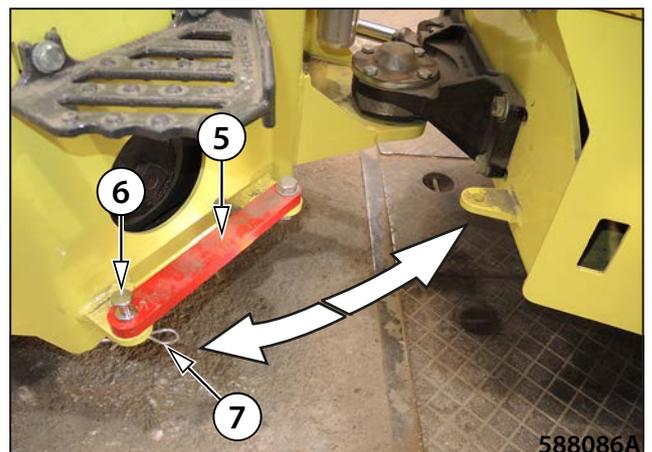
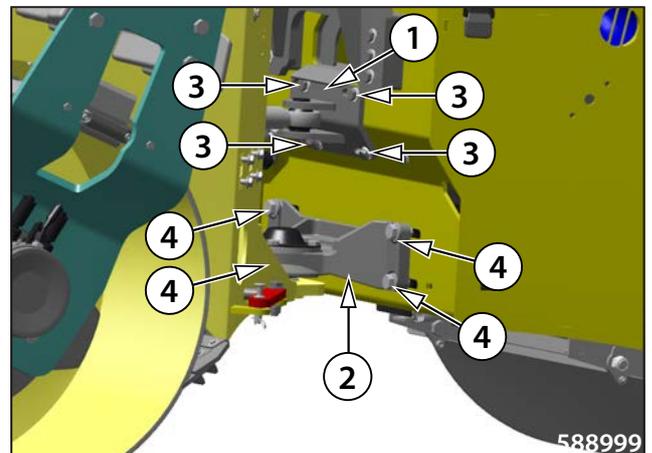
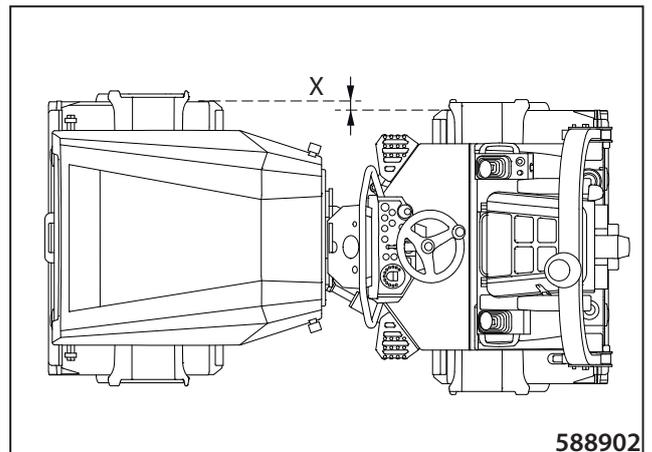
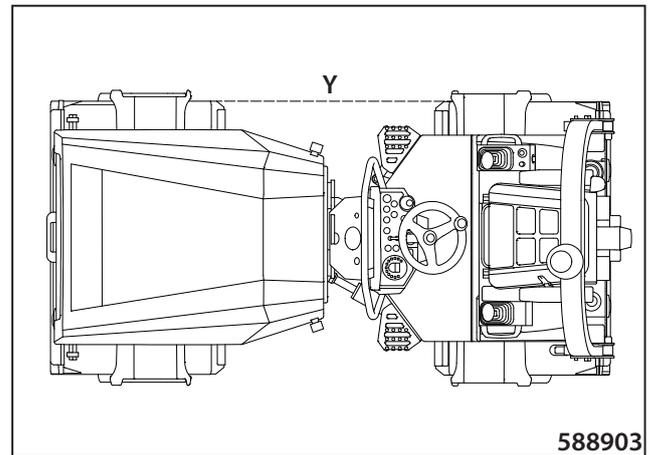
- Lock the strut (5) using the pin (6) and safety pin (7).
- Loosen the screws (3) and move the suspension of the connecting rod (1) to the left and then tighten the screws (3).
- Loosen the screws (4) and move the joint part (2) to the right and then tighten the screws (4).
- Unlock the strut (5) using the pin (6) and safety pin (7).

Offset position (X)

In the offset position, the front drum of the machine is offset to the right side from the rear drum. The drum offset is 40 mm.

To adjust the drums from the in-line position to the offset position:

- Lock the strut (5) using the pin (6) and safety pin (7).
- Loosen the screws (3) and move the suspension of the connecting rod (1) to the right and then tighten the screws (3).
- Loosen the screws (4) and move the joint part (2) to the left and then tighten the screws (4).
- Unlock the strut (5) using the pin (6) and safety pin (7).



Danger of injury!

Carry out the drum offset when the engine is not running!
Lock the front and rear frame with the strut (5) in the joint area to prevent squeezing.

After the drum offset is completed, unlock the front and rear frame using the strut (5) in the joint area.

Make sure there are no persons in the dangerous area of the machine.

2.9.3 Machine operation during initial run period

When putting a new machine into operation or during the first 30 hours after a complete overhaul, do not run the machine at full power!

2.9.4 Machine operation 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.

At the temperatures below 0 °C (32 °F) it is possible to compact only dry soils (and loose stony materials), or carry out rapid compaction of non-frozen materials (before the soil gets frozen).

Prepare the machine for operation at low temperatures:

- Check concentration of the engine coolant.
- Replace the engine oil with the oil recommended for the range of ambient temperatures.
- Use hydraulic oil of the corresponding cinematic viscosity.
- Use a winter diesel.
- Check the battery for charging.

The good condition of the battery is a precondition for good starting under low temperatures. The machine can be used at full power only after the operating fluids have been heated to their operating temperatures.

2.9.5 Machine operation at higher temperatures and humidity

The engine power output decreases with the increasing temperature and air humidity. Considering that both of the factors reducing the engine power are independent on each other, it is possible to describe their impact as follows:

- 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).

At outdoor temperatures when the hydraulic oil temperature is constantly about 90 °C (194 °F), we recommend you to replace the oil with the oil ISO VG 100 having the cinematic viscosity of 100 mm²/s at 40 °C (104 °F).

2.9.6 Machine operation at higher 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.



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

2.9.7 Machine operation in dusty environment



While operating in a very dusty environment, shorten cleaning and replacement intervals of air filter cartridges and shorten cleaning intervals of coolers.

The recommended cleaning interval is once a week.

2.9.8 Driving with vibration on compacted and hard materials

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

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

Note

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



3 MAINTENANCE MANUAL

ARX 23-2

ARX 26-2

(Kubota Tier 4i)



3.1 Safety and other measures during maintenance of the machine

3.1.1 Safety during machine maintenance

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;
- 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 Safety and other measures during maintenance of the machine

3.1.3 Environmental and hygiene 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 preservative 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 immediately the principles of the first aid. 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 in particular:
- organic and synthetic lubricating materials, oils and fuels;
- coolants;
- battery fluids and batteries;
- cooling system media;
- cleaning and preservative agents;
- all dismantled 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 Specification of operating fluids

3.2.1 Engine oil



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

Performance classification according to

API (AMERICAN PETROLEUM INSTITUTE)

ACEA (ASSOCIATION DES CONSTRUCTEURS EUROPÉENS DE AUTOMOBILE)

Viscosity classification

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

Use of permissible oils according to API: CF, CF-4, CG-4, CH-4, CI-4

SAE 15W-40 year-round

If a fuel with a high sulphur content is used, use only CF oil.

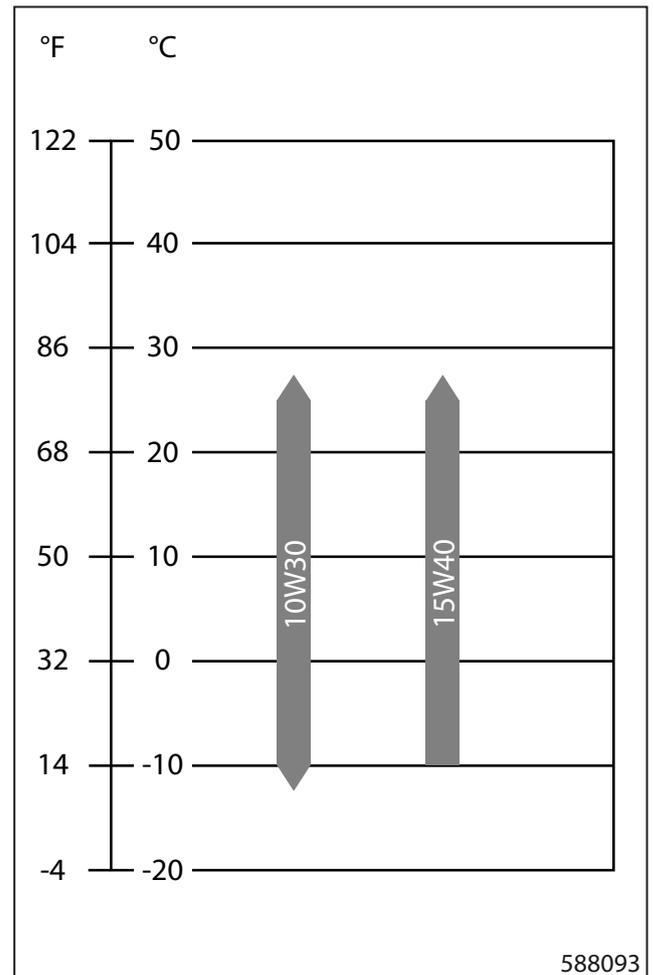
Note

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

Viscosity diagram



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

3.2 Specification of operating fluids

3.2.2 Fuel



Diesel oil is used as fuel for the engine:

- EN590
- ASTM D975: 1D S15, 2D S15

Note

Do not use fuels with a sulphur content exceeding 1% (10000 ppm).

Use fuels with a sulphur content 0.1% (1000 ppm).

When a fuel with a sulphur content exceeding 0.5–1% (5000–10000 ppm) is used, shorten the engine oil replacement interval.



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

Mixing diesel with special additives is forbidden.

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 and the warranty lost.

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

Water quality

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

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

The maximum content of compounds of chlorine is 40 milligrams.

The maximum content of compounds of sulphur is 100 milligrams.

Safety instructions:

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

3.2.4 Hydraulic oil



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

Fill the machines with hydraulic oil that has cinematic viscosity of 46 mm²/s at 40 °C (104 °F) ISO VG 46. This oil is the most appropriate to be used within the widest range of ambient temperatures.

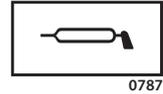
Synthetic hydraulic oil

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



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

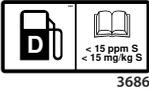
ISO 6743/9 CCEB 2

DIN 51 502 KP2K-30

3.2.6 Emulsion



For sprinkling the tyres, use anti-adhesive emulsion of RHODOSIL EMULSION E1P with water in the mixing ratio of 1.5:100.

Part	Fluid type	Fluid quantity l (gal US)	Brand
Engine	Engine oil according to Chapter 3.2.1.	7 (1.8)	 2412
Fuel tank	Fuel according to Chapter 3.2.2.	35 (9.3)	 3686
Hydraulic system	Hydraulic oil according to Chapter 3.2.4.	28.5 (7.5)	 2158
Steering joint bearings, stirrup bearings, steering swivel pins, suspensions	Lubricating grease according to Chapter 3.2.5.	as required	 0787
Cooling system	Coolant according to the chapter 3.2.3.	6.7 (1.8)	 2152
Sprinkling tank	Water	190 (50.2)	 AMN59
Emulsion sprinkling tank	Emulsion according to Chapter 3.2.6	12 (3.2)	 AMN242

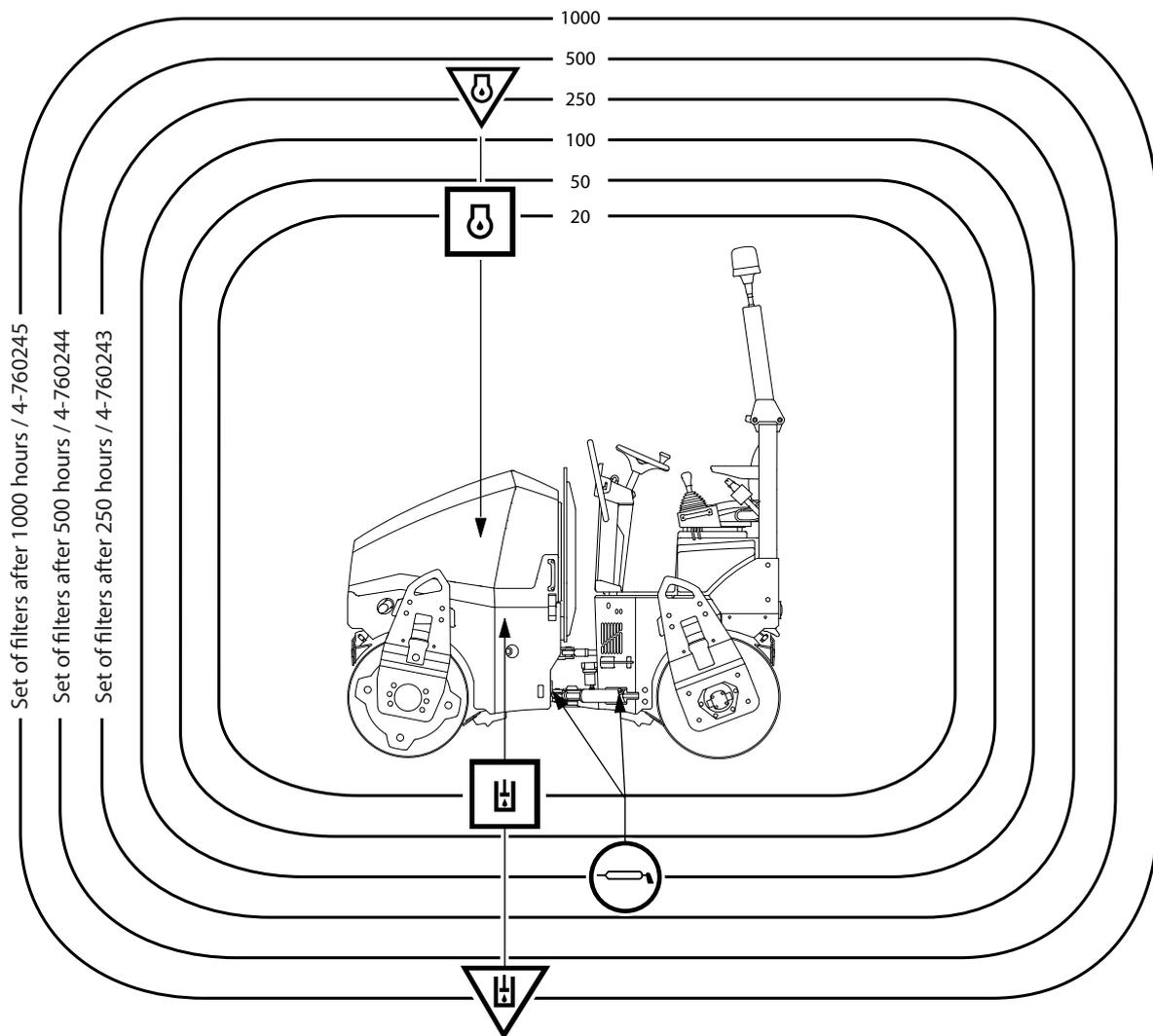
3.4 Lubrication and maintenance chart

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	Checking the oil in the hydraulic tank
3.6.5	Hydraulic oil cooler cleaning
3.6.6.	Air filter check
3.6.7	Sprinkling emulsion level check
3.6.8	Sprinkling tank refilling
3.6.9	Scraper adjustment
3.6.10	Inspection of warning and checking devices
3.6.11	Engine leakage check
3.6.12	Check of the fan and engine belt for condition
Every 50 hours of operation	
3.6.13	Check of hoses and clips
3.6.14	Travel pressure check
3.6.15	Battery inspection
After 50 hours of operation	
3.6.21	Engine oil change *
Every 100 hours of operation (weekly)	
3.6.16	Air filter cleaning
3.6.17	Cleaning the water separator on the fuel filter
3.6.18	Machine lubrication
3.6.19	Tyre pressure check
Every 250 hours of operation (every 3 months)	
3.6.20	Fuel filter replacement
3.6.21	Engine oil change *
3.6.22	Checking the hoses of the engine cooler for wear and mounting
3.6.23	Checking the hoses and clips for mounting
3.6.24	Sprinkling filter cleaning
3.6.25	Engine intake pipe inspection

Every 500 hours of operation (every 6 months)	
3.6.26	Fuel tank cleaning
3.6.27	Electrical installation inspection
3.6.28	Replacement of the fuel separator filter cartridge
3.6.29	Valve clearance check and adjustment
3.6.30	Engine cooler cleaning
3.6.31	Check of rubber-metal elements of the engine cooler
After 500 hours of operation	
3.6.32	Hydraulic oil change and filter replacement **
Every 1000 hours of operation (yearly)	
3.6.32	Hydraulic oil change and filter replacement **
3.6.33	Replacement of air filter cartridges
3.6.34	Damping system check
3.6.35	Swinging support check
3.6.36	Articulation joint check
Every 2000 hours of operation (every 2 years)	
3.6.37	Engine belt replacement
3.6.38	Engine coolant change
3.6.39	Replacement of hoses of the cooling system
3.6.40	Replacement of rubber-metal elements of the engine cooler
3.6.41	Replacement of hoses of the fuel system
3.6.42	Replacement of suction hoses
Maintenance as required	
3.6.43	Gas strut replacement
3.6.44	Cleaning the water separator
3.6.45	Cleaning the water tank
3.6.46	Cleaning the machine
3.6.47	Draining water from the sprinkling circuit before the winter season
3.6.48	Fuel system venting
3.6.49	Checking the screw connections for tightening
<p>* First after 50 engine hours.</p> <p>** First after 500 engine hours.</p>	

LUBRICATION AND SERVICE PLAN

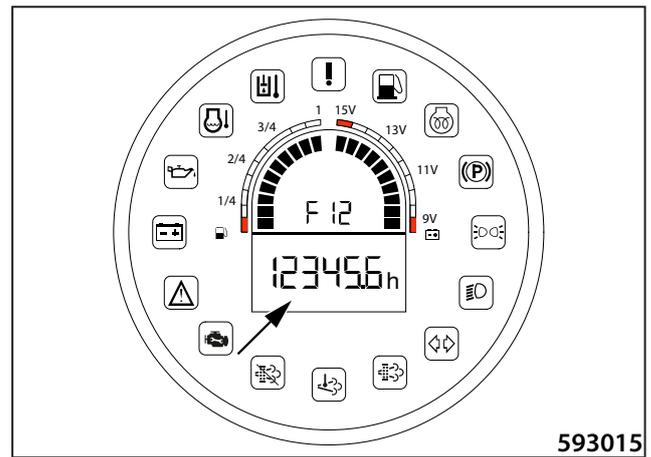
□	INSPECTION
○	LUBRICATION
▽	REPLACEMENT



	Engine oil:	SAE 15W/40	API CF-4
	Hydraulic oil:	ISO VG 46 HVLP	
	Lubricating grease:	ISO 6743/9	DIN 51 502

3.6 Lubrication and maintenance operations

The lubrication and maintenance are carried out in periodic intervals based on daily values of the worked hours counter.



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!

Retighten removed or loosened bolts, plugs, threaded joints in the hydraulic system, etc. with the tightening torque specified in tables in the chapter 3.6.48 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).

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

3.6.21 Engine oil change

After the first 500 hours of operation of the new machine or after its general overhaul, carry out the following operations according to Chapter:

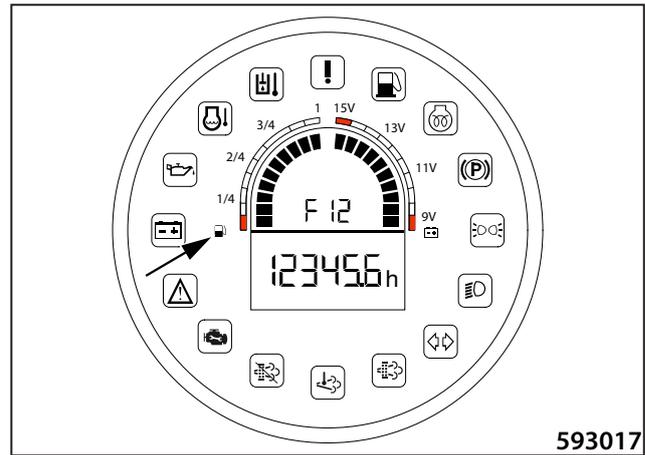
3.6.30 Filter hydraulic oil change

3.6 Lubrication and maintenance operations

Every 20 hours of operation (daily)

3.6.1 Fuel check

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



Clean the tank cap and the filler neck.

Unlock the lock and remove the cap.

Refill the tank up to the bottom line of the filler neck.

Note

The fuel tank volume is 35 l (9.3 gal US).



Fill up the same fuel type; see Chap. 3.2.2.

Check the fuel tank and the fuel circuit for leaks.



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

Do not refill the fuel when the engine is running.



Stop the fuel soaking into the ground.

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, 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 shows the lowest possible oil level, the upper mark indicates the highest.

Refill the oil as required.

Refill engine oil through the filler neck.

Check the engine for leaks and remove the cause.

Check the engine for damaged and/or missing parts and for changes in appearance.

Note

The total volume of oil in the engine is 7 litres (1.85 US gal).



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

Carry out the check after the oil has been cooled down.

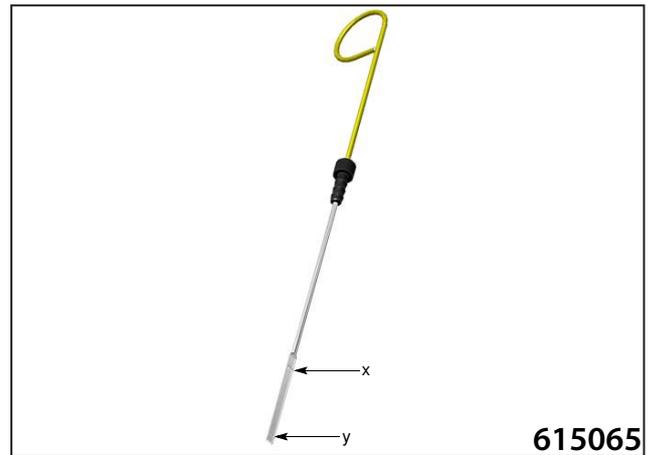
Fill up the same oil type; see Chap. 3.2.1.



Stop the oil soaking into the ground.



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3.6 Lubrication and maintenance operations

3.6.3 Engine coolant check

Let the coolant cool below 50 °C (120 °F).

Do visual inspection of the level on the expansion tank. The fluid level must be between the upper (MAX) and the lower (MIN) mark.

Refill the coolant as required. Carry out the refilling through the filler neck.

Note

The total volume of coolant in the engine is 6.7 l (1.8 US gal).



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 drop below the lower mark.

Refill only with a coolant containing antifreeze agents on the same basis according to Chapter 3.2.3.

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

Do not refill cold coolant into a hot engine. There is a danger of damage to the engine castings.

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



3.6.4 Checking the oil in the hydraulic tank

Check the hydraulic oil level always when the engine is cold but running.

Put the machine on a flat terrain.

Let the engine run at idle.

Check the oil level in the inspection hole.

The ideal oil level is when the gauge is half-full.



Hydraulic oil refilling

Take off the ventilation filter (1) from the filler neck.

Refill the required quantity of hydraulic oil.

Screw in the ventilation filter (1) back in place.



Always lubricate the O-ring before screwing it in place.

Check the oil when it is cooled down.

Fill up the same oil type; see Chap. 3.2.4.



Stop the oil soaking into the ground.

3.6 Lubrication and maintenance operations

3.6.5 Cleaning the hydraulic oil cooler

Check the cooling fins that they are not dirty or clogged.

Clean the fins with water or blow through with compressed air.

When working in a very dusty environment, carry out the cleaning daily. The cooler fouling results in reduced cooling effect and increased temperatures of the engine coolant and of the hydraulic oil.



Never clean the cooler with high pressure (e.g. with strong water jets).

When the cooler is contaminated by petroleum products, use a cleaning agent and proceed according to the manufacturer's instructions! Find out the cause of contamination!

Do not smoke while working!

Check the hydraulic circuit for leakage.



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!



3.6.6 Air filter check

Check that the suction hole is not dirty.



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

Note

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



Replace the dust valve immediately if it is damaged!



3.6 Lubrication and maintenance operations

3.6.7 Sprinkling emulsion level check

Open the lid.

Remove the tank cap.

Refill the emulsion.



— _____
Fill up the same emulsion type; see Chap. 3.2.6.



— _____
Stop the emulsion soaking into the ground.



3.6.8 Sprinkling tank refilling

Check the water level in the tank in the inspection hole.



Open the tank cap and refill with clean water.



Before the winter period, drain the water from the water tank and from the sprinkling system!



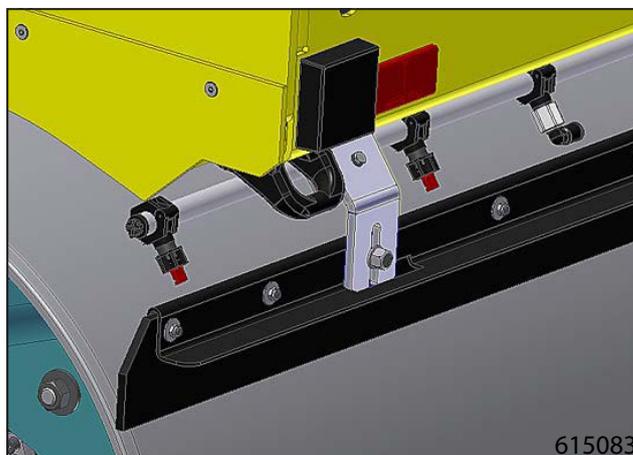
3.6.9 Scraper adjustment

Fixed scrapers (optional equipment)

Loosen the screws and move the scraper so that it is in contact with the drum.

Hinged scrapers (optional equipment)

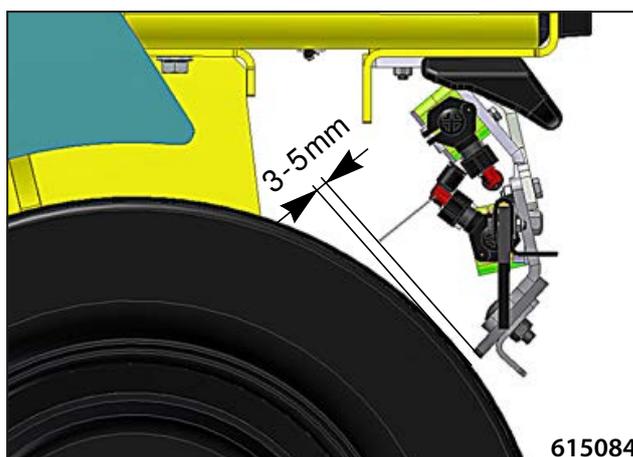
The hinged scrapers can be lifted and lowered manually. Before driving adjust the drum scrapers and move the scraper so that it is in contact with the drum.



Scrapers for the wheel axle

Adjust the tyre scrapers so that there is a gap of 3–5 mm between the scraper and the tyre.

Never wipe off the emulsion.



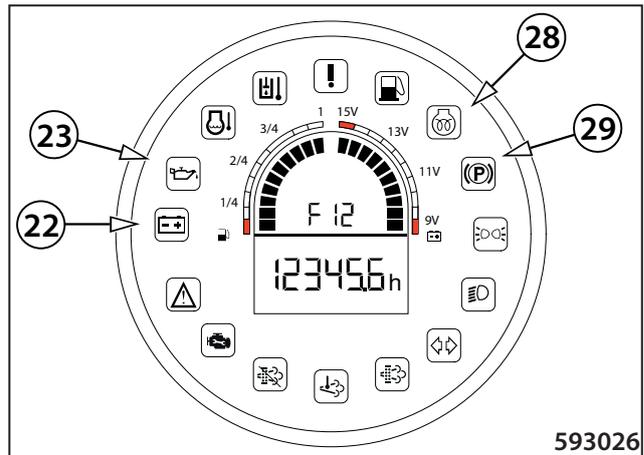
3.6 Lubrication and maintenance operations

3.6.10 Inspection of warning and checking devices

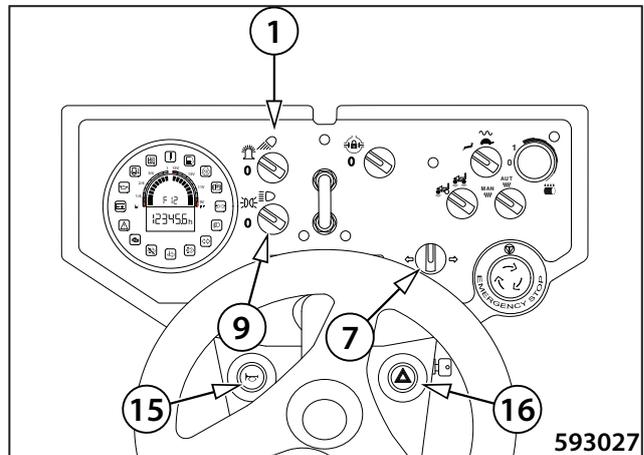
Turn the key in the ignition box to the position II.



The indicator lamps for battery charging (22), engine lubrication (23), engine glowing (28) and parking brake (29) will light up.

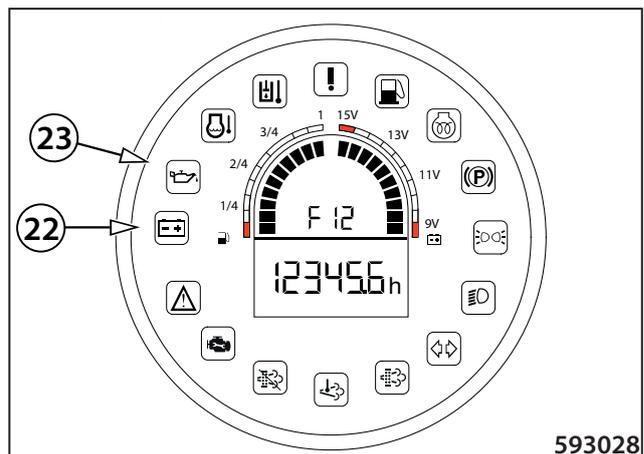


Then check the switches (1, 7, 9, 15, 16) for operation.



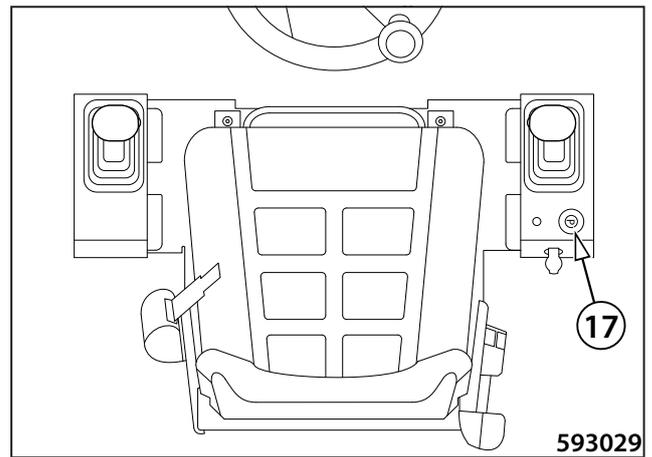
Turn the key to the position "III" to start the engine.

After the start, the indicator lamps for battery charging (22) and engine lubrication (23) must go off.



Move off the machine:

Turn off the parking brake switch (17) and move off the machine.



Emergency brake button function:

Move off the machine at a low speed.

Press the emergency brake button (5).

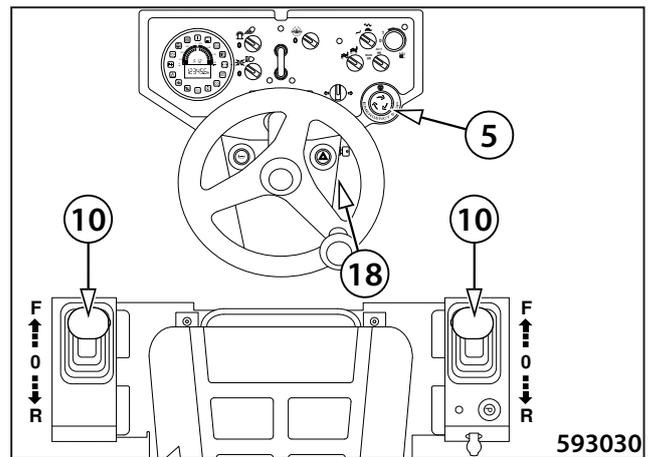
The machine stops moving, the brake is enabled and the engine stalls.

The parking brake indicator lamp (29) lights up.

Turn the emergency brake button (5) in the direction of arrows.

Set the travel control (10) to the zero position (0) and the engine speed control (18) to the idle speed position.

Now you can start the engine again.

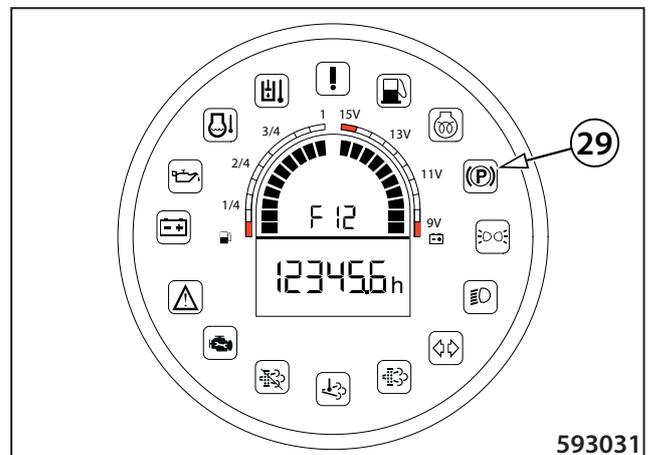


Use the audible alarm to announce the engine start!

Before starting the engine, check that nobody is endangered by the engine start!

Use the warning horn to signal the engine starting and check that nobody is endangered by starting the engine!

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 Lubrication and maintenance operations

3.6.11 Engine leakage check

Visually check the engine and the engine compartment for oil leakage.

Remove the identified defects.



3.6.12 Check of the fan and engine belt for condition

Fan wear check

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

Fan

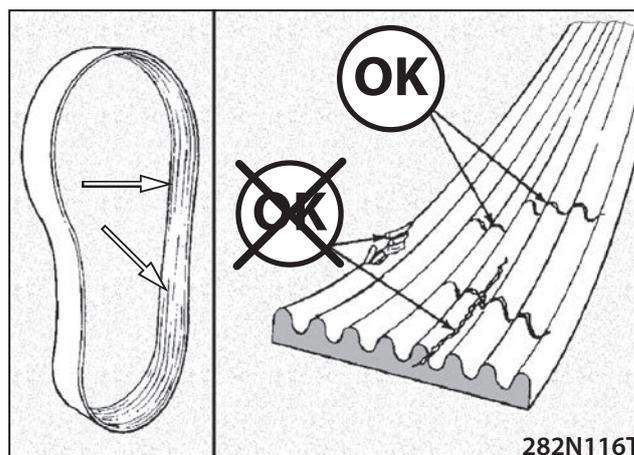
Order number: 1448212



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.

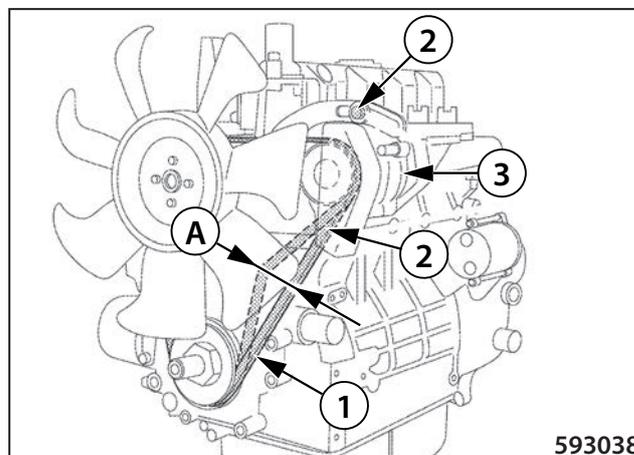


Belt tension check

Push your thumb with 110 N (25 lb) force where the belt length between pulleys is the longest. 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.

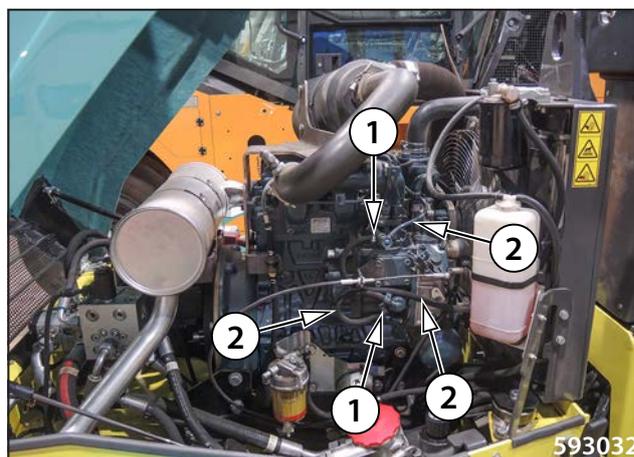


3.6 Lubrication and maintenance operations

Every 50 hours of operation

3.6.13 Check of hoses and clips

Check visually clips (1) and fuel hoses (2). If clips are loosened or hoses worn out, ensure remedy.



3.6.14 Travel pressure check

The drive of the vehicle can also be controlled with brakes applied. Although it is impossible in normal operation, this option can be activated by the X8 connector.



This activation will cause a high mechanical and hydraulic load of the machine. Ensure a suitable safe distance in front of the machine, behind the machine as well as on its sides.

Required material

A jumper for the connector X8.

Order number: 4-37570

Note

You can temporarily also use a piece of wire.

Travel pressure check procedure

Remove the cover on the steering pillar.

Turn the key to the "I" position.

Switch off the ignition by turning the key to the "0" position.

Turn the key back to the "I" position.

Start the engine by turning the key to the "III" position.

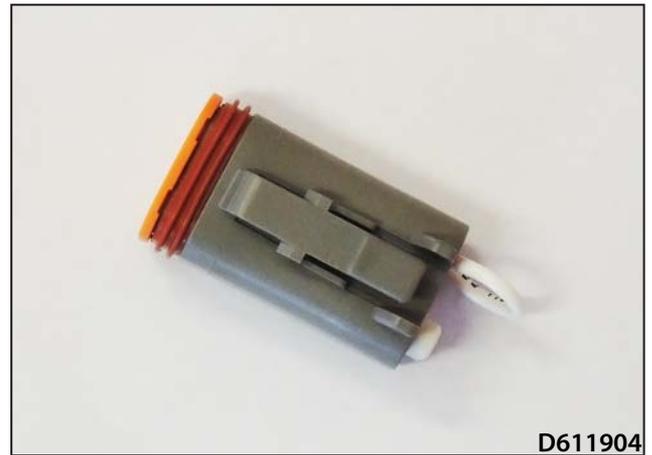
Now connect two contacts using the X8 connector.

Apply the parking brake by pressing the parking brake switch (1).

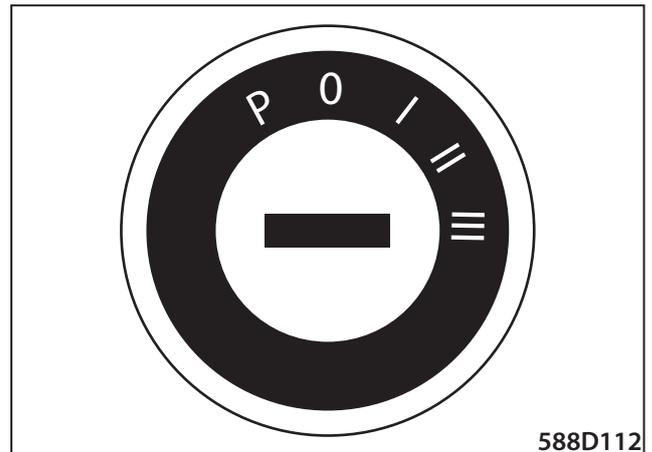
A brake indicator lamp starts flashing on the display unit.

You can drive a braked machine.

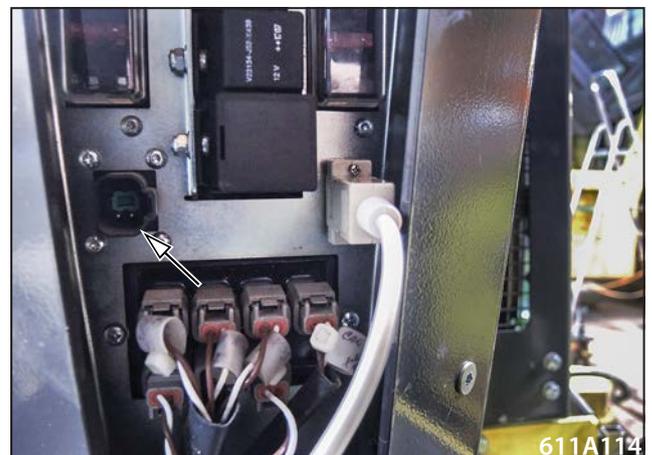
To exit this mode, remove the jumper at X8.



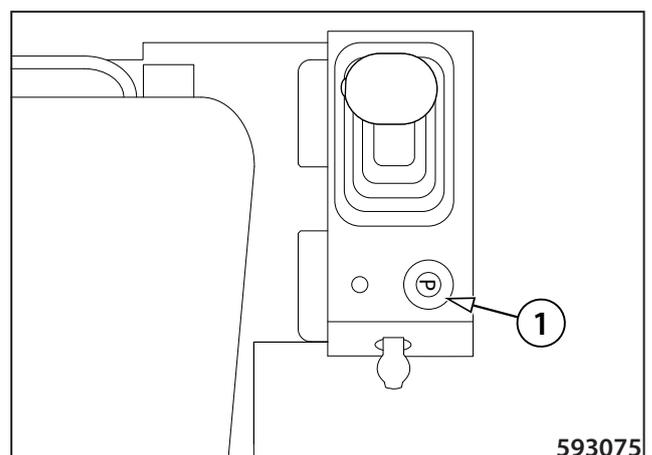
D611904



588D112



611A114



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3.6 Lubrication and maintenance operations

3.6.15 Battery inspection

Stop the engine.

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. After the battery is charged, leave it to stand for 2–3 hours and then measure the voltage again. 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.



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.



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.

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.

Every 100 hours of operation (weekly)

3.6.16 Air filter cleaning

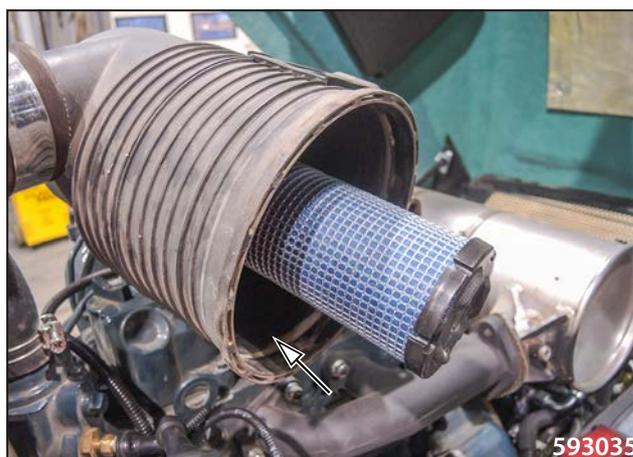
Remove the main cartridge of the air filter and clean with compressed air.



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 Lubrication and maintenance operations

3.6.17 Cleaning the water separator on the fuel filter

If the red ring goes up from the bottom, drain the water from the separator.

Close the stop valve (1).

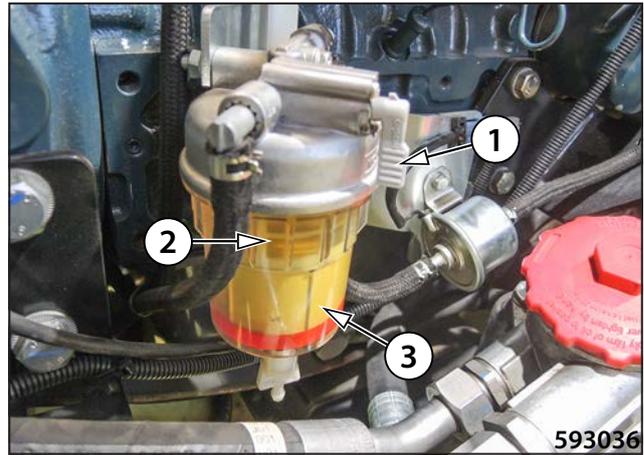
Unscrew the filter housing (2).

Clean the filter element (3).

Screw in the filter housing back (2)

Open the stop valve (1).

Turn the ignition on. The fuel pump will vent the system automatically.



Fuel filter cartridge

Order number: 1448216



Do not smoke while working!



Check the water separator for leaks.



Stop the fluid soaking into the ground.

3.6.18 Machine lubrication

Remove the caps on the grease nipples.

Before lubricating, clean the grease nipple.

Connect the grease gun to the grease nipple.

Lubricate the bearing sufficiently until the lubricant starts to flow out.

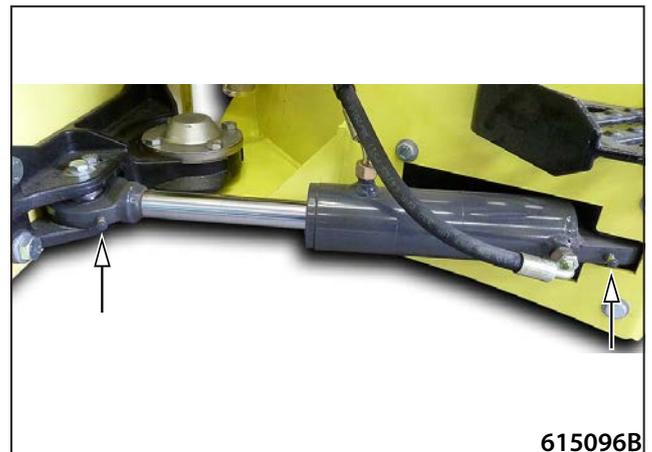
Install the protective cover in place.

Note

After every machine cleaning or steam cleaning, lubricate the bearing again.

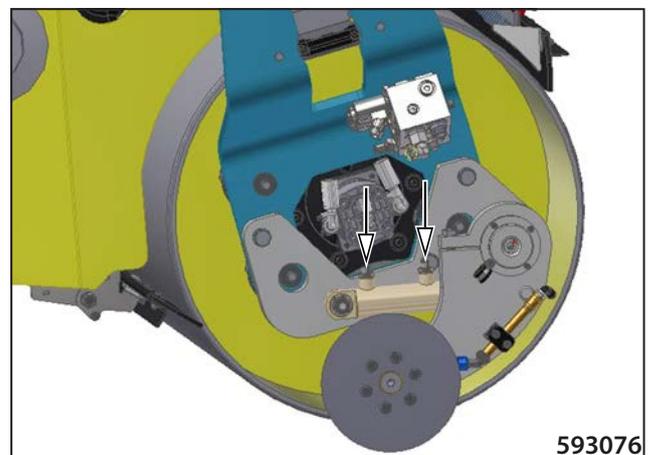
Steering linear hydraulic motor

Turn the steering mechanism up to the stop to lubricate the hydraulic cylinder. Turn the machine slightly to the right and to the left. This will loosen the bearings.



Edge cutter

Pins 2x



3.6 Lubrication and maintenance operations

3.6.19 Tyre pressure check

Check the air pressure with a pressure gauge on the tyre valve;
100 kPa (14.5 PSI).



Pay attention to the equal pressure in all of the tyres.

Every 250 hours of operation (every 3 months)

3.6.20 Fuel filter replacement

Clean the fuel filter head.

Remove the filter.



Lubricate the seal rings of the new filters with oil.

Fill up the filter with new fuel. Mount the new filter in the machine. Tighten manually!

Vent the fuel system.

Fuel filter

Order number: 1448257



Follow safety regulations!

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



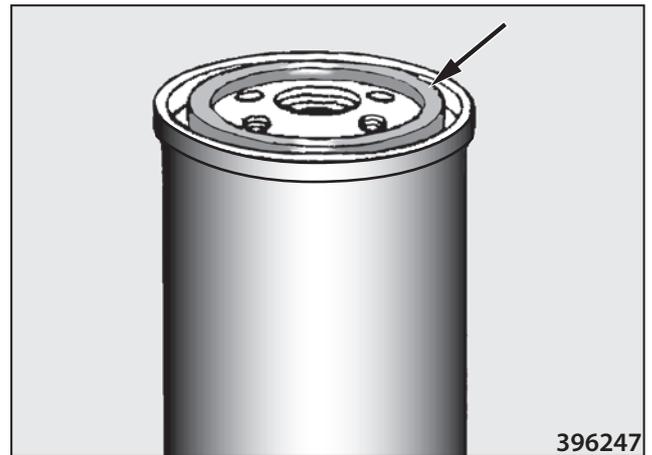
Use original specified filters.

Do NOT tighten the filters with force!

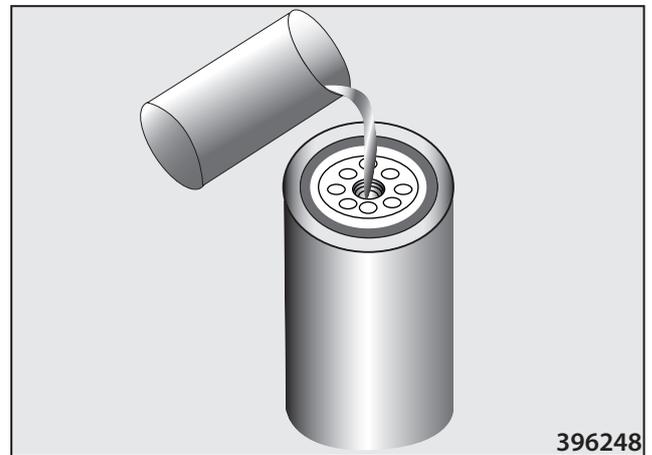


Catch the drained fuel.

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



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3.6 Lubrication and maintenance operations

3.6.21 Engine oil change



Carry out for the first time after 50 hours

Drain the oil after the operation is finished immediately after the coolant has been cold down to 60 °C (140 °F), or warm up the engine during operation until the coolant temperature reaches 60 °C (140 °F).

The engine oil drain plug is on the left side in front between the front and rear frame of the machine.

Turn the machine to the right to get better access to the drain plug.

The total volume of oil in the engine is 7 litres (1.85 US gal).

Remove the drain plug and let the oil drain out.

Remount the plug.



Clean the surface around the head of the oil filter. Remove the filter. Clean the seating surface for the filter gasket.

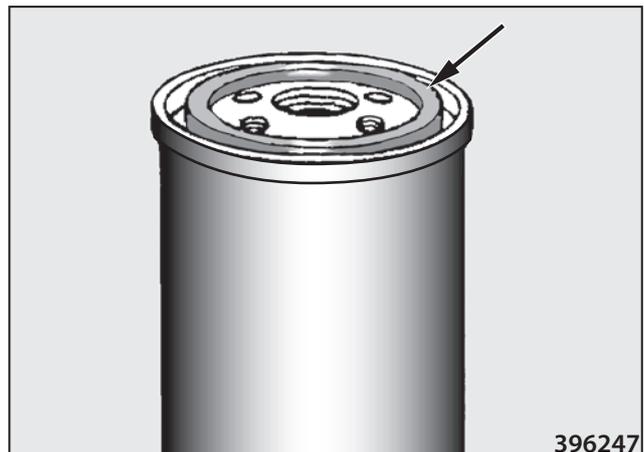


Lubricate the gasket with oil.

Mount the new filter.



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



Engine oil filter

Order number: 1504183

Fill the engine through the filler neck.

Keep the level within the range of gauge marks imprinted in the dipstick (1). The lower mark shows the lowest possible oil level, the upper mark indicates the highest.

Refill the oil to the upper oil level mark (1). The oil volume is 7 l (1.85 gal US) including the oil filter volume.

Note

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

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



**Beware of the risk of scalding when draining hot oil.
Let the oil cool down below 50 °C (122 °F).
Follow the fire-fighting measures.**



When changing oil, check that the old oil has been drained from the tank completely. Do not mix different types of oils.

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 oils; 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 Lubrication and maintenance operations

3.6.22 Checking the hoses of the engine cooler for wear and mounting

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 the cooler if required.

3.6.23 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 for new ones.



3.6.24 Sprinkling filter cleaning

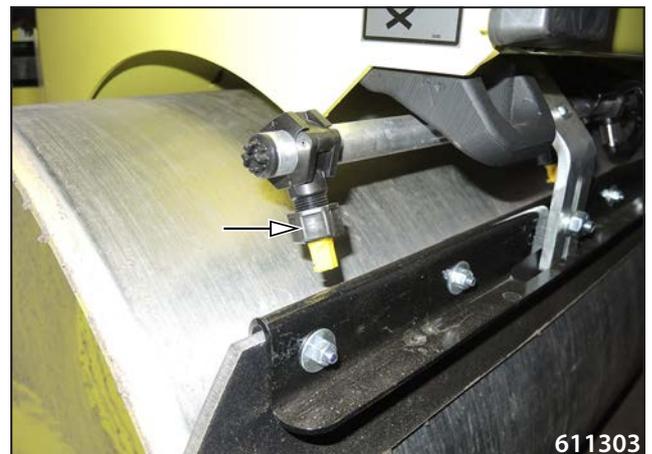
Remove the sprinkling filter vessel, remove the sieve, clean it and mount back.

Check the seal.

Replace if damaged.



Remove and clean the sprinkler strainers.



3.6 Lubrication and maintenance operations

3.6.25 Engine intake pipe inspection

Check the engine intake piping for leakage.

Check the rubber air suction hose from the filter for damage and for missing clamping clips.

Check the connection between the bonnet and air filter for leakage.

Replace damaged gasket with new one.



Do not work with the machine if the seal between the bonnet and the air filter is damaged or the connection is leaky.



Every 500 hours of operation (every 6 months)

3.6.26 Fuel tank cleaning

Over time, condensed water accumulates in the fuel tank and it should be drained.

Remove the plug from the fuel tank.

Place a vessel under the drain plug.

Drain the engine diesel fuel.

Check and clean the interior of the tank.

Put on the screw plug.

Tighten the screw connection with hand.

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



Do not smoke while working!



Catch the drained fuel.



3.6 Lubrication and maintenance operations

3.6.27 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.

3.6.28 Replacement of the fuel separator filter cartridge

If the red ring goes up from the bottom, drain the water from the separator.

Close the stop valve (1).

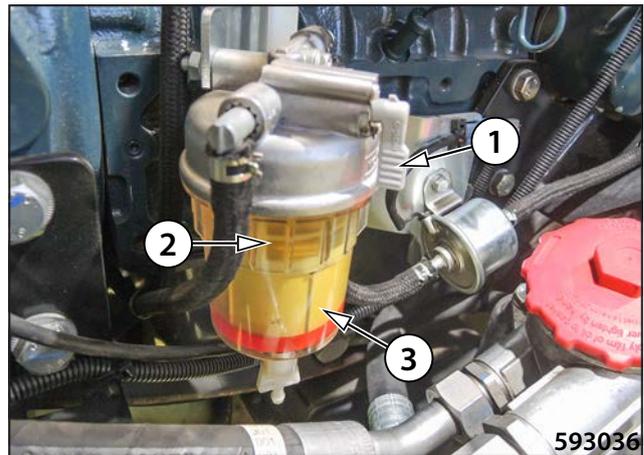
Unscrew the filter housing (2).

Replace the filter element (3).

Refit the filter housing (2).

Open the stop valve (1).

Turn the ignition on. The fuel pump will vent the system automatically.



Fuel filter cartridge

Order number: 1448216



Do not smoke while working!



Check the water separator for leaks.



Stop the fluid soaking into the ground.

3.6.29 Valve clearance check and adjustment

Contact the Kubota service for adjusting the engine valves.

3.6.30 Engine cooler cleaning

The cooler fouling results in reduced cooling effect and increased temperatures of the engine coolant.

Clean with compressed air or pressure water (steam). Clean in the direction from the fan side.



When working in a very dusty environment, carry out the cleaning daily.

Do not use cleaners with a too high pressure to avoid damage to the cooling fins.

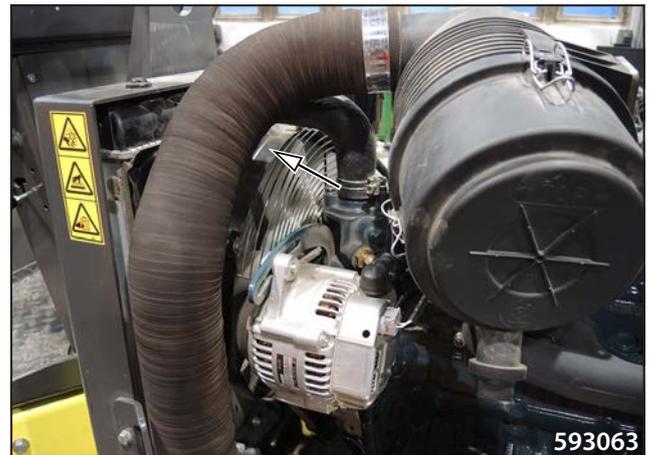
When the cooler is contaminated by petroleum products, use a cleaning agent and proceed according to the manufacturer's instructions! Find out the cause of contamination!



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 Lubrication and maintenance operations

3.6.31 Check of rubber-metal elements of the engine cooler

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

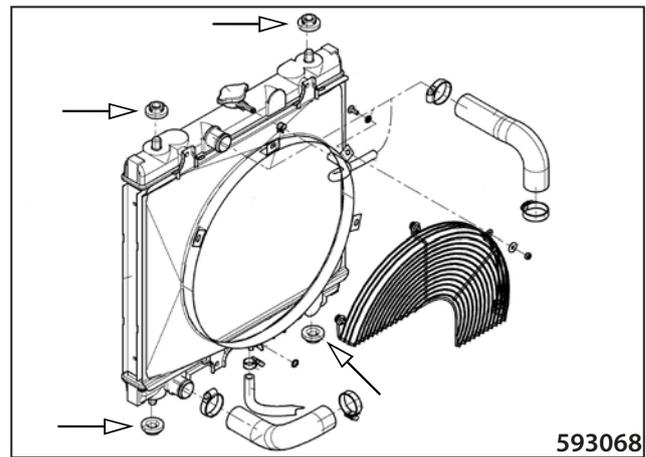


Replace if damaged.

Recheck screws and nuts for tightening.

Engine cooler rubber-metal element

Order number: 1448304



Every 1000 hours of operation (yearly)

3.6.32 Hydraulic oil change and filter replacement



Check for the first time after 500 hours.

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.

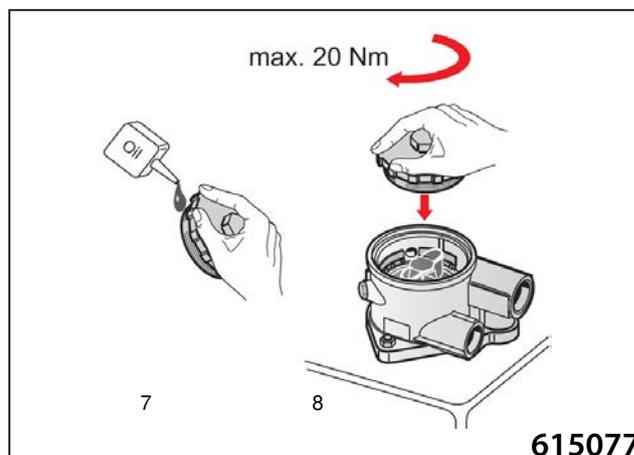
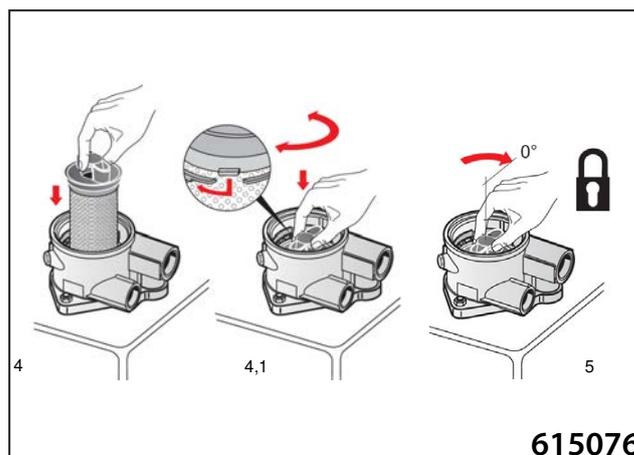
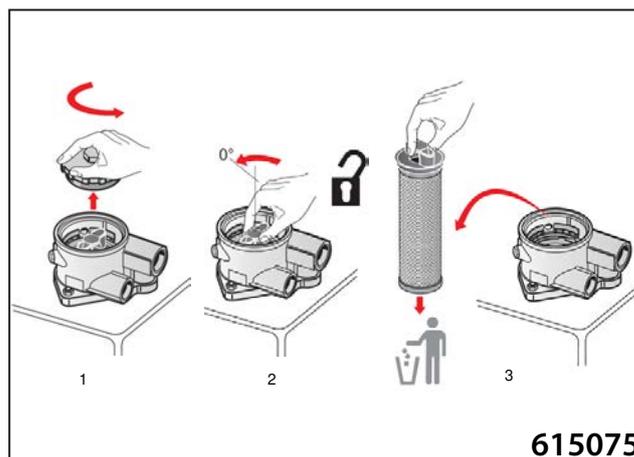
Oil the sealing ring on the filter cap slightly.

Put the filter cap in place.

Tighten the cap with the torque spanner (max. torque 20 Nm).

Set of hydraulic oil filters

Order number: 1182946



Hydraulic oil draining

Note

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. Oil charge is 28.5 l (7.5 gal US).

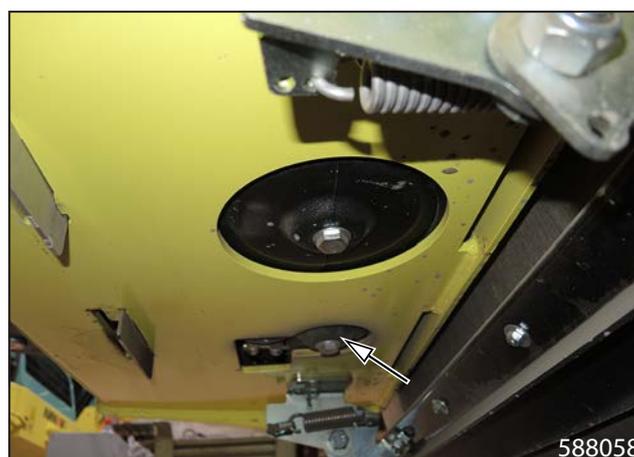
Take out the ventilation filter.

Remove the cap from the hydraulic tank.

Let the oil flow out into the vessel.

Mount the plug. Tighten the screw connection with hand.

Tighten the screw connections in the hydraulic tank with hand.



3.6 Lubrication and maintenance operations

Hydraulic circuit filling

Take out the ventilation filter.

Fill the hydraulic oil through the hole into the tank.

Replace the ventilation filter with a new one.

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

Mount a new filter (1).



Carry out the oil change when the oil is warm, preferably after operation of the machine.

Let the drained oil cool down below 50 °C (122 °F).

Refill the same type of oil.

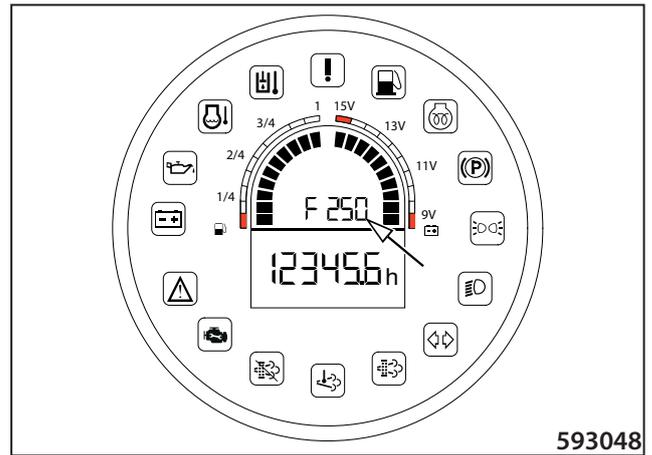


Stop the oil soaking into the ground.



3.6.33 Replacement of air filter cartridges

If the F250 error code appears on the display during operation of the machine, the cartridge must be replaced, however after 500 operation hours at the latest.



593048

Remove the filter cap.



593049

Take out the main cartridge.

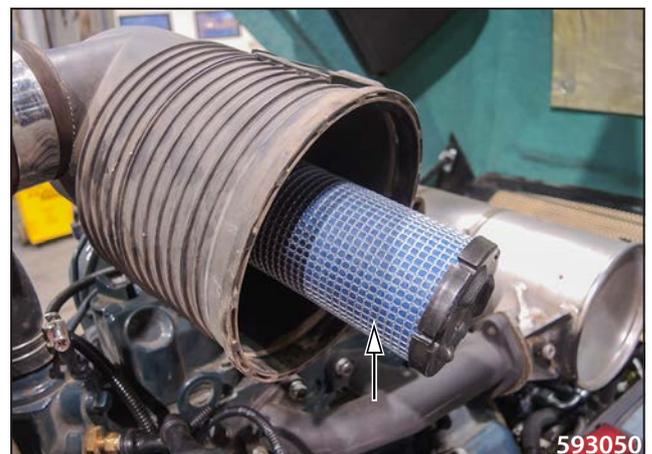
Air filter cartridge
Order number: 1503941



593034

Take out the safety element.
Replace the safety cartridge after every third replacement of the main cartridge.

Air filter cartridge
Order number: 1503942



593050

3.6 Lubrication and maintenance operations

Clean the internal area of the filter and of the contact surface so that no dust is taken into the inner supply piping towards the engine.

Insert the new safety cartridge.

Insert the new main cartridge. Check that both cartridges are mounted correctly and are sealing.



Remove the dust valve of the air filter, clean and remount.



Check connections and the piping for leakage and the engine inlet opening on the bonnet for clogging (e.g. by leaves).



Do NOT clean filter's inner space with pressure air so no dust is taken into the engine intake piping.

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 filter body or lid damaged.



3.6.34 Damping system check

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

Drum rubber-metal element

Order number: 1175152



Engine rubber-metal element

Order number (1): 1-491740

Order number (2): 1-491741



Replace if damaged.

Recheck screws and nuts for tightening.

3.6 Lubrication and maintenance operations

3.6.35 Swinging support check

Once a year check the swinging support for excessive clearance.

Machine equipped with a one-point lifting lug

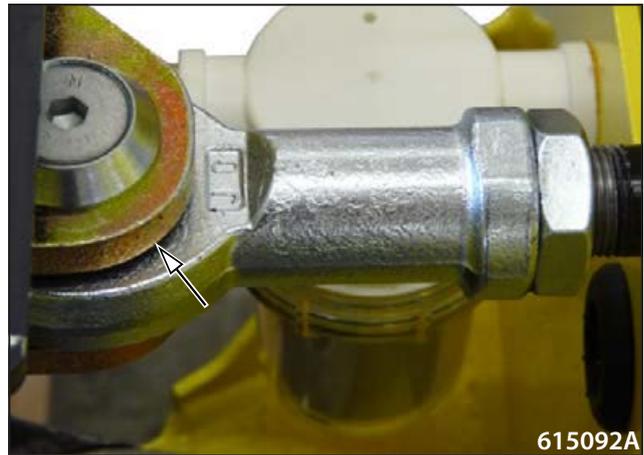
Lift the machine with a crane while using the one-point lifting lug.

Visually check the clearance of the swinging support by applying pressure on the machine alternatively upwards and downwards.

The machine is not equipped with a one-point lifting lug

Lift the machine slightly with a suitable hydraulic jack.

Visually check the clearance of the swinging support by applying pressure on the machine alternatively upwards and downwards.



3.6.36 Articulation joint check

Once a year check the articulation joint for excessive clearance.

Machine equipped with a one-point lifting lug

Lift the machine with a crane while using the one-point lifting lug.

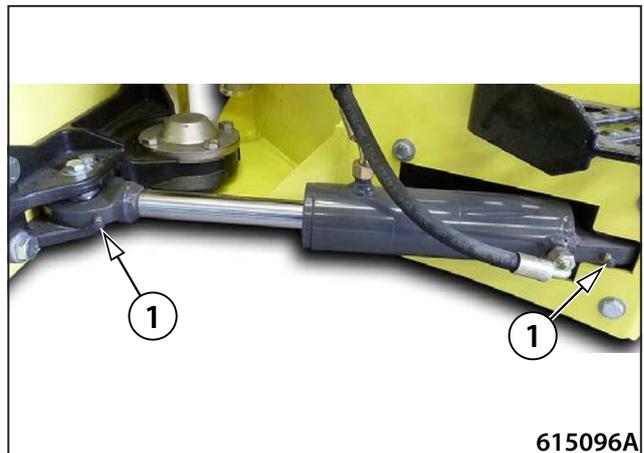
Visually check the clearance of the articulated joint by applying pressure on the machine alternatively upwards and downwards.

The machine is not equipped with a one-point lifting lug

Lift the machine slightly with a suitable hydraulic jack.

Visually check the clearance of the articulated joint by applying pressure on the machine alternatively upwards and downwards.

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Every 2000 hours of operation (every 2 years)

3.6.37 Engine belt replacement

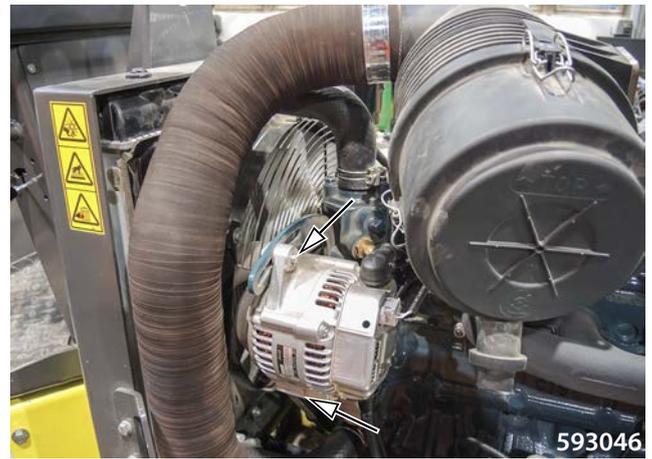
Loosen the alternator screws.

Take out the engine belt.

Insert the new belt.



Change and tension the belt when the engine is not running!



3.6.38 Engine coolant change

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



Remove the drain plug and drain the coolant.

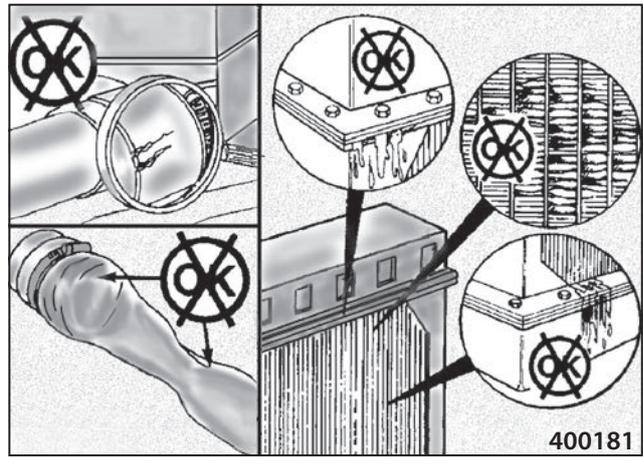
Note

The total volume of coolant in the engine is 6.7 l (1.8 US gal).



3.6 Lubrication and maintenance operations

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 the cooler if required.



Fill the cooling system through the hole in the expansion tank.



Remove the filling plug only after the temperature of the engine coolant has dropped 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.



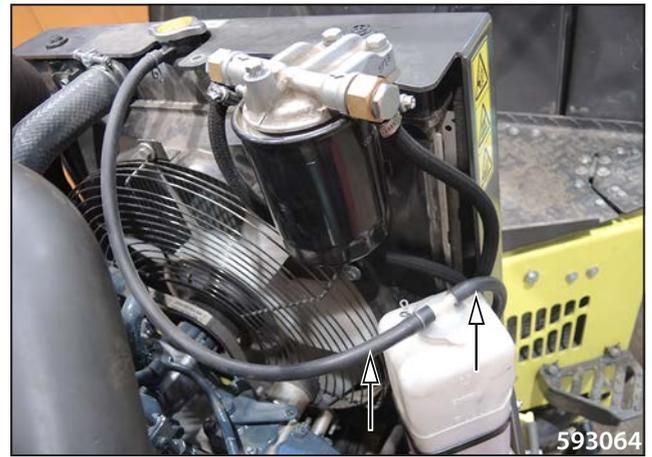
The level must not drop below the lower mark.
Refill only with a coolant containing antifreeze agents on the same basis according to Chapter 3.2.3.
Do not use any additives to repair the cooling system leakage into the engine coolant!
Do not refill cold coolant into a hot engine. There is a danger of damage to the engine castings.
In case of larger losses, find out where the cooling system leaks and repair the cause.



Stop the oil soaking into the ground.

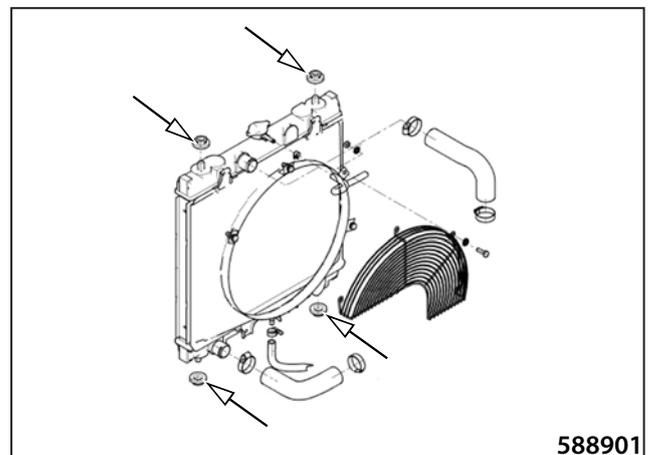
3.6.39 Replacement of hoses of the cooling system

Replace hoses of the cooling system.



3.6.40 Replacement of rubber-metal elements of the engine cooler

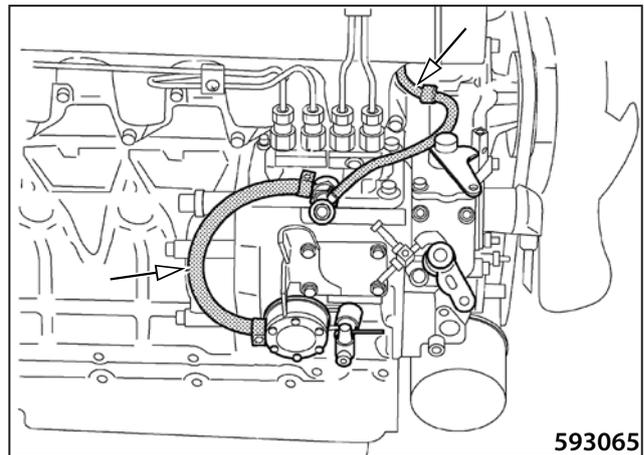
Replace rubber-metal elements of the engine cooler.



3.6 Lubrication and maintenance operations

3.6.41 Replacement of hoses of the fuel system

Replace hoses of the fuel system.



3.6.42 Replacement of suction hoses

Replace suction hoses.



Maintenance as required

3.6.43 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: 1448823



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.



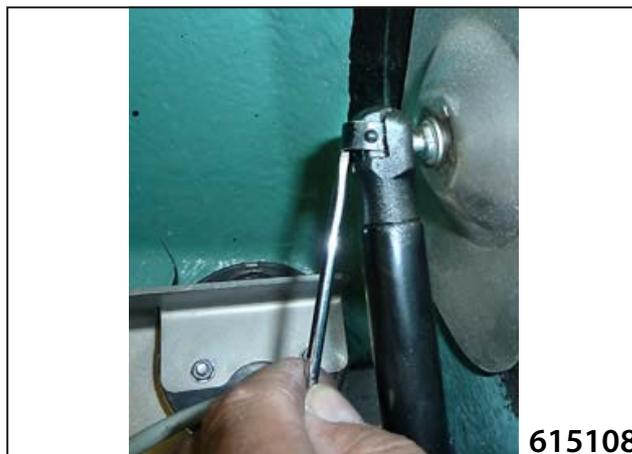
Do not install the gas strut if it is damaged due to mechanical handling. Use genuine parts only!



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



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3.6 Lubrication and maintenance operations

3.6.44 Cleaning the water separator

If the red ring goes up from the bottom, drain the water from the separator.

Close the stop valve (1).

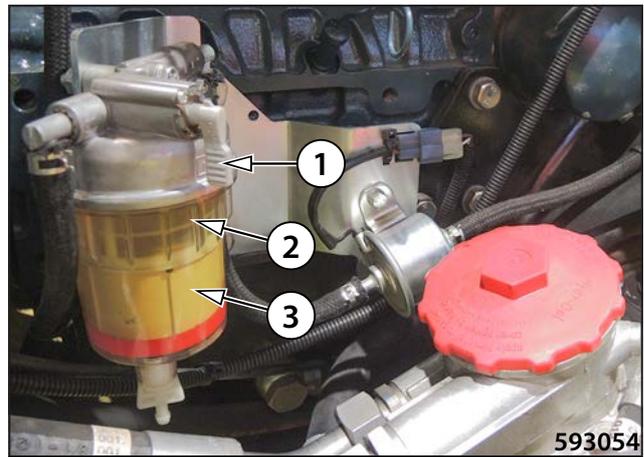
Unscrew the filter housing (2).

Clean the filter element (3).

Refit the filter housing (2).

Open the stop valve (1).

Turn the ignition on. The fuel pump will vent the system automatically.



3.6.45 Cleaning the water tank

Remove the cap of the filler neck of the tank.

Clean the strainer in the filler neck.



Remove the drain plug of the water tank.

Rinse the tank with running water.



3.6.46 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.



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.).

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 Lubrication and maintenance operations

3.6.47 Draining water from the sprinkling circuit before the winter season

Water must be drained from the sprinkling circuit before the winter season because the individual parts may get damaged due to frost.

Procedure for draining water from the sprinkling circuit

Release the quick coupler of the sprinkling hose.

Push the ring against the screw joint.

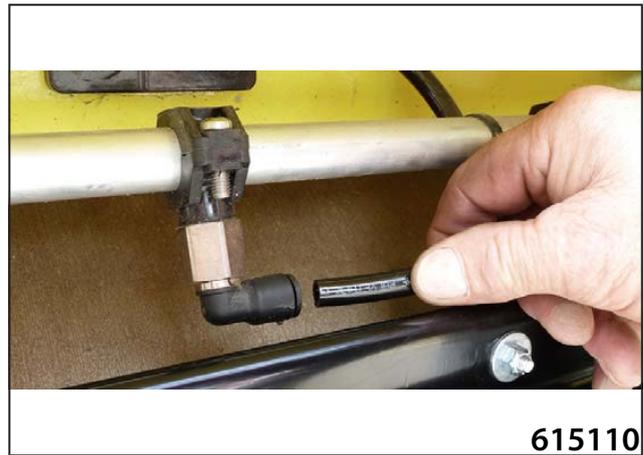
Remove the hose from the coupler.

The water will flow out automatically.

Turn on the sprinkling and let the pump run briefly. The remaining water will flow out.

Removal of the sprinkling filter

Remove and clean the vessel with the sprinkling filter. Keep the vessel with the filter in a safe place.



3.6.48 Fuel system venting

Vent 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 venting:

Prepare a suitable vessel.

Set the key to position "I".

Release the bleed screw on the fuel filter.

Bleed the system and tighten the screw.



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

Follow safety regulations!

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



Stop the fuel soaking into the ground!

3.6 Lubrication and maintenance operations

3.6.49 Checking the screw connections for tightening

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

Thread	TIGHTENING TORQUE				Thread	TIGHTENING TORQUE			
	For screws 8.8 (8G)		For screws 10.9 (10K)			For screws 8.8 (8G)		For screws 10.9 (10K)	
	Nm	lb ft	Nm	lb ft		Nm	lb ft	Nm	lb ft
M6	10	7.4	14	10.3	M18×1.5	220	162.2	312	230.1
M8	24	25.0	34	25.0	M20	390	287.6	550	405.6
M8×1	19	14.0	27	19.9	M20×1.5	312	230.1	440	324.5
M10	48	35.4	67	49.4	M22	530	390.9	745	549.4
M10×1.25	38	28.0	54	39.8	M22×1.5	425	313.4	590	435.1
M12	83	61.2	117	86.2	M24	675	497.8	950	700.6
M12×1.25	66	48.7	94	69.3	M24×2	540	398.2	760	560.5
M14	132	97.3	185	136.4	M27	995	733.8	1400	1032.5
M14×1.5	106	78.2	148	109.1	M27×2	795	586.3	1120	826.0
M16	200	147.5	285	210.2	M30	1,350	995.7	1,900	1401.3
M16×1.5	160	118.0	228	168.1	M30×2	1,080	796.5	1,520	1121.0
M18	275	202.8	390	287.6					

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

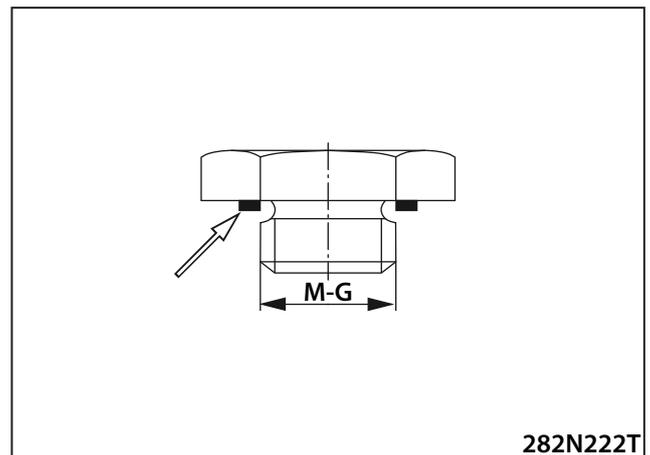
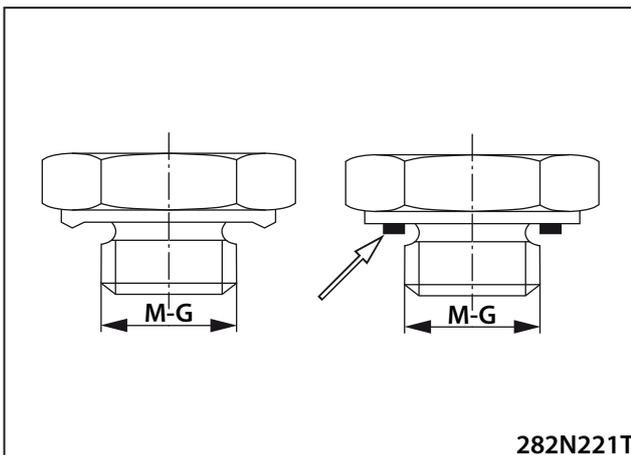
			Tightening torque values of cap nuts with O-rings – hoses					
			Nm			lb ft		
Spanner size	Thread	Pipe	Nominal	Min	Max	Nominal	Min	Max
14	12×1.5	6	20	15	25	15	11	18
17	14×1.5	8	38	30	45	28	22	33
19	16×1.5	8	45	38	52	33	28	38
		10						
22	18×1.5	10	51	43	58	38	32	43
		12						
24	20×1.5	12	58	50	65	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	52×2	35	290	255	325	214	188	240
		38						
		42						
			330	280	380	243	207	280

Table of tightening torque values for necks with tightening edges or with flat gaskets

G-M	Neck tightening torques	
	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 1 1/4	600	443
G 1 1/2	800	590
10×1	25	18
12×1.5	30	22
14×1.5	50	37
16×1.5	60	44
18×1.5	60	44
20×1.5	140	103
22×1.5	140	103
26×1.5	220	162
27×1.5	250	184
33×1.5	400	295
42×1.5	600	443
48×1.5	800	590

Table of tightening torques for plugs with flat gaskets

G-M	Plug tightening torques	
	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 1 1/4	600	443
G 1 1/2	800	590
10×1	13	10
12×1.5	30	22
14×1.5	40	30
16×1.5	60	44
18×1.5	70	52
20×1.5	90	66
22×1.5	100	74
26×1.5	120	89
27×1.5	150	111
33×1.5	250	184
42×1.5	400	295
48×1.5	500	369



3.7 Troubleshooting



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 systems and electrical installations; therefore contact the service department of an authorised dealer or the manufacturer for troubleshooting.

3.7.1 List of error codes displayed on the display

Code F	Short description	Causes and troubleshooting
F021	Travel lever, right	
F022	Neutral switch of right lever	
F023	Travel lever, left	
F024	Neutral switch of the left lever	
F025	Sprinkling potentiometer	
F026	Hydraulic oil temperature	
F027	PWM signal – forward travel	
F028	PWM signal – reverse travel	
F032	Too high hydraulic oil temperature	
F029	Vibration relay	
F030	Brake solenoid valve	
F031	Supply voltage	
F033	Voltage 8 V	
F034	Voltage 5 V (2.5 V)	
F035	Pump check OFF	
F036	PWM current, forward	
F037	PWM current, reverse	
F038	Incorrect travel direction	
F039	Current from joystick neutral switch	
F040	Program is running	
F042	Asphalt temperature	
F044	Start-up conditions	
F043	Diesel engine speed	
BUS	CAN bus failure between Bauser and RC	
EBUS	Disconnection of signal lost between RC and ECU (electronic engine only)	

3.8 Appendix

Code F	Short description	Causes and troubleshooting
PBUS	Disconnection of signal lost between RC and Poti (electronic engine only)	
F100	Pressure limiter emergency open	
F101	SCV (MPROP) stuck	
F102	Fuel leak (in high pressured fuel system)	
F103	Rail pressure sensor: Low	
F104	Rail pressure sensor: High	
F105	Injector charge voltage: High	
F106	Open circuit of harness/coil in 1st cylinder injector	
F107	Open circuit of harness/coil in 3rd cylinder injector	
F108	Open circuit of harness/coil in 4th cylinder injector	
F109	Open circuit of harness/coil in 2nd cylinder injector	
F110	Engine overheat	
F111	Engine overrun	
F112	Oil pressure error	
F113	ECU FLASH ROM error	
F114	ECU CPU (Main IC) error	
F115	ECU CPU (Monitoring IC) error	
F116	Injector charge voltage: Low	
F117	Open circuit of SCV (MPROP)	
F118	SCV (MPROP) drive system error	
F119	Injector drive IC error or Open circuit	
F120	Internal short-circuit of the injector drive	
F121	Sensor supply voltage 1: Low	
F122	Sensor supply voltage 1: High	
F123	Short-circuit of the injector of the cylinder 1 & 4 to +B or GND	
F124	Short-circuit of the injector of the cylinder 2 & 3 to +B or GND	
F125	Pressure limiter not open	
F126	Rail pressure failure after pressure limiter open	
F127	CAN2 Bus off	
F128	CAN1 Bus off	
F129	CAN-KBT Frame error	
F150	MAF sensor: Low	
F151	MAF sensor: High	
F152	Emission deterioration	
F153	Emergency sensor of the exhaust gas temperature 0: High	
F154	Emergency sensor of the exhaust gas temperature 1: High	
F155	Emergency sensor of the exhaust gas temperature 2: High	

Code F	Short description	Causes and troubleshooting
F156	Excessive PM5	
F157	High exhaust gas temp. after emergency high temp. of DTC.	
F200	NE-G phase shift NE: Crankshaft position sensor G: Camshaft position sensor	
F201	High rail pressure	
F202	Coolant temperature sensor: Low	
F203	Coolant temperature sensor: High	
F204	No input of NE sensor (Crank position sensor) pulse	
F205	NE sensor (Crank position sensor) pulse number error	
F206	Short-circuit of the excitation current of the glowing relay	
F207	Battery voltage: Low	
F208	Battery voltage: High	
F209	Short-circuit to B SCV (MPROP)	
F210	Sensor supply voltage 2: Low	
F211	Sensor supply voltage 2: High	
F212	Sensor supply voltage 3: Low	
F213	Sensor supply voltage 3: High	
F214	Accelerator position sensor 1: Low	
F215	Accelerator position sensor 1: High	
F216	Accelerator position sensor 2: Low	
F217	Accelerator position sensor 2: High	
F218	Accelerator position sensor error (CAN)	
F250	Intake air volume: Low	
F251	EGR actuator open circuit	
F252	Short-circuit of the EGR actuator coil	
F253	EGR position sensor failure	
F254	Exhaust gas temperature sensor 1: Low	
F255	Exhaust gas temperature sensor 1: High	
F256	Exhaust gas temperature sensor 0: Low	
F257	Exhaust gas temperature sensor 0: High	
F258	Intake throttle feedback error	
F259	Accelerator position sensor correlation error	
F260	EGR actuator valve stuck	
F261	EGR (DC motor) overheat	
F262	EGR (DC motor) temp. sensor failure	
F263	Exhaust gas temperature sensor 2: Low	

3.8 Appendix

Code F	Short description	Causes and troubleshooting
F264	Exhaust gas temperature sensor 2: High	
F265	Differential pressure sensor 1: Low	
F266	Differential pressure sensor 1: High	
F267	Intake throttle lift sensor: Low	
F268	Intake throttle lift sensor: High	
F269	Excessive PM3	
F270	Excessive PM4	
F271	Boost pressure low	
F272	All exhaust temp. sensor failure	
F273	High frequency of regeneration	
F274	No communication with EGR	
F300	Intake air temp. error: Low	
F301	Intake air temp. error: High	
F302	Boost pressure sensor: Low	
F303	Boost pressure sensor: High	
F304	No input of G sensor (Camshaft position sensor) pulse	
F305	G-sensor (Camshaft position sensor) pulse number error	
F306	Open circuit of glow relay driving circuit	
F307	Short-circuit to GND of the excitation circuit of the glowing relay	
F308	Glow heater relay driving circuit overheat	
F309	QR(IQA) data error	
F310	No QR (IQA) data	
F311	Main relay is locked in closed position	
F312	Short-circuit to GND of the excitation circuit of the starter relay	
F313	Barometric pressure sensor error (Low side)	
F314	Barometric pressure sensor error (High side)	
F350	Intake air temp. built-in MAF sensor: Low	
F351	Intake air temp. built-in MAF sensor: High	
F352	EEPROM check sum error	
F353	Low coolant temp. in parked regeneration	
F354	Parked regeneration time out	
F355	Over heat pre-caution	
F356	CAN CCVS (Parking SW and Vehicle speed) frame error	
F357	CAN CM1 (Regen SW) frame error	
F358	CAN DDC1 (Transmission) frame error	
F359	CAN ETC2 (Neutral SW) frame error	
F360	CAN ETC5 (Neutral SW) frame error	

Code F	Short description	Causes and troubleshooting
F361	CAN TSC1 frame error	
F362	CAN EBC1 frame error	

3.8 Appendices

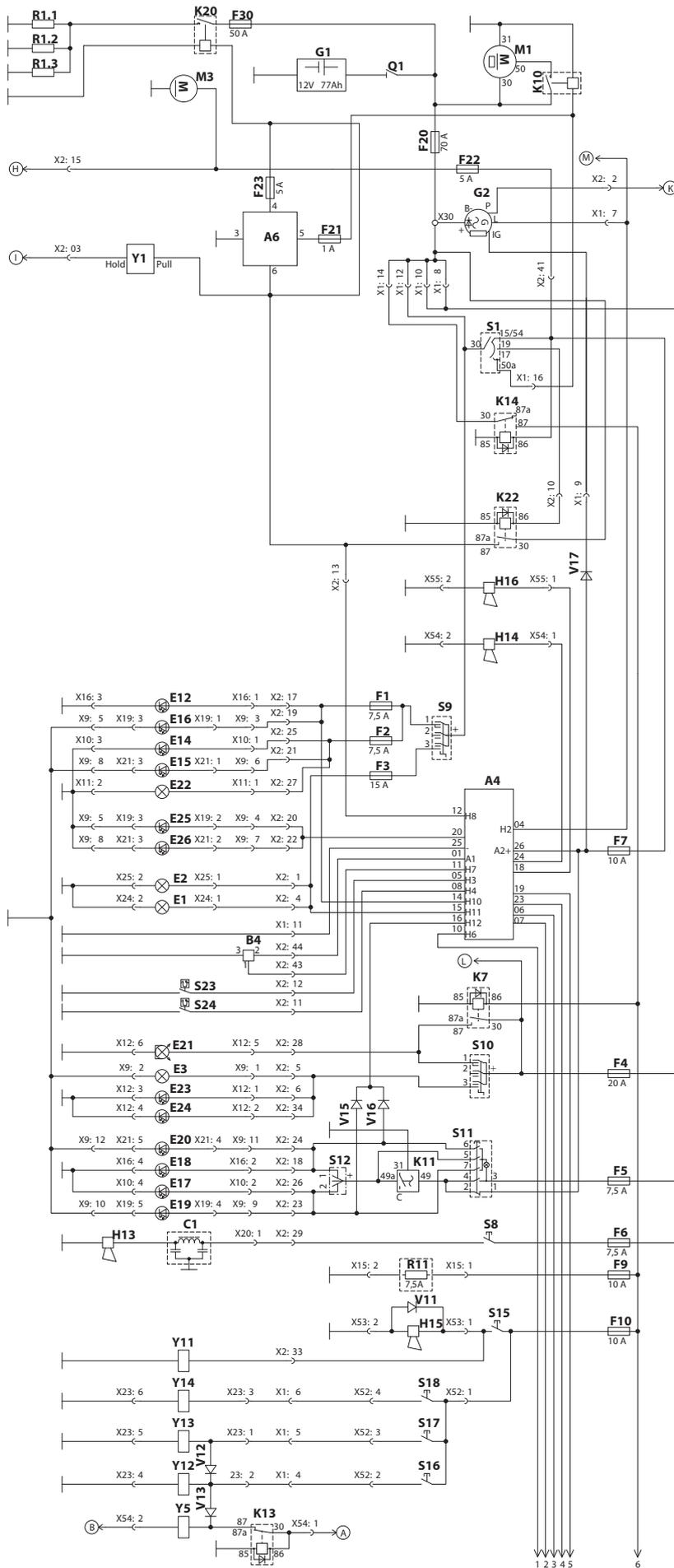
Wiring diagram

Legend:

A1	Fuel tank level indicator	H7	Diesel fuel reserve indicator lamp	S11	Warning lights switch
A2	Voltage indicator	H8	Glowing indicator lamp	S12	Direction indicators switch
A3	Rexroth RC2-2/21 computer	H9	Brake pilot indicator lamp	S13	Travel lever switch, left
A4	Multifunctional Bauser display	H10	Parking light indicator lamp	S14	Parking brake switch
A5	Infra thermometer	H11	Headlamp indicator lamp	S15	Quantity divider switch (lock)
A6	Time relay	H12	Indicator lamp for direction indicators	S16	Edge cutter switch – up
A8	Track unit module	H13	Horn	S17	Edge cutter switch – down
B1	Travel lever sensor, right	H14	Back signal horn	S18	Edge cutter sprinkling switch
B2	Travel lever sensor, left	H15	Quantity divider horn	S19	Seat switch
B3	Hydraulic oil temperature sensor	H16	Seat contact delay horn	S20	Regeneration switch
B4	Fuel level float	K4-6	Auxiliary relay	S21	Speed selector switch
C1	Noise suppressing filter	K10	Starter contactor	S22	Brake pressure switch
E1, 2	Front headlamps	K11-14	Auxiliary relay	S23	Engine oil pressure sensor
E3	Rear headlamp	K20	Glowing relay	S24	Cooling water temperature sensor
E12, 14	Front parking lights	K22	Auxiliary relay	V11-17	Diodes
E15, 16	Rear tail lights	M1	Engine starter	Y1	Intake/holding coil
E17, 19	Right direction indicators	M2	Hydraulic oil cooler	Y2	Brake valve electromagnet
E18, 20	Left direction indicators	M3	Fuel pump	Y3	Valve electromagnet, forward travel
E21	Warning beacon	M4	Sprinkling pump	Y4	Vibration valve electromagnet, reverse
E22	Licence plate lighting	M11	Emulsion sprinkling pump	Y5	Vibration valve electromagnet, front
E23, 24	Working lights, ROPS	P1	Engine hour counter	Y6	Vibration valve electromagnet, rear
E25, 26	Brake lights	Q1	Battery disconnecter	Y9	Sprinkling pump valve electromagnet
F1-16	Fuses	R1.1-1.3	Engine glowing	Y11	Quantity divider valve electromagnet
F20-23	Fuses	R11	Seat heating	Y12	Valve electromagnet of the edge cutter – up
F30	Fuses	S1	Ignition box	Y13	Valve electromagnet of the edge cutter – down
G1	Battery	S2	Emergency brake button	Y14	Valve electromagnet of the edge cutter – sprinkling
G2	Alternator	S3	Travel lever switch, right		
H1	ERROR indicator lamp	S4	Sprinkling potentiometer		
H2	Charging indicator light	S5	Switch, operating mode		
H3	Engine oil pressure indicator lamp	S6	Automatic vibration switch		
H4	Coolant temperature indicator lamp	S7	Vibration switch, rear		
H5	Hydraulic oil temperature indicator lamp	S8	Horn switch		
H6	Emergency stop indicator lamp	S9	Front headlamps switch		
		S10	Tail lights switch		

(*) Optional equipment

(**) not available



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3.8 Appendix

Wiring diagram

Legend:

A1 Fuel tank level indicator	H7 Diesel fuel reserve indicator lamp	S11 Warning lights switch
A2 Voltage indicator	H8 Glowing indicator lamp	S12 Direction indicators switch
A3 Rexroth RC2-2/21 computer	H9 Brake pilot indicator lamp	S13 Travel lever switch, left
A4 Multifunctional Bauser display	H10 Parking light indicator lamp	S14 Parking brake switch
A5 Infra thermometer	H11 Headlamp indicator lamp	S15 Quantity divider switch (lock)
A6 Time relay	H12 Indicator lamp for direction indicators	S16 Edge cutter switch – up
A8 Track unit module	H13 Horn	S17 Edge cutter switch – down
B1 Travel lever sensor, right	H14 Back signal horn	S18 Edge cutter sprinkling switch
B2 Travel lever sensor, left	H15 Quantity divider horn	S19 Seat switch
B3 Hydraulic oil temperature sensor	H16 Seat contact delay horn	S20 Regeneration switch
B4 Fuel level float	K4-6 Auxiliary relay	S21 Speed selector switch
C1 Noise suppressing filter	K10 Starter contactor	S22 Brake pressure switch
E1, 2 Front headlamps	K11-14 Auxiliary relay	S23 Engine oil pressure sensor
E3 Rear headlamp	K20 Glowing relay	S24 Cooling water temperature sensor
E12, 14 Front parking lights	K22 Auxiliary relay	V11-17 Diodes
E15, 16 Rear tail lights	M1 Engine starter	Y1 Intake/holding coil
E17, 19 Right direction indicators	M2 Hydraulic oil cooler	Y2 Brake valve electromagnet
E18, 20 Left direction indicators	M3 Fuel pump	Y3 Valve electromagnet, forward travel
E21 Warning beacon	M4 Sprinkling pump	Y4 Vibration valve electromagnet, reverse
E22 Licence plate lighting	M11 Emulsion sprinkling pump	Y5 Vibration valve electromagnet, front
E23, 24 Working lights, ROPS	P1 Engine hour counter	Y6 Vibration valve electromagnet, rear
E25, 26 Brake lights	Q1 Battery disconnecter	Y9 Sprinkling pump valve electromagnet
F1-16 Fuses	R1.1-1.3 Engine glowing	Y11 Quantity divider valve electromagnet
F20-23 Fuses	R11 Seat heating	Y12 Valve electromagnet of the edge cutter – up
F30 Fuses	S1 Ignition box	Y13 Valve electromagnet of the edge cutter – down
G1 Battery	S2 Emergency brake button	Y14 Valve electromagnet of the edge cutter – sprinkling
G2 Alternator	S3 Travel lever switch, right	
H1 ERROR indicator lamp	S4 Sprinkling potentiometer	
H2 Charging indicator light	S5 Switch, operating mode	
H3 Engine oil pressure indicator lamp	S6 Automatic vibration switch	
H4 Coolant temperature indicator lamp	S7 Vibration switch, rear	
H5 Hydraulic oil temperature indicator lamp	S8 Horn switch	
H6 Emergency stop indicator lamp	S9 Front headlamps switch	
	S10 Tail lights switch	

(*) Optional equipment

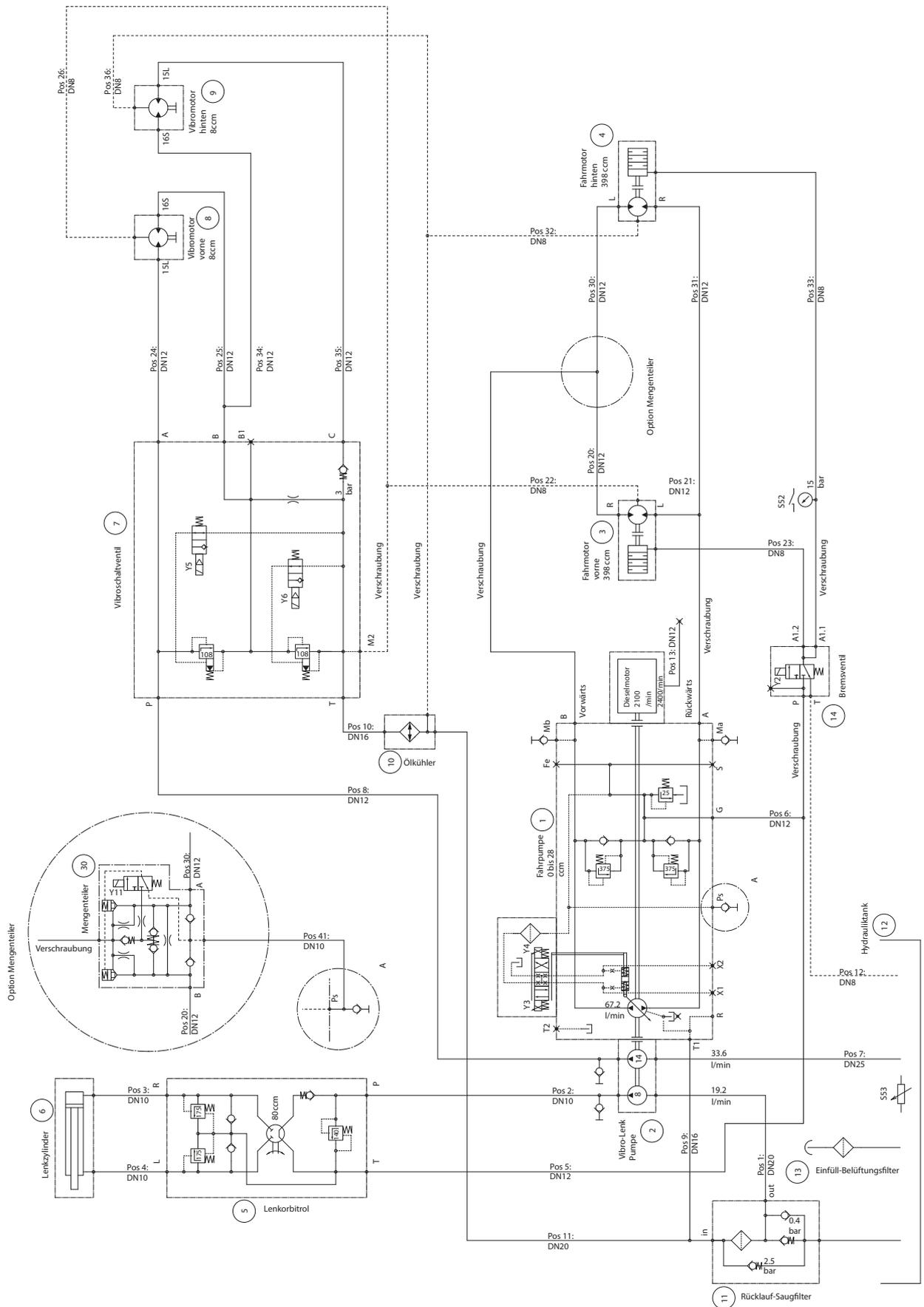
(**) not available

3.8 Appendix

Hydraulic diagram ARX 23-2 T4i, ARX 26-2 T4i

Legend:

- 1 Travel pump
- 2 Pump, vibration, steering
- 3 Travel engine, front
- 4 Travel engine, rear
- 5 Steering unit (Orbitrol)
- 6 Steering cylinder
- 7 Vibration switching valve
- 8 Vibration motor, front
- 9 Vibration motor, rear
- 10 Oil cooler
- 11 Suction return filter
- 12 Hydraulic oil tank
- 13 Input ventilation filter
- 14 Brake valve
- 15 Travel engine, rear left
- 16 Travel engine, rear right



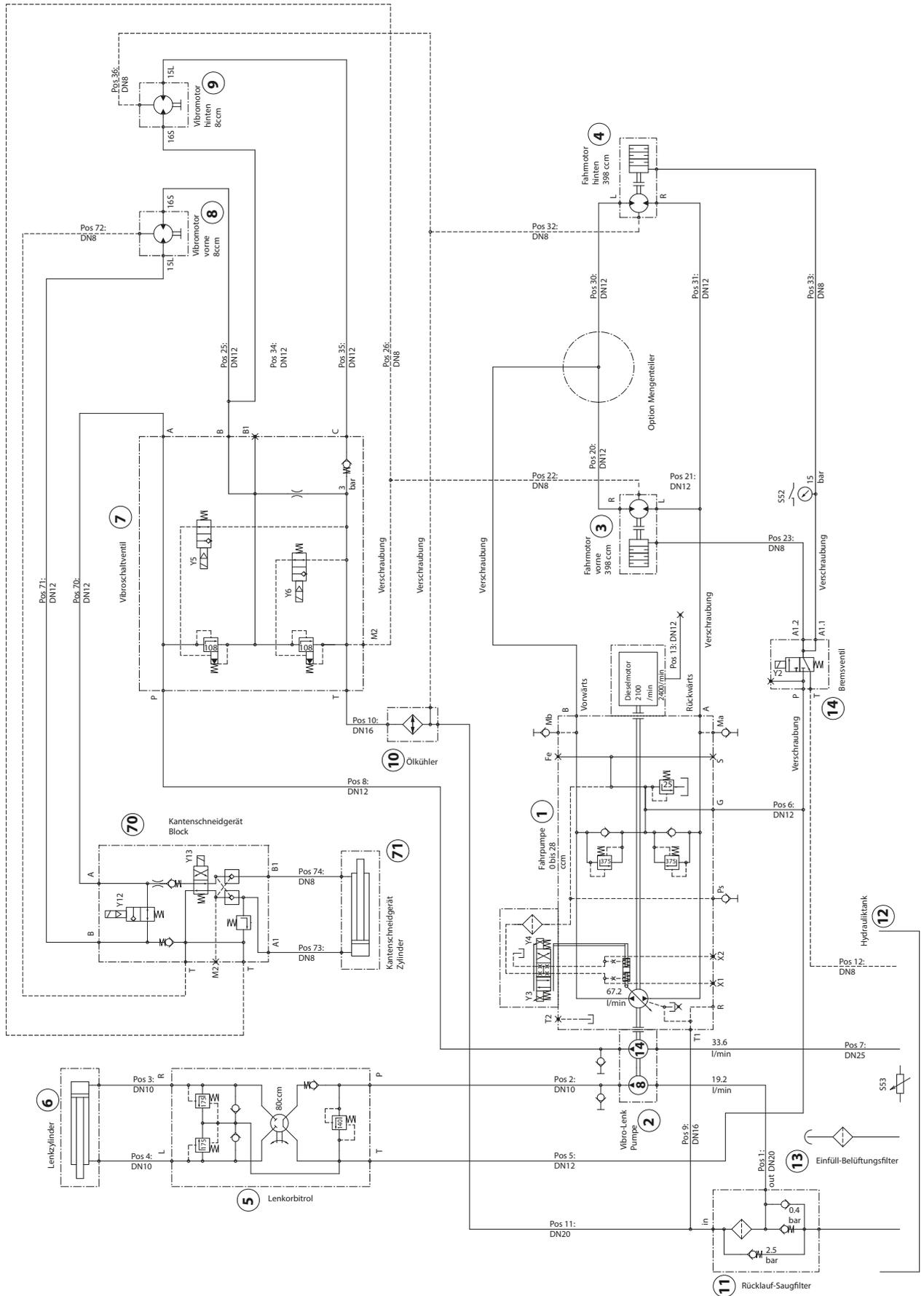
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3.8 Appendix

Hydraulic diagram – Edge cutter

Legend:

- 1 Travel pump
- 2 Pump, vibration, steering
- 3 Travel engine, front
- 4 Travel engine, rear
- 5 Steering unit (Orbitrol)
- 6 Steering cylinder
- 7 Vibration switching valve
- 8 Vibration motor, front
- 9 Vibration motor, rear
- 10 Oil cooler
- 11 Suction return filter
- 12 Hydraulic oil tank
- 13 Input ventilation filter
- 14 Brake valve
- 30 Quantity divider
- 70 Edge cutter – unit
- 71 Edge cutter – cylinder



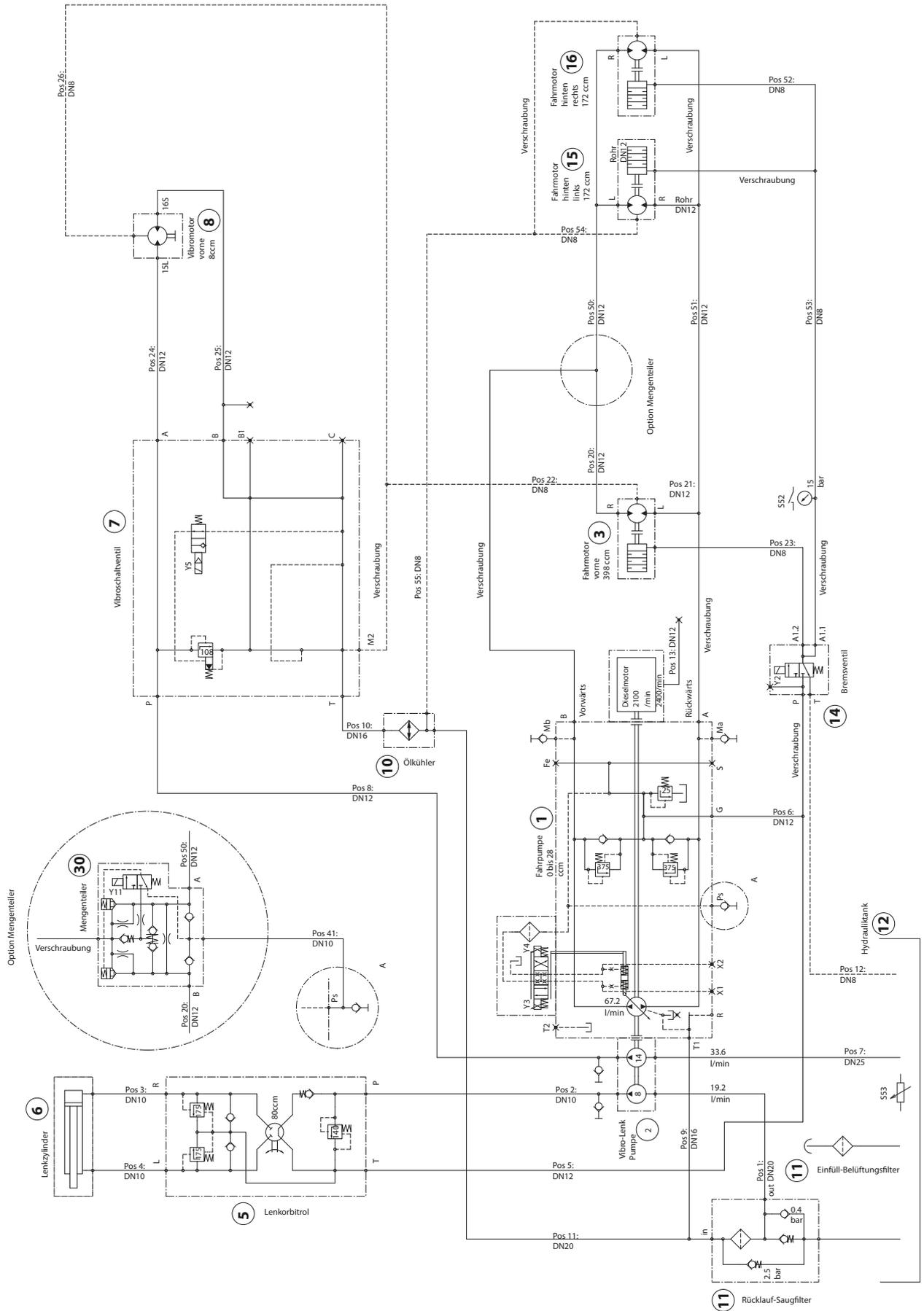
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3.8 Appendix

Hydraulic diagram ARX 23-2C, ARX 26-2C

Legend:

- 1 Travel pump
- 2 Pump, vibration, steering
- 3 Travel engine, front
- 4 Travel engine, rear
- 5 Steering unit (Orbitrol)
- 6 Steering cylinder
- 7 Vibration switching valve
- 8 Vibration motor, front
- 9 Vibration motor, rear
- 10 Oil cooler
- 11 Suction return filter
- 12 Hydraulic oil tank
- 13 Input ventilation filter
- 14 Brake valve
- 15 Travel engine, rear left
- 16 Travel engine, rear right



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3.8 Appendix

Table of spare parts for regular maintenance

Chapter	Spare part	Order number
3.6.12	Fan	1448212
3.6.17	Fuel filter cartridge	1448216
3.6.20	Fuel filter	1448257
3.6.21	Engine oil filter	1504183
3.6.28	Fuel filter cartridge	1448216
3.6.32	Set of hydraulic oil filters	1182946
3.6.33	Air filter cartridge	1503941
3.6.33	Air filter cartridge	1503942
3.6.34	Drum rubber-metal element	1175152
3.6.34	Engine rubber-metal element	1-491740
3.6.34	Engine rubber-metal element	1-491741
3.6.43	Gas strut	1448823

Content of the filter set after 250 hours (4-760243)

Chapter	Spare part	Number of parts	Order number
3.6.20	Fuel filter	1	1448257
3.6.21	Engine oil filter	1	1504183

Content of the filter set after 500 hours (4-760244)

Chapter	Spare part	Number of parts	Order number
3.6.20	Fuel filter	1	1448257
3.6.21	Engine oil filter	1	1504183
3.6.28	Fuel filter cartridge	1	1448216
3.6.32	Set of hydraulic oil filters	1	1182946

Content of the filter set after 1000 hours (4-760245)

Chapter	Spare part	Number of parts	Order number
3.6.20	Fuel filter	1	1448257
3.6.21	Engine oil filter	1	1504183
3.6.28	Fuel filter cartridge	1	1448216
3.6.32	Set of hydraulic oil filters	1	1182946
3.6.33	Air filter cartridge	1	1503941
3.6.33	Air filter cartridge	1	1503942

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