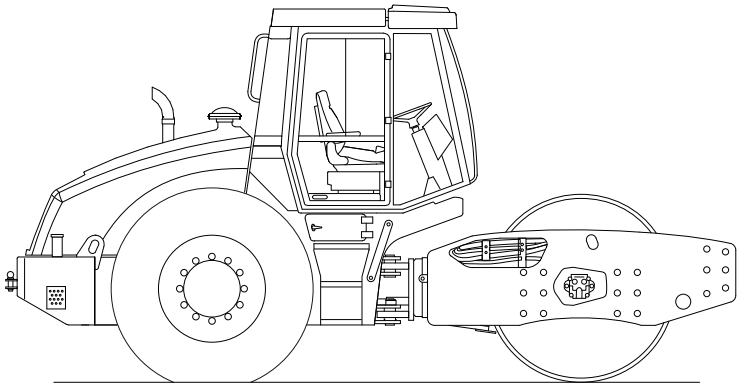
AMMANN

Operating manual

ASC 110
Cummins



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ASC 110
Single drum roller
Cummins Tier 3

Operating manual

Edition 09/2011 EN
From Serial No. 2823081
Translation of Original Operating Manual

ES Prohlášení o shodě

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

EC Declaration of conformity / EG-Konformitätserklärung

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

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

Výrobce / *Manufacturer / Hersteller:* **Adresa /** *Address / Adresse:* **IČ /** *Identification Number / Ident.-Nr:*	Ammann Czech Republic a.s. Náchodská 145, CZ-549 01 Nové Město nad Metují, Czech Republic 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:*	Tahačový válec / *Single drum roller / Walzenzug*
Typ / *Type / Typ:*	ASC 110
Verze / *Version / Version:*	
Výrobní číslo / *Serial number / Maschinennummer:*	
Motor / *Engine / Motor:*	Cummins QSB 4.5-C160, vznětový, jmenovitý výkon (ISO 3046-1): 119,0 kW, jmenovité otáčky: 2200 min^{-1}. / *Cummins QSB 4.5-C160, Diesel, nominal power (ISO 3046-1): 119,0 kW, rated speed: 2200 RPM. / Cummins QSB 4.5-C160, Dieselmotor, Nennleistung (ISO 3046-1): 119,0 kW, Nenndrehzahl: 2200 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 2004/108/ES / *Electromagnetic Compatibility Directive 2004/108/EC / Elektromagnetische Kompatibilität – Richtlinie 2004/108/EG* 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 12100-2, ČSN EN 500-1+A1, ČSN EN 500-4+A1, ČSN EN 982+A1, ČSN EN 13309:2001
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 zemědělských, lesnických a potravinářských strojů, a. s., Třanovského 622/11, 163 04 Praha 6–Řepy, ČR. / *The Government Testing Laboratory of Agricultural, Food Industry and Forestry Machines, Joint–stock company, Třanovského 622/11, 163 04 Praha 6–Řepy, Czech Republic / Staatliche Prüfanstalt für Land-, Forst- und Lebensmittelmaschinen, 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} = 106 dB
Garantovaná hladina akustického výkonu / *Guaranteed sound power level / Garantierter Schallleistungspegel:*	L_{WA} = 107 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:*	Ing. Jiří Macháček
Funkce / *Grade / Stelle:*	Quality Control Manager
Podpis / *Signature / Unterschrift:*	

CZ / EN / DE

Congratulations on your purchase of an AMMANN road roller. This modern compaction device is characterised by simple operation and maintenance and is the product of many years of AMMANN experience in the field of road roller engineering. In order to avoid faults due to improper operation and maintenance we request that you read this operating manual with great care and keep it for later reference.

With kind regards,

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

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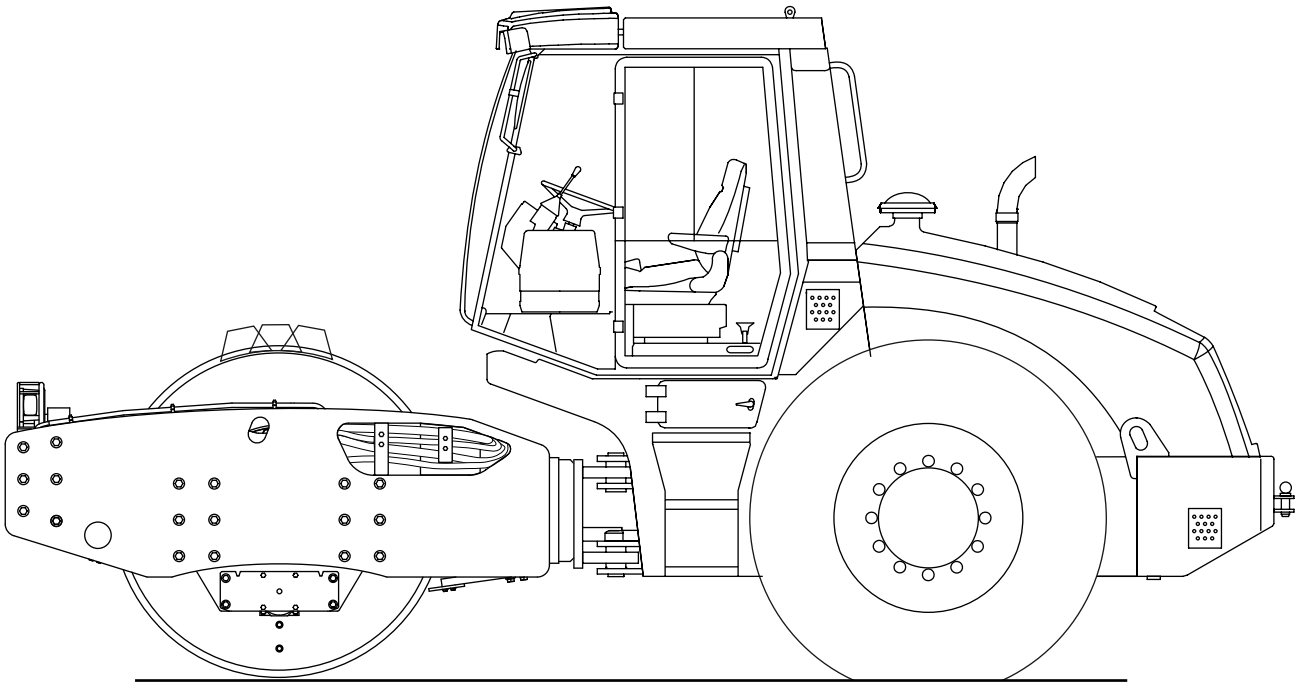

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This manual consists of:

I. Specification manual

II. Operating instructions

III. Maintenance manual

The following explanations serve to familiarise the machinist (operator) with the roller and to support him during handling and maintenance. It is therefore absolutely necessary to provide the operator with these instructions and to ensure that he reads them carefully before using the road roller. This aids training comprehension during the first use of the road roller.

Subsequent faults due to improper operating are avoided.

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

AMMANN accepts no liability for continued safe functioning of the road roller if it is incorrectly operated and / or operating modes are employed which represent improper use.

Spare parts must meet AMMANN technical specifications. These requirements are fulfilled if only original AMMANN spare parts are used.

These instructions must always be kept available on the equipment.

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. Printer's errors, technical modifications, and modifications of figures are reserved. All dimensions and weights are approximate and, therefore, not binding.

Ammann Czech Republic a.s. reserves the right to perform modifications without 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.

SYMBOLS OF THE SAFETY NOTICES:

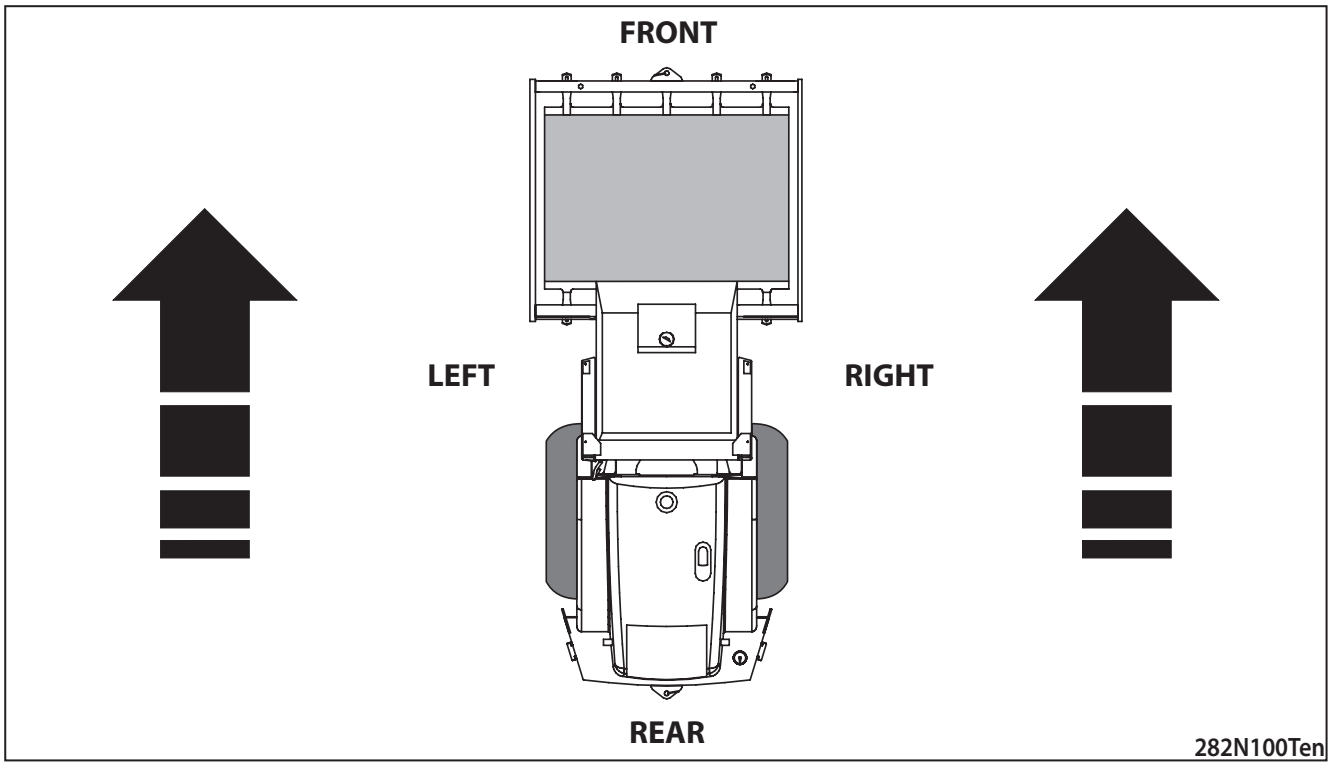
The notice warns of a serious risk of personal injury or other personal hazards.

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

The notice warns of the necessity of environmental protection.

! NOTICE !

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



Content

Content

1. SPECIFICATION MANUAL

ASC 110
(Cummins Tier 3)

1.1. Basic Data

Machine description

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

Machine application

ASC 110 rollers are suitable for medium and large-sized compaction works in transport construction (motorways, railways, airfields), water resources construction (rockfill dams), and building construction (industrial zones, harbours), etc.

ASC 110 D roller with a smooth drum is suitable for the compaction of all kinds of soils. It is possible to be used for the compaction of clay soils up to a layer thickness (after compaction) of 25 cm (9.8 in), loam soils up to a layer thickness of 40 cm (15.7 in), mixed soils up to a layer thickness of 50 cm (19.7 in), sandy and gravel materials up to a layer thickness of 60 cm (23.6 in), and rockfill up to a layer thickness of 80 cm (31.4 in). The maximum permissible grain size in a loose layer is 2/3 of the layer thickness. The roller can also be used for compaction by means of stabilisation.

ASC 110 D ACE roller with a smooth drum is suitable for the compaction of all kinds of soils. It is possible to be used for the compaction of clay soils up to a layer thickness (after compaction) of 27 cm (10,6 in), loam soils up to a layer thickness of 45 cm (17,7 in), mixed soils up to a layer thickness of 60 cm (23,6 in), sandy and gravel materials up to a layer thickness of 70 cm (27,5 in), and rockfill up to a layer thickness of 100 cm (39,4 in). The maximum permissible grain size in a loose layer is 2/3 of the layer thickness. The roller can also be used for compaction by means of stabilisation.

ASC 110 PD roller with a padfoot drum (synchronous kneading and vibrating effect) is suitable for the compaction of clay soils up to a layer thickness (after compaction) of 30 cm (11.8 in), loam soils up to a layer thickness of 40 cm (15.7 in), and mixed soils up to a layer thickness of 50 cm (19.7 in).

ASC 110 HD roller with an increased pulling force – smooth drum.

ASC 110 HDPD roller with an increased pulling force – padfoot drum.

ASC 110 HT roller for permanently difficult conditions and on slopes above 30% – smooth drum.

ASC 110 HTPD roller for permanently difficult conditions and on slopes above 30% – padfoot drum.

ASC 110 PDB roller with a padfoot drum and blade for spreading materials. The blade is the optional equipment supplied per order.

The machines are intended for operation in conditions of the following types according to ČSN IEC 721-2-1 (038900): WT, WDr, MWDr (i.e. mild, warm dry, hot dry with a limited temperature range of from -15 °C (5 °F) to +45 °C (113 °F).

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

Please fill in the following data:

(see Pin label, Label of the CUMMINS engine)

Type of machine

.....

ICV/PIN (Serial number of the machine)

.....

Production year

.....

Type of engine

.....

Serial number of the engine

.....

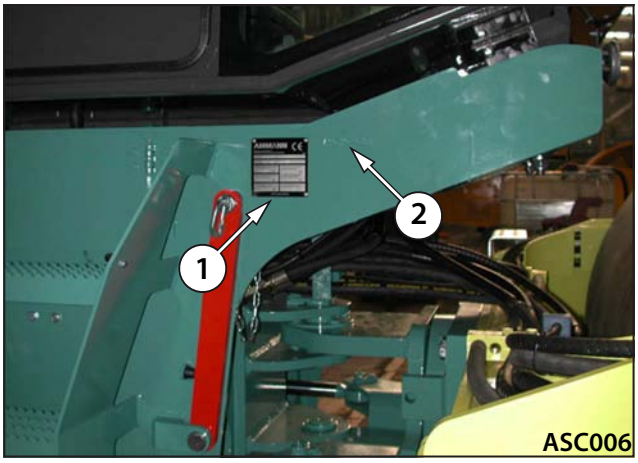
Please refer to the data in the table below always when approaching the dealer or the manufacturer.

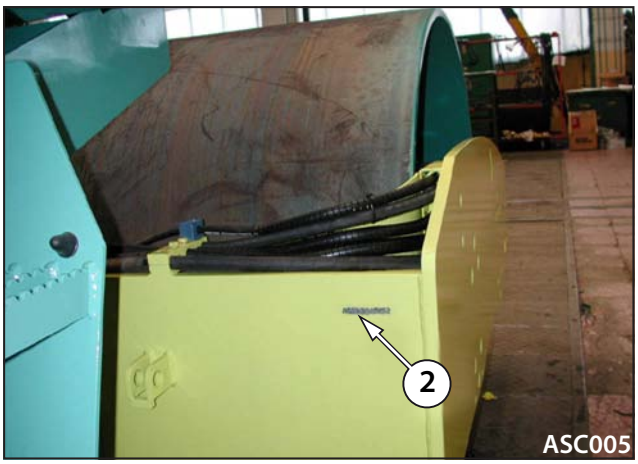
The machine that complies with the requirements as to health protection and safety is identified with a name plate with CE marking.

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

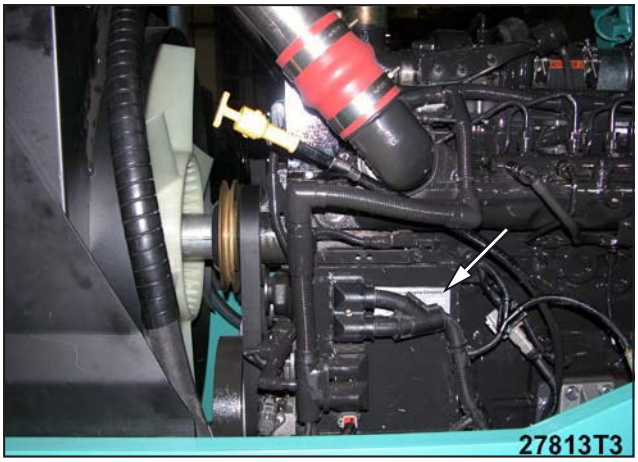
Name plate location

1 - Name plate
2 - Machine frame number



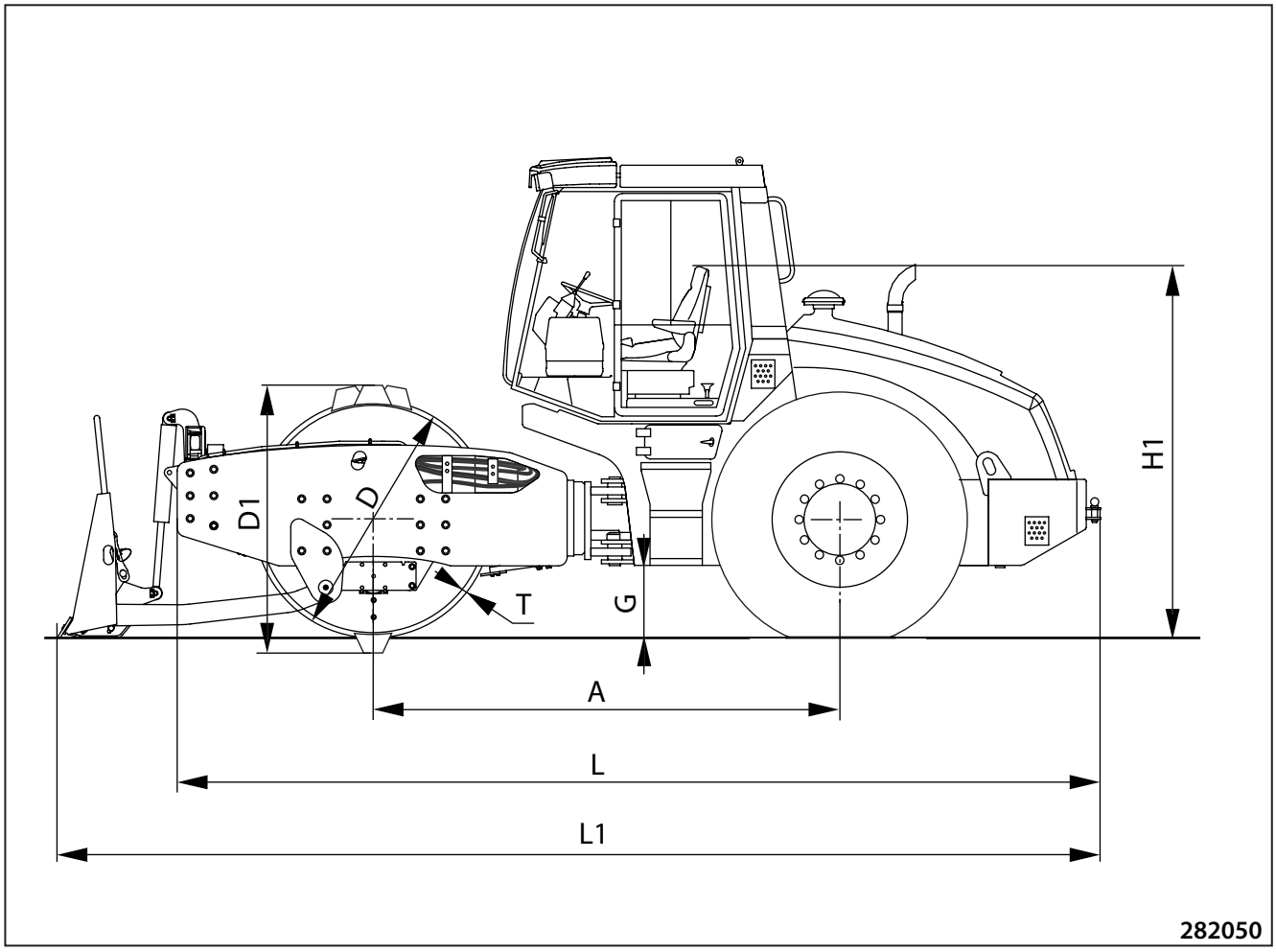


Engine name plate location



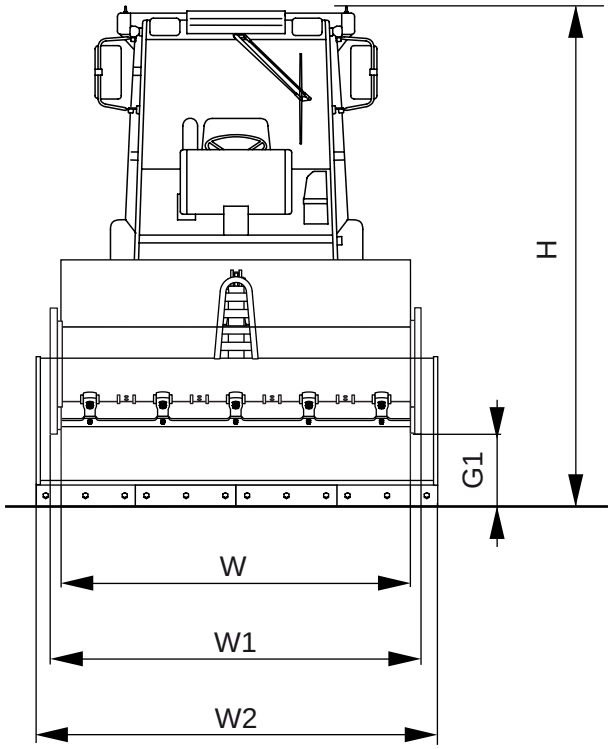
1.2. Dimension Chart

Dimension Chart of the Machine ASC 110 (with cab and ROPS frame and blade)



mm (in)	A	D	D1	G	G1	H	H1	L	L1	T*	W	W1	W2
ASC 110 D	2878	1500	-	440	420	3070	2400	5780	-	25	2130	2258	-
	(113,3)	(59,1)	(-)	(17,3)	(16,5)	(120,9)	(94,5)	(227,6)	(-)	(1,0)	(83,9)	(88,9)	(-)
ASC 110 PD	2878	1440	1640	440	420	3070	2400	5780	-	20	2130	2258	-
	(113,3)	(56,7)	(64,6)	(17,3)	(16,5)	(120,9)	(94,5)	(227,6)	(-)	(0,8)	(83,9)	(88,9)	(-)
ASC 110 PDB	2878	1440	1640	440	420	3070	2400	5780	6557	20	2130	2258	2441
	(113,3)	(56,7)	(64,6)	(17,3)	(16,5)	(120,9)	(94,5)	(227,6)	258,1	(0,8)	(83,9)	(88,9)	(96,1)

Dimension Chart of the Machine ASC 110 (with cab and ROPS frame and blade)



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mm (in)	A	D	D1	G	G1	H	H1	L	L1	T*	W	W1	W2
ASC 110 D	2878	1500	-	440	420	3070	2400	5780	-	25	2130	2258	-
	(113,3)	(59,1)	(-)	(17,3)	(16,5)	(120,9)	(94,5)	(227,6)	(-)	(1,0)	(83,9)	(88,9)	(-)
ASC 110 PD	2878	1440	1640	440	420	3070	2400	5780	-	20	2130	2258	-
	(113,3)	(56,7)	(64,6)	(17,3)	(16,5)	(120,9)	(94,5)	(227,6)	(-)	(0,8)	(83,9)	(88,9)	(-)
ASC 110 PDB	2878	1440	1640	440	420	3070	2400	5780	6557	20	2130	2258	2441
	(113,3)	(56,7)	(64,6)	(17,3)	(16,5)	(120,9)	(94,5)	(227,6)	258,1	(0,8)	(83,9)	(88,9)	(96,1)

1.3. Technical Data

		ASC 110 Cummins Tier 3					
		D	HD	HT	PD	HDPD	HTPD
Weight							
Operating weight of CECE with cab, ROPS	kg (lb)	11490 (25330)	12730 (28060)	12730 (28060)	12100 (26680)	13330 (29390)	13330 (29390)
Operating weight of CECE with cab	kg (lb)	11260 (24820)	13500 (29760)	13500 (29760)	11870 (26170)	13100 (28880)	13100 (28880)
Operating weight of CECE with platform, rail	kg (lb)	11110 (24490)	12350 (27230)	12350 (27230)	11720 (25840)	12950 (28550)	12950 (28550)
Operating load of CECE with cab, ROPS on front axis	kg (lb)	7360 (16230)	7400 (16310)	7400 (16310)	7970 (17570)	8000 (17640)	8000 (17640)
Operating load of CECE with cab, ROPS on rear axis	kg (lb)	4130 (9110)	5330 (11750)	5330 (11750)	4130 (9110)	5330 (11750)	5330 (11750)
Weight of half fluid capacities	kg (lb)	190 (420)	190 (420)	190 (420)	190 (420)	190 (420)	190 (420)
Operating weight of ISO 6016 with cab, ROPS	kg (lb)	11660 (25710)	12900 (28440)	12900 (28440)	12270 (27050)	12300 (27120)	12300 (27120)
Max. weight – cab + ROPS (6016) + accessories + weighing	kg (lb)	15430 (34020)	15470 (34110)	15470 (34110)	14300 (31530)	14330 (31590)	14330 (31590)
Maximum permitted weight according to ROPS	kg (lb)	18500 (40790)	18500 (40790)	18500 (40790)	18500 (40790)	18500 (40790)	18500 (40790)
Static linear load of front drum	kg/cm (lb/in)	34,5 (193,4)	34,7 (194,3)	34,7 (194,3)			
Cab weight	kg (lb)	220 (490)	220 (490)	220 (490)	220 (490)	220 (490)	220 (490)
Weight of ROPS	kg (lb)	230 (510)	230 (510)	230 (510)	230 (510)	230 (510)	230 (510)
Weight of ROPS/ FOPS (CNH design)	kg (lb)	370 (820)	370 (820)	370 (820)	370 (820)	370 (820)	370 (820)
Weight of sheet roof on ROPS	kg (lb)	140 (310)	140 (310)	140 (310)	140 (310)	140 (310)	140 (310)
Weight of canopy	kg (lb)	60 (130)	60 (130)	60 (130)	60 (130)	60 (130)	60 (130)
Weight of canopy posts (version without ROPS)	kg (lb)	60 (130)	60 (130)	60 (130)	60 (130)	60 (130)	60 (130)
Weight of blade	kg (lb)	830 (1830)	830 (1830)	830 (1830)	830 (1830)	830 (1830)	830 (1830)
Weight of 2 padfoot segments	kg (lb)	1750 (3860)	1750 (3860)	1750 (3860)			
Weight of tyre filling -25°C	kg (lb)	1200 (2650)	1200 (2650)	1200 (2650)	1200 (2650)	1200 (2650)	1200 (2650)

		ASC 110 Cummins Tier 3					
		D	HD	HT	PD	HDPD	HTPD
Driving characteristics							
Number of speeds	-	3+1	3+1	3+1	3+1	3+1	3+1
Maximum transport speed	km/h (MPH)	12,8 (6,9)	9,2 (5,7)	8,2 (5,1)	12,8 (6,9)	9,6 (5,96)	8,6 (5,34)
Working speed 1	km/h (MPH)	2,5 (1,55)	2,5 (1,55)	2,4 (1,49)	2,5 (1,55)	2,5 (1,55)	2,4 (1,49)
Working speed 2	km/h (MPH)	3,5 (2,17)	3,1 (1,93)	3,1 (1,93)	3,5 (2,17)	3,1 (1,93)	3,1 (1,93)
Working speed 3	km/h (MPH)	5,6 (3,4)	4,1 (2,54)	3,7 (2,3)	5,6 (3,47)	4,2 (2,61)	3,8 (2,36)
Climbing ability	%	45	55	60	45	55	60
Climbing ability with vibration	%	45	55	60	45	55	60
Lateral static stability	%	72,65	72,65	72,65	72,65	72,65	72,65
Lateral stability during driving without vibration	%	25	25	25	25	25	25
Lateral stability during driving with vibration	%	15	15	15	15	15	15
Maximum gradient when towing machine on slope	%	60	60	60	60	60	60
Turning radius inner (edge)	mm (in)	3050 (120,0)	3050 (120,0)	3050 (120,0)	3050 (120,0)	3050 (120,0)	3050 (120,0)
Turning radius outer (contour)	mm (in)	5370 (211,4)	5370 (211,4)	5370 (211,4)	5370 (211,4)	5370 (211,4)	5370 (211,4)
Front approach slope	%	65	65	65	65	65	65
Rear approach slope	%	53	53	53	53	53	53
Type of drive	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic
Number of driving axles	-	2	2	2	2	2	2
Oscillation angle	°	±10	±10	±10	±10	±10	±10
Angle of steering	°	±36	±36	±36	±36	±36	±36
Steering							
Type of steering	-	Joint	Joint	Joint	Joint	Joint	Joint
Steering control	-	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Linear hydraulic motors	-	2	2	2	2	2	2

1.3. Technical Data

		ASC 110 Cummins Tier 3					
		D	**HD**	**HT**	**PD**	**HDPD**	**HTPD**
Engine							
Manufacturer	-	Cummins	Cummins	Cummins	Cummins	Cummins	Cummins
Type	-	QSB4.5-C160	QSB4.5-C160	QSB4.5-C160	QSB4.5-C160	QSB4.5-C160	QSB4.5-C160
Power according to DIN 6271	kW (HP)	119 (160)	119 (160)	119 (160)	119 (160)	119 (160)	119 (160)
Power according to ISO 3046/1	kW (HP)	119 (160)	119 (160)	119 (160)	119 (160)	119 (160)	119 (160)
Number of cylinders	-	4	4	4	4	4	4
Cylinder capacity	cm^3 (cu in)	4500 (275)	4500 (275)	4500 (275)	4500 (275)	4500 (275)	4500 (275)
Nominal speed	min^{-1} (RPM)	2200	2200	2200	2200	2200	2200
Maximum torque	Nm/rpm	624/1500	624/1500	624/1500	624/1500	624/1500	624/1500
Routine operation fuel consumption	l/h (gal US/h)	11,8 (3,1)	11,8 (3,1)	11,8 (3,1)	11,8 (3,1)	11,8 (3,1)	11,8 (3,1)
Engines complies with emission regulations	-	97/68/EU Level 3, EPA/CARB 40 CFR Part 89 Tier 3					
Cooling system of engine	-	Liquid	Liquid	Liquid	Liquid	Liquid	Liquid
Axle							
Maximum tyre pressure	MPa (PSI)	0,160 (23,2)	0,160 (23,2)	0,160 (23,2)	0,160 (23,2)	0,160 (23,2)	0,160 (23,2)
Pattern of tyres	-	UK-5 Diamond	UK-5 Diamond	UK-5 Diamond	TR-1 Tractor	TR-1 Tractor	TR-1 Tractor
Size of tyres	-	23,1x26´´	23,1x26´´	23,1x26´´	23,1x26´´	23,1x26´´	23,1x26´´
Type of tyres	-	Tubeless	Tubeless	Tubeless	Tubeless	Tubeless	Tubeless
Number of pads (only PD version)	-				140	140	140
Pad contact surface (only PD version)	cm^2 (sq in)				120 (18,6)	120 (18,6)	120 (18,6)
Pad height (only PD version)	mm (in)				100 (3,93)	100 (3,93)	100 (3,93)
Brakes							
Operating	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic
Parking	-	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake
Emergency	-	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake	Multiple-disc spring brake
Vibration							
Small amplitude	mm (in)	1,15 (0,045)	1,15 (0,045)	1,15 (0,045)	1,1 (0,043)	1,1 (0,043)	1,1 (0,043)
Large amplitude	mm (in)	1,85 (0,073)	1,85 (0,073)	1,85 (0,073)	2,0 (0,078)	2,0 (0,078)	2,0 (0,078)
Low frequency	Hz (VPM)	32 (1920)	32 (1920)	32 (1920)	31 (1860)	31 (1860)	31 (1860)
High frequency	Hz (VPM)	35 (2100)	35 (2100)	35 (2100)	35 (2100)	35 (2100)	35 (2100)
Low centrifugal force	kN	206	206	206	220	220	220
High centrifugal force	kN	277	277	277	277	277	277
Type of drive	-	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic	Hydrostatic

		ASC 110 Cummins Tier 3					
		D	HD	HT	PD	HDPD	HTPD
Fluid capacities							
Fuel	l (gal US)	410 (108,3)	410 (108,3)	410 (108,3)	410 (108,3)	410 (108,3)	410 (108,3)
Engine (oil filling)	l (gal US)	11,0 (2,9)	11,0 (2,9)	11,0 (2,9)	11,0 (2,9	11,0 (2,9)	11,0 (2,9)
Cooling system	l (gal US)	32,0 (8,45)	32,0 (8,45)	32,0 (8,45)	32,0 (8,45)	32,0 (8,45)	32,0 (8,45)
Hydraulic system	l (gal US)	90,0 (23,8)	90,0 (23,8)	90,0 (23,8)	90,0 (23,8)	90,0 (23,8)	90,0 (23,8)
Drum vibrator	l (gal US)	8,0 (2,1)	8,0 (2,1)	8,0 (2,1)	8,0 (2,1)	8,0 (2,1)	8,0 (2,1)
Drum vibrator cooling mixture (up to -25°C)	l (gal US)	60 (15,85)	60 (15,85)	60 (15,85)	60 (15,85)	60 (15,85)	60 (15,85)
Wheel gearbox	l (gal US)	2x2,8 (2x0,74)	2x2,8 (2x0,74)	2x2,8 (2x0,74)	2x2,8 (2x0,74)	2x2,8 (2x0,74)	2x2,8 (2x0,74)
Drum gearbox	l (gal US)	4,2 (1,11)	4,2 (1,11)	4,8 (1,27)	4,8 (1,27)	4,2 (1,11)	4,8 (1,27)
Washer tank	l (gal US)	2,75 (0,72)	2,75 (0,72)	2,75 (0,72)	2,75 (0,72)	2,75 (0,72)	2,75 (0,72)
Wiring							
Voltage	V	24	24	24	24	24	24
Battery capacity	Ah	2x100	2x100	2x100	2x100	2x100	2x100
Noise and vibration emissions							
Declared value of sound pressure A at operator's place (cab)	dB	79	79	79	79	79	79
Guaranteed sound power level A	dB	107	107	107	107	107	107
Highest weighted effective value of acceleration of vibrations transmitted to the whole body (cab)	m/s^2 (ft/s^2)	<0,5 (<1,6)	<0,5 (<1,6)	<0,5 (<1,6)	<0,5 (<1,6)	<0,5 (<1,6)	<0,5 (<1,6)
Total value of acceleration of vibrations transmitted to hands (cab)	m/s^2 (ft/s^2)	<2,5 (<8,2)	<2,5 (<8,2)	<2,5 (<8,2)	<2,5 (<8,2)	<2,5 (<8,2)	<2,5 (<8,2)
Level of sound pressure affecting operator (platform)	dB	89	89	89	89	89	89

1.3. Technical Data

	ASC 110 Cummins Tier 3					
	D	HD	HT	PD	HDPD	HTPD
Optional equipment						
Air-conditioning						
Installation for radio with antenna and loudspeakers						
Radio with CD						
Electro-hydraulic cab and bonnet lifting						
ROPS 2D						
Warning beacon						
Reversing alarm						
Alternator and fan cover						
Head and rear lights (including direction indicator lights)						
Inter-axle electronic differential lock ATC						
Additional padfoot segments (recommended with ATC and tractor tyre)						
Blade (recommended with a HD version)						
Plates made of Hardox on PD segments						
Tractor tyre (as standard with HD, HT, and PD versions)						
Loader tyres 23.5x25						
Ballasting of tyres with liquid of up to 0 °C						
Ballasting of tyres with liquid of up to -25 °C (as standard with HD and HT versions)						
Contact scrapers made of Polytan						
Engine air pre-filter (Syclone)						
Panel with testing points under the platform						
Padlock staple above the fuel tank cover						
ACE Ammann Compaction Expert with the ADS data storage and evaluation system						
ACE printer						
ADS software						
ACI Ammann compaction meter - without memory						
ACI compaction meter printer						
ADC digital compaction meter with recording memory, printer, and software						
ECM compaction meter						
Biologically degradable hydraulic oil (Panolin)						
Additional documentation						
Ammann set of tools						
First servicing set (engine and air filters)						
Fire extinguisher						
Different colour design (Ammann scheme), 1 colour						
Special colour design (others)						

Notes

Notes

2. OPERATION MANUAL

ASC 110
(Cummins Tier 3)

2.1.1. Safety Measures during Machine Operation

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

2.1.1.1. Compaction Work Commencement

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

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

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

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

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

2.1.1.2. Work Safety Secured by User

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

2.1.1.3 Ensurance of safety measures by the owner

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

2.1.1.4. ROPS

The following precautions shall be observed while the protection frame ROPS is used:

- The machine frame must not be damaged (broken, bent, etc.) in the place of connection.
- The ROPS frame itself must not show the marks from corrosion, damage through cracks or splits.
- ROPS frame must not be loose during the machine operation.
- All bolted connections must meet the specifications requirements and must be tightened to the moment specified.
- Bolts and nuts must not be damaged, distorted and they must not show the marks from corrosion.
- None additional modifications can be carried out on the ROPS frame without the approval of the manufacturer because they can result in decrease of its strength (e.g. openings, welding, etc.).
- Weight of the machine with the protective frame must not exceed the permitted weight for which ROPS was approved.

2.1.2. Reguirements on Driver's Qualification

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

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

  or

  b) assigned by Constructional Supplier to operate (carry out maintenance) and is evidently trained and acquainted with, or owns professional competence to operate and drive under special regulations (machinist licence, etc.).
- Machine driver must undergo training and examination concerning work safety regulations at least 1x every 2 years.

2.1.3. Driver's Liabilities

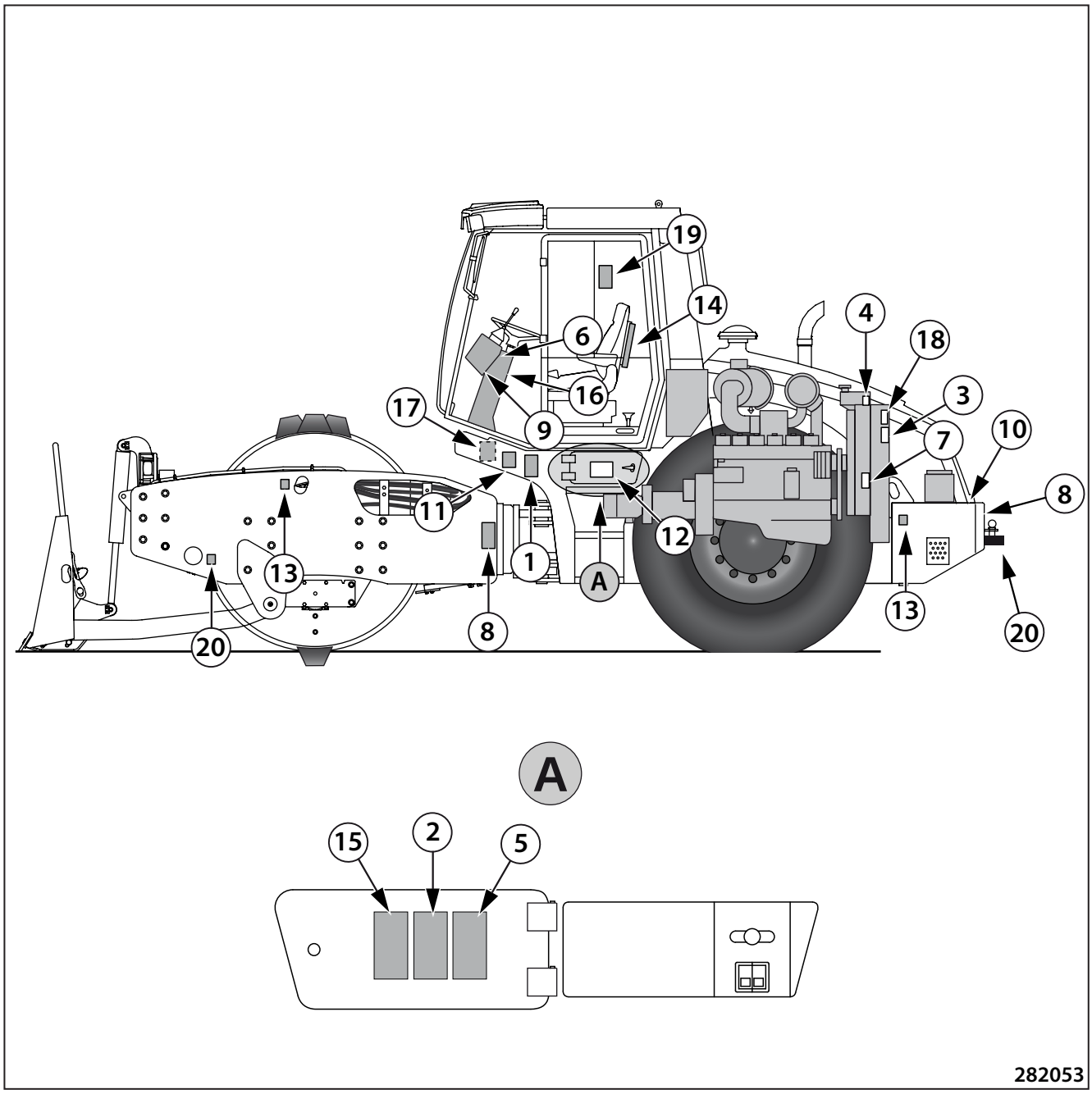
- Before starting to operate the Machine the driver will be liable to get familiar with the guidelines given in the documentation delivered with the Machine, with safety precautions in particular, and observe these thoroughly. This applies as well to the personnel in charge of maintenance, adjustments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

2.1.4. Banned Operations

Banned are the following

- Operate the machine in the explosive environment and underground.
- To use the Machine following ingestion of alcoholic beverages or dopes.
- To use the Machine if its operation might put its technical condition, safety (life, health) of persons, facilities or objects, or road traffic and its continuity, at risk.
- Put into operation and use the Machine when other persons are within its hazardous reach - exception is training a driver by lector.
- Put into operation and use the Machine when some of its safeguarding device (emergency brake, driving brake, horn, etc.) has been dismantled or damaged.
- To roll and compact at such slopes where Machine stability would be disrupted (turning over). Machine's static stability stated will lower by drive's dynamic effects.
- To roll and compact at such angles of slopes where hazard of soil breaking off (dropping) under the Machine exists, or loss of adhesion followed by uncontrolled slip might occur.
- To control the Machine in some other way than stated in Driving Manual.
- To roll and compact per bearing capacity of subsoil at such a distance from the edge of slope or trenches, where hazard of landslide or shoulder breaking off (dropping) together with the Machine would occur
- To roll and compact with vibration at such a distance from the walls, cuts, slopes, where their slip (slide) would happen and the Machine covered in.
- To compact with vibration at such a distance from buildings or facilities and equipment within which the risk of them being damaged due to vibration transfer impact, would occur.
- To operate the Machine unless driver control stand fixed properly.
- To operate the Machine when engine bay cover is open.
- To move and transport persons on the Machine.
- To operate the Machine when within hazardous reach thereof are other machines or transportation means aside from those that operate in mutual concert with the Machine.
- To operate the Machine at places impossible to see from driver's stand, and where hazard to people or property could occur unless work safety has been secured through some other way like for instance via signalling by duly instructed person.
- To work with the Machine at a protected zone of electric lines or substations.
- To cross electric cables if these are not properly protectedli against mechanical damage.
- To operate the Machine under lowered visibility or at night, unless Machine's working area and workplace are illuminated sufficiently.
- To leave driver's cockpit of the Machine when the Machine is running.
- Boarding or or getting off while on the run, jumping off the Machine.
- Sit or stand on the outside parts of the Machine when driving, or stand on the steps.
- Leave unsecured Machine - move away from the Machine without having prevented its misuse.
- Disable safeguarding, protective or locking systems or alter their parameters.
- Use the Machine with oil, fuel, cooling liquid or other fillings leaking.
- Start the engine through some other way than given in the Driving Manual.
- Locate some other items (tools, accessories) aside from personal needs at driver's stand.
- Lay away material or other objects on the Machine.
- Remove dirt while the Machine is running.
- Perform maintenance, cleaning or repairs with the Machine not secured against spontaneous move or accidental start, and when contact of a person with moving parts of the Machine is not excluded.
- Contact of moving parts of the Machine with human body or objects and tools held in hands.
- Smoke or handle open fire when checking or pumping fuels, refilling oils, lubricating the Machine, or inspecting the accumulator or making up the accumulator.
- Carry rags soaked with flammable materials, or carry flammable liquids in free vessels on the Machine (in engine bay).
- Let the engine run inside confined spaces.
- Drive with open doors.
- Perform any adjustments on the machine without the prior consent of the manufacturer.
- Drive without the seat belt fastened.
- Shift electrical conductors.
- Use other than original spare parts.
- Interfere in the electrical and electronic units in any manner.

2.1.5. Safety inscriptions and signs used on the Machine



1 Clamping hazard


2941bz

imminent danger of being pressed. (Symbols located left and right on the frame)

2 Burn hazard


2586bz

imminent risk of burn. Do NOT touch hot parts of the Machine unless you make certain these have cooled out sufficiently. (Symbol located from within on the LH door)

3 Risk of injury


2409bz

imminent risk of cutting oneself and/or chipping off. Do NOT touch rotating parts if the engine is running. (Symbol located on LH side of the cooler).

4 Cooling liquid


3227bz

imminent risk of scald. Do NOT open expansion tank lid until liquid cools down below 50 °C (122 °F). (Symbol located on expansion tank)

5 Adjust while at rest


2584bz

Switch OFF the engine and remove the key from ignition box before carrying out any maintenance or repair. (Symbol located from within on LH door)

6 Read Operation Manual


2702bz

Read Operation Manual before starting the Machine. (Symbol located on LH side of the actuator panel)

7 Risk of injury


2601bz

Imminent risk of hand caught by belt. (Symbol located on LH side of cooler)

8. Danger zone


2942bz

Keep a safe distance from the machine! (Symbol located on both sides of the drum frame and on the rear of the machine frame)

9 Safety belt


2687bz

Fasten the seat belt before starting to move the Machine. (Symbol located on LH side of actuator panel)

10 Danger of explosion


3017bz

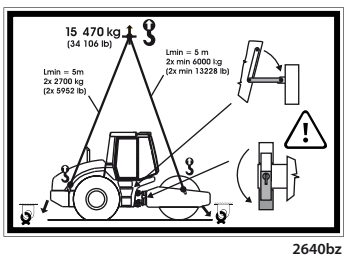
imminent danger of explosion while handling the battery - read Operation Manual. (Symbol located on fuel tank)

11 Machine max height

3155

Attention when passing through places with height limits. (Symbol located on LH side under the cab on frame)

12 Suspension scheme



2640bz

For lifting the machine, use slings with a sufficient capacity, see the Machine loading section. Before suspending, secure the machine joint. (Symbol located on the left door)

13 Lifting points


2153bz

Sling (hang) the Machine only in these points. (Symbols located along both sides of the frames)

14 Manual


2428bz

Identification of stowage box to put Machine documentation in. (Symbol located on the back rest of the seat, from the rear)

15 Disconnect alternator


2668bz

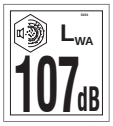
before welding, please disconnect alternator and electronics of the Machine, engine actuator unit. (Symbol located from within on lateral LH door)

16 Ear protectors


2408bz

Use ear muffs when the Machine has no cab or you work with open windows. (Symbol located on centre steering column)

17 Emitted noise level



3204bz

Plate located on the right side of the frame under the cab (for the noise level, see the Noise and vibration emissions section)

18 Electric instruments


2225bz

Cover electric instruments when washing Machine. (Symbol located on LH side of cooler)

19 Emergency exit

Unless possible to exit the Machine via LH door, please use emergency exit. (Symbol located on cab's RH window)

20 Rigging points

Sling the Machine in these points only. The maximum permitted force for fastening the machine to a vehicle using rear slings is 5 t. (Symbols located along both sides of the frames).

21 Machine repair

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

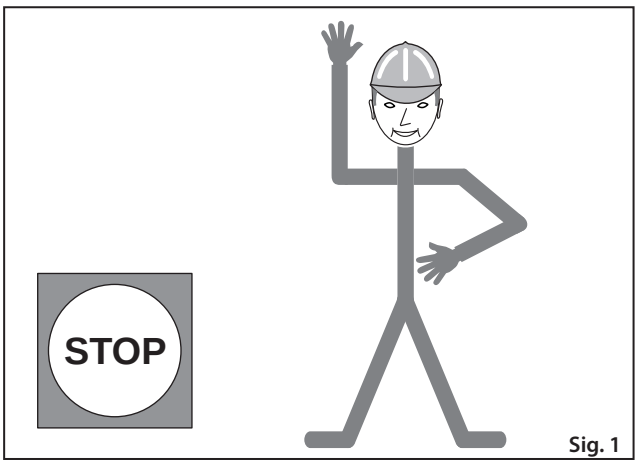
2.1.6. Hand signals

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

SIGNALS USED FOR ALL THE COMMANDS

Stop

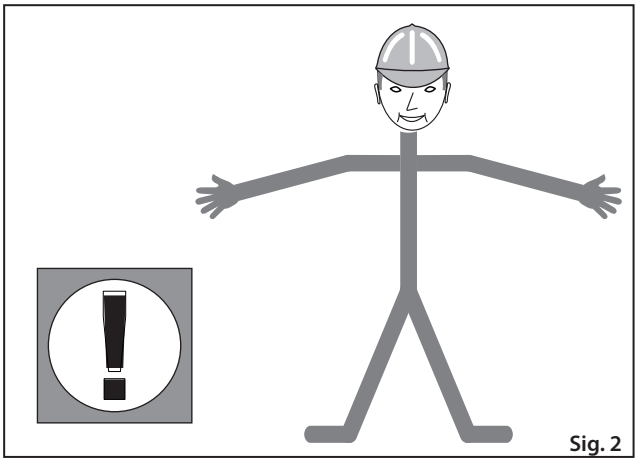
One arm stretched upward with open palm in the Operator direction, second arm akimbo.



Sig. 1

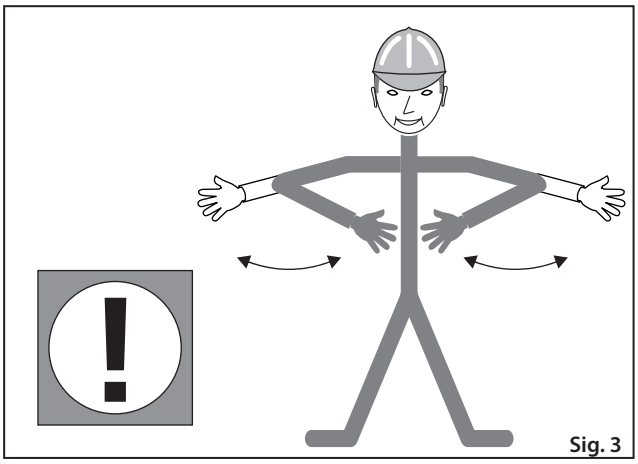
Attention!

Both arms horizontally sideways raised - palms facing forward.


Sig. 2

Attention, Danger!

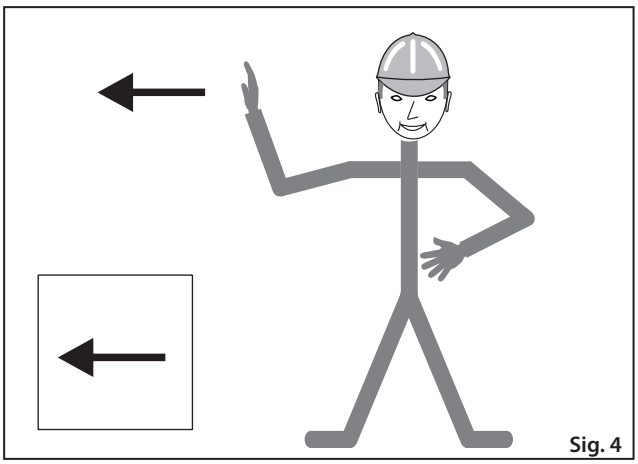
Oscillating motion of both arms with antebrachium from the position of arms horizontally sideways raised to the position or arms sideways raised - bent and back.


Sig. 3

SIGNALS FOR DRIVING

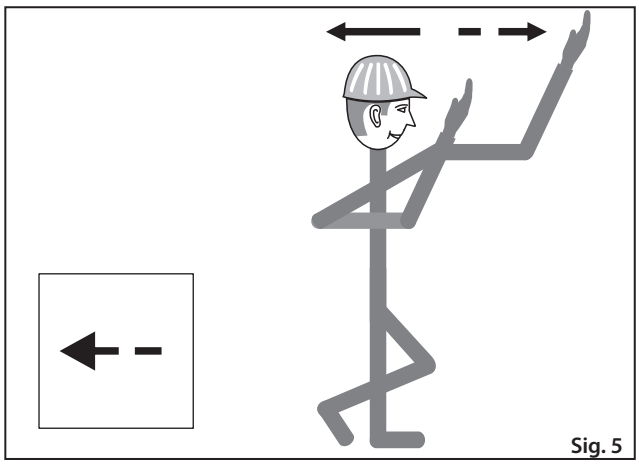
Drive away with the Machine

One arm stretched upward - bent with open palm, long motion of antebrachium in the direction of the movement required, second arm akimbo.


Sig. 4

Slow driving forward - towards me

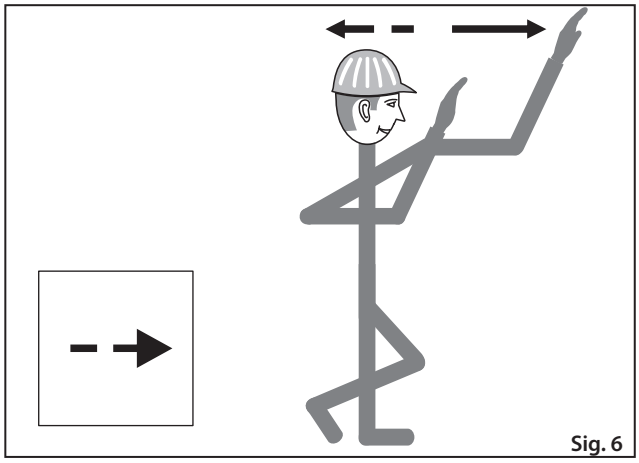
Both arms stretched upward, abreast, bent, with palms facing the body - short oscillating motions of antebrachium, towards the body, and back.



Sig. 5

Slow driving backward - away from me

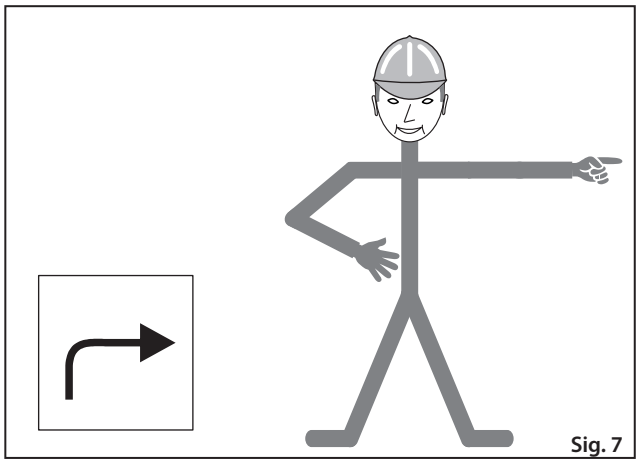
Both arms stretched upward, abreast, bent, with palms away from the body - short oscillating motions of antebrachium away from the body, and back.



Sig. 6

Driving on the right

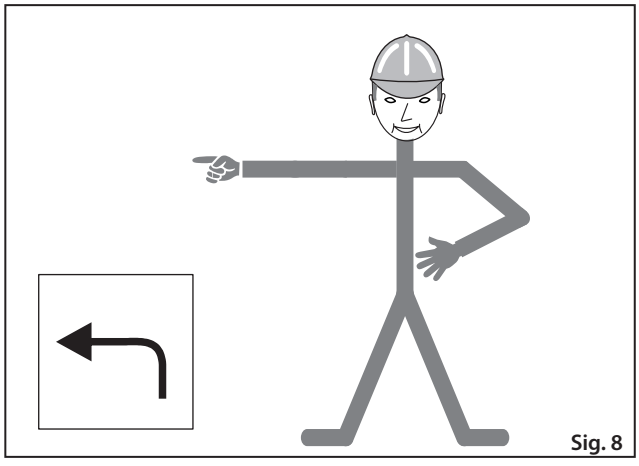
Left arm sideways raised, right arm akimbo.



Sig. 7

Driving on the left

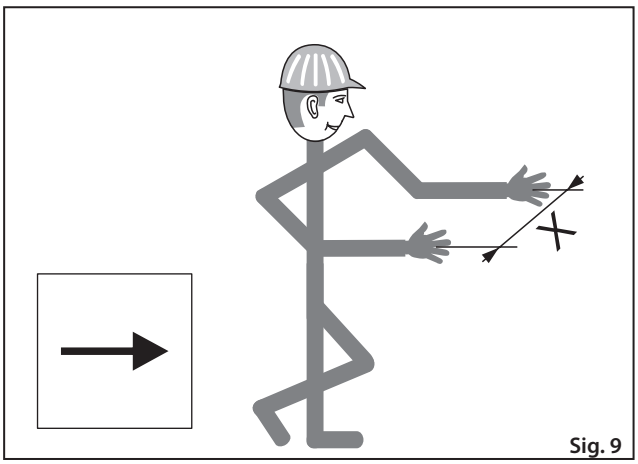
Right arm sideways raised, left arm akimbo.



Sig. 8

Short motion

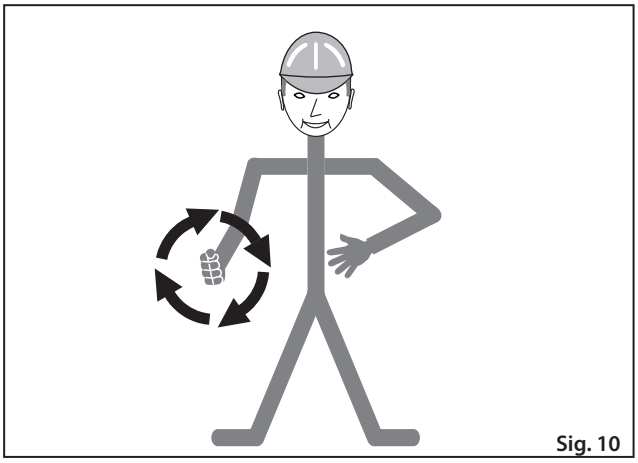
Both arms lifted forward, bent. Mark distance "X" between palms, then follows the motion signal.



Sig. 9

Engine start

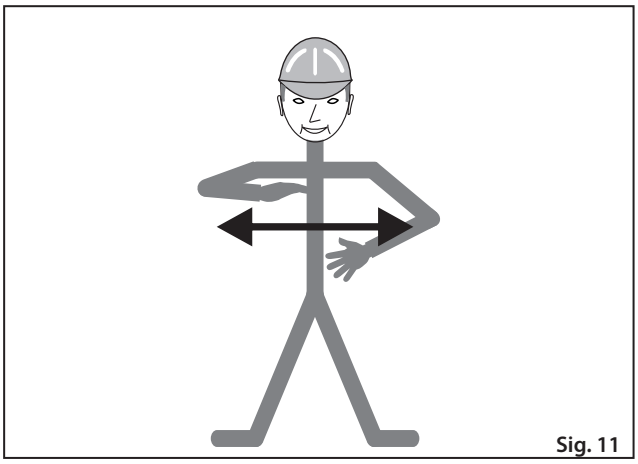
Circular motion of antebrachium of right hand, with tight fist.



Sig. 10

Engine cut off

Oscillating motion of right hand sideways raised in front of the body, to the sides.



Sig. 11

2.2. Ecological and hygienic principles

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

2.2.1. Hygienic principles

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

  Observe the following in particular:

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

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

2.2.2. Ecological principles

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

  This waste product category includes the following in particular:

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

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

  - oils
  - batteries
  - tyres

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

2.3. Machine preservation and storage

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

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

In addition:

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

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

2.3.2. Preservation and storage for the period over 2 months long

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

In addition, we recommend the following:

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

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

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

NEVER start the engine in course of storage!

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

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

2.3.3. Dewaxing and inspection of a supplied machine

Check the Machine according to the shipping documents.

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

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

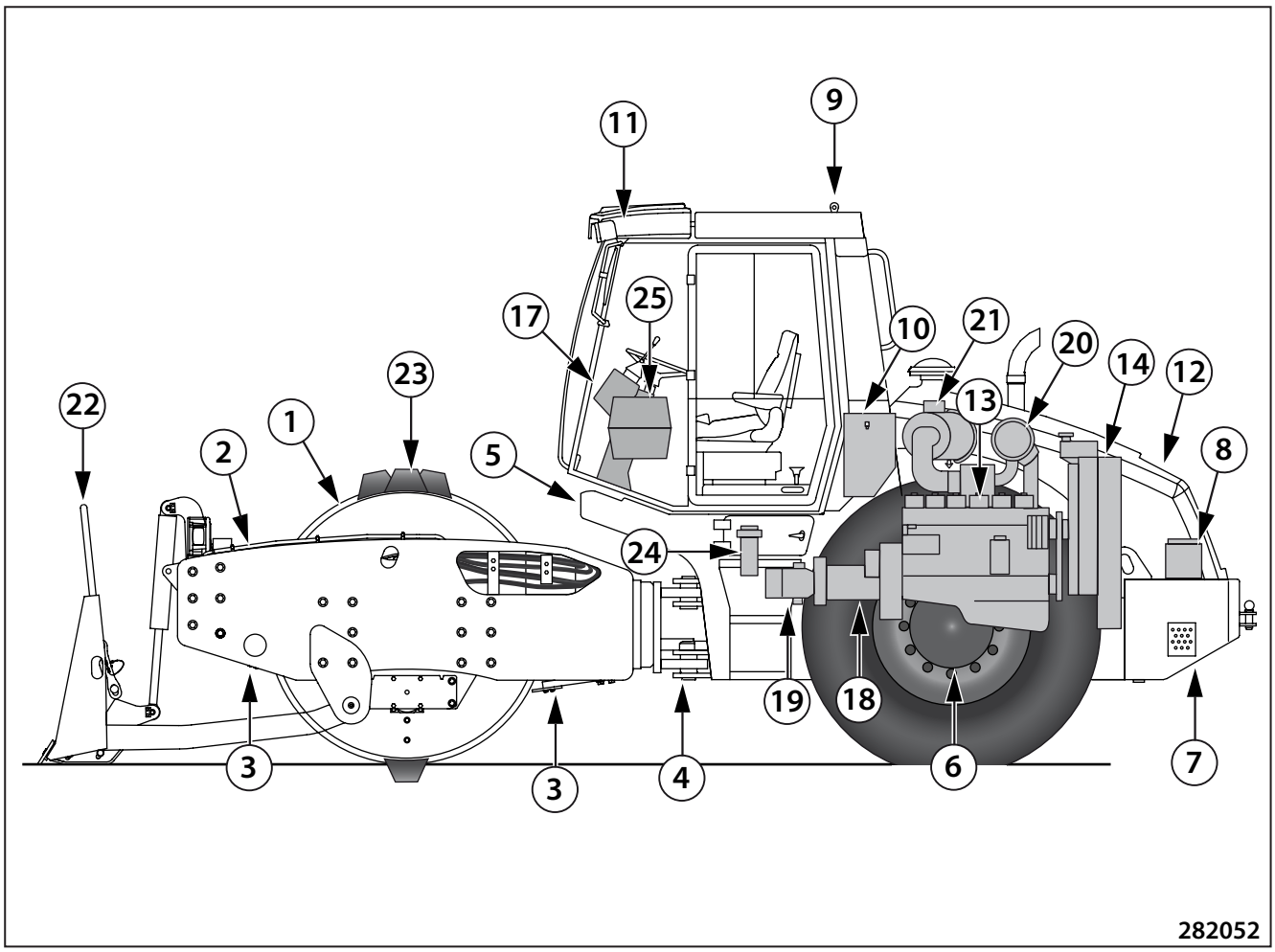
Carry out dewaxing and washing of the Machine at places equipped with collection sumps to catch rinsing water and dewaxing agents.

2.4. Machine disposal following its life cycle end

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

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

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



1 - Vibratory drum
2 - Drum frame
3 - Scraper
4 - Joint
5 - Tractor frame
6 - Axle
7 - Fuel tank
8 - Batteries
9 - ROPS protection frame
10 - Hydraulic tank
11 - Cab
12 - Bonnet
13 - Engine
14 - Engine cooler
- Cooler for engine air induction manifold
- Hydraulics cooler
17 - Driver's actuator stand
18 - Travel hydrogenerator
19 - Vibration hydrogenerator
20 - Exhaust muffler
21 - Air filter
22 - Plough blade
23 - Padfoot segments
24 - Hydraulic oil pressure filter
25 - Air Conditioner

2.6. Actuators and dashboard instruments

Layout of actuator elements and cab accessories - with no air conditioner

1 - Windshield washer switch

2 - Fan switch - fan induces ambient air

3 - Front wiper switch

4 - Rear wiper switch

5 - Cab light

6 - Ventilation nozzles

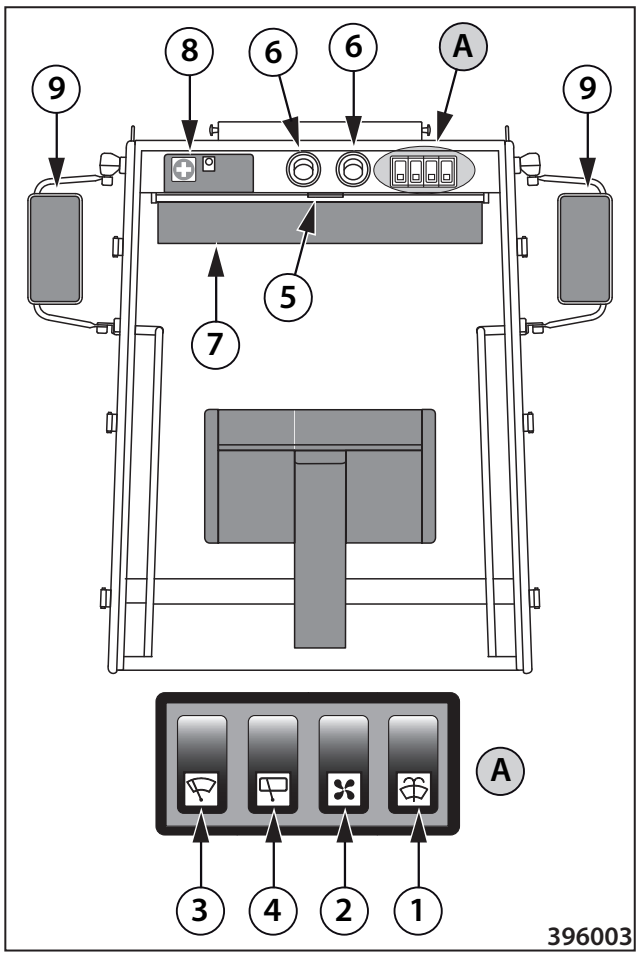
7 - Sun visor

8 - Stowage box for first aid kit, operation logbook, etc.

9 - Back mirrors - able to fold for transport position by 90° towards cab

Note

Rollers fitted with air conditioner have Air Conditioner Operation Manual apart.



11 - Socket for beacon, for hand lamp

13 - Battery disconnector

14 - Cab lifting / lowering switch (OPTION)

15 - Bonnet lifting / lowering switch (OPTION)

16 - Fuse for lifting actuator - cab/bonnet lowering 50 A (OPTION)

17 - Manual hydrogenerator for lifting / lowering

18 - Manual hydrogenerator joy stick

19 - Heater valve tie rod

20 - Heater breaths

21 - Fire extinguisher (OPTION)*

22 - Washer tank

23 - Drink holder

24 - Blade actuator hand-type (OPTION)

25 - Blade actuator foot-type (OPTION)

26 - Lifting levers - cab and bonnet lowering

27 - Cab ventilation filter

28 - Beacon

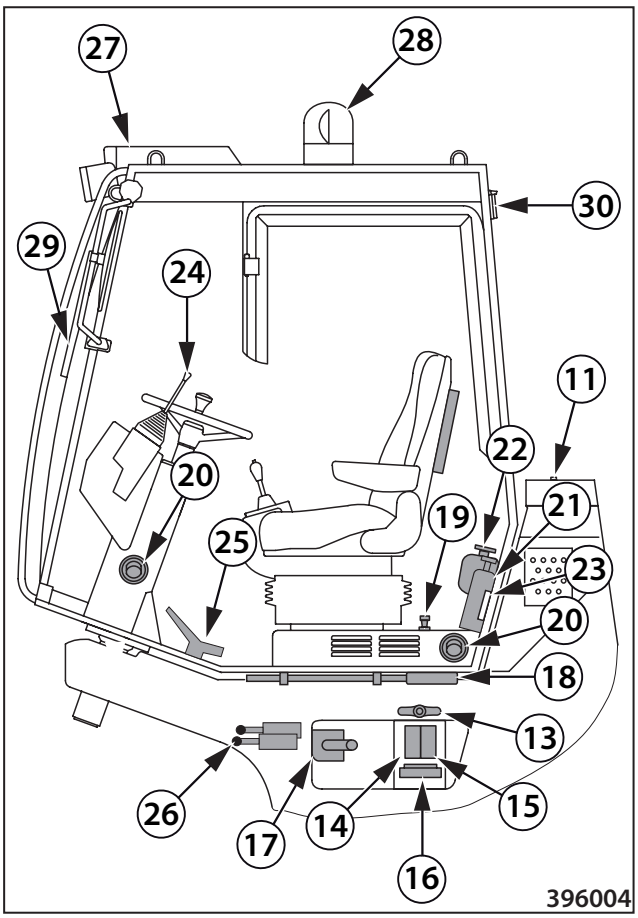
29 - Front wiper incl. screen washer

30 - Rear washer incl. screen washer

* Place for the installation of a fire extinguisher holder.

! ATTENTION !

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



1 **ACE control panel** - Manual for the setting and checking of the functions of the system of the ACE drum is supplied if the roller is equipped with such system.

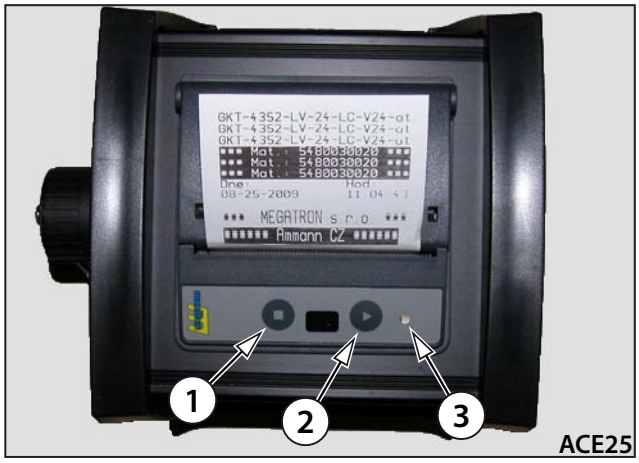
2 **Printer**

ACE21

1 Printer switch on button – the button is not used (the printer is permanently on with the ACE system)

2 Button for paper feed LF

3 Indication diode



ACE25

- Diode 3 indicates the condition of the equipment after switching on the ignition box key.
- A short green flashing (3 times shortly and pause) signalises the readiness of the printer and its error-free state.
- A longer red flashing (long flashing and pause) signalises one of error conditions:

  End of paper

  Low operating temperature

  High operating temperature

  Supply voltage outside tolerance

- The precise code of the error is transferred through the interface to the control system /see the technical documentation/.
- The inserting of paper is described in the section Maintenance as needed, Printer paper replacement.

Driver's seat

Seat adjustment:

1 Backrest position

2 Arm rest position and folding

3 Seat swivel

4 Seat sliding (shift)

5 Seat squab sliding (shift)

6 Seat cushion stiffness as per Driver weight indicator

7 Seat height - please, grasp underneath seat squab and lift slowly to adjust seat height to next higher position, 0 ÷ MAX, which will be locked (it clicks). When lifted to highest position the seat will drop again to lowest position.

8 Lumbar bolster

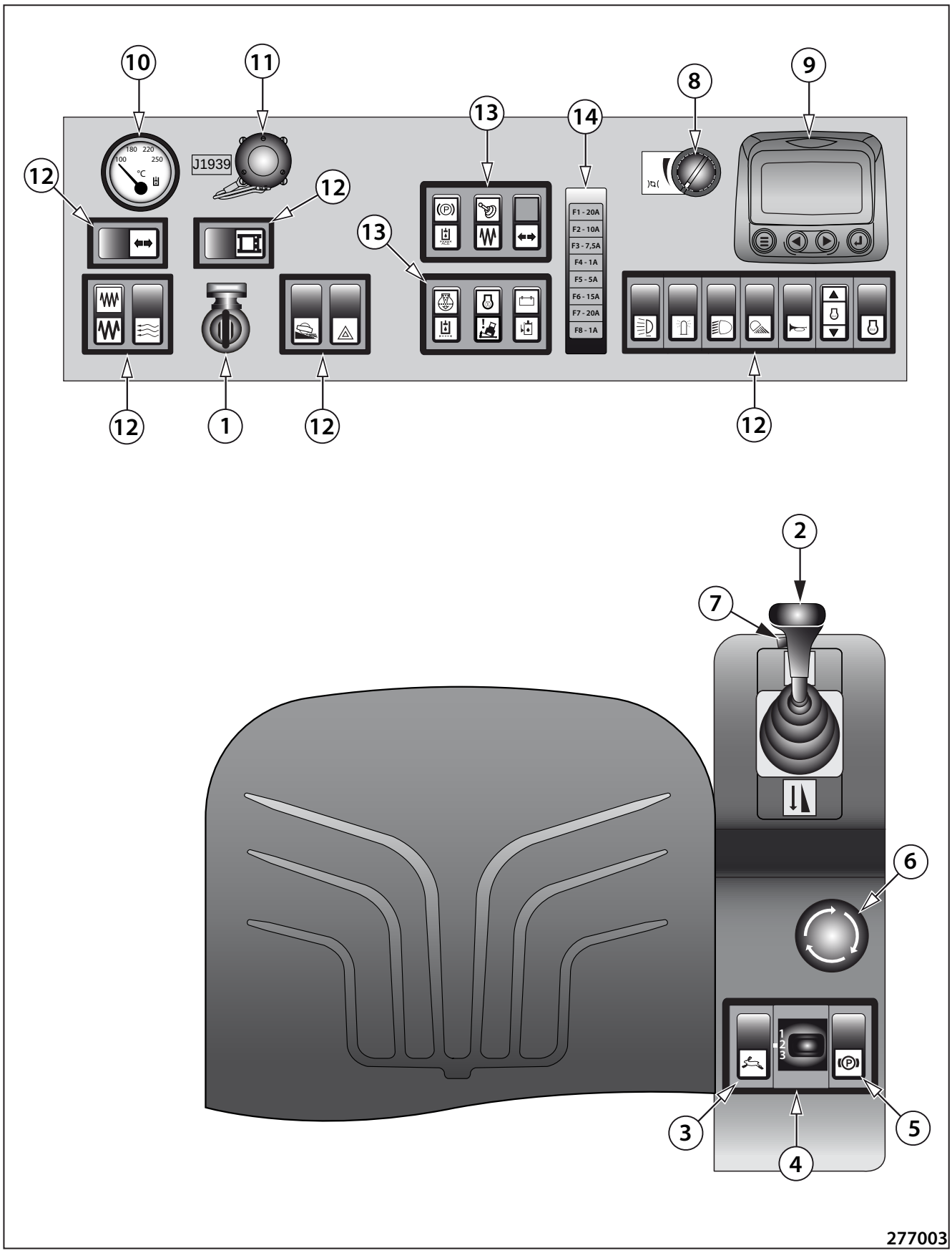
Adjust your seat and fasten your seat belt before driving off!

2428

Document compartment

A document compartment is located on the rear side of the seat back.

2.6. Actuators and dashboard instruments



Dashboard & Actuator Panel

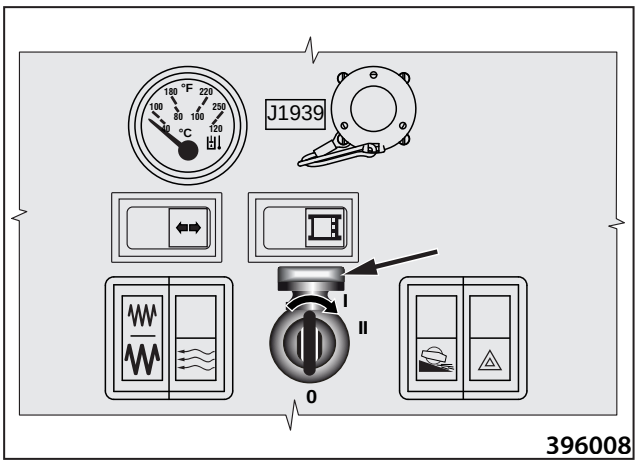
1 - Ignition box
2 - Travel joy stick
3 - Transport speed controller
4 - Operating speed preselector
5 - Parking brake
6 - TOTAL STOP pushbutton (for emergency brake)
7 - Vibration switch
8 - Engine speed selector
9 - Power View Display
10 - Hydraulic oil thermometer
11 - ECM engine socket
12 - Switches
13 - Pilot lamps
14 - Fuses

Ignition box 1

While in "0" position the lights, cab/bonnet lifting and AC are connected. While in "I" position the dashboard instruments are connected. Position "II" is used to start the Machine.

Note

Ignition key is common for cab door, service door underneath cab, and for tool kit.



2.6. Actuators and dashboard instruments

Travel joy stick 2

Use this joy stick to adjust driving direction and speed. Driving speed corresponds to the size of joy stick deflection from neutral position. This joy stick becomes locked in the position adjusted. Joy stick neutral position (N) will be signalled through indicator lamp going on. In the actuator handle there is vibration switch 7 located to turn ON/OFF vibrations.

! CAUTION !
Adjust joy stick to neutral before engine start.

Transport speed controller 3

You may switch ON the controller while driving. Roller can reach max speed at reduced tractive force.

Operating speed preselector 4

Use this preselector to choose three operating speeds while driving. Transport speed controller must be switched OFF.

Parking brake 5

Use this brake to stop the Roller if the engine is to keep running. In this case Driver may stand up from the seat and leave the Roller.

Note

Unless standing Roller is braked and Driver stands up from the seat, the Roller will brake and engine will shut off after 8 seconds.

TOTAL STOP pushbutton 6

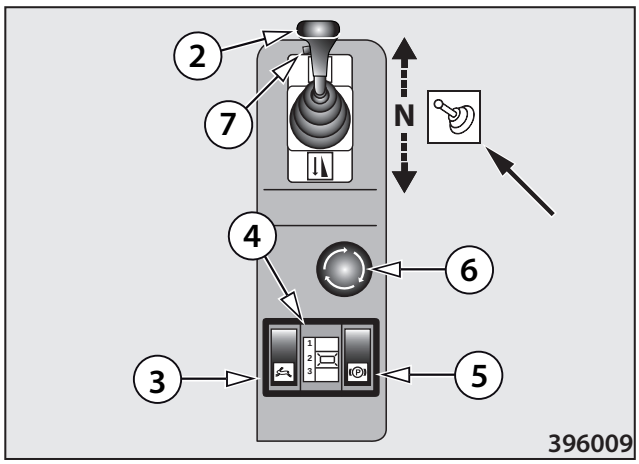
Press this button to stop and brake the Roller, and to shut off the engine.

! CAUTION !
Brake off in arrow direction before starting the engine.

Use only in case of emergency during a failure when the Roller is unable to stop through resetting the travel actuator.

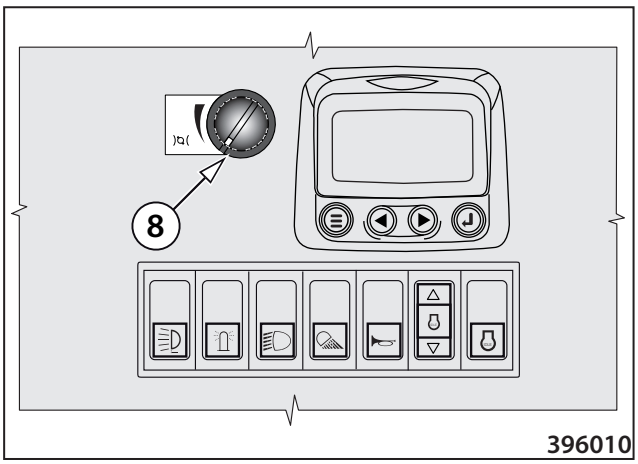
Vibration switch 7

Vibration is able to be switched ON while driving.



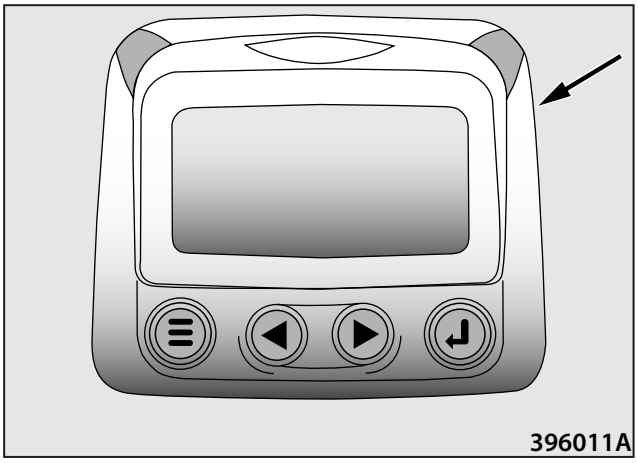
Engine speed selector 8

It is used to adjust the combustion engine speed from max to min.



Power View Display 9

Multifunctional instrument to display parameters of the engine function and fuel level.



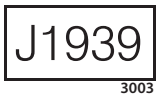

549476

Hydraulic oil thermometer 10

It indicates hydraulic oil temperature during operation. Highest admissible temperature is 90 °C (194 °F) for oil of viscosity class of HV 68 and HV 100. Optimal operating temperature is 50 - 60 °C (122 - 140 °F).

The use of oil of other viscosity

Oil viscosity	Max admissible oil temperature
HV 46	80 °C (176 °F)
HV 32	70 °C (158 °F)



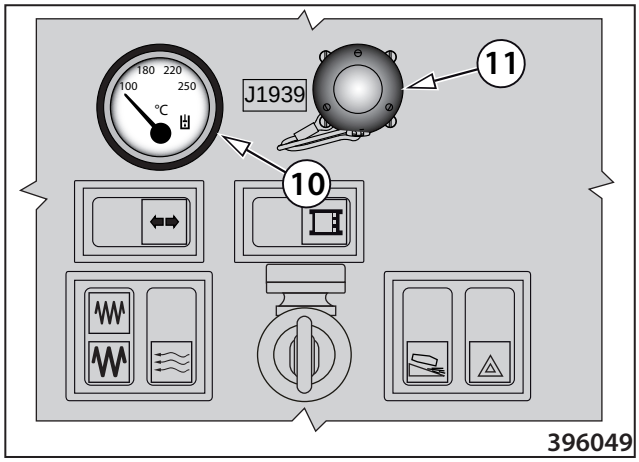
3003

Socket 11

Connection to ECM (Electronic Actuator Module) - actuator units of the engine and diagnosing of defects or parameter adjustments

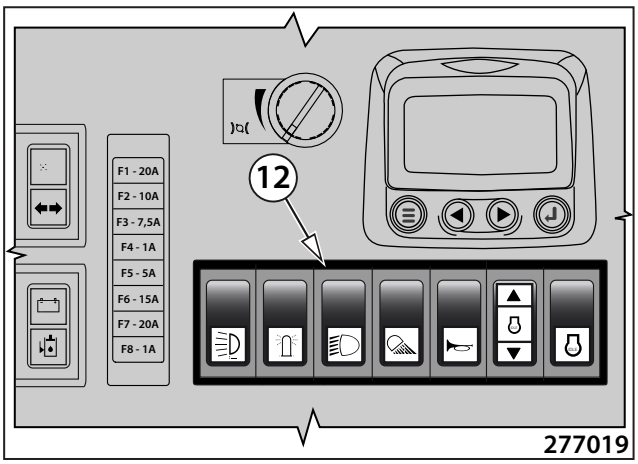
Note

ECM is designed to process data about engine function, and to actuator its operation.



396049

SWITCHES 12




596473

Additional lights


596303

Fender lights + working headlamps - 3-position one

- switched OFF
- 1. Front fender lights ON + rear lights ON, dashboard instrument lighting
- 2. Front lamps ON


591668R

Rear lights


2246

Loud horn

AMN40

Incrementing of engine idling

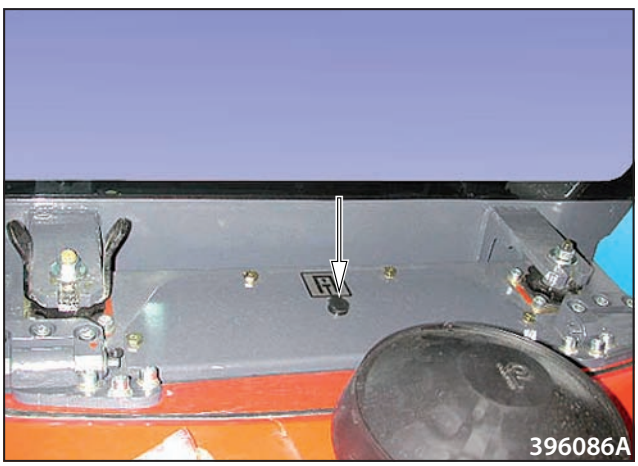
Idle rmp can be adjusted from 800÷1000 min^{-1}.

3006

Engine idling

It must be switched ON when starting the engine.

Flashing beacon - connect to the socket.


396086A


596191

Warning lights


2854

Limitation for drum slip

It is used only for Roller to move onto the loading area of a transport vehicle.

Note

If the Roller is equipped with the drum slip limitation system then ATC will not be used.

! CAUTION !

Transport speed controller must be switched OFF when drum slip limitation is enabled. At the same time the vibration is interlocked.


596116

Inter-axle differential ATC - Ammann Traction Control - OPTION

When turned on, it is activated in both speed modes (working and transporting).

Note

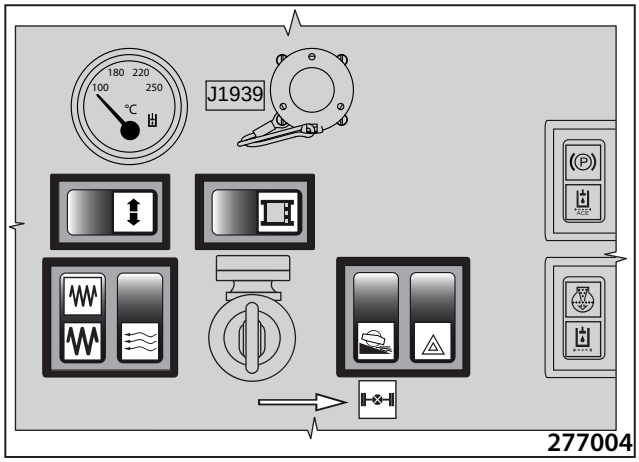
If the roller is equipped with the ATC system (inter-axle differential lock), the drum slip blocking is not used.


2476

Vibration preselector - 2 positions

High frequency - low amplitude

Low frequency - high amplitude




2487

Heater fan switch - 3-position one

- OFF
- high fan motor rpm
- low fan motor rpm

! CAUTION !

The fan will provide for air circulation inside cab only.


2489

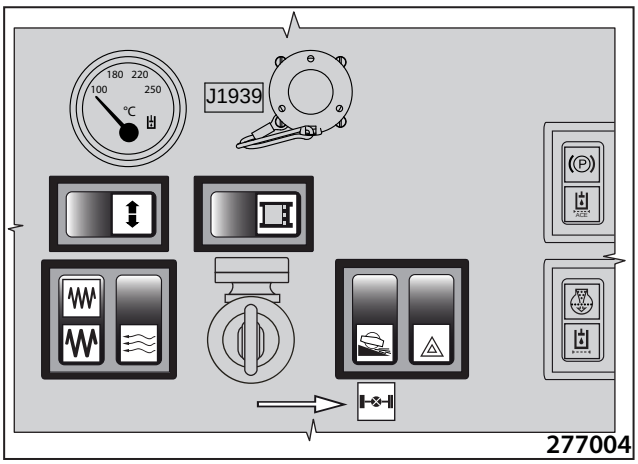
Change-over switch for direction indicator lights


AMN39

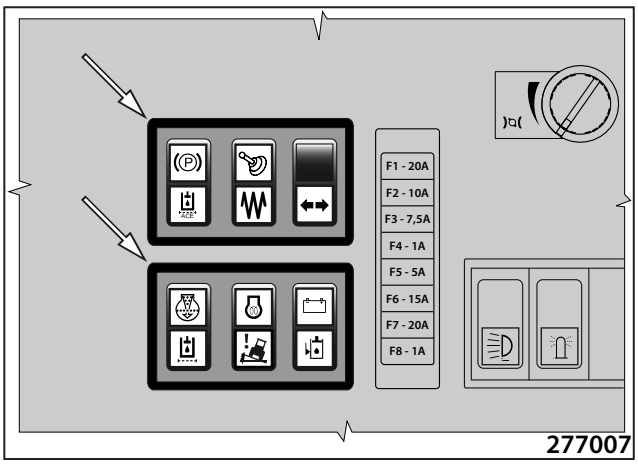
Compaction meter switch

Note

Compaction Meter Operation Manual has been supplied separately.



PILOT LAMPS 13




2703

Brake - pilot lamp ON, signals the Machine is braked.


3250

Hydraulic oil filter fouled - ACE drum

It signals filter element is clogged with dirt.

Promptly replace the filter element!


2612

Vibration - signals the vibration is ON via switch 7


2489

Direction lights

! CAUTION !

Rapid flashing signals a failure (defective bulb). Check function of direction lights.


596653

Zero position of travel actuator - neutral (idle)

! CAUTION !

Check travel actuator in neutral before starting the engine!


3400

ROPS2D (Roll Over Preventative System)

Flickering indicator lamp incl. acoustic alarm will signal any hazardous bank of the Machine during cross travel of Roller on the slope, and vibration will stop simultaneously – lateral slip hazard.

! CAUTION !

Vibration is unable to switch ON until Machine returns to its safe bank.


589502

Engine glowing

It signals glowing before engine start at low ambient temperature.


2276

Hydraulic oil filter fouled

It signals filter element is clogged.

Promptly replace the filter element!


591507

Hydraulic oil level

Hydraulic oil level indicator lamp ON will signal the level in the tank has dropped below set limit. Roller will stop - engine stalling.

! CAUTION !

Engine can be started once defect is repaired and oil in hydraulic tank filled up to its set limit!


594423

Air filter fouled

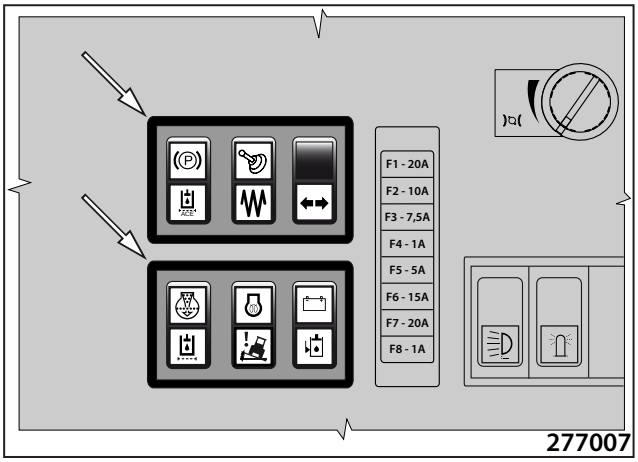
It signals filter elements are fouled.

Promptly replace the filter element!


2587

Recharging indicator lamp

Goes off when started.



277007

Fuse block 14

Fuse (F1) - 20 A (upper fuse) front + rear lamps, front fender lights + rear lights, auxiliary headlamps, dashboard instrument illumination, bonnet lifting - lowering and Driver's control stand,

Fuse (F2) - 10 A cab light, loud horn, direction indicator lights, beacon.

Fuse (F3) - 7,5 A brake, engine STOP, travel, vibration, brake lights, return horn, hydraulic oil level indicator lamp, vibration contact indicator lamp, brake indicator lamp, indicator lamp for zero position of travel actuator

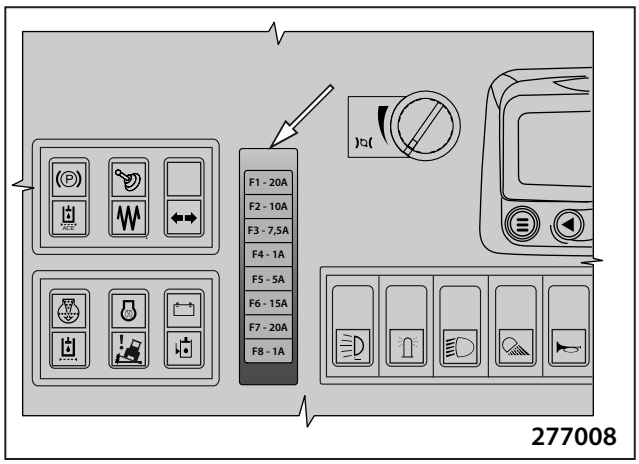
Fuse (F4) - 1 A POWER VIEW, J1939 socket power supply

Fuse (F5) - 5 A hydraulic oil thermometer, indicator lamp for vacuum in engine suction filter, regarding indicator lamp, indicator lamp for hydraulic oil filter fouled, glowing indicator lamp, engine rpm switches

Fuse (F6) - 15 A ventilation and heater fan, front wiper and rear wiper, front washer and rear washer

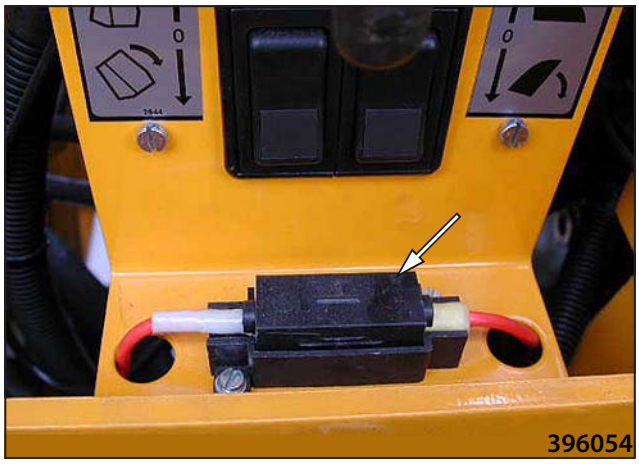
Fuse (F7) - 20 A reserve (air conditioner / ROPS2D)

Fuse (F8) reserve



Fuse (F9) - 50 A

Electrohydraulic unit (aggregate) for bonnet lifting/lowering and Driver's control stand.

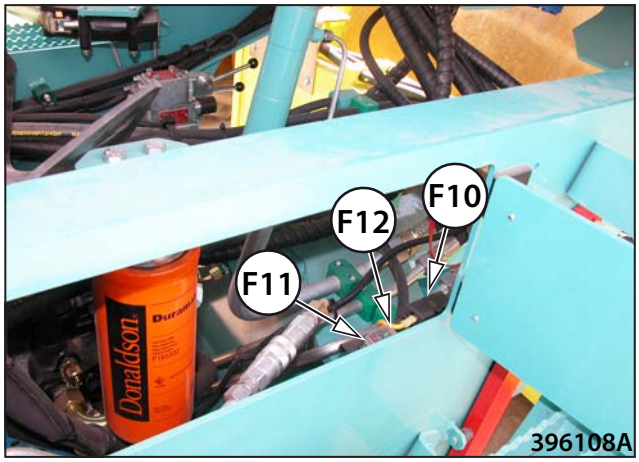


Engine fuses

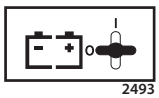
Fuses (F10) - 125 A engine glowing

Fuse (F11) - 30 A engine electronics

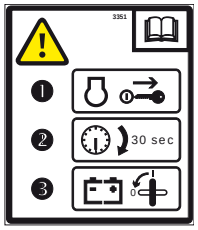
Fuse (F12) car radio



! CAUTION !
Replace fuses only with fuses of identical value!!!


2493

Master switch



3351

When driving is ended, please use master switch to disconnect battery!

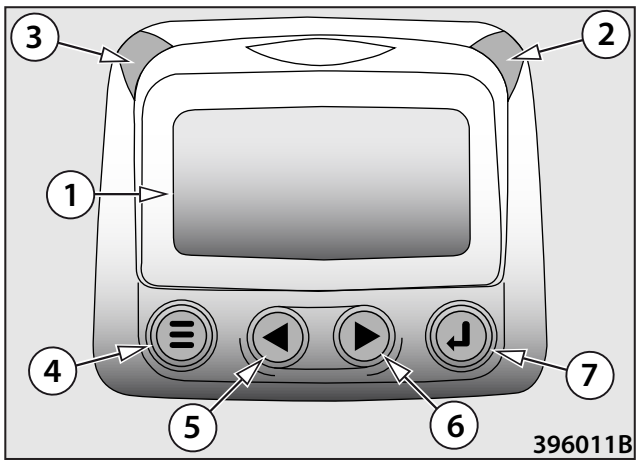
Cut OFF master switch only after 30 sec. following ignition key removed from switch box.

Time limits must be observed for ECM engine data to be stored.

When washing the Machine ALWAYS cut OFF master switch!


282N048T

2.6.1. Power View control



1 Display

2 Red LED lights – **ENGINE SHUTOFF – engine substantial defect alarm**

3 Yellow LED lights **- WARNING – engine failure alarm, or minimal fuel level in tank alarm**

4 Menu selection pushbutton – to enter or exit menu

5 Pushbutton – to move cursor UP – illuminates data on display or moves parameter option to the left or up

6 Pushbutton – to move cursor DOWN – illuminates data on display or moves parameter option to the right or down

7 ENTER pushbutton – selects menu or parameter, or conceals/displays active error code

Red LED lights – reduce engine power, stop the machine immediately at safe place and shut off the engine! Call Cummins service centre to repair the defect. Do NOT operate the machine unless the defect has been repaired!

Yellow LED lights - warning – engine failure alarm, or minimal fuel level in tank alarm. Reduce engine power, stop the machine immediately at safe place and shut off the engine! Repair the defect or call Cummins service centre. Do NOT operate the machine unless the defect has been repaired!

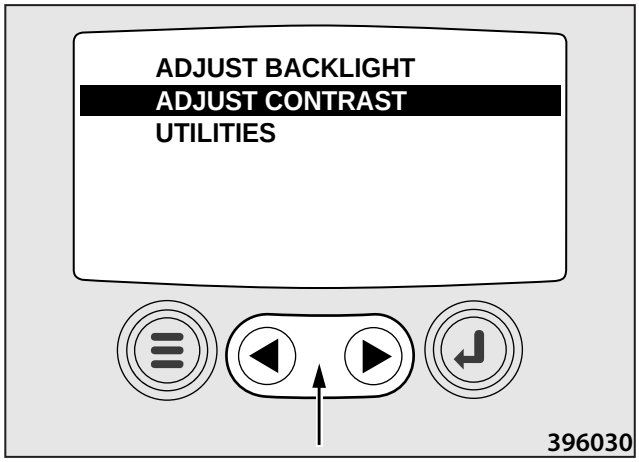
! CAUTION !

When Power View Murphy display shows code and engine failure outline, contact the regional representative of Cummins engines and report the failure code. List of representatives and contact data are given in the Engine Operation Manual supplied with the machine.

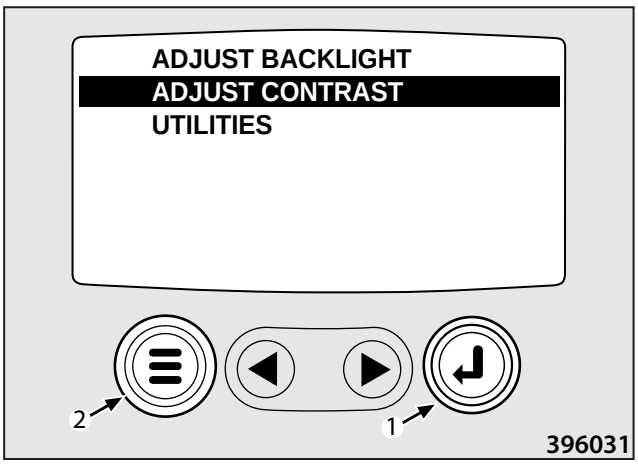
NAVIGATION BASIS

Menus have pages with other items. Use CURSOR (ARROWS) to select some of the items highlighted.

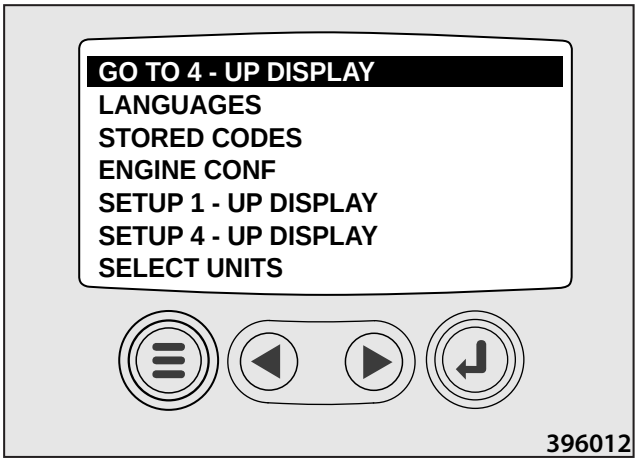
Operate pushbuttons with light touch.



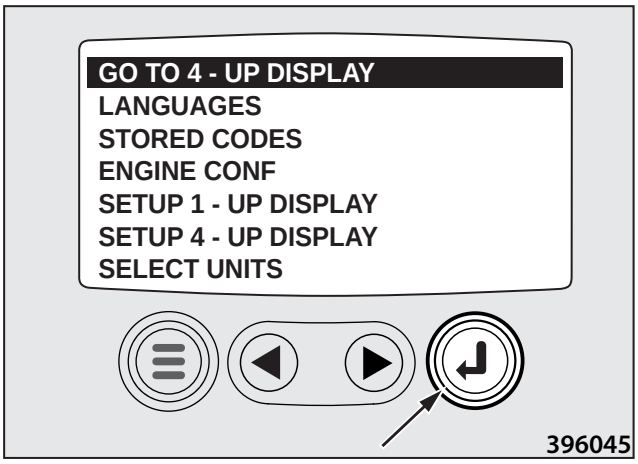
Use ENTER 1 to open highlighted item. Press buttons in Menu 2.



Main menu will be displayed (GO TO 4-UP DISPLAY).



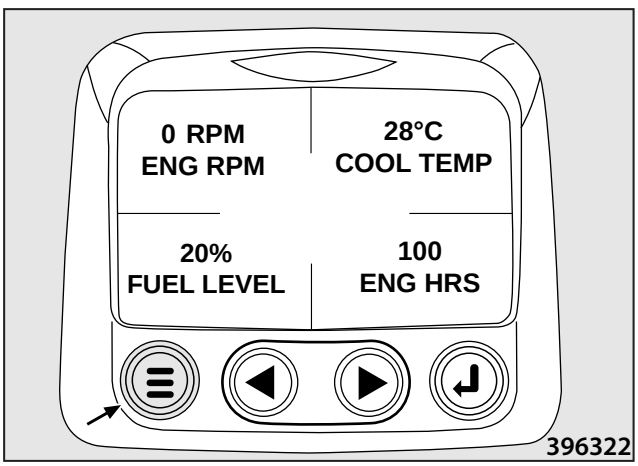
Press ENTER button.



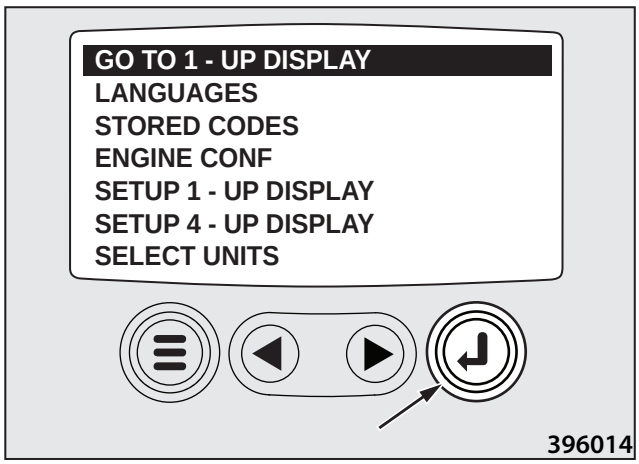
Four-parameter display will show. Press MENU button to display main menu.

Note

Four-parameter display is basic setting from the machine manufacturer; turn ON ignition box key to display it.



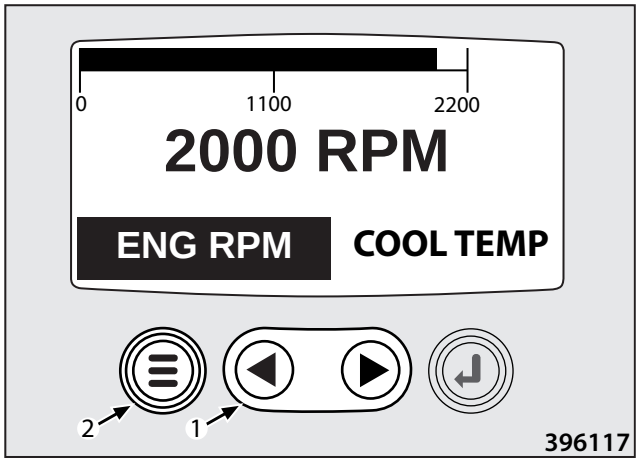
Press ENTER button to move to GO TO 1 - UP DISPLAY menu where parameters are displayed one by one.



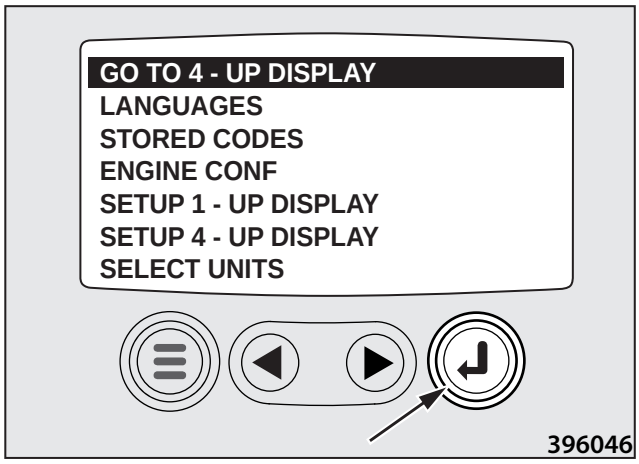
Use cursor 1 to display step by step eight parameters set (Number of engine operating hours, engine rpm, el. system voltage, engine load in % during actual engine speed, cooling liquid temperature, engine oil pressure, fuel level, instantaneous consumption). Press MENU 2 button.

Note

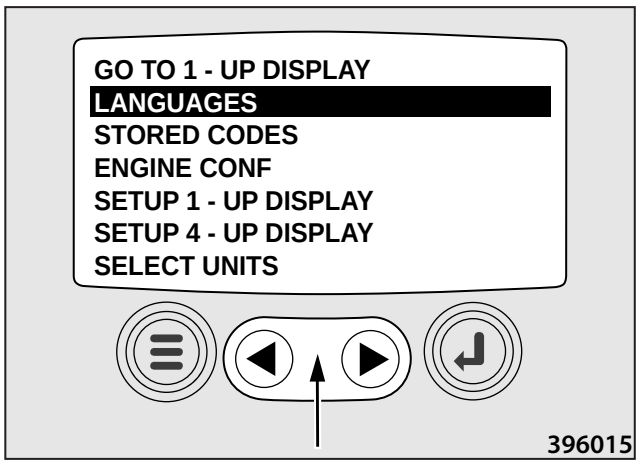
If the engine is at rest, the battery voltage is indicated. If the engine is running, then roller's el. system voltage is indicated.



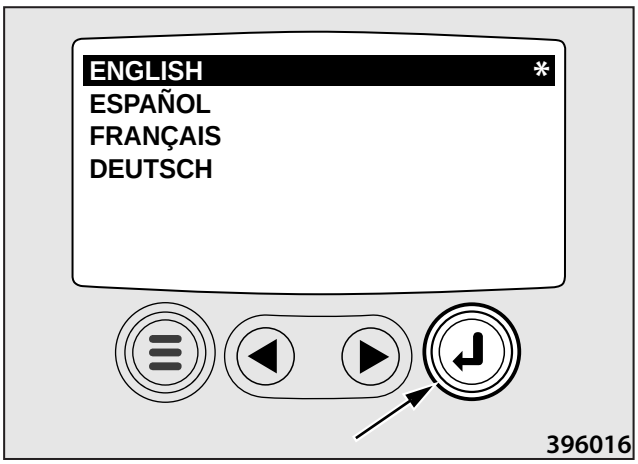
Main menu is displayed again. Press ENTER button to move back to four-parameter display.



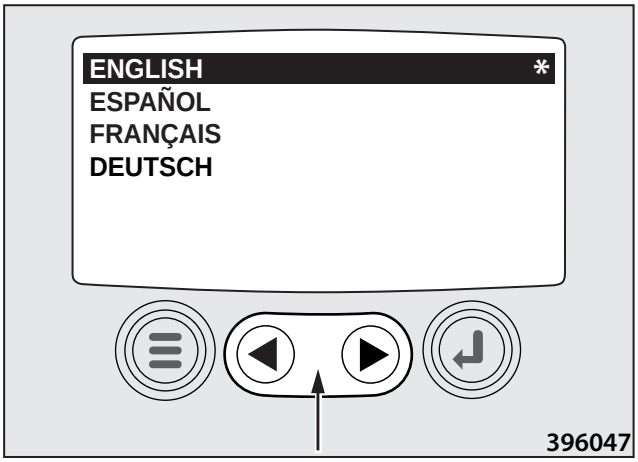
Use cursor in main menu to move to next item, i.e. LANGUAGES – to select language.



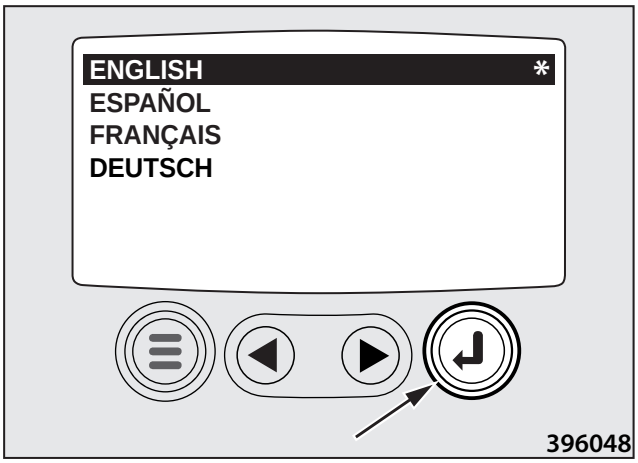
First, press ENTER to select language.



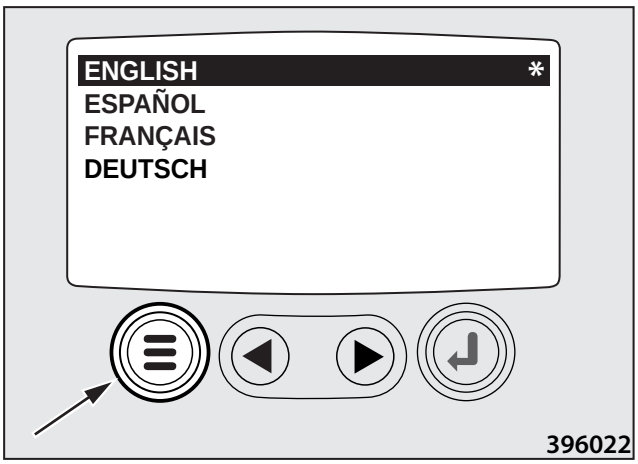
Another time, use cursor to select language.



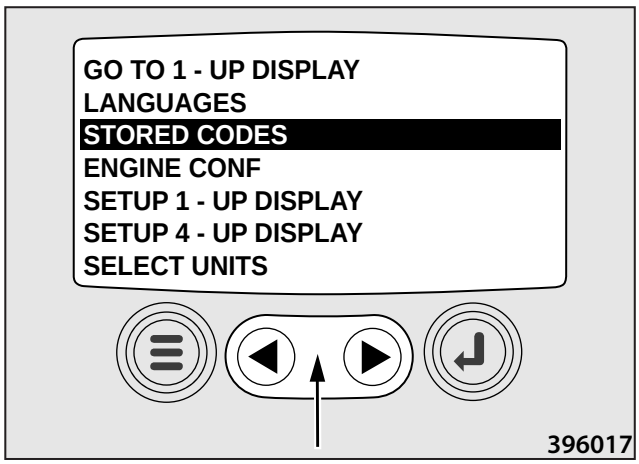
Press ENTER to confirm.



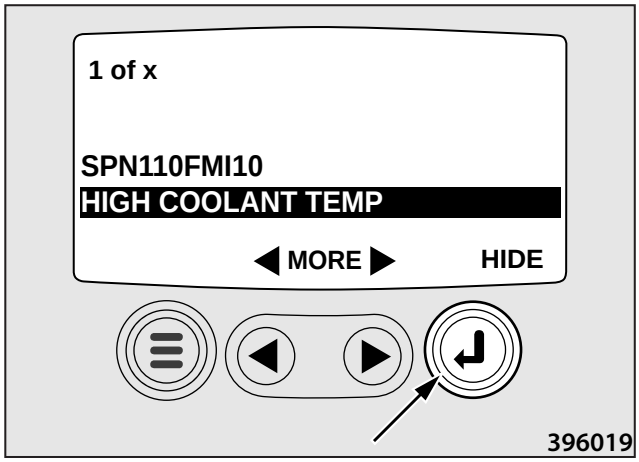
Press MENU to return to the menu.



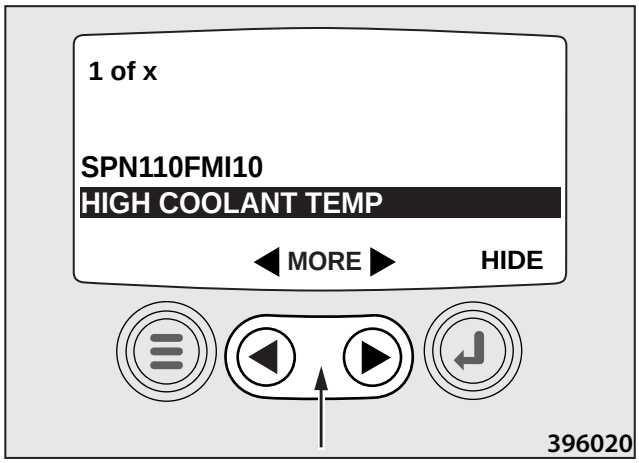
STORED CODES - stored defects not enabled. Move cursor in main menu to the item.



Continue with ENTER to display stored failures.



When the word MORE occurs use cursor to move to other stored failures.



Press Menu to return to main menu.

ENGINE CONF - menu to scan engine parameters, refer to CAUTION.

SETUP 1 - UP DISPLAY – press Enter to have various modifications of parameter display available.

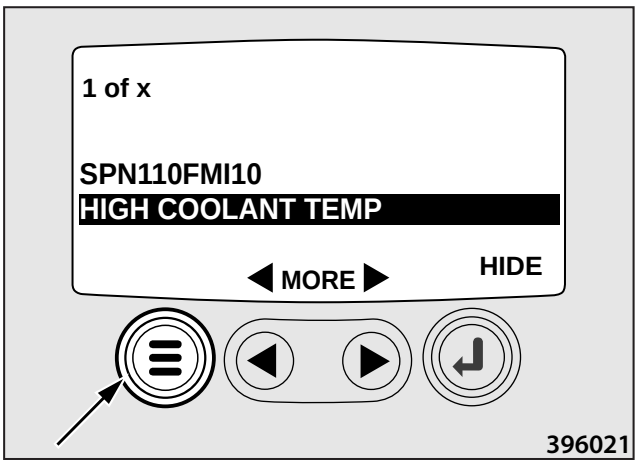
CUSTOM SETUP – possible to select from displayed number of parameters, and to set the sequence in which parameters will be displayed (Number of engine operating hours, engine rpm, wiring voltage, battery voltage, engine load during actual engine speed in %, cooling liquid temperature, oil pressure, etc.). The following parameters have been set by the machine manufacturer.

1) ENG RPM
2) COOL TEMP
3) BAR OIL PRES
4) % LOAD@ RPM
5) VDC SYS VOLT
6) ENG HRS
7) FUEL LEVEL
8) FUEL RATE

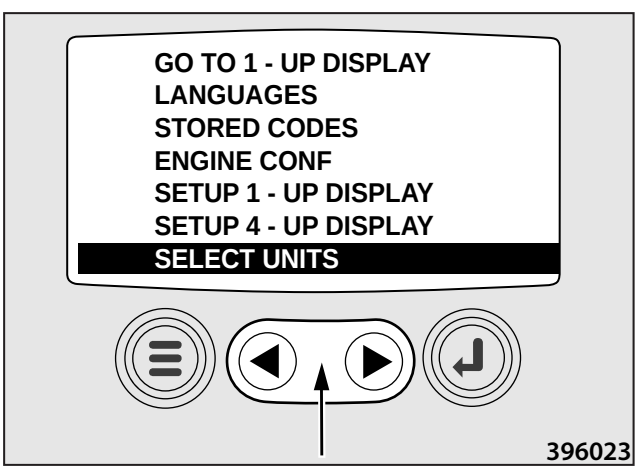
AUTOMATIC SCANNER – set parameters are displayed automatically one by one in time interval.

! CAUTION !

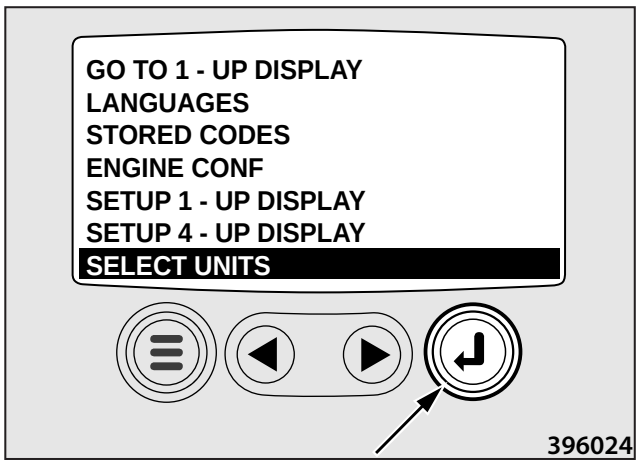
Roller manufacturer does not permit to alter the set parameters in CUSTOM SETUP. Parameters set up are the most appropriate optimum of set engine function check.



In main menu, with cursor to SELECT UNITS - selection of measurement unit for parameters displayed.

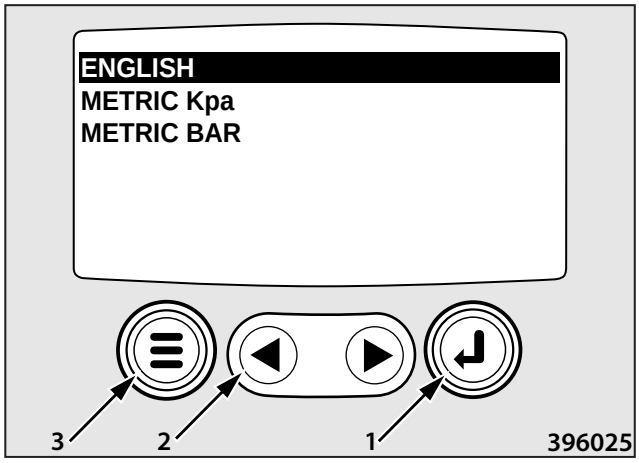


Press ENTER to open units menu:

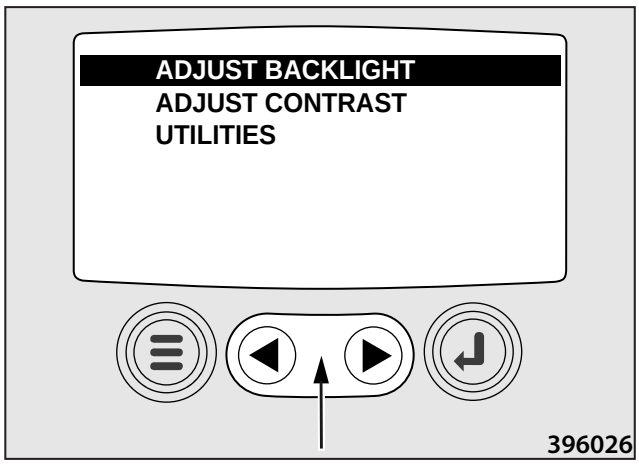


Use cursor to set 1 ENGLISH and the indicated variables will be displayed in PSI units (pressure), °F (temperature).

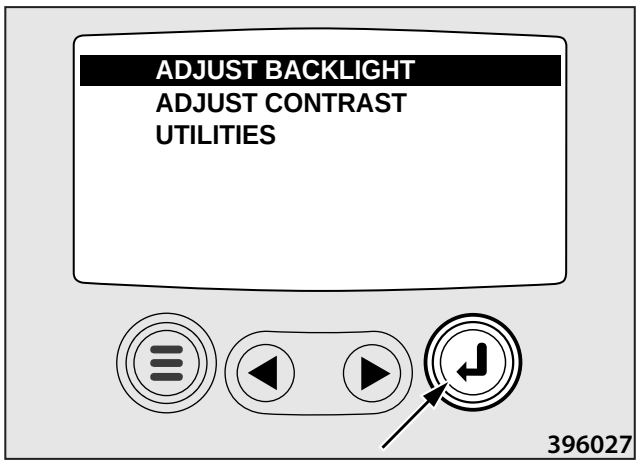
When METRIC KPA or METRIC BAR are set the variables displayed are in IS units, i.e. kPa, bar, °C, press Enter 2 to confirm selected variables. Press MENU 3 to return to main menu.



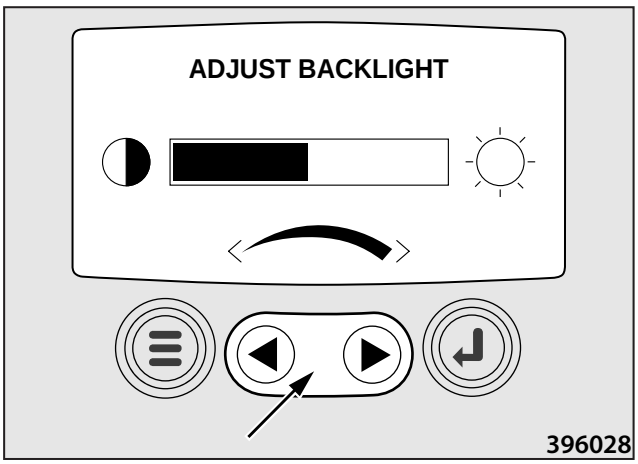
In main menu, move cursor to ADJUST BACKLIGHT - to adjust intensity of display backlight.



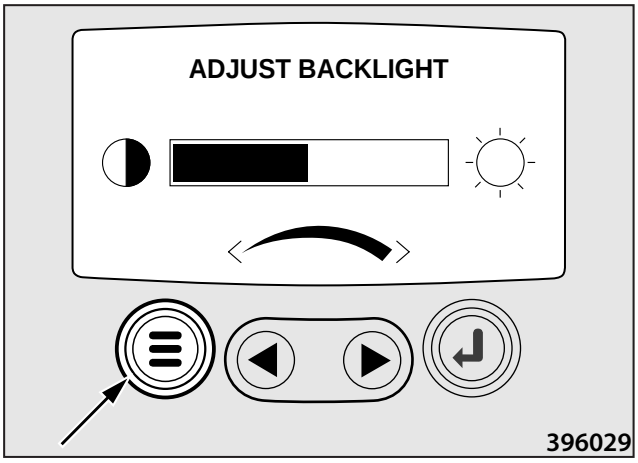
Press ENTER to open the item



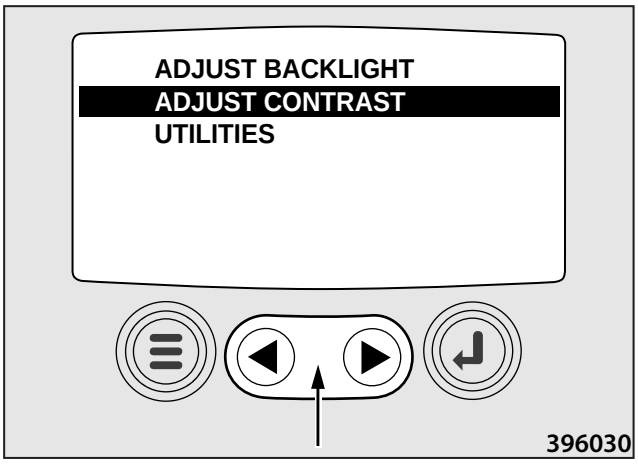
Use CURSOR to adjust backlight intensity



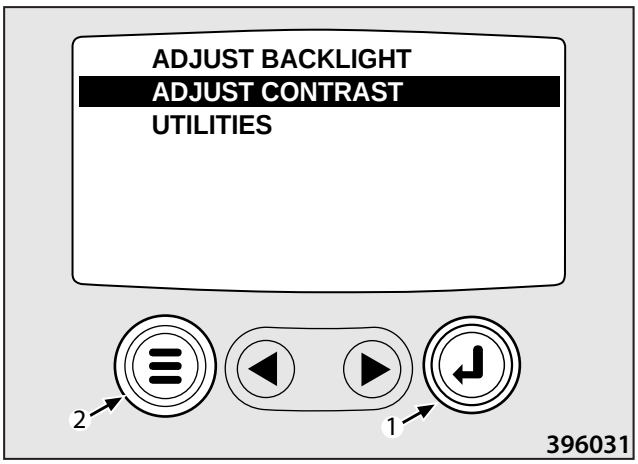
Press MENU to return to main menu



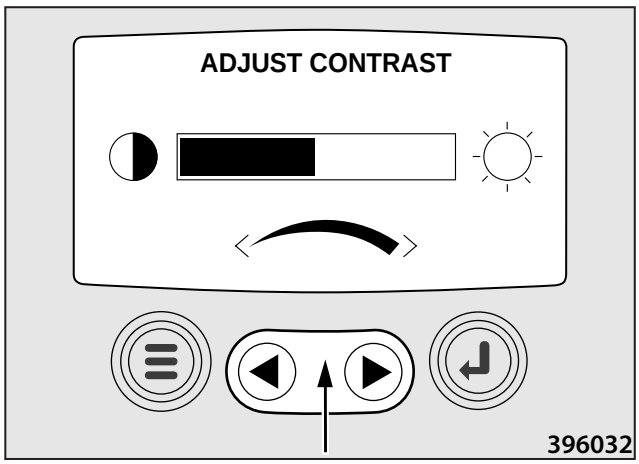
In main menu, move cursor to ADJUST CONTRAST - to adjust contrast.



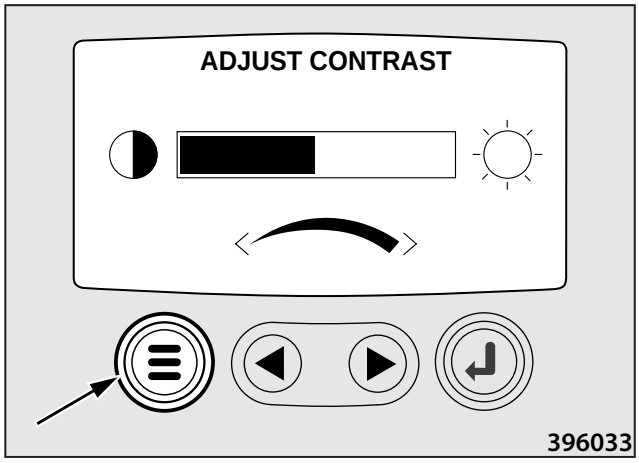
Press ENTER to open the item



Press CURSOR to adjust contrast



Press MENU to return to main menu

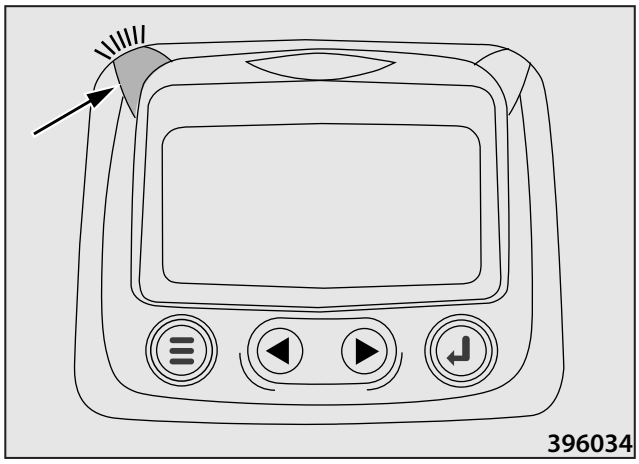


ENGINE FAULT SIGNALLING

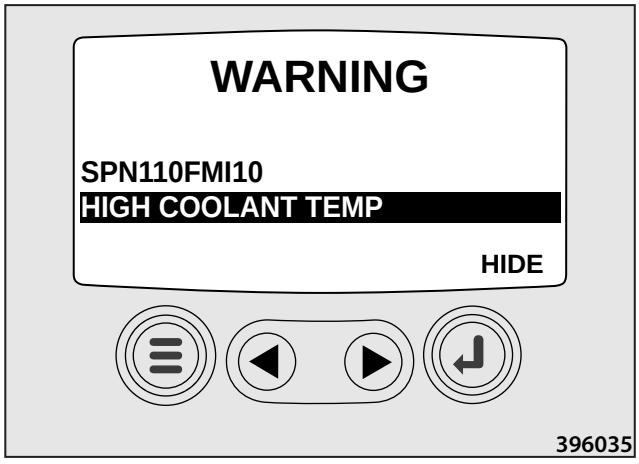
ALARM SIGNALLING

Alarm signal, indicated with yellow LED ON, informs about engine malfunction - **Warning**.

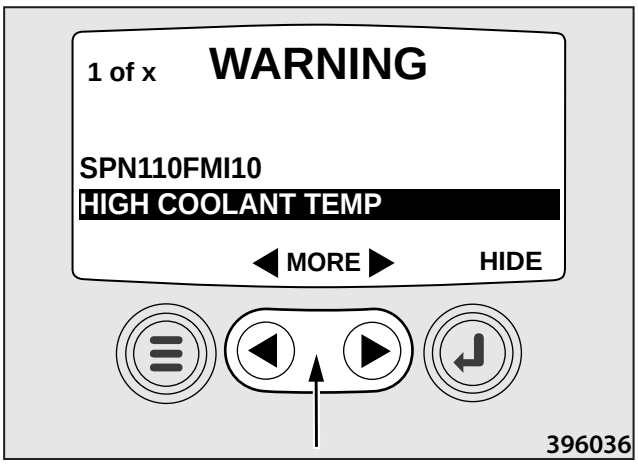
Engine failure alarm, or min fuel level in tank alarm. Reduce engine power, stop the machine immediately at safe place and shut off the engine! Repair the defect or call Cummins service centre. Do NOT operate the machine unless the defect has been repaired!



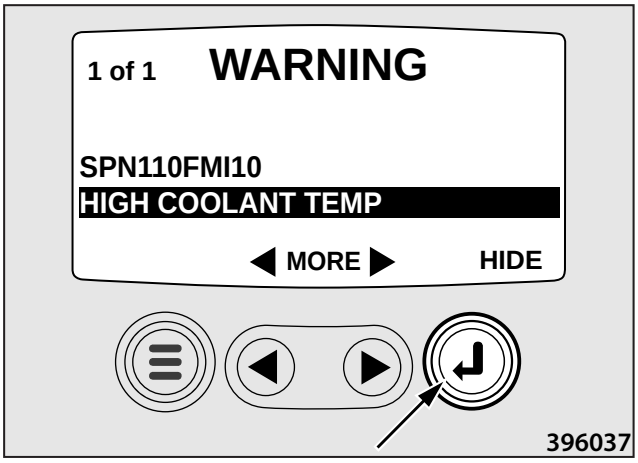
Engine failure registered from engine ECU (Electronic Actuator Unit) will be displayed via error code for a failure and description on the display.



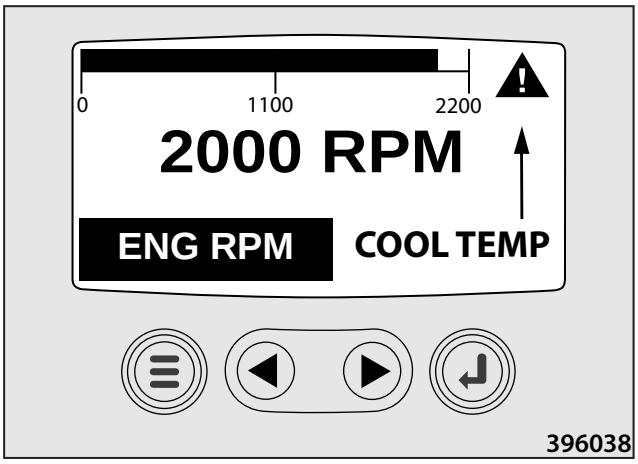
Upon registration of more errors, please use the cursor to display the registered failures step by step.



Press ENTER to acknowledge and hide the display.



Return to display 1 of parameter display with warning icon for active failure in RH corner

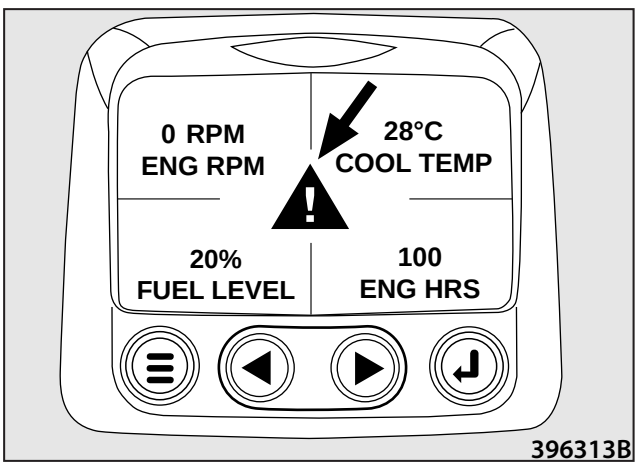


or display 4 of parameter display with warning icon for active failure in the centre.

Note

Press ENTER to display again the hidden error code for failures. Press ENTER again to display either with 1 parameter or 4 parameter. Until defect is eliminated the displaying of warning icon will remain active.

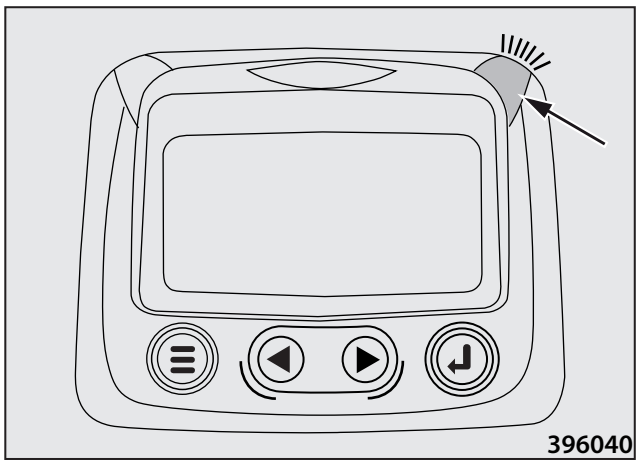
! CAUTION ! When failure outline and failure code are indicated on instrument board display, contact the regional representative of Cummins engines, unless the failure is possible to repair. Contact data are given in the Engine Operation Manual supplied with the machine.



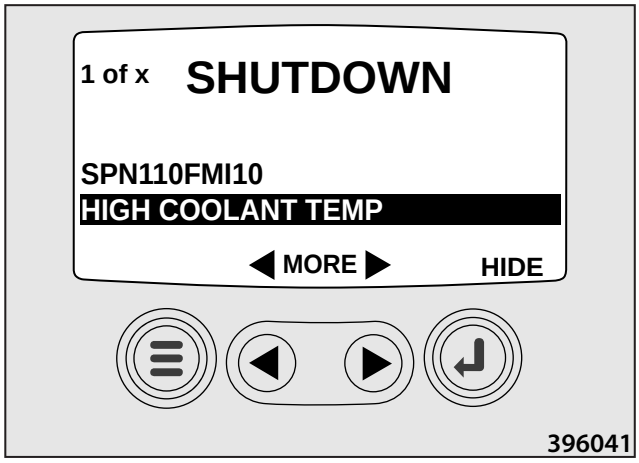
ENGINE CUT OFF ALARM

Alarm signal indicated by red LED ON informs about engine's substantial defect – **Shut off engine**.

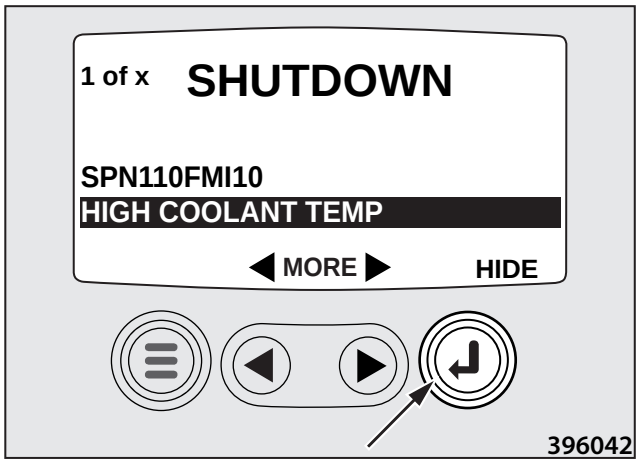
> **Reduce engine power, stop the machine immediately at safe place and shut off the engine! Call Cummins service centre to repair the defect. Do NOT operate the machine, unless the defect has been repaired!**



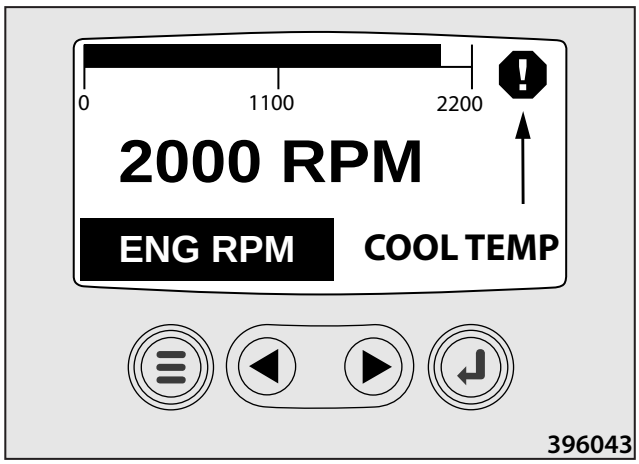
Engine failure registered from engine ECU (Electronic Actuator Unit) will be displayed via error code for a failure and description on the display warning to "SHUT DOWN ".



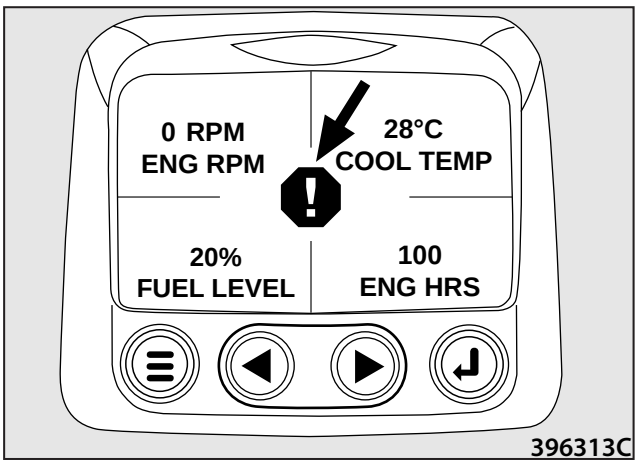
Press ENTER to acknowledge and hide the display.



Return to display 1 of parameter display with "SHUT DOWN" warning icon in RH corner.



Or of 4 parameter display with warning icon for active failure in the centre.



Note

Press ENTER to display again the hidden error code for failure. Press ENTER again to display again either with 1 parameter or 4 parameters. Until defect is eliminated the displaying of warning icon will remain active.

! CAUTION !

When failure outline and failure code are indicated on instrument board display, contact the regional representative of Cummins engines, whose contact data are given in the Engine Operation Manual supplied with the machine.

ERROR MESSAGES	
Error message	**Signature**
"**WAIT TO START PREHEATING**" is displayed	The ECU is broadcasting a ‚Wait To Start'message. Engine manufacturers typically recommend against starting the engine while the ECU is broadcasting this message. Once the ECU stops broadcasting this message,this screen will no longer be displayed on the Power View.
"**CANBUS FAILURE**" is displayed	The Power View has not received any valid J1939 CAN messages for at least 30 seconds.
"**TIMEOUT ECU NOT RESPONDING**" is displayed	The Power View sent a request to the ECU for Stored Fault Code (DM2) information, and the ECU did not respond to the request. This message on the PowerView indicates the ECU may not support Stored Fault Code (DM2) functionality over J1939.
"**NO STORED CODES**" is displayed	The Power View sent a request to the ECU for Stored Fault Code (DM2) information, and the ECU responded. There are zero stored codes.
"**NO GAGE DATA**" is displayed	The Power View has no record of gages connected to the RS485 bus.
"**NO DATA**" is displayed in place of a parameter value	The Power View has not received data for the selected parameter for at least 5 seconds.
"**NOT SUPPORTED**" is displayed in place of a parameter value	The ECU is sending a message that it does not support this parameter.
"**DATA ERROR**" is displayed in place of a parameter value	The ECU is sending a message that there is a data error with this parameter. Or (PV101 only) FUEL LEVEL has been selected for display, ANALOG INPUT has been set to FUEL LEVEL, but no Murphy Fuel Sender has been connected to the analog input.
One of the 4-UP quadrants is empty	No parameter has been selected for display in this quadrant.
Display is not readable, either very dim or very dark	The LCD contrast may have been over or under adjusted. Press and hold the MENU key for approximately 5 seconds. This will reset the LCD contrast setting to factory default.

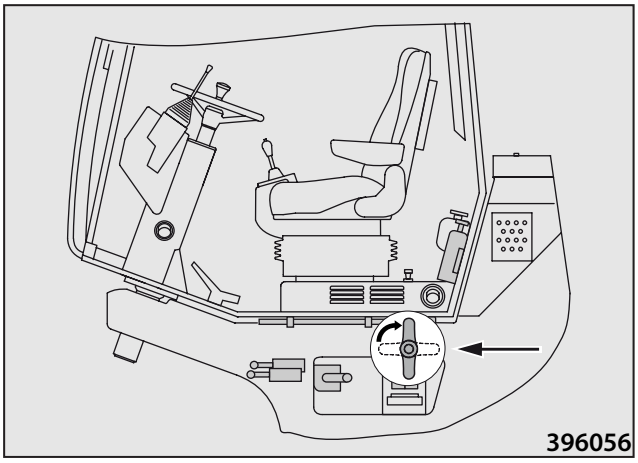
2.7.1. Starting the engine

Before starting the engine, please confirm nobody gets endangered when engine is started!

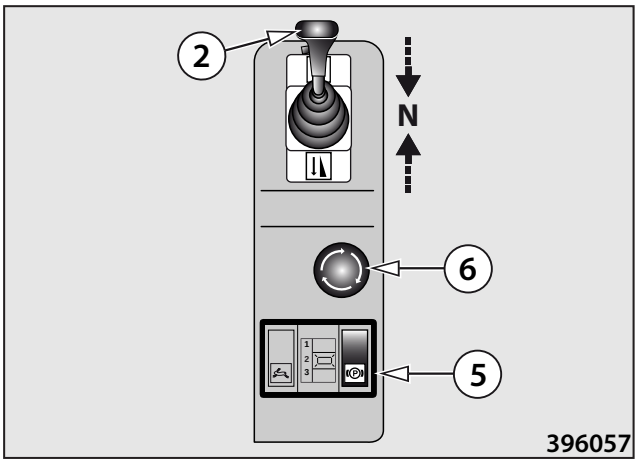
How to start:

- Pump fuel via feed hand pump on the engine (upon long term shutdown of the Machine).

- Cut in battery disconnector.



- Check "TOTAL STOP" 6 is off, and brake 5 is on, and actuator 2 in neutral.

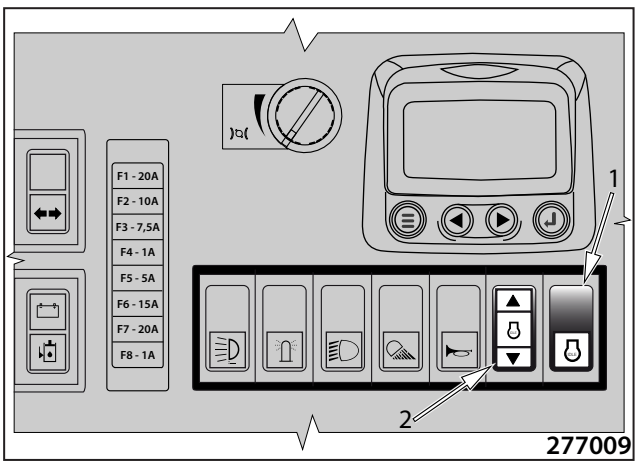


- Turn on IDLE 1 engine idling switch.

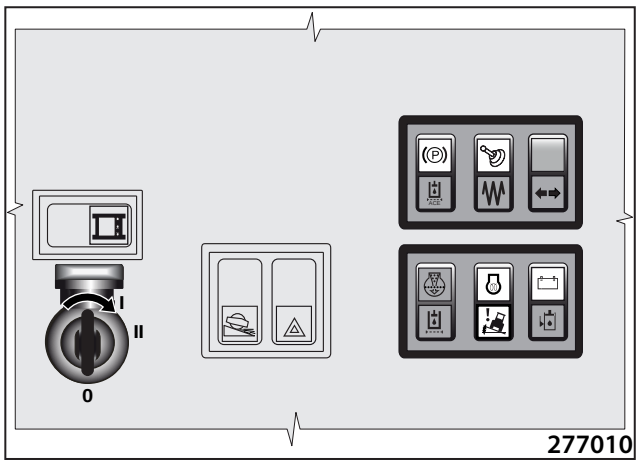
Note

Use switch 2 for stepping of idling at IDLE switched on to select idle rpm from 800 ÷ 1000 min^{-1} with engine heated to 30 °C (86 °F). Newly selected rpm will be stored in engine ECM memory and remain set for next engine starting.

It is recommended not to alter RPM of 850 min^{-1} set by Manufacturer since Roller's parameters have been adjusted to this RPM.



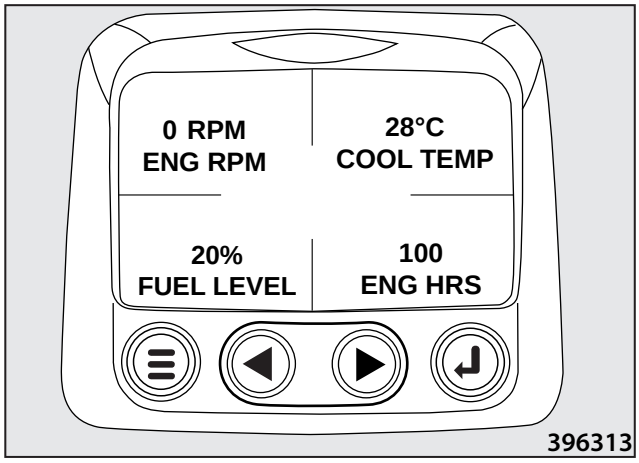
- Turn key in ignition box 1 to position "I" - the pilot lamps for brake, recharging, neutral, engine glowing (as per ambient temperature) will light. ROPS2D indicator lamp will light up shortly along with acoustic alarm.



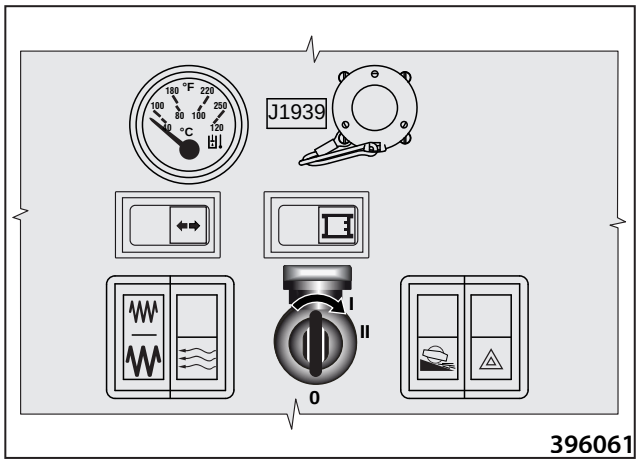
- The display will show logo and then 4 quadrants with parameters set.

Note

The display has been set by Manufacturer, it is possible to change it to a single parameter display, refer to par. 2.6.1.



- Glowing indicator lamp goes off, please switch to position "II" to start the engine and (hold key in "II" position only until engine is started).



Do NOT start for no longer than 30 sec. Repeat starting only after 2 minutes.

Repeat starting max 3x, then track a failure within fuel system. Absence of smoke in exhaust will signal a defect within fuel supply to the engine.

When started, please check recharging function - indicator lamp must go off.

Do NOT increase RPM abruptly, let engine run for 3 to 5 minutes in idle speed so to stabilize pressure in the engine, and bearings to lubricate. Do not let engine run idle longer than 10 minutes, engine may get damaged.

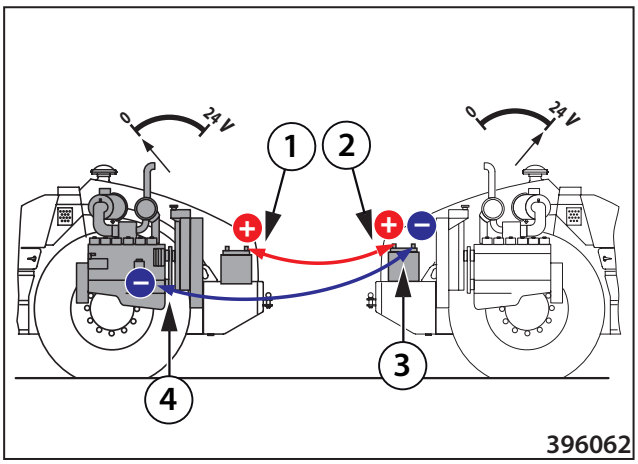
Starting will be interlocked if:

- **Roller is not braked.**
- **Actuator 2 not in neutral.**
- **STOP button pressed.**
- **Driver not sitting on the seat.**

When using auxiliary starting source this power supply shall have starting voltage of 24 V.

How to start via starting cables from different machine

1. Connect one end (+) of cable pole to (+) pole of discharged battery.
2. Connect second end of (+) cable pole to (+) pole of the Machine battery from which starting will be made.
3. Connect one end of (-) pole to (-) pole of vehicle battery with the help of which starting will be made.
4. Connect second end of (-) cable pole to such part of the Machine being started which is wired in the engine (or eventually in the engine block itself).



Observe unconditionally the sequence of operations given below!

Once started, disconnect the starting cables in reverse sequence.

When having used starting unit with no batteries connected do not disconnect this unit before Machine's battery is connected.

Do NOT connect cable of (-) pole to (-) pole of discharged battery of started Machine! Strong sparking followed by explosion of gas generated by the battery may occur when starting.

Non-insulated parts of starting cable collets may not touch each other!

Starting cable connected to battery (+) pole may not come into contact with electrically conductive parts of the Machine - short-circuit possible.

Do NOT bend over the battery - hazard of acid burn!

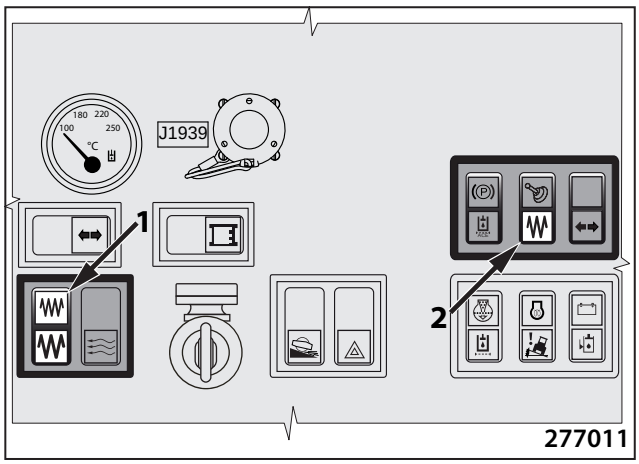
Eliminate presence of flammable sources (open fire, burning cigarettes, etc.).

Do NOT check presence of voltage in wires with the use of sparking via Machine frame!

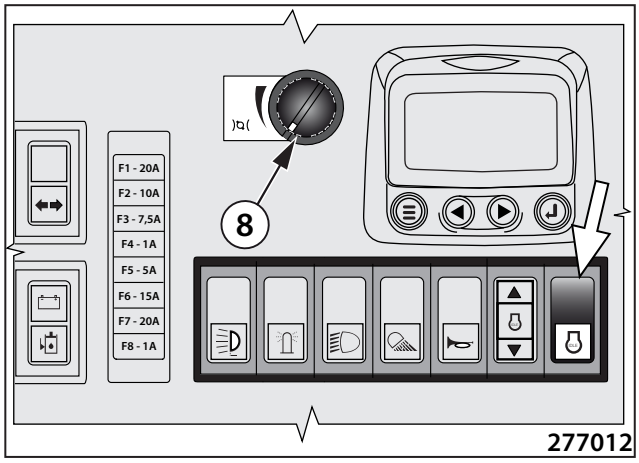
2.7.2. Travel and reversing

Give acoustic signal for Machine started to move, and wait long enough so any persons present could leave the area within Machine vicinity (under the Machine) in time!

Before starting to move, please confirm the area in front and behind the Machine is free and that no persons are found therewithin!

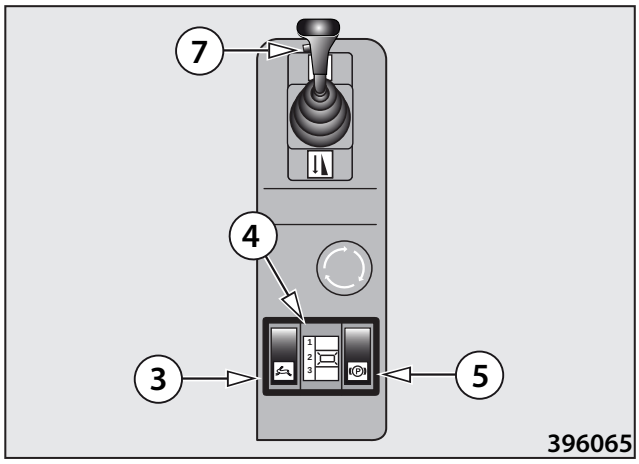


- Switch ON vibration amplitude 1, indicator lamp 2 will light.



- Switch OFF IDLE and engine rpm to max. 2200 min^{-1} via gas actuator 8.

- Turn OFF speed controller 3 - thus switching ON working speed. Switch preselector 4 to the suitable operating speeds "1"÷"3". Brake off the Roller via pressbutton 5. Start moving the Machine and turn ON the vibration via switch 7 - you can stop the vibration by pressing and releasing the pressbutton.



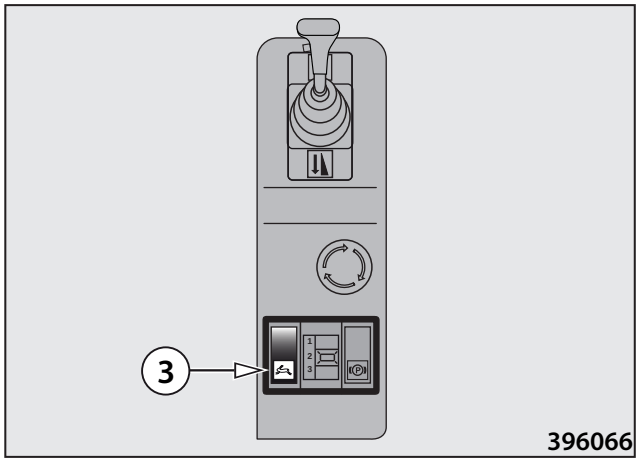
Note

You may select gear "1" ÷ "3" of the operating speed via preselector 4 while driving.

! CAUTION !

When driving uphill, engage gear "3" via preselector 4 so to achieve max tractive (pulling) force (climbability) of the Roller.

- By switching ON the transport speed 3 you turn OFF operating speed - vibration is interlocked.



Note

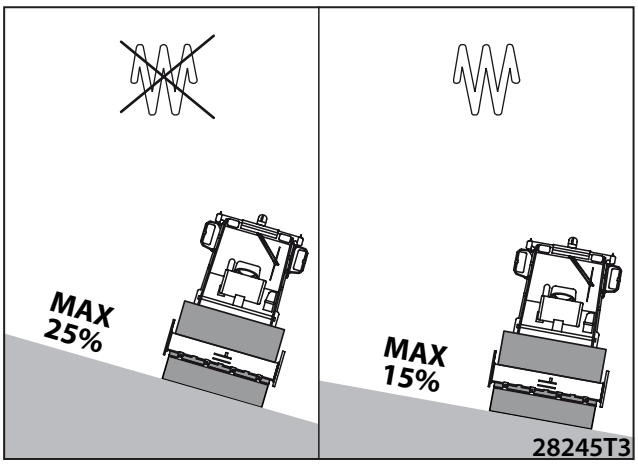
You may switch ON/OFF transport speed controller 3 while driving.

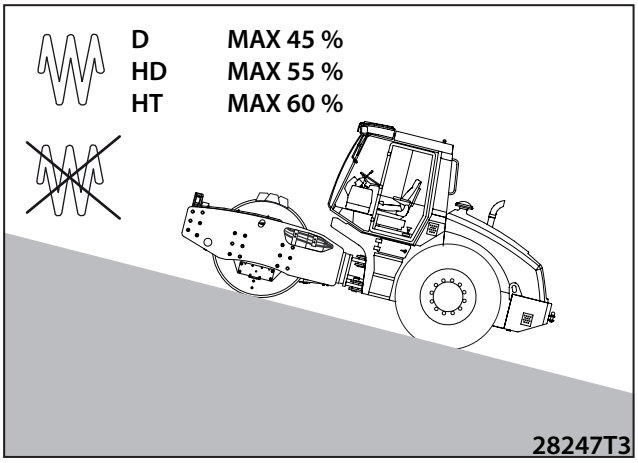
Unless there is enough tractive force while climbing uphill - please switch OFF the controller and select gear "3" via selector 4.

Before driving downhill, please turn OFF the transport speed controller!

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

The values given are lower depending on adhesive conditions and the machine instantaneous weight!

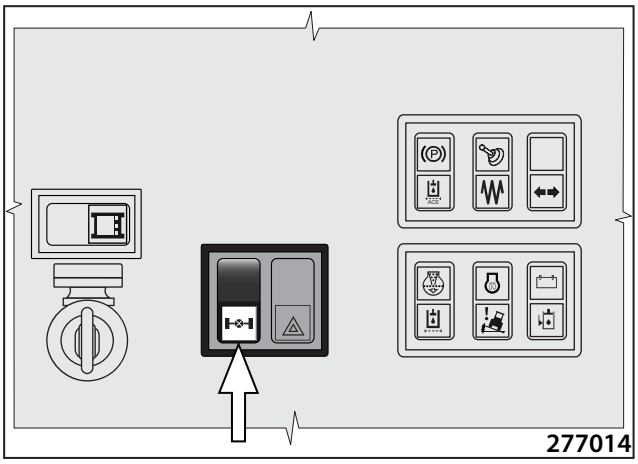




- When driving in a difficult terrain with an impaired adhesion, turn on the ATC function (optional equipment). After leaving the difficult terrain, turn off the function.

Note

The function can be activated in both modes – working and transport speeds.



Do NOT load engine at full capacity until it reaches 60 °C (140 °F) temperature.

Do NOT turn OFF the controller at high speed - sudden deceleration (retardation) will occur followed by an impact within hydraulic system. Turn OFF the controller at low speed or with standing Machine!

! CAUTION !

If Driver stands up from the seat while driving the speed will slow down until Roller is fully stopped and braked, this will last 4 seconds. Following next 4 sec. the engine shuts down.

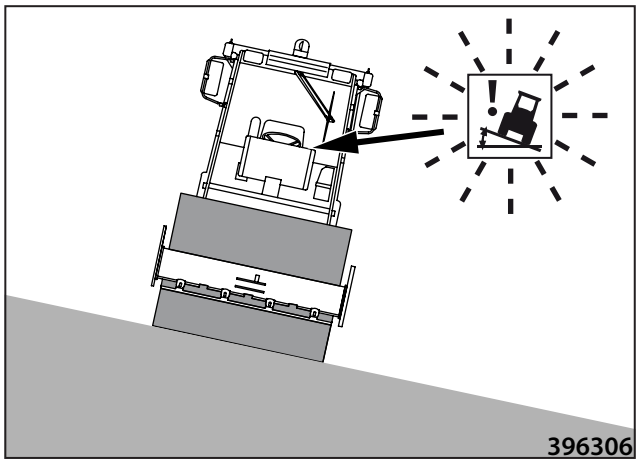
To start the engine again the Driver must sit down again, shift the travel actuator to neutral, turn ON brake switch, turn ignition key to "0" position and then start the engine. Driver must brake off before starting to move.

If Driver sits down again before 4 sec. have elapsed, then the Roller will continue driving at a speed selected.

If Driver sits down after 4 sec. have elapsed, then the engine will shut down, the Driver may start moving it again. Before that the Drives must shift the controller to neutral, and select again the original driving direction.

! CAUTION !

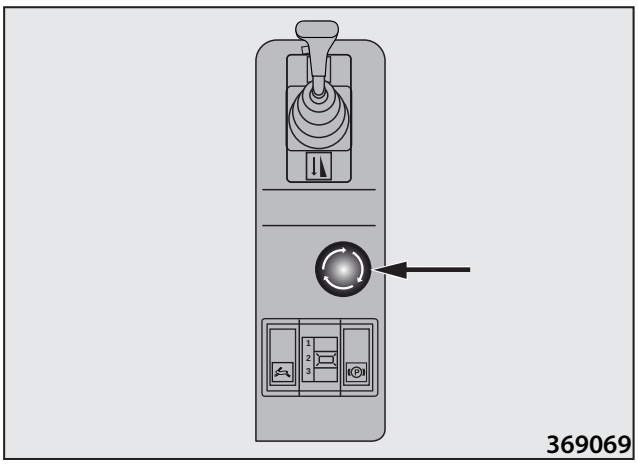
Indicator lamp will light up and acoustic signal will be heard with Rollers equipped with ROPS2D and driving across a slope with gradient over 12. Vibration will cut off if Roller bank increases to 15°.



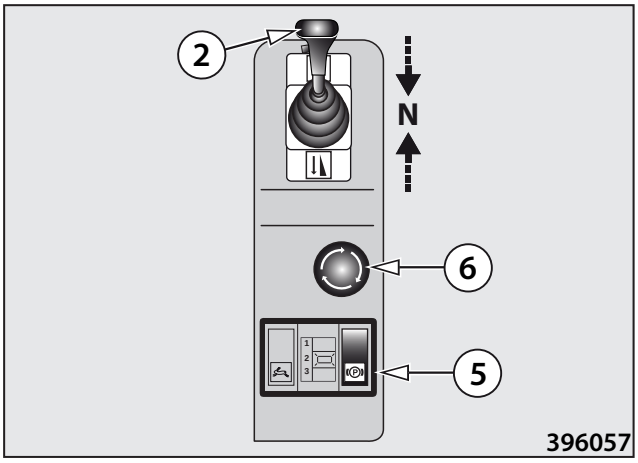
2.7.3. Emergency stop of the Machine

Apply in the event when engine is unable to stop via ignition key or when Machine is unable to stop via switching the travel controller to neutral.

- Press TOTAL STOP (emergency brake) - the engine stops and the Machine stops moving.

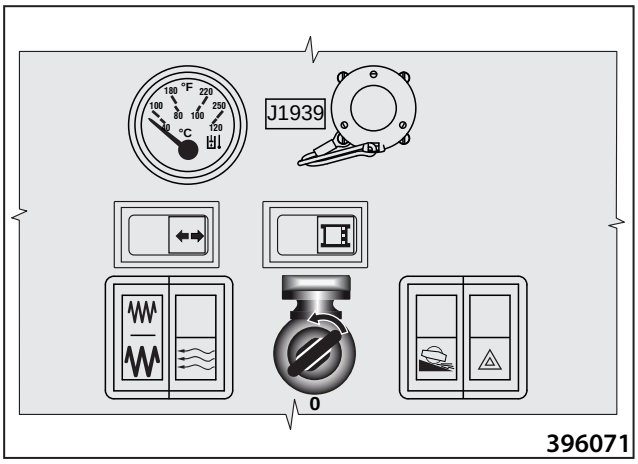


- Before new engine start, please shift controller 2 to "N" position and turn pressbutton 6 according to arrow direction. Brake via parking brake switch 5.



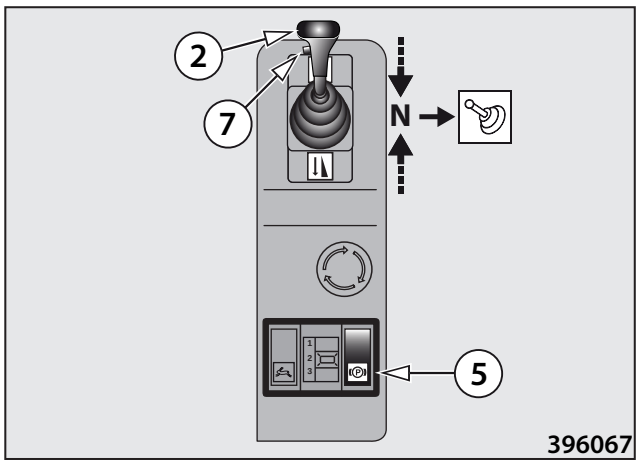
- Switch key 1 to "0" position and then start.

Do NOT apply emergency brake during normal operation just to shut off the engine.

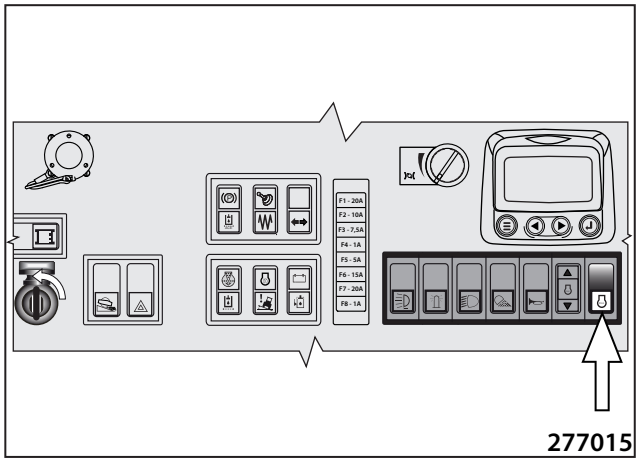


2.7.4. How to stop the Machine and its engine

- Turn OFF the vibration via switch 7, if turned ON. Stop the Machine via actuator 2, and brake with parking brake 5.



- Turn ON the IDLE switch. Turn OFF the engine via key 1 to "0" position, and pull it out - close the ignition box lid.



! CAUTION !

If you wish to stand up from the seat, leave the engine and let the engine run, please switch ON the parking brake.

Do NOT stop hot engine instantly but let it idle for 3 minutes for turbocharger to cool down.

2.7.5. Machine parking

- Stop the Machine, switch OFF battery disconnector
- Clean the Machine to get rid of any coarse dirt.
- Carry out overall inspection of the Machine and repair any defects that occurred during operation.
- Check sufficient pressure in tyres.
- Use scotch blocks to secure the wheels and drum.
- Lock the covers of instruments or cab and door underneath the Driver's control stand.

Switch off the battery disconnector no sooner than 30 seconds after removing the key from the ignition switch.

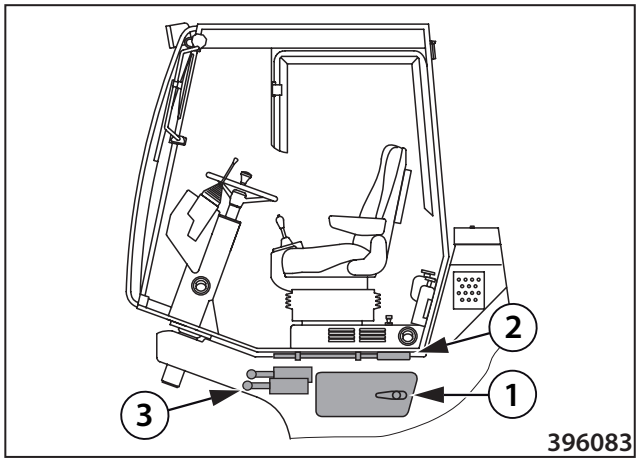
Keeping of the time limit is necessary for saving the data of the ECM motor.

Shut down the Machine on flat and paved surface. Confirm there is no potential of natural hazard (landslide, potential flooding due to any deluges, etc.) at the location.

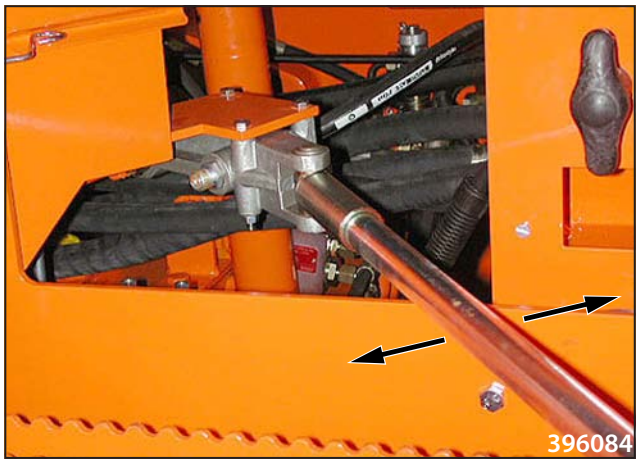
2.7.6. Cab and bonnet raising and lowering

Before lifting Driver's control stand with the Machines that have a canopy with ROPS, please fold down the backrest and arms.

- Open door 1, remove pump lever 2. Levers for lifting - dropping 3.



- Do pumping on hand hydrogenerator to lift - drop the cab or bonnet.

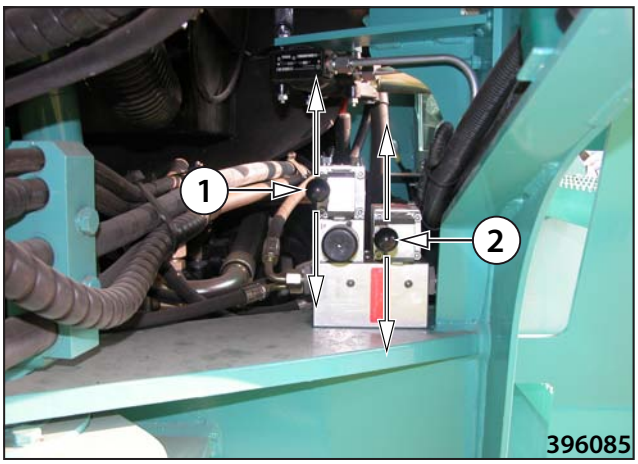


- Before lifting, please unlock the cab.

Cab - 1

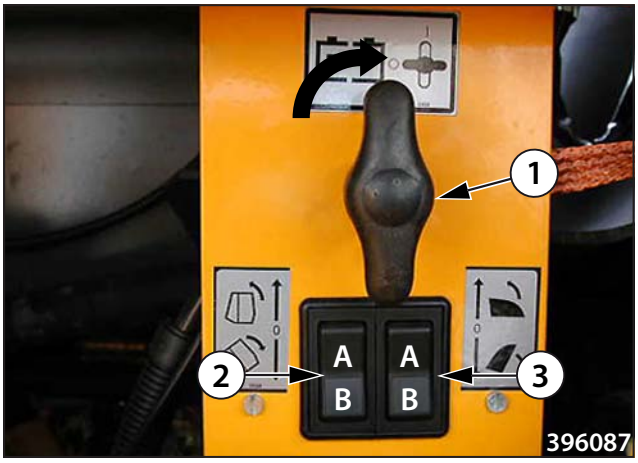
Bonnet - 2

- Lever up - lifting
- Lever down - dropping



Electric-hydraulic control (optional)

- Connect wiring by turning battery disconnector 1. Press pushbutton 2 to position "A" to lift the cab, or pushbutton 3 to lift the bonnet. To drop you must press pushbuttons to position "B".

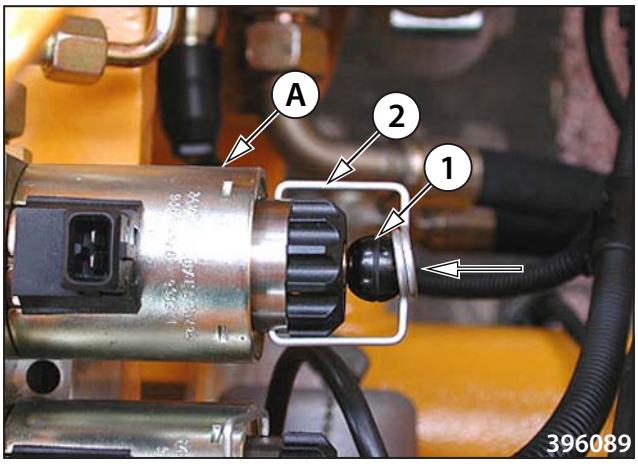


Note

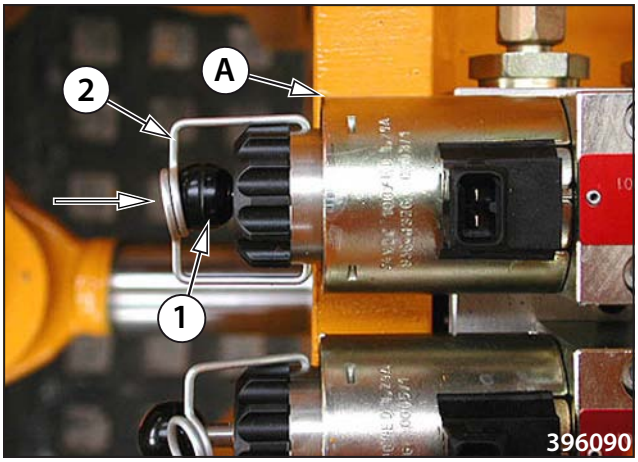
When unit (aggregate) is broken, or battery discharged, please lift - drop the cab or bonnet by pumping on hand hydrogenerator with the distributors adjusted as seen hereinafter. The distributors are located underneath the cab, inside the frame, on LH side.

Cab

- To lift manually you must plug in the slide 1 on distributor A, secure with safety pin 2. Before dropping, please unlock the safety pin.

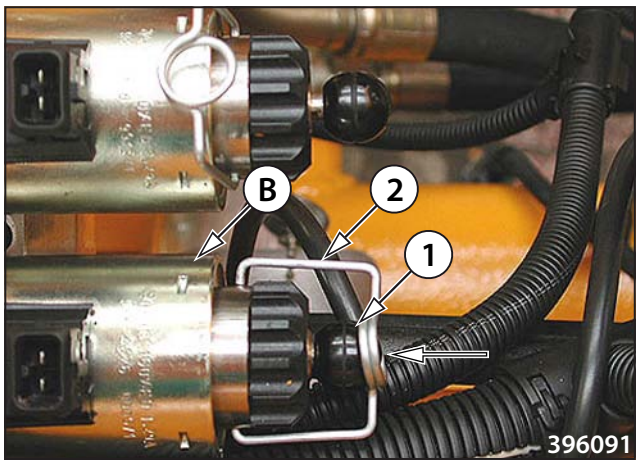


- To drop you must plug in the slide 1 on the second side of distributor A, secure with safety pin 2.

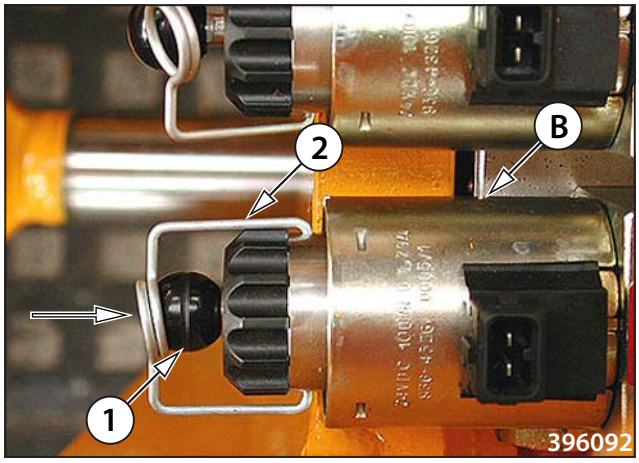


Bonnet

- To lift manually, please plug in slide 1 on distributor B and secure with safety pin 2. Before dropping, please unlock the safety pin.



- To drop you must plug in the slide 1 on the second side of distributor B and secure with safety pin 2.



Note

Remember to unlock the safety pin before dropping.

Once dropped, please bolt the Driver's control stand (cab)!

2.7.7. Blade

- Unlock the blade on both sides. Unlocked blade

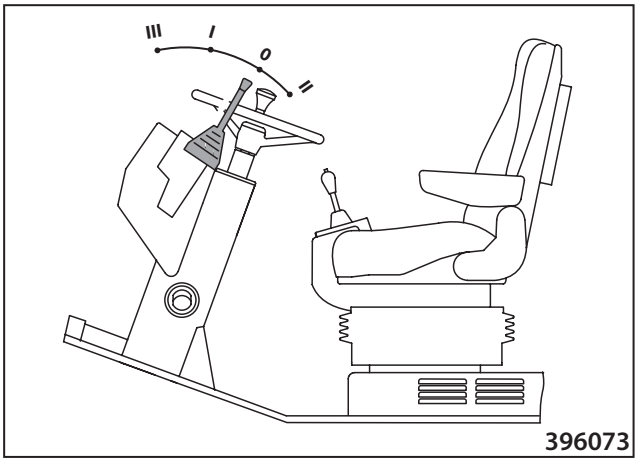
- Control function is given by four positions:

  0 position basic position

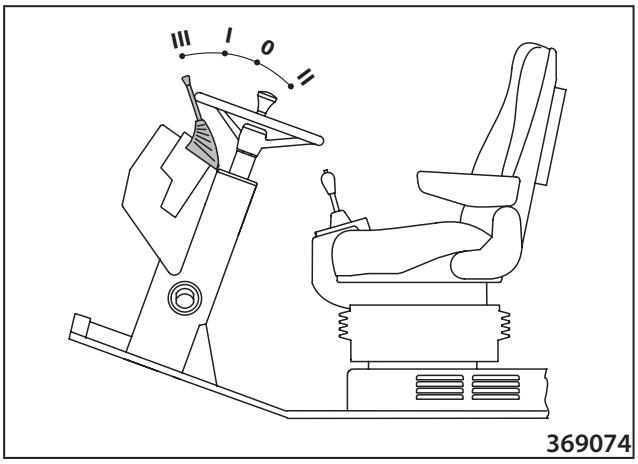
  Position I blade going down

  Position II blade ascending

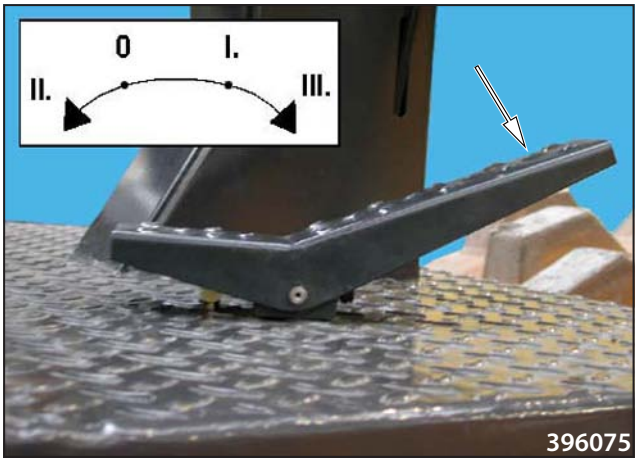
  Position III blade is in floating positions



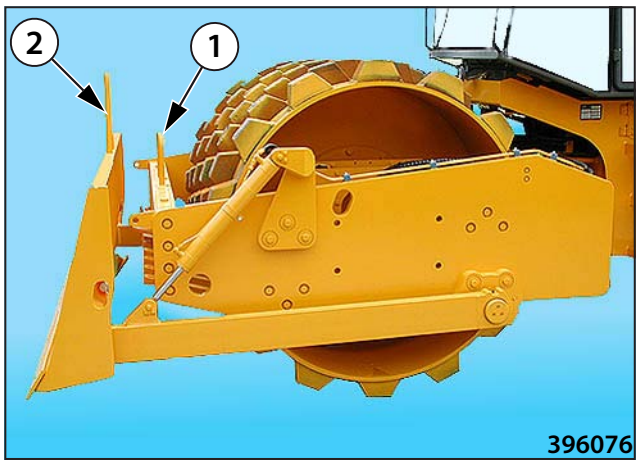
- Drop the blade to the ground via shifting the actuator to "III" position (floating position)



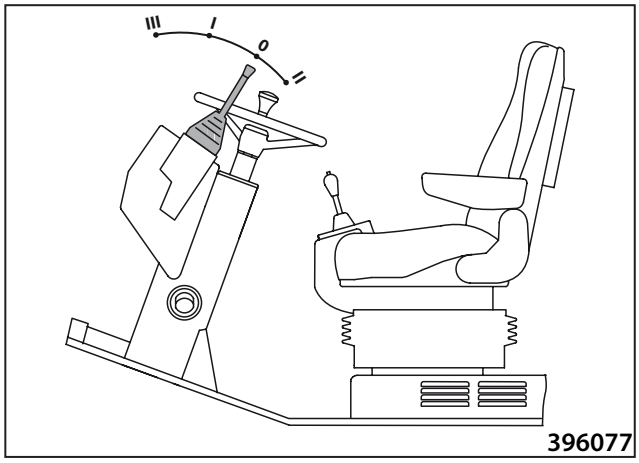
or via the pedal.



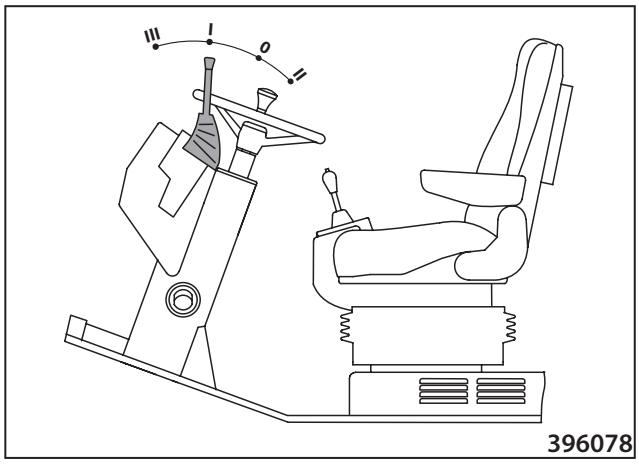
- Find out mutual position of fixed indicator 1 against mobile indicator 2. This is the basic position of the blade.



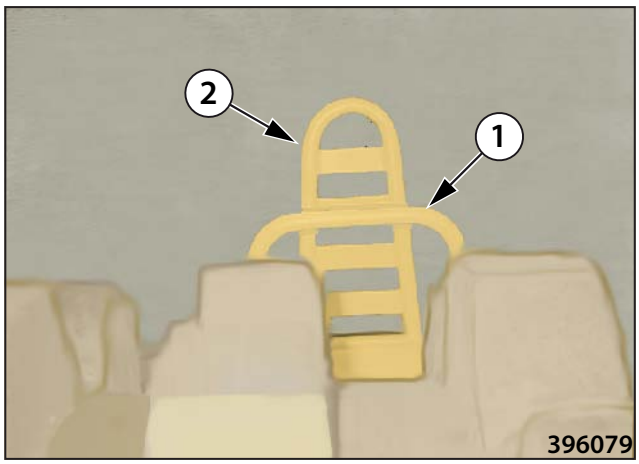
- Return controller (pedal) to “0” position and start moving the Machine.



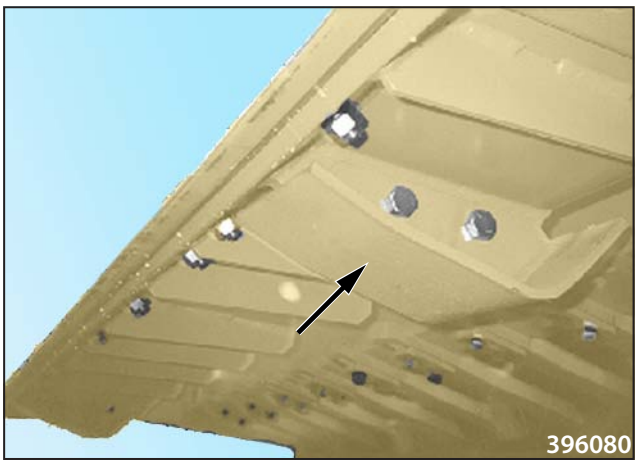
- You may sink the blade through shifting the controller (pedal) to “I”.



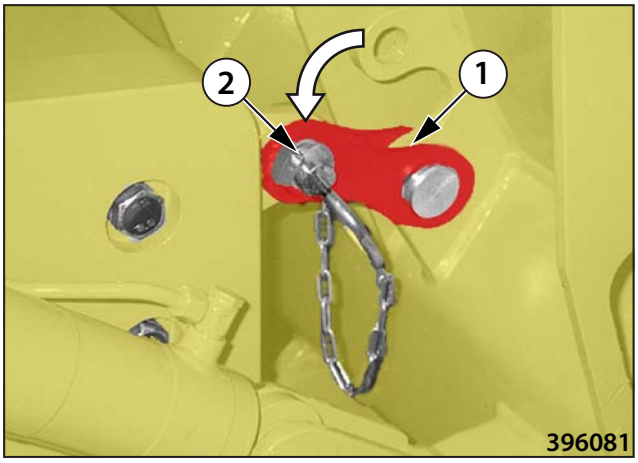
- Read the size of sinking from mutual position of fixed and mobile indicators 1, 2. Shifting by one gap (from one diagonal to the second one) the blade will shift by 50 mm.



- Floating blade can be used when bulldozing a material on a paved area. Floating position may also be applied when spreading and levelling again the material being spread. The blade will skim on removable skids.



- When work with blade is completed, please secure it in its upper position with the help securing tie rods 1 and pivots 2 on both sides.



Note

The blade edges are able to dismount, and when worn out you may turn them round by 180°.

Do NOT perform any adjusting of scrapers or any work on the blade unless blade is descended on the ground and engine stopped, or unless blade is secured with both locking tie rods.

Do not operate the blade if it is locked.

If attached to one securing tie rod, there is hazard of blade damaged.

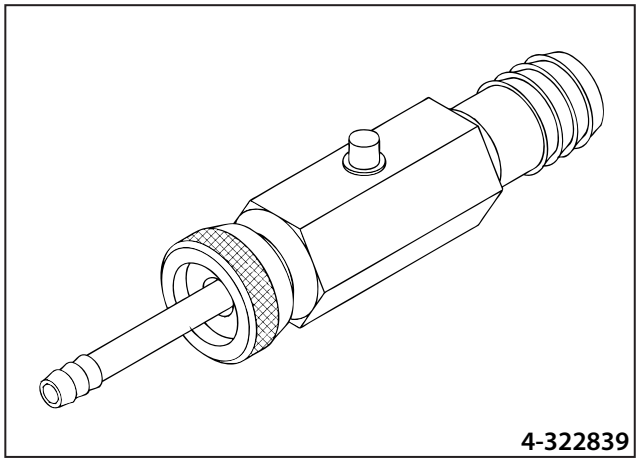
2.7.8. Filling tyres with water

It is used for lowering the machine gravity centre. An advantage is that the solution in tyres does not increase the axle load.

The inner space of the tyre is filled with the solution of water, slaked lime (calcium hydroxide) and anhydrous calcium chloride $CaCl_2$ or magnesium chloride $MgCl_2$. The mixing ratios for individual temperature per one tyre are given in the table.

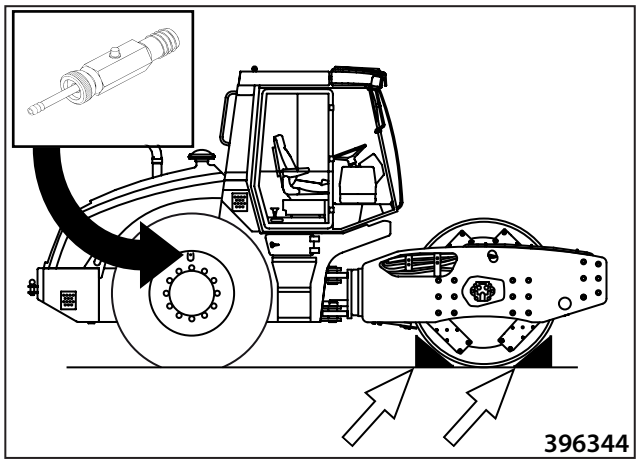
Freezing point	Water	Calcium chloride $CaCl_2$	Calcium hydroxide	Added weight
(°C) [°F]	(l) [gal US]	(kg) [lb]	(kg) [lb]	(kg) [lb]
-18 [0]	458 [121]	120 [365]	2 [4,4]	580 [1280]
-25 [-13]	458 [121]	141 [312]	2,2 [4,9]	600 [1323]
-30 [-22]	458 [121]	155,5 [343]	2,5 [5,5]	617 [1360]

A filler neck can be ordered as a replacement part under number 4-322839.

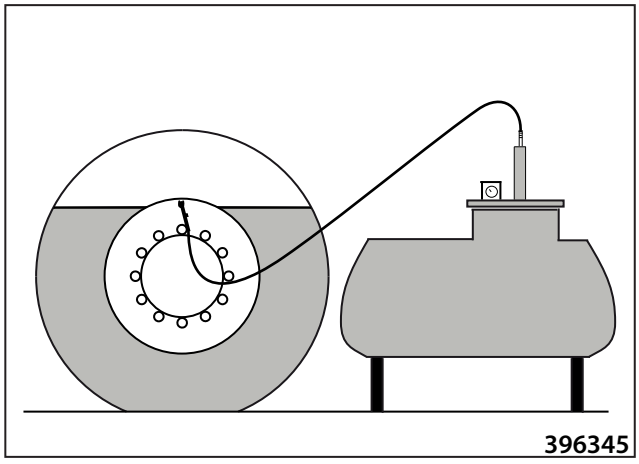


Filling procedure:

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

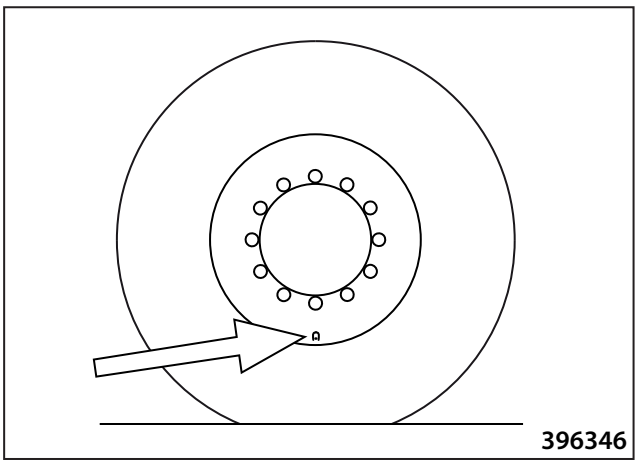


- Mount the hose from the filling equipment (a tank located above, pump, etc.) on the filler neck and fill the tyres with the solution.
- During the filling, air escapes from the tyre through the side opening from the filler neck. The tyre is sufficiently filled (at 75%) when the solution starts flowing out through the opening.
- Unscrew the filler neck, screw the valve insert back on, and inflate the tyre to a pressure of 160 kPa (23,2 PSI).



Draining procedure:

- Move the machine to a firm base. The filling valves should be in the extreme lower position (1). Secure the drum with blocks on both sides.
- Unscrew the removable valve insert and let the solution flow out.



The solution can spurt out after unscrewing the valve insert.

- As soon as the solution does not flow out due to a decrease in pressure, screw on the filler neck and inflate the tyre to a pressure of 160 kPa (23,2 PSI).
- After the tyre has been inflated, remove the filler neck and screw the valve insert back on.

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

Add anhydrous calcium chloride $CaCl_2$ to water, never vice versa!

Wash away spilled solution with clean water.

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

2.8. How to transport the Machine

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

When moving on the working site, observe the safety measures applicable to the working site.

When driving for long distances, 1-hour cooling breaks after 3 hours of driving should be taken. Failing that, you are exposed to the risk of damage to the machine for which the manufacturer is not responsible.

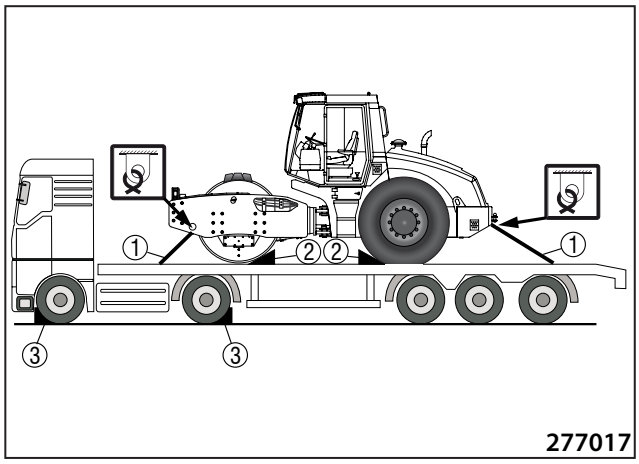
- When on the road, the machine should be transported on a vehicle.

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

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

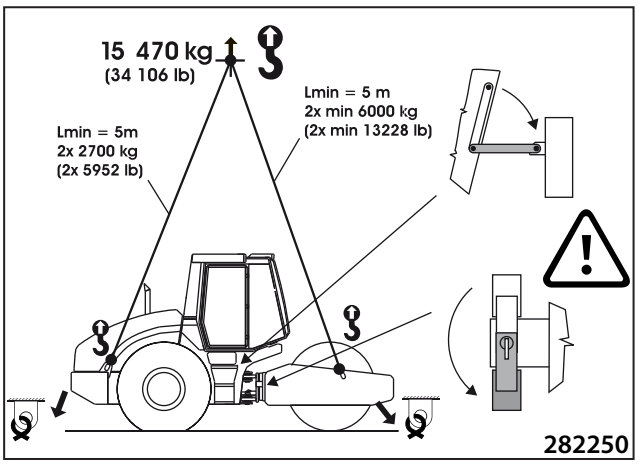
When moving onto the transport carrier you must switch ON the function of Drum Slip Limitation. At the same time we recommend to put rubber bands or wooden planks, etc. underneath the drum.

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



2.8.1. Machine loading

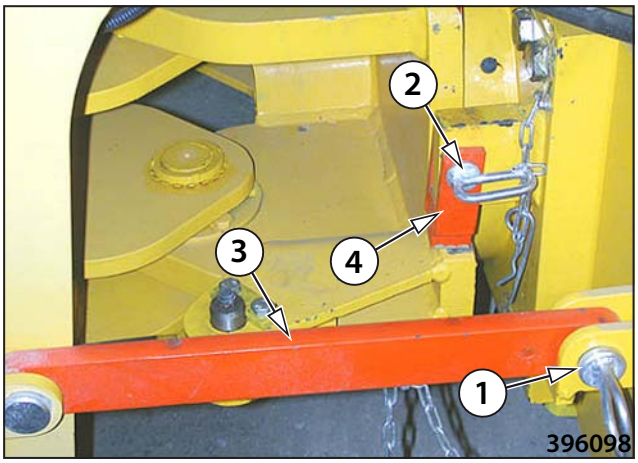
- Use loading ramps or crane to load the Machine onto the transport carrier.
- When loading with crane the Roller is fitted with lifting lugs - refer to the Fig. showing the lifting method.
- When lifting the Roller the Machine's joint shall be secured against turning.



When loading and unloading the machine, it is necessary to observe the provisions of ISO 12480-1 and to use slings under EN 1492-4+A1.

How to secure the joint:

- Fold down the arm 3, turn the cotters (scotch blocks) 4, insert pins 1, 2, lock with safety pin.



Note

The scotch blocks are optional.

Do NOT enter the area under the lifted load!

Upon loading completion, please return the safety arm and cotters to their initial position.

Use corresponding, undamaged riggings of sufficient loading capacity.

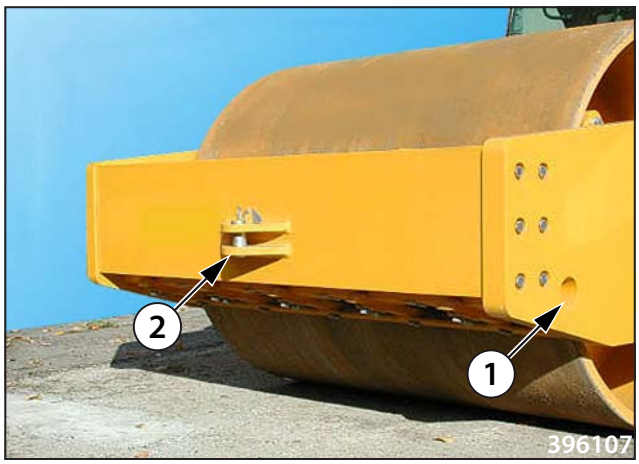
To sling, please use only the lifting lugs on the Machine designed for that purpose.

Only a trained slinger may carry out the slinging.

2.9. Special conditions of the Machine use

2.9.1. Machine towing

- To tow the Machine is equipped with the following: two eyes 1 on the drum frame, plus front towing attachment 2 (optional).



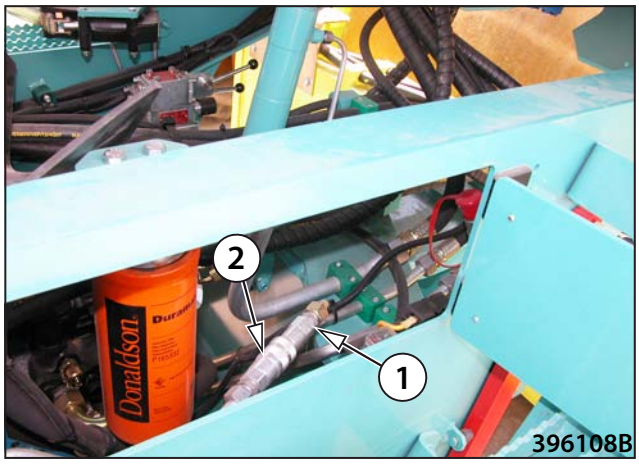
Rear towing attachment.

When towed the Machine shall be attached with both lugs !

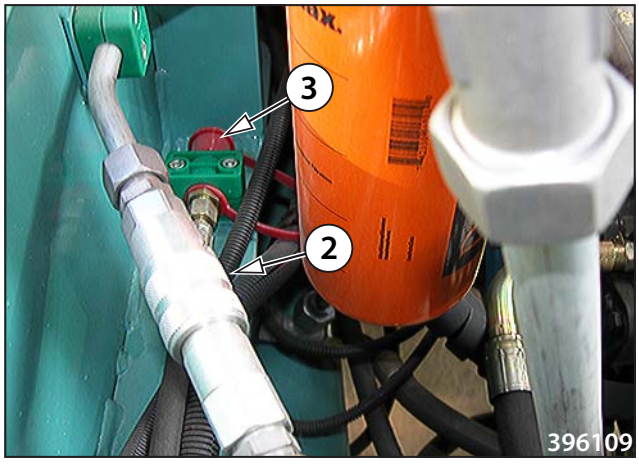
It is forbidden to use the Machine for hauling towed units (e.g. tankers, compressors, dwelling cells, etc.).

How to brake off:

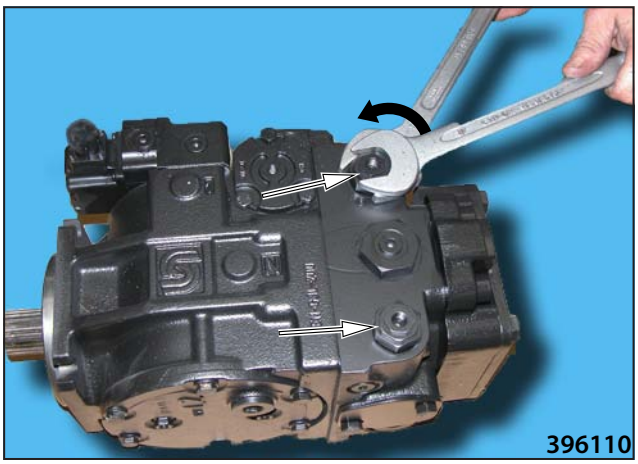
- Disconnect hose 1 in the quick-coupling 2.



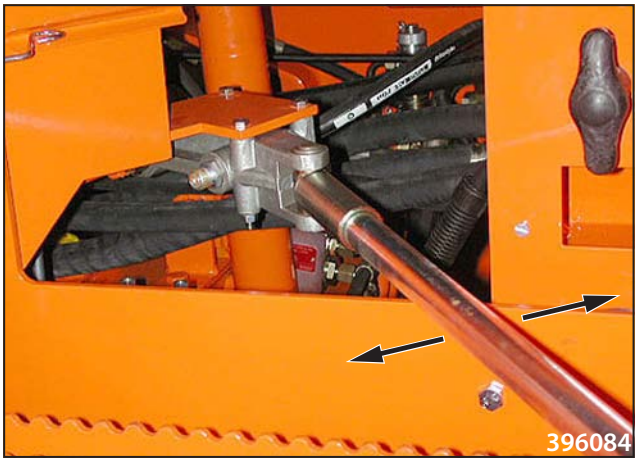
- Loosen hose 3 in the clamp, and connect with quick-coupling 2.



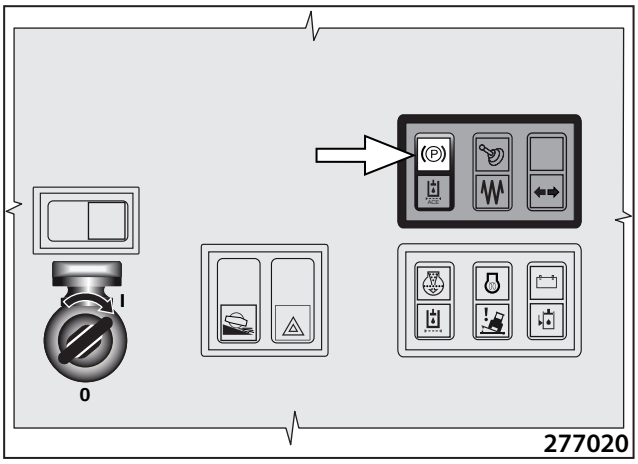
- Cut short the hydraulic circuit of the travel through loosening the centre parts of both multifunctional valves by 3 turns in CCW direction. Spanner 27 mm, (11/16“)



- Pump with the use of hand hydrogenerator.



- Watch until brake indicator lamp goes OFF with the ignition key turned ON. Now the Roller is braked off.



When towing is completed, please secure the wheels and drum with scotch blocks (cotters), and put into initial state.

How to put into initial state

- Screw back the multi-purpose valves on the travel hydrogenerator.
- Disconnect hose 3 at the quick-coupling 2.
- Connect hose 1 back with pressure filter quick-coupler 2.
- Attach hose 3 in clamp.
- Put hand hydrogenerator lever into the holder underneath the Driver’s control stand.

2.9. Special conditions of the Machine use

When braking off the gearbox, hydro motors and short-circuiting the hydraulic loop of the travel, it will not be possible to use operating, emergency or parking brakes! All brakes are now disabled!

Due to the seepages the pressure may drop when towing; check brakes do not heat up due to insufficient braking off.

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

No person may stay on a towed Machine where engine does not work.

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

It will be required to keep moving continuously when hauling. Do NOT exceed hauling speed of over 2 km/hr. (1.2 mph).

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

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

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

Do NOT start the engine when towing the Machine.

A sunk Roller can be hauled for a short distance if its engine is running and the drive and steering work. Driver on hauled Roller must steer the Roller in hauling direction.

Unless the engine works, measures have to be taken to avoid any damage to the steering, drive and brake that are not effective.

- These are general requirements for safe hauling of a broken Machine under normal conditions. Any and all different situations that may occur while hauling, shall be discussed with the dealer.

2.9.2. Machine operation during running-in

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

2.9.3. Machine operation at low temperatures

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

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

Preparation for work under low temperatures:

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

Note

Warm the batteries to ca 20 °C (68 °F) (removing the batteries and storing them in a warn room) to lower the limit temperature for starting by 4 to 5 °C (39,2 to 41 °F).

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

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

! CAUTION !

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

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

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

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

2.9.4. Operating the Machine at high temperatures and humidity

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

- Each 10 °C (50 °F) increase of temperature means capacity drop of up to 4 % (at constant humidity)
- Each 10 % increase of relative humidity means capacity drop of up to 2 % (at constant temperature).

Machine cooling will improve through hot air removal away from engine compartment when you remove the fender shields of the bonnet.

Note

For oil of HV 46 class the max admissible oil temperature will be 80 °C (144 °F), for HV 32 oil the max admissible oil temperature will be 70 °C (158 °F).

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

2.9.5. Operating the Machine at high altitudes

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

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

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

The machine may be used up to a maximum altitude of 3,658 m (12,000 ft).

2.9.6. Work of the machine in the dusty environment

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

2.9.7. Driving with vibrations on compacted and hard materials

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

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

Note

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

Notes

Notes

3. MAINTENANCE MANUAL

ASC 110
(Cummins Tier 3)

3.1. Safety and other measures for machine maintenance

3.1.1. Safety of machine maintenance

Carry out lubrication, maintenance and adjustments:

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

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

3.1.2. Fire precautions during operation media exchanges

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

  IInd Hazard class – Diesel oil

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

3.1.3. Ecological and hygienic principles

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

Hygienic principles

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

  We call your attention to the following in particular:

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

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

Ecological principles

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

This category of waste products includes the following in particular

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

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

3.2.1. Engine oil

Engine oil is specified by its performance and viscosity classifications.

Performance classification according to

API (AMERICAN PETROLEUM INSTITUTE)

CCMC (COMMITE of COMMON MARKET AUTOMOBILE CONSTRUCTORS).

ACEA (ASSOTIATION DES CONSTRUCTEURS EUROPÉENS DE AUTOMOBILE)

Viscosity classification

To determine SAE (Society of Automotive Engineers) viscosity class, the ambient temperature and type of operation in place of usage of the machine are decisive.

Permitted oil according to API: CH-4/SJ; CI-4/SK

All season - SAE 15W-40 (e.g. Valvoline, Premium Blue,).

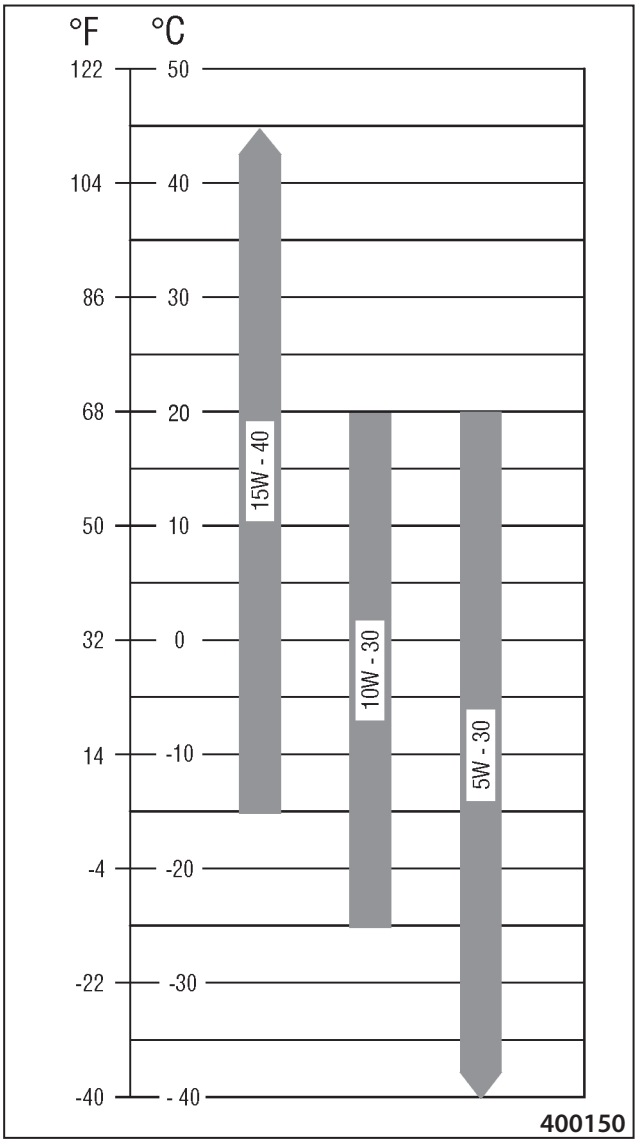
NOTE

Exceeding of the lower temperature limit does not damage the engine, it may only cause starting problems.

It is suitable to use general-purpose multi-grade oil in order that oil need not be exchanged because of ambient temperature changes.

Use of synthetic engine oils is permited subjekt to the same performance and viskosity limitations of minarel (petroleum) based engine oils. The same oil change intervals must be applied to the synthetic oils that are applied to mineral (petroleum)based engine oils.

For easier start at temperatures below 0 °C (32 °F), SAE 10W-30 oil is recommended by the engine manufacturer.



! CAUTION !

Oil for the ACE drum vibrator: SAE 10W-40; API CI-4.

Exceeding the upper temperature limit must not last for long, taking into consideration reduced lubricating properties of oil.

When using oil according to API CG-4/ SH, the exchange interval should be cut to one half, i.e. 250 hours or 3 months.

3.2.2. Fuel

2151

Diesel is used as fuel:

- CEN EN 590
- ASTM D 975-88: 2-D

NOTE

Engine producer recommends to use fuel with sulphur content less than 0.05 weight percent.

Therefore use winter Diesel fuel at outdoor temperatures below 0 °C (32 °F). Special Diesel fuel with additives intended for very low temperatures must be used at outdoor temperatures below -15 °C (5 °F) (”super Diesel”).

Use of biofuel (Diesel fuel)

Using the fuel mixture under the trade name of Bionafta is in principle approved by the engine manufacturer for the engine on the machine if it conforms to the specifications under EN 14214 or ASTM D6751.

Before using Bionafta on the machine, make sure that it is supplied by a reputable supplier who supplies fuels corresponding to the above-mentioned standards.

Always ask the supplier of Bionafta for information concerning the condition under which it can be used.

Guarantee for the engine will be rejected when using Bionafta not conforming to the above-mentioned standards and if the fuel system or engine is damaged as a result of using improper Bionafta!

! CAUTION !

When using Bionafta, power can be reduced by up to 12% depending on the used mixture of Bionafta. Therefore, do not adjust the engine or the setting of the injection pump for increasing the power in any case. Never mix the fuel mixture at the place of use.

Bionafta has a higher cloud point at a low ambient temperature, which leads to the creation of wax crystals in the fuel resulting in the fuel filter clogging.

When using Bionafta, it is necessary to shorten the intervals of the engine oil exchange and replacement of an oil filter and fuel filter.

When changing over to Bionafta, the action of Bionafta releases corrosion and impurities created on the fuel tank internal walls. Impurities are brought by the fuel to the filter catching them and the filter must be replaced afterwards.

Bionafta has a higher ability to absorb atmospheric moisture, which results in the condensation of atmospheric moisture on the internal walls of the tank and a higher content of water in the fuel and the need for more frequent discharging of water from the fuel filter separators. The possibility of the occurrence of the problem increases in cold weather.

If Bionafta (Biodiesel) is used all the year round, it is necessary to clean the fuel system under the engine operation with a clean diesel fuel for at least 30 minutes before parking the machine for longer than 3 months. Further, it is necessary to drain off the fuel tank, clean it, and either fill it with diesel fuel or minimise the occurrence of moisture and limit the microbiological growth inside the tank. Consult the measures with the fuel supplier.

3.2.3. Coolant

Use coolant consisting of 50% of frost-resistant ethyl glycol agent and water. Use the coolant with antifreeze even in zones where temperatures do not fall below -36 °C (-34 °F). The coolant is not only protecting the cooling system against frost but increases also the boiling point. Inhibitors contained in the antifreeze protect parts of the engine cooling system and extend their life. Propylene antifreeze may also be used as coolants.

Do not use more than 50% of antifreeze in the coolant, unless absolutely necessary.

Never use a ratio higher than 68 %.

Their mutual mixing is not recommended. Anti-corrosive properties may be lost when mixing different types of coolants.

Nitric amines dangerous to health are formed when mixing the nitride-base antifreeze and the amine-base agent.

Check the ratio of antifreeze in the coolant before wintertime using a refractometer (hydrometer).

3.2.4. Hydraulic oil

For use in the hydraulic system of the machine, only high-quality hydraulic oils of output class according to ISO 6743/HV (equal to DIN 51524 part 3 HVLP; CETOP RP 91 H).

Standardly refill the machines with hydraulic oil of kinematic viscosity 68 mm^2/s at the temperature of 40 °C (104 °F) ISO VG 68. This oil is the most suitable one to use in the broadest range of ambient temperatures.

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

Should it be required to start the machine at temperatures below –8 °C (18 °F) lasting more than one month, replace oil in the hydraulic system with one of kinetic viscosity 46 mm^2/s - viscosity class HV 46.

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

Synthetic hydraulic oil

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

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

3.2.5. Gearbox oil

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

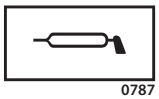
Viscosity SAE 80W/90 for outdoor temperature range -10 °C÷ +30 °C (14 °F ÷ 86 °F).

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

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

Oil for the drum vibration regulation gearbox: SAE 75W-90; API GL-4/GL-5; MIL-L 2105E

3.2.6. Lubricating grease



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

ISO 6743/9 CCEB 2

DIN 51 502 KP2K-30

3.2.7. ACE drum cooling liquid

Mixture:

53 l of water

14 kg of calcium chloride $CaCL_2$

0.3 kg of burnt lime CaO

3.2.8. Vibrator cooling mixture

Mixture:

55 l of water

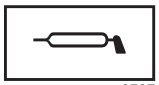
17 kg of calcium chloride - $CaCl_2$

0,26 kg of slaked lime (calcium hydroxide) - $Ca(OH)_2$

3.2.9. Windshield washer liquid

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

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

Fills of...	Type of fill	Quantity l (gal US)	Brand
Engine	Engine oil according to chapter 3.2.1.	11 (2,9)	 2412
Fuel tank	Diesel according to chapter 3.2.2.	410 (108,3)	 2151
Hydrostatic system	Hydraulic oil according to chapter 3.2.4.	90 (23,8)	 2158
Drum gearbox	Gearbox oil according to chapter 3.2.5.	4,2 (1,11) - HD, HDPD 4,8 (1,27) - HT, HTPD	 2186
Axle gearbox	Gearbox oil according to chapter 3.2.5.	2x2,8 (2x0,7)	 2186
ACE vibration regulation gearbox	Gearbox oil according to chapter 3.2.5.	6 (1,59)	 2186
Joint bearings - joint and steering cylinder	Plastic grease according to chapter 3.2.6.	as required	 0787
Engine cooling system - coolant	All year round - anti-freeze liquid according to chapter 3.2.3. for temperatures down to -25 °C (-13 °F)	32 (8,45)	 2152
Vibrator box	Engine oil according to chapter 3.2.1.	8 (2,1)	 2412
ACE vibrator box	Engine oil according to chapter 3.2.1.	16,8 (4,4)	 2412
Battery	Distilled water	as required	 2587
Windshield washers	Water and antifreeze - ratio according to out-door temperature	2,75 (0,72)	 2260
Tires	Air or liquid see Operating Instructions chapter 2.7.8.		
ACE drum cooling liquid	Mixture according to chapter 3.2.7.	53 (14)	 2152
Vibrator cooling mixture	Vibrator cooling mixture according to chapter 3.2.8.	60 (15,85)	 2152

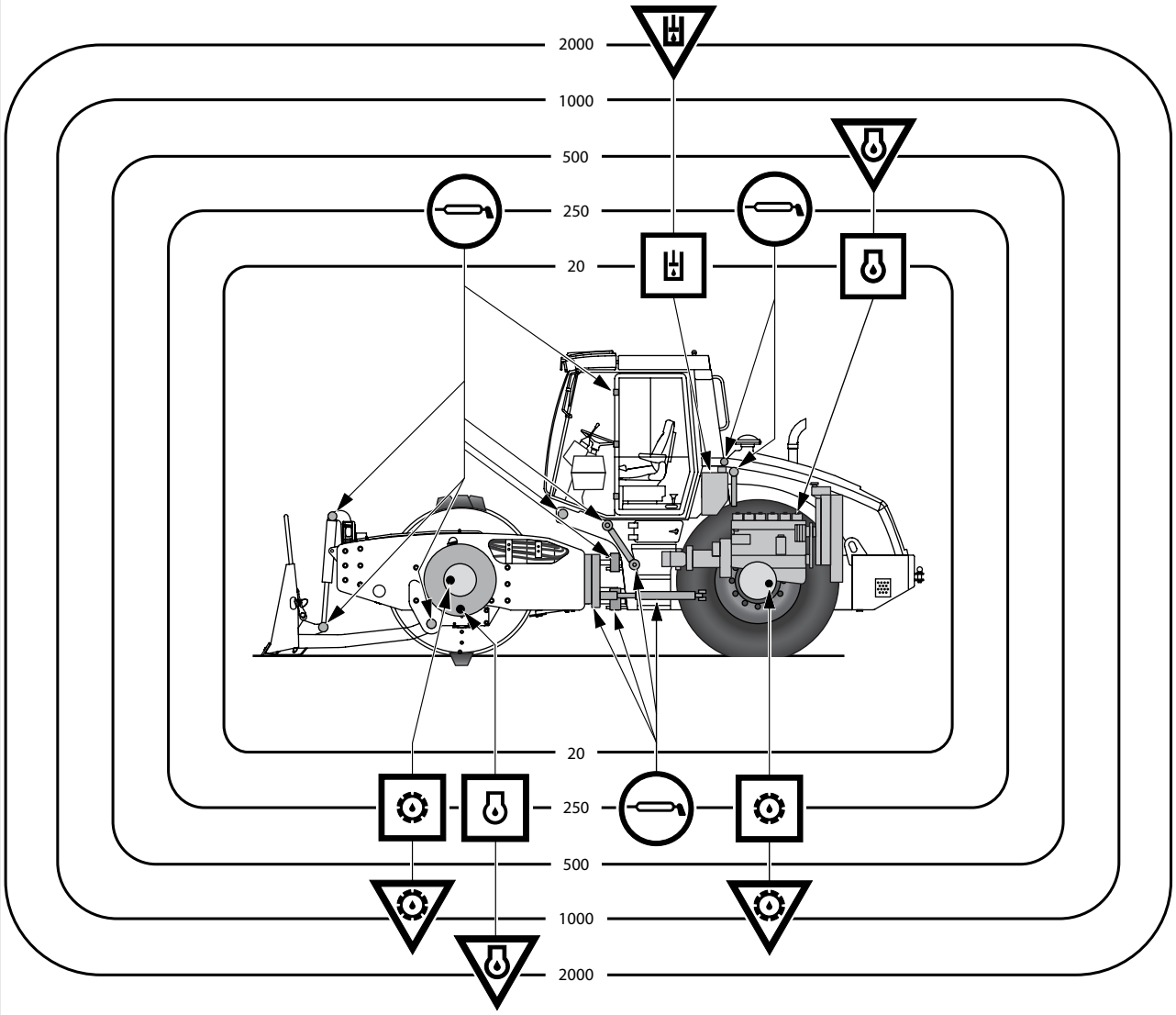
3.4. Lubrication and Maintenance Chart

After 20 hours of operation (daily)	
3.6.1.	Engine oil level check
3.6.2.	Engine cooling liquid level check
3.6.3.	Hydraulic tank oil level check
3.6.4.	Crankcase breather tube
3.6.5.	Check of the fan and engine belt condition
3.6.6.	Checking the vacuum valve of the air cleaner
3.6.7.	Checking warning and control device
After 100 hours of operation (weekly)	
3.6.8.	Checking the tyre pressure
After 250 hours of operation (3 months)	
3.6.9.	Checking the engine inlet piping
3.6.10.	Check of the fan and engine belt condition
3.6.11.	Check of coolers
3.6.12.	Battery check
3.6.13.	Air filter sensor check
3.6.14.	Machine lubrication
3.6.15.	Checking oil in the vibrator
3.6.16.	Check of oil level in the travel gearboxes
3.6.17.	Inspect the pad foot segments
After 500 hours of operation (after 6 months)	
3.6.18.	Replacing oil in the engine
3.6.19.	Fuel filter replacement
3.6.20.	Engine cooling liquid check
3.6.21.	Check of wiring
3.6.22.	Checking tightening bolts of wheel
After 1,000 hours of operation (after 1 year)	
3.6.23.	How to check tightening pulley and belt of the engine
3.6.24.	Oil exchange in the travel gearboxes *
3.6.25.	Checking the damping system

After 2,000 hours of operation (after 2 years)	
3.6.26.	Checking, adjusting the valve clearance **
3.6.27.	Oil exchange in the vibrator
3.6.28.	Vibration ACE Control Gearbox
3.6.29.	Exchanging hydraulic oil and filter
3.6.30.	Cab and bonnet raising and lowering suction strainer unit cleaning
3.6.31.	Exchanging the engine cooling liquid
Maintenance - As Needed	
3.6.32.	Exchanging cleaner elements of air cleaner
3.6.33.	Cleaning of the water separator on the fuel filter
3.6.34.	Cleaning of coolers
3.6.35.	Cleaning the air cleaner of cabin ventilation
3.6.36.	Cleaning the machine
3.6.37.	Adjusting scrapers
3.6.38.	Vibrator cooling mixture
3.6.39.	Check of the screw connection tightening
3.6.40.	Printer paper replacement
*** First after 100 hours** **** First after 5000 hours**	

LUBRICATION PLAN

☐ CONTROL
○ LUBRICATE
▽ EXCHANGE



	Engine oil:	**SAE 15W/40**	**API CI-4**
	Hydraulic oil::	**ISO VG 68**	**ISO 6743/HV**
	Grease:	**ISO 6743/9**	**CCEB 2**
	Transmission oil:	**SAE 80W/90; SAE 80W/140**	**API GL-5**

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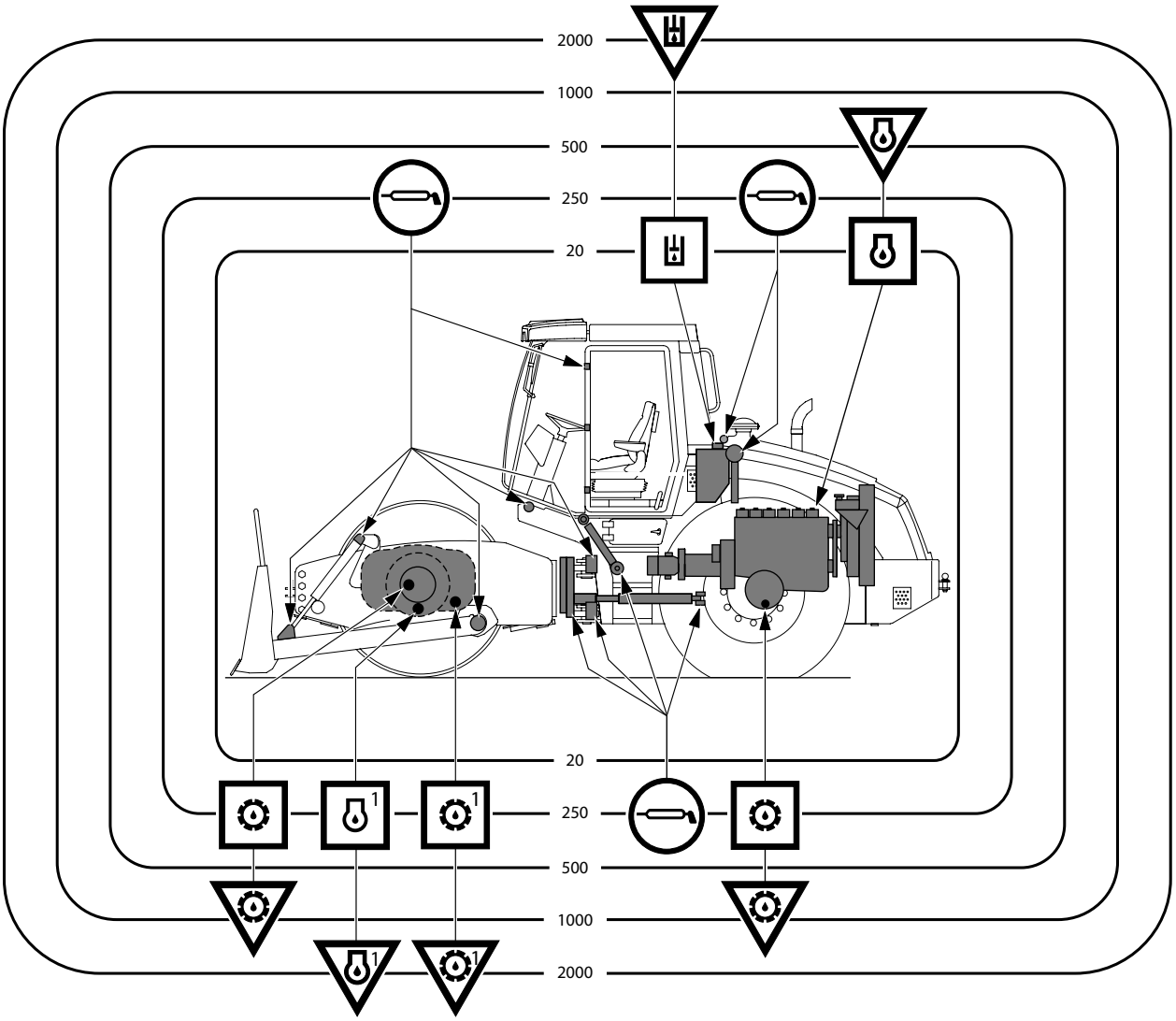
LUBRICATION PLAN - ACE

□	CONTROL
○	LUBRICATE
▽	EXCHANGE



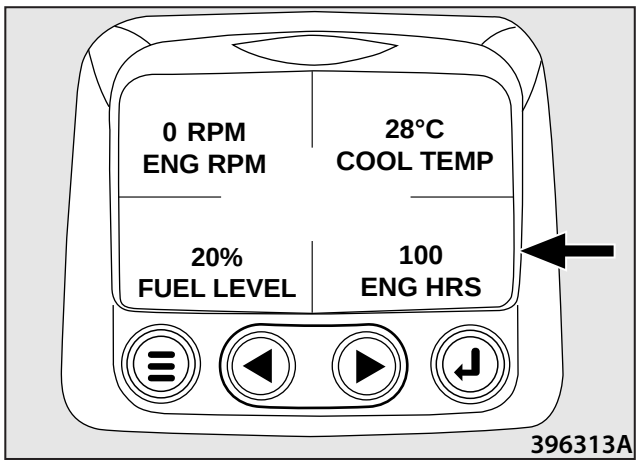
	Engine oil:	**SAE 15W/40**	**API CI-4**
1	Engine oil:	**SAE 10W/40**	**API CI-4**
	Hydraulic oil:	**ISO VG 68**	**ISO 6743/HV**
	Grease:	**ISO 6743/9**	**CCEB 2**
	Transmission oil:	**SAE 80W/90; SAE 80W/140**	**API GL-5**
1	Transmission oil:	**SAE 75W/90**	**API GL-5**

1 Applicable to the rollers with the ACE system

ACE24en

3.6. Individual Operations of Maintenance

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



! CAUTION !

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

Tighten the removed or loosened bolts, plugs, threaded joints of the hydraulics, etc. with tightening torque according to the Chart in par. 3.6.39. unless another value is provided with the respective operation.

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

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

3.6.24. Oil exchange in the travel gearboxes

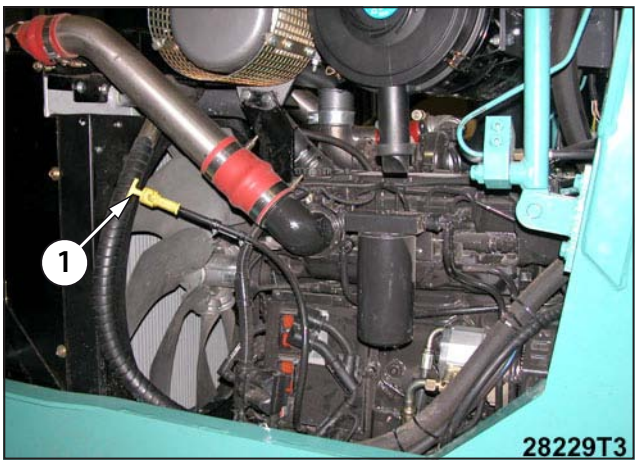
Following the first 5000 hours of operation of the new Machine (following a major overhaul) carry out as per:

3.6.26. Checking, adjusting the valve clearance

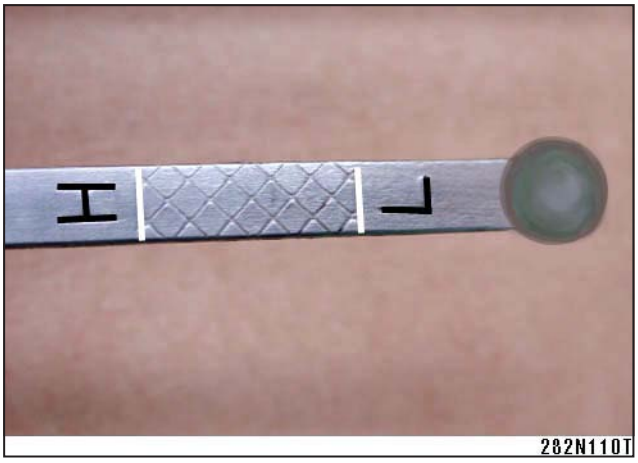
After 20 hours of operation (daily)

3.6.1. Engine oil level check

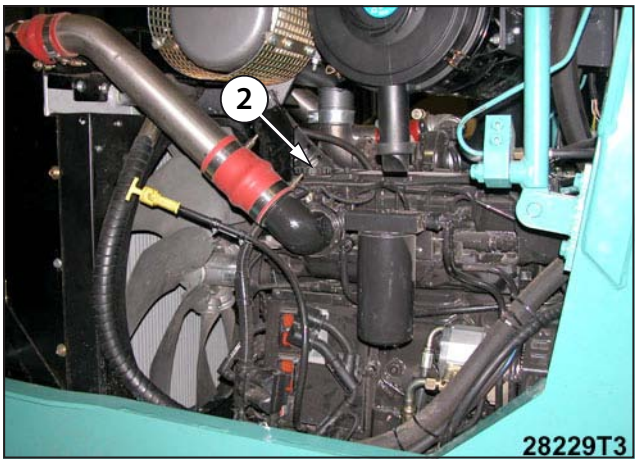
- Wait approx. 5 min. until oil runs down to the engine sump.
- Take out the oil dipstick 1, wipe it, insert fully back and take it out again to read out the oil level.



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



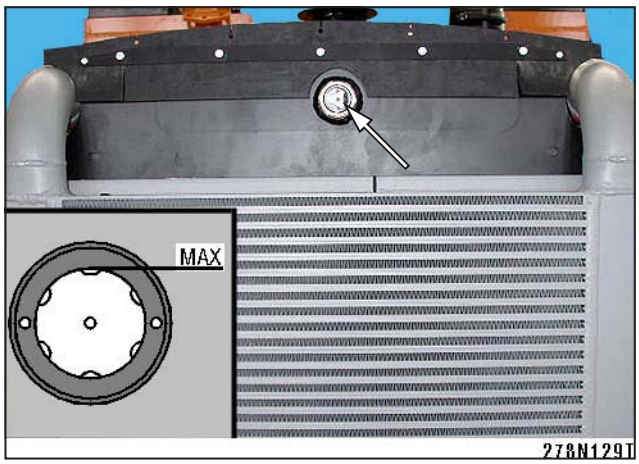
- Refill oil after removing the filler plug 2 through the oil filler. Wait approx. 1 min until the level is stable and check again.
- Refill the identical type of oil. Use oils according to chapter 3.2.1.
- Check the engine for leakage, repair possible causes.
- Check the engine for damaged and missing parts and for changes in appearance.



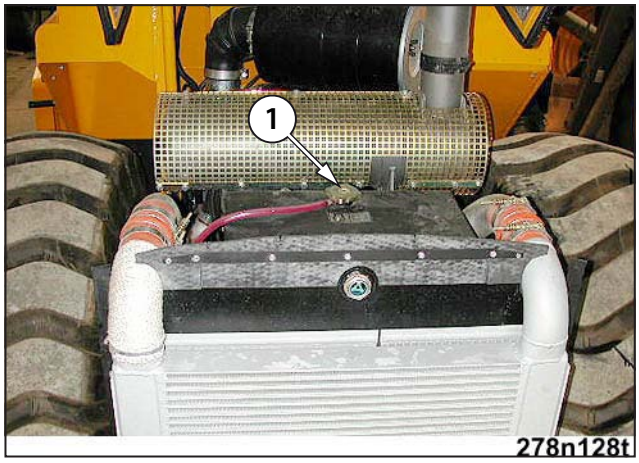
Do not use the engine unless the oil level in the engine is correct.

3.6.2. Engine cooling liquid level check

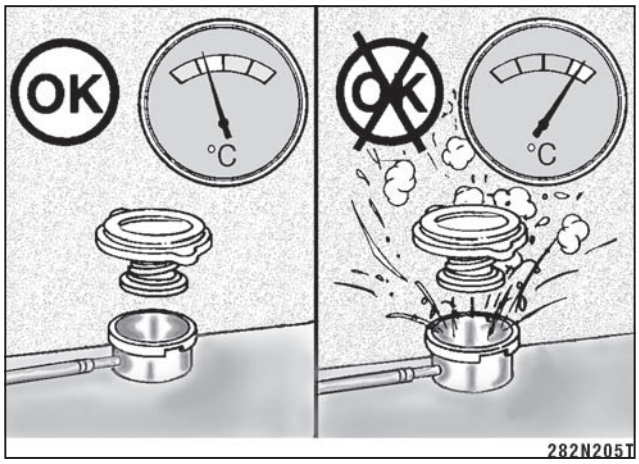
- Let cooling liquid cool down to less than 50 °C (120 °F).
- Check visually the level.



- Refill coolant through the filler 1.



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



The level must not fall below the level indicator eyesight.

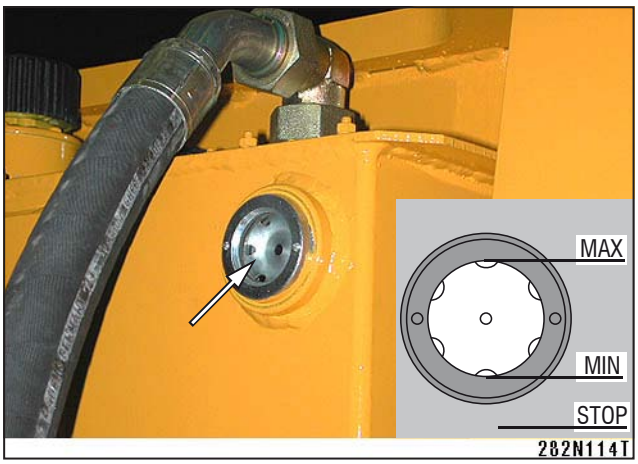
Refill only cooling liquids containing the frost-resistant agents on the identical basis, according to chapter 3.2.3.

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

Do not refill cold cooling liquid into hot engine. Engine castings might get damaged.

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

3.6.3. Hydraulic tank oil level check



- Check and maintain oil level. Indicator lamp will signal any oil loss below "STOP" (engine stops).

Note:

Engine can be started only after oil is filled up.

! NOTE !

If the oil level falls below the lower edge of the "MIN" oil-level indicator, the engine will automatically stop and signal lamp 27 will light up.

NOTE

In case of more extensive losses find the location of hydraulic system leaks and repair the cause.

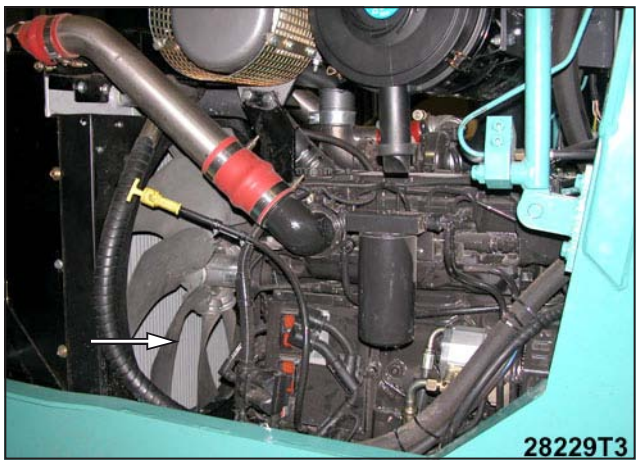
By stopping the engine in case of oil leakage, the hydraulic system of the machine is protected and operation is environment-friendly, since in case of hydraulic hose damage not all the content of the hydraulic tank but only limited amount would leak out. The engine can only be started after refilling oil.

3.6.4. Crankcase breather tube

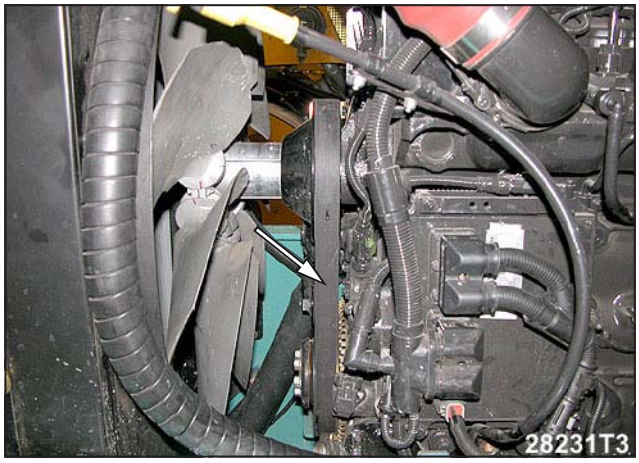
- Check crankcase bleeding pipe to avoid its contamination with deposits.

3.6.5. Check of the fan and engine belt condition

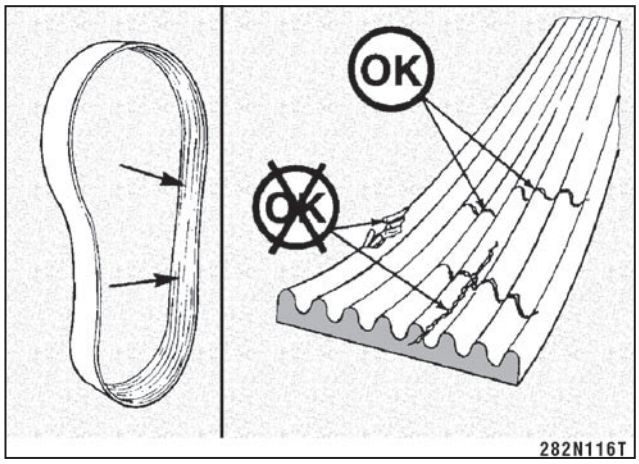
- Check the ventilator visually. In case of any damage (e.g. missing parts of the material, cracks, changes in shape etc.) replace the ventilator.



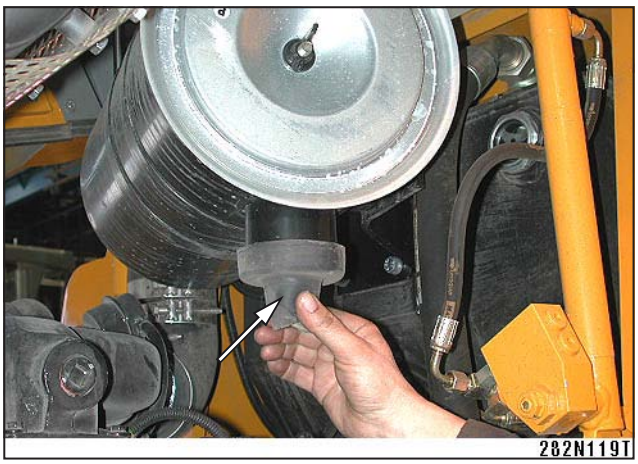
- Check visually the belt for its deterioration.



- Traverse (across the belt width) cracks are acceptable. Longitudinal (direction of belt length) cracks that intersect with traverse cracks are not acceptable. Replace the belt if it is frayed or has pieces of material missing.



3.6.6. Checking the vacuum valve of the air cleaner



- Clean the exit slit and remove the trapped dust by pushing.

NOTE

- Collected dust is stored in the dust valve and automatically emptied during the machine operation.

Do not operate the machine if the dust valve is damaged.

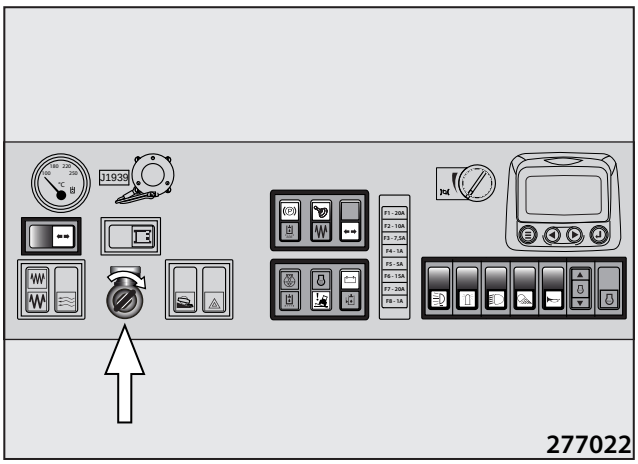
- Check and clean up the pre-filter tray 1 when any contamination deposited reaches the mark, first unscrew the nut 2 and remove lid 3.

NOTE:

Pre-filter is optional and is mounted based on separate order only.

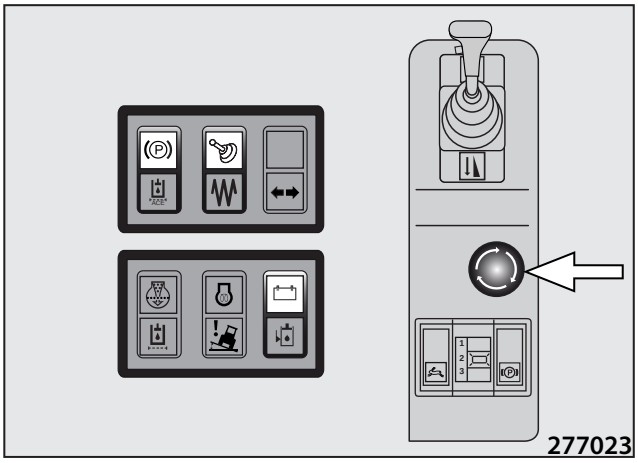
3.6.7. Checking warning and control devices

- Turn ON the switches, test if horn, lights and direction indicators lights work. Turn ON the ignition key to position I, check brake pilot lamps for brake, neutral, and for recharging. ROPS2D indicator lamp will light up shortly along with warning alarm heard.



If ROPS2D indicator lamp continues to flicker, carry out troubleshooting.

- Start the engine, press TOTAL STOP - engine stalling must occur, pilot lamps go ON.



After 100 hours of operation (weekly)

3.6.8. Checking the tyre pressure

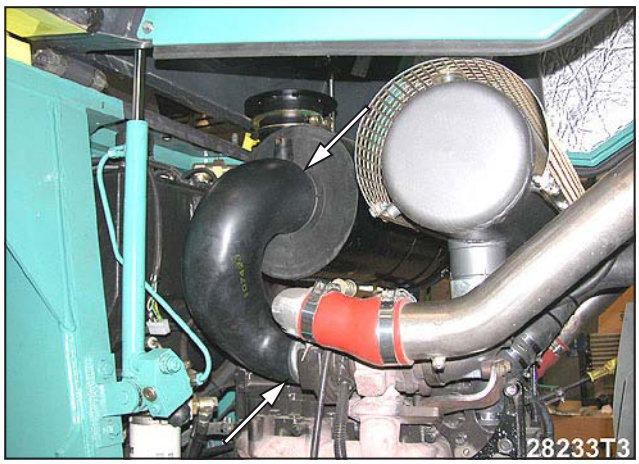
! NOTE !
Rotate tyres so that valves are at top positions.

- Check the pressure in cold tyres, by air pressure meter.
- Keep the tyre pressure at 160 kPa (23.2 PSI).

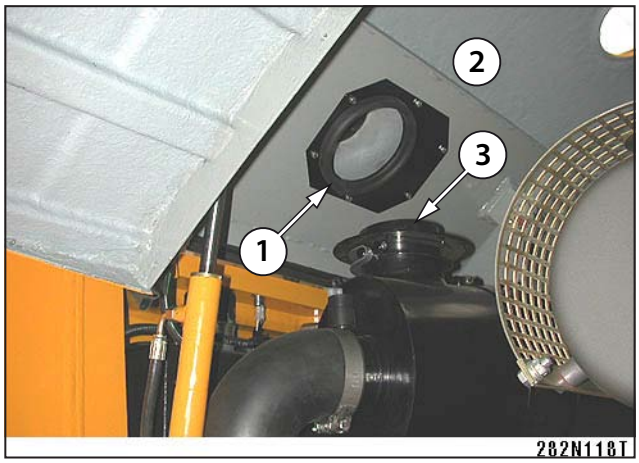
After 250 hours of operation (3 months)

3.6.9. Checking the engine inlet piping

- Check the tightness of engine inlet piping.
- Check for any damage of the rubber hose of the inlet piping leading from the filter, and for missing clamping clips.



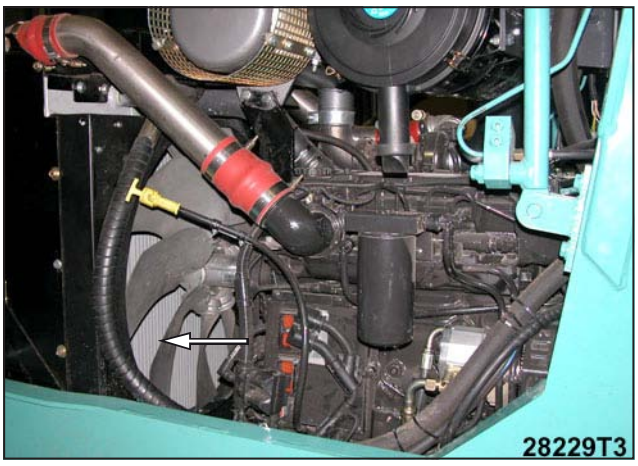
- Check again tightness between the bonnet 2 and the air cleaner 3.
- Replace damaged sealing 1 with a new one.



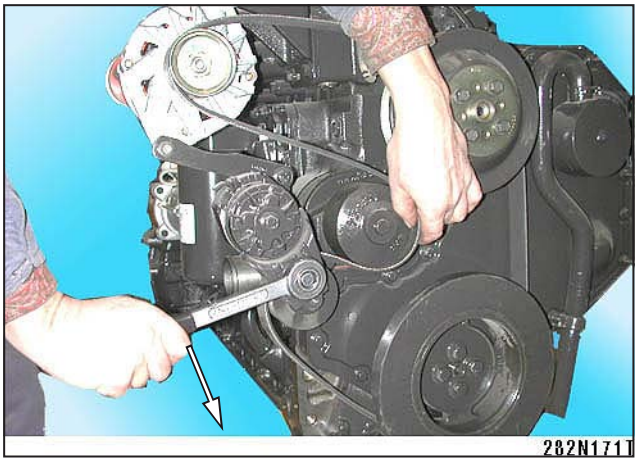
Do not operate the machine if the sealing between the bonnet and the air cleaner is damaged or not tight.

3.6.10. Check of the fan and engine belt condition

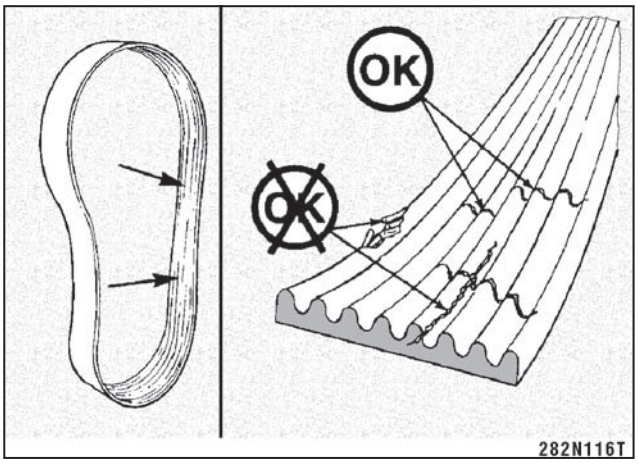
- Check the ventilator visually. In case of any damage (e.g. missing parts of the material, cracks, changes in shape etc.) replace the ventilator.



- Lift the belt-tensioning pulley using the lever and remove the belt.

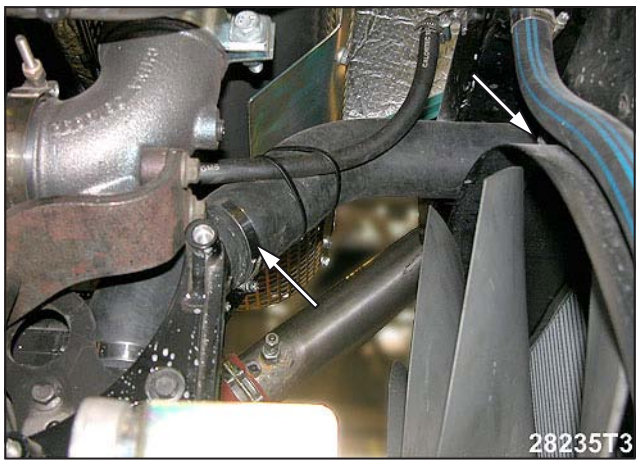


- Check visually the belt, for intersecting crakcks. Traverse (across the belt width) cracks are acceptable. Longitudinal (direction of belt length) cracks that intersect with traverse cracks are not acceptable. Replace the belt if it is frayed or has pieces of materiál missing.

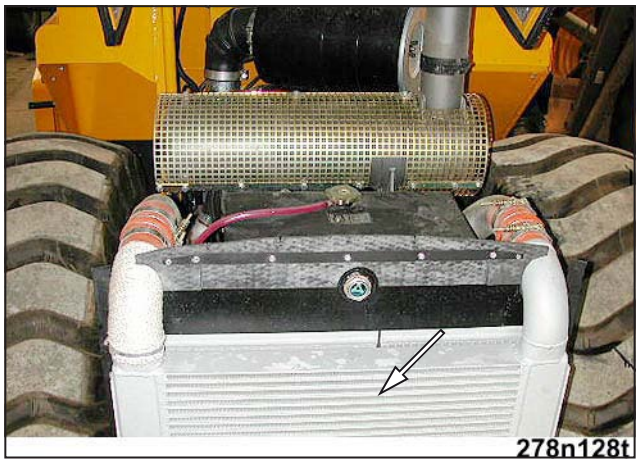


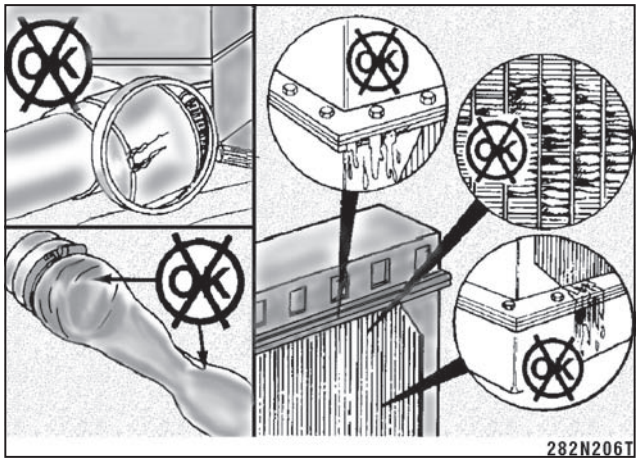
3.6.11. Check of coolers

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

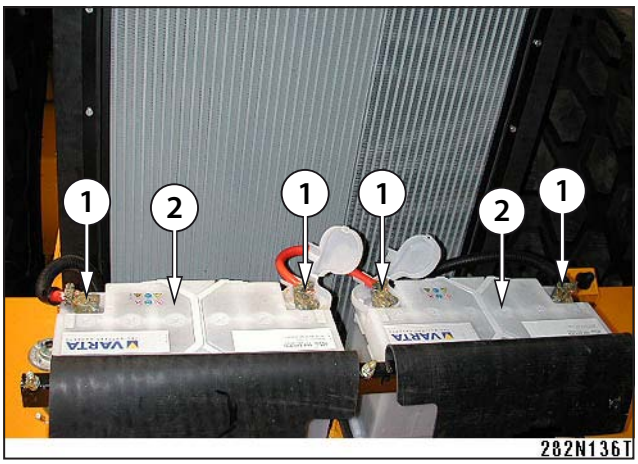


- Check whether the oil cooler gills and the engine radiator gills are not clogged. In case of clogged gills clean them for instance by blowing the radiators through with pressure air (steam or warm water).

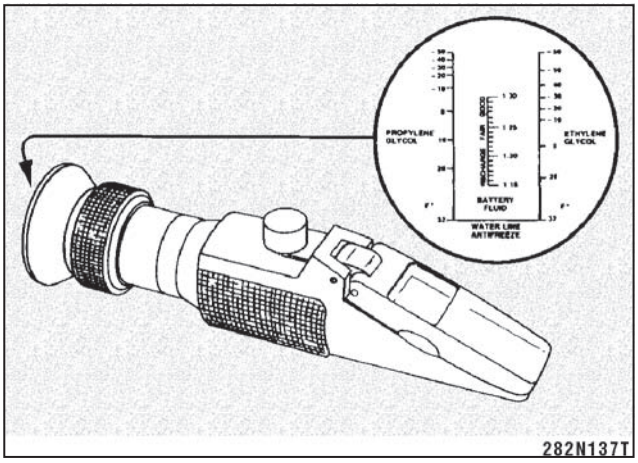




3.6.12. Battery check



- Place the roller onto flat, firm surface.
- Stop the engine and disconnect the electric system using the isolating master switch.
- Clean the surface of batteries.
- Check the condition of poles and terminals 1 and clean them. Slightly wipe terminals with grease.
- Check the level of electrolyte after opening plugs of the battery cells 2 - the level of electrolyte in all cells should be 5 - 15 mm (0.2-0.6 in) above the plates, or to the lower edge of the gauge in the battery cells. Refill the cells whose electrolyte level is lower, than 5 mm (0.2 in) above the plates, with distilled water.



- Measure electrolyte density in the individual cells using a refractometer

or hydrometer.

- Compare measured values with the chart.

	Density			
	in g/cm³		in °Be (Beume)	
	20 °C 68 °F	Tropics	20 °C 68 °F	Tropics
fully charged	1,28	1,23	32°	27°
semi charged	1,2	1,12	24°	16°
exhausted – charge immediately	1,12	1,08	16°	11°

NOTE

- Check the level using a glass tube.
- Should the machine not be used during winter period - for couple of weeks, dismantle the batteries and store them away from frosts. Check batteries and charge level before and during storage.

3.6. Individual Operations of Maintenance

Use protective gloves and eye protection equipment when working with the battery.

Wear suitable dress to protect your skin against staining with electrolyte.

In case of an eye injured by electrolyte immediately wash the eye with flowing water for couple of minutes. Then seek medical advice.

In case of ingestion of electrolyte drink maximum possible amount of milk, water or mixture of magnesium oxide with water.

In case of staining your skin with electrolyte take off your clothes and shoes, wash injured spots with soap water or with solution of soda and water as soon as possible. Then seek medical advice.

Do not eat, drink and smoke during operation!

Wash your hands and face carefully with soap and water after finishing you work!

Do not test whether wires are alive by touching the frame of the machine.

In case of contact of both poles of the battery the short-circuit may cause explosion of the battery.

Keep the batteries dry and clean.

Close batteries after checking.

Refill battery with distilled water only - never with acid.

Refill distilled water immediately before working with the machine or before recharging the battery.

Recharge insufficiently charged battery.

Recharge batteries dismantled from the machine.

Open the plugs before recharging.

Do not disconnect the battery under running engine.

Always follow the instructions of the manufacturer, when working with the battery.

Disconnect the battery to avoid short-circuit when repairing it or manipulating with wires and electric equipment in the circuit of electric system.

Disconnect the minus pole wire first when disconnecting the battery. Connect the plus pole wire first when connecting the battery.

Do not turn batteries upside down to avoid draining of electrolyte from venting of the battery.

In case of spilling electrolyte wash such a place with water and neutralise with lime.

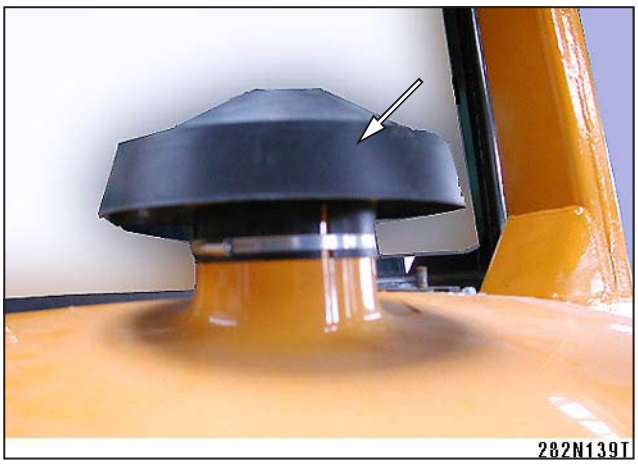
Dispose of old damaged batteries.

! NOTE !

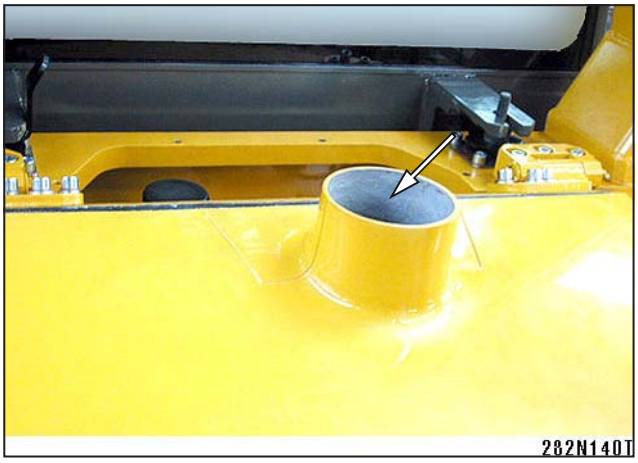
If a maintenance-free battery is installed on the machine, it is not necessary to check the electrolyte level and the electrolyte is not filled up for the whole service life of the battery. Other tasks prescribed above must be performed. Consult the battery discharge condition – the lowest permissible voltage level (measures on the battery terminals) under which the battery could be damaged and the charging procedure with the manufacturer.

3.6.13. Air filter sensor check

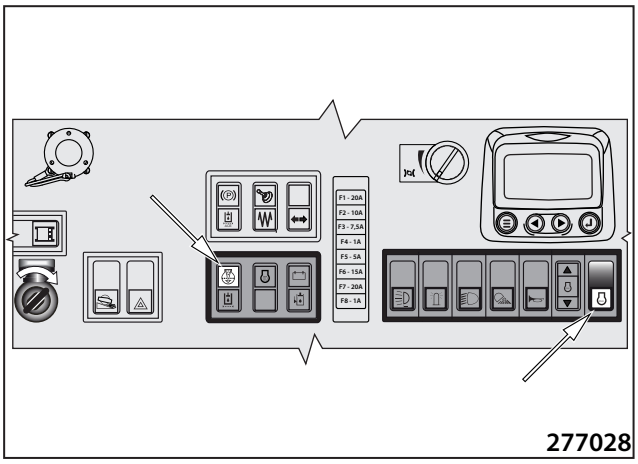
- Remove engine induction cover.



- Cover the air filter suction hole on the engine bonnet.



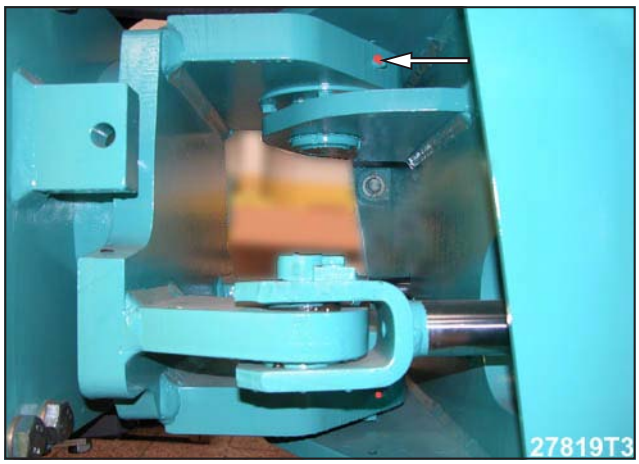
- Start the engine and increase its speed by turning OFF the IDLE switch. Check the filter-fouled indicator lamp goes ON.



- Unless it lights, check the following: vacuum switch, bulb inside indicator lamp, contact, feeder cable.

3.6.14. Machine lubrication

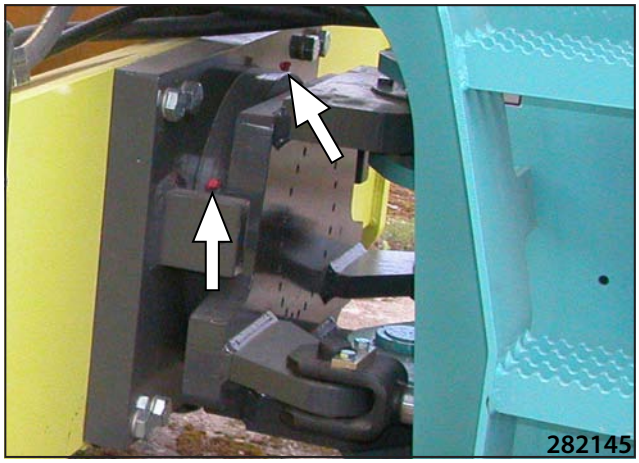
- Remove the caps on the grease nipples.
- Successively mount the grease nipple of pressure lubricator and continue greasing until the old grease starts to drain out.
- Return the grease nipple caps.



Steering

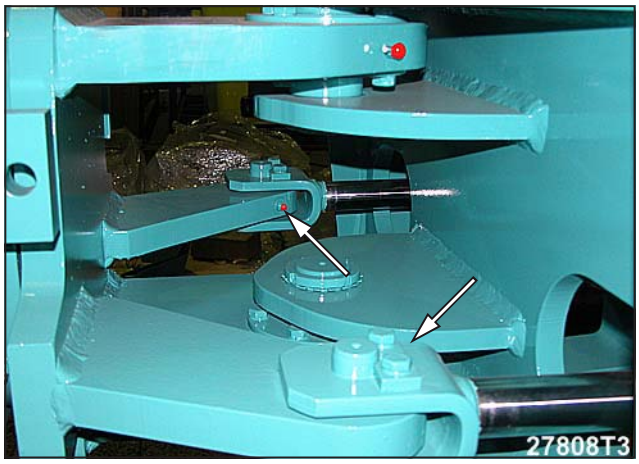
upper bearing, lower bearing

bearing 4x



Steering hydraulic cylinders

front pins 2x



rear pins 2x

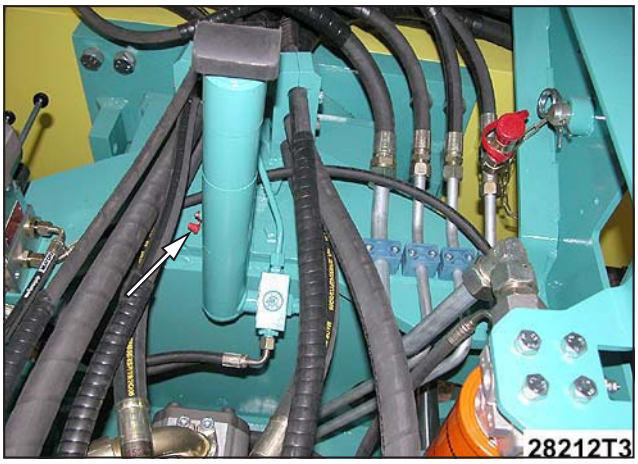
Hydraulic cylinders of bonnet lifting

upper pins 2x

lower pins 2x

Hydraulic cylinder of driver's post lifting

lower pins 2x

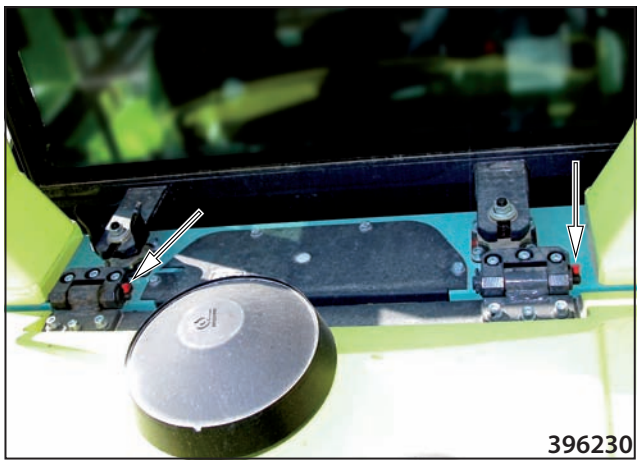


Door hinges pins

pins 6 x

Bonnet hinges pins

pins 2 x

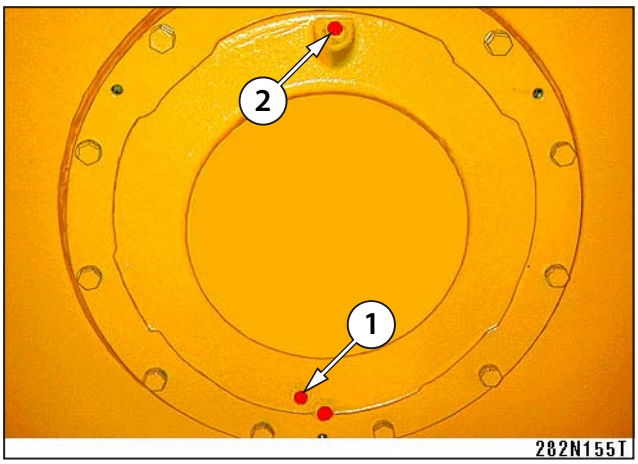


Front pins of cabin attachment

pins 2 x

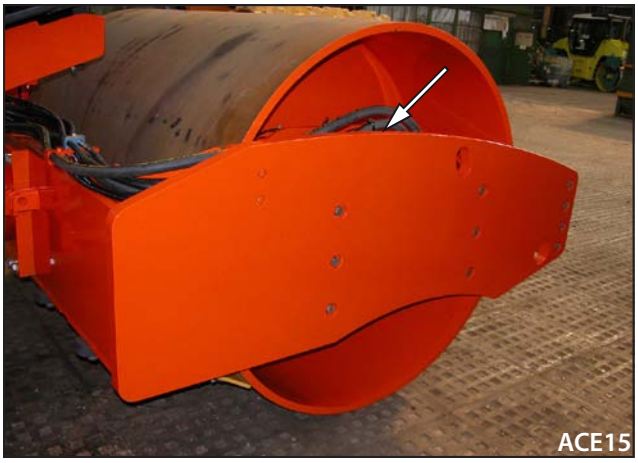
Use only recommended lubricating greases, see chapter 3.2.6.

3.6.15. Checking oil in the vibrator



- Stop the machine on an even firm surface in order that the plugs on the left side of the drum are in the position according to fig.
- Clean the area around the checking plug 1.
- Unscrew the plug 1 and check the oil level. The oil level must reach the checking opening or slightly flow out.
- Refill oil after unscrewing filling plug 2.
- Clean the plugs and mount again.

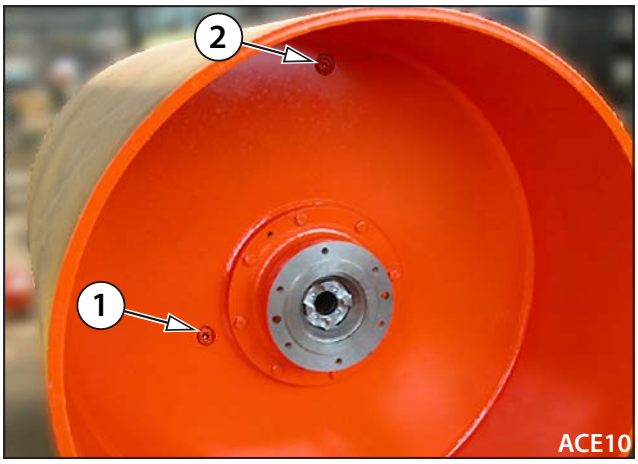
Vibrator Housing ACE



- Location of the vibrator housing.

Note

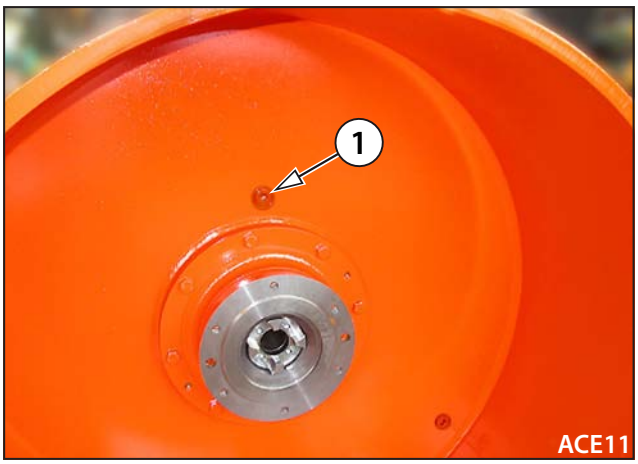
To better illustrate the positions of plugs the drum frame has not been installed.



- Move the Machine so the plug 2 is in its highest position. Check the oil level of plug 1. The oil must reach the low edge of the inspection hole or flow out slightly.

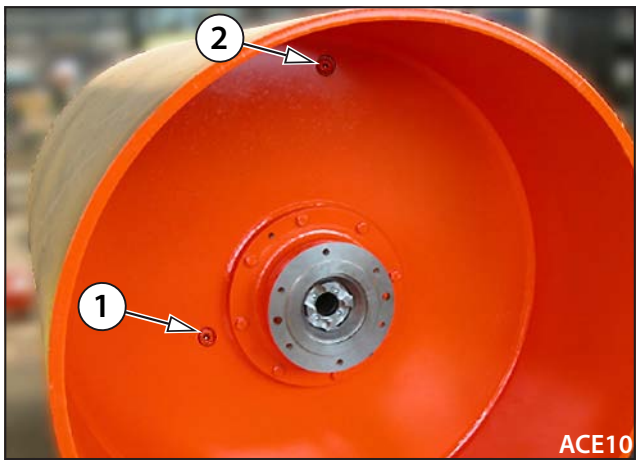
Note

Plug 2 for the drum cooling liquid.



- When oil needs to be replenished, move the Roller a bit so the hole 1 gets to its highest position.

- Then return the roller to the original position and check the level again. Remount the plug 1.



! NOTE !
Check oil when it is cooled down.

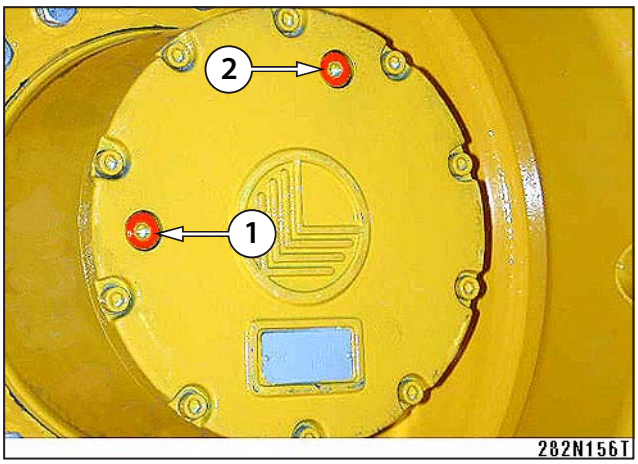
Refill the identical type of oil.

Avoid leakage of oil to the soil.

3.6.16. Check of oil level in the travel gearboxes

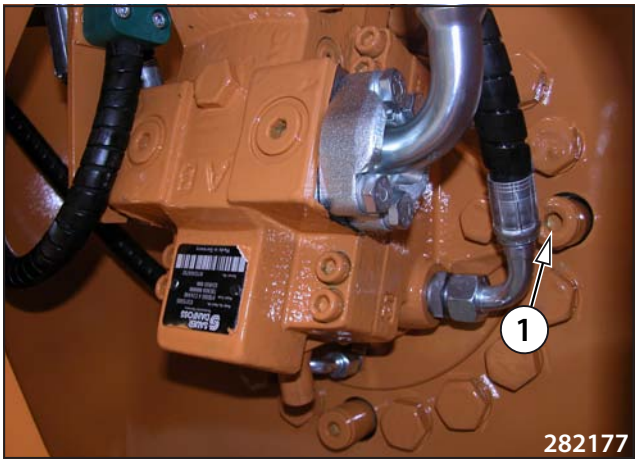
Axle gearbox

- Stop the machine on even, firm surface in order that the gearbox plugs of both wheels are in the position according to fig.
- Clean the area around the checking plug 1.
- Unscrew the plug 1 and check the oil level. The oil level must reach the checking opening or slightly flow out.
- Refill oil through the filling plug 2, if necessary.
- Clean the plugs and mount again.

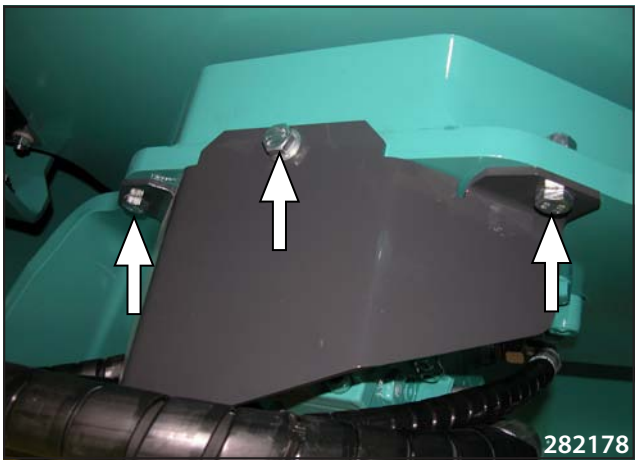


Drum gearbox

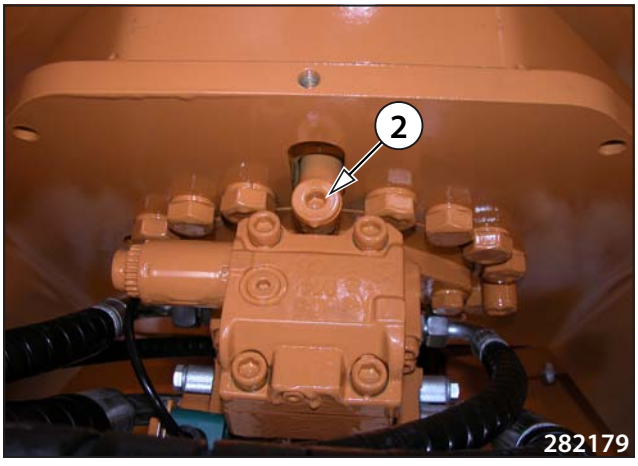
- Clean the area around the checking plug 1.
- Unscrew the plug 1 and check the oil level. The oil level must reach the checking opening or slightly flow out.



- After disassembly the cover.



- Refill oil through the filling plug 2, if necessary.
- Clean the plugs and mount again.
- Check tightness of the gearboxes.



! NOTE !

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

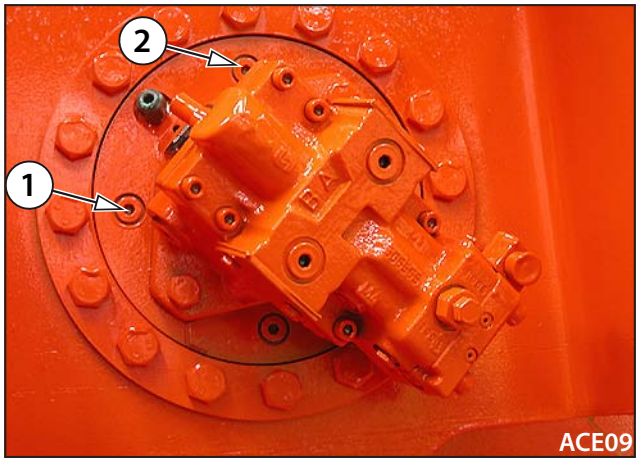
Drum drive gearbox ACE

- Location of drum drive gearbox.

Note:

For better illustration of the position of plugs, the drum frame and gearbox cover are not mounted.

- Clean the place round the check plug 1. Unscrew the plug and check the oil level.
- The level must reach the inspection hole or flow out slightly. Make up the oil via the filler plug, if needed 2. Clean the plugs and reinstall. Confirm the gearbox tightness.



! NOTE !
Check oil when it is cooled down.

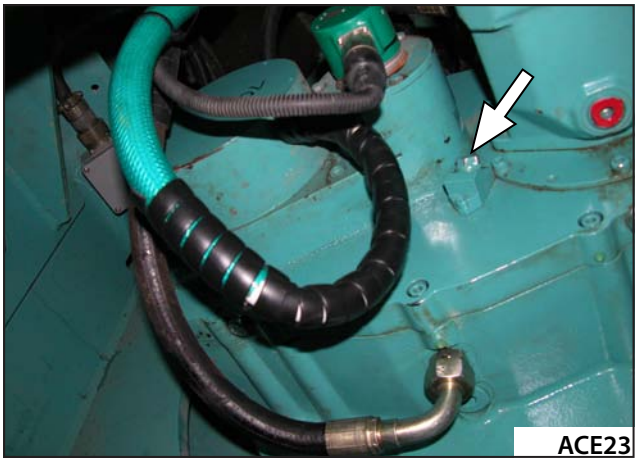
Refill the identical type of oil.

Avoid leakage of oil to the soil.

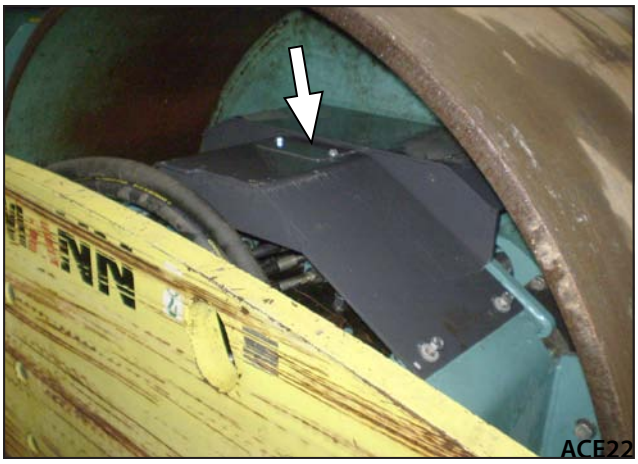
ACE vibration regulation gearbox

- Gearbox regulation location.

- Dismount the inspection plug; the oil level must reach the bottom edge of the hole (slightly flowing out).



- Fill up oil through the oil filler after dismounting the cap so that oil flows out through the inspection hole.



! NOTE !
Check oil when it is cooled down.

Refill the identical type of oil.

Avoid leakage of oil to the soil.

3.6.17. Inspect the pad foot segments

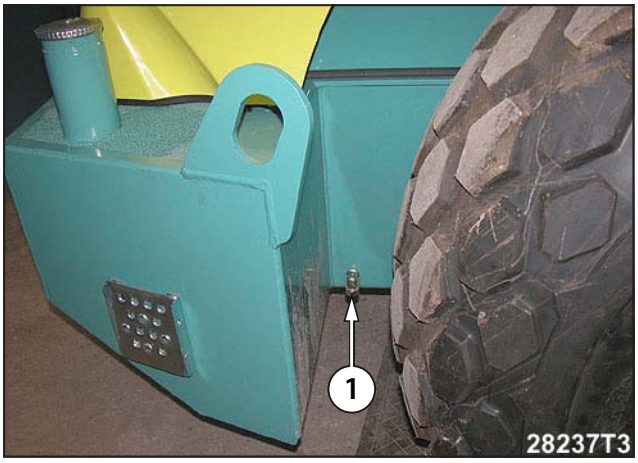
- Before inspection is made, clean the segment surface, and mainly round bolted connections. Check overall condition of the segments (any fissures, deformations) and whether M20 8G bolts are tightened with 390 Nm (287,6 lb ft) torque.

After 500 hours of operation (after 6 months)

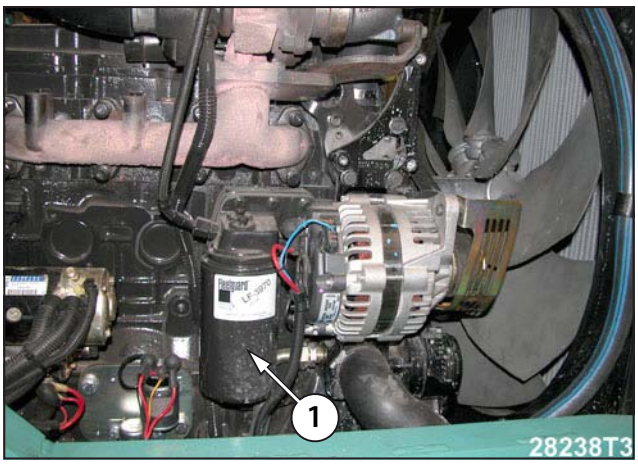
3.6.18. Replacing oil in the engine

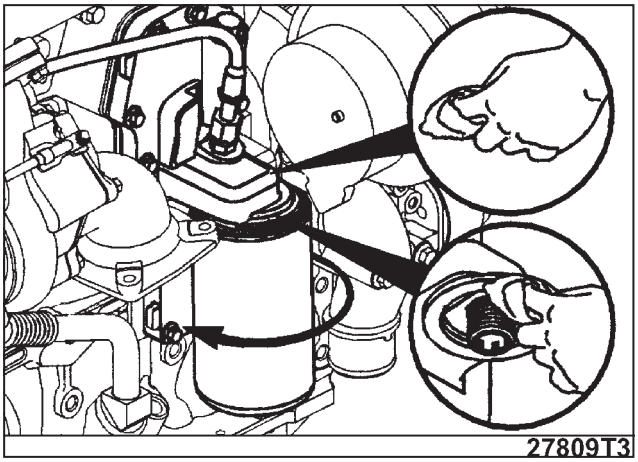
Drain the oil after stopping the operation immediately, when is temperature of cooling liquid 60 °C (140 °F). Alternatively, operate the engine until the cooling liquid temperature reaches 60 °C (140 °F).

- Prepare a suitable container with the capacity of approximately 20 l (21 qt).
- Dismantle the drain plug 1 and let oil drain.
- Mount the plug back.

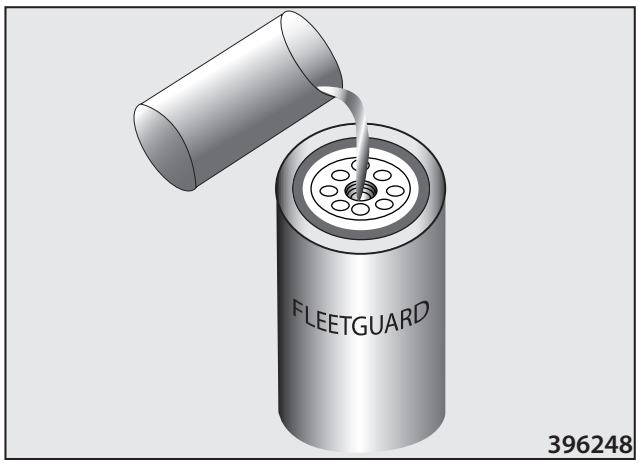


- Clean the area around the oil filter head. Dismantle the filter 1. Clean the contact area of the filter sealing.

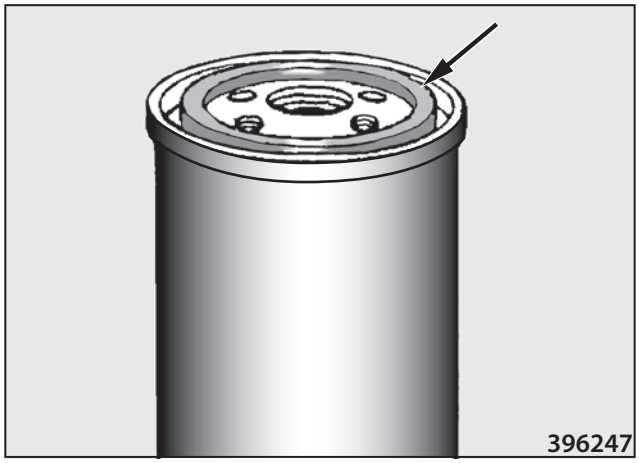




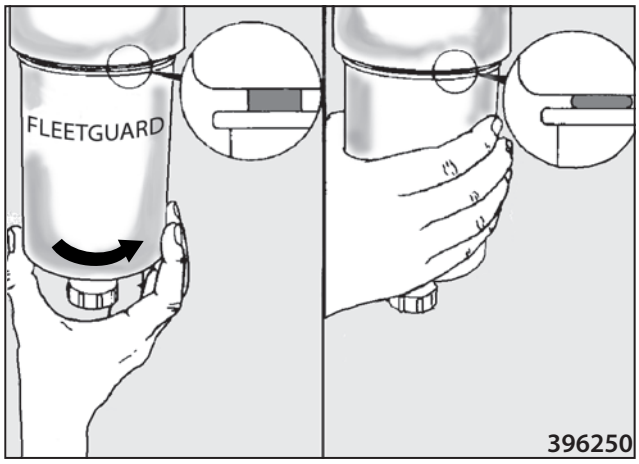
- Take a new filter and fill it with clean engine oil.



- Wipe the sealing with oil.

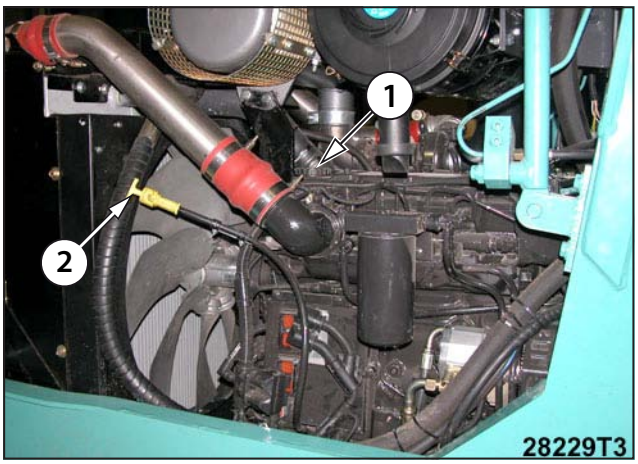


- Tighten 3/4 to 1 turn after gasket makes contact with the filter head.

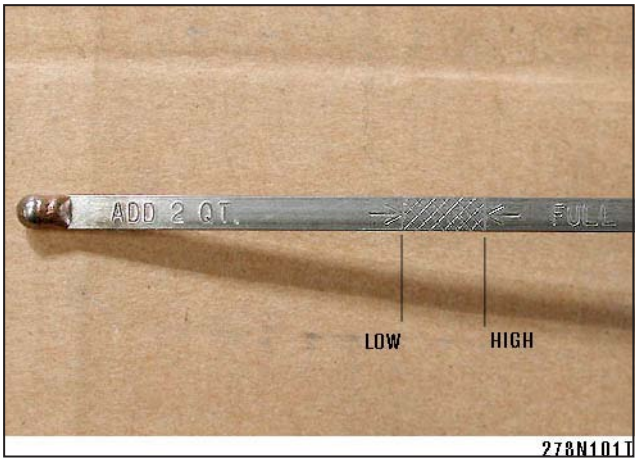


Do not tighten the filter too tight, the thread and sealing might get damaged.

- Fill the engine through the filler 1.



- Refill oil to the upper oil level mark 2. Oil charge is 11 l (12 qt) inclusive of fill oil filter.



NOTE

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

Beware of scalding when draining hot oil. Let oil cool down to less than 50 °C (122 °F).

Follow the fire safety measures!

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

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

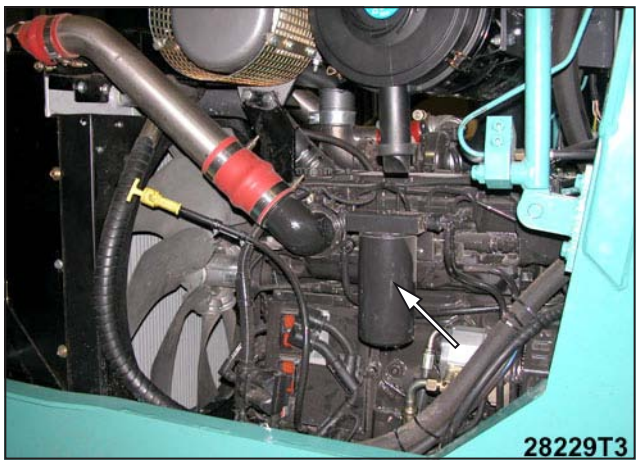
Collect drained oil; do not let it soak into the ground.

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

3.6.19. Fuel filter replacement

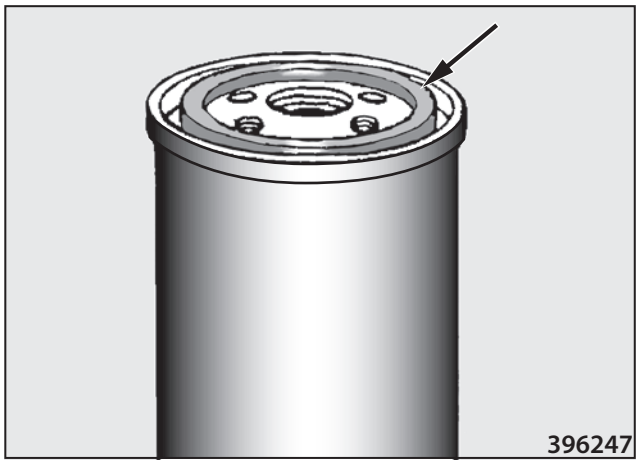
Fuel filter

- Clean and remove fuel filter.

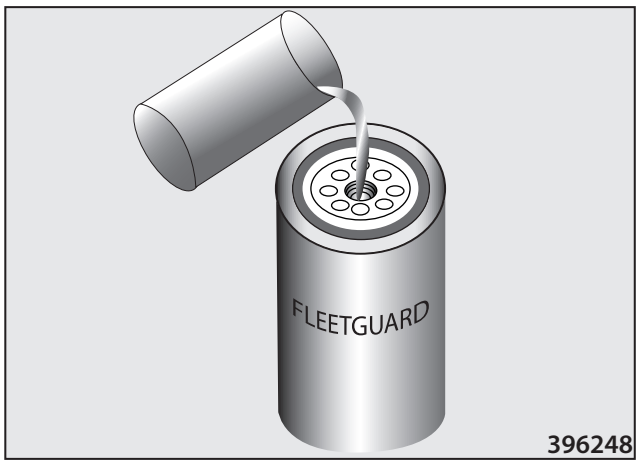


- Clean contact surface for the filter.

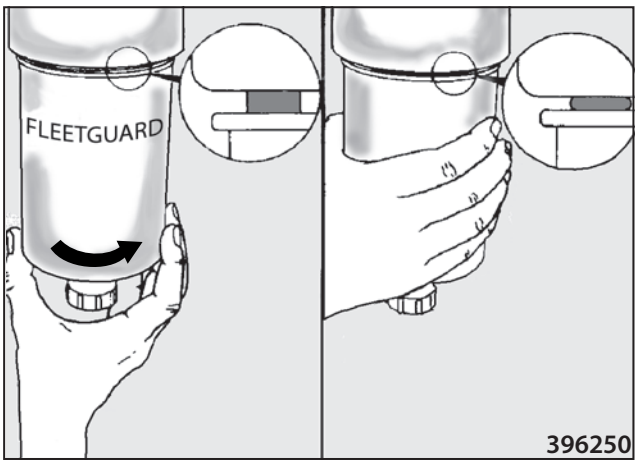
- Apply oil over the sealing ring at the new filter.



- Fill the filter with pure fuel.

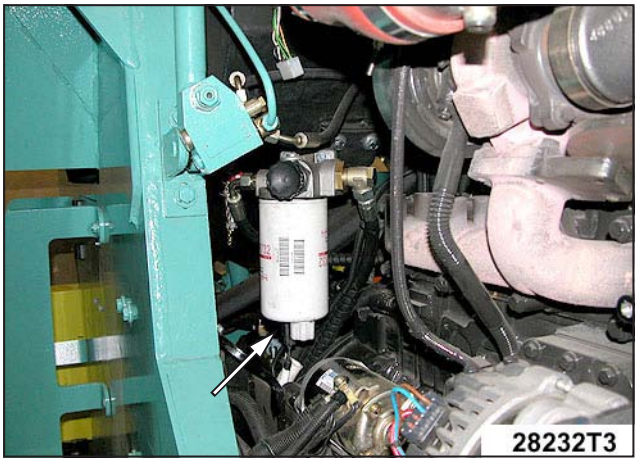


- Install the filter and tighten with your hand - as per filter manufacturer's data (by 2/3 turn once the filter bears on).



Fuel pre-filter

- Disconnect the connector of water separator sensor and proceed in the same way like in the previous text. Connect the sensor connector.



Note

- Unless filters are filled with fuels when exchanging them, please replenish fuel, refer to the Chapter named "**Clearing the water separator**".

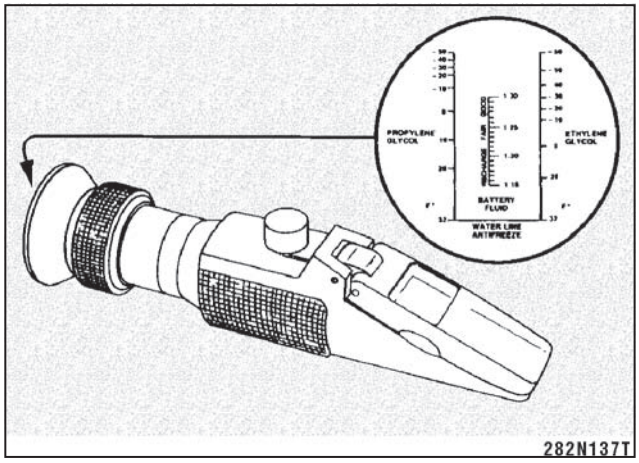
Use original filters required.
No smoking at work!
Do NOT tighten the filters with force.

Retain any fuel flowing out.
Store used filters inside separate container, and hand over for their disposal.

3.6.20. Engine cooling liquid check

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

Check the cooling liquid always before winter season. In case the concentration measured is not sufficient for -36 °C (-34 °F), adjust it by adding frost-resistant agent into cooling liquid or exchange cooling liquid.



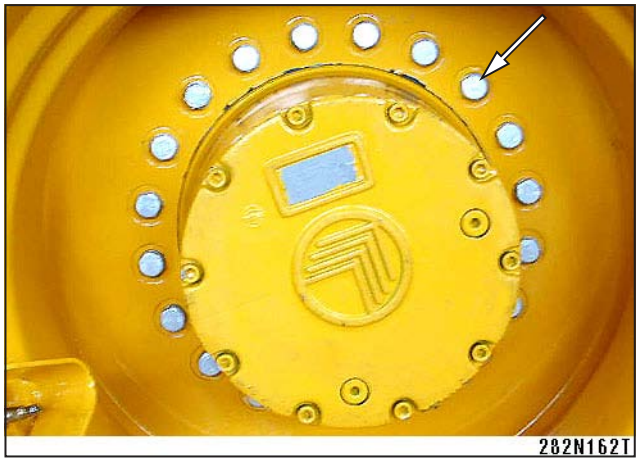
- Add anti-freeze agent according to chapter 3.2.3.

3.6.21. Check of wiring

- Check for any damage to cables, connectors, protective hoses, and their fastening, especially if in the vicinity of hot surfaces and moving parts of the machine including the engine. Replace damaged parts. Use only original spare parts.

3.6.22. Checking tightening bolts of wheel

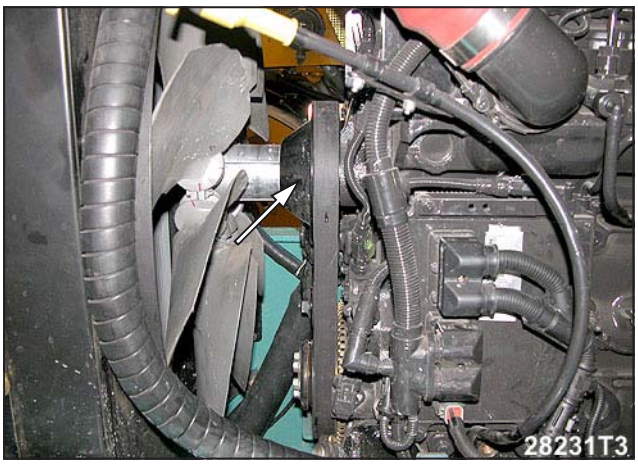
- Check tightening bolts of wheel using a torque wrench.
- Tightening torque is 165 Nm (122 lb ft).



After 1,000 hours of operation (after 1 year)

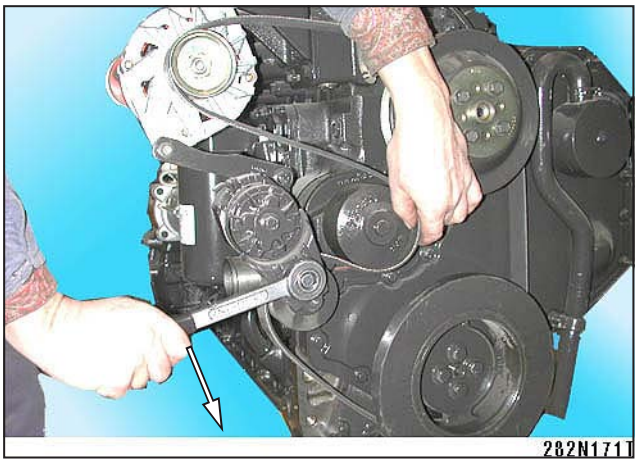
3.6.23. How to check tightening pulley and belt of the engine

- With the engine running inspect visually any vibrations of the fan pulley.

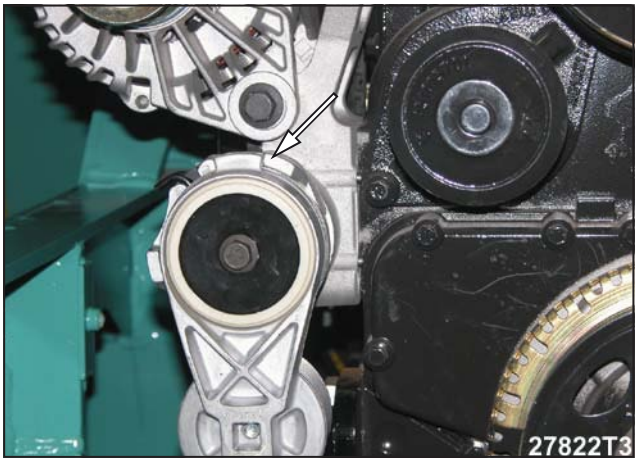


- Stop the engine!
- Confirm the stop of tensioner arm does NOT contact bump stop of the bush. Replace the belt if it makes a contact. When the arm stops continue to contact bump stop of the bush, replace the tensioner.

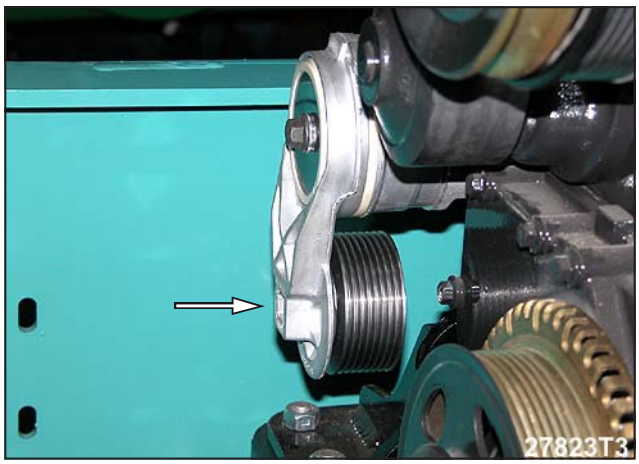
- Lift the belt tightening pulley using a lever with a square end of 10 mm (3/8 in) and remove the belt.



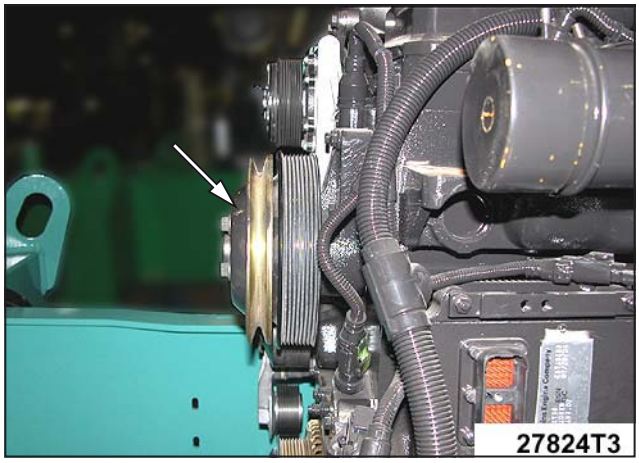
- With the belt removed, check to confirm the stop of the tensioner arm comes into contact with the bump stop of the bush. Unless so, replace the tensioner.



- Check the pulley (arm) does not deflects from the vertical axis. Maximal deflection allowed is 3 mm (0.12 in). Inspect the tensioner pulley along with the arm to make sure there are no fissures over there.



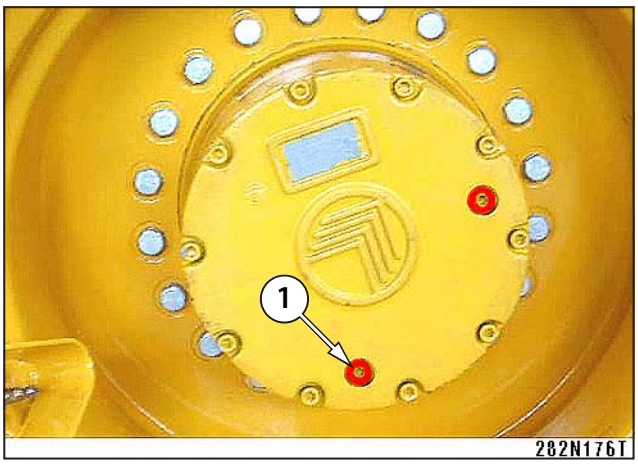
- Check axial clearance of fan pulley. This clearance may not exceed 0,15 mm (0.006 in).
- Reinstal the belt back.



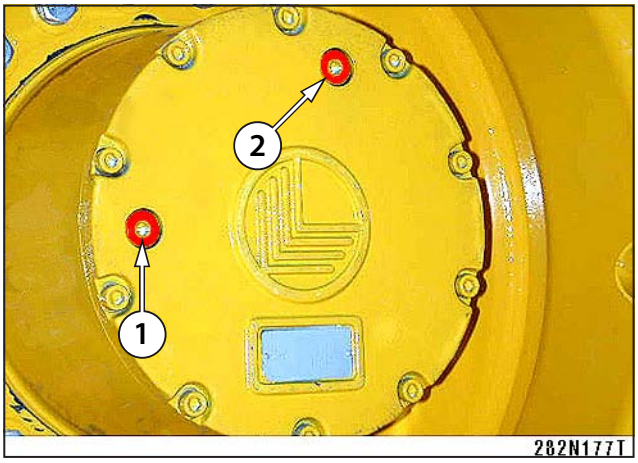
3.6.24. Oil exchange in the travel gearboxes

Axle (wheel) gearboxes

- Place the roller onto a flat, firm surface so that the axle gearbox plugs are in the position according to Fig. Clean the area around plugs. Put appropriate vessel under the drain plug 1. Unscrew both plugs and clean them and drain oil.

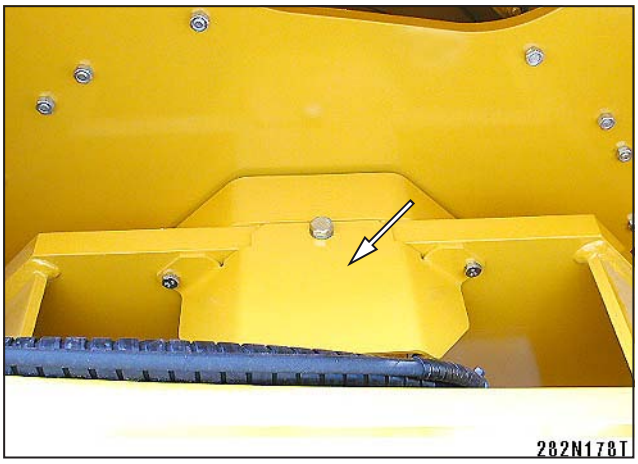


- After draining drive away with the roller so that the plugs turn to the position.
- Fill oil through the upper plug 2 until the level reaches the checking opening 1 or until it starts flowing out.
- Mount the plugs, replace damaged plug sealings.

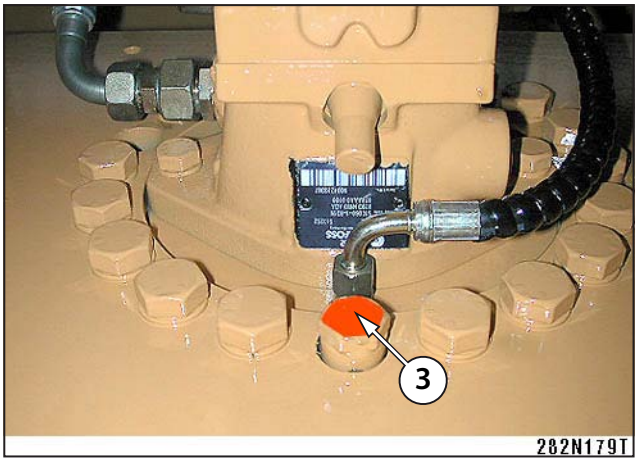


Drum gearbox - right side

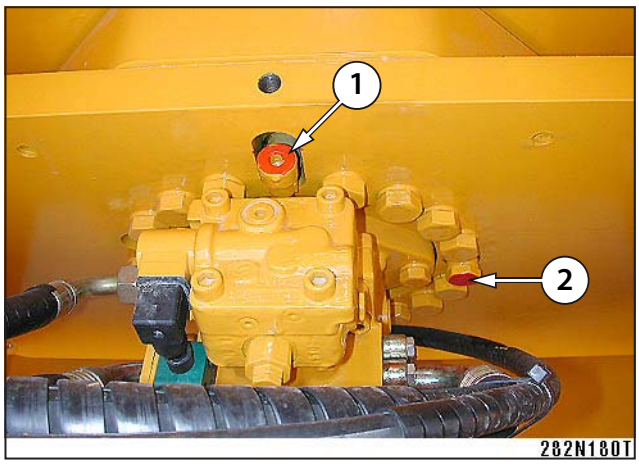
- Place the roller onto a flat, firm surface.
- Unscrew cover.



- Clean the area around plugs.
- Put appropriate vessel under the drain plug 3.

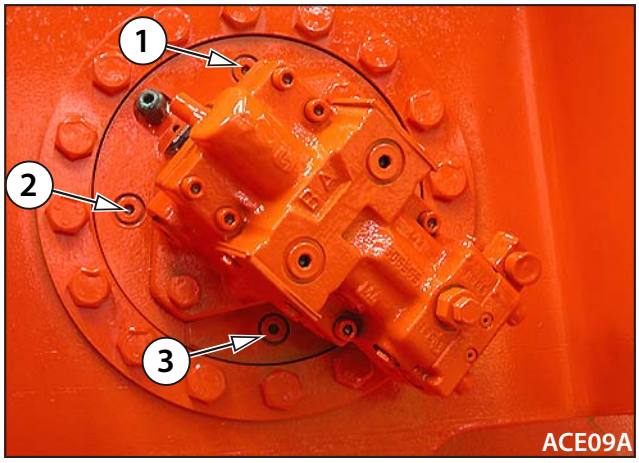


- Unscrew all plugs 1, 2, 3 and let oil drain.
- Mount the drain plug 3 after draining is finished.
- Refill recommended oil through the filling plug 1.
- Check oil level in the checking opening 2. The oil level must reach the lower edge of the opening or slightly flow out.
- Mount the plugs 1 and 2, replace damaged plug sealings.



ACE drum drive gearbox - left side

- Clean the places around the plugs. Put a suitable vessel under the drain plug 3. Unscrew all the plugs 1, 2, and 3 and let oil flow out. After draining, remount the drain plug 3. Fill up oil through the filling plug 1 according to chapter 3.3. Check the oil level in the inspection hole 2. The oil level must reach the bottom edge of hole or flow out slightly. Remount the plugs 1 and 2 and replace the plug sealing if damaged.



! NOTE !

Exchange oil when it is warm, preferably after the machine stops.

Let drained oil cool down to less than 50 °C (122 °F).

Perform the first oil exchange after reaching 100 operation hours.

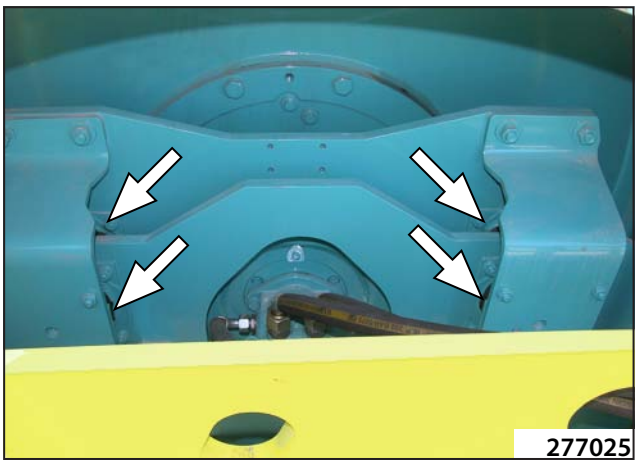
Refill the identical type of oil.

Avoid leakage of oil to the soil.

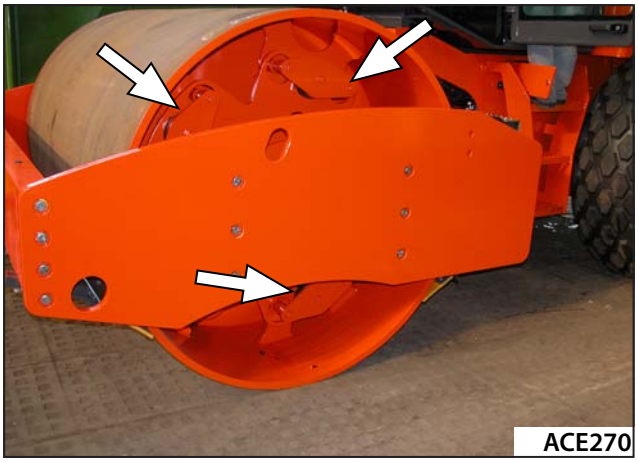
3.6.25. Checking the damping system

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

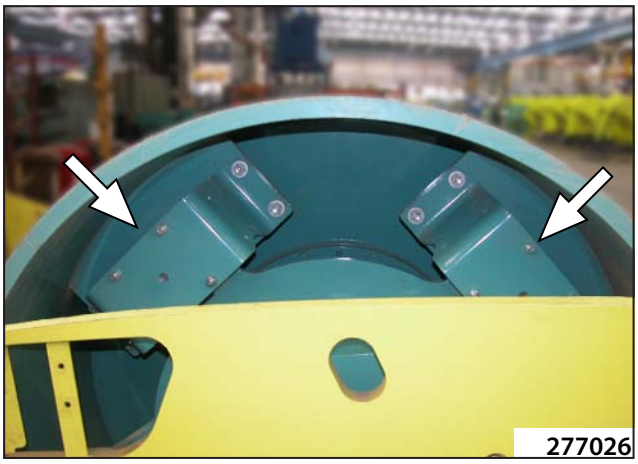
Drum damping system - left side;



Drum damping system - left side - ACE;



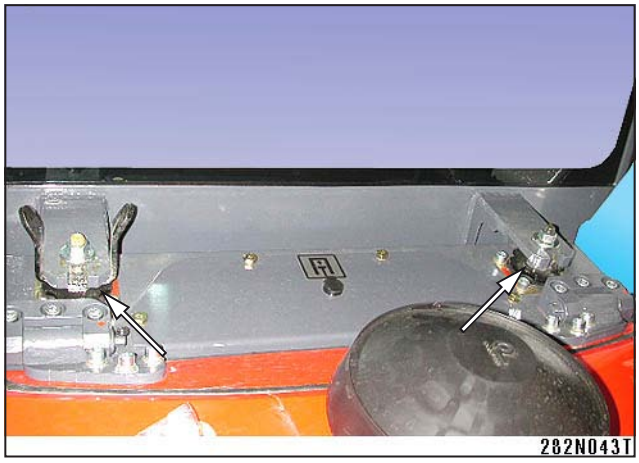
Drum damping system - right side;



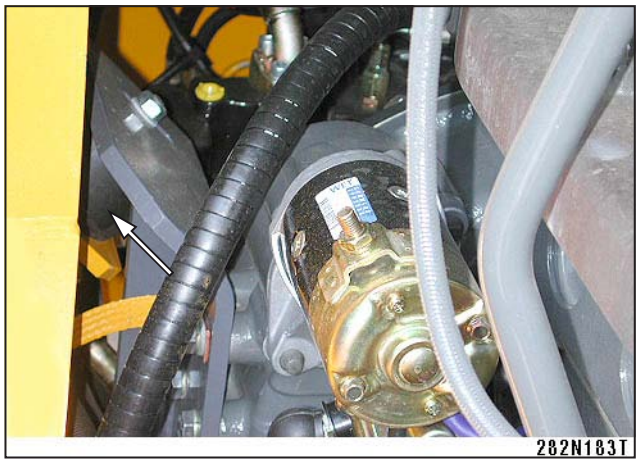
Drum damping system - right side - ACE;

Front metal-rubber mountings - driver's post

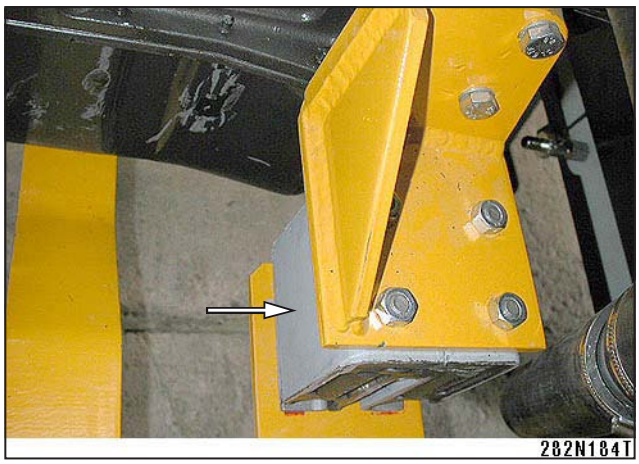
Rear metal-rubber mountings - driver's post



Front metal-rubber mountings of the engine



Rear metal-rubber mountings of the engine



- Replace damaged mountings.
- Check again tightening of bolts and nuts.

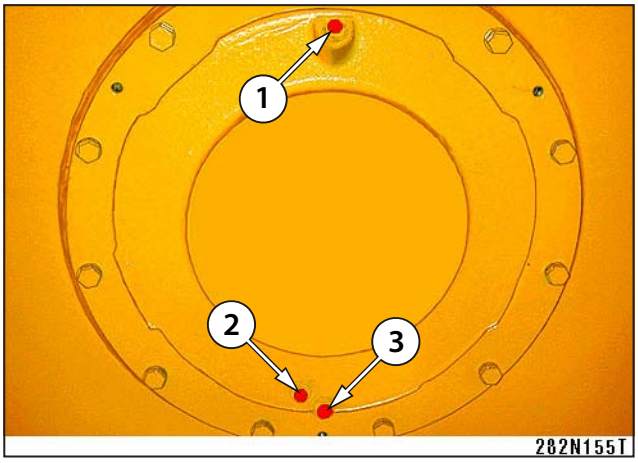
After 2,000 hours of operation (after 2 years)

3.6.26. Checking, adjusting the valve clearance

- Call CUMMINS service department to adjust the engine valves. Next valve adjustment will follow periodically after 2000 hours or after two years - for contact points, please refer to Engine Operation and Maintenance Manual.

3.6.27. Oil exchange in the vibrator

- Place the roller onto a flat, firm surface so that the drain plug on the left side of the drum 3 is in the lowest position and the opposite filling plug 1 in the highest position.
- Put appropriate vessel under the drain plug.
- Unscrew all plugs and let oil drain.
- Mount the drain plug after draining is finished.
- Refill recommended oil to the edge of the checking opening 2 through the filler 1.
- Mount remaining plugs.



! NOTE !

Exchange oil when it is warm, preferably after the machine stops.

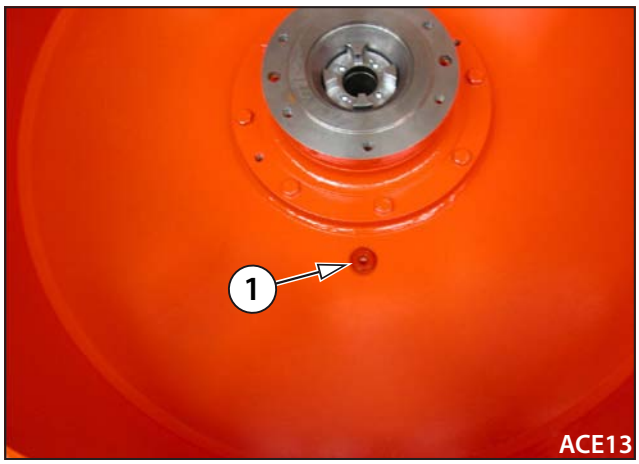
Let drained oil cool down to less than 50 °C (122 °F).

Refill the identical type of oil.

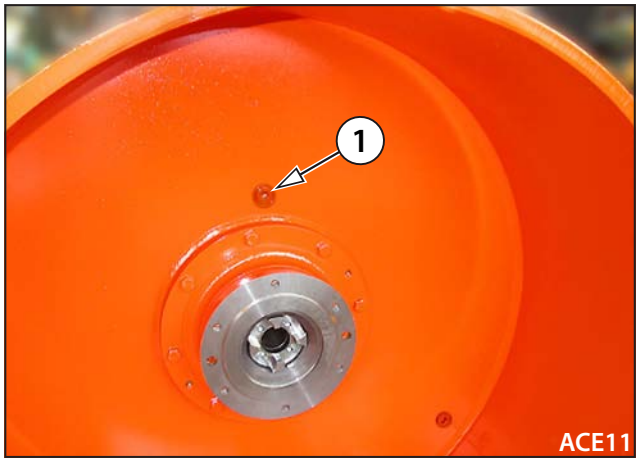
Avoid leakage of oil to the soil.

Vibrator Housing ACE

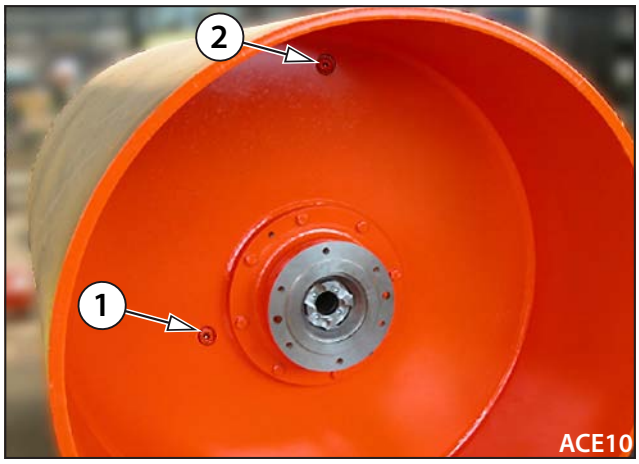
- Move the Roller so the plug 1 is in tis lowest position. Clean the place round the plug and drain oil to a proper receptacle.



- Move the Roller a bit so the plug 1 is in its highest position. Fill with 16,8 l of oil.



- Move the Roller a bit so the plug 2 is in its highest position, check the oil level via the inspection hole 1.



! NOTE !

Exchange oil when it is warm, preferably after the machine stops.

Let drained oil cool down to less than 50 °C (122 °F).

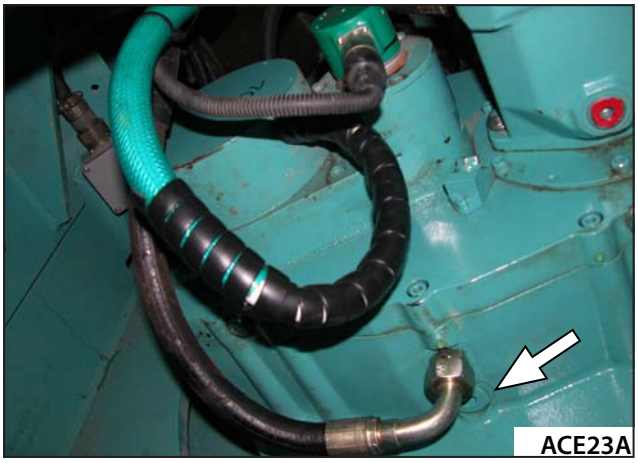
Refill the identical type of oil.

Avoid leakage of oil to the soil.

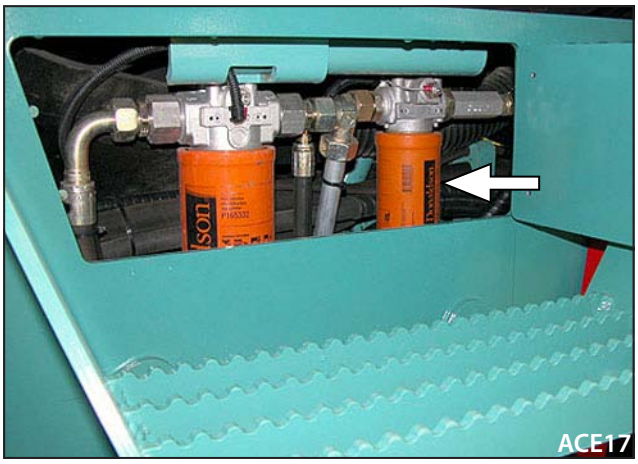
3.6.28. Vibration ACE Control Gearbox

- Dismount the oil filler cover, dismount the cap.

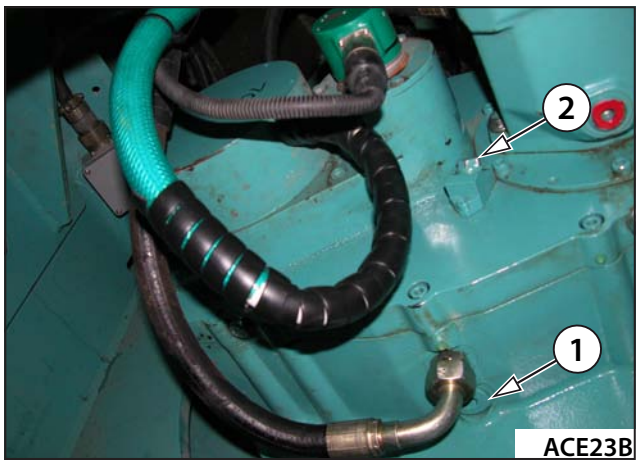
- Clean the place round the drain plug in the gearbox bottom, use a receptacle to contain drained oil.



- Replace the filter always following the three replacements of oil fill.



- Screw the drain plug 1 back on. Unscrew the inspection plug 2 and fill 6 l (1.59 gal US) through the oil filler. Start up the engine, turn on vibration for a short time, and fill up oil to the bottom edge of the inspection hole.



! NOTE !

Exchange oil when it is warm, preferably after the machine stops.

Let drained oil cool down to less than 50 °C (122 °F).

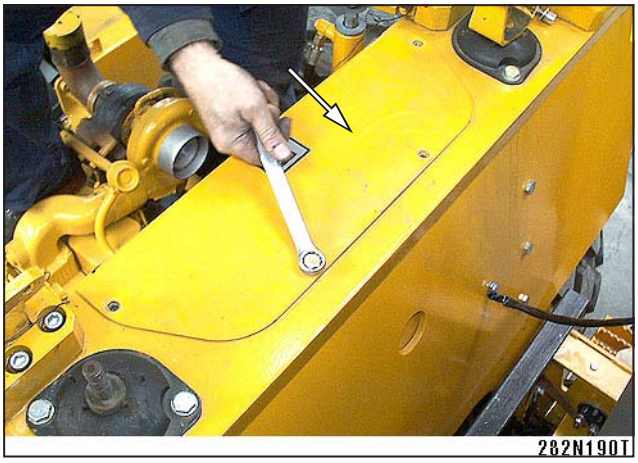
Refill the identical type of oil.

Avoid leakage of oil to the soil.

3.6.29. Exchanging hydraulic oil and filter

Exchange oil before winter season starts or following a long term shutdown of the Machine. Clean the suction strainer at the same time, refer to par. 3.6.30.

- Fit the hose to the drain cock. Let oil drain into a prepared vessel - the total amount of oil is approximately 73 l (19.3 US gal).



- Dismantle the cover.

- Dismantle suction hose.

- Dismantle cover with suction strainer. Dismantle the suction strainer from the suction pipe. Wash the suction strainer and blow the strainer with pressure air from inside. Check the condition of the suction strainer; replace the strainer in case of damaged filter part. Check the inside of the tank. Carefully clean the bottom and flush it with new oil if there are any impurities on the bottom. Reassemble and wipe the "O" ring with clean oil.

For easier cleaning it is possible to dismantle the whole upper cover 1 with the filler. If you dismantled the whole upper cover, use a new teflon sealing strip.

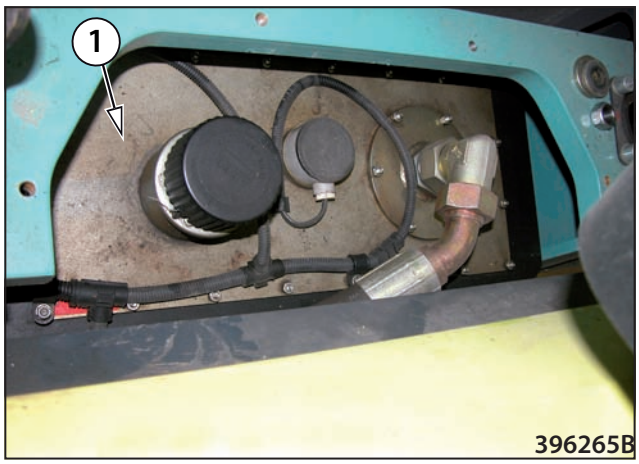
Drain oil after it has cooled down below 50 °C (122 °F).

Follow the fire safety measures!

After disconnecting the hydraulic circuits blind all holes with plugs.

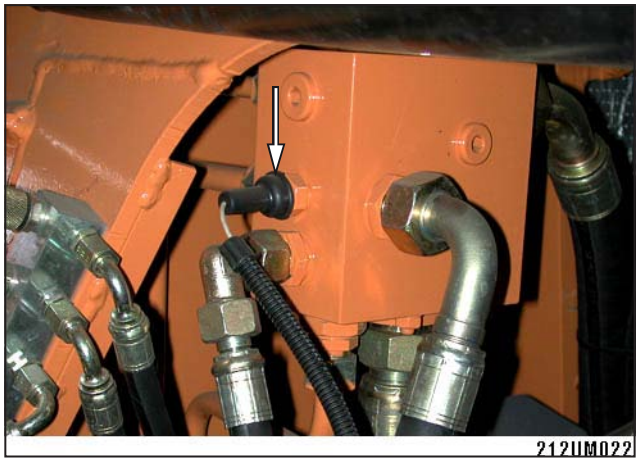
Collect drained oil; do not leave it soak into the soil.

Used oil is environmentally dangerous waste - have them liquidated.



Checking the oil thermometer sensor

- Dismantle the sensor and clean the contact.
- Dip the sensor into warm oil of known temperature and read out the oil temperature on the thermometer. Replace the sensor if not working properly.

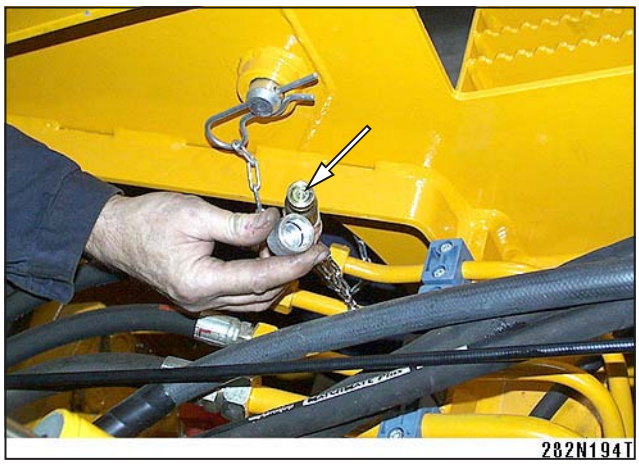


Filling the hydraulic circuit:

- Use a filling device with the following parameters:

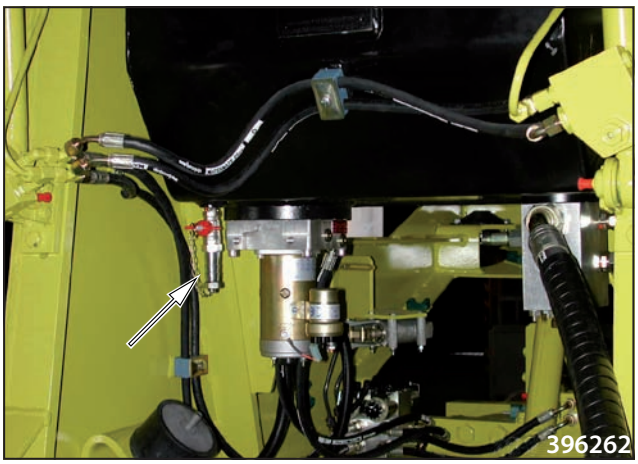
  min. pressure 6 MPa (870 PSI)

  filtering property 3 to 10 µm
- Open the cover on the right side under the cabin and remove the cap of filling terminal.

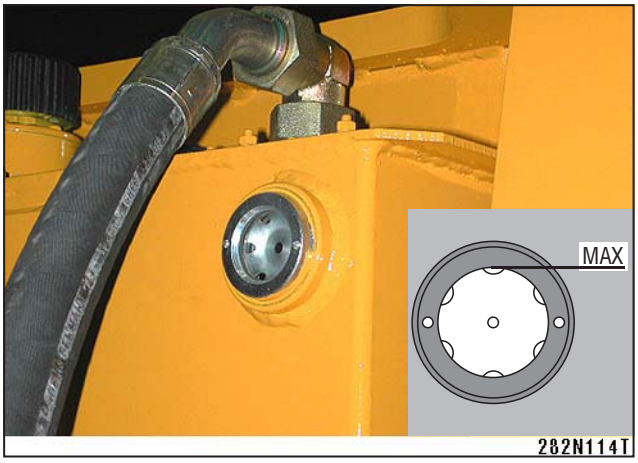


- Mount the quick coupling of the filling device to the quick coupling. Fill the hydraulic circuit until clean oil starts to flow out of the hose. Collect it to a clean vessel.

- After flowing out of approximately 15 l (4 US gal), close the drain cock.



- Refill oil in the tank to maximum and disconnect the filling device.



Alternative filling through the tank filler

The alternative way of filling the hydraulic circuit is only emergency solution!

In this way of filling it is necessary to cut the next exchange interval to one half, i.e. 1000 h or 1 year.

The cap of the tank filler is sealed. In case of breaking the seal during warranty period, the warranty expires.

- Refill the tank through the filler with specified type of oil up to the bottom of the strainer in the filler.

NOTE

- When filling via tank filler neck a large portion of used oil incl. dirt will remain within the vicinity, and hydraulic units' life cycle will lower.
- Order your filling device from your Machine manufacturer or dealer.

Observe cleanliness at work. Avoid contamination of the system with materials that may cause damage to crucial units!

Do NOT open hydraulic tank uselessly!

When cleaning the tank, use cleaners with no fibre-slip, do not use chemical detergents.

Refill oil according to par. 3.2.4.

Exchanging the filter element of pressure filter

! NOTE !

Exchange the filter element always in the following occasions:

- **when changing oil**
- **if the signal lamp of pressure filter lights up after the working temperature reached 50 through 60 °C (122 - 140 °F).**

- Remove the filter. Clean from below the following: contact surface of the filtration block, spread pure oil over the new filter's ring, screw down, tighten.

Use original filter elements according to spare parts catalogue only.

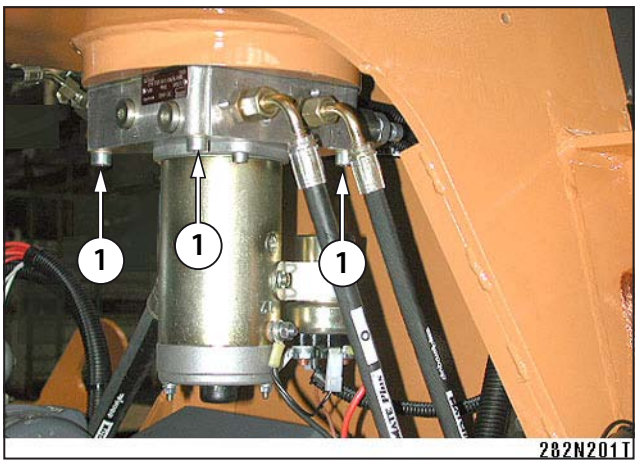
Exchange oil and filter always when a destruction of internal parts of the units occurs (of hydromotors, of hydrogenerators), or during a major overhaul of the hydraulic system. Clean and rinse out the hydraulic tank before installing new unit, and fill it with oil. With the engine running at increased speed, please test the functions of the Machine. Check the tightness.

Used filter elements are environmentally dangerous waste - have them liquidated.

3.6.30. Cab and bonnet raising and lowering suction strainer unit cleaning

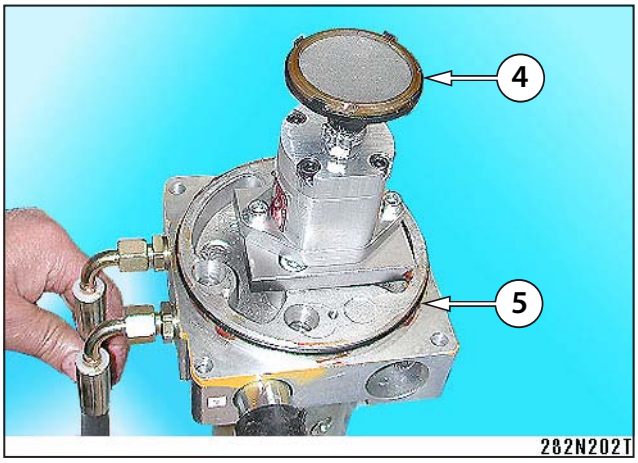
! NOTE !
Clean the strainer when exchanging hydraulic oil.

- Unscrew bolts 1, take out the unit from the bottom of the tank.



- Remove the suction strainer 4. Wash the suction strainer in petrol and blow through the strainer with pressure air. Check the sealing ring 5.

Avoid leakage of oil to the soil!

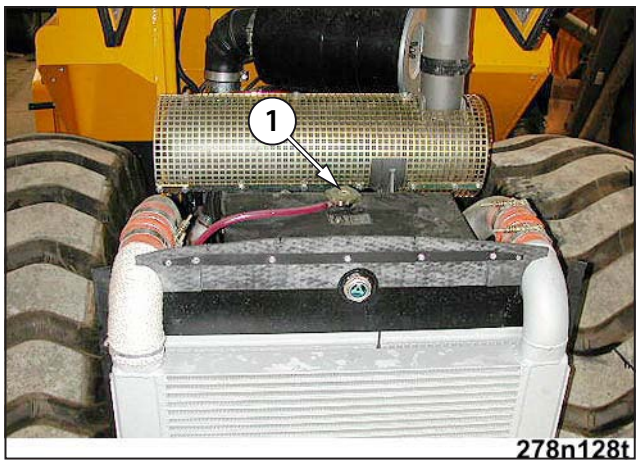


3.6.31. Exchanging the engine cooling liquid

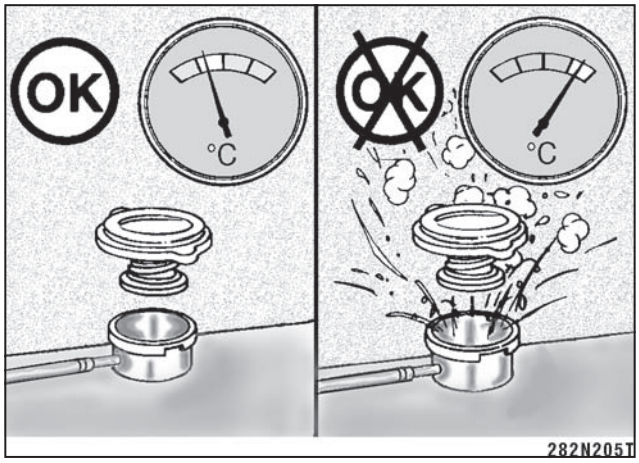
! NOTE !

Exchange the coolant after operation of the machine or after warming the coolant (by running the engine) to 80 °C (176 °F).

- Open cooling system by removing pressure plug 1 on the equaliser reservoir.



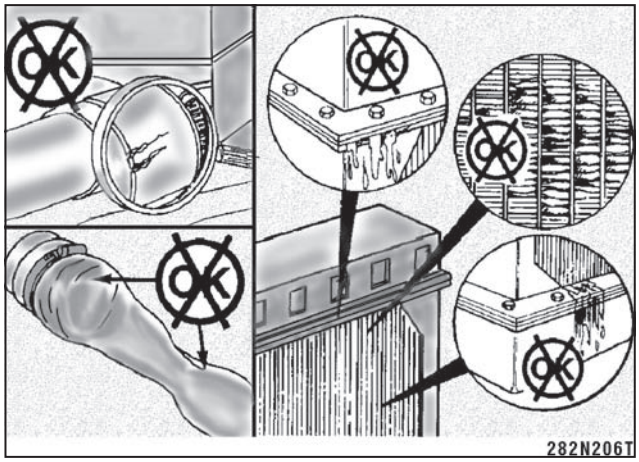
Do not dismantle the pressure plug before the temperature of cooling liquid falls lower than to 50 °C (122 °F). Beware of gushing of the coolant and scalding when opening the pressure plug.



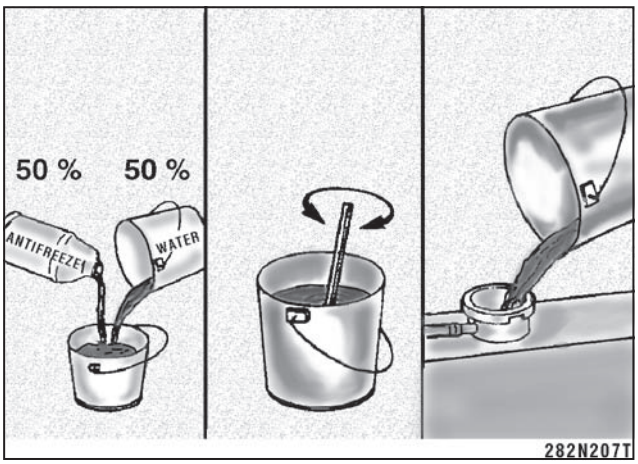
- Dismantle the drain plug.
- The quantity drained is approximately 32 l (8.5 US gal).

NOTE

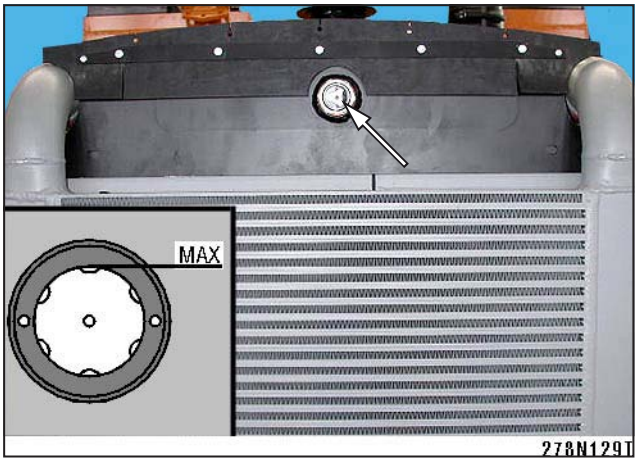
Check cooling system for defective hoses and missing hose clips. Check the condition of the cooler - search for defects, leaks and cooling gills blocked with impurities.



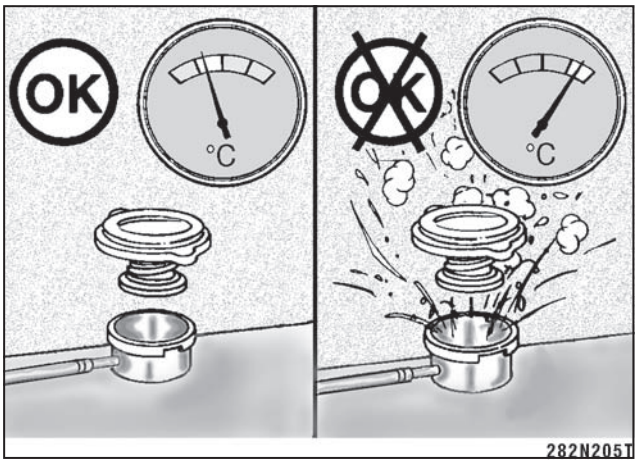
- After closing the drain cock, fill cooling system with new cooling liquid with ratio of 50% of water + 50% of anti-freeze agent.



- Fill it up to the upper edge of the level indicator. After filling, wait for approx. 2-3 minutes until air goes off and the circuit is filled. The maximum filling rate is 19 l/min (5 US gal/min). Close the equaliser reservoir with the pressure plug.
- Start the engine and wait until the temperature reaches 80 °C (175 °F). Check during your waiting for any leakage of cooling liquid.
- Stop the engine.
- Check the level on the indicator. If the level is low, refill cooling liquid to maximum.



Do not dismantle the pressure plug before the temperature of cooling liquid falls lower than to 50 °C (122 °F). Beware of gushing of the coolant and scalding when opening the pressure plug.



! NOTE !

Use cooling liquid according to chapter 3.2.3!

Follow the instructions of the manufacturer of anti-freeze fluid when changing coolant!

Protect your hands with gloves!

Use safety glasses or safety shield!

Collect used liquid and have it safely disposed according to valid regulations!

Maintenance - As Needed

3.6.32. Exchanging cleaner elements of air cleaner

NOTE

The air cleaner contains the main and safety elements.

If the indicator lamp lights up, replace the main element. The safety element should be replaced after three replacements of the main element. The manufacturer recommends that the elements should not be cleaned due to a decrease in the filtration capacity by up to 40 % and possible damaging of elements resulting from the cleaning.

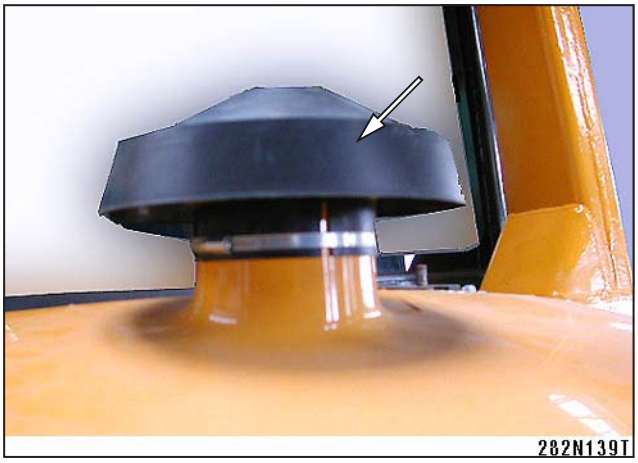
- Lift the bonnet to the limit position. (See Operating instructions, chapter 2.7.6.).
- Remove the lid.

- Carefully remove the main element.

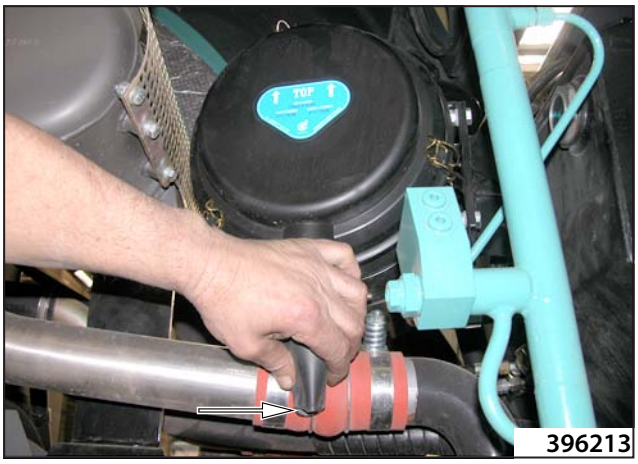
- After remove the safety element.

- Clean the inside of the cleaner and contact surface in order that the engine inlet pipe does not get blocked.

- Check connections and piping for any untightness and clogging of the engine inlet opening on the bonnet (e.g. by leaves).



- Insert the safety element.
- Mount the new main element. Check whether the both cartriges fits correctly and whether are sealing.
- Remove the dust valve, clean it and mount it back.



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

Use original elements only.

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

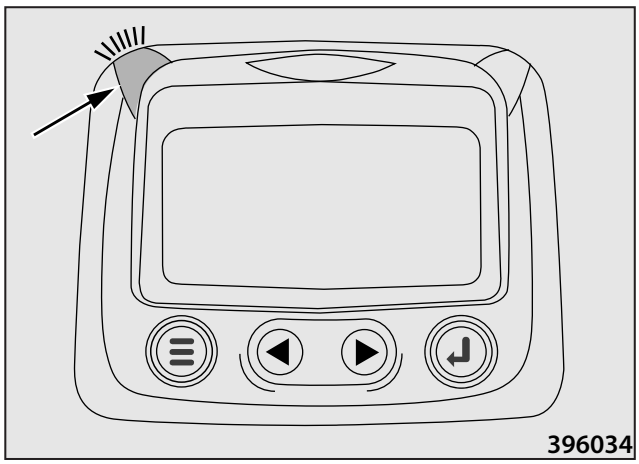
In case of absorbing water, exchange main element. Dry the cleaner body.

Replace defective vacuum valve immediately!

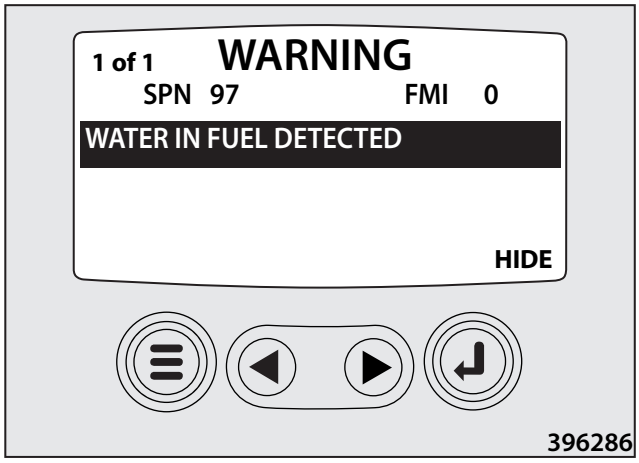
Do not operate the machine with damaged cleaner body or cover.

3.6.33. Cleaning of the water separator on the fuel filter

- Yellow indicator lamp signal.



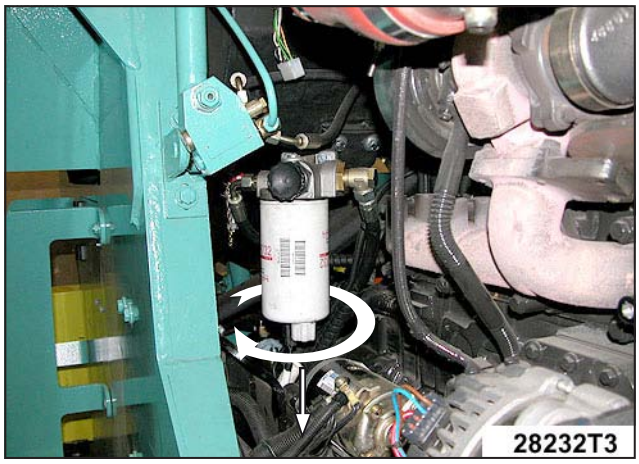
- The message. SPN 97 is displayed.



- Twist the separator valve , drain the water from filter.

Shut off the engine during separator draining!

Drain water/fuel into a container and dispose of in accordance with local environmental regulations.

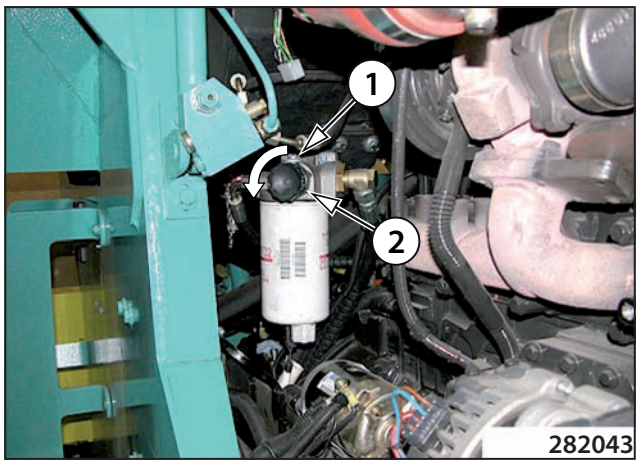


- If you drained over 60 cm^3 [0.63 quarts] of fuel refill the fuel into fuel filter. Open the bleed screw 1. Unscrew a transfer pump and operate until the fuel flowing is free of air.

Do not bleed the fuel with the hot engine flowing out fuel may couse a fire!

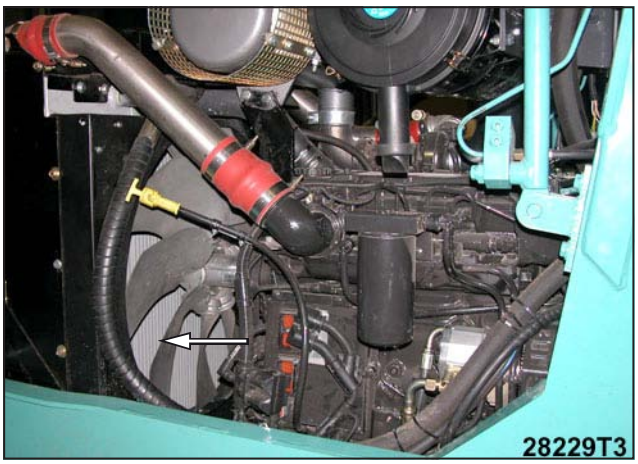
No smoking et Work on fuel system!

Drain fuel into a container and dispose of in accordance with local environmental regulations.



3.6.34. Cleaning of coolers

- Due to variable working conditions it is not possible to determine any fixed interval of cleaning.
- In case of work in very dusty conditions clean the radiator daily. Clogged radiators will result in lower cooling capacity and increasing temperatures of engine cooling liquid and hydraulic oil.
- Clean it using pressure air or pressure water (steam). Cleaning direction is from the ventilator side.



Do not use cleaner with too high pressure so as not to damage radiator honeycombs.

In case of contamination of the radiator by oil products, use a cleaning agent and proceed according to the manufacturer's instructions! Find the cause of contamination!

Follow environmental standards and regulations when cleaning the machine!

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

Do not use forbidden cleaning agents!

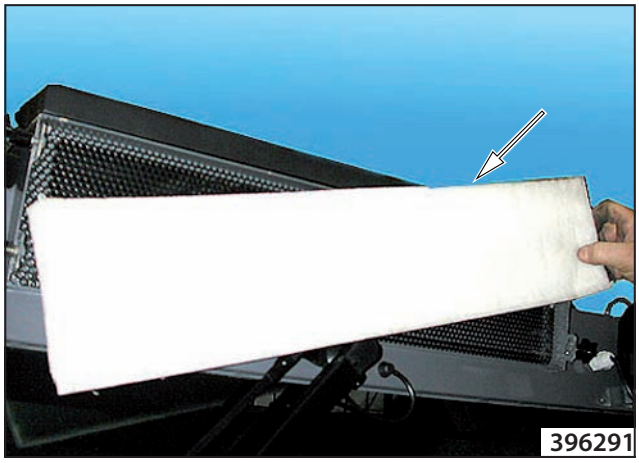
3.6.35. Cleaning the air cleaner of cabin ventilation

- Dismantle the cover grill.

- Take out the cleaner with cleaning element.
- Carefully beat out the element and wash it in a detergent solution. If you damage the cleaning element or you are not able to clean it properly, replace it with a new one.

! NOTE !

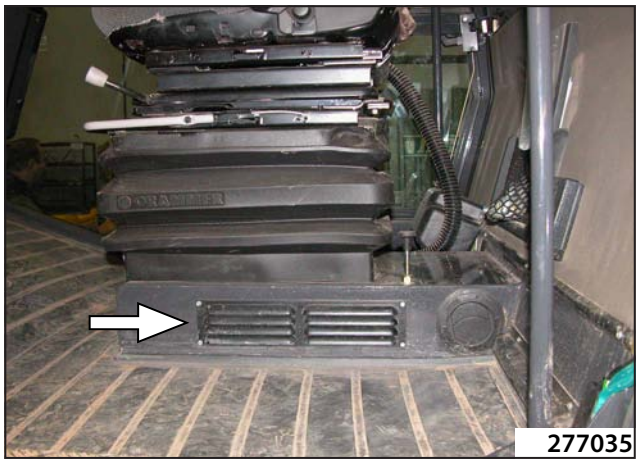
Clean it once in a month. In case you work in very dusty conditions, make the interval shorter.



- Dismantle the cover grill.
- Take out the cleaner with cleaning element.
- Carefully beat out the element and wash it in a detergent solution. If you damage the cleaning element or you are not able to clean it properly, replace it with a new one.

! NOTE !

Clean it once in a month. In case you work in very dusty conditions, make the interval shorter.



3.6.36. Cleaning the machine

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

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

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

Disconnect batteries using the isolating master switch.

Work with stopped engine.

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

Follow environmental standards and regulations when cleaning the machine!

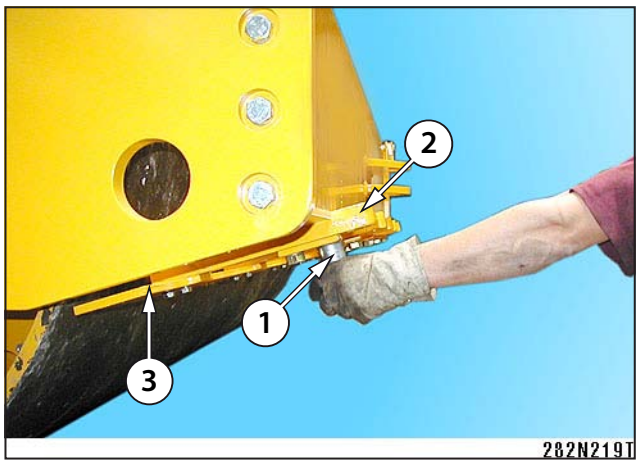
Clean the machine in a site equipped with an intercepting system for cleaning agents so that the soil and water sources are not contaminated!

Do not use forbidden cleaning agents!

3.6.37. Adjusting scrapers

Scrapers for the smooth drum

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

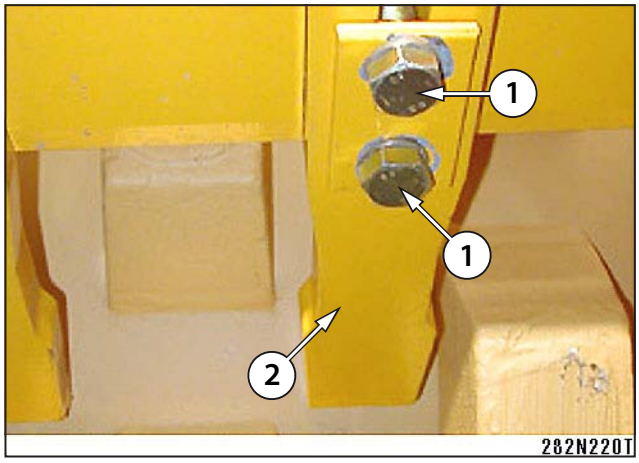


! NOTE !

If you can not move scrapers any more within the range of oval openings of the holders 2 due to the wear of the scrapers, dismantle the scraper 3 and move it closer to the drum by one hole.

Scrapers for the taper foot drum

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

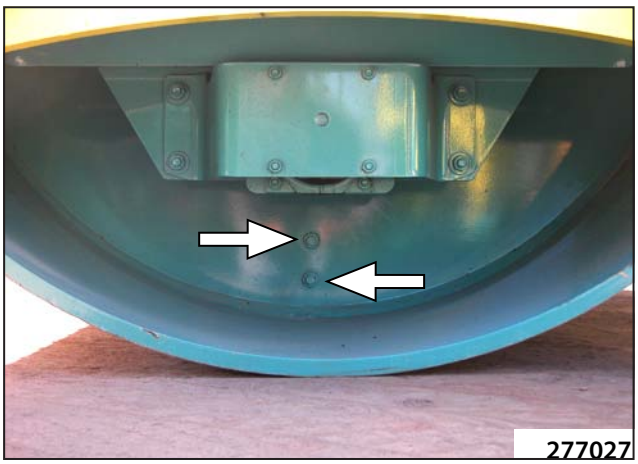


Rear scrapers of the taper foot drum are longer. When replacing worn scrapers, replace the front scrapers with rear ones and the rear scrapers with new ones.

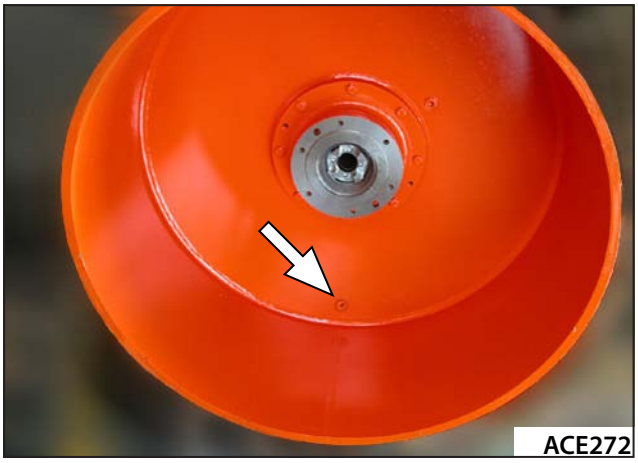
If you set too short distance between the scraper and drum, they may get into contact when cornering with the machine.

3.6.38. Vibrator cooling mixture

- The drum water filling is a filling for the whole service life and it is not necessary to exchange it. The lower plug is used for draining the water, the upper plug is for filling up and checking the water level. When draining the water, make sure that the drum is in an inclined position for draining the liquid. After the drum has been filled up, drive the machine so that the plugs are at an opposite position (upward). Fill the liquid up to the level according to chapter 3.2.8.



ACE drum



Do not operate the machine without the drum being filled with water!

3.6.39. Check of the screw connection tightening

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

	Torque			
	For 8,8 Bolts (8G)		For 10,9 Bolts (10K)	
Thread	Nm	lb ft	Nm	lb ft
M6	10	7,4	14	10,3
M8	24	25,0	34	25,0
M8x1	19	14,0	27	19,9
M10	48	35,4	67	49,4
M10x1,25	38	28,0	54	39,8
M12	83	61,2	117	86,2
M12x1,25	66	48,7	94	69,3
M14	132	97,3	185	136,4
M14x1,5	106	78,2	148	109,1
M16	200	147,5	285	210,2
M16x1,5	160	118,0	228	168,1
M18	275	202,8	390	287,6

	Torque			
	For 8,8 Bolts (8G)		For 10,9 Bolts (10K)	
Thread	Nm	lb ft	Nm	lb ft
M18x1,5	220	162,2	312	230,1
M20	390	287,6	550	405,6
M20x1,5	312	230,1	440	324,5
M22	530	390,9	745	549,4
M22x1,5	425	313,4	590	435,1
M24	675	497,8	950	700,6
M24x2	540	398,2	760	560,5
M27	995	733,8	1400	1032,5
M27x2	795	586,3	1120	826,0
M30	1350	995,7	1900	1401,3
M30x2	1080	796,5	1520	1121,0

Values given in the Table are the torques at dry tread (at coefficient of friction = 0,14). Such values do NOT apply to a greased thread.

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

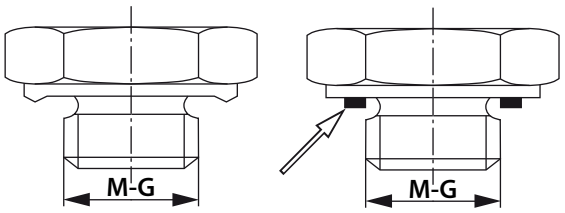
			Torques for cap nuts incl. "O" ring - hoses					
			Nm			lb ft		
Spanner Size	Thread	Pipe	Nominal	Min	Max	Nominal	Min	Max
14	12x1,5	6	20	15	25	15	11	18
17	14x1,5	8	38	30	45	28	22	33
19	16x1,5	8	45	38	52	33	28	38
		10						
22	18x1,5	10	51	43	58	38	32	43
		12						
24	20x1,5	12	58	50	65	43	37	48
27	22x1,5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

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

	Neck Torques	
G -M	**Nm**	**lb ft**
G 1/8	25	18
G 1/4	40	30
G 3/8	95	70
G 1/2	130	96
G 3/4	250	184
G 1	400	295
G 11/4	600	443
G 11/2	800	590
10 x 1	25	18
12 x 1,5	30	22
14 x 1,5	50	37
16 x 1,5	60	44
18 x 1,5	60	44
20 x 1,5	140	103
22 x 1,5	140	103
26 x1,5	220	162
27 x 1,5	250	184
33 x 1,5	400	295
42 x 1,5	600	443
48 x 1,5	800	590

Chart for torques of plugs with flat gasket

	Plug Torques	
G -M	**Nm**	**lb ft**
G 1/8	15	11
G 1/4	33	24
G 3/8	70	52
G 1/2	90	66
G 3/4	150	111
G 1	220	162
G 11/4	600	443
G 11/2	800	590
10 x 1	13	10
12 x 1,5	30	22
14 x 1,5	40	30
16 x 1,5	60	44
18 x 1,5	70	52
20 x 1,5	90	66
22 x 1,5	100	74
26 x1,5	120	89
27 x 1,5	150	111
33 x 1,5	250	184
42 x 1,5	400	295
48 x 1,5	500	369



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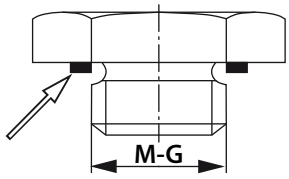


282N222T

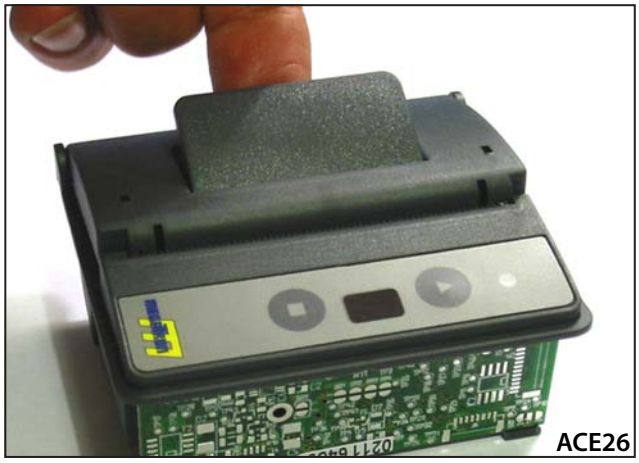
3.6.40. Printer paper replacement

Only use the thermal paper suitable for the printer. It must be inserted correctly in accordance with the illustrations. Incorrectly inserted thermal paper may lead to paper jams or "blank printouts".

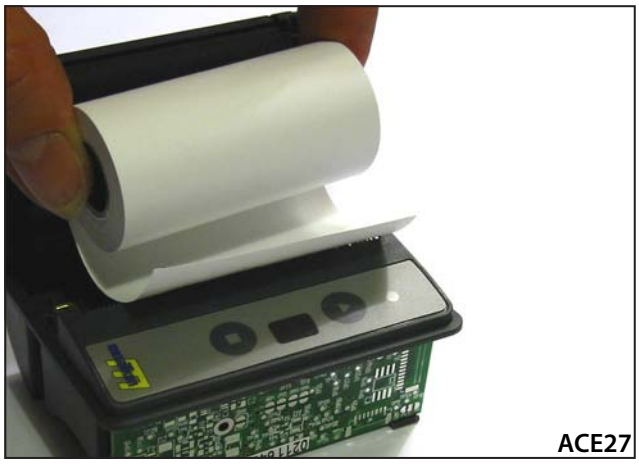
Paper sort:	Thermal paper roll
Paper roll width:	58 mm
Paper roll diameter:	32 mm

Printer paper replacement

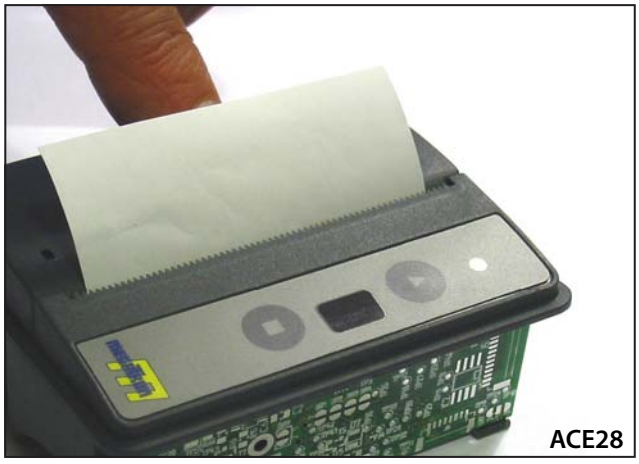
- Unwind approximately 10 mm of paper from the paper roll; grasp it so that individual threads of paper are not released.
- Open the printer cover by means of pulling the moving lever of the cover slightly. The thrust roll for the paper transport is released from the drive gear. Now, the cover can be opened easily.


ACE26

- Insert the paper roll into the paper magazine with the sensitive coating as the outer side. Approximately 10 mm of the end of paper should be left outside.


ACE27

- Press down the printer cover so that it fits in the bushing lock. Then, it is possible to tear off paper over the tear edge without the cover being opened and the paper roll falling out. The printer is ready for printing.


ACE28

General errors

Problem	Possible causes	Recommended actions
Restart of TCD device direct after start printing	Weak power supply	Check the power supply. The TCD device needs during printing operation max. 1 A (depending on supply voltage).
Blank printout	Wrong paper sort	Insert the correct paper sort. The printer needs thermal paper.
	Incorrectly inserted paper roll	Insert the paper in accordance to the descriptions in chapter "Change paper TCP".
Bad print quality	Bad paper quality	The fist print with a new paper roll may has poor quality. The thermal paper is sensitive against direct sun light and skin touch/ fat. Store the paper appropriate.

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

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

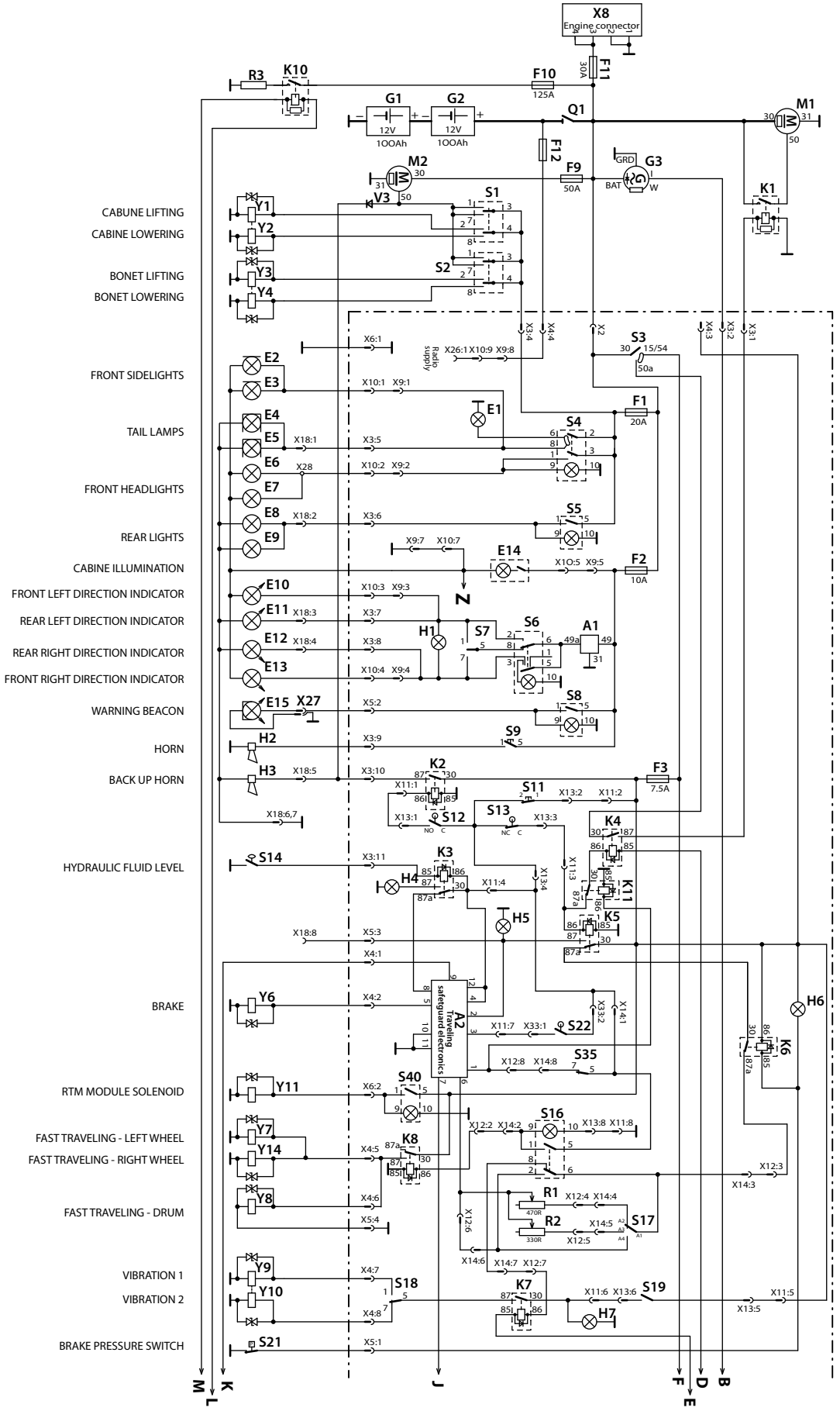
3.8. Annexes

Wiring diagram

Seat switch; Engine Tier 3; RTM MODULE; MURPHY Power view gauge (the schematic reflects machine version that includes all controlling elements and accessories)

Legend:

A1 - Clicker for direction-indicator lights (optional)
A2 - Electronics to secure travel
A3 - Travel actuator
A4 - Multifunctional display Murphy PV - 101
B2 - Hydraulic oil thermometer sensor
B3 - Float (displacer) in fuel tank
E1 - Gauges lighting
E2,3 - Front fender lights (optional)
E4,5 - Rear lamps (optional)
E6,7 - Front headlights
E8,9 - Rear headlights
E10,11 - LH direction-indicator lights (optional)
E12,13 - RH direction-indicator lights (optional)
E14 - Cab lighting
E15 - Hazard beacon (optional)
F1-12 - Drop-out fuses
G1,2 - Batteries
G3 - Alternator
H1 - Pilot lamp for direction-indicator lights (optional)
H2 - Horn
H3 - Backing horn (optional)
H4 - Pilot lamp for hydraulic oil level
H5 - Pilot lamp for neutral
H6 - Pilot lamp for brake
H7 - Pilot lamp for vibration preset
H8 - Pilot lamp for differential interlock
H10 - Pilot lamp for battery recharging
H11 - Pilot lamp for air filter clogged
H12 - Pilot lamp for hydraulic oil filter clogged
H17 - Pilot lamp for glowing
K1 - Starting contactor
K2-9 - Auxiliary relays
K10 - Glowing contactor
K11 - Auxiliary relay
M1 - Engine starter
M2 - Motor for cab lifting pump
M3 - Cab ventilation fan
M4 - Front wiper
M5 - Rear wiper
M6 - Windscreen washer
M7 - Rear glass washer
M8 - Heater fan
P2 - Hydraulic oil thermometer
Q1 - Battery disconnector
R1,2,5,6 - Resistors
R3 - Engine preheating
R4 - Engine revolution control potentiometer
S1 - Cab lifting double pushbutton
S2 - Bonnet lifting double pushbutton
S3 - Ignition box
S4 - Front headlight switch
S5 - Rear headlight switch
S6 - Warning light switch (optional)
S7 - Direction-indicator light change-over switch (optional)
S8 - Hazard beacon switch (optional)
S9 - Horn pushbutton
S11 - Emergency brake pushbutton
S12 - Backing horn switch (in travel actuator)
S13 - Neutral switch (in travel actuator)
S14 - Float (displacer) inside hydraulic oil tank
S16 - Fast travel switch
S17 - Selector switch for operating speed preset
S18 - Vibration selector switch
S19 - Vibration switch (in travel actuator)
S21 - Brake pressure switch
S22 - Seat switch
S27 - Vacuum switch for air filter clogged
S28 - Vacuum switch for hydraulic oil filter clogged
S29 - Cab fan selector switch
S30 - Front wiper switch
S31 - Rear wiper switch
S32 - Washer double pushbutton
S33 - Heater fan selector switch
S35 - Parking brake switch
S36 - Switch to reduce drum slip
S37 - Engine idling switch
S39 - Double pushbutton to adjust idle rpm
S40 - RTM module switch (ATC)
V3 - Interlocking LED (only with Machines having cab lifting alarm)
V4 -7 - Interlocking LEDs
X2-24 - Interface connectors
X27 - Socket for hazard beacon
X28-33 - Interface connectors
X34 - Socket for engine diagnostics
X35-40 - J1939 Connector
X41 - Interface connector
X44 - Supply connector
Y1 - Solenoid valve for cab lifting
Y2 - Solenoid valve for cab lowering
Y3 - Solenoid valve for bonnet lifting
Y4 - Solenoid valve for bonnet lowering
Y6 - Solenoid valve for brake
Y7 - Solenoid valve for fast travel - left wheel
Y8 - Solenoid valve for fast travel - drum
Y9 - Solenoid valve vibrations 1
Y10 - Solenoid valve for vibrations 2
Y11 - Solenoid valve to disengage RTM differential interlock
Y13 - Servo valve for travel pump
Y14 - Solenoid valve for fast travel - right wheel


X8
Engine connector
F11
30A
F10
125A
R3
K10
G1
12V
100Ah
G2
12V
100Ah
Q1
M1
F12
M2
F9
50A
G3
BAT
K1
V3
S1
S2
CABUNE LIFTING
CABINE LOWERING
BONET LIFTING
BONET LOWERING
Y1
Y2
Y3
Y4
S3
15/54
50a
Radio supply
FRONT SIDELIGHTS
TAIL LAMPS
FRONT HEADLIGHTS
REAR LIGHTS
CABINE ILLUMINATION
FRONT LEFT DIRECTION INDICATOR
REAR LEFT DIRECTION INDICATOR
REAR RIGHT DIRECTION INDICATOR
FRONT RIGHT DIRECTION INDICATOR
WARNING BEACON
HORN
BACK UP HORN
E1
E2
E3
E4
E5
E6
E7
E8
E9
E10
E11
E12
E13
E14
E15
F1
20A
F2
10A
F3
7.5A
S4
S5
S6
S7
S8
S9
S11
S12
S13
S14
A1
H1
H2
H3
H4
H5
H6
K2
K3
K4
K5
K6
K11
HYDRAULIC FLUID LEVEL
BRAKE
RTM MODULE SOLENOID
FAST TRAVELING - LEFT WHEEL
FAST TRAVELING - RIGHT WHEEL
FAST TRAVELING - DRUM
VIBRATION 1
VIBRATION 2
BRAKE PRESSURE SWITCH
Y6
Y11
Y7
Y14
Y8
Y9
Y10
S21
A2
safeguard electronics
Traveling
S22
S35
S40
S16
K8
R1
R2
S17
K7
S18
S19
H7
W
L
K
J
F
E
D
B

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3.8. Annexes

Wiring diagram

Seat switch; Engine Tier 3; RTM MODULE; MURPHY Power view gauge (the schematic reflects machine version that includes all controlling elements and accessories)

Legend:

A1 - Clicker for direction-indicator lights (optional)
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A3 - Travel actuator
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B3 - Float (displacer) in fuel tank
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E4,5 - Rear lamps (optional)
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E15 - Hazard beacon (optional)
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H3 - Backing horn (optional)
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R1,2,5,6 - Resistors
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R4 - Engine revolution control potentiometer
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S5 - Rear headlight switch
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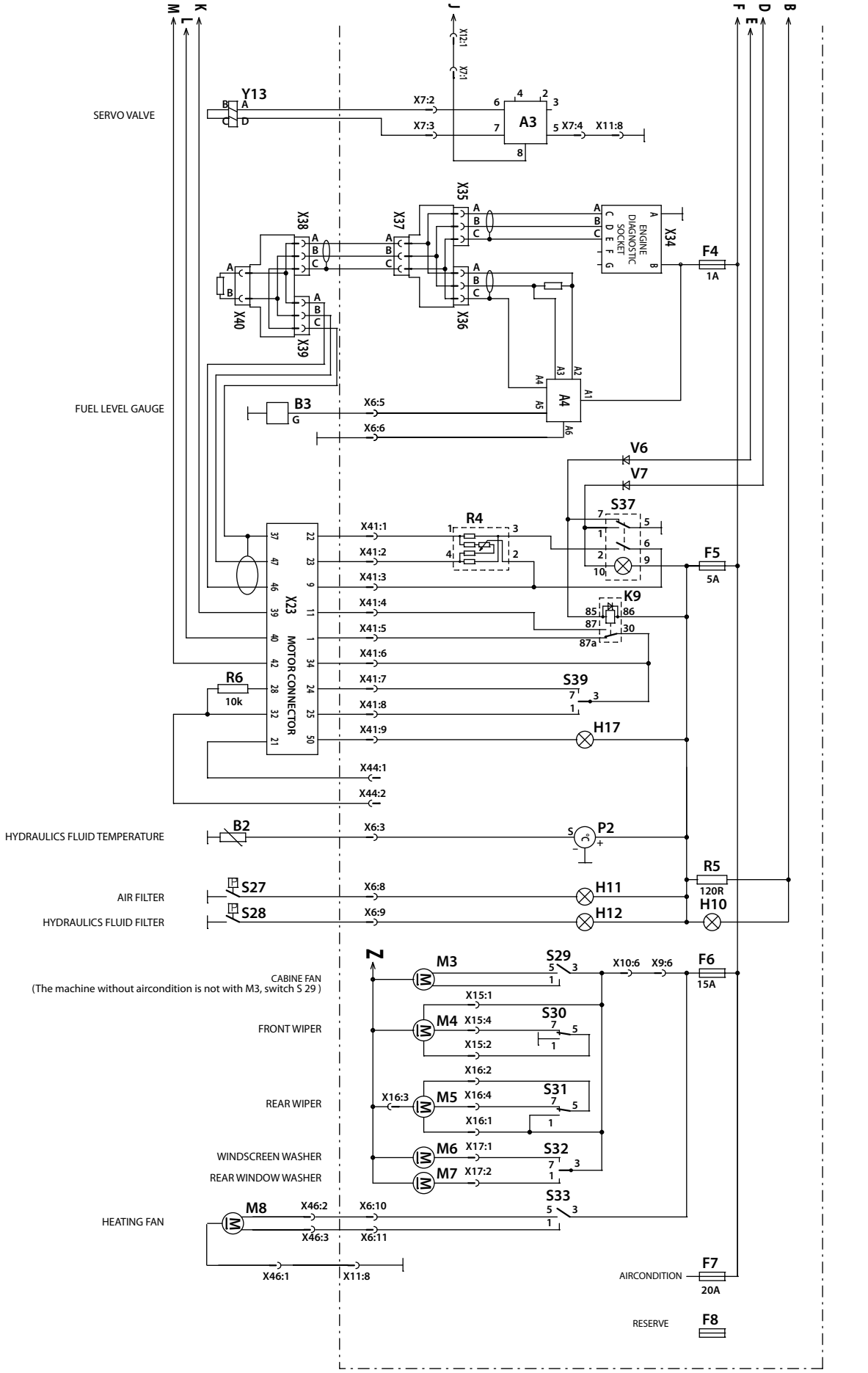
Y8 - Solenoid valve for fast travel - drum
Y9 - Solenoid valve vibrations 1
Y10 - Solenoid valve for vibrations 2
Y11 - Solenoid valve to disengage RTM differential interlock
Y13 - Servo valve for travel pump
Y14 - Solenoid valve for fast travel - right wheel


SERVO VALVE
FUEL LEVEL GAUGE
HYDRAULICS FLUID TEMPERATURE
AIR FILTER
HYDRAULICS FLUID FILTER
CABINE FAN
(The machine without aircondition is not with M3, switch S 29)
FRONT WIPER
REAR WIPER
WINDSCREEN WASHER
REAR WINDOW WASHER
HEATING FAN
AIRCONDITION
RESERVE
MOTOR CONNECTOR
ENGINE DIAGNOSTIC SOCKET
Y13
A3
A4
B3
B2
P2
S27
S28
S29
S30
S31
S32
S33
S37
S39
R4
R5
R6
10k
120R
K9
H10
H11
H12
H17
M3
M4
M5
M6
M7
M8
F4
1A
F5
5A
F6
15A
F7
20A
F8
X23
X34
X35
X36
X37
X38
X39
X40
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3.8. Annexes

Wiring diagram

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G1,2 - Batteries
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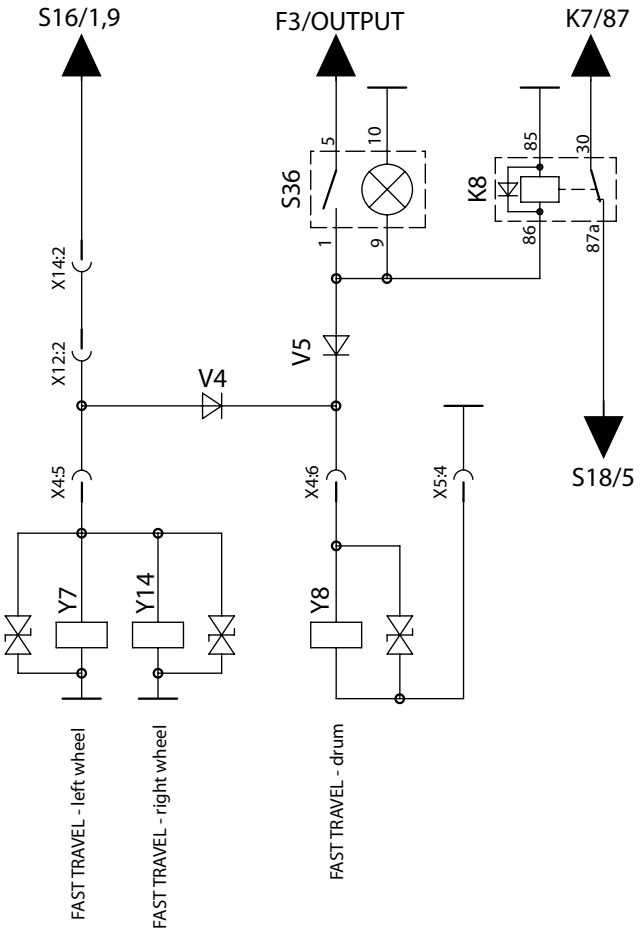
Y9 - Solenoid valve vibrations 1
Y10 - Solenoid valve for vibrations 2
Y11 - Solenoid valve to disengage RTM differential interlock
Y13 - Servo valve for travel pump
Y14 - Solenoid valve for fast travel - right wheel

Connection of electromagnetic valves Y7, Y8 and Y14 for machines with wheel differential lock.



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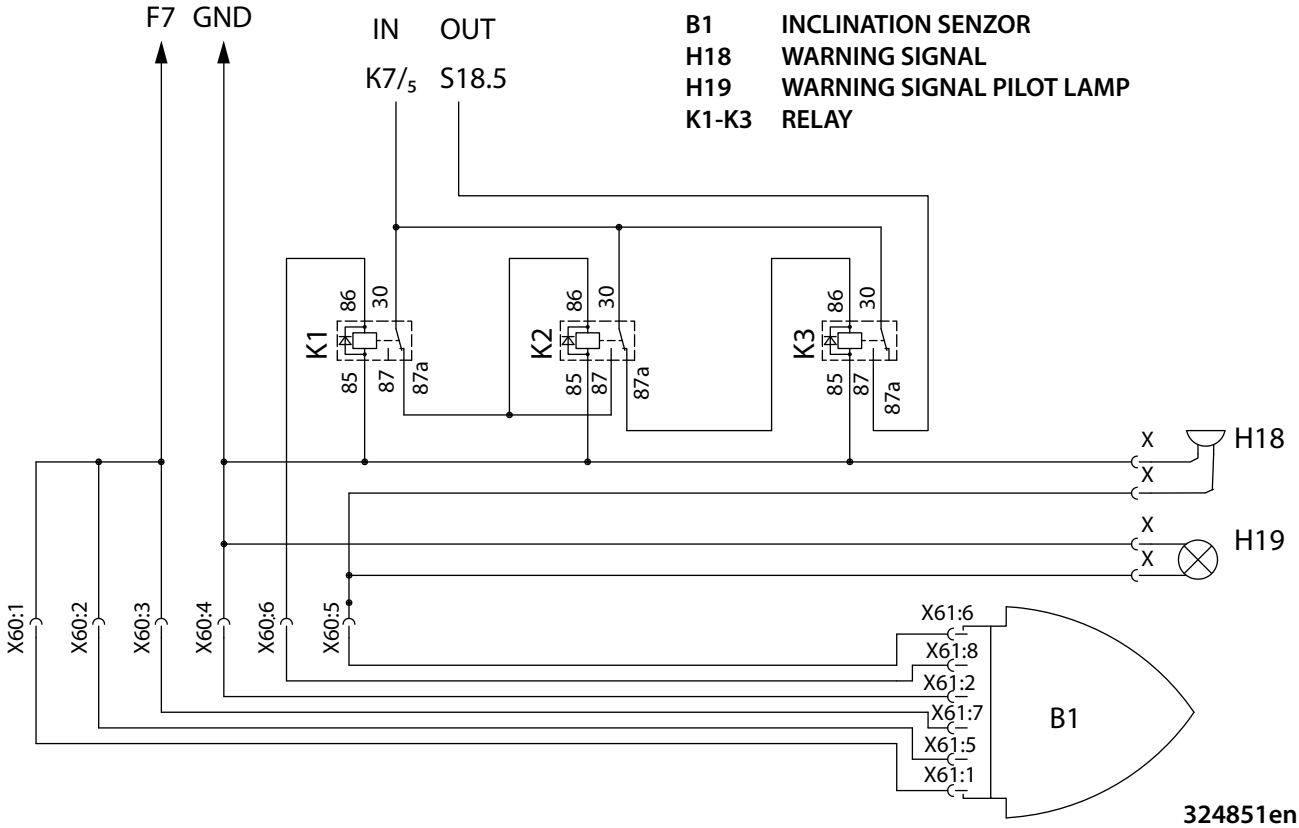

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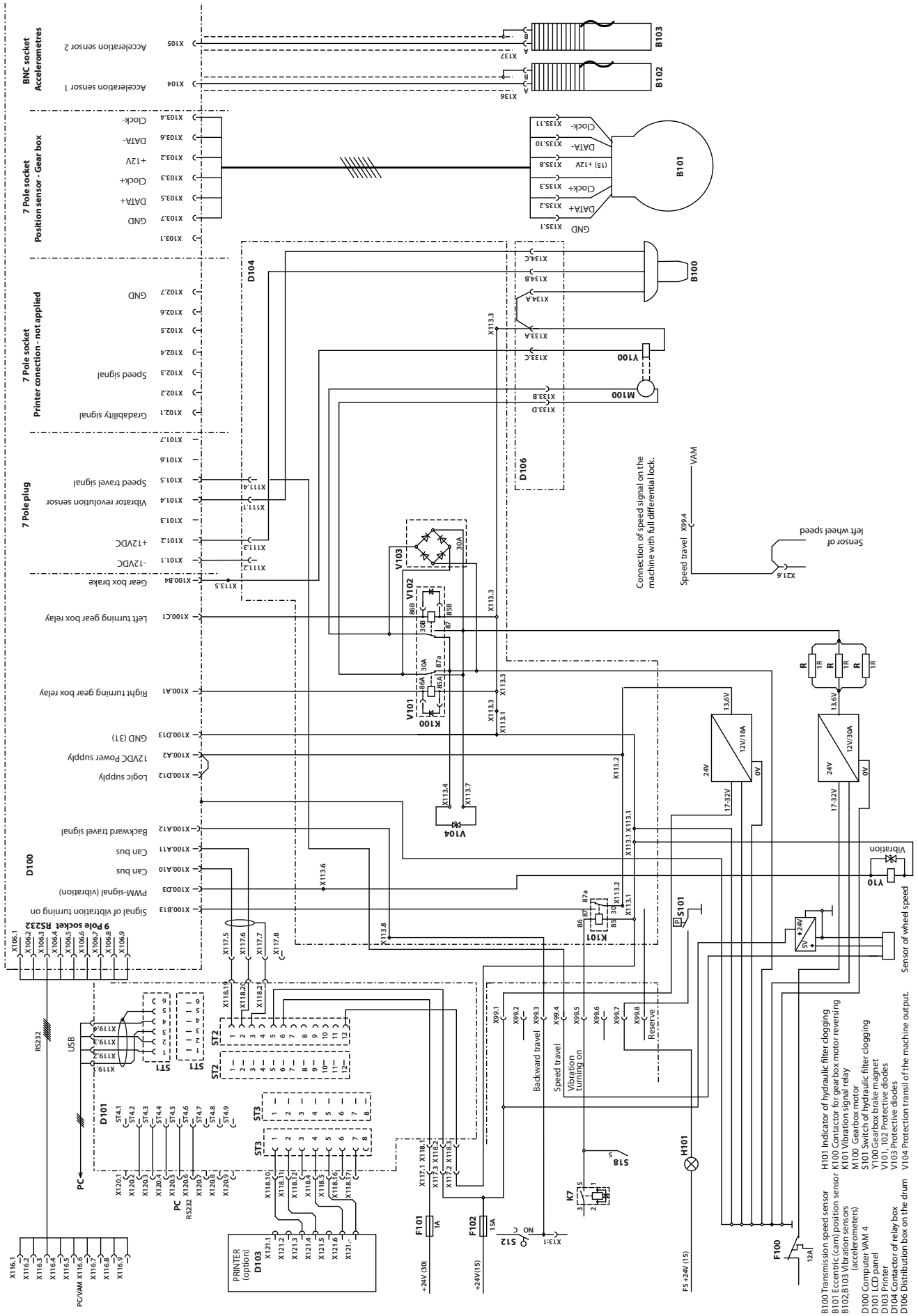
3.8. Annexes

Wiring diagram ASC 110 ACE



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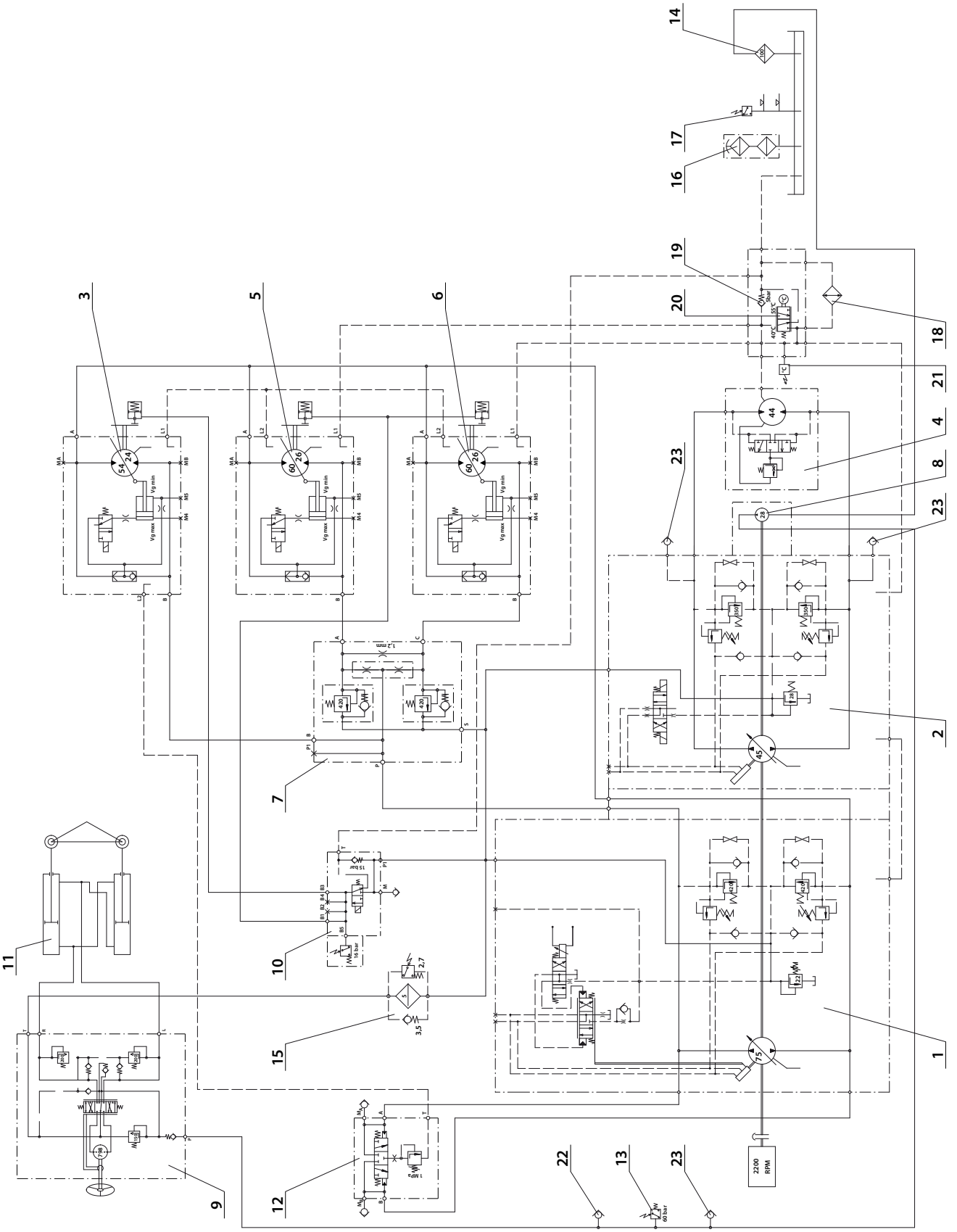
3.8. Annexes

Hydraulic system diagram - INTER - Wheel differential lock

Diagram:

1 - Travel pump
2 - Vibration pump
3 - Drum travel hydromotor
4 - Vibration hydromotor
5 - Left wheel travel hydromotor
6 - Right wheel travel hydromotor
7 - Divider block
8 - Steering pump
9 - Power-assisted steering
10 - Brake block
11 - Hydraulic cylinder - steering
12 - Flushing Block
13 - Pressure switch
14 - Suction strainer
15 - Filter
16 - Filler neck
17 - Level indicator
18 - Combined cooler
19 - One-way valve (check valve)
20 - Thermo-regulator
21 - Thermometer sensor
22 - Quick-coupler for filling
23 - Quick-coupler for measuring



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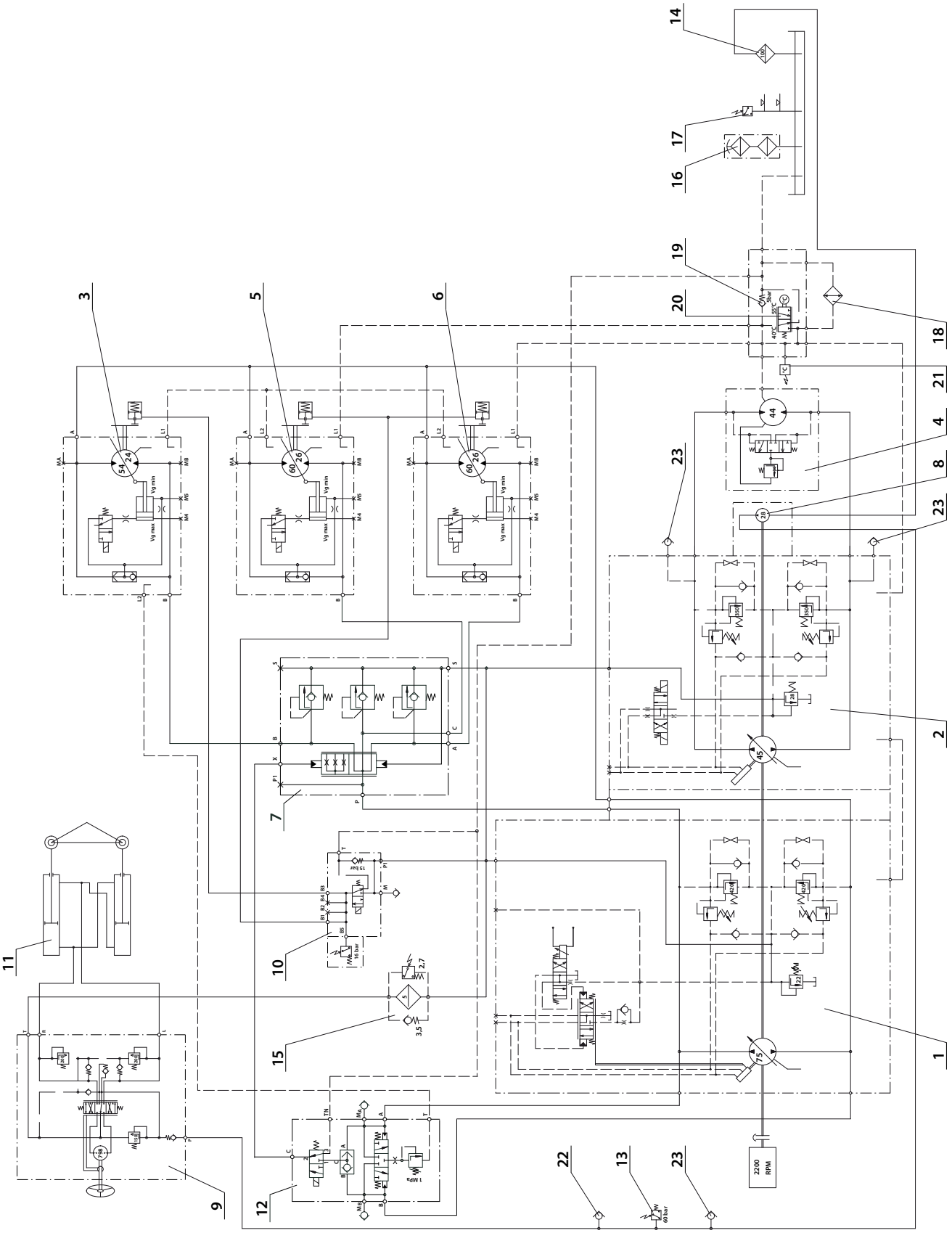
3.8. Annexes

Hydraulic system diagram - Interaxle differential lock ATC

Diagram:

1 - Travel pump
2 - Vibration pump
3 - Drum travel hydromotor
4 - Vibration hydromotor
5 - Left wheel travel hydromotor
6 - Right wheel travel hydromotor
7 - RTM Module
8 - Steering pump
9 - Power-assisted steering
10 - Brake block
11 - Hydraulic cylinder - steering
12 - RTM control block
13 - Pressure switch
14 - Suction strainer
15 - Filter
16 - Filler neck
17 - Level indicator
18 - Cooler combined-type
19 - One-way valve
20 - Thermoregulator
21 - Thermometer sensor
22 - Quick-coupler for filling
23 - Quick-coupler for measuring



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Notes

Notes

Notes

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