

Product: Volvo A20C Articulated Haulers Service Repair Manual

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V O L V O

Service Information

Document Title: Description	Function Group: 000	Information Type: Service Information	Date: 12/16/2023
Profile:			

Description

Volvo A20C is an articulated hauler manufactured by Volvo Articulated Haulers AB.

A20C consists of two main sections, the tractor unit and the load unit. The two units are joined by the frame joint which allows movement about a vertical axis for steering and for the two units to twist independently of each other along a horizontal axis.

The tractor unit consists of a six-cylinder, direct-injected, intercooled and turbocharged diesel engine that is rubber mounted on the frame together with the transmission. The tractor unit drive axle is independently suspended in relation to the frame.

The articulated hauler has in permanent 4-wheel drive (64) with the possibility of engaging and disengaging 6-wheel drive (66). There is a longitudinal differential lock in the dropbox and transverse differential locks on all axles. All differential locks provide one hundred per cent locking.

The load unit consists of a frame, elevation load body and bogie drive axles.

Sample of manual. Download All 1028 pages at:

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Document Title: Product identification plates	Function Group: 000	Information Type: Service Information	Date: 12/16/2023
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Product identification plates

The following text with numbers refers to the illustration below, and shows which product identification plates should be on the machine.

The machine model and **Product Identification Number (PIN)** must always be quoted when ordering spare parts and in any telephone inquiries or correspondence.

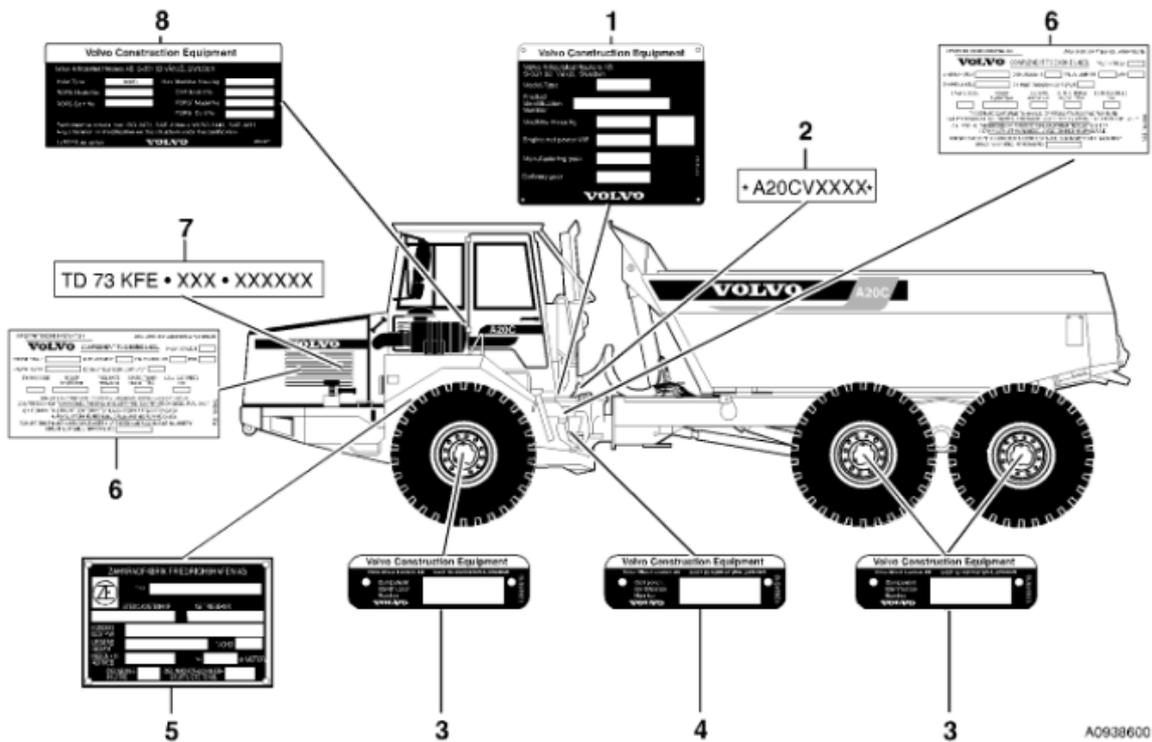


Figure 1

Product identification plates on A20C

1. Product plate with Product Identification Number, PIN for complete machine (includes model, product and serial numbers, machine weight, engine rated output and CE-approval). The plate is located on the left side of the tractor unit frame by the steering joint.
2. The machine serial number is also stamped on the right side of the tractor unit frame by the steering joint.
3. Drive axle serial numbers are located on the axle housing.
4. Dropbox serial number is located on the rear left side of the dropbox.
5. Transmission type designation and serial number is located on the right side of the transmission.
6. The "Important engine information" decal is located on the front of the engine and on the left side of the tractor unit frame by the steering joint.
7. Engine type designation, part and serial number is stamped into the left side of the engine block.
8. Cab type, type approval and serial number is located on the left inside the cab.

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Document Title: Brakes	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
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Brakes

General

Type	Compressed air – hydraulic dual circuit service brake system and parking brake
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Service brake

Type	Dual circuit – compressed air - hydraulic
Tractor unit drive axle	Disc brakes, area 1584 cm ² (246 in ²)
Load unit drive axles	Disc brakes, area 792 cm ² (123 in ²)/axle

Parking brake

Type	Disc brake on propeller shaft, spring brake function
Propeller shafts	Disc brake, area 282 cm ² (44 in ²)

Compressor

Type	Piston compressor
Air capacity at 700 kPa (7 bar) (102 psi) back-pressure and engine speed 37 r/s (3200 rpm)	275 dm ³ /min (litres/min) (73 US gal/min)
Operating speed, max.	50 r/s
Number of cylinders	1
Cylinder bore	88 mm (3,46 in)
Displacement	213 cm ³ (13 in ³)

Air pressure regulator

Cut-out (unloading) pressure	790 – 830 kPa (7.9 – 8.3 bar) (115 – 120 psi)
Cut-in (engagement) pressure	750 – 790 kPa (7.5 – 7.9 bar) (109 – 115 psi)
Safety valve opening pressure	990 kPa (9.9 bar) (144 psi)

4-way protection valve

Opening pressure, all circuits	620 – 650 kPa (6.2 – 6.5 bar) (90 – 94 psi)
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Blocking valve (market adapted equipment)

Closes at pressure below	340 – 400 kPa (3.4 – 4.0 bar) (49 – 58 psi)
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Valve for parking brake

Operation	Automatic return to operating position, block for braking position
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Foot-brake valve

Type	2-circuit
Maximum allowed pressure difference between circuits	25 kPa (0.25 bar) (3.6 psi)

Compressed air tanks

	(serial no. – 3100	(serial no. 3101–,
Tractor unit 1	30 dm ³ (litres) (7.9 US gal)	45 dm ³ (litres) (11.9 US gal)
Tractor unit 1	6 dm ³ (litres) (1.6 US gal)	6 dm ³ (litres) (1.6 US gal)
Load unit 1	30 dm ³ (litres) (7.9 US gal)	30 dm ³ (litres) (7.9 US gal)
Load unit 1		15 dm ³ (litres) (4.0 US gal)
Max. pressure	1 MPa (10 bar) (145 psi)	1 MPa (10 bar) (145 psi)

Brake cylinder for parking brake

Type	Spring brake cylinder
Spring force	1100 kp (2420 lbs)
Release pressure	550 kPa (5.5 bar) (80 psi)
Stroke	57 mm (2.24 in)

Brake pads, service brake

Thickness	14.0 mm (0.55 in)
Thickness, min.	3.0 mm (0.12 in)

Brake disc, service brake

Thickness	16.0 mm (0.63 in)
Thickness, min.	10.0 mm (0.39 in)
Maximum allowed wear per side	3.0 mm (0.12 in)

Brake pads, parking brake

Thickness	23.0 mm (0.91 in)
Thickness, min.	3.0 mm (0.12 in)

Brake disc, parking brake

Thickness	25.0 mm (0.98 in)
Thickness, min.	23.5 mm (0.93 in)
Maximum allowed wear per side	0.75 mm (0.03 in)

Document Title: Capacities	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

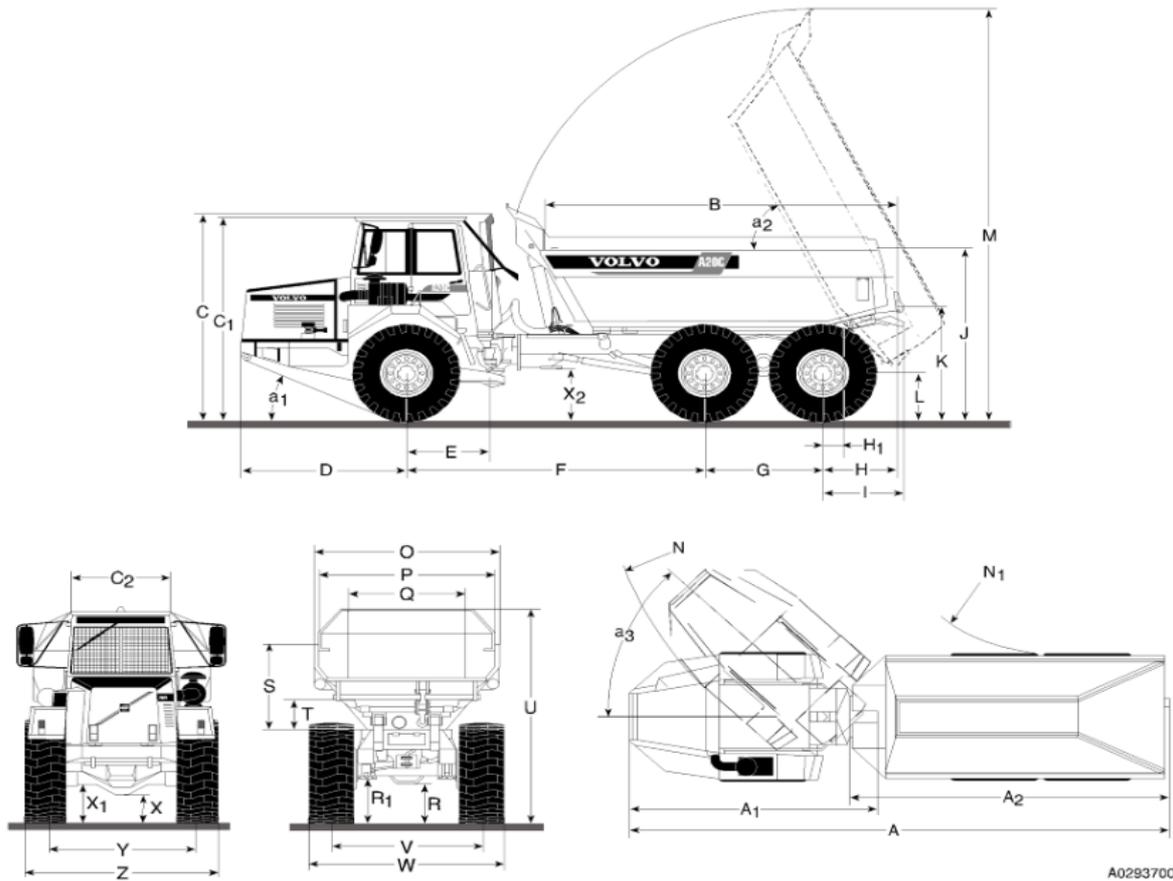
Capacities

Engine, including lubrication oil filter, total	24 litres (6.4 US gal)
Engine, including lubrication oil filter, changing	20 litres (5.3 US gal)
Cooling system	35 litres (9.2 US gal)
Fuel tank	100 + 180 litres (26.4 + 47.5 US gal)
Transmission, total	28 litres (7.4 US gal)
Transmission, changing	19 litres (5.0 US gal)
Dropbox	6 litres (1.6 US gal)
Drive axle, tractor unit	29 litres ^[1] (7.7 US gal)
Drive axle, front bogie axle	30 litres (7.9 US gal)
Drive axle, rear bogie axle	29 litres (7.7 US gal)
Hydraulic oil tank	145 litres (38.3 US gal)
Hydraulic system, total	180 litres (47.5 US gal)
Hydraulic system, at oil change, approx.	160 litres (42.2 US gal)
Compressed air tank, tractor unit	1 6 + 1 30 litres (7.9 US gal)
Compressed air tank, load unit	1 30 litres (7.9 US gal)
Brake fluid reservoir, tractor unit	2 0.5 litres (0.3 US gal)
Brake fluid reservoir, load unit	2 0.5 litres (0.3 US gal)
Anti-freeze reservoir	1 0.9 litres (0.2 US gal)
Load volume, heaped in accordance with SAE norm	12 m ³ (424 ft ³)
Load volume, struck	9.4 m ³ (332 ft ³)

[1]of which approx. 2 litres per hub

Document Title: Dimensions	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

Dimensions



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Figure 1

Dimensions

Measurements in mm (in) for unloaded machine with wheel equipment 20.5–25

A	9505 (374)	J	2600 (102)	V	1930 (76)
A ₁	4495 (177)	K	1675 (66)	W	2490 (98)
A ₂	5535 (218)	L	600 (24)	X	420 (17)
B	4955 (195)	M	6040 (238)	X ₁	550 (22)
C	3225 (127)	N	7850 (310)	X ₂	700 (28)
C ₁	3150 (124)	N ₁	4250 (167)	Y	1930 (76)
C ₂	1320 (52)	O	2480 (98)	Z	2490 (98)
D	2415 (95)	P	2320 (91)	a ₁	24.5
E	1200 (47)	Q	1490 (59)	a ₂	63
F	4200 (165)	R	460 (18)	a ₃	45
G	1650 (65)	R ₁	560 (22)		
H	1115 (44)	S	1265 (50)		
H ₁	425 (17)	T	380 (15)		

I

1290 (51)

U

3230 (127)

Document Title: Electrical system	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

Electrical system

Battery

System voltage	24 V
Capacity	145 Ah
Chassis connection	Negative terminal
Quantity	2 x 12 V

Starter motor

Output	5.5 kW (7.3 hp)
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Alternator with built-in regulator

	Earlier version	Later version
Type	A14N118M	A14N206M
Output	1680 W	1650 W
Voltage, max.	28 V	27.5 V
Current, max.	60 A	60 A
Resistance in rotor windings (across slip rings) 10 %	13.5 W	13.5 W
Resistance in stator windings (between phases) 15 %	0.12 W	0.12 W
Speed at engine speed 10 r/s (600 rpm)	25 r/s (1500 rpm)	

Charging regulator

Type	Electronic (integrated in alternator)
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Fuses

	Type	Quantity	Marking/current rating
Electrical distribution box	Spool fuse	2	5 Amp
Electrical distribution box	Spool fuse	15	8 Amp
Electrical distribution box	Spool fuse	7	16 Amp
Electrical distribution box	Rail fuse	2	25 Amp
Information converter	Glass fuse	1	1.6 Amp
Main fuse, preheating coil (located in engine compartment)	Rail fuse	1	100 Amp
Main fuse, tachograph (located in battery compartment)	Blade fuse	1	5 Amp
Voltage converter	Glass fuse	1	10 Amp

Bulbs

Tractor unit

	Output	Socket	
Headlights	75/70 W	P43t-38	(right asymmetric lights)
	55/50 W	P45T	(left asymmetric lights)
Direction indicators	21 W	BA 15s	
Cab lighting	10 W	BA 15s	
Instrument lights	2 W	BA 9s	
Control lights	2 W	BA 9s	
Central warning light	3 W	BA 7s	
Work lights	70 W (H 3)	PK 22s	
Rotating beacon	45 W	BA 15s	
Parking lights	5 W	BA 15s	
Running (side) lights	7 W	SV 8.5	

Load unit

	Output	Socket
Tail lights, 2	10 W	BA 15s
Direction indicators	21 W	BA 15s
Back-up light	70 W (H 3)	PK 22s
Running lights	7 W	SV 8.5
Brake lights	21 W	BA 15s

Cold-start device

Type	Preheating coil
Output	2400 W
Time relay, connection period	approx. 40 seconds

Diodes

Max. current in conducting direction	1 A
Max. voltage in blocking direction	1000 V

Central warning

Connected functions	Oil pressure, engine
	Temperature, engine
	Overspeeding, engine
	Air filter, engine
	Brake hydraulics – stroke indicator
	Compressed air, service and parking brake
	Steering function (engine-driven pump)
	Hydraulic oil level
	Charging, batteries
Temperature, transmission	

Indication elevated load body, sensor

Adjustment, distance to plate	4 1 mm (0.16 0.04 in)
Voltage	12 – 30 V

Tipping limitation sensor

Adjustment, distance to plate	4 1 mm (0.16 0.04 in)
Voltage	12 – 30 V

Document Title: Engine	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

Engine

General

Designation	TD73KFE
Max. output SAE J1349 Gross at 40 r/s (2400 rpm)	173 kW (232 hp)
Flywheel output SAE J1349 Net at 40 r/s (2400 rpm)	170 kW (228 hp)
Torque SAE J1349 Gross at 20 r/s (1200 rpm)	980 Nm (723 lbf ft)
Torque SAE J1349 Net at 20 r/s (1200 rpm)	970 Nm (715 lbf ft)
Number of cylinders	6
Cylinder bore	104.77 mm (4.125 in)
Stroke	130 mm (5.118 in)
Displacement, total	6.7 litres (1.77 US gal)
Compression ratio	17.7:1
Firing order	1-5-3-6-2-4
Slow idle speed	11.1 – 11.9 r/s
Fast idle speed	(665 – 715 rpm)
Stall speed	44 – 45 r/s
	(2600 – 2720 rpm)
	30.8 – 32.5 r/s
	(1850 – 1950 rpm)
Valve clearance, cold engine, inlet valve	0.40 mm (0.0157 in)
Valve clearance, cold engine, exhaust valve	0.55 mm (0.0217 in)

Turbocharger

Lubrication system	Pressure lubrication (force-feed) from engine
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Lubrication system

Oil pressure, operating speed	350 – 550 kPa (3.5 – 5.5 bar) (50 – 80 psi)
Oil pressure, slow idle speed, minimum	150 kPa (1.5 bar) (22 psi)
Opening pressure, safety valve in filter head	100 – 140 kPa (1.0 – 1.4 bar) (15 – 20 psi)
Oil pressure, piston cooling at 40 r/s (2400 rpm)	80 – 120 kPa (0.8 – 1.2 bar) (12 – 17 psi)

Air cleaner

Type	Dry filter with secondary filter
Primary filter	Cyclone cleaner
Optional equipment	Oil bath cleaner

Fuel system

Fuel feed pump

Designation	FP/KG 24 P300
Feed pressure	100 – 150 kPa (1.0 – 1.5 bar) (15 – 22 psi)

Fuel injection pump with regulator

Fuel injection pump, designation	Engine serial no. -91103 PE 6P 110 A 320 RS 8036 Engine serial no. 91104- PE 6P 110 A 320 RS 8042
Regulator, designation	RQV 300 – 1200 PA 1043
Pump timing setting	8° BTDC
Timing adjustment (α -angle)	6° 1°

Injectors

Nozzle holders	KBEL 98/P 74
Nozzles	DLLA 145 P 286
Injector opening pressure	25 MPa (250 bar) (3625 psi)
Injectors, setting pressure with new spring	26.0 – 26.8 MPa (266 – 268 bar) (3770 – 3886 psi)
Max. allowed pressure drop when testing with pressure 12.5 – 10 MPa (125 – 100 bar) (1813 – 1450 psi)	2.5 MPa (25 bar) (3625 psi) in 5 – 25 s
Injector nozzle diameter	0.218 mm (0.0086 in) (6 holes)
Marking	73.6

Cooling system

General

Thermostat, engine, marked	Red center
Thermostat, begins to open at	82 C (180 F)
Thermostat, fully open at	95 C (203 F)
Relief valve, opening pressure	50 kPa (0.5 bar) (7.25 psi)
Intercooler	Liquid-cooled

Hydraulic pump for fan

Type	Variable piston pump
Displacement	Variable between 0 – 45 cm ³ /rev. (0 – 2.75 in ³ /rev.)
Capacity at 34 r/s (2040 rpm, engine)	115 dm ³ /min (litres/min) (30 US gal/min)
Rotational direction (RCA)	Clockwise
Reduction ratio, engine – pump	1:1.11
Operating pressure, max.	17.5 – 19.5 MPa (175 – 195 bar) (2538 – 2828 psi)
Max. pressure at 0-flow	21 MPa (210 bar) (3045 psi)

Hydraulic motor for fan

Designation	F11-19-MU-SN-1-101
Type	Fixed piston motor
Base speed, engine temperature below 70 C (158 F)	engine speed <24 r/s (1440 rpm), fan speed 11.6 – 15 r/s (700 – 900 rpm) engine speed 24.5 – 26 r/s (1470 – 1570 rpm), fan speed 22.5 – 24.1 r/s (1350 fan speed 22.5 – 24.1 r/s (1350 – 1450 rpm) Refer also to Section 9, Hydraulic system
Displacement	19 cm ³ /rev. (1.16 in ³ /rev.)
Leak-off oil quantity at 20 r/s (1200 engine rpm)	2 dm ³ /min (litres/min) (0.5 US gal/min)

Pressure at base speed, engine temperature below 70 C (158 F)	2.3 – 3.5 MPa (23 – 35 bar) (334 – 508 psi)
8-bladed cooling fan	Ø 680 mm (26.77 in)

Thermostat valve, fan motor

Type	553/1/09498/006
Closes at	96 C (204 F)
Fully open at	70 C (158 F)
Operating pressure, max.	21 MPa (210 bar) (3045 psi)

Solenoid valve

Type	on/off with variable by-pass restriction
Operating pressure, max.	21 MPa (210 bar) (3045 psi)

Return oil filter, fan motor

Cleaning efficiency	10 micron nominally
Capacity, max.	90 dm ³ /min (litres/min) (24 US gal/min)

Document Title: Hydraulic system	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

Hydraulic system

Hydraulic pumps, engine dependent

Type	Variable piston pump
Displacement	Variable, 0 – 45 cm ³ /rev. (0 – 2.75 in ³ /rev.)
Capacity at 40 r/s (2400 rpm, engine)	110 dm ³ /min (litres/min) (29 US gal/min)
Rotational direction	Rear, Anticlockwise, 1
Rotational direction	Front, Clockwise, 2
Reduction ratio, engine – pump	1:1.11
Leak-off oil quantity at 20 r/s (1200 engine rpm)	10 dm ³ /min (litres/min) (2.6 US gal/min)
Thread dimensions for connections: applies to all pumps (4 pumps)	
Inlet	1 5/8" UNF-12
Outlet	1 5/16" UNF-12
Steering line	7/16" UNF-20
Leak-oil line	9/16" UNF-18
Max. pressure at 0-flow	21 MPa (210 bar) (3045 psi)

Hydraulic pump, ground-dependent

Type	Variable piston pump
Displacement	0 – 45 cm ³ /rev. (0 – 2.75 in ³ /rev.)
Rotational direction	Counter-clockwise
Reduction ratio, road wheels – pump	1:5,73
Pump speed at 45 km/h	approx. 51.7 r/s (3100 rpm)
Max. pressure at flow = 0	21 MPa (210 bar) (3045 psi)

Hydraulic pump for fan

See heading "Engine, Cooling system".

Return oil filter, hydraulic tank

Capacity	390 dm ³ /min (litres/min) (103 US gal/min)
Cleaning efficiency	10 m nominally
Overflow pressure	0.08 MPa (0.8 bar) (11.6 psi)

Tipping valve

Make	Volvo
Type	Single-acting

Tipping cylinder

Make	Volvo
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Type	Single-acting, 5-stage telescopic
Tipping time (with load)	Approx. 15 s
Lowering time	Approx. 12 s

Document Title: Power transmission	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

Power transmission

Speed ranges (max.)

Machine (fitted with 20.5-25 tyres)

Gear	km/h (mph)
1st	9 (5.6)
2nd	15 (9.3)
3rd	25 (15.5)
4th	35 (21.7)
5th	47 (29.1)
Reverse	10 (6.2)

Power take-off, engine

Make	Volvo
Connections for	4 hydraulic oil pumps

Transmission

Transmission type	Automatic planetary transmission
Designation	PT 1052
Number of gears	5 forward gears 1 reverse gear

Oil pressure

Warm oil 33.3 – 41.6 r/s (2000 – 2500 rpm), in N-position:

Main pressure	1.7 – 2 MPa (17 – 20 bar) (247 – 290 psi)
Main pressure, Lock-up engaged	1.0 – 1.2 MPa (10 – 12 bar) (145 – 174 psi)
Torque converter pressure	0.7 – 0.8 MPa (7 – 8 bar) (102 – 116 psi)
Lubrication oil pressure	0.18 – 0.25 MPa (1.8 – 2.5 bar) (26 – 36 psi)
Modulating pressure	0.60 – 0.70 MPa (6 – 7 bar) (87 – 102 psi)

Reduction ratios

Torque converter	2.4:1
1st gear	5.6:1
2nd gear	3.4:1
3rd gear	2.0:1
4th gear	1.4:1
5th gear	1.0:1
Reverse	4.8:1

Engine speed dependent functions

Exhaust retarder engaged	18.8 r/s (1130 rpm)
Exhaust retarder disengaged	17.5 r/s (1050 rpm)
Upshifting at overspeed	48.3 r/s (2700 rpm)

Dropbox, 2 ranges

Make	Volvo
Designation	FL650D
Reduction ratio	0,9:1,0
Reduction ratio from output shafts to ground-dependent pump	1:1.17

For additional technical data, see separate Service Manual, Dropbox FL650, 650 B, 652, 652 B.

Drive axles, tractor and load unit

Drive axles

(serial no. –3100)			
	Tractor unit	Front bogie axle	Rear bogie axle
Make	Volvo	Volvo	Volvo
Designation	AH54E	AH54C	AH54D
Product number	23549	23537	23538

(serial no. 3101–)			
66	Tractor unit	Front bogie axle	Rear bogie axle
Make	Volvo	Volvo	Volvo
Designation	AH54X	AH56H	AH54Z
Product number	23761	23912	23763

Final drive

(serial no. –3100)			
	Tractor unit	Front bogie axle	Rear bogie axle
Make	Volvo	Volvo	Volvo
Designation	EV80	EV BM	EV80
Reduction ratio	3.78:1	3.78:1	3.78:1
Differential lock	Dog clutch	Dog clutch	Dog clutch
6-wheel drive (66)			Drive via dog clutch in front bogie axle

Hub reduction

(serial no. –3100)			
	Tractor unit	Front bogie axle	Rear bogie axle
Type	Planetary gear	Planetary gear	Planetary gear
Reduction ratio	4.235:1	4.235:1	4.235:1

For further technical specifications, refer to separate Service Manual.

Differential lock

Longitudinal	In dropbox
Transverse	In drive axles

Document Title: Specifications, change intervals	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

Specifications, change intervals

Oil and fluid change

	Hours
Engine	250
Oil bath air cleaner (optional)	250
Transmission	500
Coolant	2000
Dropbox	2000
Drive axles	2000
Brake fluid	2000
Hydraulic system	2000

Filter change, intervals

Engine	
Oil filters	250
Fuel filter	1000
Extra fuel filter (optional equipment)	1000
Air cleaner, primary filter	1000
Air cleaner, secondary filter	2000
Clean, oil bath cleaner	2000
Clean suction strainer, power take-off	1000
Transmission	
Suction filter	500
Breather filter	1000
Hydraulic system	
Breather filter	1000
Return oil filter	2000
Return oil filter, cooling fan	2000
Miscellaneous	
Air filter, compressor	500
Ventilation filter, cab	1000

Document Title: Steering system	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
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Steering system

General

Type	Hydro-mechanical
Steering angle	2.45
Steering wheel turns, lock-to-lock	3.4 turns
Time for 90 steering angle	approx. 3.6 s

Steering valve

Make	Volvo
Shock valve, opening pressure at 0 – 150 l/min	29 – 32 MPa (290 – 320 bar) (4205 – 4640 psi)
Shock valves, quantity	2

Steering gear

Type	Rack and pinion gear
Stroke	167 mm (6.57 in)

Damping cylinder for steering

Damping spring, pre-load	2.2 – 3.8 mm (0.09 – 0.15 in)
Pressure, max.	30 MPa (300 bar) (4350 psi)

Steering cylinder

Make	Volvo
Quantity	2 double-acting
Distance between attachment hole centers, min.	910 mm (35.83 in)
Distance between attachment hole centers, max.	1470 mm (57.87 in)
Stroke	560 mm (22.05 in)
Remaining stroke at max. steering angle	min. 12 mm (0.47 in)
Cylinder barrel, diameter	100 mm (3.94 in)
Piston rod	70 mm (2.76 in)
Valve slide, max. movement	7.5 mm (0.30 in)

Document Title: Tightening torques	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

Tightening torques

General

Engine and power take-off, refer also to Service Manual "Engine TD61/63, TD 71/73".

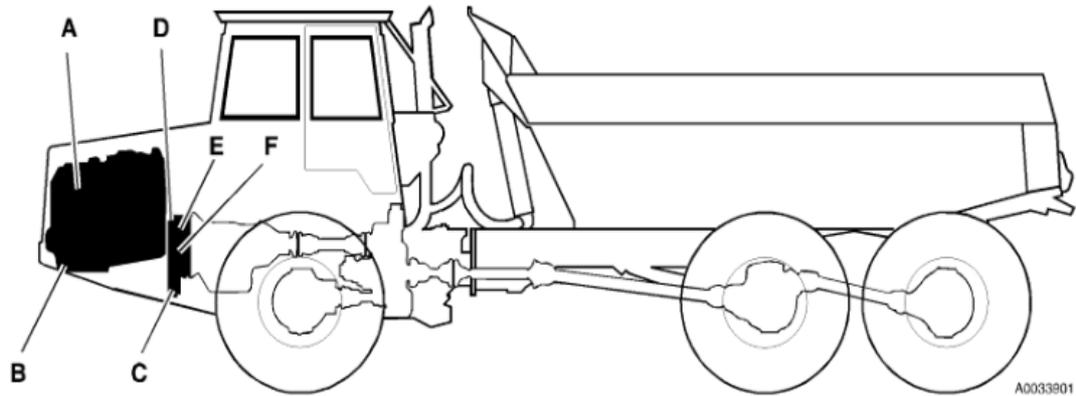
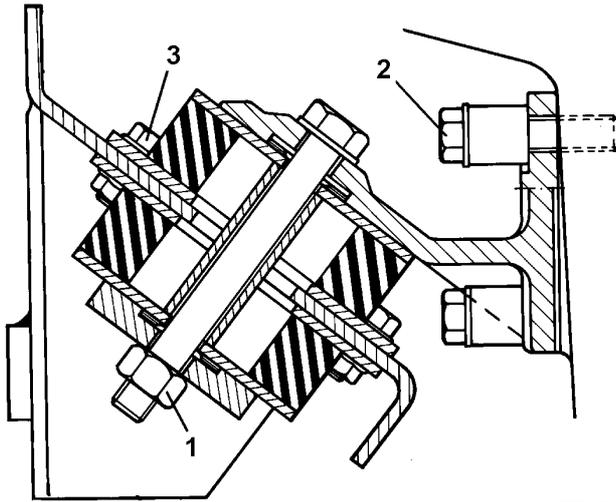


Figure 1

		Nm (lbf ft)	Kpm
A	Air compressor		
	Gear for drive	225 (166)	22.5
	Cylinder head	31 (23)	3.1
	Cylinder foot	23 (17)	2.3
	Compressor, attachment	54 (40)	5.4
B	Front engine mount		
	Centre bolt	185 (136)	18.5
	Against engine	73 (54)	7.3
C	Against frame	20 (15)	2.0
	Power take-off, lower section, flywheel housing	38 (28)	3.8
	Centre bolt	185 (136)	18.5
D	Against frame	73 (54)	7.3
	Engine - flywheel housing	135 (100)	13.5
E	Torque converter - drive disc	80 (59)	8.0
F	Frame bracket - flywheel housing bracket	73 (54)	7.3

Front engine mount



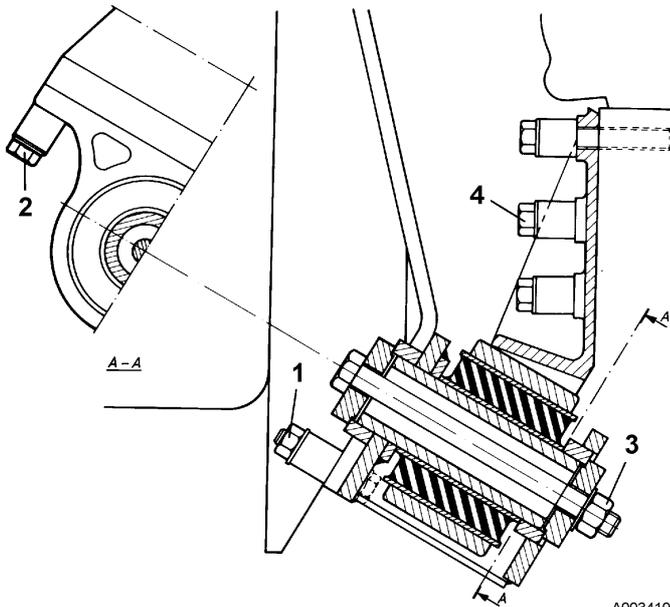
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Figure 2

Tightening torque, front engine mount

1. Centre bolt
2. Against engine
3. Against frame

Rear engine mount



A0034101

Figure 3

Tightening torques, rear engine mount

1. Against frame
2. Frame bracket – flywheel housing bracket
3. Centre bolt
4. Against flywheel housing

Engine

IMPORTANT! Bolts and nuts should be clean and lubricated with oil.

Cylinder head	[1]
Main bearings	150
Crankshaft (big-end) bearings	190
Flywheel (for 6 and 9 bolt types)	190
Flywheel housing	140
Cleaning plugs, cylinder head and cylinder block	70
Vibration damper, retaining bolts	90
Centre bolt, crankshaft	260
Oil sump	24
Drain plug for oil sump	80
Exhaust manifold	48
Lubrication oil pump	
bearing sleeve for transfer gear	33
bracket	65
Valves	
bearing cap, rocker arm shaft	65 (50 aluminium)
inspection covers, tappets	24
valve covers	24
Transmission	
axial bearing, camshaft	65
gear wheel, camshaft	70
gear wheel, pump drive	33
stub axle for transfer gear	90
timing gear casing	33
Injectors	
nut for injector yoke	50
pressure pipe nuts	15 – 25
Injection pump	
clamping bolt in pump coupling	90
pump coupling – flange	27
flange – pump shaft	200

1st torque:	30 Nm (22 lbf ft)
2nd torque:	90 Nm (66 lbf ft)
3rd torque (check-tightening):	90 Nm (66 lbf ft)
Final torque:	Tighten bolts through a 60° angle

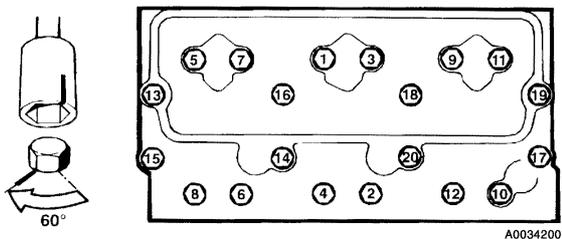


Figure 4
Tightening chart
Transmission

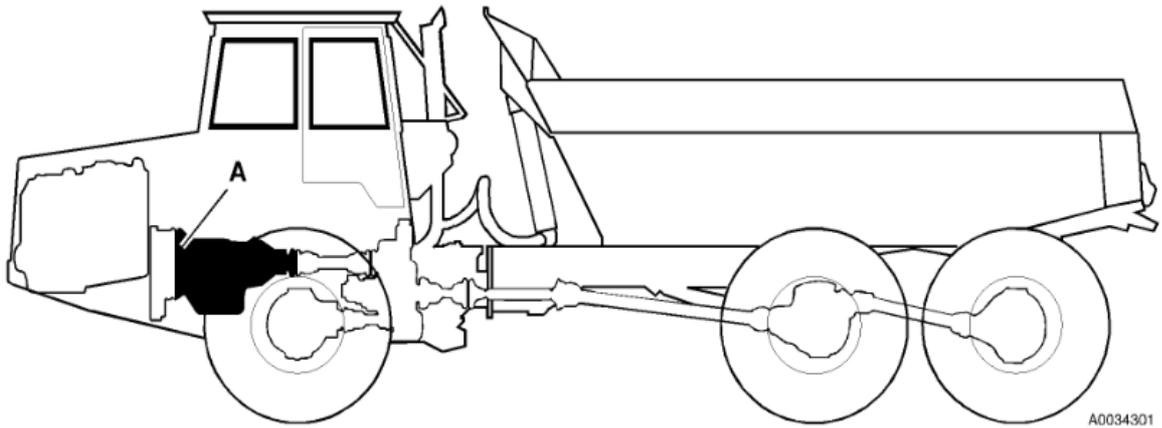


Figure 5

		Nm (lbf ft)	kpm
A	Transmission	48 (35)	4.8
	Flywheel – crankshaft	180 (133)	18.0

Propeller shafts

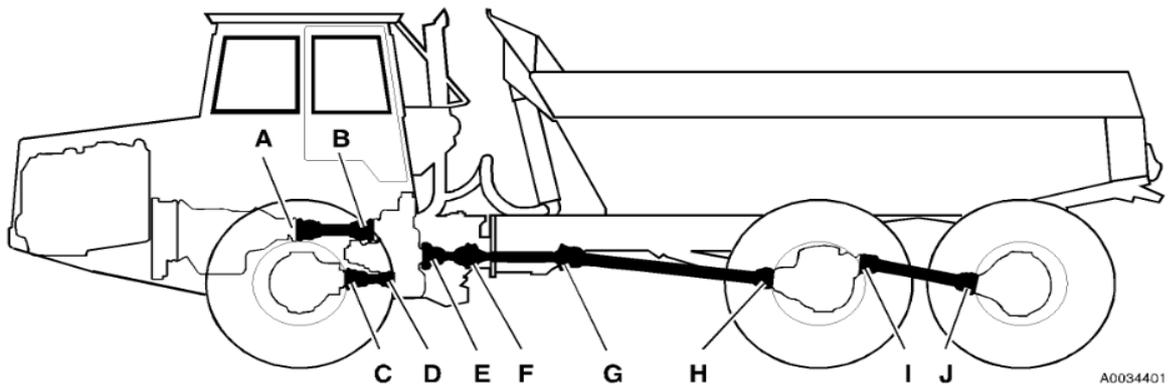


Figure 6

		Nm (lbf ft)	kpm
A	Centre bolts, M12 Transmission	60 (44)	6.0
	Bolted joint 7/16" UNF	100 (74)	10.0
B	Centre nut, dropbox	600 (443)	60.0
	Bolted joint 7/16" UNF	100 (74)	10.0
C	Centre nut, shaft	1200 (885)	120.0
	Bolted joint 1/2" UNF	140 (103)	14.0
D	Centre nut, dropbox	600 (443)	60.0
	Bolted joint 1/2" UNF	140 (103)	14.0
E	Centre nut, dropbox	600 (443)	60.0
	Bolted joint 1/2" UNF	140 (103)	14.0
F	Centre bolts, M12 hitch	125 (92)	12.5
	Bolted joint 1/2" UNF	140 (103)	14.0
G	Centre bolts, M12 parking brake	125 (92)	12.5

	Bolted joint 3/8" UNF	66 (49)	6.6
H	Centre nut, shaft	1200 (885)	120.0
	Bolted joint M10	70 (52)	7.0
I	Centre nut, output shaft 66	600 (443)	60.0
	Bolted joint 7/16" UNF	100 (74)	10.0
J	Centre nut, shaft	1200 (885)	120.0
	Bolted joint 7/16" UNF	100 (74)	10.0

Front and rear output propeller shaft, dropbox

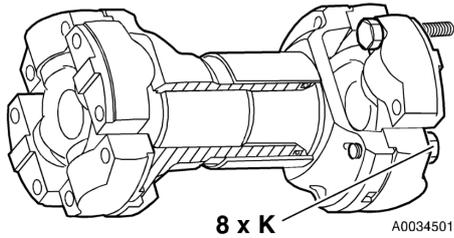


Figure 7

	Nm (lbf ft)	kpm
Bolted joint 1/2" UNF	140 (103)	14.0

Dropbox

Refer also to Service Manual "Dropbox FL 650, 650B, 652, 652B".

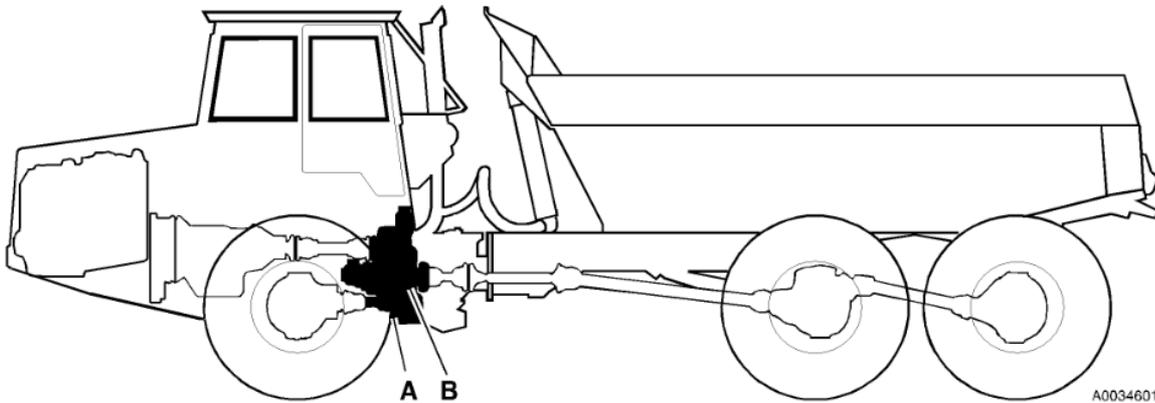


Figure 8

		Nm (lbf ft)	kpm
A	Attachment against dropbox	(M16)	185 (136)
	Attachment against frame	(M16)	185 (136)
B	Bearing retainer – separator plate in housing	(M12)	80 (59)
	Differential housing front – rear	(M12)	80 (59)
	Spacer washer – countershaft, upper shaft	(M10)	46 (34)
	Bearing retainer – front cover	(M10)	46 (34)
	Bearing retainer, lower shaft – housing	(M10)	46 (34)
	Bearing retainer, countershaft – housing	(M10)	46 (34)

Front cover – housing	(M12)	80 (59)	8.0
Lock bolt for diaphragm sleeve, differential lock	(M10)	30 (22)	3.0
Plug for dropbox cover	(M18)	52 (38)	5.2

Drive axles

Refer also to Service Manual "Drive axles Articulated Haulers".

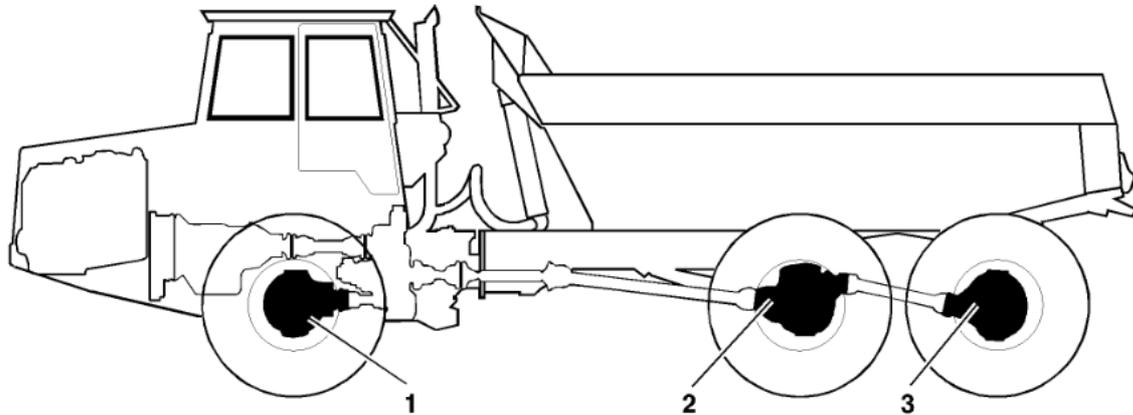


Figure 9

(serial no. -3100)			
66	Front axle	Front bogie axle	Rear bogie axle
Type	AH54E	AH54C	AH54D
Serial no.	23549	23537	23538
Final drive	EV 80	EV BM	EV 80

(serial no. 3101-)			
66	Front axle	Front bogie axle	Rear bogie axle
Type	AH54X	AH56H	AH54Z
Serial no.	23761	23912	23763
Final drive	EV 80	EV BM	EV 80

	Nm (lbf ft)	kpm
Bolts, pinion bearing housing	140 (103)	14.0
Bolts, differential bearing caps	440 (325)	44.0
Bolts, crown wheel	150 (111)	15.0
Bolts, differential housing	100 (74)	10.0
Pinion nut, minimum	1200 (885)	120.0

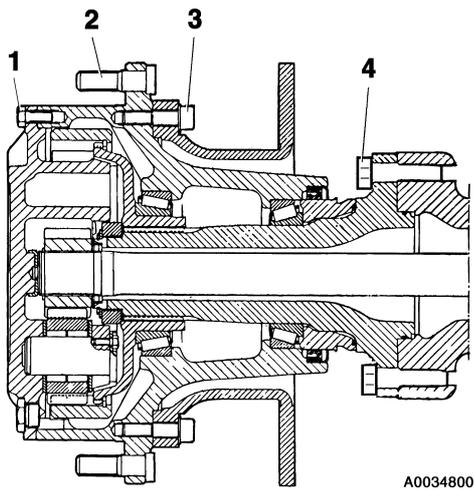


Figure 10

	serial no. -3100	(serial no. 3101-
Pos.	AH54 E, AH54 C, AH54 D	AH54 X, AH56 H, AH54 Z
1	130 Nm (13.0 kpm) (96 lbf ft)	130 Nm (13.0 kpm) (96 lbf ft)
2	625 Nm (62.5 kpm) (461 lbf ft)	625 Nm (62.5 kpm) (461 lbf ft)
3	310 Nm (31.0 kpm) (229 lbf ft)	310 Nm (31.0 kpm) (229 lbf ft)
4	550 Nm (55.0 kpm) (406 lbf ft)	550 Nm (55.0 kpm) (406 lbf ft)
Brake caliper	550 Nm (55.0 kpm) (406 lbf ft)	550 Nm (55.0 kpm) (406 lbf ft)

Frame joint

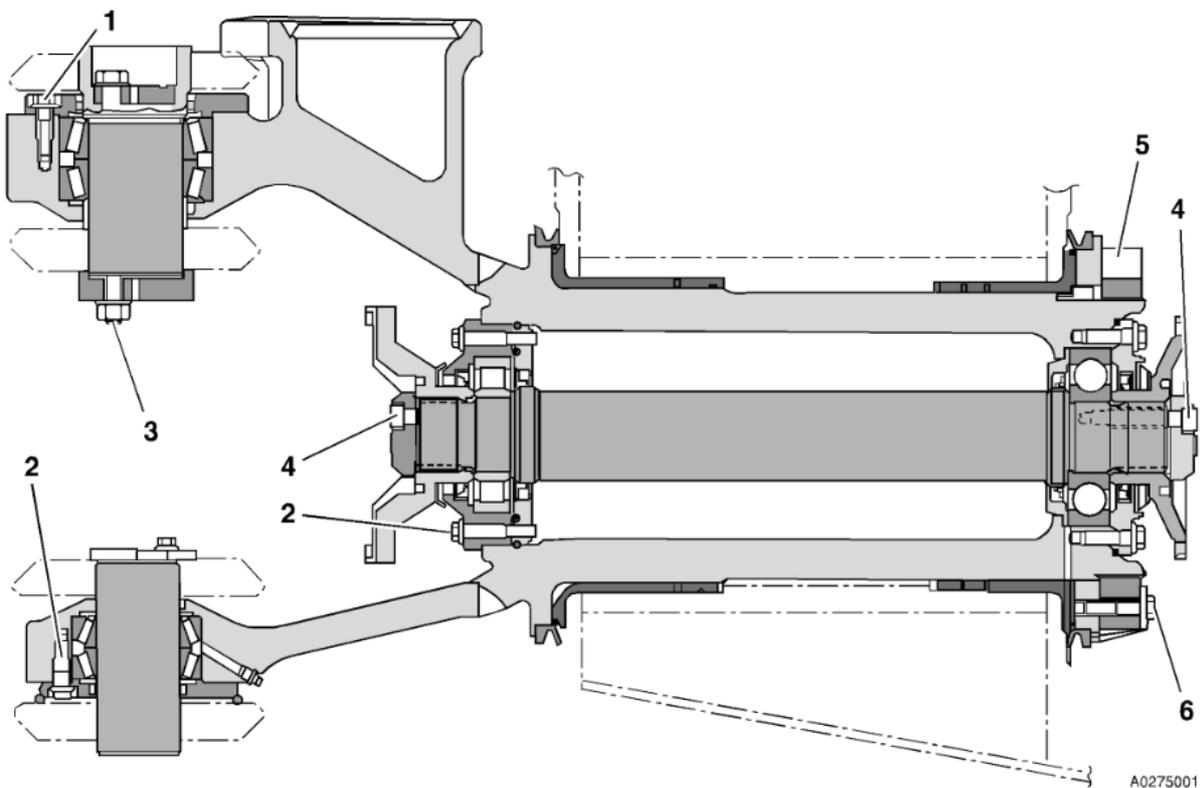


Figure 11

	Nm (lbf ft)	kpm
1	85 (63)	8.5
2	48 (35)	4.8
3	125 (92)	12.5
4	125 (92)	12.5
5	1000 (738)	100.0
6	85 (63)	8.5

Bracket for parking brake caliper

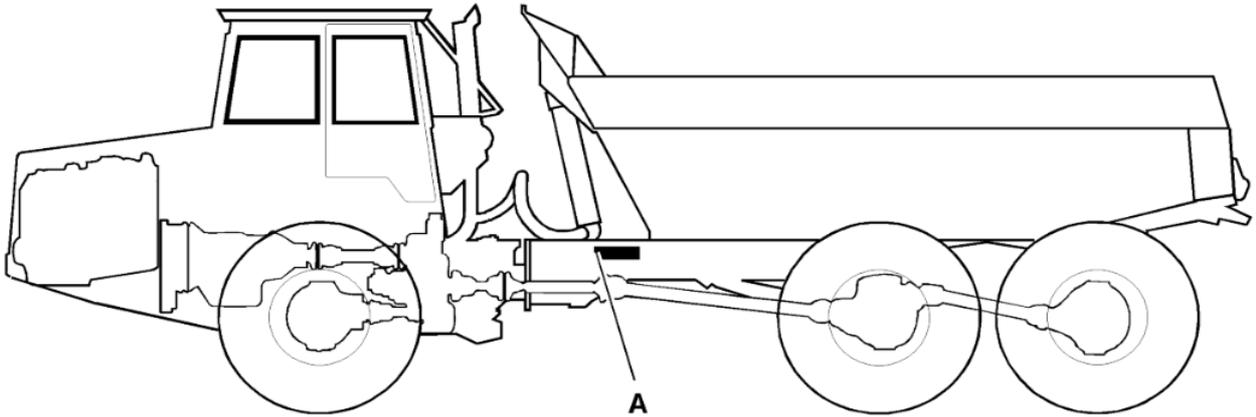
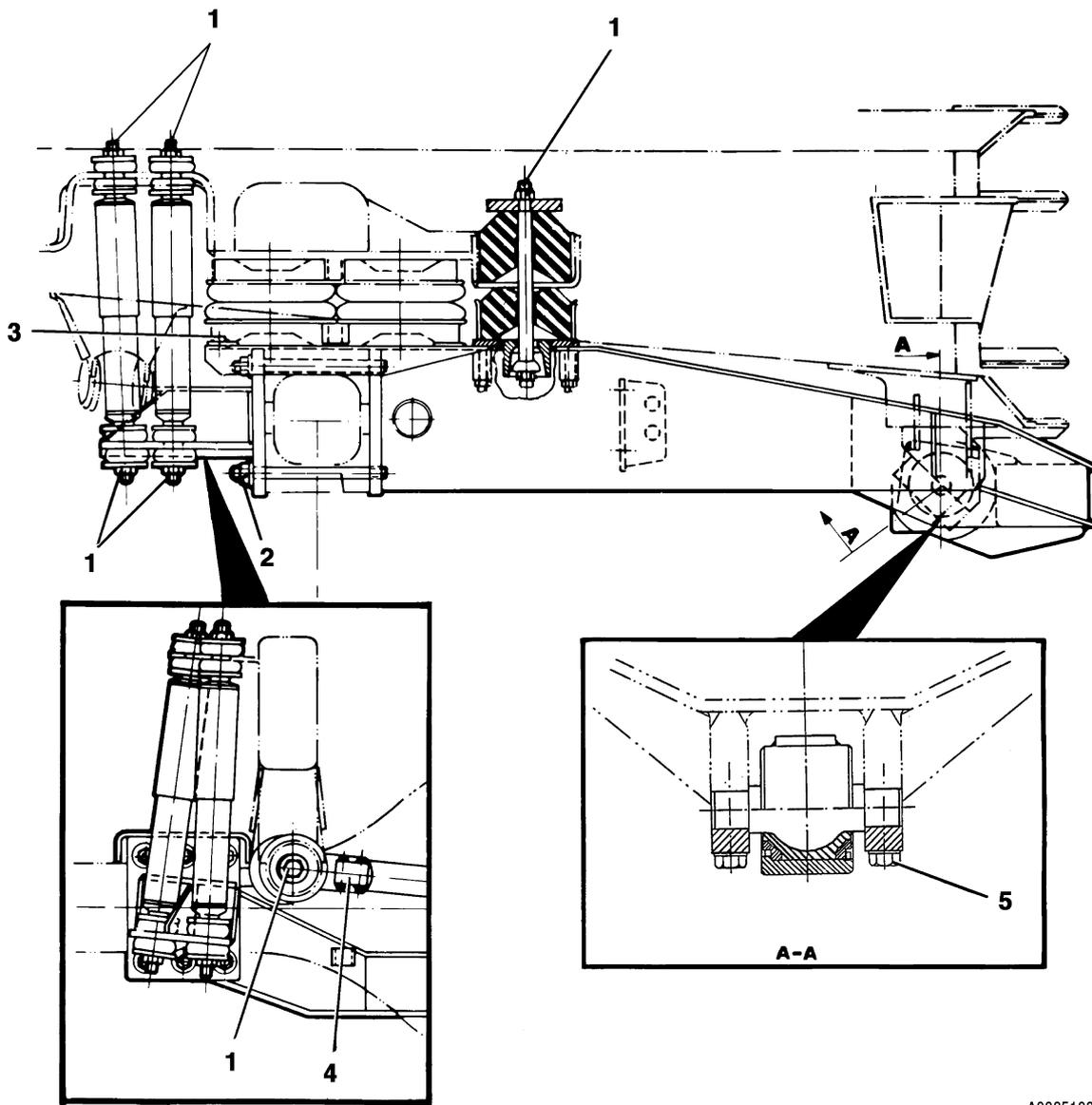


Figure 12

	Nm (lbf ft)	kpm
A	200 (148)	20,0

Tractor unit

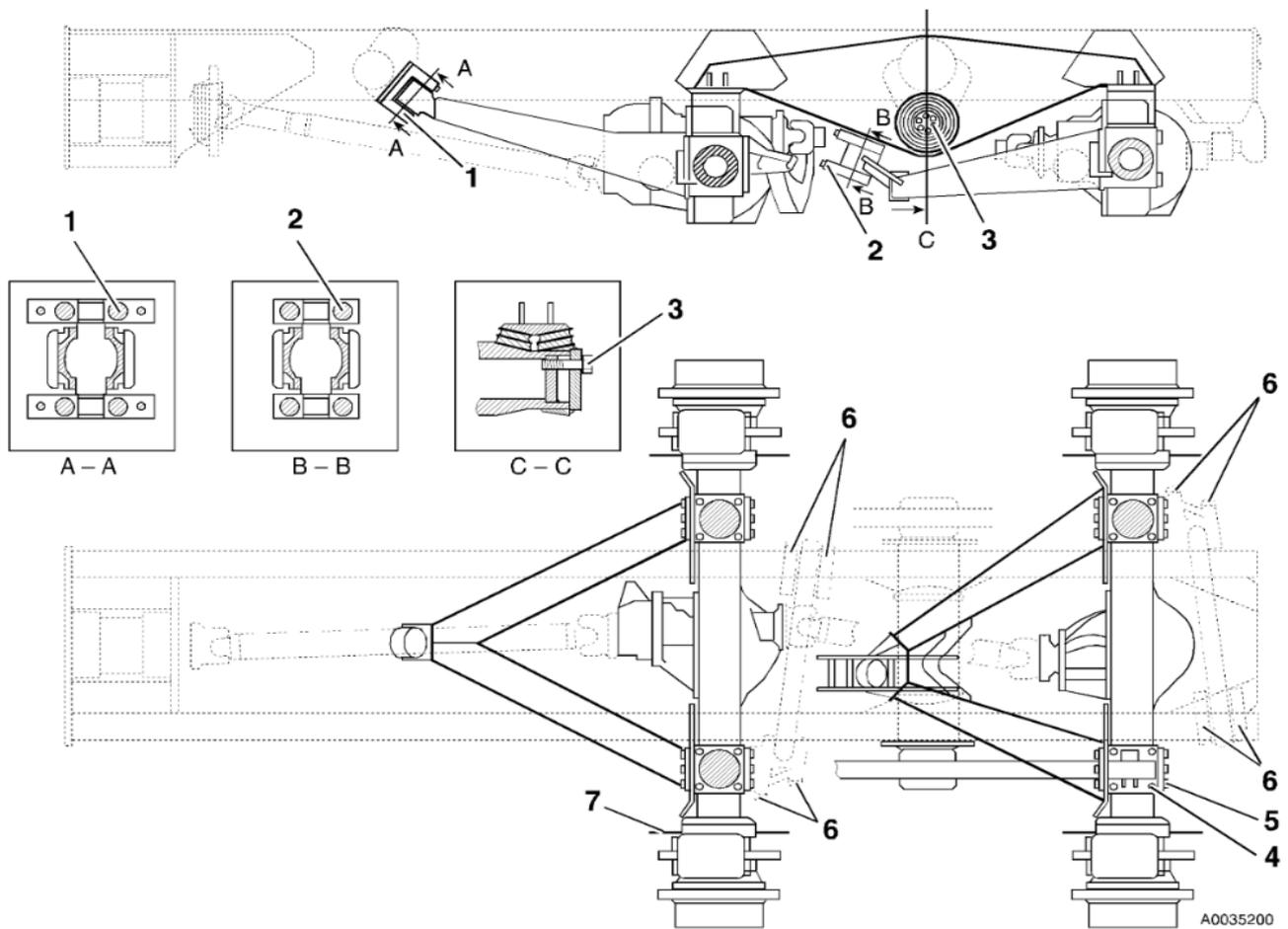


A0035100

Figure 13

	Nm (lbf ft)	kpm
1	100 (74)	10.0
2	395 (291)	39.5
3	41 (30)	4.1
4	73 (54)	7.3
5	355 (262)	35.5

Load unit



A0035200

Figure 14

	Nm (lbf ft)	kpm
1	360 (266)	36.0
2	360 (266)	36.0
3	185 (136)	18.5
4	185 (136)	18.5
5	500 (369)	50.8
6	500 (369)	50.0
7	185 (136)	18.5

[1]A combination of torque tightening (in sequences) and angle tightening applies to cylinder heads. Dip the cylinder head bolts (including the bolt heads) in anti-corrosion fluid max. 24 hours before installing. The bolts must be covered but not dripping wet when installed.

Document Title: Volvo standard tightening torques	Function Group: 030	Information Type: Service Information	Date: 12/16/2023
Profile:			

Volvo standard tightening torques

The tightening torques in the following tables apply to bolts and nuts with a strength class as specified in the information below. The tables should be considered as general guidelines for tightening bolts and nuts which have no specified torque values.

Strength class 8.8 Metric coarse and fine threads

IMPORTANT! The torque values should be increased by 10% for flange bolts of U6FS type. Bolts and nuts must be clean and lubricated with oil.

Thread	Nm	kpm	lbf ft
M6	10	1.0	7.4
M8	24	2.4	18.0
M10	48	4.8	35.0
M12	85	8.5	63.0
M14	140	14.0	103.0
M16	220	22.0	160.0
M20	430	43.0	320.0
M24	740	74.0	550.0

Strength class 10.9 Metric coarse and fine threads

Thread	Nm	kpm	lbf ft
M6	12	1,2	6,6
M8	30	3,0	13,0
M10	60	6,0	24,0
M12	105	10,5	40,0
M14	175	17,5	59,0
M16	275	27,5	89 0
M20	540	54,0	130,0
M24	805	80,5	220,0

Strength class 8.8 UNC-threads, coarse pitch

Thread	Nm	kpm	lbf ft
1/4"	9	0.9	6.6
5/16"	18	1.8	13.0
3/8"	33	3.3	24.0
7/16"	54	5.4	40.0
1/2"	80	8.0	59.0
9/16"	120	12.0	89.0
5/8"	170	17.0	130.0
3/4"	300	30.0	220.0
7/8"	485	48.5	360.0

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