VEBM420100

SHOP MANUAL

KOMATSU

WA150PZ-5

MACHINE MODEL	SERIAL NUMBER
WA150PZ-5	**H50051 and up**

- This shop manual may contain attachments and optional equipment that are not available in your area. Please consult your local Komatsu distributor for those items you may require.
  Materials and specifications are subject to change without notice.
- WA150PZ-5 mounts the SAA4D102E-2 engine.
  For details of the engine, see the 102 Series Engine Shop Manual.

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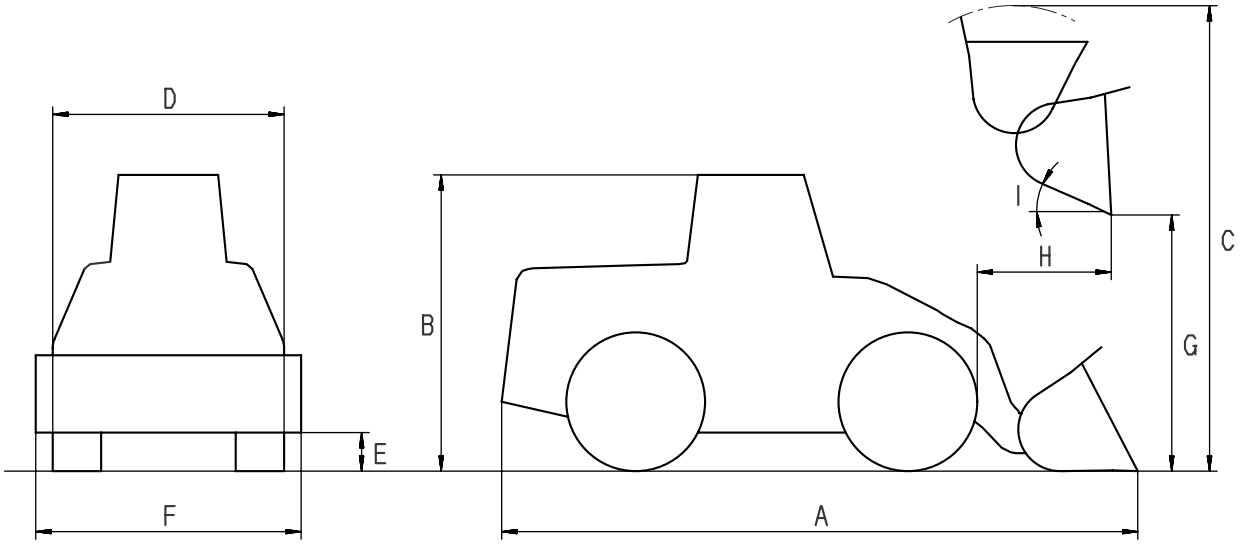
01 GENERAL

GENERAL ASSEMBLY DRAWINGS



	Item		Unit	WA150PZ-5
	Operating weight (With Teeth)		kg	8,480
	Rated load		kN {kg}	23.5 {2,400}
	Bucket capacity (piled) (With Teeth)		m^3	1.5
	Engine model		—	KOMATSU SAA4D102E-2 Diesel engine
	Flywheel horse power		kW {HP} / rpm	71 {96} / 2,000
A	Overall length (With Teeth)		mm	6,600
B	Overall height		mm	3,035
C	Overall height when bucket is raised		mm	4,979
D	Overall width		mm	2,250
E	Min. ground clearance		mm	400
F	Bucket width		mm	2,390
G	Dumping clearance	Tip of bucket/Tip of Teeth	mm	2,915/2,775
H	Dumping reach	Tip of bucket/Tip of Teeth	mm	825/960
I	Bucket dump angle		deg.	45
	Min. turning radius	Tip of bucket/Tip of Teeth	mm	5,270 / 5,330
		Center of outside wheel	mm	4,470
	Travel speed	F1	km / h	4.6 – 13.0
		F2	km / h	13.0
		F3	km / h	20.0
		F4	km / h	38.0
		R1	km / h	4.6 – 13.0
		R2	km / h	13.0
		R3	km / h	20.0
		R4	km / h	38.0

SPECIFICATIONS

Machine model				WA150PZ-5
Serial No.				H50051 and up
Weight	Operating weight (With BOC)		kg	8,880
	Distribution (front) SAE travel posture		kg	3,940
	Distribution (rear) SAE travel posture		kg	4,940
Performance	Bucket capacity (piled) (With BOC)		m^3	1.5
	Rated load		kN {kg}	23.5 {2,400}
	Travel speed	FORWARD 1st	km / h	4.6 – 13.0
		FORWARD 2nd	km / h	13.0
		FORWARD 3rd	km / h	20.0
		FORWARD 4th	km / h	38.0
		REVERSE 1st	km / h	4.6 – 13.0
		REVERSE 2nd	km / h	13.0
		REVERSE 3rd	km / h	20.0
		REVERSE 4th	km / h	38.0
	Max. rimpull	FORWARD	kN {kg}	63.7 {6,500}
		REVERSE	kN {kg}	63.7 {6,500}
	Gradeability		deg.	25
	Min. turning radius	(Center of outside wheel)	mm	4,470
	Min. turning radius (Tip of bucket/Tip of BOC)	[SAE travel posture]	mm	5,165 / 5,185
Dimensions	Overall length (with BOC)		mm	6,600
	Overall width (chassis)		mm	2,250
	Bucket width (with BOC)		mm	2,390
	Overall height (top of cab)		mm	3,035
	Overall height (Bucket approx. raised to max.)		mm	4,979
	Wheel base		mm	2,600
	Tread		mm	1,780
	Min. ground clearance		mm	400
	Max. height of bucket hinge pin		mm	3,485
	Dumping clearance (Tip of bucket/Tip of Teeth)		mm	2,915 / 2,775
	Dumping reach (Tip of bucket/Tip of Teeth)		mm	825 / 960
	Steering angle		deg.	40
	Bucket tilt angle (travel posture)		deg.	46
	Bucket tilt angle (max. height)		deg.	66
	Bucket dump angle (max. height)		deg.	46
	Digging depth (10° dump) (Tip of bucket/Tip of BOC)		mm	220 / 255

Machine model				WA150PZ-5
Serial No.				H50051 and up
Engine	Model			SAA4D102E-2
	Type			4-cycle, water-cooled, in-line, 4-cylinder, direct injection with turbocharger, air-cooled after cooler
	No. of cylinders - bore x stroke		mm	4 – 102 x 120
	Piston displacement		ℓ {cc}	3.92 {3,920}
	Flywheel horsepower		kW / rpm	71 / 2,000
			{HP / rpm}	{96 / 2,000}
	Maximum torque		Nm / rpm	402 / 1,300
			{kgm / rpm}	{41 / 1,300}
	Min. fuel consumption ratio		g / kWh {g / HPh}	219 {161}
	High idling speed		rpm	2,250
	Low idling speed		rpm	825
	Starting motor			24 V 5.5 kW
	Alternator			24 V 35 A
	Battery (*1)			24 V 92 Ah x 2 pcs.
Power train	HST pump			Variable displacement swash plate-type piston pump
	HST motor 1			Variable displacement swash plate-type piston motor
	HST motor 2			Variable displacement swash plate-type piston motor
	Transfer			Multiple shaft planetary compound-type, spur gear constant mesh-type, 2 alternative power systems
	Reduction gear			Spiral bevel gear, splash lubrication type
	Differential			Straight bevel gear type, torque portioning
	Final drive			Planetary gear 1-stage, splash lubrication type
Axle	Drive type			Front and rear wheel drive
	Front axle			Fixed to frame, semi-floating type
	Rear axle			Center pin support, semi-floating type
Tire	Tire size			17.5–R25
	Rim size			W15L × 24
	Inflation pressure	Front tire	kPa {kg / cm²}	235 {2.4}
		Rear tire	kPa {kg / cm²}	235 {2.4}
Brakes	Main brake	Braking system		4 wheel braking, Front and rear wheel independent system control
		Brake type		Enclosed wet multiple disc type
		Operation method		Hydraulically controlled
		Control method		Hydraulic power servo assisted brake
	Parking brake	Braking system		Speed change gear output shaft braking
		Brake type		Wet multiple disc type
		Operation method		Mechanical type
		Control method		Hand lever type

*1: Battery capacity (Ah) shows the rate of 5 hours.

Machine model				WA150PZ-5
Serial No.				H50051 and up
Steering control	Type			Articulated steering
	Control			Hydraulic control
Hydraulic system	Hydraulic pump	Work equipment and Steering pump		
		• Type		Gear type
		• Theoretical capacity	cm³/rev	63.1
		Brake and cooling fan pump		
		• Type		Gear type
		• Theoretical capacity	cm³/rev	10.5
		Transfer lubrication pump		
		• Type		Gear type
		• Theoretical capacity	cm³/rev	6.4
	Cylinder	Steering cylinder	Type	Reciprocating piston type
			Cylinder inner diameter	mm 55
			Piston rod diameter	mm 30
			Stroke	mm 375
			Max. length between pins	mm 1,020
			Min. length between pins	mm 645
		Lift cylinder	Type	Reciprocating piston type
			Cylinder inner diameter	mm 110
			Piston rod diameter	mm 60
			Stroke	mm 628
			Max. length between pins	mm 1,659
			Min. length between pins	mm 1,031
		Bucket cylinder	Type	Reciprocating piston type
			Cylinder inner diameter	mm 110
			Piston rod diameter	mm 55
			Stroke	mm 628
			Max. length between pins	mm 1,608
			Min. length between pins	mm 980

Machine model				WA150PZ-5
Serial No.				H50051 and up
Hydraulic system	Control valve	Work equipment control valve • Type		2-spool type
		• Set pressure	MPa {kg / cm²}	20.6 {210}
		Steering valve • Type		Orbit-roll type
		• Set pressure	MPa {kg / cm²}	18.6 {190}
	Motor	Cooling fan motor • Type		Fixed displacement piston type
Work equipment	Link type			Single link
	Bucket edge type			Flat blade with top BOC

WEIGHT TABLE

⚠ This weight table is a guide for use when transporting or handling components.

Unit: kg

Machine model	WA150PZ-5
Serial Numbers	H50051 and up
Engine (without coolant and oil)	450
Cooling assembly (without coolant)	71
Cooling fan motor	6
Damper	3
HST pump	56
HST motor 1	26
HST motor 2	26
Transfer	158
Front drive shaft	14
Rear drive shaft	4
Front axle	410
Rear axle	380
Axle pivot (rear axle)	66
Wheel (each)	53
Tire (each)	91
Orbit-roll valve	7
Priority valve	6
Steering cylinder assembly (each)	13
Brake valve	10
Hydraulic tank (without hydraulic oil)	59
3-gear pump unit	20
Work equipment PPC valve	3
Work equipment control valve	19
Lift cylinder assembly (each)	65
Bucket cylinder assembly	56
Engine hood (with side panel)	140
Front frame	590
Rear frame	573

Unit: kg

Machine model	WA150PZ-5
Serial Numbers	H50051 and up
Lift arm (including bushing)	446 - 493
Bucket (1.5m^2, including BOC)	686 - 696
Bell crank	126
Bucket link	20
Counterweight	660
Additional counterweight (1 piece)	100
Fuel tank (without fuel)	70
Battery (each)	33
Operator’s Cab (including air conditioner and interior parts)	755
Operator’s seat	41

LIST OF LUBRICANT AND COOLANT

WA150PZ-5	LUBRICANTS, FUELS AND FILLING CAPACITIES					
	Lubricant and operating medium	Short code / cask lettering	Quality grade	Temperature range	Viscosity range	Filling capacity in litres
Engine	Engine oil	EO 0030A EO 0540A EO 10 EO 30 EO 1030A EO 1540A	ACEA E5 or, if not available: API CD or API CE or API CF -4	-30° up to 40° C -25° up to 40° C -20° up to 10° C 0° up to 40° C -20° up to 40° C - 15° up to 50° C	SAE 0W-30 SAE 5W-40 SAE 10 SAE 30 SAE 10W-30 SAE 15W-40 *)	14 (12.5 **)
Transfer case	Engine oil	EO 10	ACEA E5 or, if not available: API CD or API CE or API CF -4	-30° up to 40° C	SAE 10W*)	4.9 (4.4 **)
Hydraulic system	Hydraulic oil	HYD 0530 HYD1030	HVLP, HVLP D	-30° up to 40° C -20° up to 30°	ISO VG46 *) ISO VG68	104 (47**)
Axle with standard differential	Axle oil	AXO 80 AXO	Shell: DONAX TD5W30***		80W SAE 5W-30 *)	front 14 rear 14.5
	or Engine oil	EO 30	ACEA E5 or, if not available: API CD or API CE or API CF -4	0° up to 40° C	SAE 30	
Axle with limited-slip differential (*3)	Axle oil (*4)	AXO	Shell: DONAX TD5W30*** Esso: TORQUE FLUID56**** Mobil: MOBILFLUID 424 Fuchs: TITAN HYDRA ZF20W-40		SAE 5W-30 *) SAE 20W-40	
Fuel tank	Diesel fuel	ASTM D975 No.1 ASTM D975 No.2 DIN-EN 590	CFPP class B CFPP class D CFPP class F	-30° up to -10° C -10° up to 40° C 0° up to 40° C -10° up to 40° C - 20° up to 40° C		133
Grease nippels	Multi purpose grease on a lithium base	MPG-A	KP2N-20	-30° up to 40° C	NLGI-No. 2	–
Grease box of central lubrication unit	Multi purpose grease on a lithium base	MPG-A	KP2N-20	-30° up to 40° C	NLGI-No. 2	–
Cooling system	Water and coolant	SP-C	Add antifreeze with corrosion resistor			17
Air conditioner	Coolant	NRS	R134a (CFC-free)			860 g

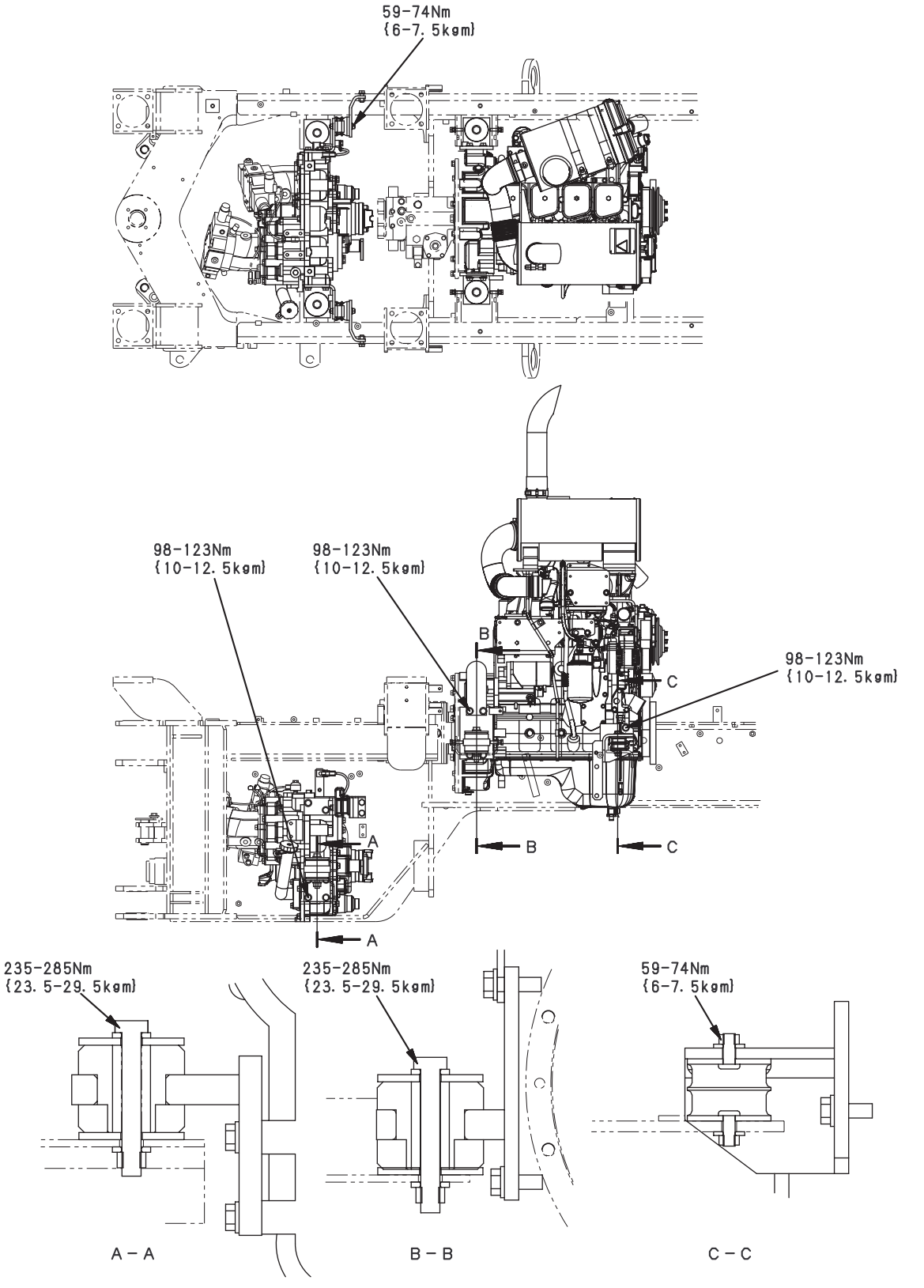
*) Work filling
** Top-up quantity
*** North American manufacted DONAX TD 20W-40 must not be used.
**** North American manufacted TORQUE FLUID 56 must not be used.

*1: ASTM D975 No. 1
*2: Use only diesel fuel.
*3: For the standard differential, except for "AX080", the oil for machines equipped with the anti-slip differential in the table below and EO30 can be used. However, in the case of "EO30", depending on conditions such as the brakes are used and the oil temperature, the brakes may squeal just before the machine stops, but there is no problem with the brake performance or durability.
*4: The letters "ASD" are stamped on the name plate of machines equipped with the anti-slip differential axle.
*5: For machines equipped with the limited-slip differential axle, select from the oil given in the table below.

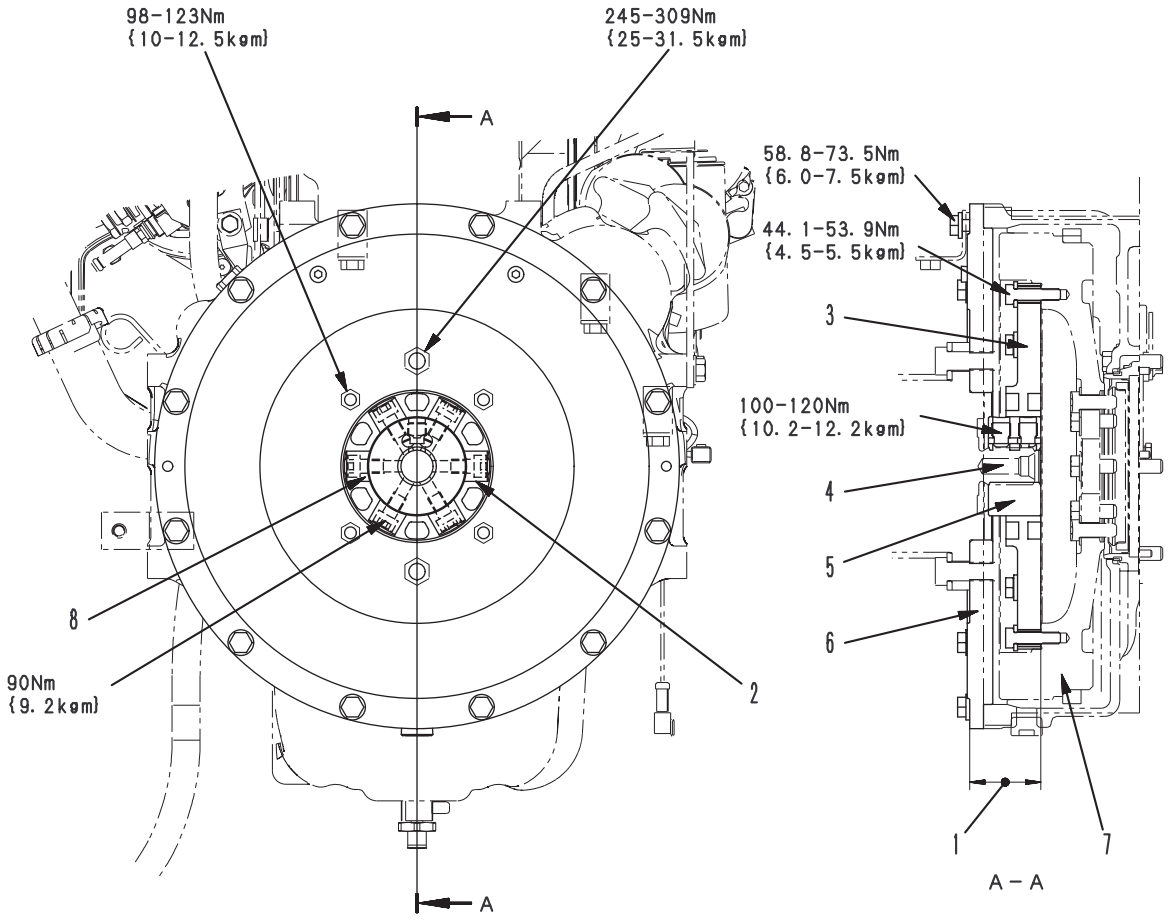
Maker	Brand	Remarks
SHELL	DONAX TD 5W-30	North American manufactured DONAX TD 20W–40 must not be used
ESSO	TORQUE FLUID 56	North American manufactured must not be used
MOBIL	MOBILFLUID 424	
FUCHS	RENOGEAR HYDRA ZF 20W–40	

10 STRUCTURE, FUNCTION AND MAINTENANCE STANDARD

ENGINE MOUNT AND TRANSFER MOUNT



DAMPER



Unit: mm

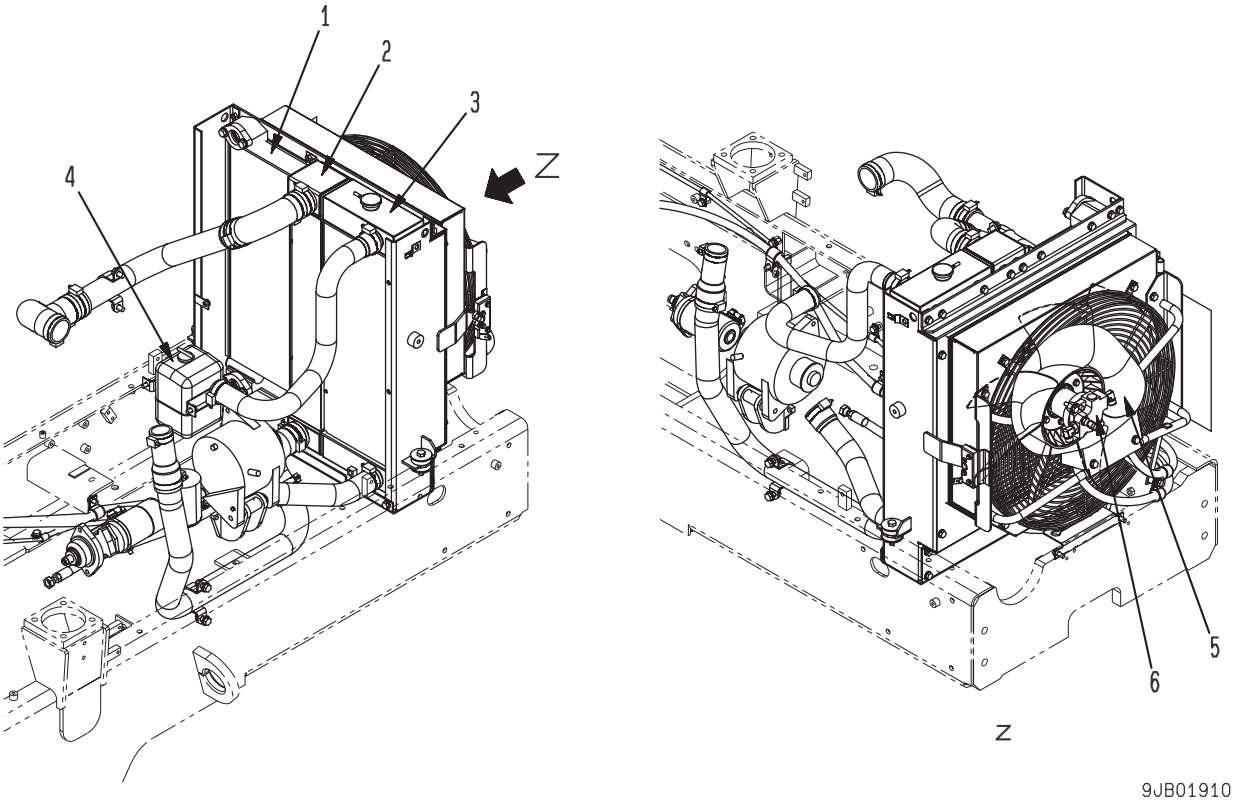
No.	Check item	Criteria		Remedy
1	Distance between HST pump mounting face and end of hub	Standard size	Repair limit	Adjust
		61.2	± 0.8	
2	Wear of flange and insert	Repair limit: 1.0		Replace

3. Flange
4. HST pump input shaft
5. Hub
6. Cover
7. Flywheel
8. Insert

Outline

- The damper reduces the torsional vibration caused by fluctuation of the engine torque to protect the drive system after the engine from the torsional vibration.
- The power from the engine is transmitted through flywheel (7) to flange (3), which absorbs the torsional vibration, and then transmitted through hub (5) to the HST pump.

COOLING SYSTEM

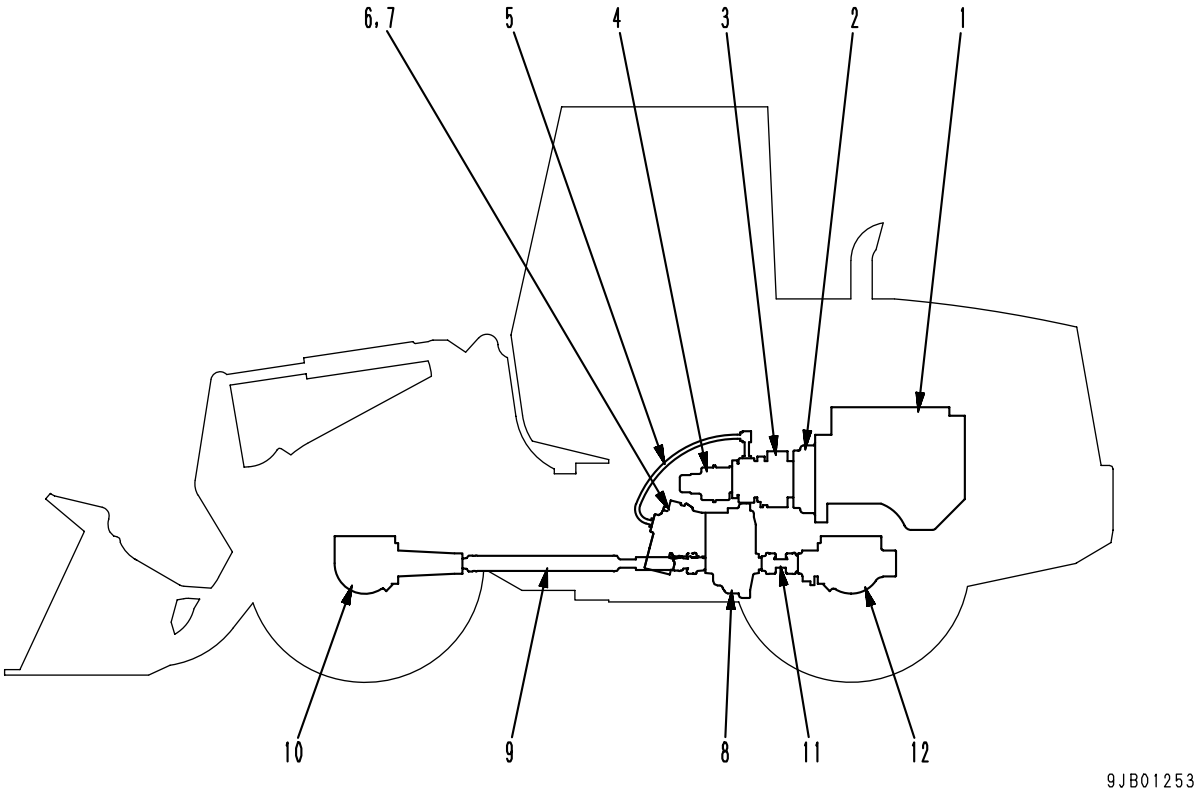


1. Oil cooler
2. After cooler
3. Radiator
4. Reservoir tank
5. Cooling fan
6. Cooling fan motor

Specification

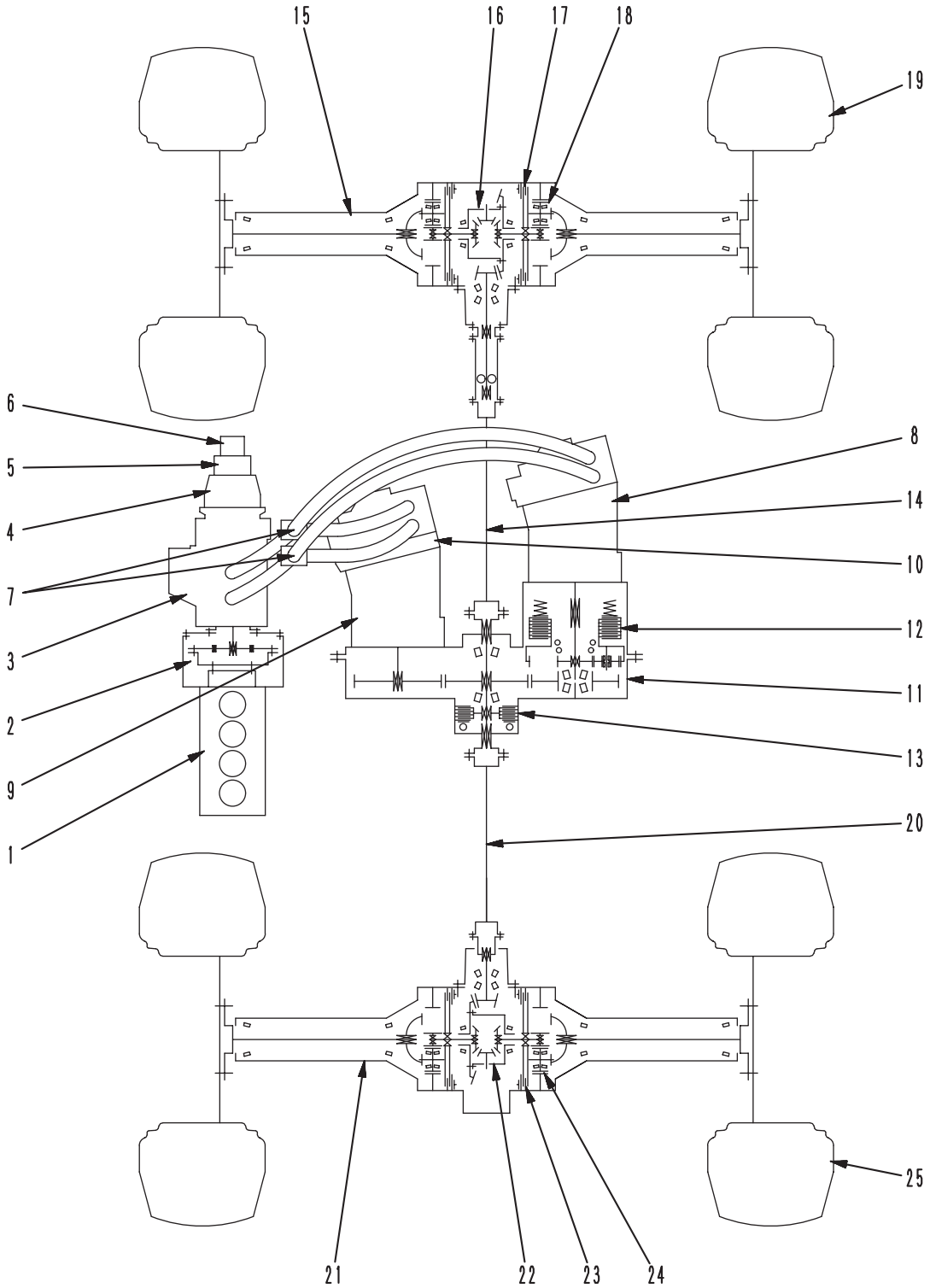
	Radiator	Oil cooler	After cooler
Core type	AL WAVE–4	CF40–1	AL WAVE
Fin pitch (mm)	3.5 / 2	3.5 / 2	4.0 / 2
Total heat radiating area (m^2)	22.0	5.72	5.75
Pressure valve opening pressure (kPa {kg/cm^2})	68.6 {0.7}	—	—
Vacuum valve opening pressure (kPa {kg/cm^2})	0 – 4.9 {0 – 0.05}	—	—

POWER TRAIN



1. Engine
2. Damper
3. HST pump
4. 3-gear pump unit
5. High-pressure hose
6. HST motor 1
7. HST motor 2
8. Transfer
9. Front drive shaft
10. Front axle
11. Rear drive shaft
12. Rear axle

POWER TRAIN SYSTEM DIAGRAM



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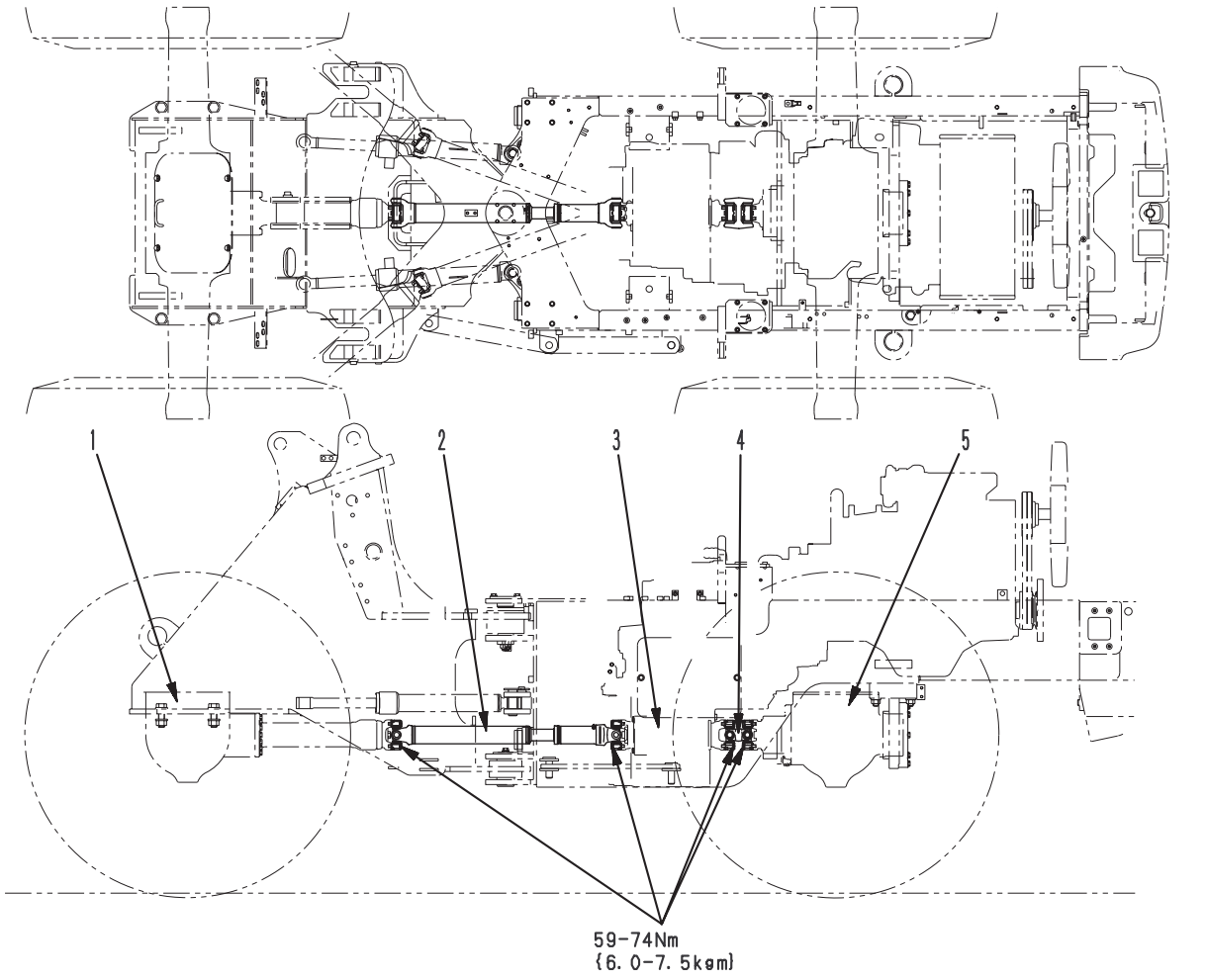
1. Engine
2. Damper
3. HST pump
4. Work equipment and Steering pump
5. Brake and cooling fan pump
6. Transfer lubricating oil pump
7. High-pressure hose
8. HST motor 1
9. HST motor 2
10. Emergency steering valve (If equipped)
11. Transfer
12. Transfer clutch
13. Parking brake
14. Front drive shaft
15. Front axle
16. Differential
17. Wet multiple disc brake
18. Final drive
19. Front tire
20. Rear drive shaft
21. Rear axle
22. Differential
23. Wet multiple disc brake
24. Final drive
25. Rear tire

Outline

- The power of engine (1) is transmitted to HST pump (3) through damper (2) which is installed to the flywheel and which absorbs the torsional vibration of the power,
- The power of engine (1) is also transmitted to HST pump (3), HST charge pump built in HST pump (3), work equipment and steering pump (4) connected to HST pump (3), brake and cooling fan pump (5), and transfer lubricating oil pump (6).
- HST pump (3) is equipped with the forward-reverse shifting valve and servo piston, which changes the discharge direction and discharge rate of HST pump (3) continuously by changing the swash plate angle.
- HST motors (8) and (9) are installed to transfer (11) and connected to HST pump (3) by high-pressure hose (7).
- The turning direction and speed of HST motors (8) and (9) are changed by the hydraulic power of HST pump (3) to control the travel direction and travel speed of the machine.
- The power of HST motor 1 (8) is transmitted through transfer clutch (12) in transfer (11) to the output shaft.
  The power of HST motor 2 (9) is transmitted through the gear in transfer (11) to the output shaft.
- Parking brake (13) is installed on the rear side in transfer (11). It operates the wet multiple disc brake to stop the machine according to the operation of the parking brake lever.
- The power for the front side is transmitted through front drive shaft (14) to front axle (15).
  The power for the rear side is transmitted through rear drive shaft (20) to rear axle (21).
- The power transmitted to axles (15) and (21) is reduced in speed by the pinion gears of differentials (16) and (22), and then transmitted through the sun gear shaft to the sun gear.
- The power of the sun gear is reduced in speed by the planetary mechanisms of final drives (18) and (24), and then transmitted through the axle shaft and wheels to tires (19) and (25).

DRIVE SHAFT



1. Front axle
2. Front drive shaft
3. Transfer
4. Rear drive shaft
5. Rear axle

Outline

- The power from the output shaft of the transfer is transmitted through front drive shaft (2) and rear drive shaft (4) to front axle (1) and rear axle (5).
- When the machine is articulated or it receives an impact from the road during travel or a working impact, the positions of the transfer and front and rear axles change. The drive shafts can change their angles and lengths by means of the universal joints and sliding joints so that the power will be transmitted without damaging any part even when the positions of the components change because of the impacts.