

Shop Manual

KOMATSU

PC270LC-6LE

HYDRAULIC EXCAVATOR

MACHINE MODEL

SERIAL NUMBERS

PC270LC-6LE

A83001 and up

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Due to this continuous program of research and development, periodic revisions may be made to this publication. It is recommended that customers contact their distributor for information on the latest revision.

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SAFETY

SAFETY NOTICE

IMPORTANT SAFETY NOTICE

Proper service and repair is extremely important for the safe operation of your machine. The service and repair techniques recommended and described in this manual are both effective and safe methods of operation. Some of these operations require the use of tools specially designed for the purpose.

To prevent injury to workers, the symbols  and  are used to mark safety precautions in this manual. The cautions accompanying these symbols should always be followed carefully. If any dangerous situation arises or may possibly arise, first consider safety, and take the necessary actions to deal with the situation.

GENERAL PRECAUTIONS

Mistakes in operation are extremely dangerous. Read the Operation and Maintenance Manual carefully BEFORE operating the machine.

1. Before carrying out any greasing or repairs, read all the precautions given on the decals which are fixed to the machine.
2. When carrying out any operation, always wear safety shoes and helmet. Do not wear loose work clothes, or clothes with buttons missing.

Always wear safety glasses when hitting parts with a hammer.

Always wear safety glasses when grinding parts with a grinder, etc.
3. If welding repairs are needed, always have a trained, experienced welder carry out the work. When carrying out welding work, always wear welding gloves, apron, glasses, cap and other clothes suited for welding work.
4. When carrying out any operation with two or more workers, always agree on the operating procedure before starting. Always inform your fellow workers before starting any step of the operation. Before starting work, hang UNDER REPAIR signs on the controls in the operator's compartment.
5. Keep all tools in good condition and learn the correct way to use them.
6. Decide a place in the repair workshop to keep tools and removed parts. Always keep the tools and parts in their correct places. Always keep the work area clean and make sure that there is no dirt or oil on the floor. Smoke only in the areas provided for smoking. Never smoke while working.

PREPARATIONS FOR WORK

7. Before adding oil or making repairs, park the machine on hard, level ground, and block the wheels or tracks to prevent the machine from moving.
8. Before starting work, lower blade, ripper, bucket or any other work equipment to the ground. If this is not possible, insert the safety pin or use blocks to prevent the work equipment from falling. In addition, be sure to lock all the control levers and hang warning signs on them.
9. When disassembling or assembling, support the machine with blocks, jacks or stands before starting work.
10. Remove all mud and oil from the steps or other places used to get on and off the machine. Always use the handrails, ladders or steps when getting on or off the machine. Never jump on or off the machine. If it is impossible to use the handrails, ladders or steps, use a stand to provide safe footing.

PRECAUTIONS DURING WORK

11. When removing the oil filler cap, drain plug or hydraulic pressure measuring plugs, loosen them slowly to prevent the oil from spurting out. Before disconnecting or removing components of the oil, water or air circuits, first remove the pressure completely from the circuit.
12. The water and oil in the circuits are hot when the engine is stopped, so be careful not to get burned. Wait for the oil and water to cool before carrying out any work on the oil or water circuits.
13. Before starting work, remove the leads from the battery. ALWAYS remove the lead from the negative (-) terminal first.

14. When raising heavy components, use a hoist or crane. Check that the wire rope, chains and hooks are free from damage. Always use lifting equipment which has ample capacity. Install the lifting equipment at the correct places. Use a hoist or crane and operate slowly to prevent the component from hitting any other part. Do not work with any part still raised by the hoist or crane.
 15. When removing covers which are under internal pressure or under pressure from a spring, always leave two bolts in position on opposite sides. Slowly release the pressure, then slowly loosen the bolts to remove.
 16. When removing components, be careful not to break or damage the wiring. Damaged wiring may cause electrical fires.
 17. When removing piping, stop the fuel or oil from spilling out. Fuel or oil on the floor is flammable and slippery, a health and safety hazard. Clean up any spilled fuel or oil immediately.
 18. As a general rule, do not use gasoline to wash parts. In particular, use only the minimum of flammable liquids when cleaning electrical parts.
 19. Be sure to assemble all parts again in their original places. Replace any damaged part with new parts.
 20. When installing high pressure hoses, make sure that they are not twisted. Damaged tubes are dangerous, so be extremely careful when installing tubes for high pressure circuits. Also check that connecting parts are correctly installed.
 21. When assembling or installing parts, always use the specified tightening torques. When installing protective parts such as guards, or parts which vibrate violently or rotate at high speed, be particularly careful to check that they are installed correctly.
 22. When aligning two holes, never insert your fingers or hand. Be careful not to get your fingers caught in a hole.
 23. When measuring hydraulic pressure, check that the measuring tool is correctly assembled before taking any measurements.
 24. Take care when removing or installing the tracks of track-type machines. When removing the track, the track separates suddenly, so never let anyone stand at either end of the track.
- When installing hoses and wires, be sure that they will not be damaged by contact with other parts when the machine is being operated.

GENERAL

This shop manual has been prepared as an aid to improve the quality of repairs by giving the serviceman an accurate understanding of the product and by showing him the correct way to perform repairs and make judgements. Make sure you understand the contents of this manual and use it to full effect at every opportunity.

This shop manual mainly contains the necessary technical information for operations performed in a service workshop. For ease of understanding, the manual is divided into the following sections. These sections are further divided into each main group of components.

GENERAL

This section lists the general machine dimensions, performance specifications, component weights, and fuel, coolant and lubricant specification charts.

STRUCTURE AND FUNCTION

This section explains the structure and function of each component. It serves not only to give an understanding of the structure, but also serves as reference material for troubleshooting.

TESTING AND ADJUSTING

This section explains checks to be made before and after performing repairs, as well as adjustments to be made at completion of the checks and repairs. Troubleshooting charts correlating "Problems" to "Causes" are also included in this section.

DISASSEMBLY AND ASSEMBLY

This section explains the order to be followed when removing, installing, disassembling or assembling each component, as well as precautions to be taken for these operations.

MAINTENANCE STANDARD

This section gives the judgement standards when inspecting disassembled parts.

NOTICE

The specifications contained in this shop manual are subject to change at any time and without any advance notice. Contact your distributor for the latest information.

HOW TO READ THE SHOP MANUAL

VOLUMES

Shop manuals are issued as a guide to carrying out repairs. They are divided as follows:

- Chassis volume:** Issued for every machine model
- Engine volume:** Issued for each engine series
- Electrical volume:** Each issued as one to cover all models
- Attachment volume:** Each issued as one to cover all models

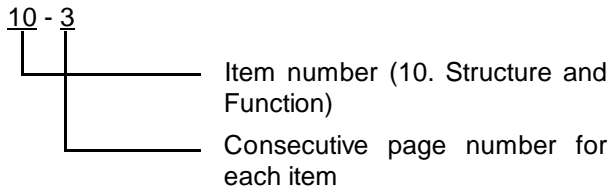
These various volumes are designed to avoid duplication of information. Therefore to deal with all repairs for any model, it is necessary that chassis, engine electrical and attachment be available.

DISTRIBUTION AND UPDATING

Any additions, amendments or other changes will be sent to your distributors. Get the most up-to-date information before you start any work.

FILING METHOD


1. See the page number on the bottom of the page. File the pages in correct order.
2. Following examples show how to read the page number:
Example 1 (Chassis volume):



Example 2 (Engine volume):
Refer to the pertinent engine manual.

3. Additional pages: Additional pages are indicated by a hyphen (-) and numbered after the page number. File as in the example.
Example:
10-4
10-4-1
10-4-2 Added pages
10-5

REVISED EDITION MARK








When a manual is revised, an edition mark ( ...) is recorded on the bottom outside corner of the pages.

REVISIONS

Revised pages are shown at the LIST OF REVISED PAGES between the title page and SAFETY page.


SYMBOLS


So that the shop manual can be of ample practical use, important places for safety and quality are marked with the following symbols.

Symbol	Item	Remarks
	Safety	Special safety precautions are necessary when performing the work.
	Caution	Special technical precautions or other precautions for preserving standards are necessary when performing the work.
	Weight	Weight of parts or systems. Caution necessary when selecting hoisting wire or when working posture is important, etc.
	Tightening torque	Places that require special attention for tightening torque during assembly.
	Coat	Places to be coated with adhesives and lubricants etc.
	Oil, water	Places where oil, water or fuel must be added, and the capacity.
	Drain	Places where oil or water must be drained, and quantity to be drained.

HOISTING INSTRUCTIONS

HOISTING

 Heavy parts (25 kg or more) must be lifted with a hoist etc. In the **DISASSEMBLY AND ASSEMBLY** section, every part weighing 25 kg or more is indicated clearly with the symbol



If a part cannot be smoothly removed from the machine by hoisting, the following checks should be made:

- 1) Check for removal of all bolts fastening the part to the relative parts.
- 2) Check for existence of another part causing interface with the part to be removed.

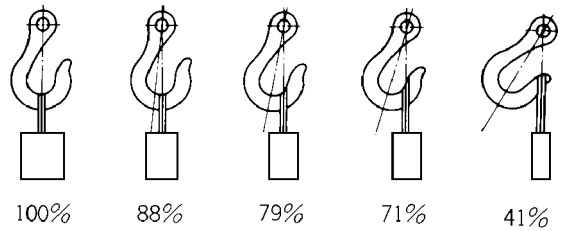
WIRE ROPES

- 1) Use adequate ropes depending on the weight of parts to be hoisted, referring to the table below:

Wire ropes (Standard "Z" or "S" twist ropes without galvanizing)	
Rope diameter (mm)	Allowable load (tons)
10.0	1.0
11.2	1.4
12.5	1.6
14.0	2.2
16.0	2.8
18.0	3.6
20.0	4.4
22.4	5.6
30.0	10.0
40.0	18.0
50.0	28.0
60.0	40.0


★ The allowable load value is estimated to be 1/6 or 1/7 of the breaking strength of the rope used.

- 2) Sling wire ropes from the middle portion of the hook. Slings near the edge of the hook may cause the rope to slip off the hook during hoisting, and a serious accident can result. Hooks have maximum strength at the middle portion.

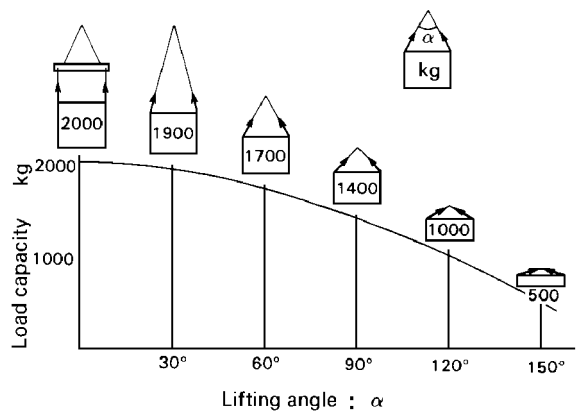


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- 3) Do not sling a heavy load with one rope alone, but sling with two or more ropes symmetrically wound on to the load.

 Slings with one rope may cause turning of the load during hoisting, untwisting of the rope, or slipping of the rope from its original winding position on the load, which can result in a dangerous accident.

- 4) Do not sling a heavy load with ropes forming a wide hanging angle from the hook. When hoisting a load with two or more ropes, the force subjected to each rope will increase with the hanging angles. The table below shows the variation of allowable load (kg) when hoisting is made with two ropes, each of which is allowed to sling up to 1000 kg vertically, up to 2000 kg of total weight can be suspended. This weight becomes 1000 kg when two ropes make a 120° angle. On the other hand, two ropes are subject to an excessive force as large as 4000 kg if they sling a 2000 kg load at a lifting angle of 150°



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COATING MATERIALS

The recommended coating materials prescribed in the shop manuals are listed below.



Category	Code	Part No.	Qty	Container	Main applications, features
Adhesive	LT-1A	790-129-9030	150 g	Tube	Used to prevent rubber gaskets, rubber cushions and cork plugs from coming out
	LT-1B	790-129-9050	20 g (x2)	Plastic container	Used in places requiring an immediately effective, strong adhesive. Used for plastics (except polyethylene, polypropylene, tetrafluoroethylene, and vinyl chloride), rubber, metal and non-metal.
	LT-2	09940-00030	50 g	Plastic container	Features: Resistance to heat, chemicals Used for anti-loosening and sealant purposes for bolts and plugs.
	LT-3	790-129-9060 Set of adhesive and hardening agent	Adh 1 kg Hard agt 500 kg	Can	Used as adhesive or sealant for metal, glass or plastic.
	LT-4	790-129-9040	250 g	Plastic container	Used as sealant for machined holes.
	Loctite 648-50	79A-129-9110	50 cc	---	Features: Resistance to heat, chemicals Used at joint portions subject to high temperature.
Gasket sealant	LG-1	790-129-9010	200 g	Tube	Used as adhesive or sealant for gaskets and packing of power train case, etc.
	LG-3	790-129-9070	1 kg	Can	Features: Resistance to heat Used as sealant for flange surfaces and bolts at high temperature locations; used to prevent seizure. Used as sealant for heat resistant gasket for at high temperature locations such as engine pre-combustion chamber, exhaust pipe.
	LG-4	790-129-9020	200 g	Tube	Features: Resistance to water, oil Used as sealant for flange surface, thread. Also possible to use as sealant for flanges with large clearance. Used as sealant for mating surfaces of final drive case, transmission case.
	LG-5	790-129-9080	1 kg	Plastic container	Used as sealant for various threads, pipe joints, flanges. Used as sealant for tapered plugs, elbows, nipples of hydraulic piping.
	LG-6	09940-00011	250 g	Tube	Features: Silicon based, resistant to heat, cold. Used as sealant for flange surface, thread. Used as sealant for oil pan, final drive case, etc.
	LG-7	09920-00150	150 g	Tube	Features: Silicon based, quick hardening type. Used as sealant for flywheel housing, intake manifold, oil pan, thermostat housing, etc.
	Rust prevention lubricant	---	09940-00051	60 g	Can
Molybdenum disulfide lubricant	---	09940-00040	200 g	Tube	Used to prevent seizure or scuffing of the thread when press fitting or shrink fitting. Used as lubricant for linkage, bearings, etc.
Lithium grease	G2-L1	SYG-350LI SYG-400LI SYG-400LI-A SYG-160LI SYGA-160CNLI	Various	Various	General purpose type
Calcium grease	G2-CA	SSG2-400CA SYG2-350CA SYG2-400CA-A SYG2-160CA SYGA-16CNCA	Various	Various	Used for normal temperature, light load bearing at places in contact with water or steam.
Molybdenum disulfide grease	---	SYG2-400M	400 g (10/case)	Bellows type	Used for places with heavy load.

STANDARD TIGHTENING TORQUE

STANDARD TIGHTENING TORQUE OF BOLTS AND NUTS

The following charts give the standard tightening torques of bolts and nuts. Exceptions are given in sections of **DISASSEMBLY AND ASSEMBLY**.

1 kgm = 9.806 Nm

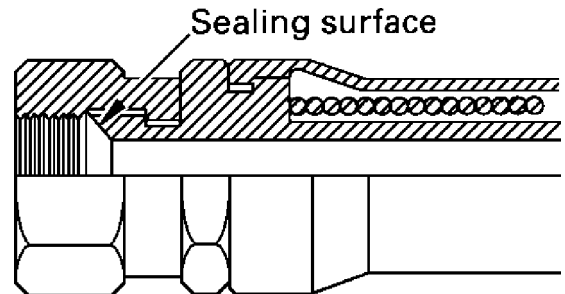
Thread diameter of bolt	Width across flat		
mm	mm	kgm	Nm
6	10	1.35 ±0.15	13.2 ±1.4
8	13	3.20 ±0.3	31.4 ±2.9
10	17	6.70 ±0.7	65.7 ±6.8
12	19	11.5 ±1.0	112 ±9.8
14	22	18 ±2.0	177 ±19
16	24	28.5 ±3	279 ±29
18	27	39 ±4	383 ±39
20	30	56 ±6	549 ±58
22	32	76 ±8	745 ±78
24	36	94.5 ±10	927 ±98
27	41	135 ±15	1320 ±140
30	46	175 ±20	1720 ±190
33	50	225 ±25	2210 ±240
36	55	280 ±30	2750 ±290
39	60	335 ±35	3280 ±340

This torque table does not apply to the bolts with which nylon packing or other non-ferrous metal washers are to be used, or which require tightening to otherwise specified torque.

TIGHTENING TORQUE OF SPLIT FLANGE BOLTS

Use these torques for split flange bolts.

Thread diameter of bolt mm	Width across flat mm	Tightening torque	
		kgm	Nm
10	14	6.70 ±0.7	65.7 ±6.8
12	17	11.5 ±1.0	112 ±9.8
16	22	28.5 ±3	279 ±29



TIGHTENING TORQUE FOR FLARED NUTS

Use these torques for flared part of nut.

Thread diameter of bolt mm	Width across flat mm	Tightening torque	
		kgm	Nm
14	19	2.5 ±0.5	24.5 ±4.9
18	24	5 ±2	49 ±19.6
22	27	8 ±2	78.5 ±19.6
24	32	14 ±3	137.3 ±29.4
30	36	18 ±3	176.5 ±29.4
33	41	20 ±5	196.1 ±49
36	46	25 ±5	245.2 ±49
42	55	30 ±5	294.2 ±49

ELECTRIC WIRE CODE

In the wiring diagrams, various colors and symbols are employed to indicate the thickness of wires. This wire code table will help you understand WIRING DIAGRAMS.

Example: 05WB indicates a cable having a nominal number 05 and white coating with black stripe.

CLASSIFICATION BY THICKNESS

Nominal number	Copper wire			Cable O.D. (mm)	Current rating (A)	Applicable circuit
	Number of strands	Dia. Of strand (mm)	Cross section (mm ²)			
0.85	11	0.32	0.88	2.4	12	Starting, lighting, signal etc.
2	26	0.32	2.09	3.1	20	Lighting, signal etc.
5	65	0.32	5.23	4.6	37	Charging and signal
15	84	0.45	13.36	7.0	59	Starting (Glow plug)
40	85	0.80	42.73	11.4	135	Starting
60	127	0.80	63.84	13.6	178	Starting
100	217	0.80	109.1	17.6	230	Starting

CLASSIFICATION BY COLOR AND CODE

Priority	Classification	Circuits	Charging	Ground	Starting	Lighting	Instruments	Signal	Other
1	Primary	Code	W	B	B	R	Y	G	L
		Color	White	Black	Black	Red	Yellow	Green	Blue
2	Auxiliary	Code	WR	---	BW	RW	YR	GW	LW
		Color	White/Red	---	Black/White	Red/White	Yellow/Red	Green/White	Blue/White
3		Code	WB	---	BY	RB	YB	GR	LR
		Color	White/Black	---	Black/Yellow	Red/Black	Yellow/Black	Green/Red	Blue/Red
4		Code	WL	---	BR	RY	YG	GY	LY
		Color	White/Blue	---	Black/Red	Red/Yellow	Yellow/Green	Green/Yellow	Blue/Yellow
5		Code	WG	---	---	RG	YL	GB	LB
		Color	White/Green	---	---	Red/Green	Yellow/Blue	Green/Black	Blue/Black
6		Code	---	---	---	RL	YW	GL	---
		Color	---	---	---	Red/Blue	Yellow/White	Green/Blue	---

CONVERSION TABLES

METHOD OF USING THE CONVERSION TABLE

The Conversion Table in this section is provided to enable simple conversion of figures. For details of the method of using the Conversion Table, see the example given below.

EXAMPLE

Method of using the Conversion Table to convert from millimeters to inches.

1. Convert 55 mm into inches.

- (1) Locate the number 50 in the vertical column at the left side, take this as a, then draw a horizontal line from a.
- (2) Locate the number 5 in the row across the top, take this as b, then draw a perpendicular line down from b.
- (3) Take the point where the two lines cross as c. This point c gives the value when converting from millimeters to inches. Therefore, 55 millimeters = 2.165 inches.

2. Convert 550 mm into inches.

- (1) The number 550 does not appear in the table, so divide by 10 (move the decimal one place to the left) to convert it to 55 mm.
- (2) Carry out the same procedure as above to convert 55 mm to 2.165 inches.
- (3) The original value (550 mm) was divided by 10, so multiply 2.165 inches by 10 (move the decimal one place to the right) to return to the original value. This gives 550 mm = 21.65 inches.

Millimeters to Inches

1 mm = 0.03937 in

mm	0	1	2	3	4	5 b	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
a 50	1.969	2.008	2.047	2.087	2.126	2.165	c 2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Millimeters to Inches

1 mm = 0.03937 in

mm	0	1	2	3	4	5	6	7	8	9
0	0	0.039	0.079	0.118	0.157	0.197	0.236	0.276	0.315	0.354
10	0.394	0.433	0.472	0.512	0.551	0.591	0.630	0.669	0.709	0.748
20	0.787	0.827	0.866	0.906	0.945	0.984	1.024	1.063	1.102	1.142
30	1.181	1.220	1.260	1.299	1.339	1.378	1.417	1.457	1.496	1.536
40	1.575	1.614	1.654	1.693	1.732	1.772	1.811	1.850	1.890	1.929
50	1.969	2.008	2.047	2.087	2.126	2.165	2.205	2.244	2.283	2.323
60	2.362	2.402	2.441	2.480	2.520	2.559	2.598	2.638	2.677	2.717
70	2.756	2.795	2.835	2.874	2.913	2.953	2.992	3.032	3.071	3.110
80	3.150	3.189	3.228	3.268	3.307	3.346	3.386	3.425	3.465	3.504
90	3.543	3.583	3.622	3.661	3.701	3.740	3.780	3.819	3.858	3.898

Kilogram to Pound

1 kg = 2.2046 lb

kg	0	1	2	3	4	5	6	7	8	9
0	0	2.20	4.41	6.61	8.82	11.02	13.23	15.43	17.64	19.84
10	22.05	24.25	26.46	28.66	30.86	33.07	35.27	37.48	39.68	41.89
20	44.09	46.30	48.50	50.71	51.91	55.12	57.32	59.53	61.73	63.93
30	66.14	68.34	70.55	72.75	74.96	77.16	79.37	81.57	83.78	85.98
40	88.18	90.39	92.59	94.80	97.00	99.21	101.41	103.62	105.82	108.03
50	110.23	112.44	114.64	116.85	119.05	121.25	123.46	125.66	127.87	130.07
60	132.28	134.48	136.69	138.89	141.10	143.30	145.51	147.71	149.91	152.12
70	154.32	156.53	158.73	160.94	163.14	165.35	167.55	169.76	171.96	174.17
80	176.37	178.57	180.78	182.98	185.19	187.39	189.60	191.80	194.01	196.21
90	198.42	200.62	202.83	205.03	207.24	209.44	211.64	213.85	216.05	218.26

Liter to U.S. Gallon

	1									
	0	1	2	3	4	5	6	7	8	9
0	0	0.264	0.528	0.793	1.057	1.321	1.585	1.849	2.113	2.378
10	2.642	2.906	3.170	3.434	3.698	3.963	4.227	4.491	4.755	5.019
20	5.283	5.548	5.812	6.076	6.340	6.604	6.869	7.133	7.397	7.661
30	7.925	8.189	8.454	8.718	8.982	9.246	9.510	9.774	10.039	10.303
40	10.567	10.831	11.095	11.359	11.624	11.888	12.152	12.416	12.680	12.944
50	13.209	13.473	13.737	14.001	14.265	14.529	14.795	15.058	15.322	15.586
60	15.850	16.115	16.379	16.643	16.907	17.171	17.435	17.700	17.964	18.228
70	18.492	18.756	19.020	19.285	19.549	19.813	20.077	20.341	20.605	20.870
80	21.134	21.398	21.662	21.926	22.190	22.455	22.719	22.983	23.247	23.511
90	23.775	24.040	24.304	24.568	24.832	25.096	25.361	25.625	25.889	26.153

Liter to U.K. Gallon

	1									
	0	1	2	3	4	5	6	7	8	9
0	0	0.220	0.440	0.660	0.880	1.100	1.320	1.540	1.760	1.980
10	2.200	2.420	2.640	2.860	3.080	3.300	3.520	3.740	3.950	4.179
20	4.399	4.619	4.839	5.059	5.279	5.499	5.719	5.939	6.159	6.379
30	6.599	6.819	7.039	7.259	7.479	7.699	7.919	8.139	8.359	8.579
40	8.799	9.019	9.239	9.459	9.679	9.899	10.119	10.339	10.559	10.778
50	10.998	11.281	11.438	11.658	11.878	12.098	12.318	12.528	12.758	12.978
60	13.198	13.418	13.638	13.858	14.078	14.298	14.518	14.738	14.958	15.178
70	15.398	15.618	15.838	16.058	16.278	16.498	16.718	16.938	17.158	17.378
80	17.598	17.818	18.037	18.257	18.477	18.697	18.917	19.137	19.357	19.577
90	19.797	20.017	20.237	20.457	20.677	20.897	21.117	21.337	21.557	21.777

kgm to ft. lb

1 kgm = 7.233 ft. lb

kgm	0	1	2	3	4	5	6	7	8	9
0	0	7.2	14.5	21.7	28.9	36.2	43.4	50.6	57.9	65.1
10	72.3	79.6	86.8	94.0	101.3	108.5	115.7	123.0	130.2	137.4
20	144.7	151.9	159.1	166.4	173.6	180.8	188.1	195.3	202.5	209.8
30	217.0	224.2	231.5	238.7	245.9	253.2	260.4	267.6	274.9	282.1
40	289.3	296.6	303.8	311.0	318.3	325.5	332.7	340.0	347.2	354.4
50	361.7	368.9	376.1	383.4	390.6	397.8	405.1	412.3	419.5	426.8
60	434.0	441.2	448.5	455.7	462.9	470.2	477.4	484.6	491.8	499.1
70	506.3	513.5	520.8	528.0	535.2	542.5	549.7	556.9	564.2	571.4
80	578.6	585.9	593.1	600.3	607.6	614.8	622.0	629.3	636.5	643.7
90	651.0	658.2	665.4	672.7	679.9	687.1	694.4	701.6	708.8	716.1
100	723.3	730.5	737.8	745.0	752.2	759.5	766.7	773.9	781.2	788.4
110	795.6	802.9	810.1	817.3	824.6	831.8	839.0	846.3	853.5	860.7
120	868.0	875.2	882.4	889.7	896.9	904.1	911.4	918.6	925.8	933.1
130	940.3	947.5	954.8	962.0	969.2	976.5	983.7	990.9	998.2	1005.4
140	1012.6	1019.9	1027.1	1034.3	1041.5	1048.8	1056.0	1063.2	1070.5	1077.7
150	1084.9	1092.2	1099.4	1106.6	1113.9	1121.1	1128.3	1135.6	1142.8	1150.0
160	1157.3	1164.5	1171.7	1179.0	1186.2	1193.4	1200.7	1207.9	1215.1	1222.4
170	1129.6	1236.8	1244.1	1251.3	1258.5	1265.8	1273.0	1280.1	1287.5	1294.7
180	1301.9	1309.2	1316.4	1323.6	1330.9	1338.1	1345.3	1352.6	1359.8	1367.0
190	1374.3	1381.5	1388.7	1396.0	1403.2	1410.4	1417.7	1424.9	1432.1	1439.4

kg/cm² to lb/in²

1kg/cm² = 14.2233 lb/in²

kg/cm ²	0	1	2	3	4	5	6	7	8	9
0	0	14.2	28.4	42.7	56.9	71.1	85.3	99.6	113.8	128.0
10	142.2	156.5	170.7	184.9	199.1	213.4	227.6	241.8	256.0	270.2
20	284.5	298.7	312.9	327.1	341.4	355.6	369.8	384.0	398.3	412.5
30	426.7	440.9	455.1	469.4	483.6	497.8	512.0	526.3	540.5	554.7
40	568.9	583.2	597.4	611.6	625.8	640.1	654.3	668.5	682.7	696.9
50	711.2	725.4	739.6	753.8	768.1	782.3	796.5	810.7	825.0	839.2
60	853.4	867.6	881.8	896.1	910.3	924.5	938.7	953.0	967.2	981.4
70	995.6	1010	1024	1038	1053	1067	1081	1095	1109	1124
80	1138	1152	1166	1181	1195	1209	1223	1237	1252	1266
90	1280	1294	1309	1323	1337	1351	1365	1380	1394	1408
100	1422	1437	1451	1465	1479	1493	1508	1522	1536	1550
110	1565	1579	1593	1607	1621	1636	1650	1664	1678	1693
120	1707	1721	1735	1749	1764	1778	1792	1806	1821	1835
130	1849	1863	1877	1892	1906	1920	1934	1949	1963	1977
140	1991	2005	2020	2034	2048	2062	2077	2091	2105	2119
150	2134	2148	2162	2176	2190	2205	2219	2233	2247	2262
160	2276	2290	2304	2318	2333	2347	2361	2375	2389	2404
170	2418	2432	2446	2460	2475	2489	2503	2518	2532	2546
180	2560	2574	2589	2603	2617	2631	2646	2660	2674	2688
190	2702	2717	2731	2745	2759	2773	2788	2802	2816	2830
200	2845	2859	2873	2887	2901	2916	2930	2944	2958	2973
210	2987	3001	3015	3030	3044	3058	3072	3086	3101	3115
220	3129	3143	3158	3172	3186	3200	3214	3229	3243	3257
230	3271	3286	3300	3314	3328	3343	3357	3371	3385	3399
240	3414	3428	3442	3456	3470	3485	3499	3513	3527	3542

Temperature

Fahrenheit Centigrade Conversion; a simple way to convert a Fahrenheit temperature reading into a Centigrade temperature reading or vice versa is to enter the accompanying table in the center or boldface column of figures. These figures refer to the temperature in either Fahrenheit or Centigrade degrees. If it is desired to convert from Fahrenheit to Centigrade degrees, consider the center column as a table of Fahrenheit temperatures and read the corresponding Centigrade temperature in the column at the left. If it is desired to convert from Centigrade to Fahrenheit degrees, consider the center column as a table of Centigrade values, and read the corresponding Fahrenheit temperature on the right.

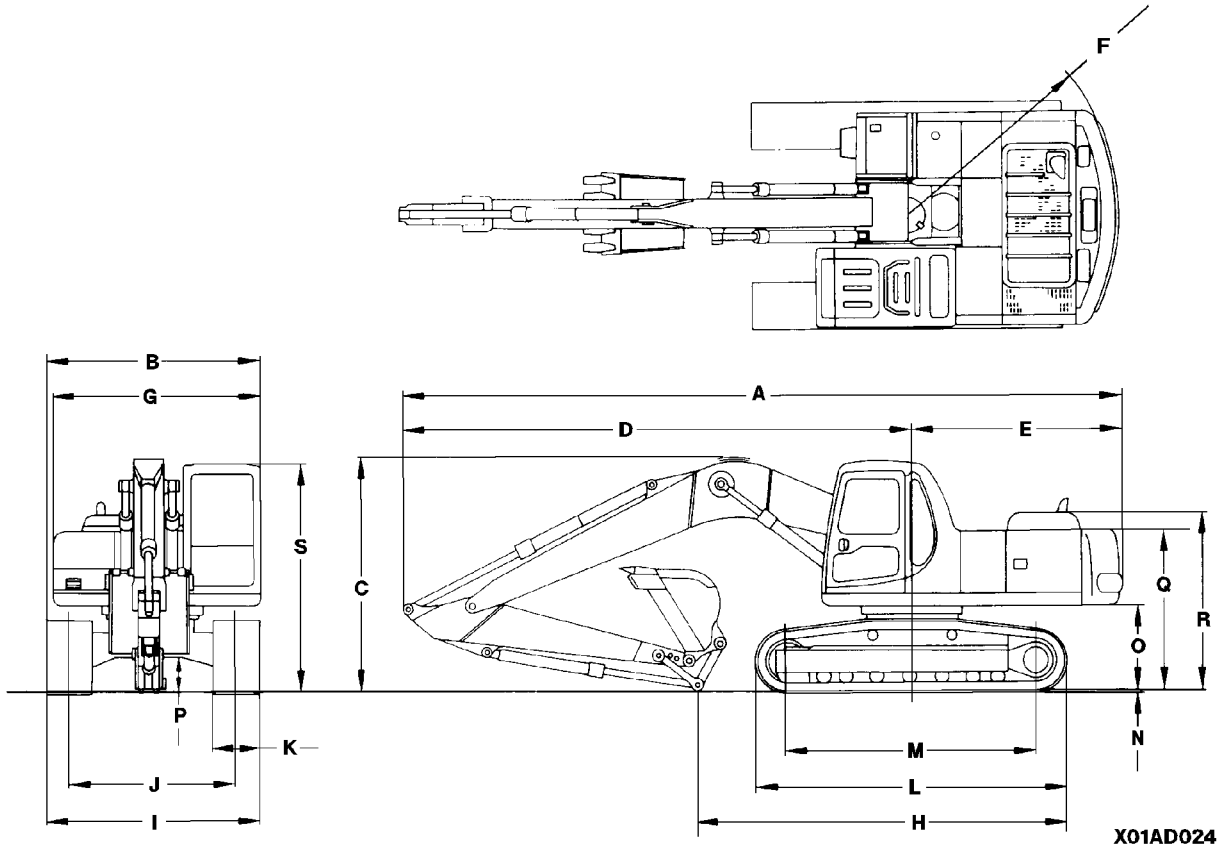
1

-40.4	-40	-40.0	-11.7	11	51.8	7.8	46	114.8	27.2	81	117.8
-37.2	-35	-31.0	-11.1	12	53.6	8.3	47	116.6	27.8	82	179.6
-34.4	-30	-22.0	-10.6	13	55.4	8.9	48	118.4	28.3	83	181.4
-31.7	-25	-13.0	-10.0	14	57.2	9.4	49	120.2	28.9	84	183.2
-28.9	-20	-4.0	-9.4	15	59.0	10.0	50	122.0	29.4	85	185.0
-28.3	-19	-2.2	-8.9	16	60.8	10.6	51	123.8	30.0	86	186.8
-27.8	-18	-0.4	-8.3	17	62.6	11.1	52	125.6	30.6	87	188.6
-27.2	-17	1.4	-7.8	18	64.4	11.7	53	127.4	31.1	88	190.4
-26.7	-16	3.2	-7.2	19	66.2	12.2	54	129.2	31.7	89	192.2
26.1	-15	5.0	-6.7	20	68.0	12.8	55	131.0	32.2	90	194.0
-25.6	-14	6.8	-6.1	21	69.8	13.3	56	132.8	32.8	91	195.8
-25.0	-13	8.6	-5.6	22	71.6	13.9	57	134.6	33.3	92	197.6
-24.4	-12	10.4	-5.0	23	73.4	14.4	58	136.4	33.9	93	199.4
-23.9	-11	12.2	-4.4	24	75.2	15.0	59	138.2	34.4	94	201.2
-23.3	-10	14.0	-3.9	25	77.0	15.6	60	140.0	35.0	95	203.0
-22.8	-9	15.8	-3.3	26	78.8	16.1	61	141.8	35.6	96	204.8
-22.2	-8	17.6	-2.8	27	80.6	16.7	62	143.6	36.1	97	206.6
-21.7	-7	19.4	-2.2	28	82.4	17.2	63	145.4	36.7	98	208.4
-21.1	-6	21.2	-1.7	29	84.2	17.8	64	147.2	37.2	99	210.2
-20.6	-5	23.0	-1.1	30	86.0	18.3	65	149.0	37.8	100	212.0
-20.0	-4	24.8	-0.6	31	87.8	18.9	66	150.8	40.6	105	221.0
-19.4	-3	26.6	0	32	89.6	19.4	67	152.6	43.3	110	230.0
-18.9	-2	28.4	0.6	33	91.4	20.0	68	154.4	46.1	115	239.0
-18.3	-1	30.2	1.1	34	93.2	20.6	69	156.2	48.9	120	248.0
-17.8	0	32.0	1.7	35	95.0	21.1	70	158.0	51.7	125	257.0
-17.2	1	33.8	2.2	36	96.8	21.7	71	159.8	54.4	130	266.0
-16.7	2	35.6	2.8	37	98.6	22.2	72	161.6	57.2	135	275.0
-16.1	3	37.4	3.3	38	100.4	22.8	73	163.4	60.0	140	284.0
-15.6	4	39.2	3.9	39	102.2	23.3	74	165.2	62.7	145	293.0
-15.0	5	41.0	4.4	40	104.0	23.9	75	167.0	65.6	150	302.0
-14.4	6	42.8	5.0	41	105.8	24.4	76	168.8	68.3	155	311.0
-13.9	7	44.6	5.6	42	107.6	25.0	77	170.6	71.1	160	320.0
-13.3	8	46.4	6.1	43	109.4	25.6	78	172.4	73.9	165	329.0
-12.8	9	48.2	6.7	44	111.2	26.1	79	174.2	76.7	170	338.0
-12.2	10	50.0	7.2	45	113.0	26.7	80	176.0	79.4	175	347.0

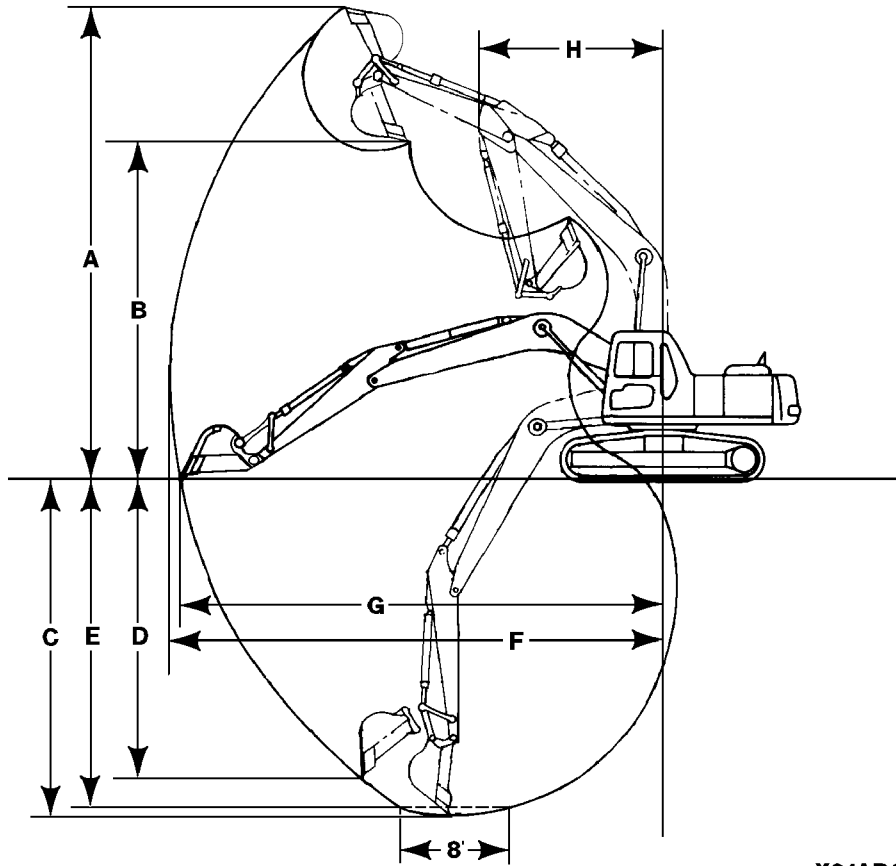
01 GENERAL

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GENERAL ASSEMBLY DRAWING



		PC270LC-6
A	Overall length	9780mm
B	Overall width	3290mm
C	Overall height (to top of boom)	3250mm
D	Boom swing radius	6930mm
E	Tail swing radius	2850mm
F	Counterweight swing radius	2860mm
G	Width of machine cab	2710mm
H	Length on ground (transport)	5420mm
I	Width of crawler	3290mm
J	Track gauge	2590mm
K	Shoe width	700mm
L	Track length	4955mm
M	Length of track on ground	4030mm
N	Grouser height	36mm
O	Ground clearance, counterweight	1205mm
P	Ground clearance, undercarriage	500mm
Q	Machine cab height	2140mm
R	Engine compartment height	2495mm
S	Operators cab height	3020mm



X01AD025

Specifications

PC270LC-6		ARMS		
		2.5 m	3.05 m	3.5 m
A	MAXIMUM DIGGING HEIGHT	9376 mm	9715 mm	9850 mm
B	MAXIMUM DUMPING HEIGHT	6526 mm	6818 mm	6976 mm
C	MAXIMUM DIGGING DEPTH	5903 mm	6448 mm	6902 mm
D	MAXIMUM VERTICAL WALL DIGGING DEPTH	5352 mm	5794 mm	6280 mm
E	MAXIMUM DIGGING DEPTH OF CUT FOR 8' LEVEL	5697 mm	6270 mm	6740 mm
F	MAXIMUM DIGGING REACH	9565 mm	10087 mm	10490 mm
G	MAXIMUM DIGGING REACH AT GROUND	9376 mm	9907 mm	10317 mm
H	MINIMUM SWING RADIUS	3580 mm	3492 mm	3452 mm
BUCKET DIGGING FORCE*		18800 kg	18800 kg	18800 kg
ARM CROWD FORCE*		16200 kg	14100 kg	12200 kg

* - At power max.

GENERAL

SPECIFICATIONS

Serial numbers		A83001 and up	
Bucket capacity		(m ³)	1.0
Operating weight		(kg)	27,500
PERFORMANCE	WORKING RANGE	Maximum digging depth	(mm) 6,448
		Maximum vertical wall depth	(mm) 5,794
		Maximum digging reach	(mm) 10,087
		Maximum digging reach at ground level	(mm) 9,907
		Maximum digging height	(mm) 9,715
		Maximum dumping height	(mm) 6,818
	Maximum digging force (when using power max.)	(KN(kg))	168.7 (17,200) (184.4 (18,800))
	Swing speed	(rpm)	11
	Swing maximum slope angle	(20
	Travel speed	(km/h)	Lo: 2.6 Mi: 4.2 Hi: 5.3
	Gradeability	(35
	Ground pressure (shoe width: 700 mm)	(kPa(kg/cm ²))	45 (0.45)
DIMENSIONS	Overall length (for transport)	(mm)	9,780
	Overall width	(mm)	3,290
	Overall width of track	(mm)	3,290
	Overall height (for transport)	(mm)	3,250
	Overall height to top of operator's cab	(mm)	3,020
	Ground clearance of counterweight	(mm)	1,205
	Minimum ground clearance	(mm)	500
	Tail swing radius	(mm)	2,850
	Minimum swing radius of work equipment	(mm)	3,860
	Height of work equipment at minimum swing radius	(mm)	7,880
	Length of track on ground	(mm)	4,030
	Track gauge	(mm)	2,590
	Height of machine cab	(mm)	2,495

GENERAL

SPECIFICATIONS

Serial numbers		A83001 and up	
ENGINE	Model	SA6D102EA-1	
	Type	4-cycle, water-cooled, in-line, vertical, direct injection, with turbocharger and aftercooler	
	No. of cylinders - bore x stroke (mm)	6 - 102 x 120	
	Piston displacement (cc)	5,883	
	PERFORMANCE	Flywheel horsepower (kW(HP)/rpm)	130 (174) / 2,200
		Maximum torque (Nm(kgm)/rpm)	786 (80.1) / 1,500
		High idle in H/O/ mode (rpm)	2300 ± 70
		Low idle in H/O mode (rpm)	950 ± 50
		Minimum fuel consumption ratio (g/kWh(g/HPh))	206 (154)
	Cranking motor	24 V, 5.5 kW	
Alternator	24 V, 50 A		
Battery	12V, 170 Ah x 2		
Type of radiator core	CWX-4		
UNDER-CARRIAGE	Carrier roller	2 on each side	
	Track roller	8 on each side	
	Track shoe	Assembly-type triple grouser	
HYDRAULIC SYSTEM	HYDRAULIC PUMP	Type, number	Variable displacement piston type x 2
		Delivery (l/min)	Piston type: 215 x 2
		Set pressure (MPa(kg/cm ²))	Piston type: 34.79 (355)
	CONTROL VALVE	Type, number	6-spool type x 1
		Control method	Hydraulic type
	HYDRAULIC MOTOR	Travel motor	Piston type (with brake valve, parking brake) x 2
		Swing motor	Piston type (with safety valve, parking brake) x 1
	Hydraulic cylinder	Reciprocating piston	
Hydraulic tank	Box-shaped, open		
Hydraulic filter	Tank return side		
Hydraulic cooler	Air cooled (SF1-3)		

WEIGHT TABLE

	Unit: kg
Serial number	A83001 and up
Engine assembly	770
	545
	6
	150
Radiator and oil cooler assembly	148
Hydraulic tank and filter assembly (excl. oil)	136
Fuel tank assembly (excl. fuel)	122
Revolving frame	2,061
Operator's cab	300
Operator's seat	29
Counterweight	4,880
Swing machinery	164
Control valve	170
Swing motor	53
Travel motor	98 x 2
Center swivel joint	51
Track frame assembly	8,670
	5,295
	716
	166 x 2
	257 x 2
	31 x 4
	52 x 16
	629 x 2
Track shoe assembly	
Standard triple grouser shoe (600 mm)	1,480.x 2
Standard triple grouser shoe (700 mm)	1,625 x 2
Wide triple grouser shoe (800 mm)	1,770 x 2

	Unit: kg
Serial number	A83001 and up
Boom assembly	2,033
Arm assembly	1,374
Bucket assembly	765 - 1,270
Boom cylinder assembly	240 x 2
Arm cylinder assembly	300
Bucket cylinder assembly	212
Link (large) assembly	80
Link (small) assembly	22 x 2
Boom pin	51 + 10 x 2 + 31 + 16.7 + 26
Arm pin	10 x 2
Bucket pin	20 x 2
Link pin	17 x 2

FUEL, COOLANT AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE								CAPACITY (l)	
		-22 -30	-4 -20	14 -10	32 0	50 10	68 20	86 30	104 40	Specified	Refill
Engine oil pan	Engine oil	SAE 30								26.3	24.0
		SAE 10 W									
		SAE 10W-30									
		SAE 15W-40									
Damper case										0.75	
Swing machinery case		SAE 30								5.5	5.5
Final drive case (each)										10.0	9.5
Idler (each)										0.07 - 0.08	0.07 - 0.08
Track roller (each)		SAE 30								0.19 - 0.21	0.19 - 0.21
Carrier roller (each)										0.23 - 0.25	0.23 - .025
Hydraulic system	Engine oil	SAE 10W								248	166
		SAE 15W-40									
		SAE 10W-30									
Fuel tank	Diesel fuel	ASTM D975 No. 2								340	
		ASTM D975 No. 1									
All lubrication fittings	Grease	No.2 Multi-purpose lithium grease with 3% molybdenum disulfide								Fill as instructed	
Cooling system	Coolant	See COOLANT on page 0?-?								24.4	

SPECIFIED CAPACITY: Total amount of oil including oil for components and oil in piping.
 REFILL CAPACITY: Amount of oil needed to refill system during normal inspection and maintenance.

ASTM: American Society of Testing and Material
 SAE: Society of Automotive Engineers
 API: American Petroleum Institute

ENGINE OIL SPECIFICATIONS

NORMAL OPERATION

Oil performance recommendations are as follows:

The use of a quality engine lubricating oil combined with appropriate oil and filter change intervals are critical factors in maintaining engine performance and durability.

Komatsu Engine Oil or multi-viscosity engine oil meeting American Petroleum Institute (API) performance classification CF-4, CG-4, CF-4/SG or CG-4/SH or MIL-L-2104D or E is recommended.

NOTICE:

Classification CD, CE, CD/SF or CE/SF oils may be used in areas where CF-4, CG-4, CF-4/SG or CG-4/SH oil is not yet available. If API classification CC or CC/CD is used, reduce the engine oil change interval by half.

A sulfated ash limit of 1.0 to 1.5 mass percent is suggested for optimum valve and piston deposit and oil consumption control. The sulfated ash **must not** exceed 1.85 mass percent. The sulfated ash limit of 1.85 mass percent has been placed on all engine lubricating oils recommended for use in the engine. Higher ash oils can cause valve and/or piston damage and lead to excessive oil consumption.

The API service symbol displays the following information. The upper half of the symbol displays the appropriate oil categories; the lower half may contain words to describe oil energy conserving features. The center section identifies the SAE oil viscosity grade.

Oil viscosity recommendations are as follows:

The use of a multi-grade lubricating oil has been found to improve oil consumption control and improve engine cranking in cold temperatures while maintaining lubrication at high operating temperatures.

While SAE 15W-40 multi-viscosity oil is recommended for most operating climates, refer to the previous table for oil viscosity recommendations for extreme climates.

NOTICE:

Limited use of low viscosity oils, such as SAE 10W-30 may be used for easier starting and providing sufficient oil flow at ambient temperatures below -5 °C. Low viscosity oils can decrease engine life due to wear.

Special "break-in" lubricating oils are **not** recommended for a new or rebuilt engine. Use the same type of oil during the "break-in" as specified for normal operation.

Additional information regarding lubricating oil availability throughout the world is available in the "E.M.A. Lubricating Oils Data Book for Automotive and Industrial Engines." The data book may be ordered from the Engine Manufacturers Association, 401 North Michigan Ave., Chicago, IL U.S.A. 60611. The telephone number is (312) 644-6610.

ARCTIC OPERATION

If an engine is operated in ambient temperatures consistently below -23 °C, to keep the engine warm when it is **not** in operation, use a synthetic engine oil API performance classification CF-4, CG-4, CF-4/SG or CG-4/SH with adequate low temperature properties such as SAE 5W-20 or 5W-30.

The oil supplier **must** be responsible for meeting the performance service specifications.

NOTICE:

The use of a synthetic base oil does not justify extended oil change intervals. Extended oil change intervals can decrease engine life due to factors such as; corrosion, deposits and wear.

DAMPER CASE, SWING MACHINERY CASE, TRACK FRONT IDLERS, TRACK ROLLERS, TOP CARRIER ROLLERS AND HYDRAULIC SYSTEM OIL SPECIFICATIONS

Komatsu Engine Oil or engine oil meeting American Petroleum Institute (API) performance classification CF-4, CG-4, CF-4/SG or CG-4/SH or MIL-L-2104D or E is recommended.

NOTICE:

Classification CD, CE, CD/SF or CE/SF oils may be used in areas where CF-4, CG-4, CF-4/SG or CG-4/SH oil is not yet available.

NOTICE:

The track front idlers, track rollers and top carrier rollers are lubricated for the life of the component. Lubrication should only be necessary during rebuilt.

FINAL DRIVE OIL SPECIFICATIONS

Komatsu Engine Oil or engine oil meeting American Petroleum Institute (API) performance classification CF-4, CG-4, CF-4/SG or CG-4/SH or MIL-L-2104D or E is recommended.

NOTICE:

Classification CD, CE, CD/SF or CE/SF oils may be used in areas where CF-4, CG-4, CF-4/SG or CG-4/SH oil is not yet available.

DIESEL FUEL SPECIFICATIONS



WARNING

Possible fire hazard - never mix gasoline, gasohol and/or alcohol with diesel fuel. This practice creates an extreme fire hazard and under certain conditions an explosion which could result in personal injury or death.



WARNING

Never remove the fuel tank filler cap or refill the fuel tank while the engine is running or when hot or when the machine is indoors. Fumes are dangerous, a spark or flame could result in a fire or explosion.

NOTICE:

The precise tolerances of diesel fuel injection systems require that the fuel be kept clean and free of contaminants and/or water. Contaminates or water in the system can cause severe damage to both the injection pump and nozzles.

REMARK

Below -12 °C, diesel fuel will change to wax particles and clog the fuel filters. For best results use Grade No. 1-D diesel fuel in cold weather.

For normal service above -10 °C, use Grade No. 2-D diesel fuel with a minimum Cetane number of 40 is recommended. The use of No. 2-D diesel fuel will result in optimum engine performance under most operating conditions. Fuels with Cetane numbers higher than 40 may be needed in high altitudes or extremely low ambient temperatures to prevent misfires and excessive smoke.

At operating temperatures below -10 °C to +14 °C, use of lighter fuels can reduce fuel economy.

Where a winterized blend of Grade No. 2-D and No. 1-D fuels is available, it may be substituted for Grade No. 1-D fuel. However, it is the supplier's responsibility to provide the fuel for the anticipated ambient temperature.

Use a low sulfur content fuel having a cloud point that is at least 10 degrees below the lowest expected fuel temperature. Cloud point is the temperature at which crystals begin to form in the fuel.

The viscosity of the fuel **must** be kept above 1.3 cSt to provide adequate fuel system lubrication.

Optionally, the equivalent grades of recognized Federal Government specifications may be used; the latest revisions of VV-F-800a.

COOLANT SPECIFICATIONS

GENERAL

Selection and maintenance of the engine coolant is important to long engine life. The following information provides recommendations for selecting the engine coolant and maintaining the supplemental coolant additives (SCA).

Heavy duty diesel engines require a balanced coolant mixture of water, antifreeze, and supplemental coolant additives. Supplemental coolant additive recommendations are included in the section entitled Supplemental Coolant Additives on page 7 in this section. The coolant mixture **must** be drained and replaced at the specified service interval shown in the Operation and Maintenance Manual, or every two years of operation, whichever comes first.

When using anti-freeze, always observe the precautions given in the Operation and Maintenance Manual.

Komatsu machines are supplied with Komatsu original anti-freeze in the coolant when the machine is shipped. This anti-freeze is effective in preventing corrosion of the cooling system. The anti-freeze can be used continuously for two years or 2000 hours. It can be used as is even in hot climates.

Anti-freeze is flammable; do not expose it to sparks, flame or fire.

If the engine overheats, wait for the engine to cool before adding coolant.

Low coolant level will cause overheating and will also cause problems with corrosion from the air in the coolant.

WATER

Use water which has a low mineral content. Water used in conjunction with antifreeze, coolant filters and inhibited water must meet the following standards:

- Total Hardness** - Not to exceed 170 parts per million (10 grains/gallon maximum) to prevent scale deposits. Water containing dissolved magnesium and calcium (the usual reason for water hardness) above the specified amount will cause scale deposits to develop in the engine.
- Chlorides** - Not to exceed 40 parts per million (2.5 grains/gallon maximum) to prevent corrosion.
- Sulfites** - Not to exceed 100 parts per million (5.8 grains/gallon maximum) to prevent corrosion.
- Dissolved Solids** - Not to exceed 340 parts per million (20 grains/gallon maximum) to minimize sludge deposits, scale deposits, corrosion or a combination of these.

If any of the above requirements cannot be met, use distilled, de-ionized, or de-mineralized water. To determine if local water supplies meet these standards, water samples can be tested by water treatment laboratories. Softened water that is prepared using common salt (sodium chloride) contains excessive amounts of chlorides and should not be used.

NOTICE:

Never use water alone in the cooling system because rust, scale deposits and corrosion will occur.

ANTIFREEZE

In climates where the temperature is above -34

Antifreeze is essential in any climate. It broadens the operating temperature range by lowering the coolant freezing point and by raising its boiling point. Do **not** use more than 50 percent antifreeze in the mixture unless additional freeze protection is required. **Never** use more than 68 percent antifreeze under any condition.

An antifreeze concentration greater than 68% will adversely affect freeze protection and heat transfer rates. Antifreeze concentrations between 68 and 100% actually have a higher freezing point than a 68% antifreeze concentration and

should not be used due to reduced heat transfer rates.

Ethylene glycol, low silicate antifreeze is recommended. The antifreeze should contain no more than 0.1% anhydrous alkali metasilicate. Low silicate antifreeze is recommended to avoid the formation of silica-gel (hydro-gel). This gel formation can occur when the cooling system contains an over concentration of high silicate antifreeze and/or supplemental coolant additive. DO NOT use methanol or alcohol as an antifreeze because of its low boiling point.

Antifreeze may retain its freeze protection for more than one season but coolant conditioners must be added to maintain corrosion protection.

Antifreeze formulated with methoxy propanol, or propylene glycol, is not recommended for this system.

NOTICE:

Do not mix types of antifreeze solutions. Mixed solutions make it impossible to determine the protection against freezing. Antifreeze containing sealer or anti-leak additives should NOT be used in this system. Sealer or anti-leak additives will cause plugging problems in the cooling system.

⚠ WARNING

Use extreme caution when adding coolant to a hot radiator to avoid being burned. Wear gloves and goggles and keep face away from the filler neck.

Check the solution periodically and at normal operating temperature, to be sure the cooling system has sufficient protection against freezing. An antifreeze concentration greater than 68% will adversely affect antifreeze protection and heat transfer rates. Antifreeze concentrations between 68% and 100% actually have a higher freezing point than a 68% antifreeze concentration and should not be used due to reduced heat transfer rates.

REMARK

Do not use a 100% antifreeze solution for freezing protection, This will cause severe corrosion in the cooling system and if not detected will cause radiator and oil cooler core damage. Use a water/antifreeze solution as described in the following table.

The following table shows the approximate percentage of antifreeze solution required for various temperatures.

Approximate Freezing Point	Percentage of Antifreeze Concentration by Volume	Specific Gravity at 16
0 (+32)	0	1.000
-7 (+20)	15	1.025
-12	25	1.040
-18	33	1.053
-23 (-10)	40	1.062
-29 (-20)	45	1.070
-34 (-30)	48	1.074
-40 (-40)	53	1.080
-46 (-50)	56	1.083
-51 (-60)	59	1.088
-57 (-70)	62	1.092
-62 (-80)	65	1.095
-68 (-90)	67	1.097
-69 (-92)	68	1.098

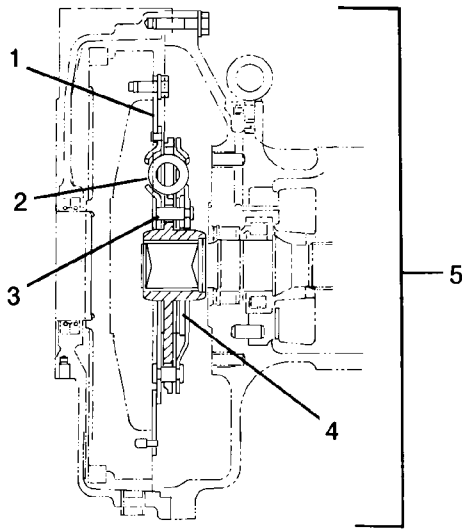
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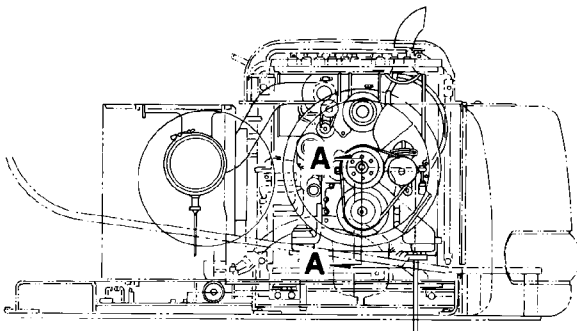
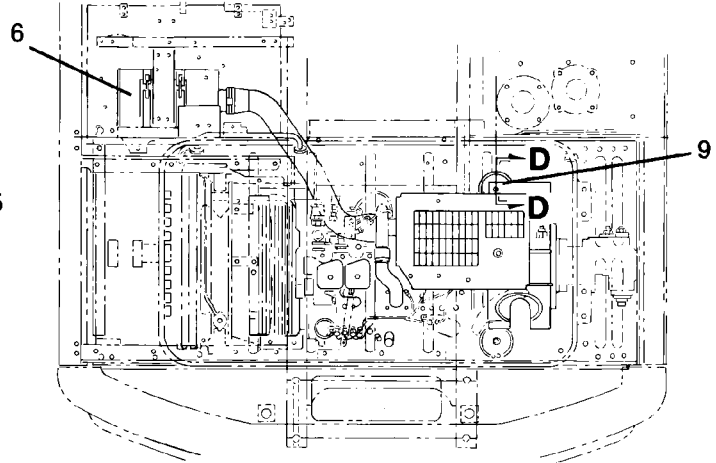
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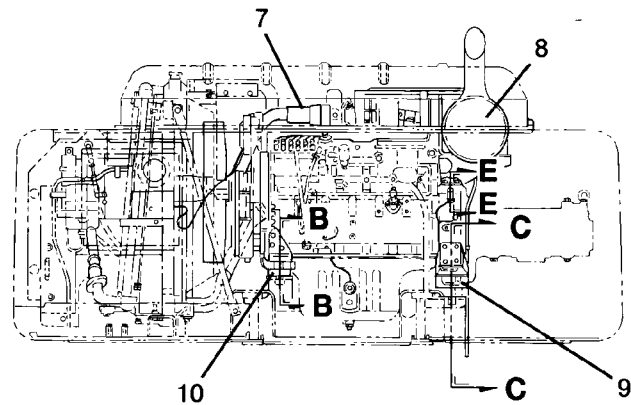
ENGINE RELATED PARTS



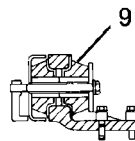
SECTION A-A



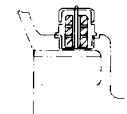
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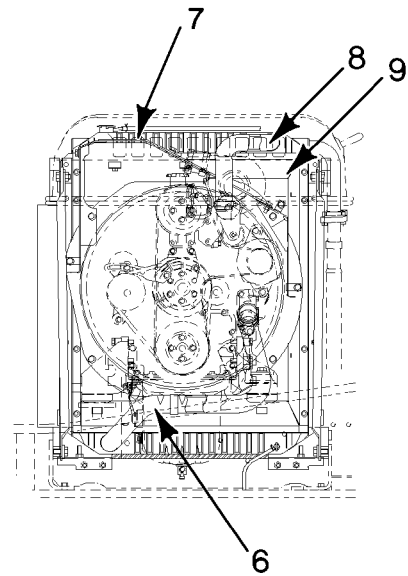
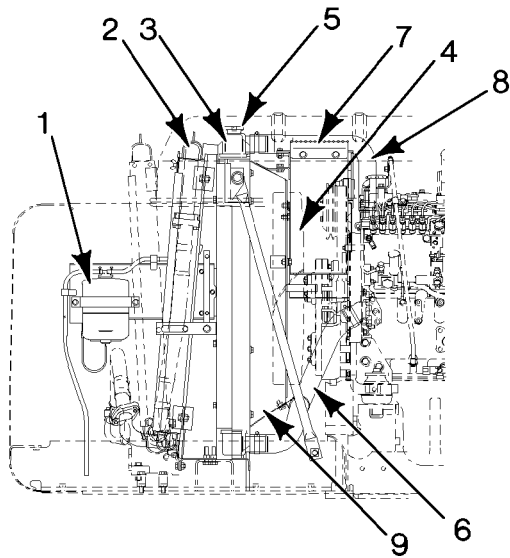
X12AD062

SPECIFICATIONS

The damper assembly is a wet type
Oil capacity: 0.75

1. Drive plate
2. Torsion spring
3. Stopper pin
4. Friction plate
5. Damper assembly
6. Air cleaner
7. Intake connector
8. Muffler
9. Rear engine mount
10. Front engine mount

RADIATOR



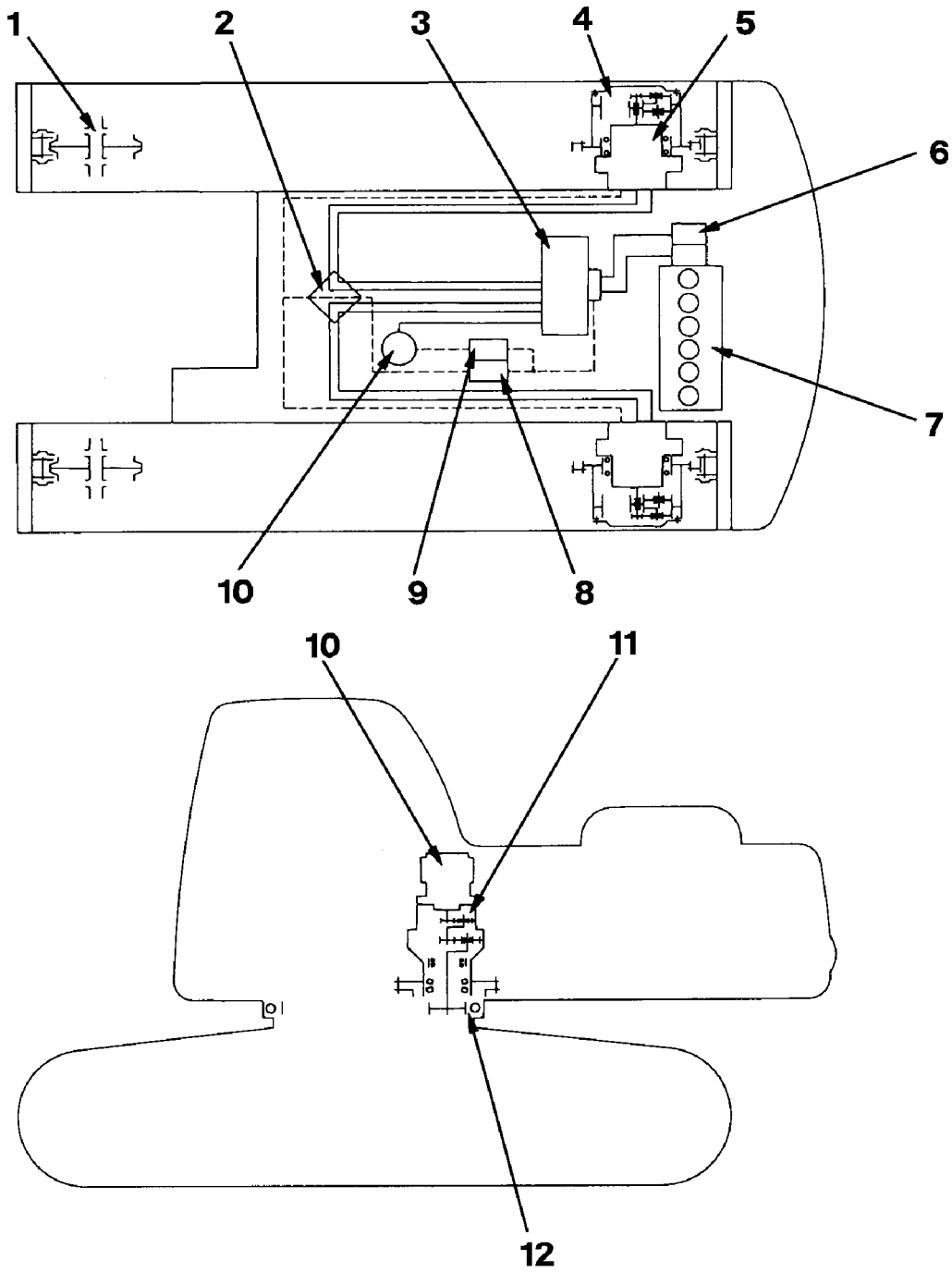
- 1. Reservoir tank
- 2. Oil cooler
- 3. Radiator
- 4. Fan
- 5. Radiator cap

- 6. Radiator outlet hose
- 7. Net
- 8. Radiator inlet hose
- 9. Shroud

SPECIFICATIONS
 Radiator : CWX-4
 Oil cooler : SF1-3

X06AD013

POWER TRAIN

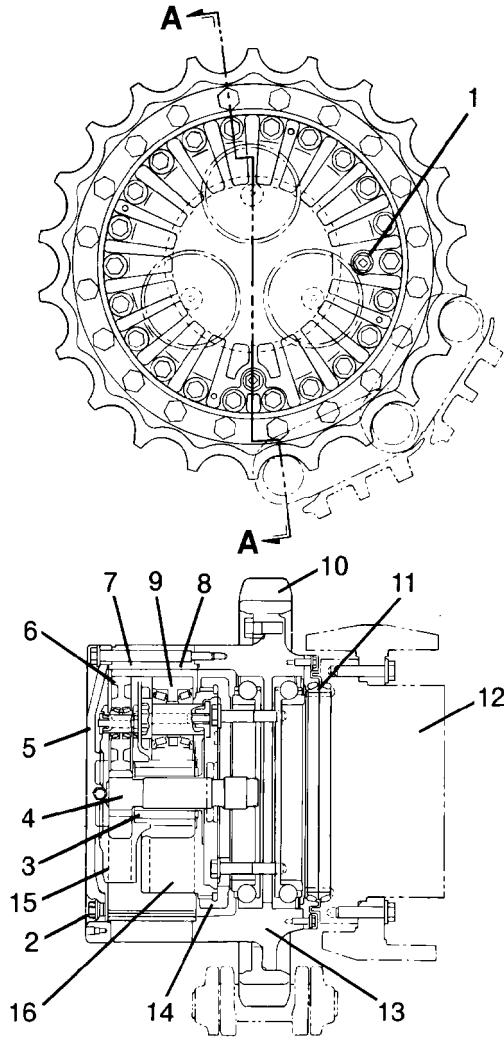


- 1. Idler
- 2. Center swivel joint
- 3. Control valve
- 4. Final drive
- 5. Travel motor
- 6. Hydraulic pump

- 7. Engine (S(A)6D102EA-1)
- 8. Travel speed solenoid valve
- 9. Swing brake solenoid valve
- 10. Swing motor (KMF90AB-3)
- 11. Swing machinery
- 12. Swing circle

X07HH027

FINAL DRIVE



- 1. Level plug
- 2. Drain plug
- 3. No. 1 sun gear (13 teeth)
- 4. No. 2 sun gear (19 teeth)
- 5. Cover
- 6. No. 2 planet gear (30 teeth)
- 7. No. 2 ring gear (80 teeth)
- 8. No. 1 ring gear (80 teeth)
- 9. No. 1 planet gear (33 teeth)
- 10. Sprocket
- 11. Floating seal
- 12. Travel motor
- 13. Hub
- 14. Retainer
- 15. No. 1 planetary carrier
- 16. No. 2 planetary carrier

SPECIFICATIONS

Reduction ratio:

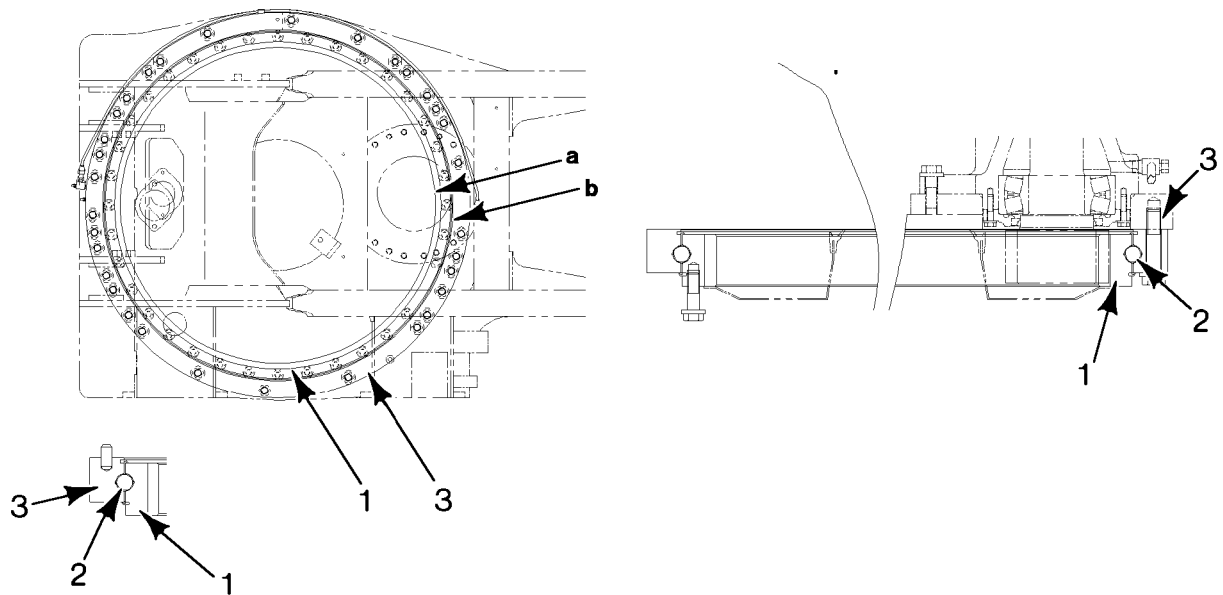
$$\left(\frac{10 \ 92}{10}\right) \times \left(\frac{19 \ 92}{19}\right) = 58.589$$

SECTION A-A

X07HH080

MEMORANDA

SWING CIRCLE



- 1. Swing circle inner race (No. of teeth: 90)
- 2. Ball
- 3. Swing circle outer race

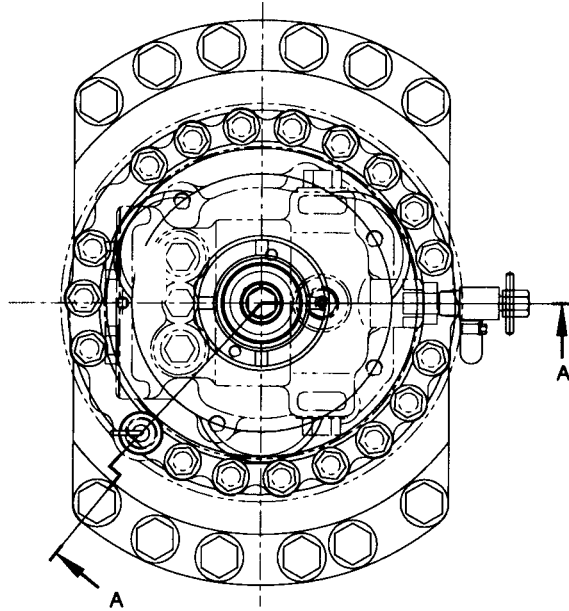
- a. Inner race soft zone S position
- b. Outer race soft zone S position

X09DD035

SPECIFICATIONS	PC270LC
Reduction ratio	90/11 = 8.182
Amount of grease	33

MEMORANDA

SWING MACHINERY

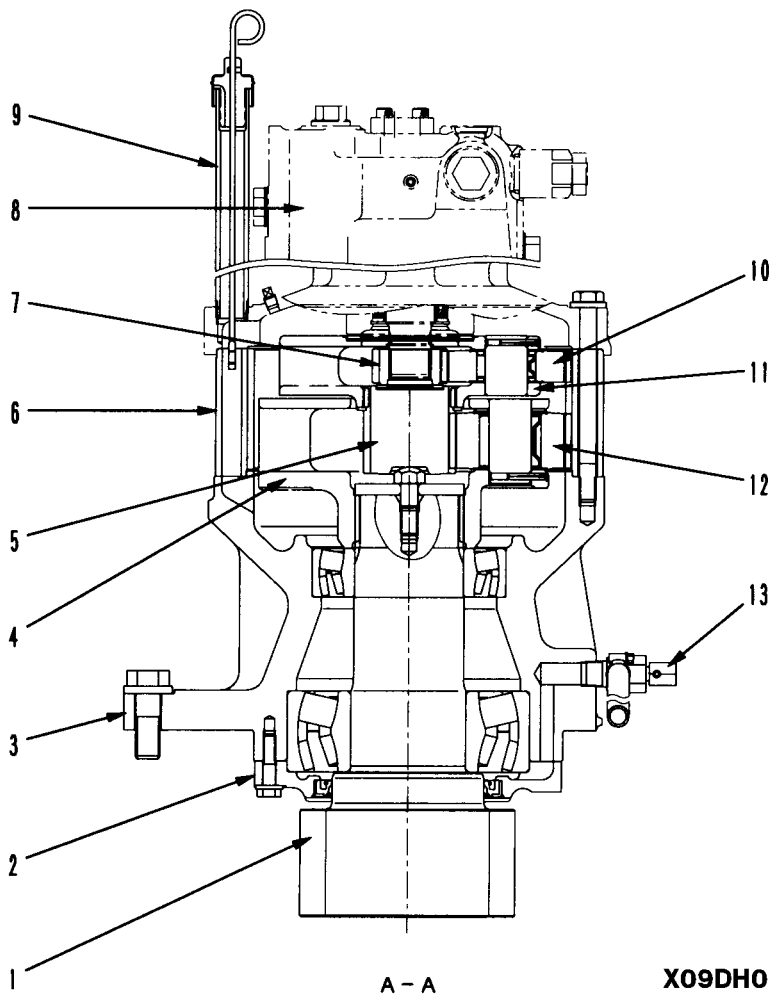


1. Swing pinion (11 teeth)
2. Cover
3. Case
4. No. 2 planetary carrier
5. No. 2 sun gear
6. No. 1 ring gear
7. No. 1 sun gear
8. Swing motor
9. Oil level gauge
10. No. 1 planetary gear
11. No. 1 planetary carrier
12. No. 2 planetary gear
13. Drain plug

SPECIFICATIONS

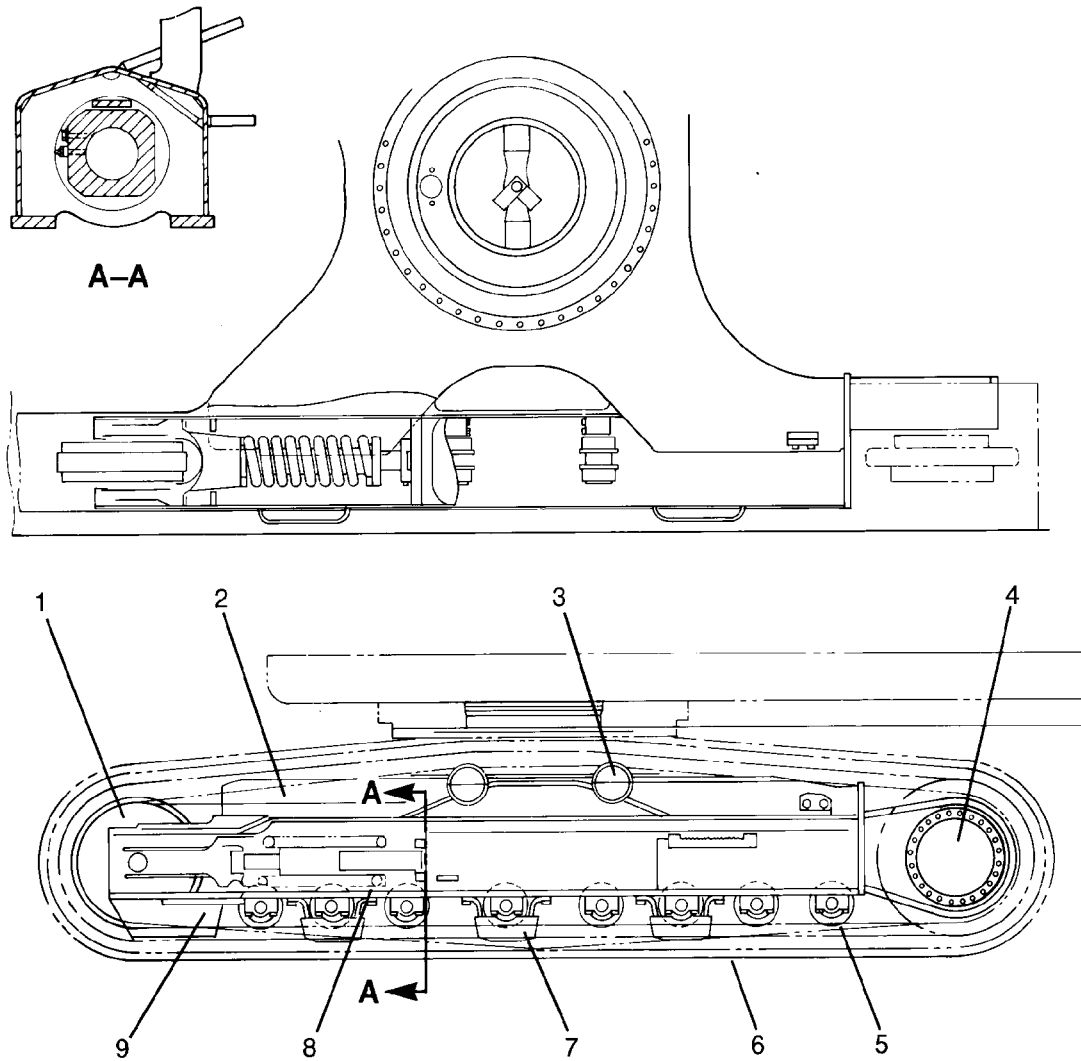
Reduction ratio:

$$\left(\frac{22}{22} \frac{101}{101}\right) \times \left(\frac{27}{27} \frac{101}{101}\right) 26.505$$



X09DH065

TRACK FRAME



X14AZ007

- | | |
|---------------------|------------------|
| 1. Idler | 6. Track shoe |
| 2. Track frame | 7. Center guard |
| 3. Carrier roller | 8. Recoil spring |
| 4. Final drive | 9. Front guard |
| 5. Track roller (8) | |

TRACK SHOE

Item	Model	Standard	Optional	Optional
Shoe width (triple shoe)		700 mm	600 mm	800 mm
Link pitch		216 mm	216 mm	216 mm
No. of rollers (each side)		48	48	48
Category		B	A	C

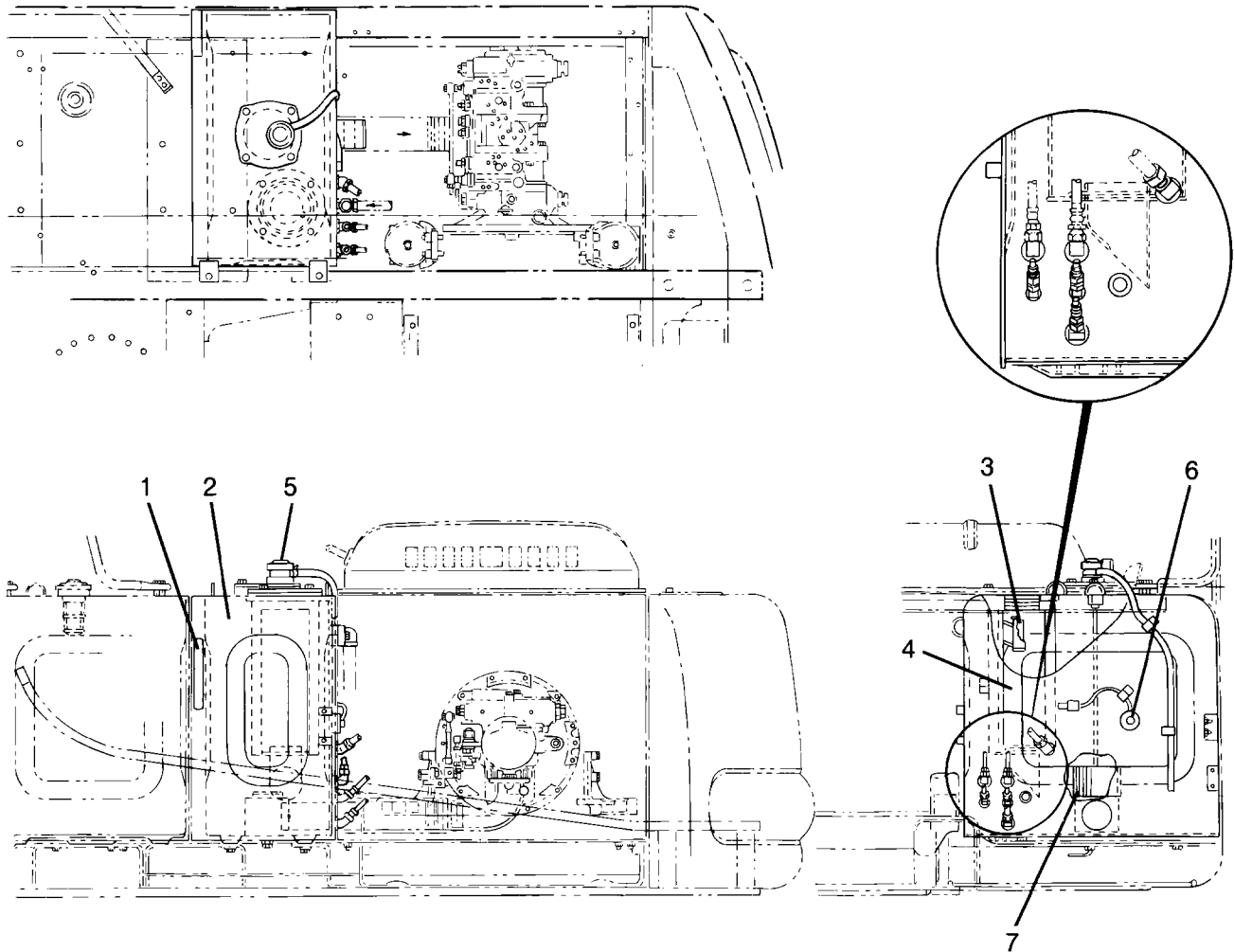
Category	Use	Precautions when using
A	Rocky ground, normal river soil	Travel in Lo speed when traveling on rough ground with obstacles such as large boulders and fallen trees.
B	Normal soil, soft land	Cannot be used on rough ground where there are large obstacles such as boulders and fallen trees. Travel in Hi speed only on flat ground; when it is impossible to avoid traveling over obstacles, lower the travel speed to approx. half of Lo speed.
C	Extremely soft ground (swampy ground)	When "A" and "B" shoes can't be used -- soft ground which allows the smaller shoes to sink. Cannot be used on rough ground where there are large obstacles such as boulders and fallen trees. Travel in Hi speed only on flat ground; when it is impossible to avoid traveling over obstacles, slow the travel speed to approx. half of Lo speed.

Width of categories "B" and "C" shoes demands extra care in their use. Check the restrictions and consider carefully the conditions of use before choosing shoe width. If necessary, consult Komatsu representative for guidance concerning shoe choice and use.

Select the narrowest shoe possible within the range that will not cause problems with flotation and ground pressure.

Using wider shoes than necessary will increase the load on individual shoes, and may lead to problems such as shoe bending, link cracking, breakage of pins, and/or loosening of shoe bolts.

HYDRAULIC TANK



X10BV083

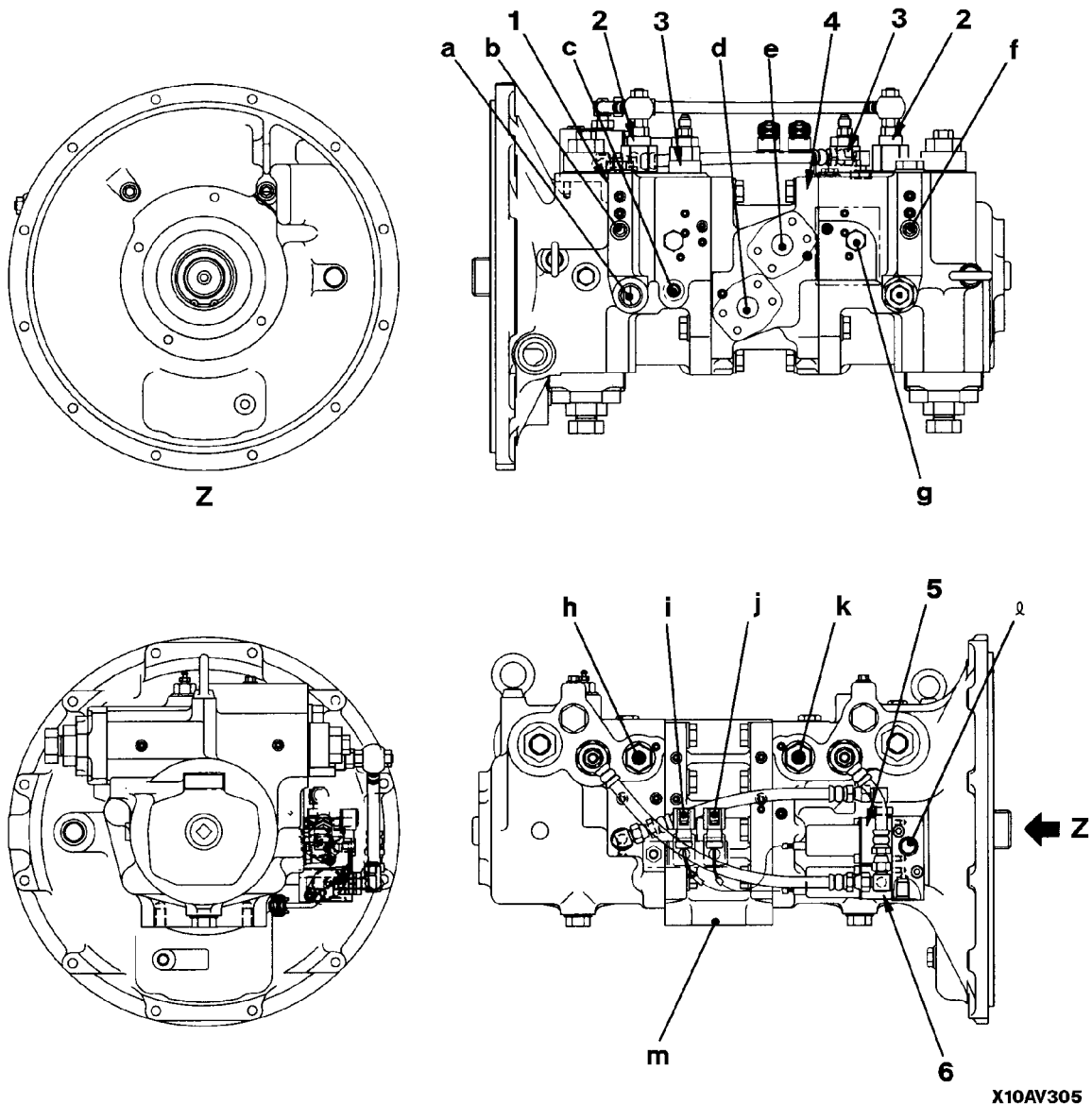
- 1. Sight gauge
- 2. Hydraulic tank
- 3. Bypass valve
- 4. Filter element
- 5. Oil filler cap
- 6. Hydraulic oil level sensor
- 7. Suction strainer

SPECIFICATIONS

Tank capacity	:230
Amount of oil inside tank	:166
Pressure valve	
Relief cracking pressure:	0.17 ± 0.04 kg/cm ² (2.41 psi)
Suction cracking pressure:	0 - 0.005 kg/cm ² (0.07 psi)
Bypass valve set pressure:	1.05 ± 0.2 kg/cm ² (14.9 psi)

HYDRAULIC PUMP

Basic pump

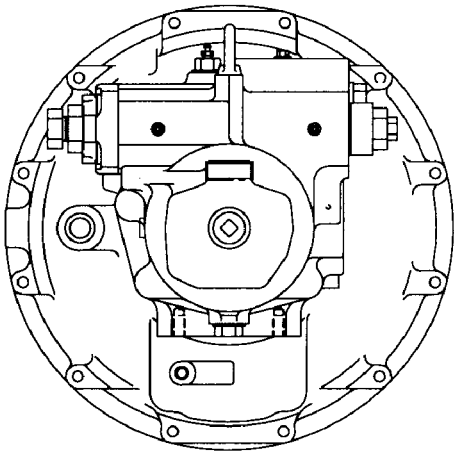


- 1. Front main pump
- 2. PC valve
- 3. LS valve
- 4. Rear main pump
- 5. LS-EPC valve
- 6. PC-EPC valve

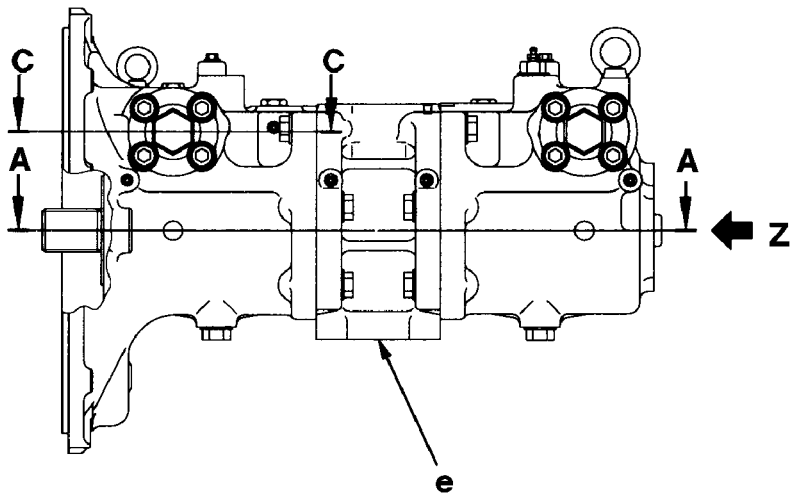
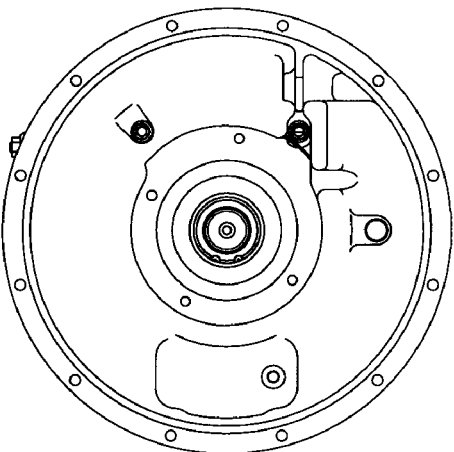
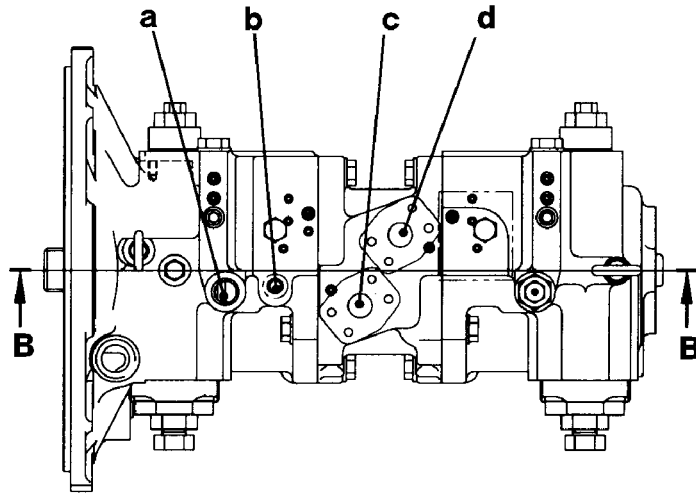
Outline

This pump consists of two variable capacity swash plate piston pumps, a PC valve, LS valve and EP C valve. Typical model (HPV 105 + 105) is shown here.

- a. **Pd1F** port (pump drain)
- b. **Pelf** port (front control pressure)
- c. **PBI** port (pump pressure input)
- d. **PAY** port (front pump delivery)
- e. **PAR** port (rear pump delivery)
- f. **Per** port (rear control pressure detection)
- g. **Psig** port (LS set selector pilot)
- h. **Im** (PC mode selector current)
- i. **PLSR** port (rear load pressure input)
- j. **Isig** (LS set selector current)
- k. **PLSF** port (front load pressure input)
- l. **EPC** basic pressure detection port
- m. **Ps** port (pump suction)

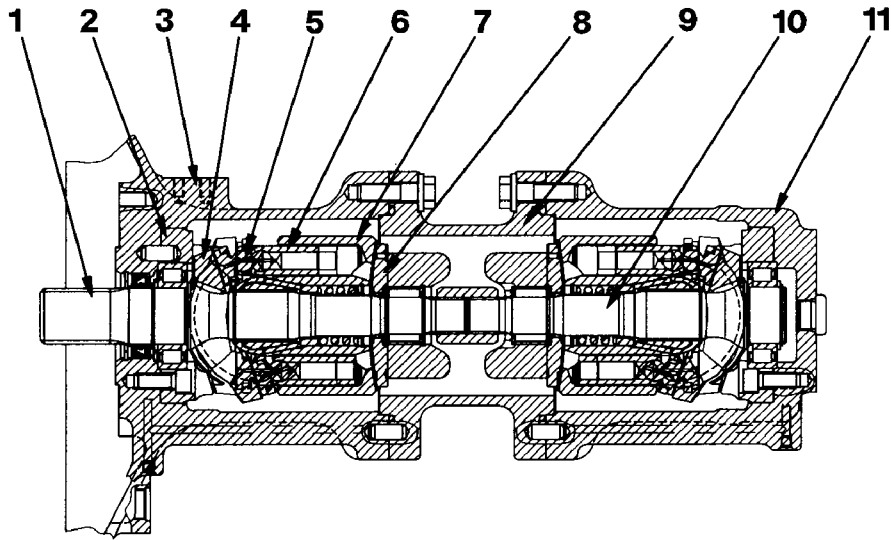


Z

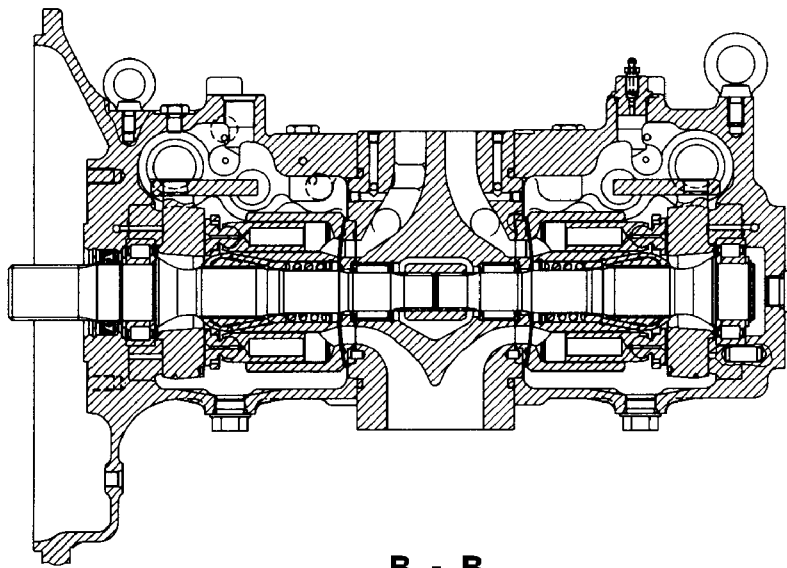


X10AV306

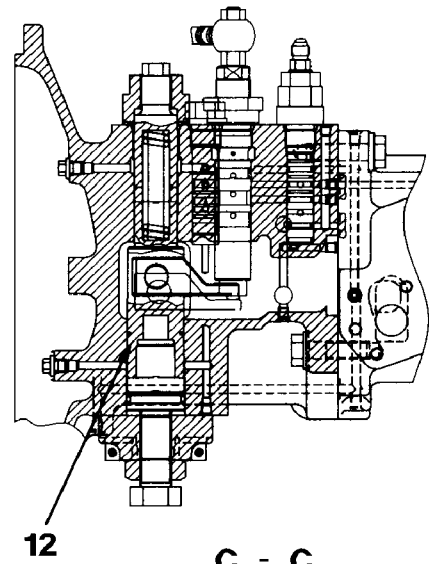
- a. **Pd1F** port (pump drain)
- b. **PBF** port (pump pressure input)
- c. **PAF** port (front pump delivery)
- d. **PAR** port (rear pump delivery)
- e. **Ps** port (suction)



A - A



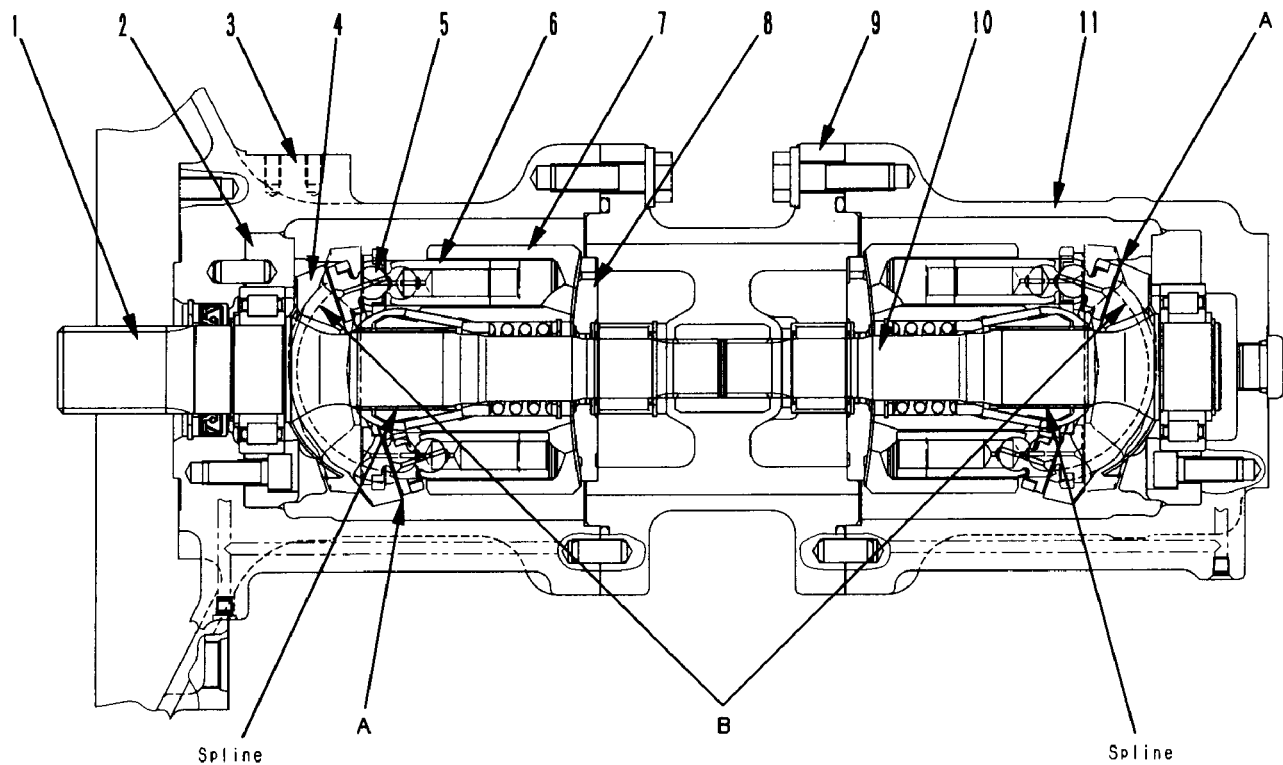
B - B



C - C

X10AV307

1. Shaft (front)
2. Cradle
3. Case (front)
4. Rocker cam
5. Shoe
6. Piston
7. Cylinder block
8. Valve plate
9. End cap
10. Shaft (rear)
11. Case (rear)
12. Servo piston



X10AV308

Function

The pump converts rotation and torque transmitted by the pump shaft into hydraulic energy, and discharge s pressurized oil according to the load.

Changing the swash plate angle changes the discharge amount.

Structure

Cylinder block (7), connected to shaft (1) with a spline, is supported by the front and rear bearings.

The top of piston (6) is a concave ball, and shoe (5) is caulked to it to form one unit. Piston (6) and shoe (5) form a spherical bearing.

Rocker cam (4) has flat surface **A**, and shoe (5) is always pressed against this surface while sliding in a circular movement. Rocker cam (4) brings high pressure oil at cylindrical surface **B** with cradle (2), which is secured to the case and forms a static pressure bearing when it slides.

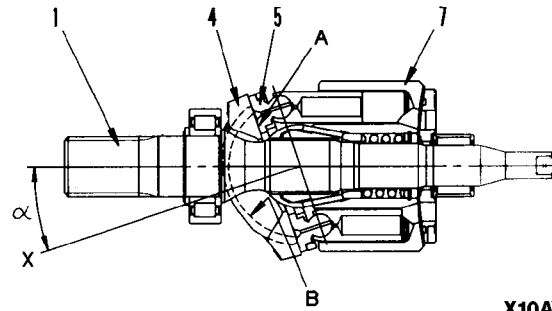
Piston (6) carries out relative movement in the axial direction inside each cylinder chamber of cylinder block (7).

The cylinder block seals the pressure oil to valve plate (8) and carries out relative rotation. This surface is designed so that the oil pressure balance is maintained at a suitable level. The oil inside each cylinder chamber of cylinder block (7) is sucked in and discharged through valve plate (8).

Operation

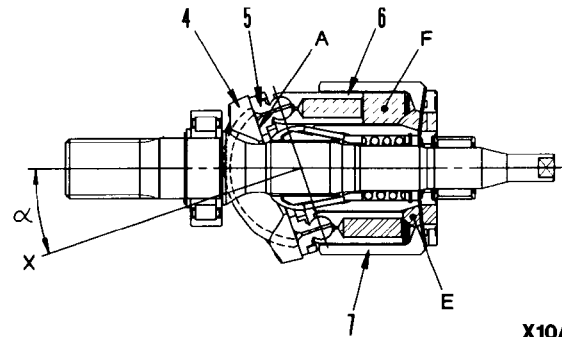
1. Operation of pump

- a. Cylinder block (7) rotates together with shaft (1), and shoe (5) slides on flat surface **A**. When this happens, rocker cam (4) moves along cylindrical surface **B**, so angle **X** of rocker cam (4) and the axial direction of cylinder block (7) changes. (Angle plate angle.)



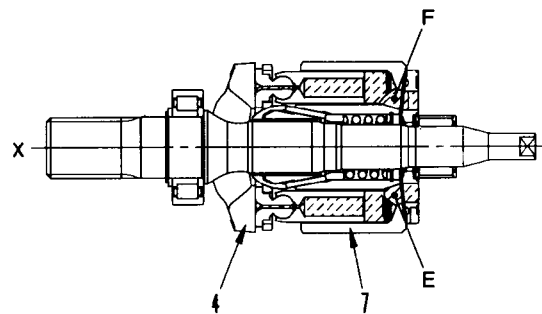
X10AV309

- b. Center line **X** of rocker cam (4) maintains swash plate angle of cylinder block (7), and flat surface **A** moves as a cam in relation to shoe (5). In this way, piston (6) slides on the inside of cylinder block (7), so a difference between volumes **E** and **F** is created inside cylinder block (7). The suction and discharge is carried out by this difference **F-E**. In other words, when cylinder block (7) rotates and the volume of chamber **E** becomes smaller, the oil is discharged during that stroke. Meanwhile, the volume of chamber **F** becomes larger, and as the volume becomes larger, the oil is sucked in.



X10AV310

- c. If center line **X** of rocker cam (4) is in line with the axial direction of cylinder block (7) (swash plate angle = 0), the difference between volumes **E** and **F** inside cylinder block (7) becomes 0, so the pump does not carry out any suction or discharge of oil. (In fact, the swash plate angle can never become 0.)



X10AV311



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