EEBM001101

SHOP MANUAL

KOMATSU

PC160-6k
PC180LC, 180NLC-6k

MACHINE MODEL
PC160-6k
PC180LC, 180NLC-6k

SERIAL NUMBER
K30001 and up
K30001 and up

- This shop manual may contain attachements 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
- PC160-6k mount the SA4D102E engine;
  PC180LC-6k, PC180NLC-6k mount the SA4D102E engine.
  For details of the engine, see the 102 Service Engine Shop Manual.

Printed in Belgium 01-97

01

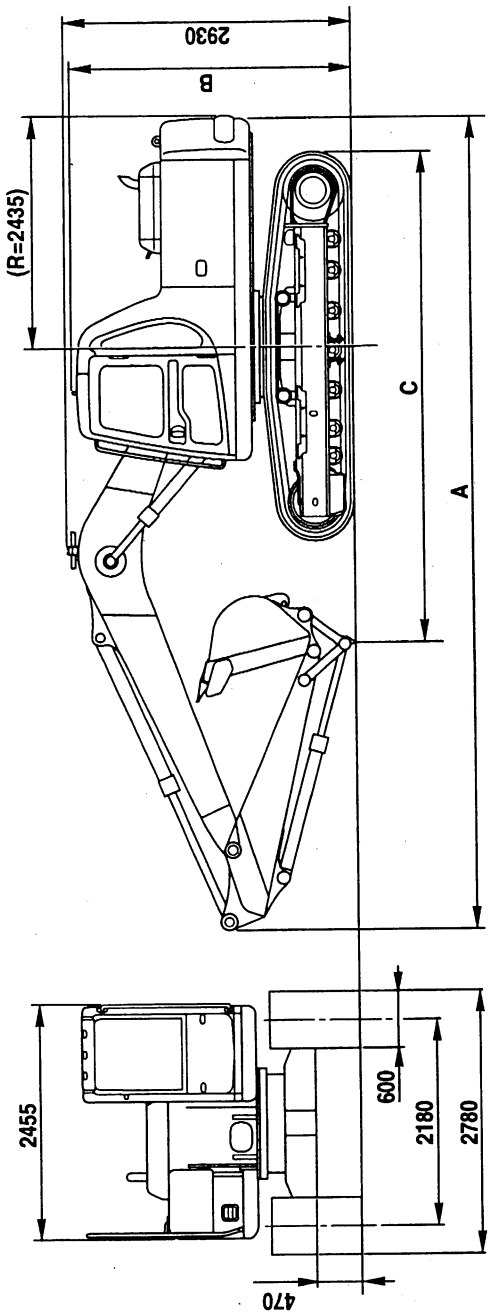
01 GENERAL

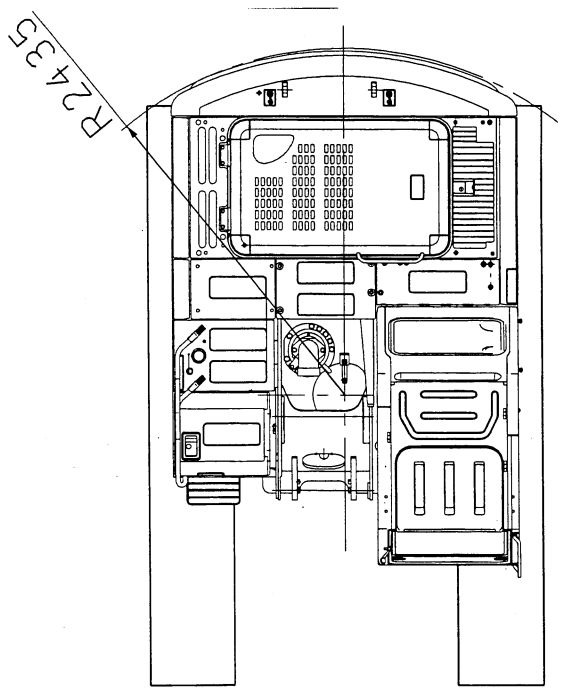
SPECIFICATIONS

				PC180LC-6K	PC160-6K
		Machine model		PC180LC-6K	PC160-6K
		Serial Number		and up	and up
		Bucket capacity	(SAE) (m^2)	0.67	0.58
		Operating weight	(kg)	17900 (with 2.25 m ARM)	16300 (with 2.25 m ARM)
Performance	Working range	Max. digging depth	(mm)	5610	5645
		Max. digging depth of cut for 8 level	(mm)	5375	5415
		Max. digging reach	(mm)	8675	8675
		Max. reach at ground level	(mm)	8510	8515
		Max. digging height	(mm)	8840	8800
		Max. dumping height	(mm)	6230	6190
	Max. digging force (using power max. function)		(kN(kg))	115 (11700)	115 (11700)
	Swing speed		(rpm)	12	12
	Swing max. slope angle		(deg.)	20	20
	Travel speed		(km/h)	Lo: 2.7 Mi: 4 Hi: 5,5	Lo: 2.7 Mi: 4 Hi: 5.5
	Gradeability		(deg.)	35	35
	Gound pressure [standard triple grouser shoe width]		(MPa(kg/cm^2)	0.041 (0.42) [600 mm]	0.051 (0.52) [500 mm]
Dimensions	Overall length (for transport)		(mm)	8560	8565
	Overall width		(mm)	2780	2490
	Overall width of track		(mm)	2780	2490
	Overall height (for transport)		(mm)	2960	2945
	Overall height to top of cab		(mm)	2930	2890
	Ground clearance of counterweight		(mm)	1030	990
	Min. ground clearance		(mm)	440	440
	Tail swing radius		(mm)	2435	2435
	Min. swing radius of work equipment		(mm)	3060	3060
	Height of work equipment at min. swing radius		(mm)	7140	7100
	Length of track on ground		(mm)	3260	2880
	Track gauge		(mm)	2180	1990
	Height of machine cab		(mm)	2010	1970

Machine model				PC180LC-6K	PC160-6k
Serial Number				and up	and up
Engine	Model			KOMATSU SA4D102E	
	Type			4-cycle, water-cooled, in-line, vertical, direct injection, with turbocharger	
	No. of cylinders - bore x stroke		(mm)	4 - 102X120	
	Piston displacement		(cc)	3920	
	Performance	Flywheel horsepower	(kW(PS)/rpm)	78 (106)	
		Max torque	(Nm(kgm)/rmp)	422 (43)/1400	
		Max. speed at no load	(rpm)	2450	
		Min. speed at no load	(rpm)	950	
		Min. fuel consumption	(g/kW.h(g/PS.h))	210 (155)	
	Starting motor			24V 4.5 KW	
	Alternator			24V 55A	
	Battery			12V 95 AhX2	
	Radiator core type			CWX-4	
Undercarriage	Carrier roller			2 on each side	1 on each side
	Track roller			7 on each side	6 on each side
	Track shoe			Assembly-type triple grouser	Assembly-type triple grouser
Hydraulic system	Hydraulic pump	Type X No.		Variable displacement piston type X gear type X 1	
		Delivery	(ℓ/min.)	Piston type: 276 X 1, gear type: 34	
		Set pressure	(MPa(kg/cm²)	Piston type 34.81(355) 31.87(325) gear type: 32.36 (33)	
	Control valve	Type X No.		6-spool + 1-spool type X 1	
		Control method		Hydraulic	
	Hydraulic motor	Travel motor		Piston type (with brake valve,)X2	
		Swing motor		Piston type (with safety valve,): X1	
	Hydraulic cylinder			Double-acting piston	
	Hydraulic tank			Box-shaped, sealed	
	Hydraulic filter			Tank return side	
	Hydraulic cooler			Air cooled	

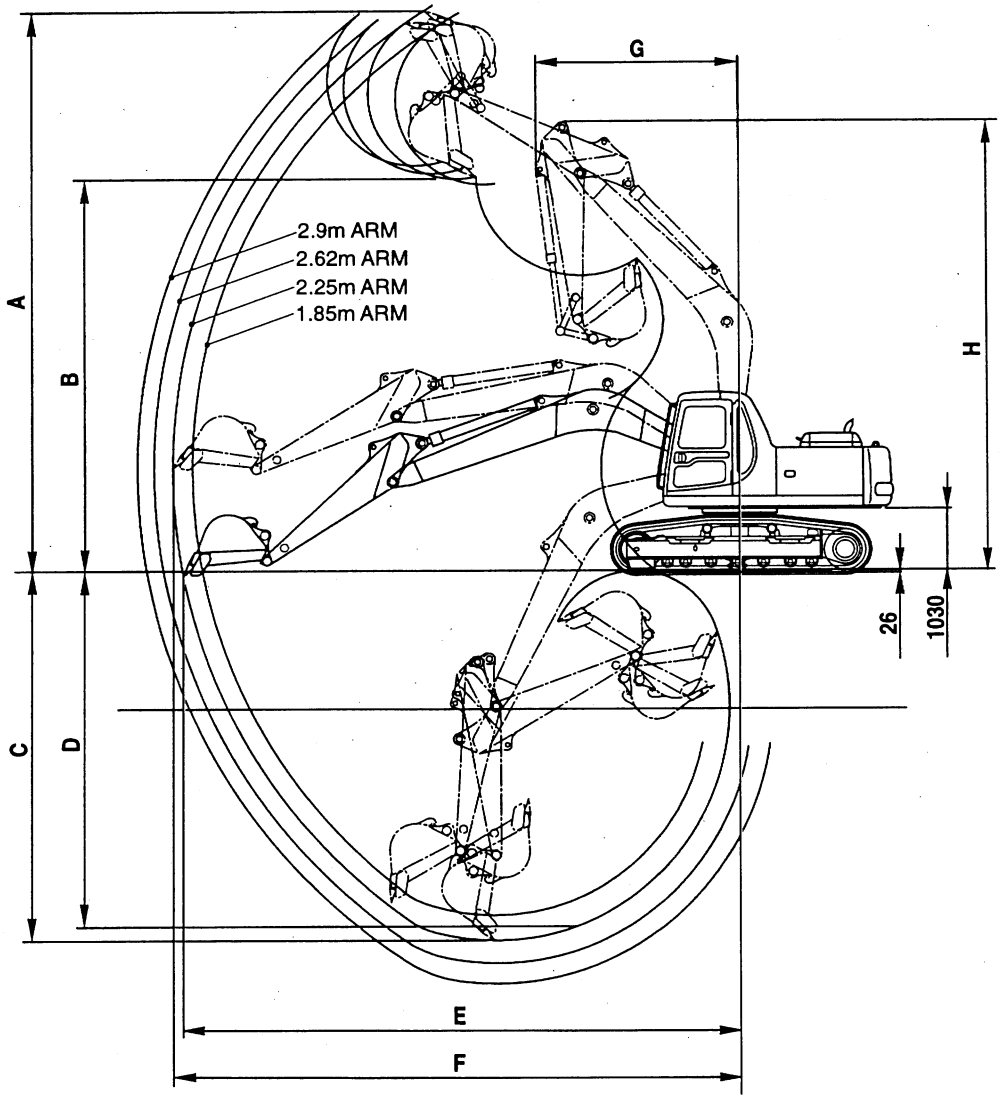
	1.85m ARM	2.25m ARM	2.62m ARM	2.90m ARM
A	8620 mm	8560 mm	8560 mm	8570 mm
B	3125 mm	2960 mm	2965 mm	3055 mm
C	6040 mm	5135 mm	4750 mm	4555 mm



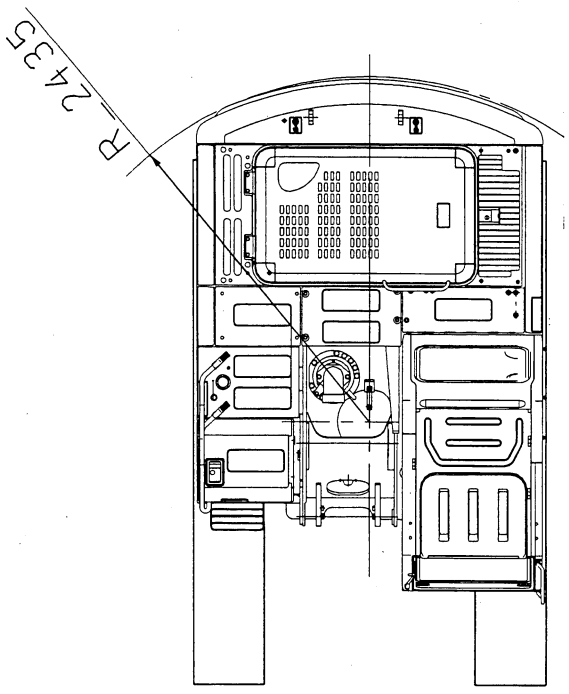


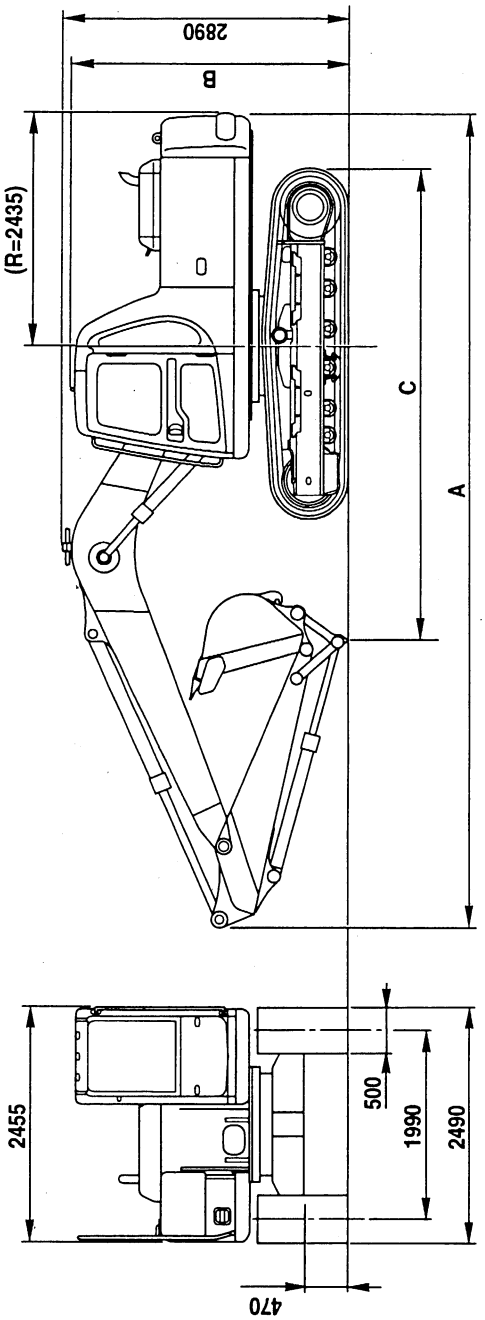
PC180LC-6k

		1.85m ARM	2.25m ARM	2.62m ARM	2.90m ARM
A	Max digging height	8775 mm	8840 mm	8900 mm	9055 mm
B	Max dumping height	6130 mm	6230 mm	6320 mm	6470 mm
C	Max digging depth	5200 mm	5610 mm	5960 mm	6250 mm
D	Max digging depth of cut for 8' level	4950 mm	5375 mm	5740 mm	6050 mm
E	Max digging reach	8355 mm	8675 mm	8960 mm	9230 mm
F	Max digging reach at ground	8180 mm	8510 mm	8800 mm	9075 mm
G	Min swing radius	3360 mm	3060 mm	3000 mm	3010 mm
H	Work equipment height of min swin radius	7210 mm	7140 mm	7120 mm	7140 mm



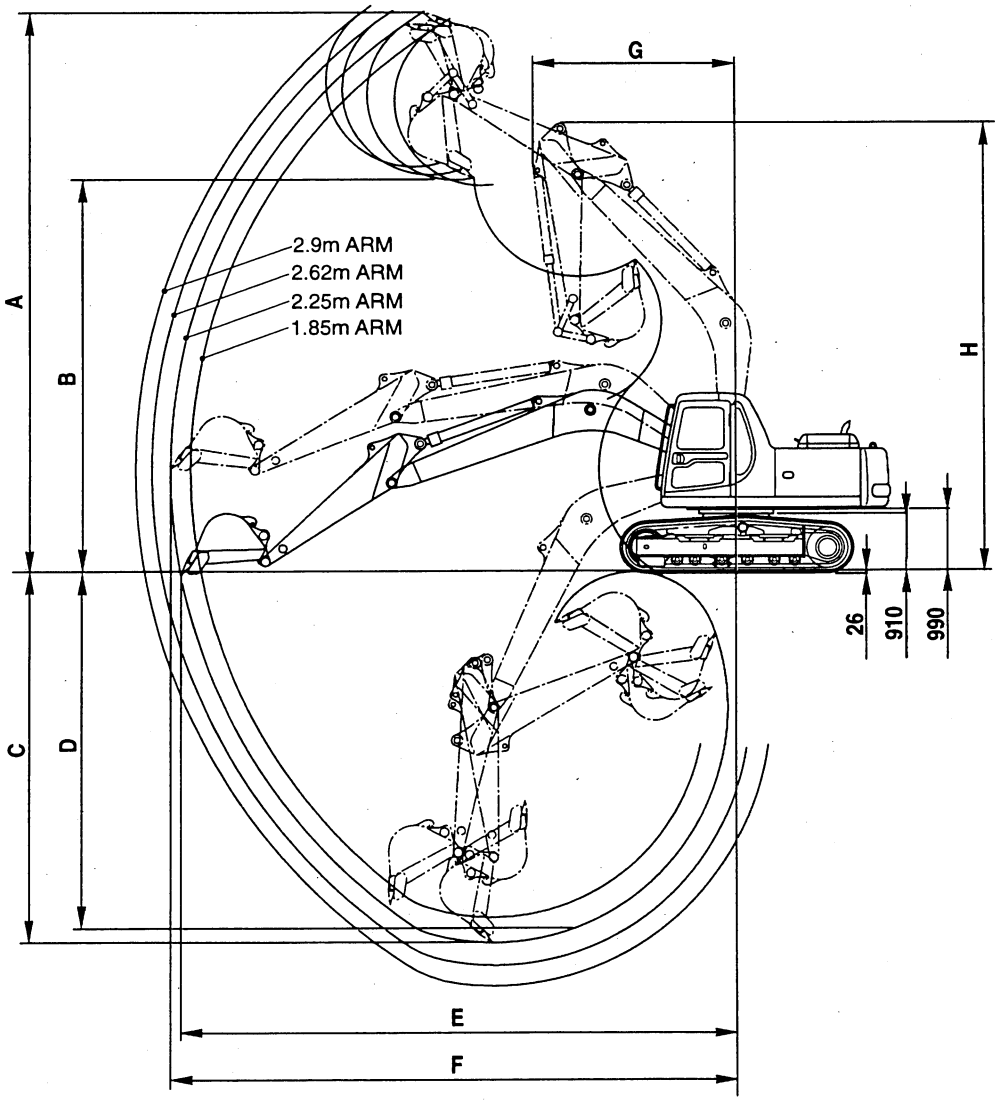
	1.85m ARM	2.25m ARM	2.62m ARM	2.90m ARM
A	8625 mm	8565 mm	8565 mm	8570 mm
B	3115 mm	2945 mm	2960 mm	3060 mm
C	5865 mm	4970 mm	4585 mm	4395 mm





PC160-6k

		1.85m ARM	2.25m ARM	2.62m ARM	2.90m ARM
A	Max digging height	8735 mm	8800 mm	8865 mm	9015 mm
B	Max dumping height	6090 mm	6190 mm	6280 mm	6430 mm
C	Max digging depth	5240 mm	5645 mm	6000 mm	6290 mm
D	Max digging depth of cut for 8' level	4990 mm	5415 mm	5780 mm	6090 mm
E	Max digging reach	8355 mm	8675 mm	8960 mm	9230 mm
F	Max digging reach at ground	8190 mm	8515 mm	8805 mm	9080 mm
G	Min swing radius	3360 mm	3060 mm	3000 mm	3010 mm
H	Work equipment height of min swin radius	7170 mm	7100 mm	7080 mm	7100 mm



WEIGHT TABLE

Units:kg

Machine model	PC180LC-6
Serial Number	
Engine assembly	600
Engine	445
Damper	15
Hydraulic pump	100
Radiator, oil cooler assembly	115
Hydraulic tank, filter assembly (excl. hydraulic oil)	125
Fuel tank (excl. fuel)	100
Revolving frame	1410
Operator's cab	290
Operator's seat	30
Counterweight	2950
Swing machinery (excl. oil)	115
Control valve (7 spools)	70
Swing motor	30
Travel motor	95 X 2
Center swivel joint	45
Under carriage assembly (excl. track shoes assembly)	4600
Track frame	2460
Swing circle	235
Idler assembly	140 x 2
Idler cushion	135 x 2
Carrier roller	20 x 2
Track roller	40 x 14
Final drive (excl. travel motor)	195 x 2

Units:kg

Machine model	PC180LC-6
Serial Number	
Track shoe assembly (shoes +link+pin)	
600mm triple grouser shoe	2620
700mm triple grouser shoe	2870
800mm triple grouser shoe	3120
Boom assembly	1030
Arm assembly	
1850 mm arm	400
2250 mm arm	450
2620 mm arm	520
2900 mm arm	600
Bucket assembly (SAE 0.67 m^3)	580
Boom cylinder assembly + Boom cylinder bottom pin	135 x 2 + 7 x 2
Arm cylinder assembly	200
Bucket cylinder assembly	130
Link assembly	160
Boom pin (boom foot pin, boom cylinder top pin, arm cylinder bottom pin, boom top pin)	30 +21 + 9 + 19
Arm pin (arm cylinder top pin, bucket cylinder bottom pin, arm top pin, arm - link joint pin)	10 + 7 + 16 + 15
Link pin (bucket cylinder top pin, link - bucket joint pin)	15 + 16

WEIGHT TABLE

Units:kg

Machine model	PC160-6k
Serial Number	
Engine assembly	600
Engine	445
Damper	15
Hydraulic pump	100
Radiator, oil cooler assembly	115
Hydraulic tank, filter assembly (excl. hydraulic oil)	125
Fuel tank (excl. fuel)	100
Revolving frame	1410
Operator's cab	290
Operator's seat	30
Counterweight	2950
Swing machinery (excl. oil)	115
Control valve (7 spools)	70
Swing motor	30
Travel motor	95 x 2
Center swivel joint	45
Under carriage assembly (excl. track shoes assembly)	4150
Track frame	2100
Swing circle	235
Idler assembly	140 x 2
Idler cushion	135 x 2
Carrier roller	20 x 2
Track roller	40 x 14
Final drive (excl. travel motor)	195 x 2

Units:kg

Machine model	PC160-6k
Serial Number	
Track shoe assembly (shoes +link+pin)	
500mm triple grouser shoe	2160
600mm triple grouser shoe	2390
700mm triple grouser shoe	2620
Boom assembly	1030
Arm assembly	
1850 mm arm	400
2250 mm arm	450
2620 mm arm	520
2900 mm arm	600
Bucket assembly (SAE 0.67 m^3)	580
Boom cylinder assembly + Boom cylinder bottom pin	135 x 2 + 7 x2
Arm cylinder assembly	200
Bucket cylinder assembly	130
Link assembly	160
Boom pin (boom foot pin, boom cylinder top pin, arm cylinder bottom pin, boom top pin)	30 + 21 + 9 + 19
Arm pin (arm cylinder top pin, bucket cylinder bottom pin, arm top pin, arm - link joint pin)	10 + 7 + 16 + 15
Link pin (bucket cylinder top pin, link - bucket joint pin)	15 + 16

FUEL, COOLANT AND LUBRICANTS

RESERVOIR	KIND OF FLUID	AMBIENT TEMPERATURE -22 -4 14 32 50 68 86 104°F -30 -20 -10 0 10 20 30 40°C	CAPACITY (ℓ)	
			Specified	Refill
Engine oil pan	Engine oil	SAE 30 / SAE 10W / SAE 10W-30 / SAE 15W-40	16	16
Swing machinery case			4	4
Final drive case (each side)			4	4
Idler (1 each)		SAE 30	0.16	0.16
Track roller (1 each)			0.10	0.10
Carrier roller (1 each)			0.16	0.16
Hydraulic system		SAE 10W / SAE 10W-30 / SAE 15W-40	190	135
	Hydraulic oil	H046-HM (★)		
Fuel tank	Diesel fuel	ASTM DG75 No. 2 ASTM D975A No. 1	250	-
Cooling system	Coolant	Add antifreeze	20	-

NOTE:

(1) When fuel sulphur content is less than 0.5%, change oil in the oil pan every periodic maintenance hours described in this manual.
Change oil according to the following table if fuel sulphur content is above 0.5%.

Fuel sculphur content	Change interval of oil in engine oil pan
0.5 to 1.0%	1/2 of regular interval
Above 1.0%	1/4 of regular interval

2) When starting the engine in an atmospheric temperature of lower than 0°C, be sure to use engine oil of SAE10W, SAE10W-30 and SAE15W-40, even though an atmospheric temperature goes up to 10°C more or less in the day time.
3) Use API classification CD as engine oil and if API classification CC, reduce the engine oil change interval to half.
4) There is no problem if single grade oil is mixed with multigrade oil (SAE10W-30), 15W matches the temperature in the table on the left.
5) We recommend Komatsu genuine oil which has been specifically formulated and approved for use in engine and hydraulic work equipment applications.

★ For the HO46-HM, use the oil recommentded by Komatsu.

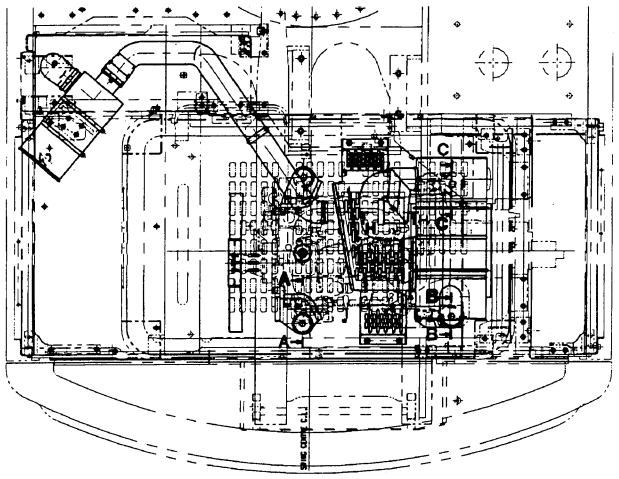
ASTM: American Society of Testing and Material
SAE: Society of Automotive Engineers
API: American Petroleum Institute

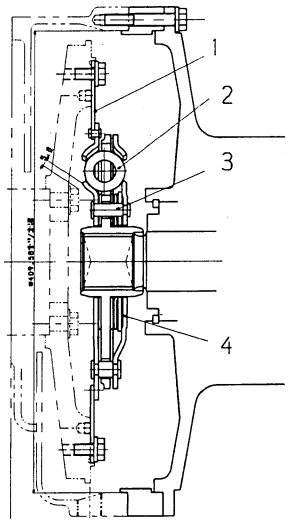
Specified capacity: Total amount of oil including oil for components and oil in piping.
Refill capacity: Amount of oil needed to refill system during normal inspection and maintenance.

10

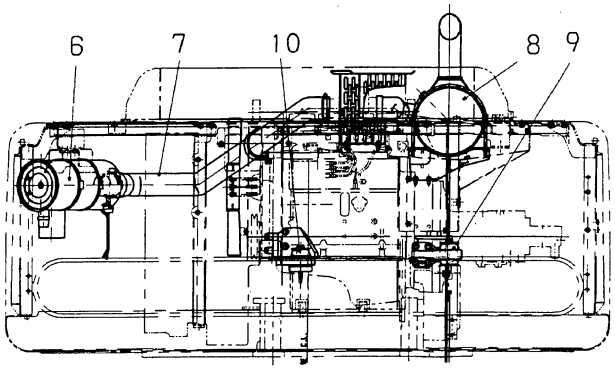
10 STRUCTURE AND FUNCTION

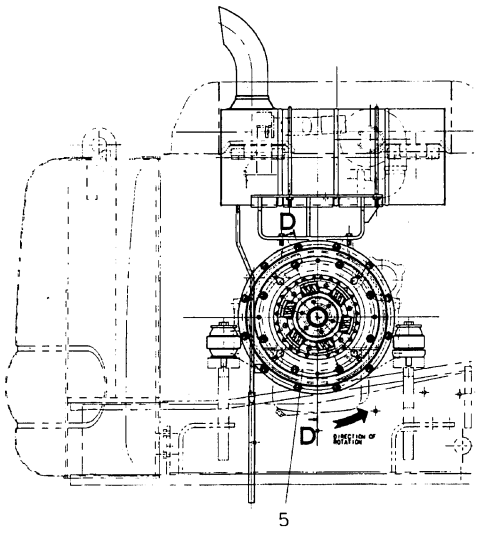
ENGINE RELATED PARTS

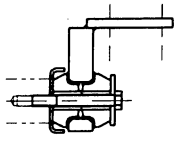




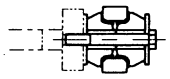
D-D



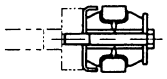




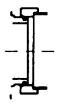
A-A



B-B



C-C



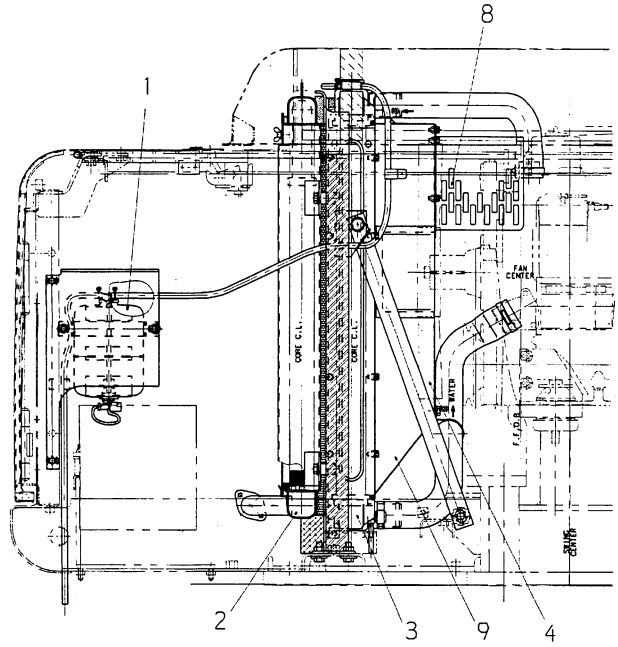
H-H

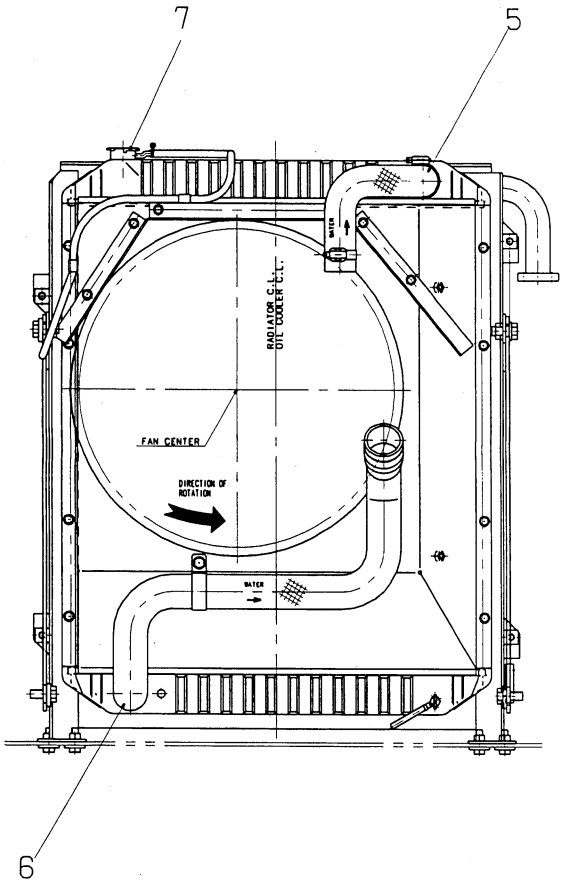
1. Drive plate
2. Torsion spring
3. Stopper pin
4. Friction plate
5. Damper assembly
6. Air cleaner
7. Intake connector
8. Muffler
9. Rear engine mount
10. Front engine mount

OUTLINE

- The damper assembly is a dry type.

RADIATOR • OIL COOLER

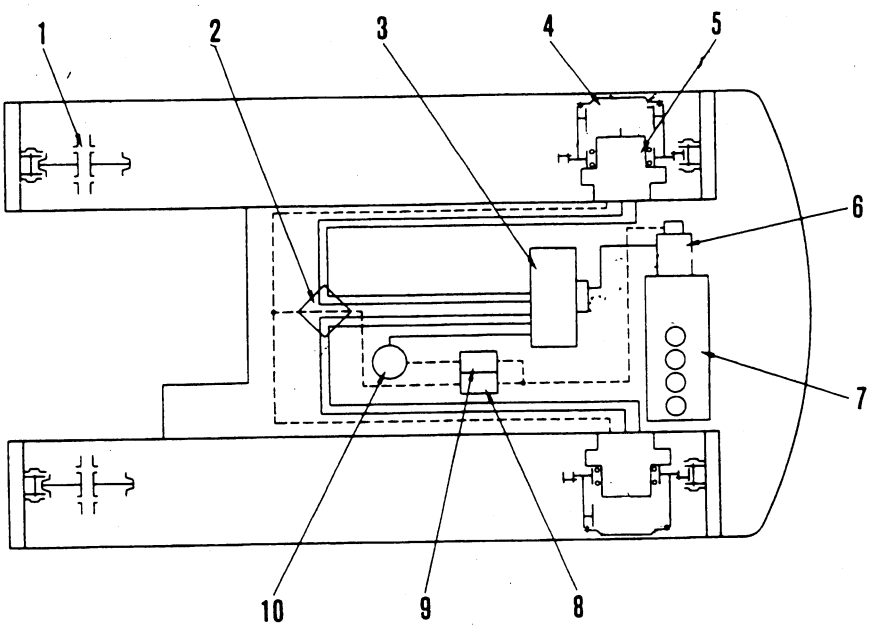


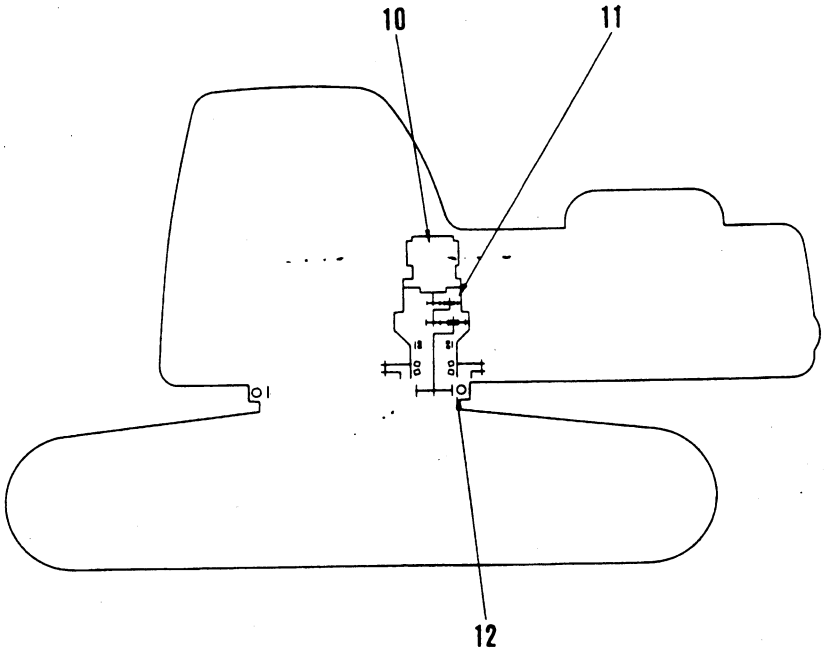


1. Reservoir tank
2. Oil cooler
3. Radiator
4. Fan
5. Radiator inlet hose
6. Radiator outlet hose
7. Radiator cap
8. Net
9. Shroud

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

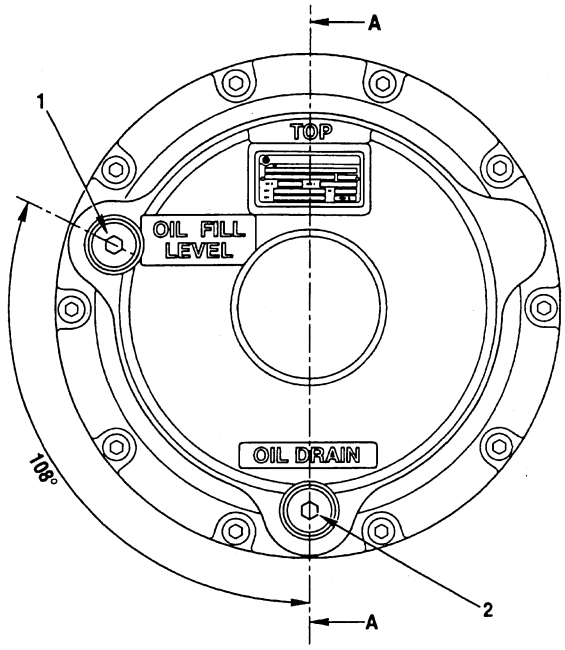
POWER TRAIN





1. Idler
2. Center swivel joint
3. Control valve
4. Final drive
5. Travel motor
6. Hydraulic pump
7. Engine
8. Travel speed solenoid valve
9. Swing brake solenoid valve
10. Swing motor
11. Swing machinery
12. Swing circle

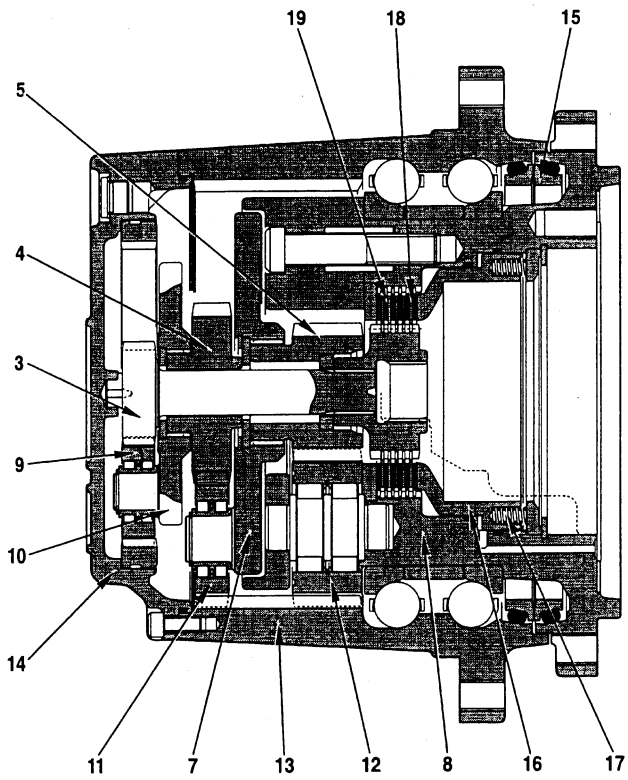
FINAL DRIVE



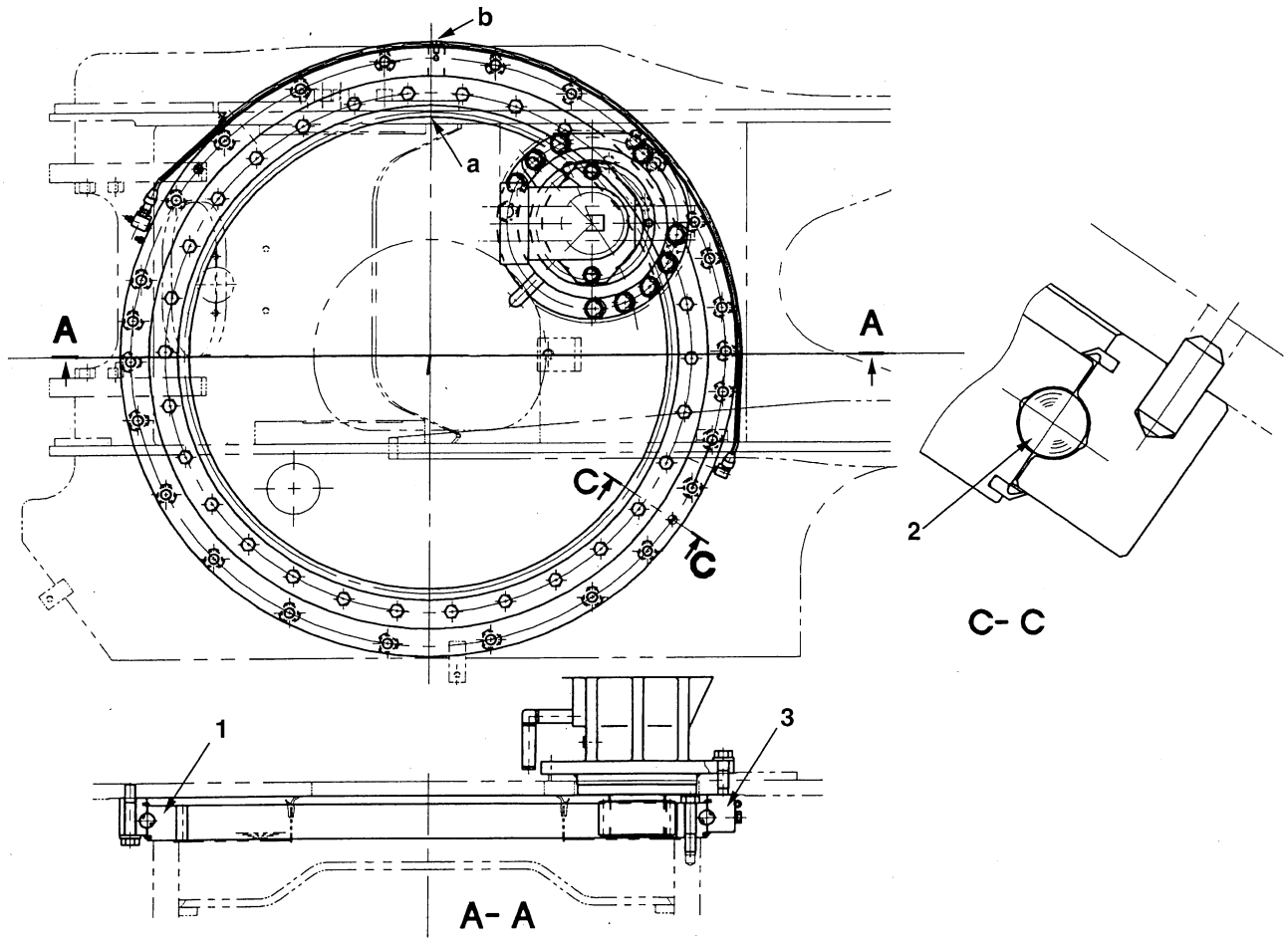
1. Level plug
2. Drain plug
3. No. 1 sun gear (No. of teeth: 24
4. No. 2 sun gear (no. of teeth: 28
5. No. 3 sun gear (No of teeth: 20)
6. No. 1 planetary carrier
7. No. 2 planetary carrier
8. No. 3 planetary carrier
9. No. 1 planetary gear (No. ot teeth: 26)
10. No. 1 ring gear (No. of teeth: 78)
11. No. 2 planetary gear (No. of teeth:20)
12. No. 3 planetary gear (No. of teeth: 23)
13. No. 2 ring gear (No. of teeth: 68)
14. Cover
15. Floating seal
16. Parking brake piston
17. Parking brake spring
18. Parking brake disc
19. Parking brake plate

Reduction ratio:

$$-\left(\frac{24+78}{24}\right) \times \left(\frac{28+68}{28}\right) \times \left(\frac{20+68}{20}\right) + 1 = 63.114$$



SWING CIRCLE



1. Swing circle inner race (No. of teeth: 94)
2. Ball
3. Swing circle outer race

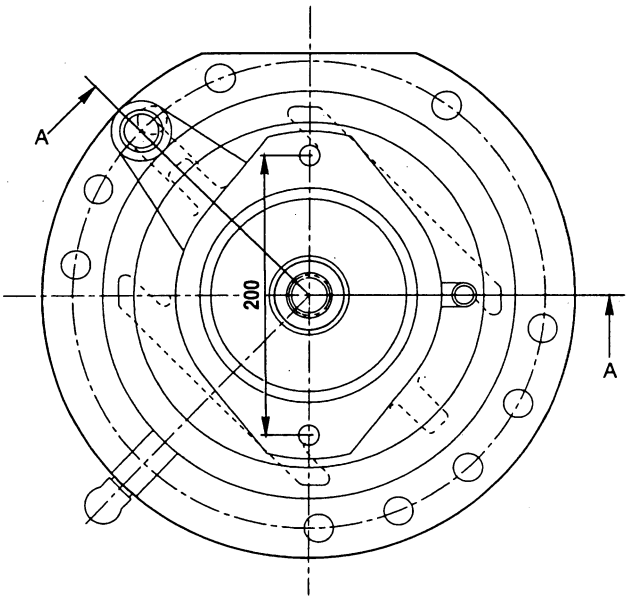
a. Innner race soft zone **S** position
b. Outer race soft zone **S** position

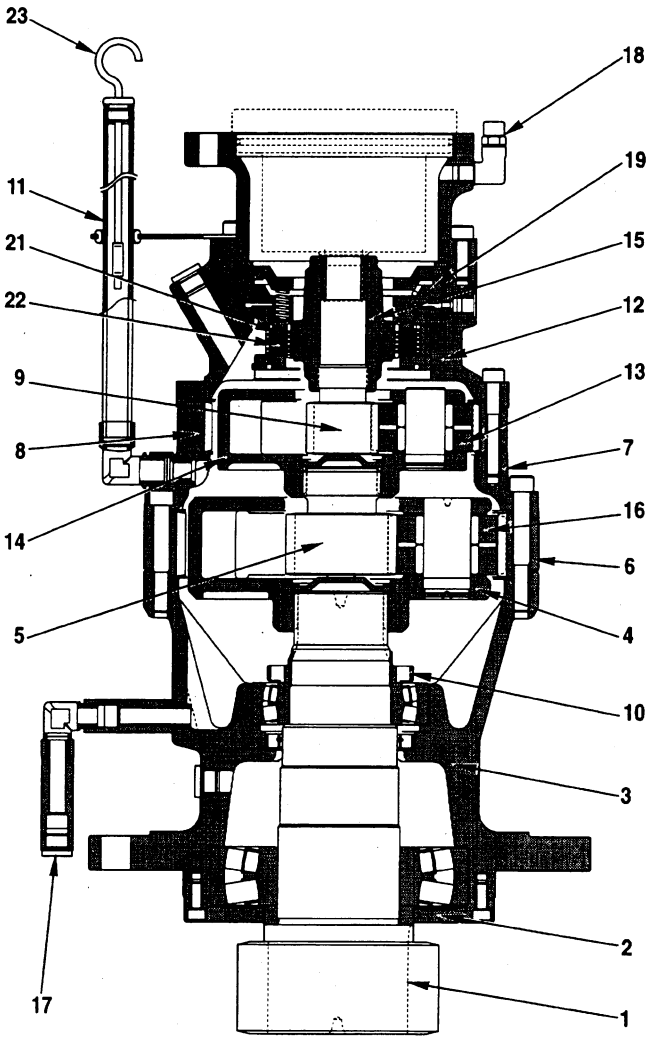
SPECIFICATIONS

Reduction ratio: $\frac{94}{12} = 7.833$

Amount of grease: 8ℓ (G2-LI)

SWING MACHINERY





1. Swing pinion (No. of teeth: 12)
2. Cover
3. Case
4. No. 2 of planetary carrier
5. No. 2 sun gear (No. of teeth: 24)
6. No. 2 ring gear (No. of teeth: 78)
7. Case
8. No. 1 ring gear (No. of teeth: 78)
9. No. 1 sun gear (No. of teeth: 18)
10. Retainer
11. Oil level gauge
12. Cover
13. No. 1 planetary gear (No. of teeth: 29)
14. No. 1 planetary carrier
15. Coupling
16. No. 2 planetary gear (No. of teeth: 26)
17. Drain plug
18. Breather
19. Parking brake piston
20. Parking brake spring
21. Parking brake disc
22. Parking brake plate.
23. Gauge rod.

SPECIFICATIONS

Reduction ratio: $\frac{24+78}{24} \times \frac{18+78}{18} = 22.667$

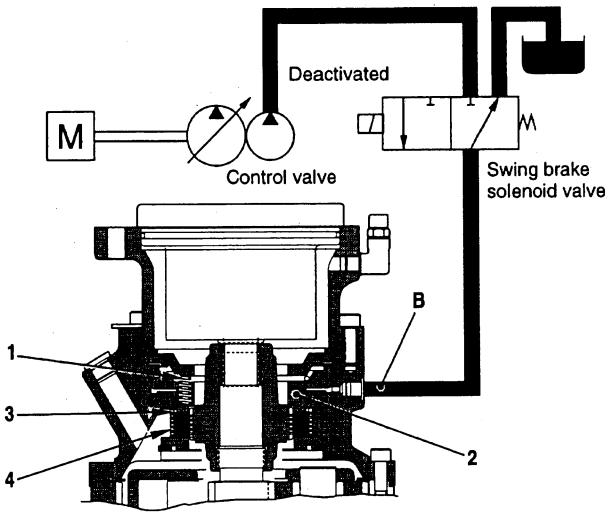
SWING HOLDING BRAKE

OPERATION

1) When swing brake solenoid valve is deactivated

When the swing brake solenoid valve is deactivated, the pressurized oil from the control pump is shut off and port **B** is connected to the tank circuit.

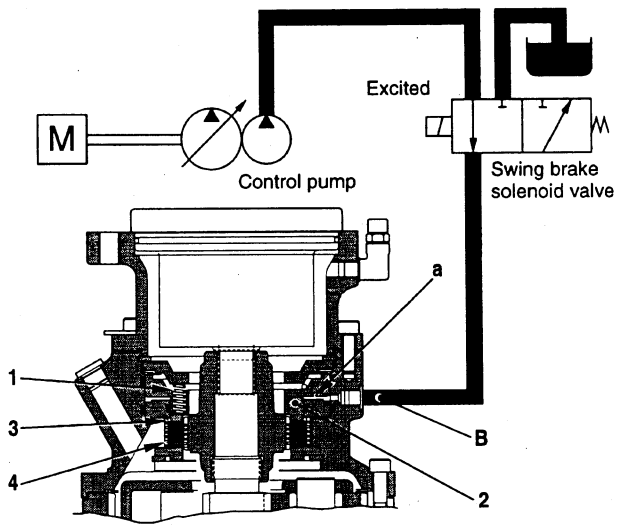
Because of this, brake piston (2) is pushed down in the direction of the arrow by brake spring (1), so disc (3) and plate (4) are pushed together and the brake is applied.



2) When swing brake solenoid valve is excited

When the swing solenoid valve is excited, the valve is switched, and the pressurized oil from the control pump enters port **B** and flows to brake chamber "**a**".

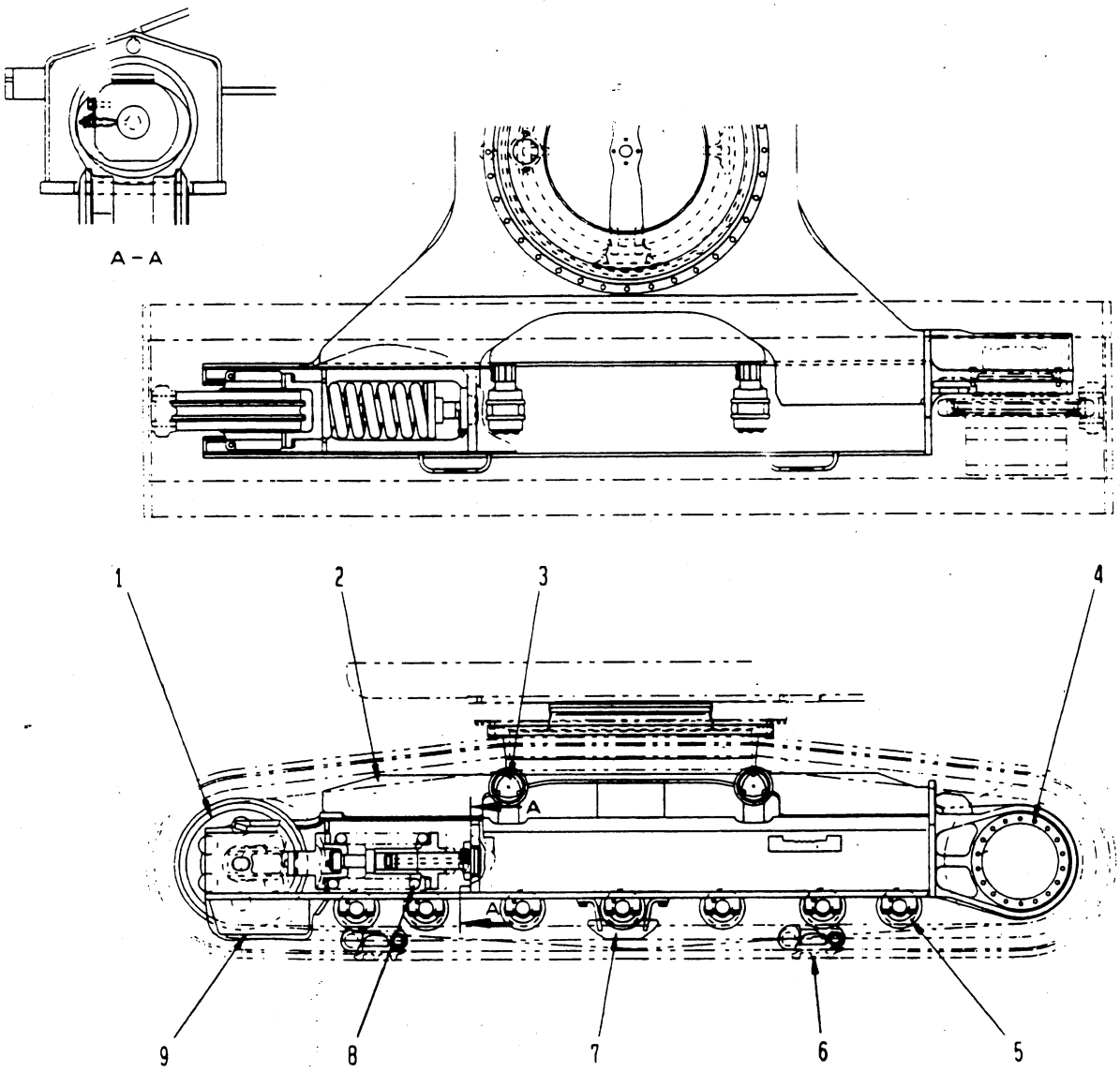
The pressurized oil entering chamber "**a**" overcomes the force of brake spring (1), and brake piston (2) is pushed up in the direction of the arrow. Because of this, disc (3) and plate (4) serparate, and the brake is released.



1. Brake spring
2. Brake piston
3. Disc
4. Plate

TRACK FRAME • RECOIL SPRING

★ The diagram shows the PC180LC-6K



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- The dimensions and number of track rollers may differ according to the model, but the basisc structure is the same.

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

• No. of rollers (each side)

Model	No. of track rollers	No. of carrier rollers
PC180LC-6K	7	2
PC160-6K	6	1

TRACK SHOE

STANDARD SHOE

Item \ Model	PC180LC-6K	PC160-6K
Shoe width (triple shoe)	600 mm	500 mm
Link pitch	190 mm	190 mm
No. of rollers (each side)	45	41

SELECTION OF TRACK SHOE

- Select the most suitable track shoe from the following table.

Model	PC180LC-6K		PC160-6K	
	Specification	Cate-gory	Specification	Cate-gory
Standard	600mm triple	A	500 mm triple	A
Option	700 mm triple	B	600 mm triple	B
Option	800 mm triple	C	700 mm triple	C
Option	-	-	-	-
Option	-	-	-	-
Option	-	-	-	-
Option	-	-	-	-

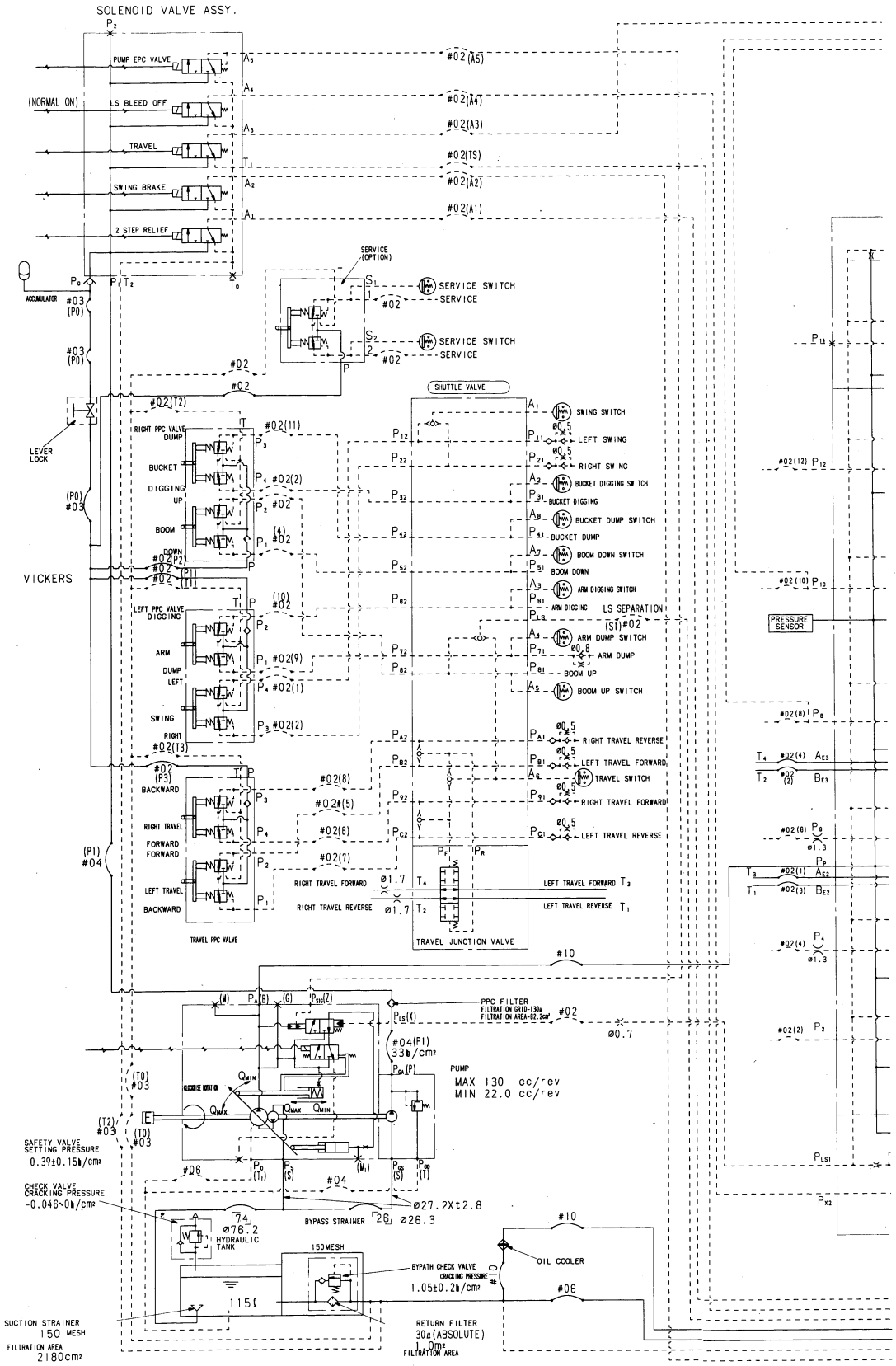
Category	Use	Precautions when using
A	Rocky ground, normal river soil	• Travel in Lo speed when traveling on rough ground with obstacles such as large boulders and fallen trees.
B	Normal soil, soft land	• Cannot be used on rough ground where there are large obstacles such as boulders and fallen trees.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

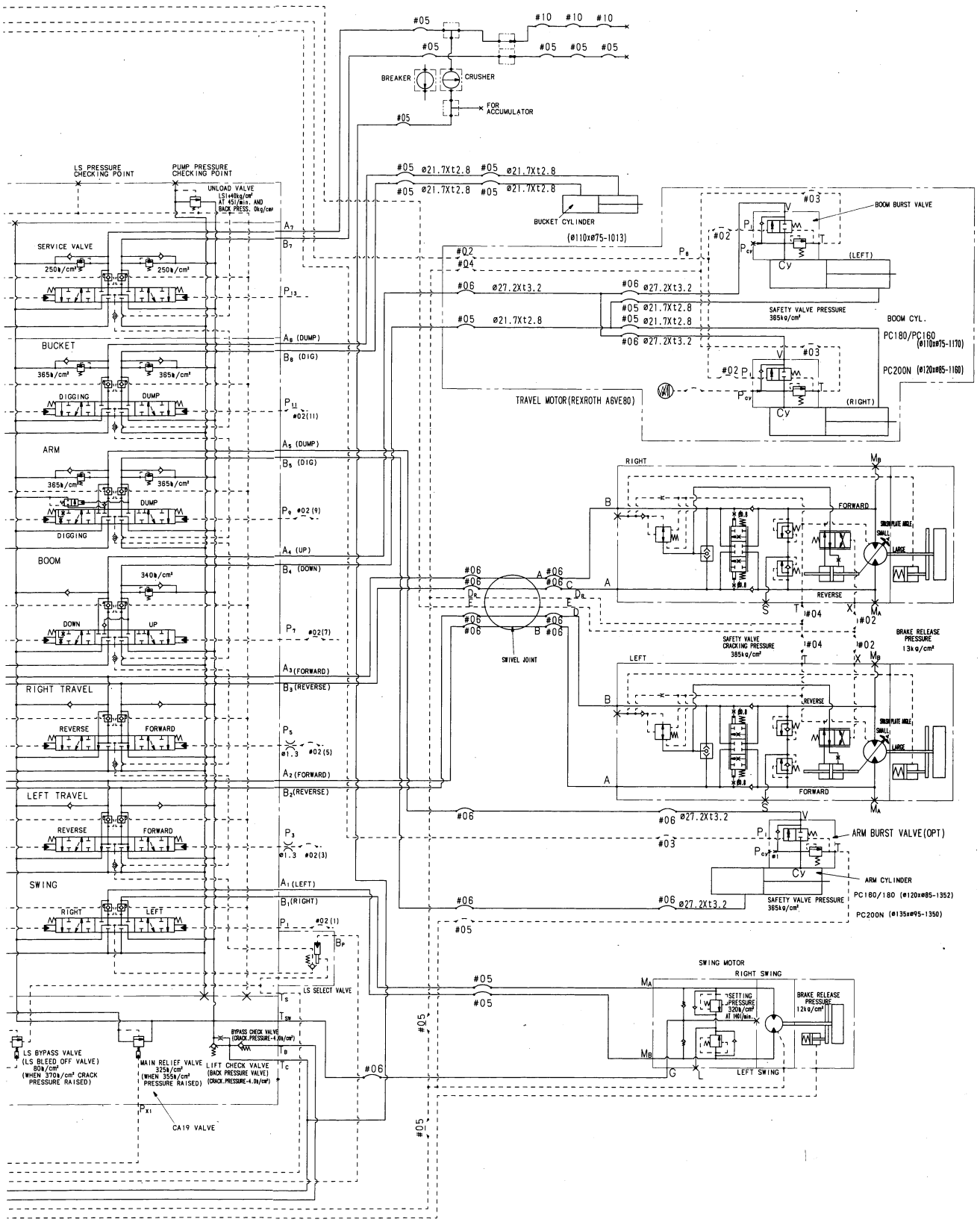
★ Categories "**B**" and "**C**" are wide shoes, so there are restrictions on their use. Therefore, before using, check the restrictions and consider carefully the conditions of use before recommending a suitable shoe width.
If necessary, given the customer guidance in their use.

★ When selecting the shoe width, select the narrowest shoe possible within the range that will give no problem with flotation and ground pressure.
If a wider shoe than necessary is used, there will be a large load on the shoe, and this may lead to bending of the shoe, cracking of the links, breakage of the pins, loosing of the shoe bolts, or other problems.

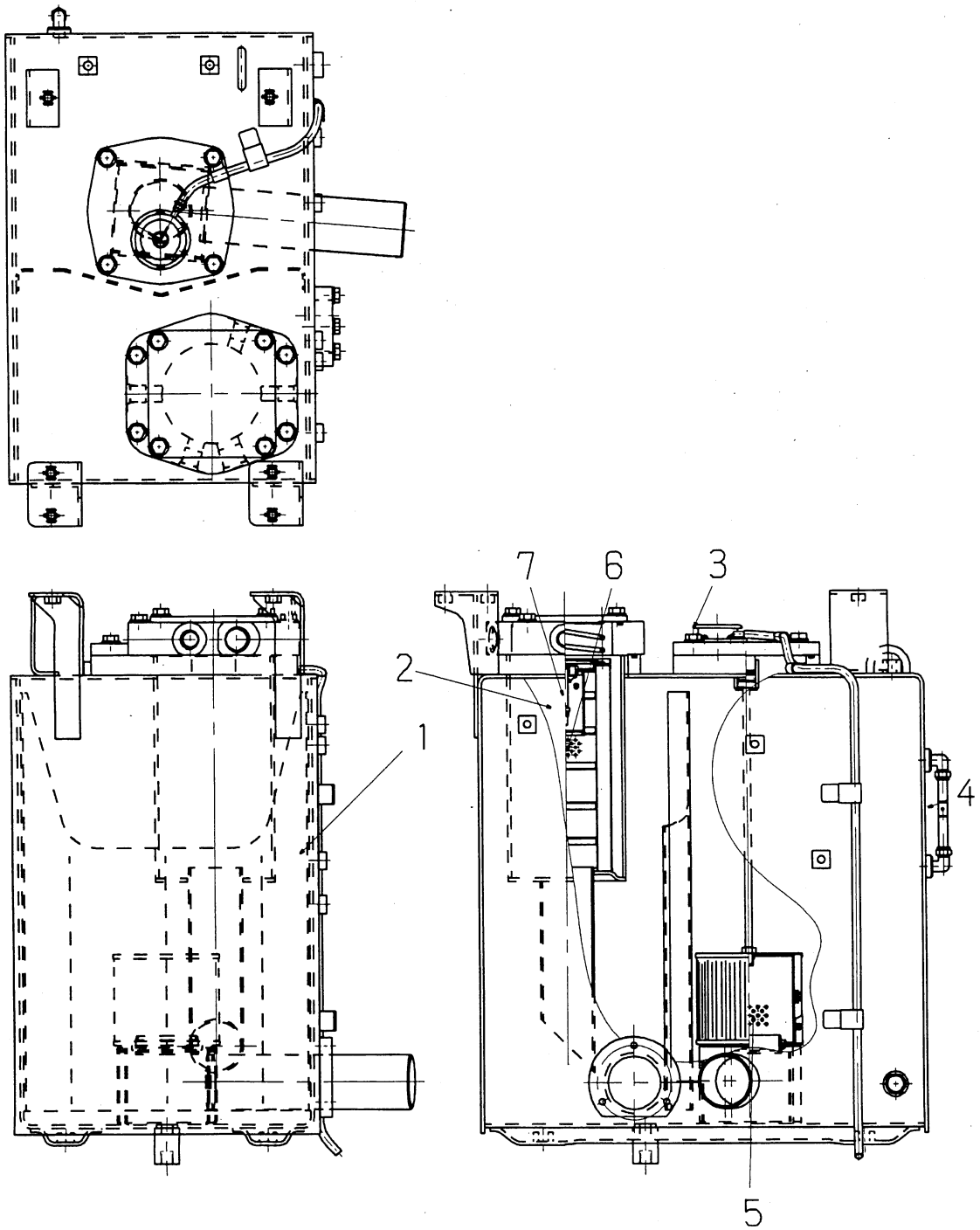
HYDRAULIC CIRCUIT DIAGRAM

PC180LC-6k
PC160-6k




#05
#10 #10 #10
#05 #05 #05
BREAKER
CRUSHER
FOR ACCUMULATOR
LS PRESSURE CHECKING POINT
PUMP PRESSURE CHECKING POINT
UNLOAD VALVE
LS(+40kg/cm² AT 45l/min. AND BACK PRESS. 0kg/cm²
SERVICE VALVE
250kg/cm²
BUCKET
365kg/cm²
DIGGING
DUMP
ARM
BOOM
340kg/cm²
DOWN
UP
RIGHT TRAVEL
REVERSE
FORWARD
LEFT TRAVEL
SWING
RIGHT
LEFT
LS SELECT VALVE
LS BYPASS VALVE (LS BLEED OFF VALVE) 80kg/cm² (WHEN 370kg/cm² CRACK PRESSURE RAISED)
MAIN RELIEF VALVE 325kg/cm² (WHEN 355kg/cm² PRESSURE RAISED)
BYPASS CHECK VALVE (CRACK.PRESSURE-4.0kg/cm²)
LIFT CHECK VALVE (BACK PRESSURE VALVE) (CRACK.PRESSURE-4.0kg/cm²)
CA19 VALVE
#05 ø21.7Xt2.8
BUCKET CYLINDER
(ø110xø75-1013)
#06 ø27.2Xt3.2
BOOM BURST VALVE
(LEFT)
(RIGHT)
SAFETY VALVE PRESSURE 385kg/cm²
BOOM CYL.
PC180/PC160 (ø110xø75-1170)
PC200N (ø120xø85-1160)
TRAVEL MOTOR(REXROTH AGVE80)
SWIVEL JOINT
SAFETY VALVE CRACKING PRESSURE 385kg/cm²
BRAKE RELEASE PRESSURE 13kg/cm²
ARM BURST VALVE(OPT)
ARM CYLINDER
PC180/180 (ø120xø85-1352)
PC200N (ø135xø95-1350)
SWING MOTOR
RIGHT SWING
LEFT SWING
SETTING PRESSURE 320kg/cm² AT 140l/min
BRAKE RELEASE PRESSURE 12kg/cm²

HYDRAULIC TANK



1. Hydraulic tank
2. Bypass valve
3. Oil filter cap
4. Sight gauge
5. Suction strainer
6. Filter element
7. Bypass strainer

SPECIFICATIONS

Tank capacity:	
Amount of oil inside tank:	
Pressure valve	
Relief cracking pressure:	0.038 ± 0.015 MPa (0.39 ± 0.15 kg/cm²)
Suction cracking pressure:	0 — 0.0045 MPa (0 — 0.046 kg/cm²)
Bypass valve set pressure:	0.103 ± 0.02 MPa (1.05 ± 0.2 kg/cm²)