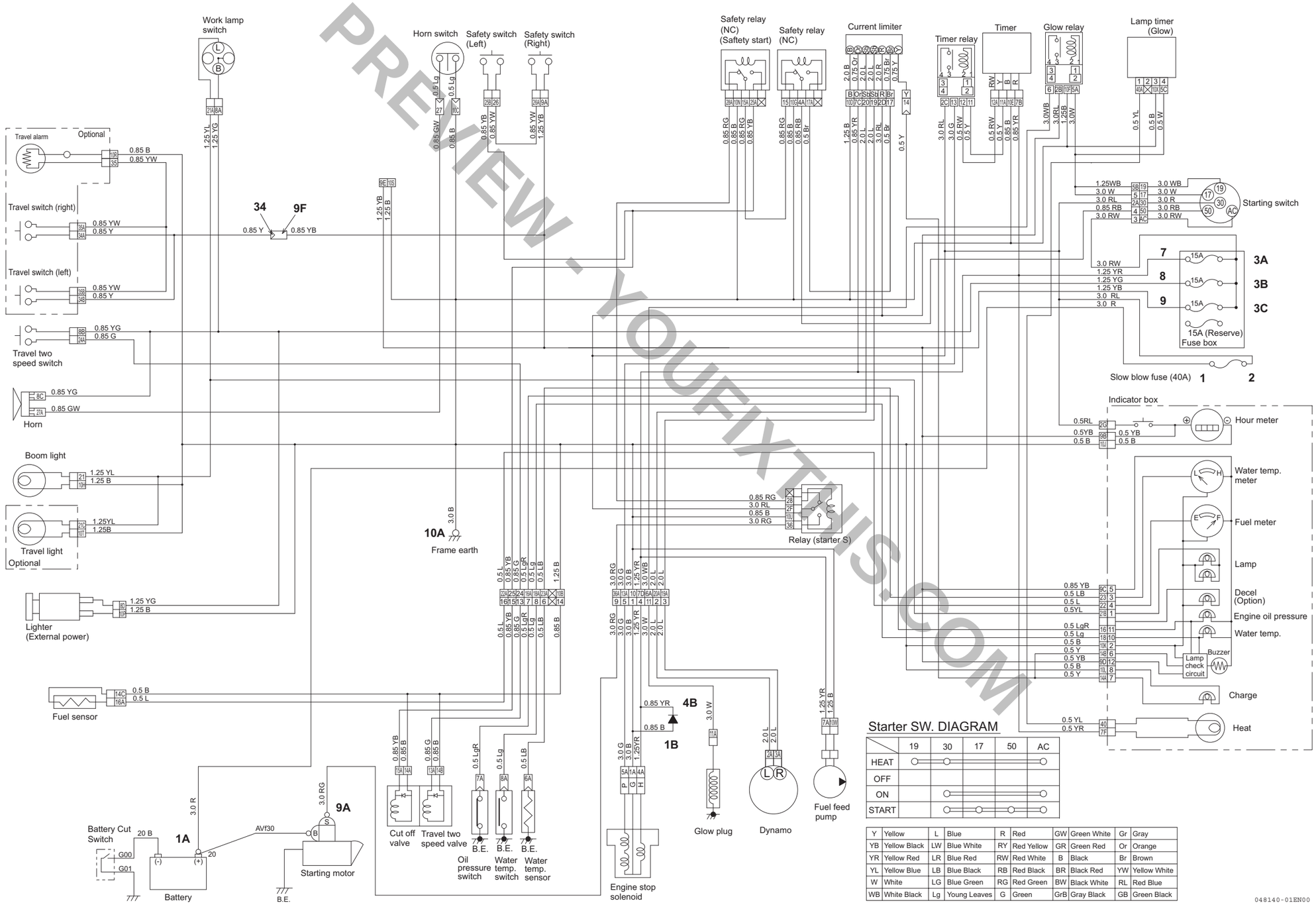
7-1-3 Wiring Diagram

1) Standard Specifications

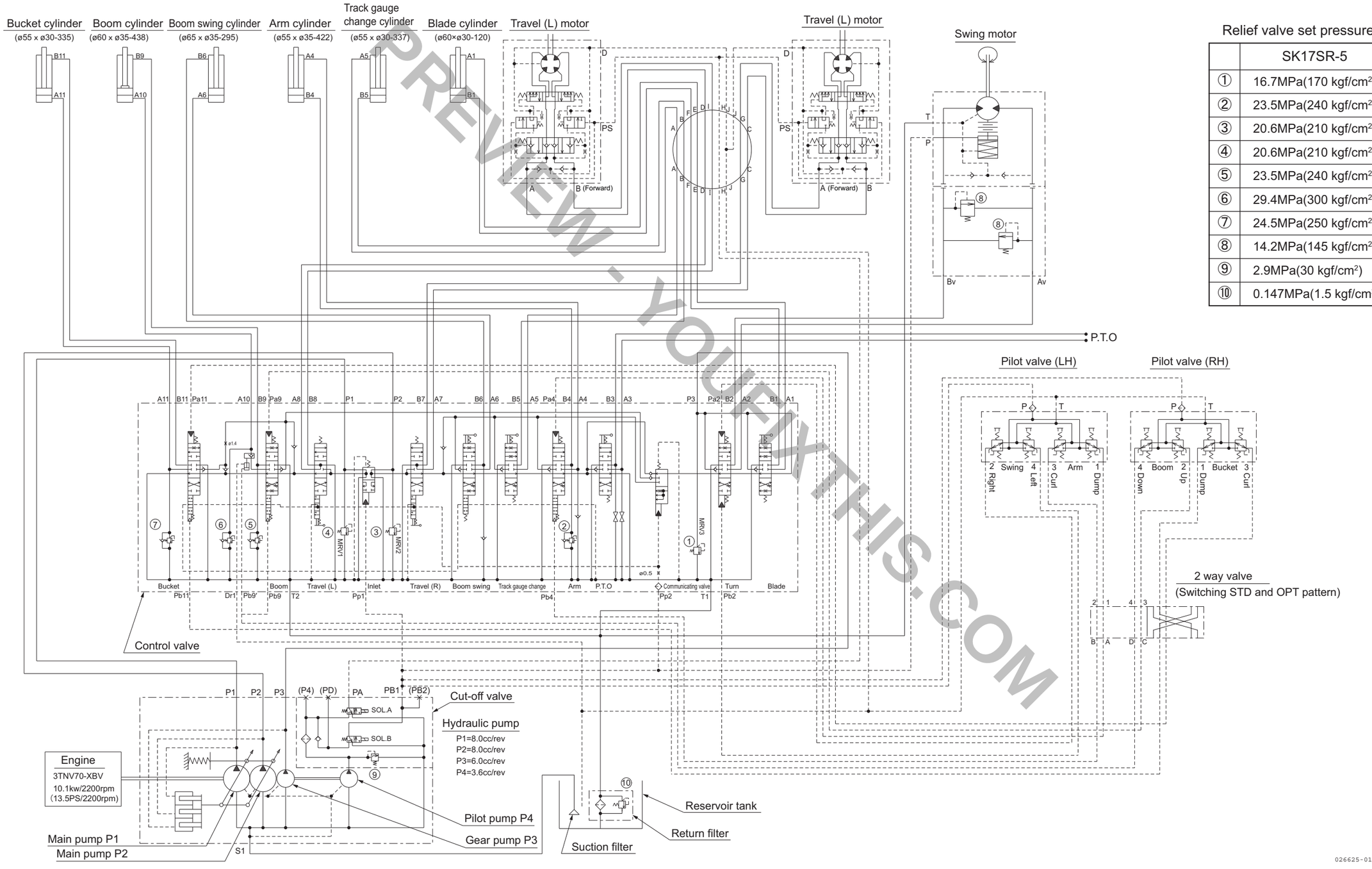


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5-2 Hydraulic Circuit Schematic

5-2-1 For Standard Type Machines

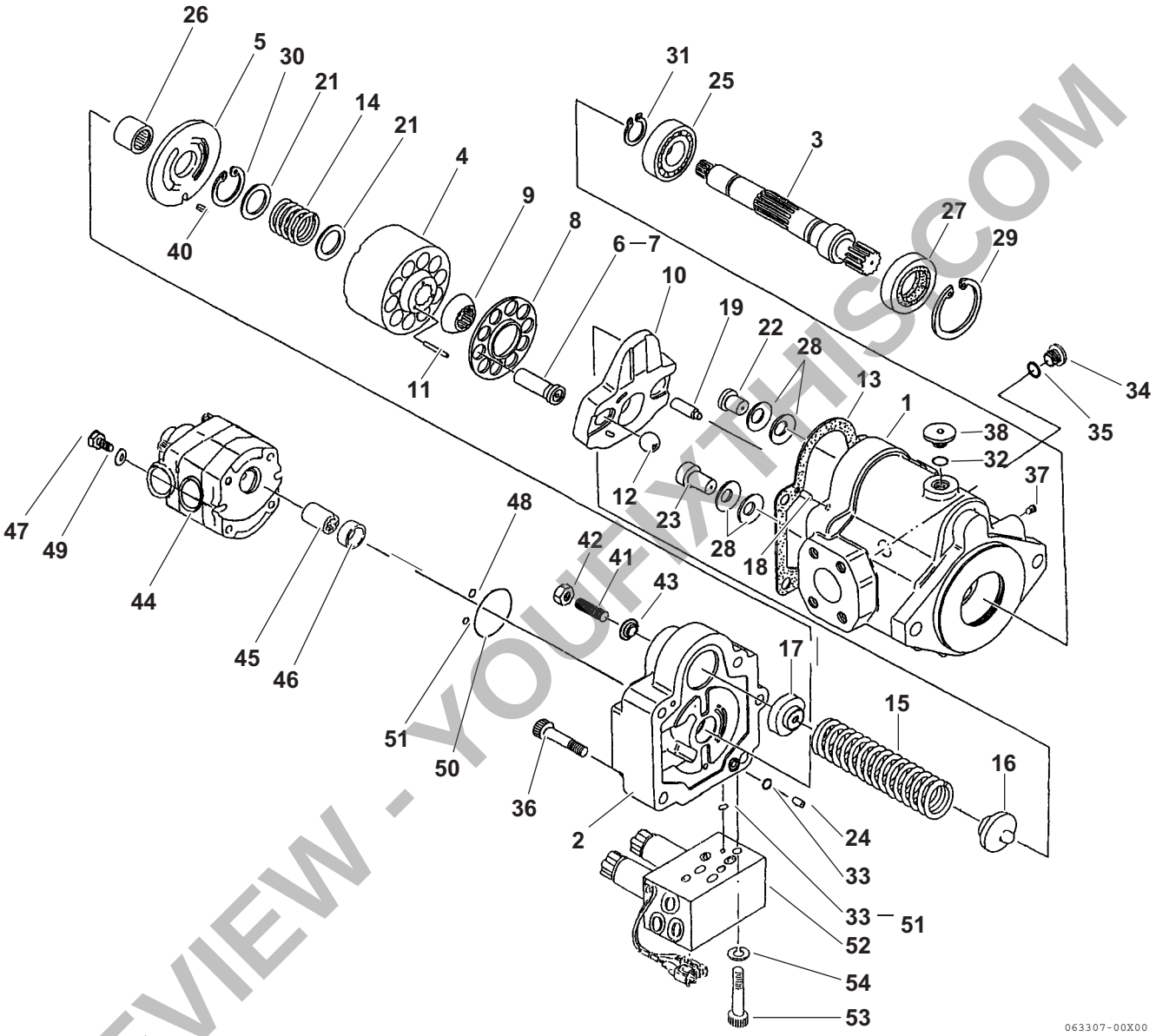


Relief valve set pressure

	SK17SR-5
①	16.7MPa(170 kgf/cm²)
②	23.5MPa(240 kgf/cm²)
③	20.6MPa(210 kgf/cm²)
④	20.6MPa(210 kgf/cm²)
⑤	23.5MPa(240 kgf/cm²)
⑥	29.4MPa(300 kgf/cm²)
⑦	24.5MPa(250 kgf/cm²)
⑧	14.2MPa(145 kgf/cm²)
⑨	2.9MPa(30 kgf/cm²)
⑩	0.147MPa(1.5 kgf/cm²)

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3. Exploded View and Component Parts



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3-7-2 Engine

Tightening torque for major bolts and nuts

No.	Item	Thread size × Pitch	Tightening torque Unit : ft•lbf (N•m)	Lubricating oil
1	Cylinder head bolt (class 1)	M9 × 1.25	39.8 to 42.7 (53.9 to 57.9)	Yes
2	Connecting rod bolt (class 1)	M7 × 1.0	16.6 to 20.3 (22.6 to 27.5)	Yes
3	Flywheel mounting bolt	M10 × 1.25	59.3 to 63.7 (80.4 to 86.4)	Yes
4	Metal cap bolt	M12 × 1.5	55.7 to 60.1 (75.5 to 81.5)	Yes
5	Crankshaft pulley fastening bolt	M12 × 1.25	61.5 to 68.7 (83.3 to 93.3)	Yes
6	Fuel injection nozzle retainer clamp nut	M20 × 1.5	36.2 to 39.1 (49.0 to 53.0)	No
7	Glow plug	M10 × 1.25	10.9 to 14.5 (14.7 to 19.6)	No
8	Governor weight support nut	M12 × 1.25	50.6 to 54.3 (68.7 to 73.7)	Yes
9	High pressure pipe nut	M12 × 1.25	21.7 to 25.3 (29.4 to 34.3)	No
10	Cam end nut (Fuel pump)	M12 × 1.75	43.4 to 50.7 (58.8 to 68.8)	Yes
11	Fop gear bolt	M8 × 1.0	2.43 to 2.73 (3.3 to 3.7)	No

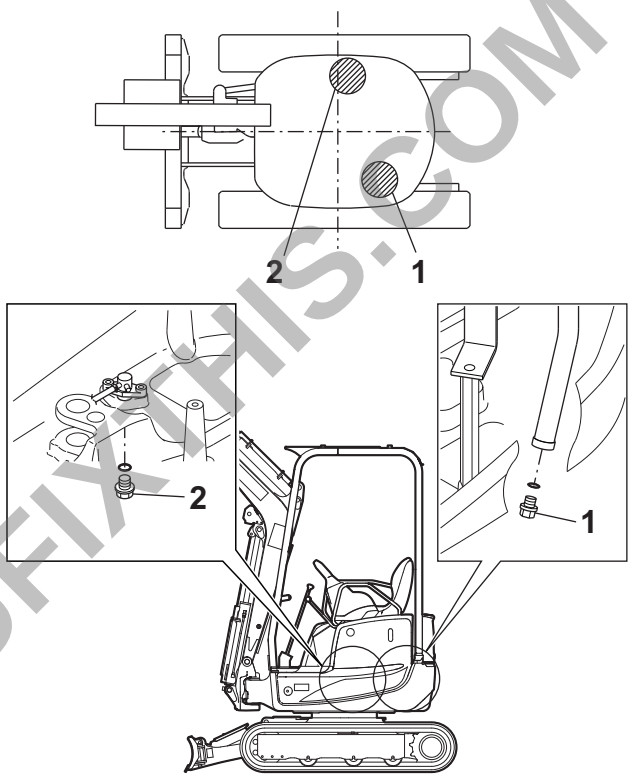
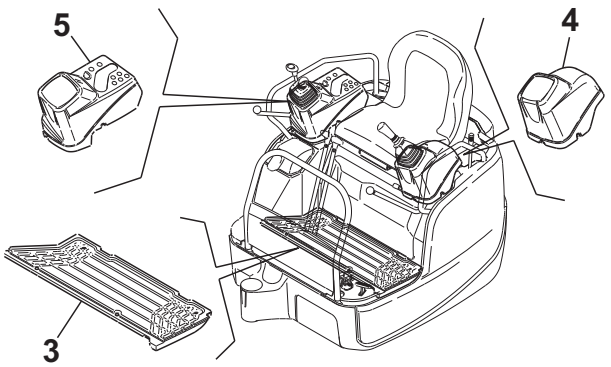
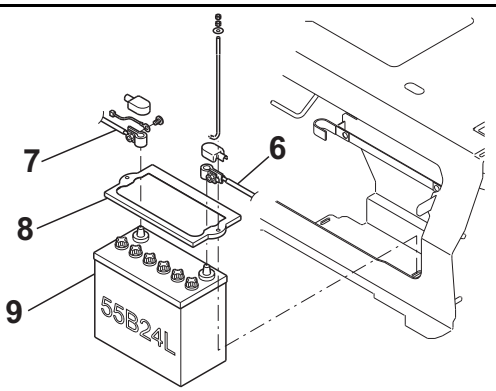
3-7-3 Tightening Torque for General Bolts and Nuts

Item		Thread size × Pitch	Tightening torque [Unit : ft•lbf (N•m)]	Remarks
Hexagon head bolt (7T) Nut	Coarse thread	M6 × 1	7.23 to 8.68 (9.8 to 11.8)	1) Apply 80% of tightening torque when tightened to aluminum. 2) Apply 60% of tightening torque for 4T bolts and lock nuts. 3) Use fine screw threads for engine only.
		M8 × 1.25	16.6 to 21.0 (22.6 to 28.4)	
		M10 × 1.5	32.6 to 43.4 (44.1 to 58.8)	
		M12 × 1.75	57.9 to 72.3 (78.5 to 98.1)	
		M14 × 2	86.8 to 108.5 (117.7 to 147.1)	
		M16 × 2	123.0 to 151.9 (166.7 to 205.9)	
		M18 × 2.5	173.6 to 209.8 (235.4 to 284.4)	
		M20 × 2.5	238.7 to 296.6 (323.6 to 402.1)	
	Fine thread	M14 × 1.5	94.0 to 108.5 (127.5 to 147.1)	
		M16 × 1.5	155.5 to 177.2 (210.9 to 240.3)	
PT plug		1/8	7.23 (9.8)	
		1/4	14.5 (19.6)	
		3/8	21.7 (29.4)	
		1/2	43.4 (58.8)	
Pipe joint bolt		M8	9.4 to 12.3 (12.7 to 16.7)	
		M12	18.1 to 25.3 (24.5 to 34.3)	
		M14	28.9 to 36.2 (39.2 to 49.0)	
		M16	36.2 to 43.4 (49.0 to 58.8)	

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7-1-5 Removal and Reinstallation of Engine

1) Removal

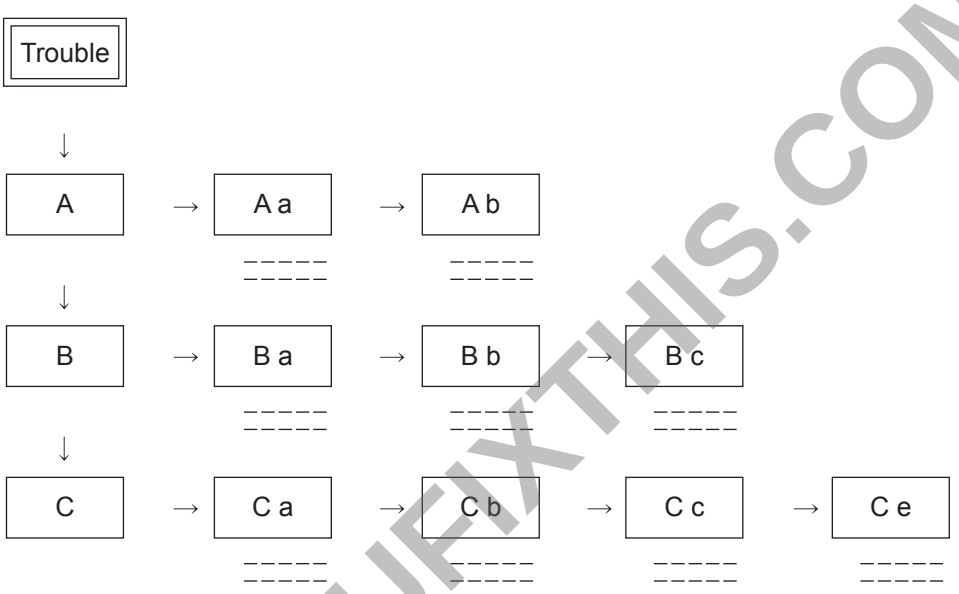
Procedure	
(1) Lower the bucket to the ground and stop the engine, and remove the drain plug **1** from the hydraulic oil tank and drain the hydraulic oil. Type: KOBELCO GENUINE HYDRO OIL (VG 46 class or its equivalent) Quantity: 4.4 Gals. (16.5 L) (2) Remove the drain plug **2** from the two-way cock for cooling water and drain the cooling water. Cooling water quantity: 2.9 Qts. (2.7 L)	
(3) Remove the step **3**, the panel L **4**, and the panel R **5**. (4) Remove the panel R **5**, and then disconnect the harness connectors.	
(5) Disconnect the battery cable (negative) **6** and the battery cable (positive) **7** and remove the battery clamp **8**, and then remove the battery **9**.	

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10-2 Troubleshooting

10-2-1 Machine and Engine

(How to use the charts)



Factors related to the trouble are enumerated in the columns and instructions for corrective procedures are given below. It is recommended that the troubles be inspected and corrected one by one according to the chart.

← Inspection item

– – – – – – – – – – ← Remedy for failure

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2. TECHNICAL DATA

2. Technical Data

2-1 Specifications

Item				Unit	SK17SR-5
Main specifications of machine					
Dimensions					
Overall length (Transportation position)				in. (mm)	135.8 (3450)
Cabin	Overall height	Transportation position		in. (mm)	-
		Traveling position		in. (mm)	-
	Overall width	Full machine width		in. (mm)	-
Canopy	Overall height	Transportation position		in. (mm)	90.6 (2300)
		Traveling position		in. (mm)	90.6 (2300)
	Overall width	Full machine width (Maximum/Minimum)		in. (mm)	50.4 (1280)/37.4 (950)
Tumbler center distance				in. (mm)	46.3 (1176)
Track gauge (Maximum/Minimum)				in. (mm)	41.3 (1050)/28.3 (720)
Minimum ground clearance				in. (mm)	6.9 (175)
Traveling performance					
Travel speed	Steel crawler	Low speed (Forward/Reverse)		MPH (km/hr)	-
		High speed (Forward/Reverse)		MPH (km/hr)	-
	Rubber crawler	Low speed (Forward/Reverse)		MPH (km/hr)	1.30 (2.1)/1.30 (2.1)
		High speed (Forward/Reverse)		MPH (km/hr)	2.61(4.2)/2.61 (4.2)
Permissible water depth limit				in. (mm)	10.4 (265)
Work performance					
Bucket	Width (Standard)			in. (mm)	17.7 (450)
	(Standard. JIS heaped capacity)			cu.ft. (cu.m)	1.77 (0.05)
	Number of teeth / Installation method			pcs.	3 / rubber pin lock type
Maximum digging depth	With blade raised			in. (mm)	86.6 (2200)
	With blade on the ground			in. (mm)	90.9 (2310)
Maximum depth of vertically digging				in. (mm)	72.8 (1850)
Maximum dumping height				in. (mm)	103.5 (2630)
Minimum front swing radius (with boom in front)				in. (mm)	60.4 (1535)
Minimum front swing radius (at 75 degrees right boom swing)			Cabin	in. (mm)	-
			Canopy	in. (mm)	54.3 (1380)
Rear end swing radius				in. (mm)	25.2 (640)
Boom swing angle		Cabin	Left	degrees	-
			Right	degrees	-
		Canopy	Left	degrees	42
			Right	degrees	75
Maximum digging force		Bucket		lbs. (kN)	3418 (15.2)
		Arm		lbs. (kN)	1911 (8.5)
Maximum tractive force (Oil pressure force) (rubber)				lbs. (kN)	4183 (18.6)
Maximum swing inclination angle (with standard bucket)				degrees	23 (at loading)

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8. PERIODIC INSPECTION AND SERVICING

8. Periodic Inspection and Servicing

8-1 List of Periodic Inspection and Servicing

◇ : Check ○ : Supply ● : Replace □ : Adjust (clean) ■ : Oil & grease

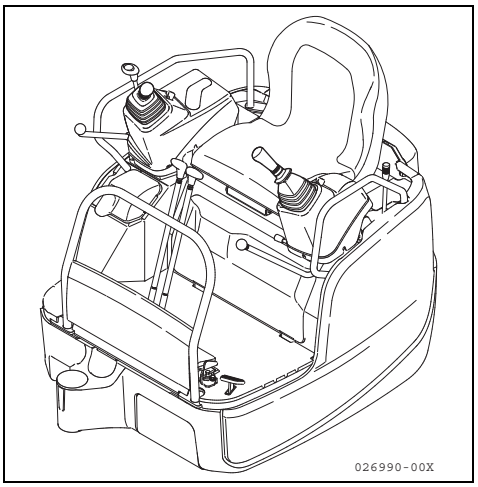
Check & service items			Daily	Every 50	Every 100	Every 250	Every 500	Every 1000 hrs
General	Check falling off, breakage of parts		◇					
	Check loosened bolts & nuts, retighten		◇					
	Check engine condition		◇					
	Clean		□					
Lube oil	*Swing gear case oil	Check, resupply				◇/○		
		Replace			●1st time			●
	*Travel reduction gear oil	Check, resupply				◇/○		
		Replace			●1st time			●
	*Transmission oil	Check, resupply	◇/○					
		Replace			●1st time			●
	*Differential gear oil	Check, resupply			◇/□			
		Replace			●1st time			●
Hydraulic system	Hydraulic oil	Check, resupply	◇/○					
		Replace						●
	Clean suction filter					□1st time		□
	Replace return filter					● 1st time	●	
	Check for abnormality of hydraulic pump		◇					
Grease	Check grease-up positions, grease		■					
	Greasing the swing gears and the swing bearings			■				
	Greasing the track gauge change cylinder and the link fulcrum			■				
Undercarriage	Check, adjust track tension		◇/□					
	*Check air pressure, wear, flaw in tyres		◇					
Steering equipment	*Check performance, play of steering lever		◇					
	Check performance, play of travel lever		◇					
	*Check performance of speed change lever		◇					
	*Check performance of forward/reverse pedal		◇					
	*Check performance, play of steering wheel		◇					
	*Brake pedal	Stroke	◇					
		Performance	◇					
	*Parking brake	Stroke	◇					
		Performance	◇					
	Check performance of accel. lever		◇					
Electric equipment	Check front & work lights, horn		◇					
	Check hourmeter function		◇					
	Check function of change, oil and pilot lamps		◇					
	Check wire breakage, short-circuits, loosened terminals retighten		◇					
	Check, resupply battery fluid		◇/○					
	Check specific gravity of electrolyte						□As required	
	Check function of OK monitor		◇					

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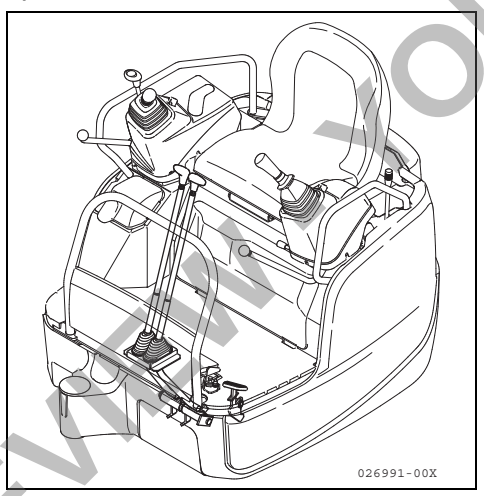
7-3 Controls

7-3-1 Control Train

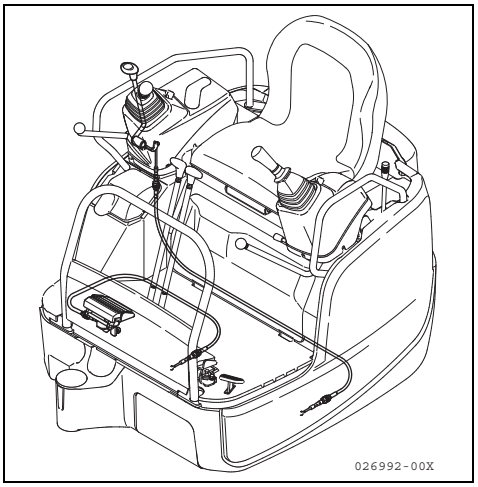
1) Control lever (R): Boom & bucket
Control lever (L): Arm & turn



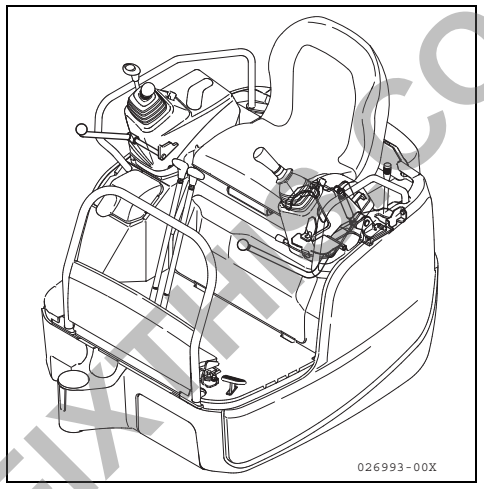
2) Travel levers



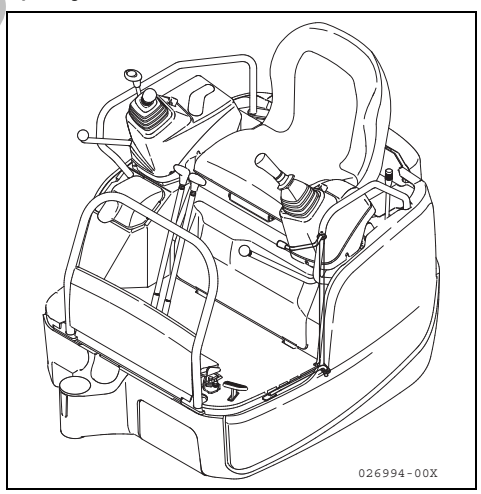
3)Boom swing pedal
4)Blade lever



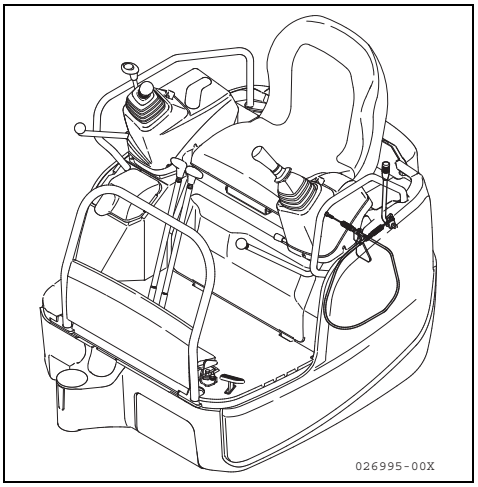
5) Lock leber



6) Adjustment of scale leber



7) Accelerator lever



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4-2-5 Checking and adjusting the Fuel Injection Timing 4-2-5
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CHAPTER 5
HYDRAULIC SYSTEM

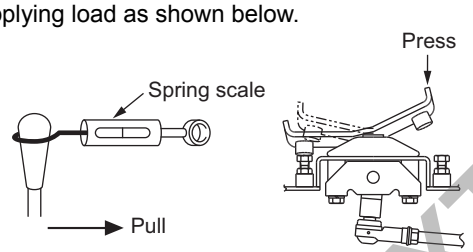
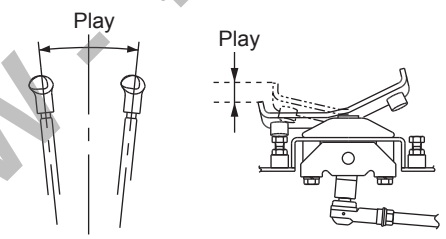
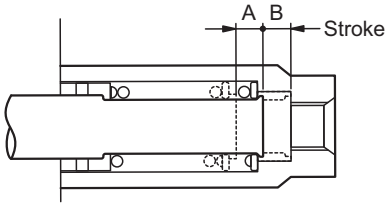
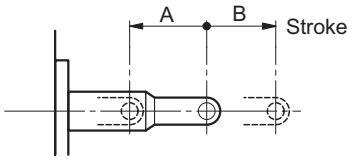
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CHAPTER 6
HYDRAULIC EQUIPMENT

6-1 Hydraulic Pump 6-1-1
6-2 Control Valve 6-2-1

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3-4 Controls

Applicable model			SK17SR-5		
Item		Measuring conditions	Unit	Standard	Allowable limit
Controls					
Operating force					
	Right control lever (Boom & Bucket)	• Engine : stopped • Hydraulic oil temp. : 122 to 140 °F (50 to 60 °C) • Lever operating force : Measure the force by hanging the spring scale on the lever grip. • Pedal operating force : Measure the force by applying load as shown below. 	lbs. (kg)	3.75 (1.7)	3.75 (1.7)
	Left control lever (Arm & Swing)			2.65 (1.2)	3.75 (1.7)
	Blade lever			4.85 (2.2)	7.06 (3.2)
	Travel levers			Forward 3.75 (1.7)	Forward 4.85 (2.2)
				Reverse 2.87 (1.3)	Reverse 3.97 (1.8)
	Boom swing lever			–	–
	Boom swing pedal			17.64 (8.0)	22.05 (10.0)
	P.T.O. pedal			–	–
Play of control lever & pedal					
	Right control lever (Front & rear / left & right)	• Engine : stopped • Hydraulic oil temp. : 122 to 140 °F (50 to 60 °C) • Play of each control lever and pedal : Measure the total play (front & rear and left & right) at the lever grip end or the pedal end. 	in. (mm)	0.79 (20) or less	–
	Left control lever (Front & rear / left & right)			0.79 (20) or less	–
	Blade lever			0.59 (15) or less	–
	Travel levers			0.79 (20) or less	–
	Boom swing pedal			0.20 (5) or less	–
	P.T.O. pedal			–	–
Control valve					
Spool stroke					
	Boom		in. (mm)	0.28 (7)	–
	Bucket				
	Arm				
	Swing				
	Parallel-flow divider				
	Right travel		in. (mm)	0.28 (7)	–
	Left travel				
	Blade				
	Boom swing				
	Offset				

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5) Where to Use Liquid Packing

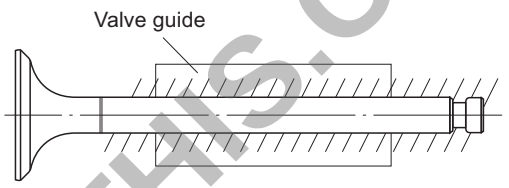
(1) Between the cylinder block and the gear case flange
(2) Between the gear case flange and the gear case cover
(3) Oil pan mounting surface

Notes :

1. *Use Three Bond No. 1212 (Part number: 97777-01212) as the liquid packing.*
2. *Apply the liquid packing so that there should no break halfway. Otherwise, oil leakage or other trouble may be caused.*

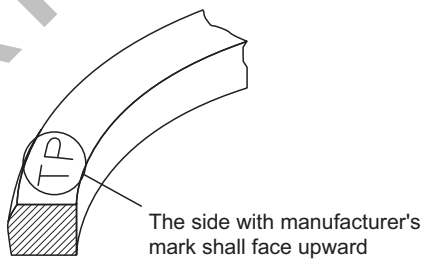
6) Applying Lubricating Oil to the Intake / Exhaust Valve Stem

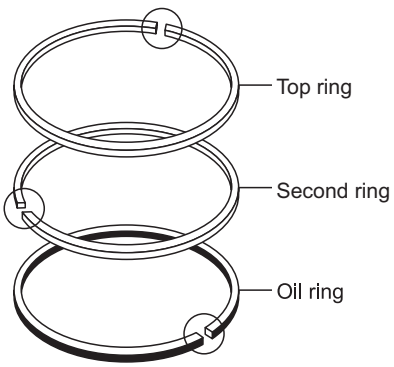
Apply lubricating oil to the valve stem so that the oil spreads over the lower surface (hatched portion in the figure) of the valve guide, before reinstalling the valve stem.

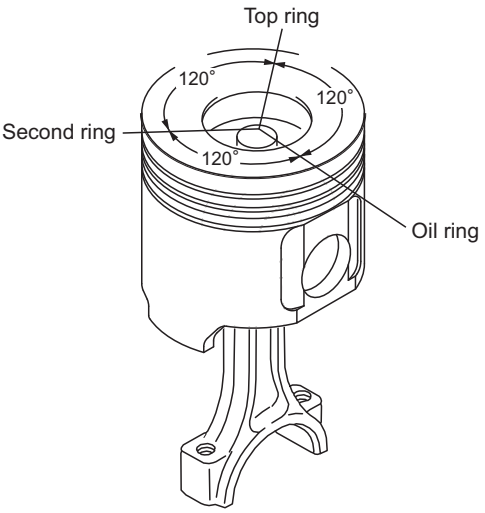


7) Reinstalling the Piston Rings

(1) Fit the piston ring into the ring groove, with the manufacturer's mark near the end of the piston ring facing upward (to the combustion chamber side), using a piston ring replacer. After fitting the piston ring, check that it moves smoothly.
(2) Install the piston their end gaps rings into their respective ring grooves so that their end gaps are shifted at 120 degrees intervals, making sure that they are not aligned along the piston. Be sure to place the end gaps of the top rings in the position not at right angle to the piston pin. Apply lubricating oil to the outside surface of the piston.







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CHAPTER 6

HYDRAULIC EQUIPMENT

6-1 Hydraulic Pump 6-1-1
6-2 Control Valve 6-2-1
6-3 Pilot Valve 6-3-1
6-4 Swing Motor 6-4-1
6-5 Travel Motor 6-5-1

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12)Swing Operation

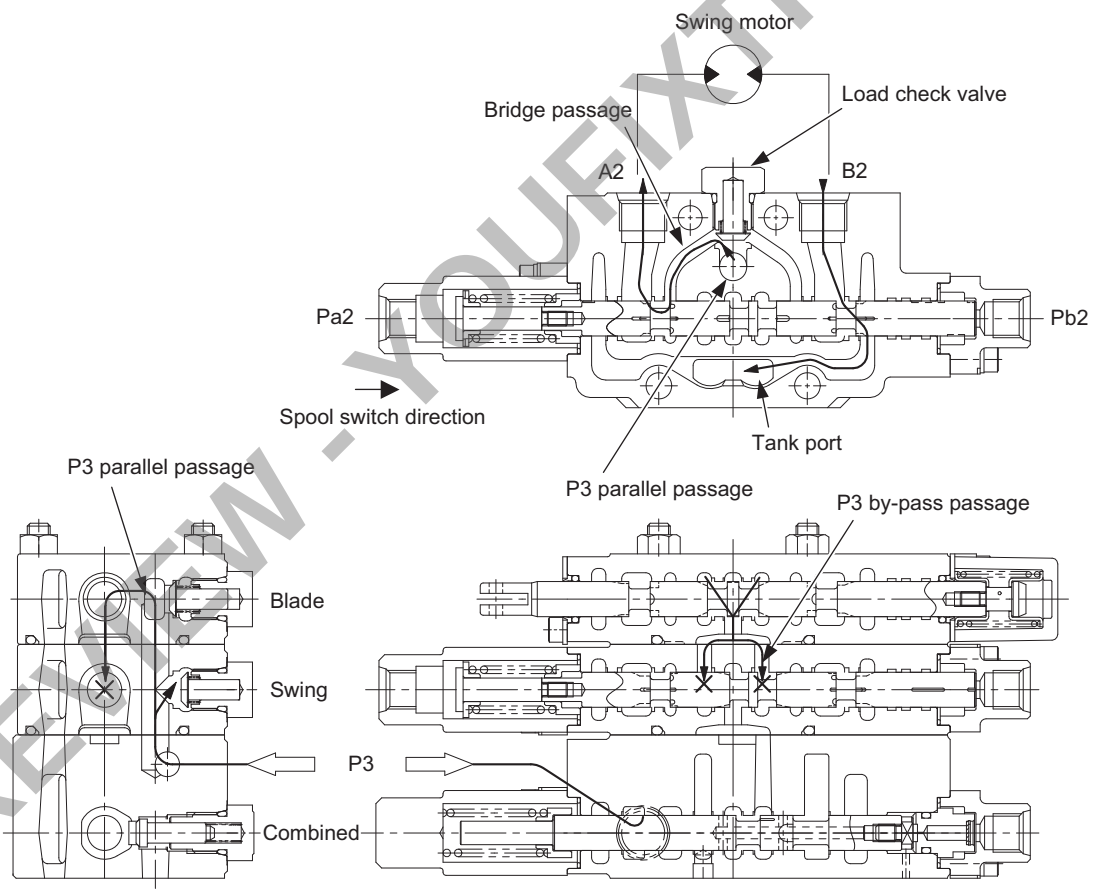
When the swing control lever is moved to the left, the oil from the pilot valve flows to the port Pa2 to move the spool of the swing section.

The P3 by-pass passage is blocked by the spool of the swing section as the spool has been moved.

The passage between the port A2 and the bridge passage is opened as the swing spool has been moved, the oil from the P3 parallel passage flows through the load check valve in the swing section and the bridge passage to the port A2 and is fed to the swing motor.

Meanwhile, the return oil from the swing motor flows to the return oil passage through the port B2 and the notches in the swing spool, which is opened to the return oil passage as the swing spool has been moved. Consequently, the upperstructure swings counter clockwise.

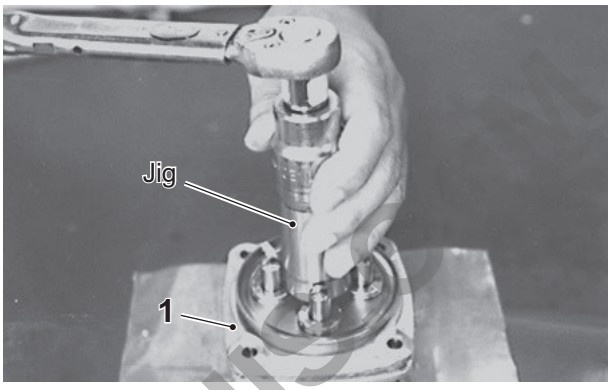
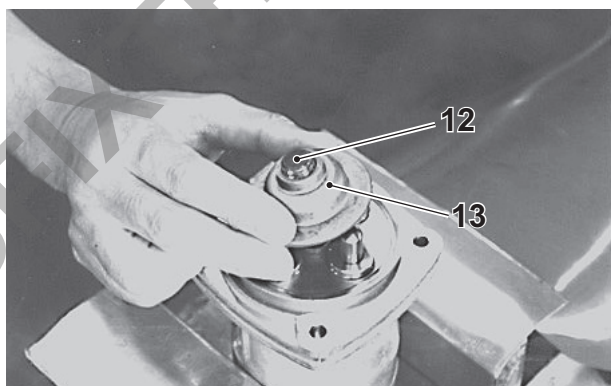
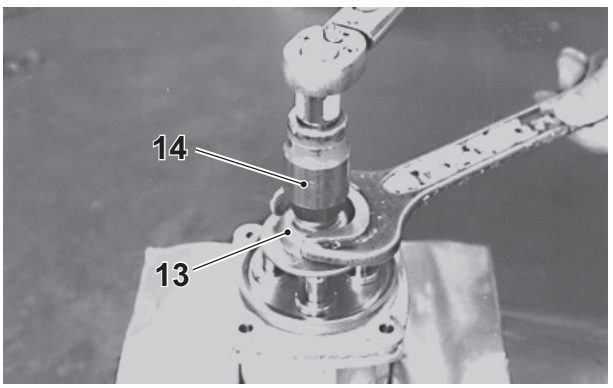
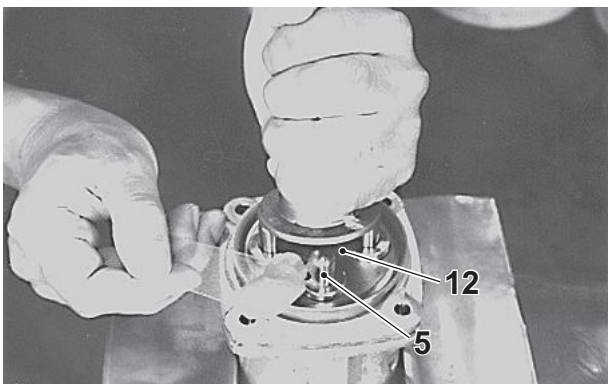
When the swing control lever is moved to the right, oil flows to the other way but the valve actuation theory is the same.



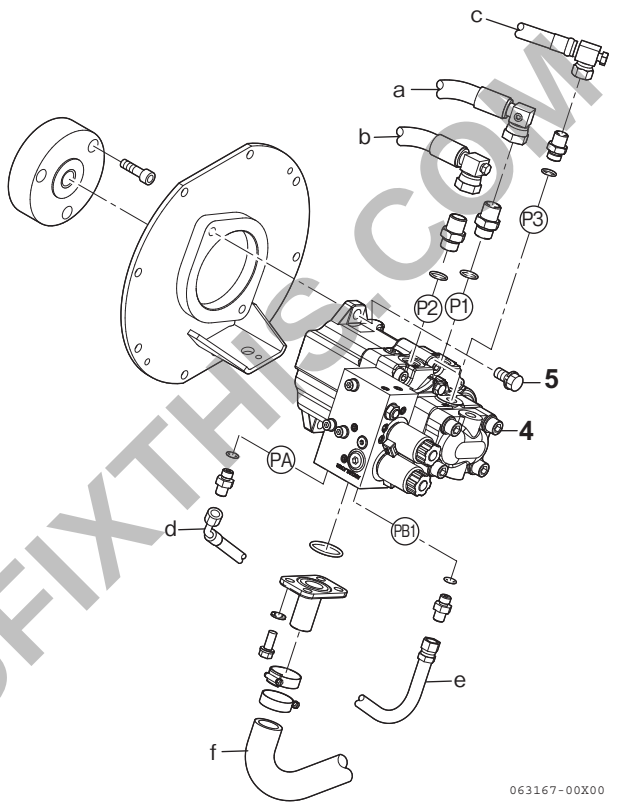
Swing control (adding pressure Pa2) operation

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Procedure	
(10) With a jig, fasten the joint **12** to the casing **1** at the specified torque. Tightening torque : 32.6 to 36.9 ft·lbf (44.2 to 50.0 N·m) Adhesive : Apply Loctite #262 or its equivalent.	
(11) Install the disc **13** onto the joint **12**. ***Notes :*** • *Screw in the disc **13** until it comes into contact with the four push rods **5** evenly.* • Screwing it too much can cause the secondary pressure when the control lever is in neutral and the malfunction of the implement. Take care of the adjustment of the disc **13** position.	
(12) Install the adjusting nut **14** and hold the disc **13** by the width across flats with a wrench. Tighten the adjusting nut at the specified torque. Tightening torque : 47.0 to 54.2 ft·lbf (63.7 to 73.5 N·m) Adhesive : Apply Loctite #262 or its equivalent. ***Note :*** *Do not move the disc **13** when tightening the adjusting nut.*	
(13) Apply grease to the moving part of the joint **12** and the top of the push rod **5.**	

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Procedure	
(4) Remove the hydraulic hoses from the hydraulic pump **4**. **a**. Hose P1 **b**. Hose P2 **c**. Hose P3 **d**. Hose PA **e**. Hose PB1 **f**. Hose (Suction) (5) Disconnect the harness connector of the cut-off valve. (6) Loosen the mounting bolts **5** to remove the hydraulic pump **4**.	

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