2. HYDRAULIC CIRCUIT DIAGRAM

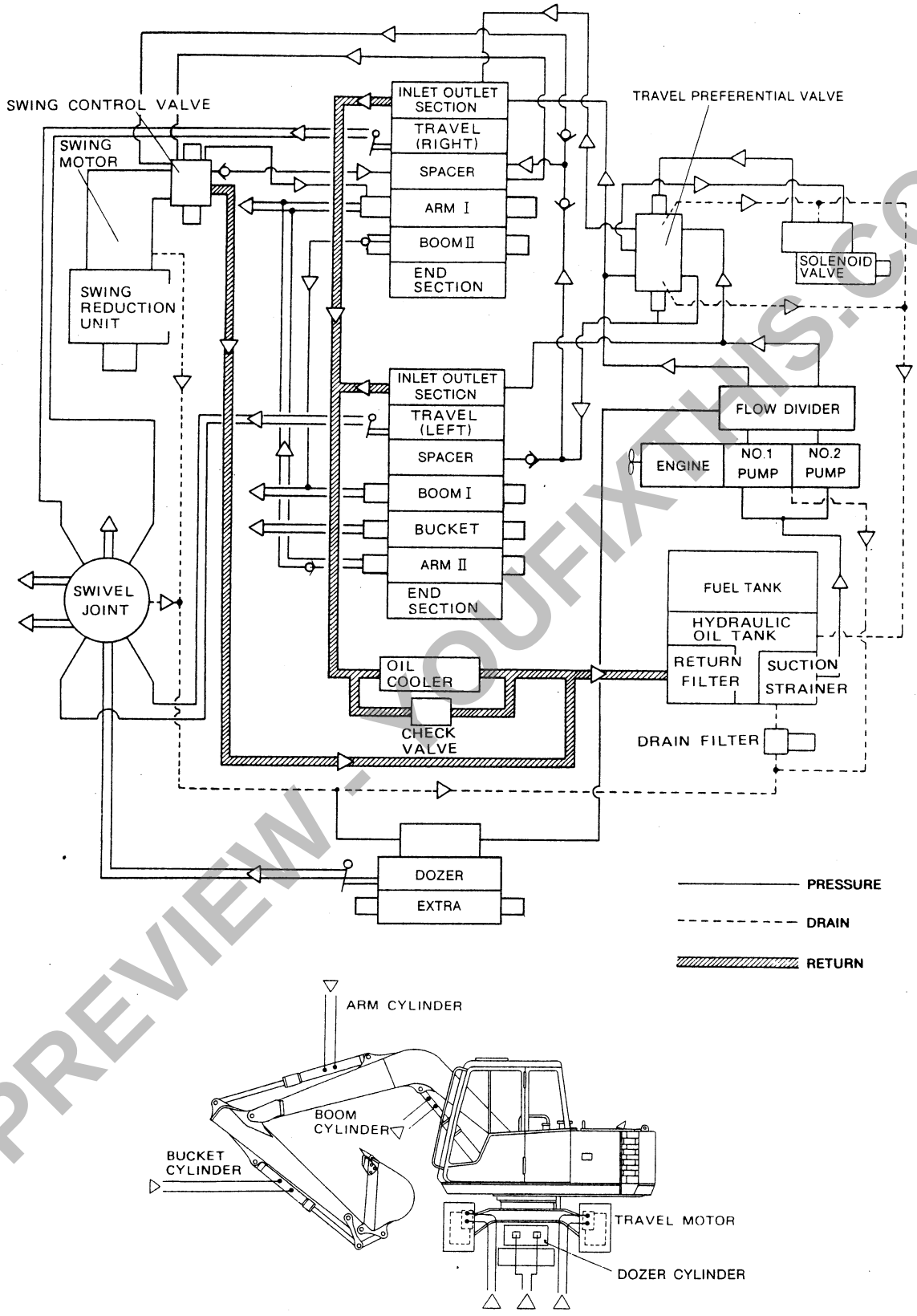


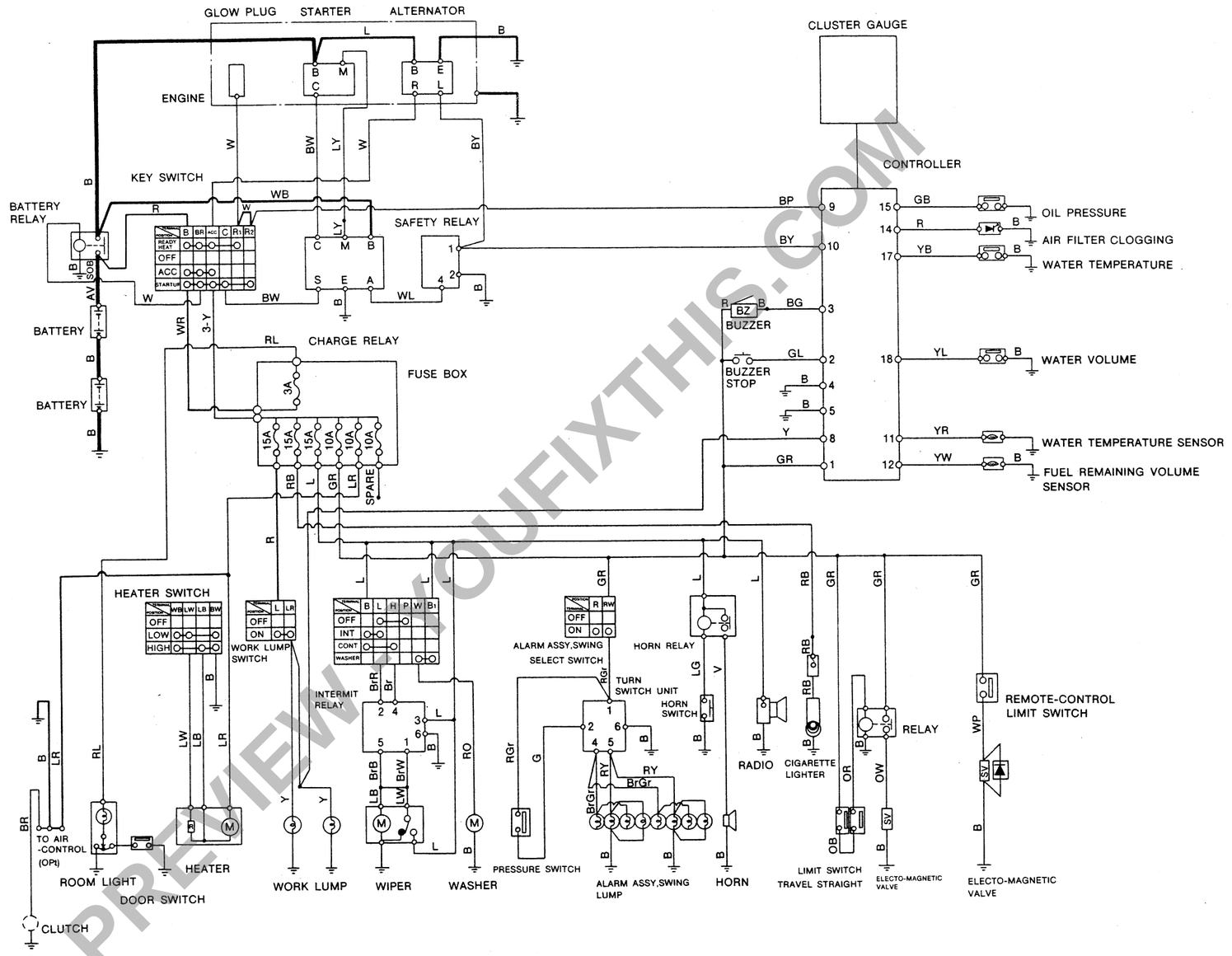
Fig. 1

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1. ELECTRIC SYSTEM DIAGRAM

APPLICABLE MACHINS LE-6601~7871



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WIRING COLOR SAMPLE W L

- L — LINE COLOR (BLUE LINE)
- W — GROUND COLOR (WHITE GROUND)

Color table of wiring

Symbol	Color	Symbol	Color
B	Black	W	White
G	Green	Y	Yellow
L	Blue	P	Pink
R	Red	O	Orange

Symbol	Color	Symbol	Color
Br	Brown	V	Violet
Lg	Leave green		
Gr	Gray		
Sb	Lead		

Table of classified wiring	
AV30	———
AV5	———
AV2	———
AV0.85	———

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2. HYDRAULIC PRESSURE

2.1 MEASURING CONDITION

1) Oil temperature: 50±5℃
2) Engine: High idling (full throttle). The engine shall be warmed up sufficiently.
3) All components including the engine shall be in normal condition, except hydraulic operated instruments.

2.2 PRESSURE GAUGE CONNECTIONS

(1) Hydraulic pump

1) Remove P_1 and P_2 (PF¼ plugs).
2) Attach a high pressure gauge (350 kgf/㎠ 500 kgf/㎠).

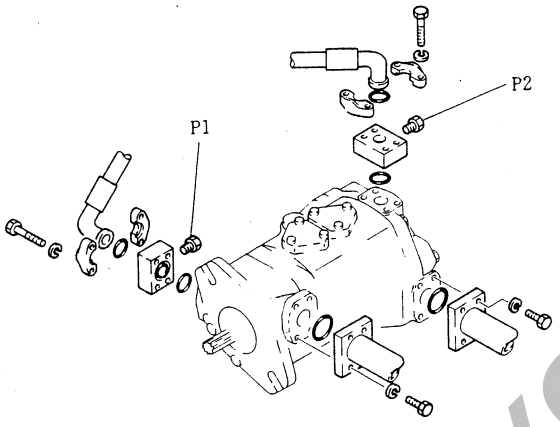


Fig. 1

(2) RH control valve

1) Disconnect swing preferential pilot piping P_3.
2) Attach a high pressure gauge (350 kgf/㎠ or 500 kgf/㎠), using a T joint.

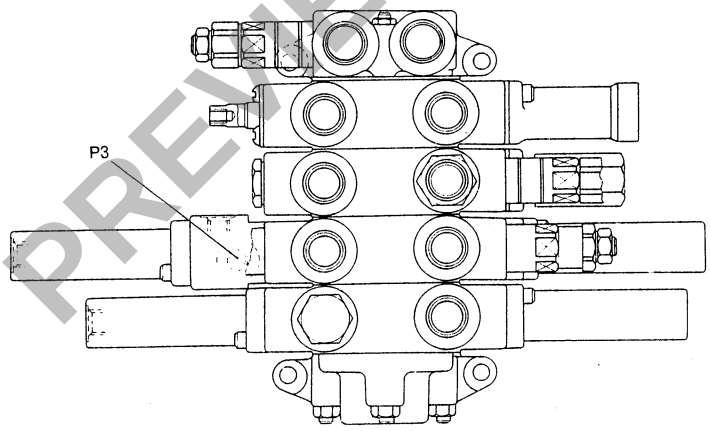


Fig. 2

(3) Swing control valve

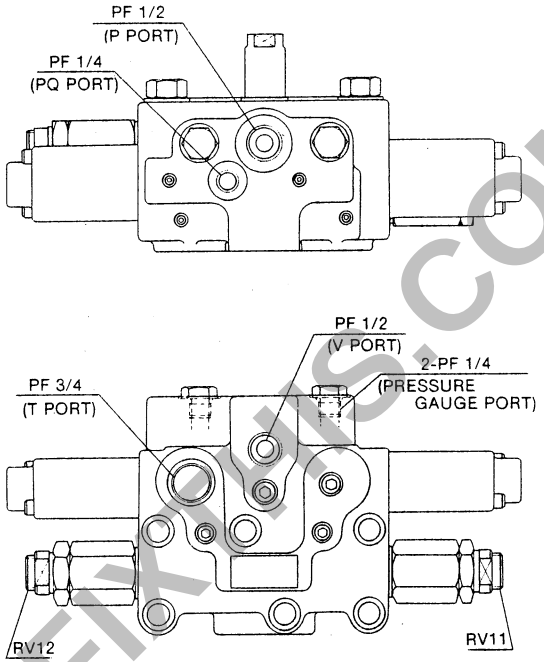


Fig. 3

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1. TIGHTENING TORQUES FOR CAPSCREWS AND NUTS

Tables 1 and 2 indicate tightening torques applicable to cases where no special note is given.

Overtightening of bolts may result in a twist-off and a fracture under load. Undertightening may lead to a loosening or loss of bolts. Always tighten bolts to proper torques.

Table 1 Standard tightening torques for metric coarse screw threads

Unit: kgf·m (ft·lbs)

Classification / Nominal size	4T		7T		10T	
	No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M 6 P=1	0.45±0.05 (3.2±0.4)	0.38±0.04 (2.7±0.3)	0.98±0.10 (7.1±0.7)	0.83±0.08 (6.0±0.6)	1.77±0.18 (12.8±1.3)	1.5±0.15 (10.8±1.1)
M 8 P=1.25	1.09±0.11 (7.9±0.8)	0.92±0.09 (6.6±0.6)	2.4±0.20 (17.3±1.4)	2.0±0.20 (14.4±1.4)	4.3±0.40 (31.0±2.9)	3.6±0.40 (26.0±2.9)
M10 P=1.5	2.2±0.20 (15.9±1.4)	1.83±0.18 (13.2±1.3)	4.7±0.50 (33.9±3.6)	4.0±0.40 (28.9±2.9)	8.5±0.90 (61.3±6.5)	7.2±0.70 (52.0±5.1)
M12 P=1.75	3.7±0.40 (26.7±2.9)	3.2±0.30 (23.1±2.2)	8.1±0.80 (58.4±5.8)	6.8±0.70 (49.1±5.1)	14.6±1.50 (105±10.8)	12.3±1.20 (88.8±8.7)
M14 P=2	5.9±0.60 (42.6±4.3)	5.0±0.50 (36.1±3.6)	12.8±1.30 (92.4±9.4)	10.8±1.10 (77.9±7.9)	23±2 (166±14.4)	19.5±1.90 (140±13.7)
M16 P=2	9.0±0.90 (64.9±6.5)	7.6±0.70 (54.8±5.1)	19.5±2 (140±14.4)	16.4±1.6 (118±11.5)	35±4 (252±28.9)	29±3 (209±21.6)
M18 P=2.5	12.4±1.20 (89.5±8.7)	10.5±1 (75.8±7.2)	27±3 (194±21.6)	23±2 (166±14.4)	49±5 (353±36.1)	41±4 (295±28.9)
M20 P=2.5	17.5±1.7 (126±12.3)	14.7±1.40 (106±10.1)	38±4 (274±28.9)	32±3 (230±21.6)	68±7 (490±50.5)	57±6 (411±43.3)
M22 P=2.5	23±2 (166±14.4)	19.6±2.0 (141±14.4)	51±5 (368±36.1)	43±4 (310±28.9)	92±9 (663±64.9)	77±8 (555±57.7)
M24 P=3	30±3 (216±21.6)	24±3 (173±21.6)	65±7 (469±50.5)	53±5 (382±36.1)	118±12 (851±86.6)	96±10 (692±72.2)
M27 P=3	44±4 (317±28.9)	36±3 (259±21.6)	96±10 (692±72.2)	78±8 (562±57.7)	173±17 (1248±122)	140±14 (1010±101)
M30 P=3.5	60±6 (433±43.3)	50±5 (360±36.1)	131±13 (945±93.8)	110±11 (793±79.4)	235±24 (1695±173)	198±20 (1428±144)
M33 P=3.5	81±8 (584±57.7)	68±7 (490±50.5)	176±18 (1270±129)	148±15 (1068±108)	317±32 (2287±230)	266±27 (1919±194)
M36 P=4	105±10 (757±72.2)	88±9 (635±64.9)	227±23 (1638±166)	190±19 (1371±137)	409±41 (2951±295)	343±34 (2475±245)

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2. REMOVAL AND INSTALLATION OF HYDRAULIC PUMP

2.1 REMOVING HYDRAULIC PUMP

1) After stopping the engine, remove hydraulic pump top cover (A) and bracket (B).

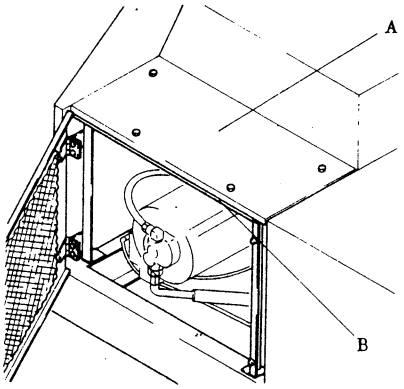


Fig. 3

2) Fix suction stopper (C) of the suction port of the hydraulic oil tank.

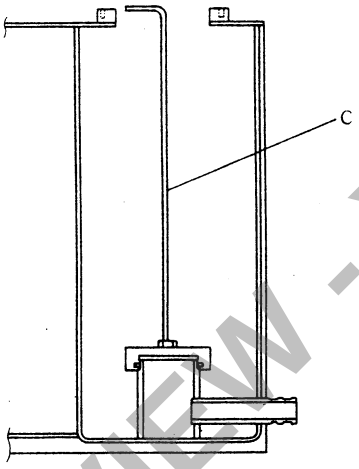


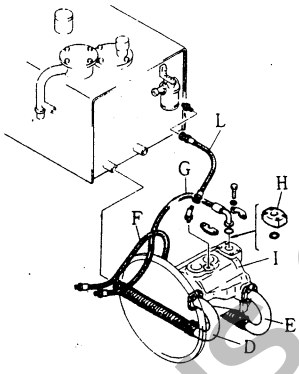
Fig. 4

NOTE

Regarding suction stopper (C), refer to "Detail of Suction Stopper" given hereinafter.

3) Remove the suction hoses (D, E), the discharge hoses (F, G), flange (H) and drain hose (L), and put a plug to each of the hoses and pump ports.

APPLICABLE MACHINS LE-6601~7014, 7016~7278, 7284~7871



APPLICABLE MACHINS LE-7015, LE-7279-7283, LE-7872~

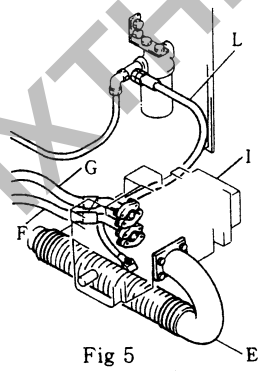


Fig 5

4) Put a wire sling in the center of hydraulic pump (1), lift the pump with a crane so the wire sling is tensioned and remove two capscrews M16 (5).

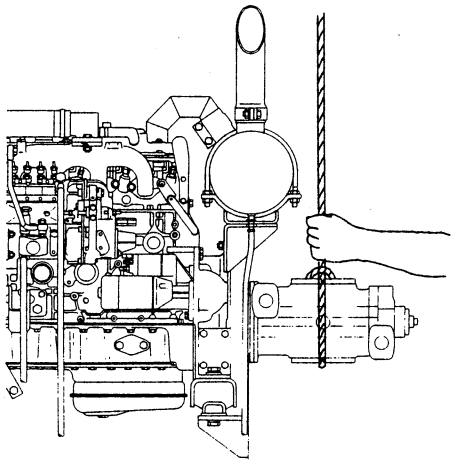


Fig. 6

5) Slack the wire sling slightly, and pull hydraulic pump (1) slowly toward yourself till the drive shaft of the pump comes off. Then remove hydraulic pump (1) while lifting it.

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1. PREFACE

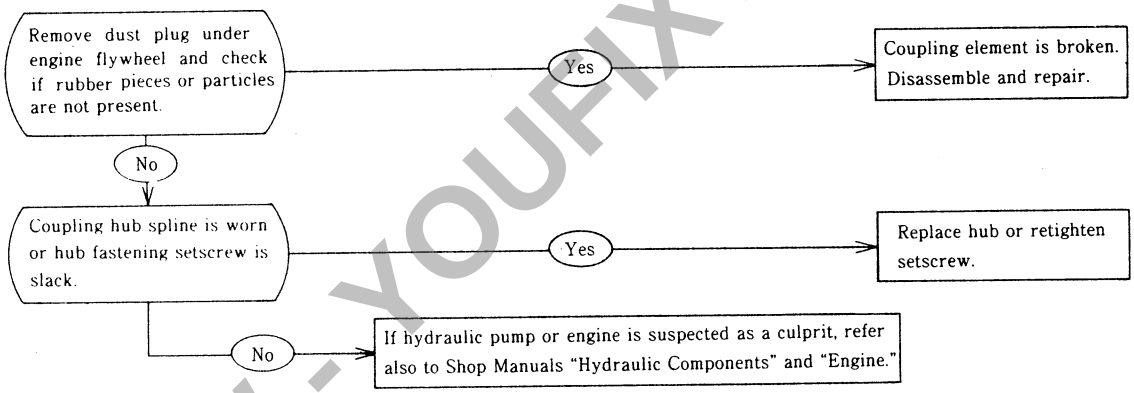
1.1 MACHINE IN GENERAL

(1) If even a minor fault is left intact and operation is continued, a fatal failure may be caused, entailing a large sum of expenses and long hours of restoration. Therefore when even a small trouble occurs, do not rely on your intuition and experience, but look for the cause based on the troubleshooting principle and perform maintenance and adjustment to prevent major failure from occurring. Keep in mind that a fault results from a combination of different causes.

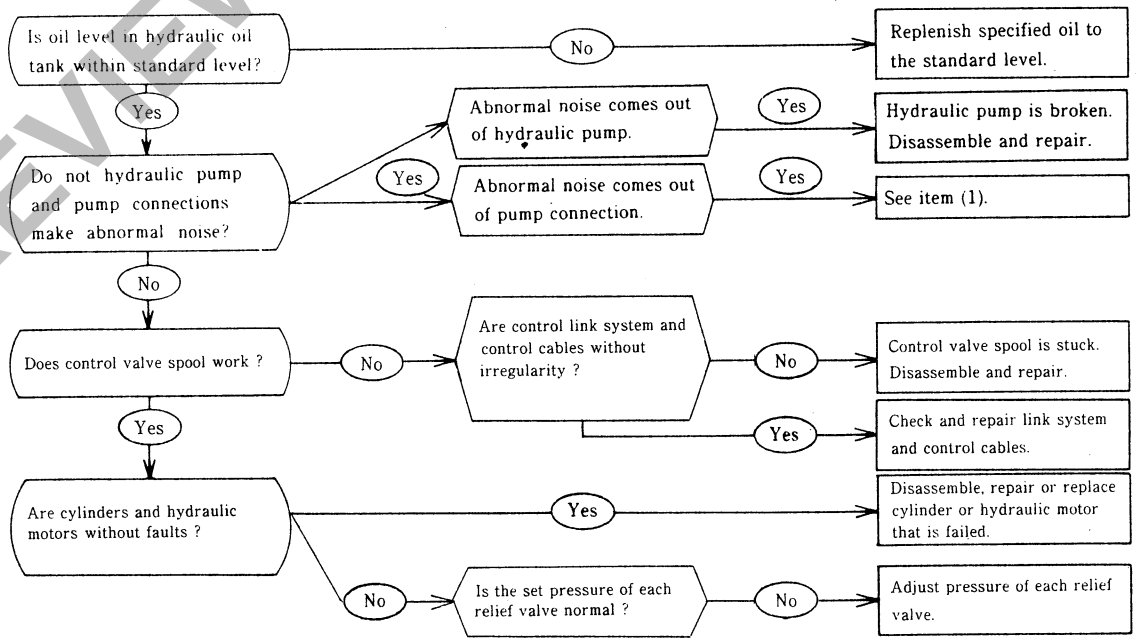
(2) The following lists up commonly occurring faults and possible causes with this machine. For the troubleshooting of the engine, refer to the Shop Manual-Engine. For the troubleshooting of hydraulic components, refer to a separate Shop Manual-Hydraulic Components.

2. DRIVE SYSTEM

(1) Unusual noise comes out of pump connection.



(2) Engine starts but machine does not operate at all.



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3. SPECIFICATIONS AND PEREORMANCE

SPEED AND GRADEABILITY

Swing speed	13.0 r.p.m
Travel speed	3.9 km/hr〔2.48 MPH〕
Gradeability	35° (70%)

ENGINE

Model		ISUZU4JBI
Type		4-cycle Cooled, direct imjection type diesel
Number of cylinder×Bore×Stroke		4×93 mm×102 mm〔4×3.6″×4″〕
Total displacement		2.771 cc〔169.1 cuin〕
Rated output power/ revolution	JIS D 1005 Net	55 PS/2200 r.p.m
	SAE J 1349 Gross	41.6 KW/2200 r.p.m
	DIN 6270 Net	53.2 PS/2200 r.p.m
Maximum torque/ revolution	JIS D 1005 Net	18 kg·m/1800 r.p.m
	SAE J 1349 Gross	178 N·m/1800 r.p.m
	DIN 6270 Net	17.4 kg·m/1800 r.p.m

HYDRUALIC COMPONENTS

Hydraulic pump	Double variable displacement pump+Gear pump
Hydraulic motor (swing)	Axial piston motor
Hydraulic motor (travel)	Axial piston motor
Control valve	1 block 4-parallel 2-tandem
Cylinder (Boom, Arm, Bucket)	Double acting cylinders
Return filter	Filter paper with safety valve
Oil cooler	Air-cooled type

WEIGHT

Fully equipped weight	Appro×6.600 kg〔14,550 lbs〕
Upper machinery	Appro×3100 kg〔6,834 lbs〕
Lower machinery (with 400 mm〔16″〕grouser shoes)	Appro×2,300 kg〔5,070 lbs〕
Attachment (with 0.3m³〔0.39cu yd〕Bucket+1.7 m〔5ft-7in〕Arm	Appro×1,200kg〔2,645 lbs〕

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1. GENERAL

1) The terms used in this Maintenance Standards shall have definitions as follows:

   Standard value:

   Standard values for adjustment or assembly of a new machine, provided the values are for standard specifications (machine with standard attachments and shoes) unless otherwise specified.

   Allowable value:

   A limit value that shall not be exceeded. If it is exceeded, remedy or replacement is required. Avoid using a machine, exceeding this value to maintain the performance or safety of the machine.

   Limit value of use:

   A value at which machine adjustment or parts replacement becomes unnecessary if it is exceeded. If the machine is still used beyond the limit value, the machine will be faced with failures leading to the out-of operation and will develop safety problems.

   Oil temperature:

   Temperature to be applied. The temperature of hydraulic oil refers to that in the hydraulic oil tank. Hydraulic oil must be circulated continuously so that the oil temperature in the circuits may be levelled off with that of the tank.

2) For items without allowable values, adjust and repair or replace them with reference to the standard values.
3) Rubber products such as hydraulic hoses, O rings and oil seals deteriorate with time. Replace them regularly or at overhaul.
4) It is advisable that important hoses for safety purpose be designated as very important parts (V.I.P.) and be replaced regularly.
5) In proceeding to maintenance, it is essential to get familiar with machine operating procedures, precautions to be observed and inspection/lubrication procedures. Read through the Operators Manual as well.

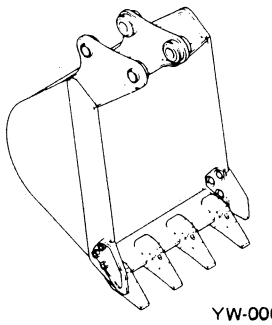
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5. TYPE AND COMBINATION OF ATTACHMENTS

TYPE OF BUCKET

Hoe bucket

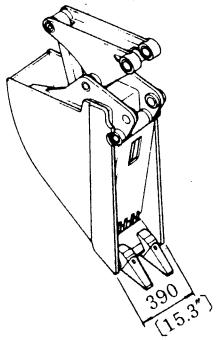


YW-0008

Heaped Capacity m³〔cu yd〕	Outer Width mm〔ft-in〕		Number of Tooth	Side Cutters	Possibility of Face Shovel	Weight kg (lbs)
	With Side Cutters	Without Side Cutters				
0.35〔0.46〕	880〔2'10"〕	830〔2'8"〕	4	Yes	Yes	210 〔529〕
0.3〔0.39〕	780〔2'6"〕	720〔2'4"〕	4	Yes	Yes	230 〔507〕
0.25〔0.33〕	680〔2'7"〕	620〔2'1"〕	4	Yes	Yes	210 〔463〕
0.2〔0.26〕	580〔1'10"〕	520〔1'8"〕	3	Yes	Yes	200 〔441〕
0.1〔0.13〕	—	400〔1'4"〕	3	No	Yes	150 〔331〕

Bucket With Ejector

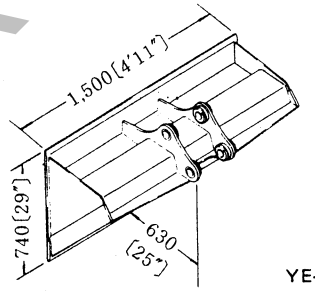
Capacity:0.1 m³〔0.13 cuyd〕
Weight:150 kg〔330 lbs〕



YE-0076

Side slope finishing bucket

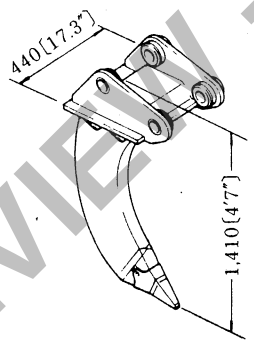
Capacity:0.2 m³〔0.26 cu.yd〕
Weight:300 kg〔660 lbs〕



YE-0077

Ripper

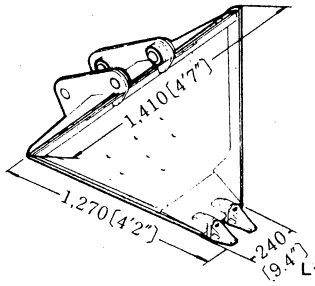
Weight:210 kg〔463 lbs〕



YE-0078

V-shape bucket

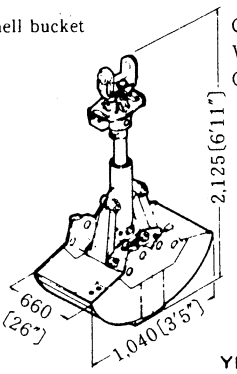
Capacity:0.2 m³〔0.26 cu.yd〕
Weight:180 kg〔397 lbs〕



L-1674

Clamshell bucket

Capacity:0.2 m³〔0.26 cu.yd〕
Weight:435 kg〔960 lbs〕
Opening width:240 mm〔9.4in〕



YE-0039

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3. HYDRAULIC CIRCUITS AND COMPONENTS

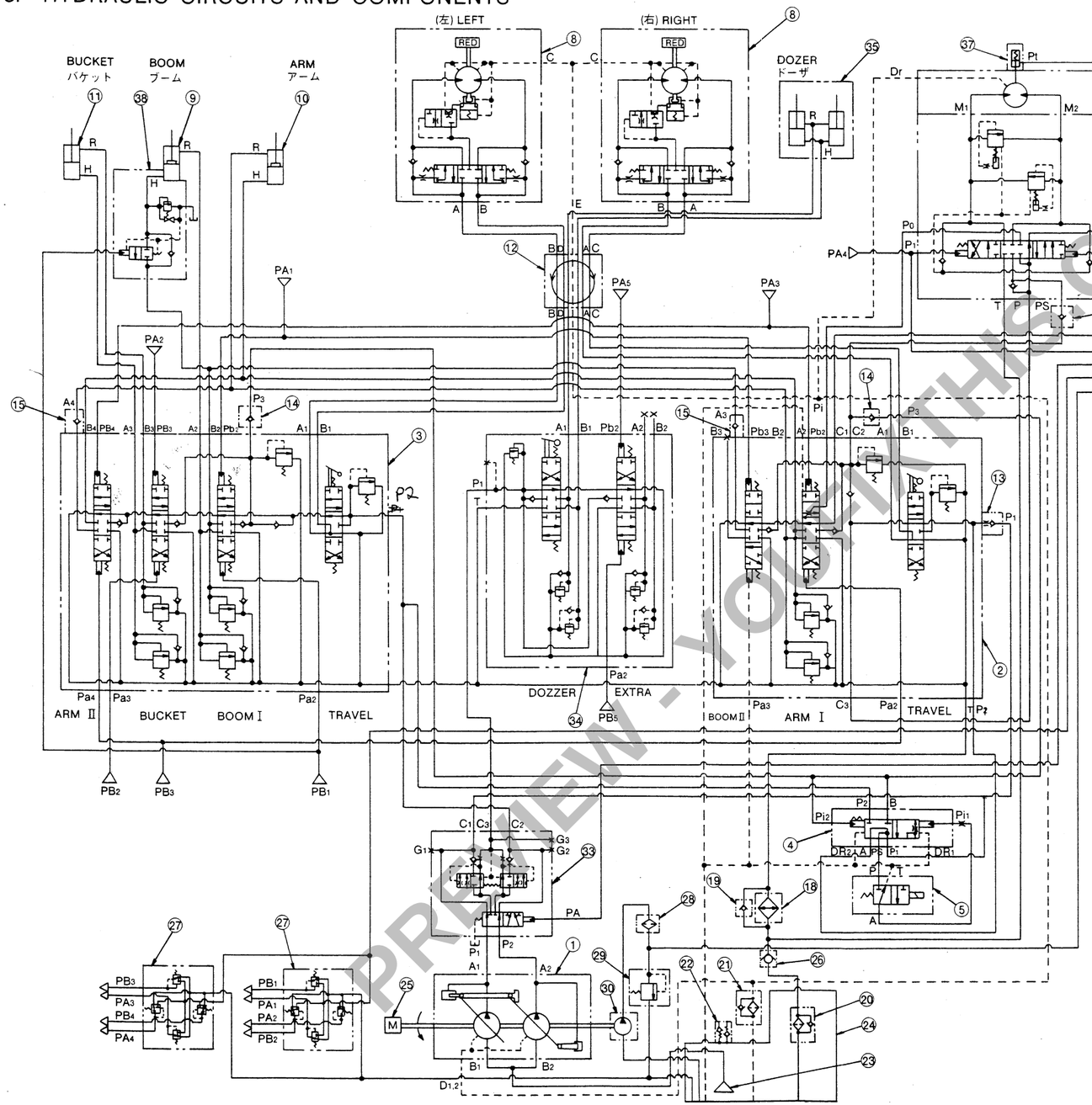


Fig. 2

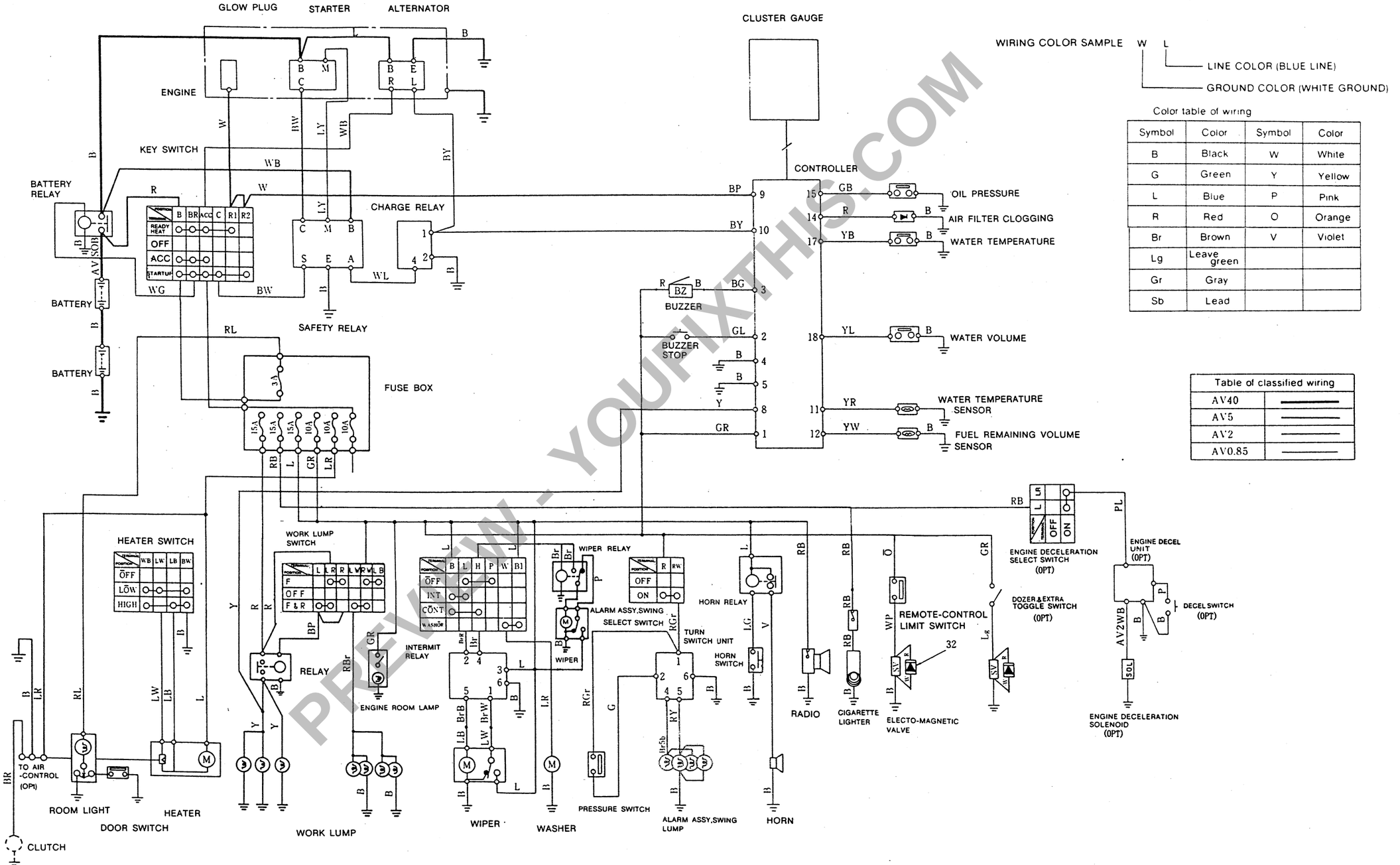
No	NAME	名　称	型　番
1	PUMP	ポンプ	NVK45DT
2	VALVE,CONTROL	コントロールバルブ	
3	VALVE,CONTROL	コントロールバルブ	
4	RUN STRAIGHT VALVE	走行直進弁	
5	VALVE,SOLENOID	ソレノイドバルブ	KPM-85070
6	VALVE,CONTROL	コントロールバルブ	OSY-09
7	SWING MOTOR	旋回モータ	MX55
8	RUN MOTOR	走行モータ	GM08L1
9	CYLINDER,BOOM	ブームシリンダ	
10	CYLINDER,ARM	アームシリンダ	
11	CYLINDER BUCKET	バケットシリンダ	
12	JOINT,SWIVEL	スイベルジョイント	
13	VALVE,CHECK	チェックバルブ	
14	VALVE,CHECK	チェックバルブ	
15	VALVE,CHECK	チェックバルブ	
16	VALVE,CHECK	チェックバルブ	
17	VALVE,CHECK	チェックバルブ	
18	COOLER,OIL	オイルクーラ	
19	VALVE,CHECK	チェックバルブ	
20	FILTER,RETURN	リタンフィルタ	≥20μ
21	FILTER,OIL	オイルフィルタ	
22	BREATHER,AIR	エアブリーザ	
23	FILTER,SUCTION	サクションフィルタ	
24	TANK,HYDR	ハイドロタンク	
25	ENGINE	エンジン	
26	VALVE,CHECK	チェックバルブ	
27	VALVE,PILOT	パイロットバルブ	TH40K1073
28	FILTER,LINE	ラインフィルター	Y-1795
29	VALVE RILIEF	リリーフバルブ	VRD-03
30	PUMP,GEAR	ギヤポンプ	KP1007
31	VALVE,SOLENOID	ソレノイドバルブ	
32	VALVE,SHUTTLE	シャトルバルブ	
33	VALVE	フローティバイドバルブ	WPR-08PD
34	VALVE,CONTROL	コントロールバルブ	
35	CYLINDER	シリンダ(ドーザー)	
36	VALVE,PILOT	パイロットバルブ	
37	BRAKE,PARKING	旋回パーキングブレーキ	NM084
38	VALVE,HOLDING	ホールディングバルブ	

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ELECTRIC SYSTEM DIAGRAM

APPLICABLE MACHINS LE-7872~



WIRING COLOR SAMPLE W L

L — LINE COLOR (BLUE LINE)

W — GROUND COLOR (WHITE GROUND)

Color table of wiring

Symbol	Color	Symbol	Color
B	Black	W	White
G	Green	Y	Yellow
L	Blue	P	Pink
R	Red	O	Orange
Br	Brown	V	Violet
Lg	Leave green		
Gr	Gray		
Sb	Lead		

Table of classified wiring

AV40	———
AV5	———
AV2	———
AV0.85	———

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(4) **Control valve**

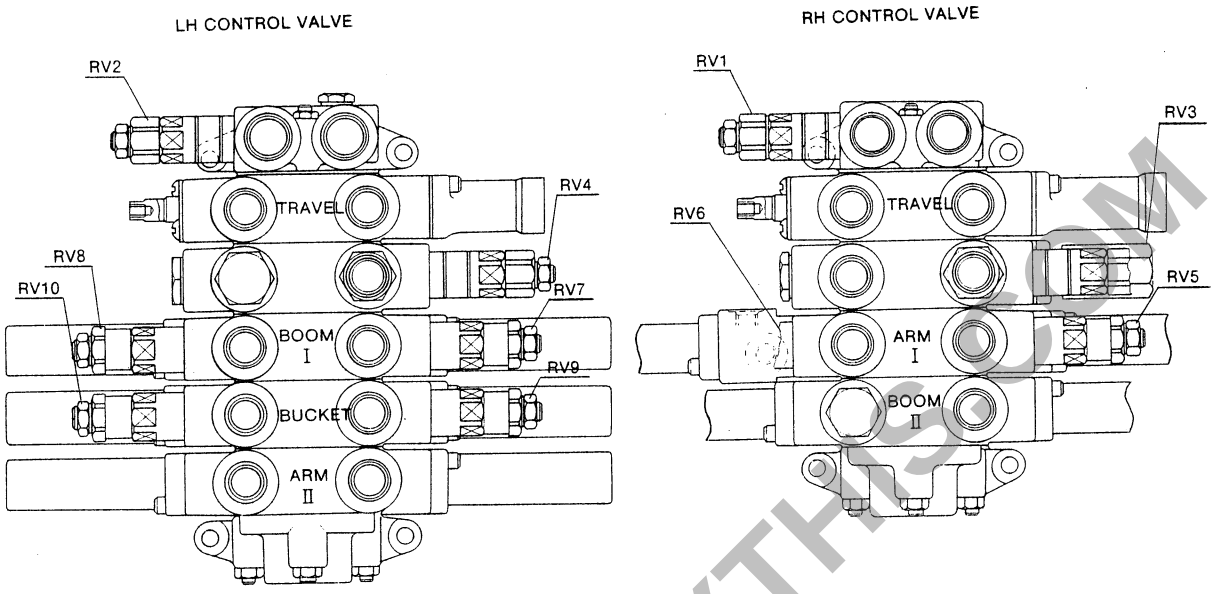


Fig. 4

2.3 PRESSURE CHECKING AND ADJUSTING PROCEDURE

1) Insert a suitable bar into the sprocket teeth, measure the pressure of the travel gently relieving the travel circuits (RH/LH travel actions), and adjust to specified levels.
2) Tighten the adjust screws of main relief valves RV3, RV4, while gently relieving the pressure from the cylinder for the attachment adjust the pressure a little higher than the set pressure of the port relief valve.
3) Measure the pressure of the port relief valves RV_5–RV_{10}, while gently relieving the cylinders in the attachment circuits (boom, arm and bucket) at their stroke end, and adjust it to a specified pressure.
4) Insert the swing lock pin, measure the pressure of the swing relief valves RV_{11}, RV_{12}, while gently relieving the swing circuits (RH/LH swing) , and adjust it to a specified level.
5) Measure the pressure of the main relief valves RV_3, RV_4, while gently relieving the pressure from the cylinder of the attachment circuit (bucket or arm) at its stroke end, and adjust it to a specified level.
6) Insert the swing lock pin, and adjust the swing preferential pilot pressure P_3, while gently relieving the swing preferential circuit (at a simultaneous operation of swing and arm contraction).

NOTE

The swing preferential pilot pressure may be measured bu can not be adjusted.

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Table 2 Standard tightening torques for metric fine screw threads

Unit: kgf·m (ft·lbs)

Classification / Nominal size	4 T		7 T		10 T	
	No lubrication	Oil lubrication	No lubrication	Oil lubrication	No lubrication	Oil lubrication
M 8 P=1	1.15±0.11 (8.3±0.8)	0.97±0.10 (7.0±0.7)	2.5±0.2 (18.0±1.4)	2.1±0.20 (15.2±1.4)	4.5±0.40 (32.5±2.9)	3.8±0.40 (27.4±2.9)
M10 P=1.25	2.3±0.20 (16.6±1.4)	1.91±0.19 (13.8±1.4)	4.9±0.5 (35.4±3.6)	4.2±0.40 (30.3±2.9)	8.9±0.90 (64.2±6.5)	7.5±0.70 (54.1±5.1)
M12 P=1.25	4.0±0.40 (28.9±2.9)	3.4±0.3 (24.5±2.2)	8.7±0.9 (62.8±6.5)	7.3±0.70 (52.7±5.1)	15.7±1.6 (113±11.5)	13.2±1.3 (95.3±9.4)
M16 P=1.5	9.4±0.90 (67.8±6.5)	7.9±0.8 (57.0±5.8)	20±2 (144±14.4)	17.2±1.70 (124±12.3)	37±4 (267±28.9)	31±3 (223±21.6)
M20 P=1.5	19±1.90 (137±13.7)	15.8±1.6 (114±11.5)	41±4 (295±28.9)	34±3 (245±21.6)	74±7 (534±50.5)	62±6 (447±43.3)
M24 P=2	32±3 (230±21.6)	27±3 (194±21.6)	70±7 (505±50.5)	58±6 (418±43.3)	126±12 (909±86.6)	105±10 (757±72.2)
M30 P=2	65±6 (469±43.3)	54±5 (389±36.1)	142±14 (1024±101)	118±12 (851±86.6)	255±26 (1840±187)	212±21 (1529±151)
M36 P=3	109±11 (786±79.4)	91±9 (656±64.9)	238±23 (1717±166)	198±20 (1428±144)	428±43 (3088±310)	357±36 (2576±259)

2. TIGHTENING TORQUES FOR NUTS AND SLEEVES

Table 3 indicates standard tightening torques applicable to cases where no particular note is given.

Overtightening or undertightening of nuts and sleeves in bite type tube fittings may develop oil leaks through pipe connections. Always tighten nuts and sleeves to proper torques.

Table 3

Manufacturer's name	Working pressure kgf/cm² (lbs/in²)	Tube size O.D. × thickness mm (in)	Tightening torque kgf·m (ft·lbs)
Nippon A.M.C.	280 (3981)	10×1.5 (0.4×0.059)	6 ±1 (43.3±7.2)
		15×2.0 (0.6×0.079)	15±2 (108±14.4)
		18×2.5 (0.7×0.098)	18±2 (129±14.4)
		22×3.0 (0.9×0.1)	22±2 (158±14.4)
		28×4.0 (1.1×0.2)	28±3 (202±21.6)
Ihara Koatu	280 (3981)	35×5.0 (1.4×0.2)	35±3.5 (252±25.3)

Applicable machines : LE-6601～

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NOTE

When lifting the hydraulic pump (1), exercise care so it may not contact the guard frame and others.

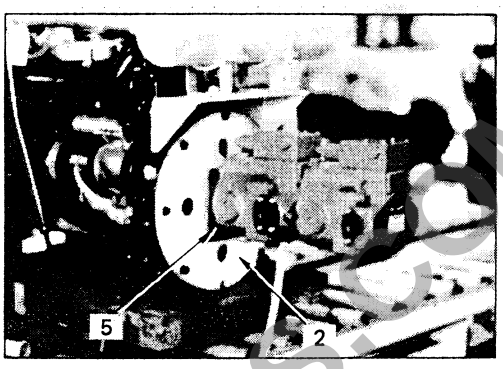
2.2 INSTALLING HYDRAULIC PUMP

1) Remove burr and soil on the mounting flange surface of hydraulic pump (1) and the mounting surface of bucket (2).
2) Coat the drive shaft spline of hydraulic pump (1) with a thin film of dimolybdenum sulfide (to an extent that grease does not come out of the hub).
3) Put a wire sling around hydraulic pump (1), lift it level and set it to its mounting position.

NOTE

When fixing hydraulic pump (1), exercise care so it may not contact the guard frame and others.

4) Confirm that the drive shaft spline of hydraulic pump (1) engages firmly with the spline of coupling hub (4), and press hydraulic pump (1) toward the engine.
5) Match the holes of bracket (2) to those of the hydraulic pump mounting flange, put a washer (9) to each of the two capscrews (5), and tighten them to a specified torque.



6) Reconnect the removed hoses to flange (H), bring the capscrews and the hose bands back in place, and tighten them as they used to be.
7) Remove suction stopper (C) of the hydraulic oil tank and fix the suction strainer there instead.
8) Start the engine, slowly loosen the air venting plug of hydraulic pump (1) and bleed the air contained.
9) Confirm that there is no oil leakage from the connections.
10) Bring back the panel (A) and the bracket (B) of the guard at the top of the hydraulic pump and refit them as they used to be.

3. REMOVAL AND INSTALLATION OF COUPLING

3.1 REMOVING COUPLING

1) Remove hydraulic pump (1). (Refer to para. 2.1.)
2) Bracket (2) and the muffler bracket are mounted together. Remove the muffler.

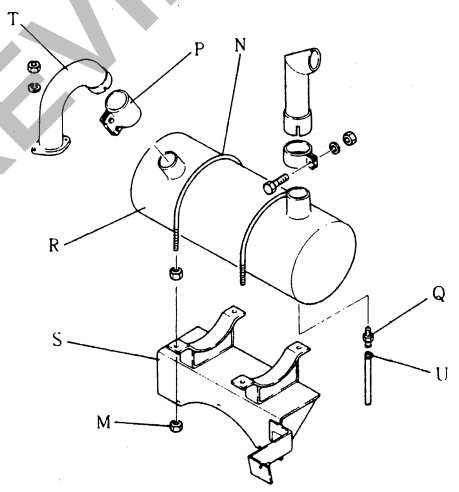


Fig. 7

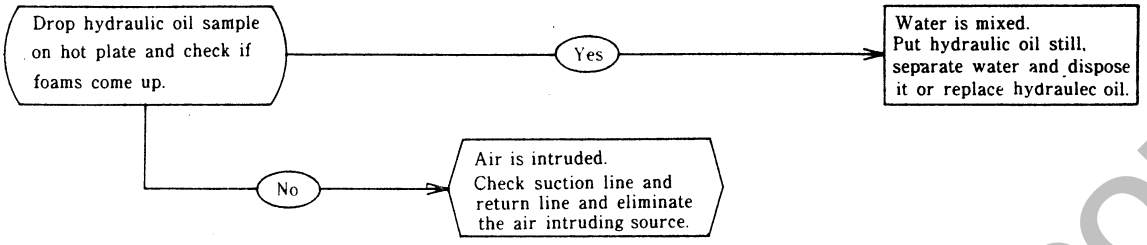
a) Loosen the nut (M) for the U-bolt (N) fastening the muffler (R) and remove the U-bolt (N).
b) Loosen the clamp (P) and the grip (Q) and remove the muffler (R).
c) Loosen three capscrews (7) M10x50, lock washers (10) and nuts (8) that fasten bracket (2) to muffler bracket (S), and remove the muffler bracket (S).

3) Loosen five capscrews (6) M10 × 45, lock washers (10) and nuts (8) that remain unremoved under Item c) of bracket (2) attached to the flywheel housing, and remove braket (2).
4) Loosen three socket bolts (3-2) in the cushion rubber (3-1) mounted to the engine flywheel, and dismantle coupling (3) and coupling hub (4).

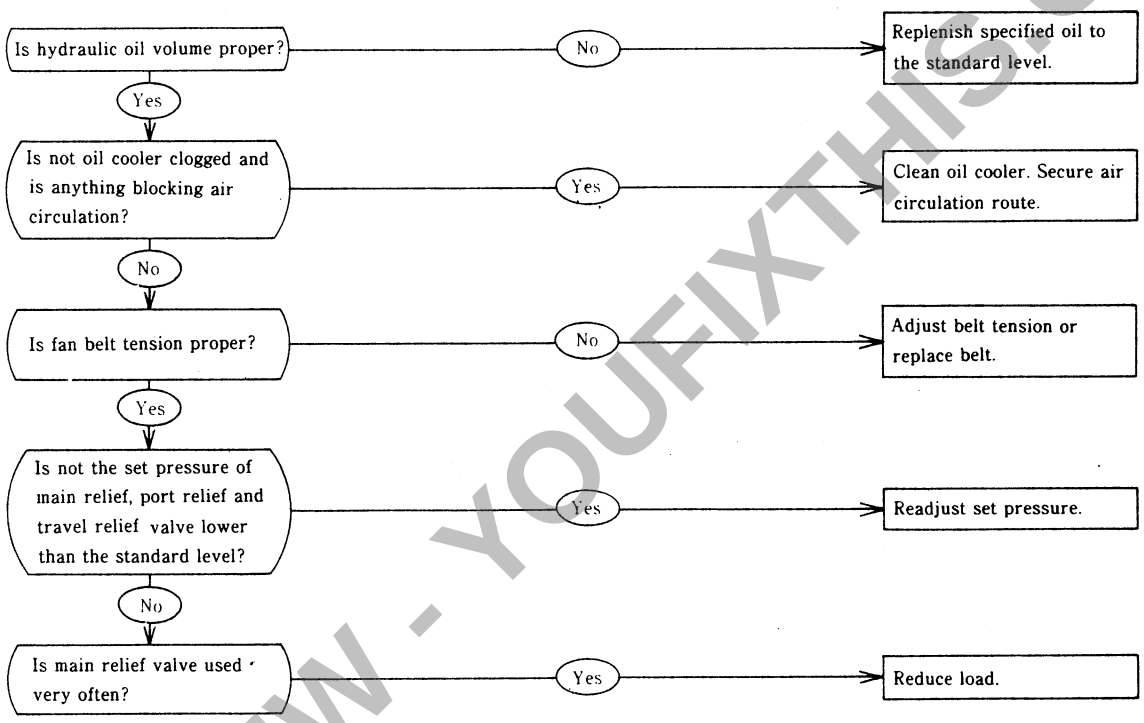
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3. HYDRAULIC SYSTEM

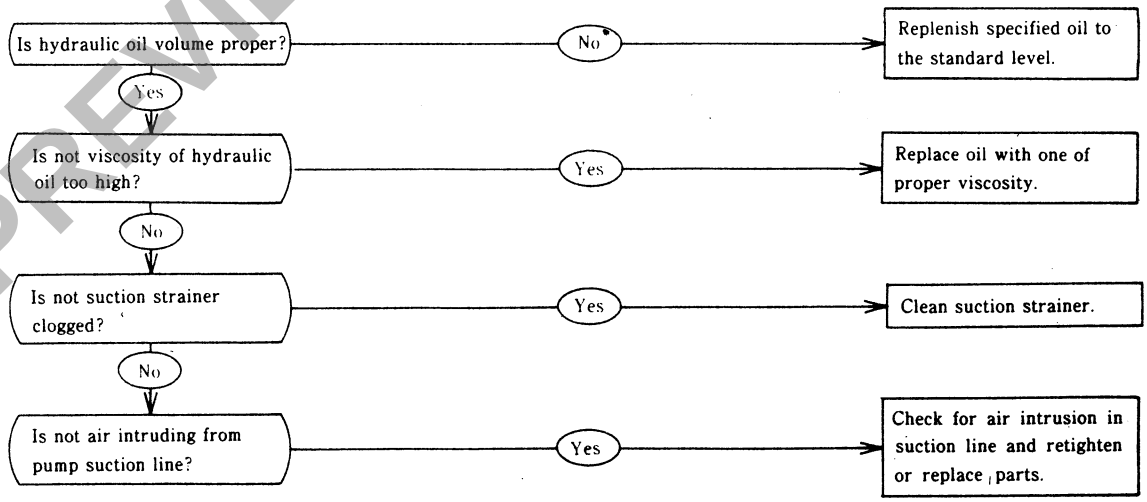
(1) Hydraulic oil is cloudy.



(2) Hydraulic oil temperature has risen abnormally.



(3) Cavitation occurs with pump.



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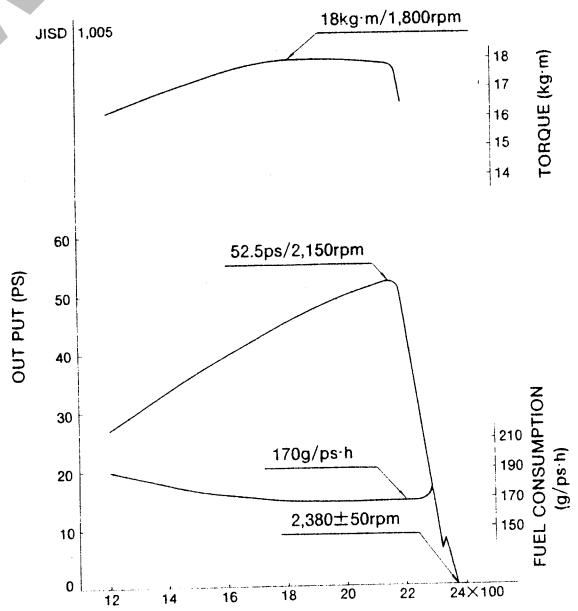
8. ENGINE SPECIFICATIONS

MAJOR SPECIFICATIONS

Model		ISUZU 4BD1		
Type		4-cycle, water-cooled, direct injection type diesel		
No. of cylinders-Dia×Stroke		4-93mm×102mm		
Total displacement		2,771c.c.〔10.5gal〕		
Compression ratio		18.2		
Output rating		55ps/2,200r.p.m.		
Max torque		18kgf·m/1,800r.p.m.〔130ft·lbs/1,800r.p.m.〕		
High idling		2,450±50r.p.m. or below		
Low idling		850±30r.p.m.		
Ignition order		1−3−4−2		
Fuel injection tining		17° before top-dead center		
Compression Pressure		30kgf/cm²〔426.6p.s.i〕		
Valve clearance		Valve clearance	Open	Close
	Suction valve	Cool 0.4mm〔0.016in〕	24.5° before top dead center	55.5° before bottom dead center
	Exhaust valve	Cool 0.4mm〔0.016in〕	54° before bottom dead center	26° before top dead center
~~Injection timing~~		Before top-dead center 82℃ Full open 95℃		
Starting motor		24V−3.5kW		
Charging generator		24V-20A		
Dry Weight		220kg〔484lbs〕		
Cooling fan drive method		φ475〔18.7″〕suction type Belt drive pulley ratio: 1.117		

ENGINE CHARACTERISTIC CURVE

ISUZU DIESEL ENGINE MODEL 4JB1



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1. GENERAL

1) The terms used in this Maintenance Standards shall have definitions as follows:

Standard value:

Standard values for adjustment or assembly of a new machine, provided the values are for standard specifications (machine with standard attachments and shoes) unless otherwise specified.

Allowable value:

A limit value that shall not be exceeded. If it is exceeded, remedy or replacement is required. Avoid using a machine, exceeding this value to maintain the performance or safety of the machine.

Limit value of use:

A value at which machine adjustment or parts replacement becomes unnecessary if it is exceeded. If the machine is still used beyond the limit value, the machine will be faced with failures leading to the out-of operation and will develop safety problems.

Oil temperature:

Temperature to be applied. The temperature of hydraulic oil refers to that in the hydraulic oil tank. Hydraulic oil must be circulated continuously so that the oil temperature in the circuits may be levelled off with that of the tank.

2) For items without allowable values, adjust and repair or replace them with reference to the standard values.

3) Rubber products such as hydraulic hoses, O rings and oil seals deteriorate with time. Replace them regularly or at overhaul.

4) It is advisable that important hoses for safety purpose be designated as very important parts (V.I.P.) and be replaced regularly.

5) In proceeding to maintenance, it is essential to get familiar with machine operating procedures, precautions to be observed and inspection/lubrication procedures. Read through the Operators Manual as well.

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COMBINATION OF ATTACHMENTS

Bucket				Applicable Arm		
Type	JIS heaped capacity m^3 [cu yd]	SAE heaped capacity m^3 [cu yd]	JIS. SAE struck capacity m^3 [cu yd]	With 1.7 m [5ft-7in] arm	With 2.1 m [6ft-11in] arm	With 1.7 m [5ft-7in] 0.45 m [1ft-6in] ext. arm
Hoe bucket	0.35 [0.46]	0.4 [0.52]	0.3 [0.39]	△	×	×
	0.3 [0.39]	0.34 [0.44]	0.26 [0.34]	◎	△	×
	0.25 [0.33]	0.28 [0.36]	0.22 [0.28]	○	◎	△
	0.2 [0.26]	0.22 [0.28]	0.18 [0.23]	○	○	◎
	0.1 [0.13]	0.11 [0.14]	0.09 [0.11]	○	○	○
Bucket With Ejector	0.1 [0.13]	0.11 [0.14]	0.09 [0.11]	○	○	○
Side slope finishing bucket	0.2 [0.26]	0.22 [0.28]	0.18 [0.23]	△	△	△
Ripper	—	—	—	○	×	×
V-shape bucket	0.2 [0.26]	0.22 [0.28]	0.18 [0.23]	△	△	△
Clamshell bucket	0.2 [0.26]	0.22 [0.28]	0.18 [0.23]	○	○	×

◎ Standard combination

○ General use: Digging and loading of gravel, sand and clayey soil

△ Light duty: Work mainly loading loose gravel or clayey soil

× Not usable: Not warranted

CAUTION

If a bucket other than hoe bucket is turned over for operation, the arm and the bucket may be broken.

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2. HYDRAULIC SYSTEM DIAGRAM

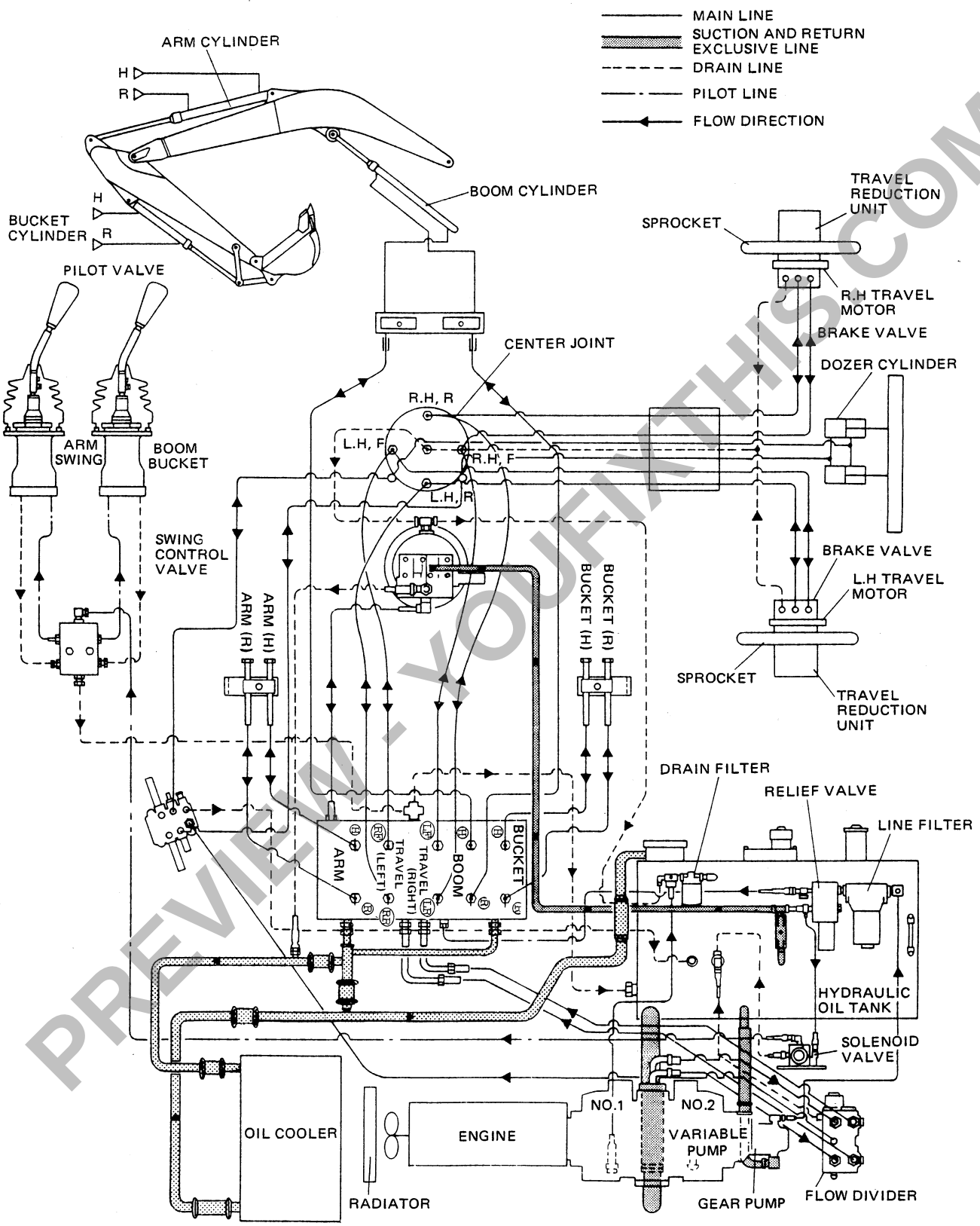
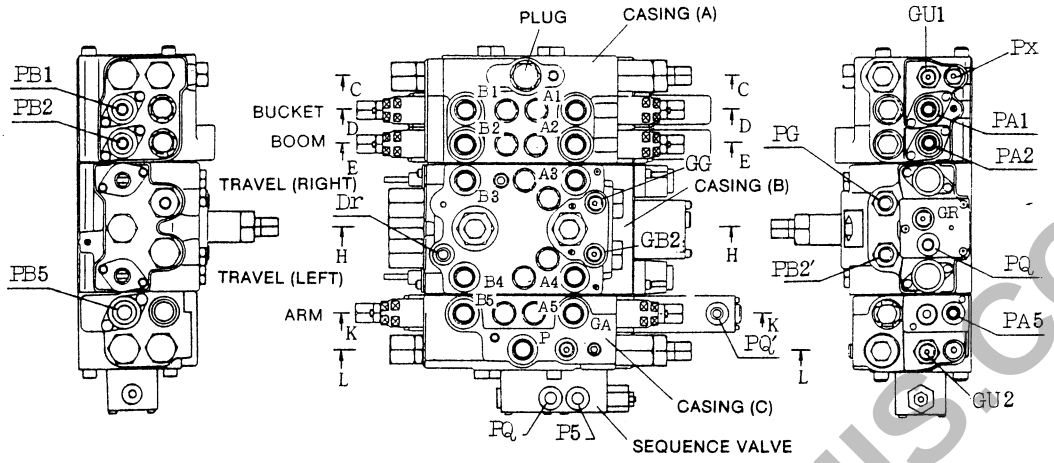


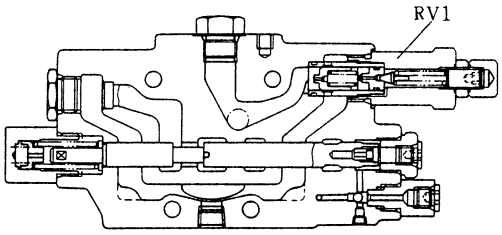
Fig. 1

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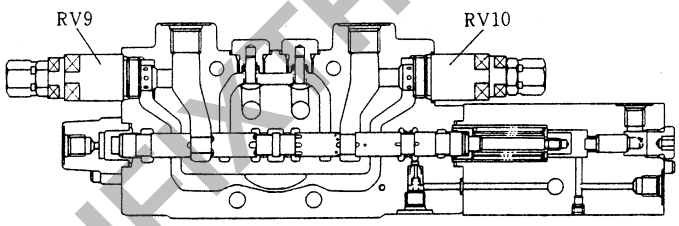
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(3) Control valve

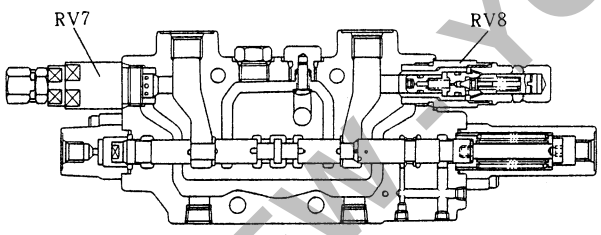




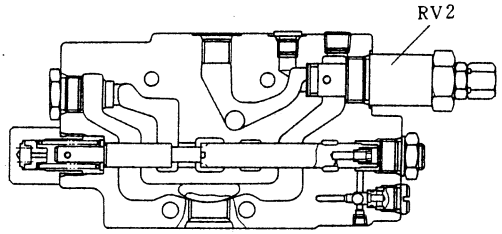
SECTION C-C (MAIN RELIEF RIGHT)



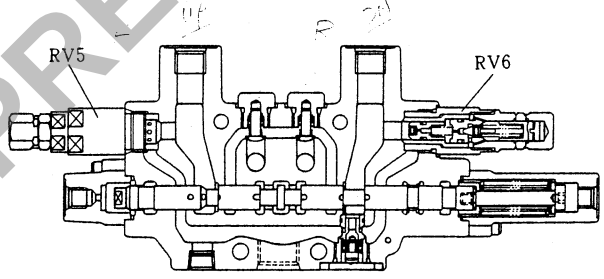
SECTION K-K (ARM)



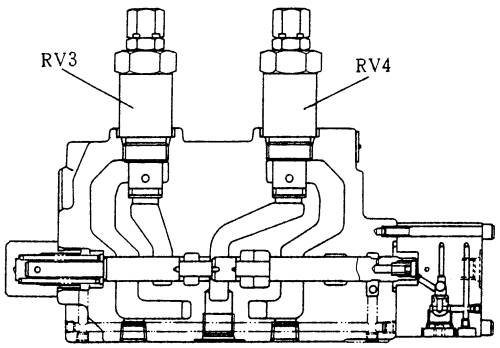
SECTION D-D (BUCKET)



SECTION L-L (MAIN RELIEF LEFT)



SECTION E-E (BOOM)



SECTION H-H (TRAVEL MAIN RELIEF)

Fig. 5

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5. 3 INSTALLING ENGINE MOUNT AND RADIATOR

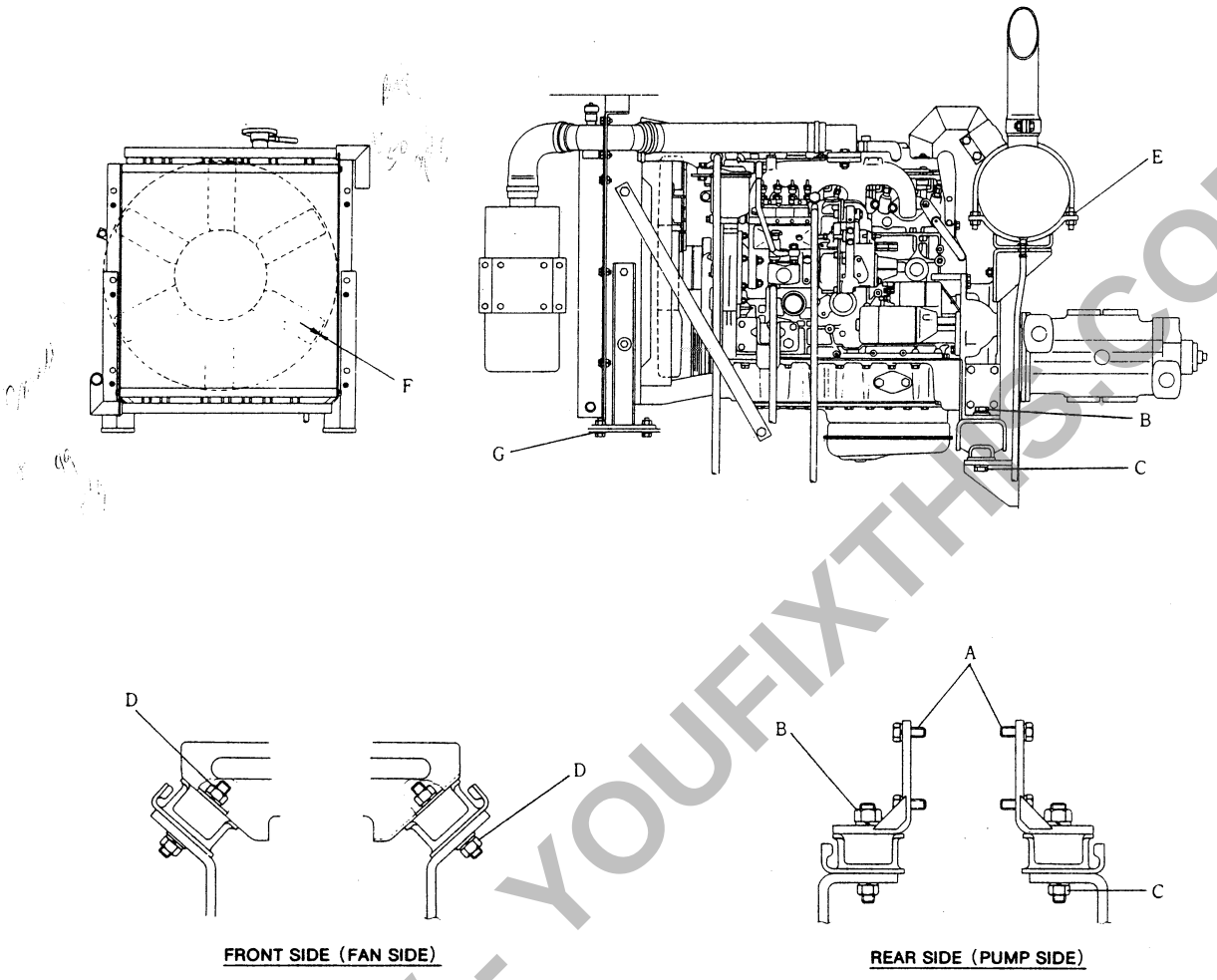


Fig. 12

Tightening torque

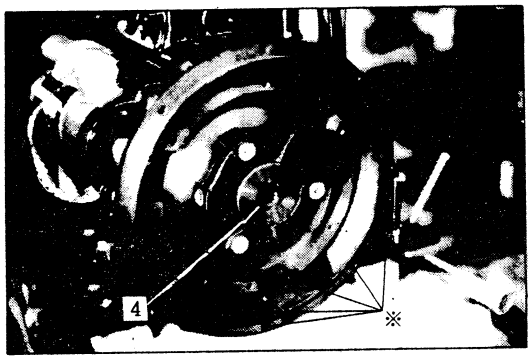
Table 3

Unit : kgf·m〔ft·lbs〕

Sign	Item	Standard value	Remedy
A	Capscrew for fdstening the rear engine mount bracket	6.5±0.6 〔46.9±4.3〕	Apply Locktite #271 and retighten.
B	Nut (M16) for fastening the rear engine mount upper frame	10.0±1 〔72.2±7.2〕	
C	Nut (M12) for fastening the rear engine mount upper frame	8.1±0.8 〔58.4±5.8〕	
D	Nut (M12) for fastening the front engine mount upper frame		
E	U-bolt nut fastening the muffler	2.4±0.5 〔17.3±3.6〕	Retighten.
F	Adjusting dimension between the fan and the radiator shroud	$10^{+4}_{-1.5}$ $\{72.1^{+28.9}_{-10.8}\}$	Adjust part G with shims.

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c) Tighten the muffler bracket to the three capscrew holes at the top of the flywheel housing. Attach capscrews (7) M10 × 50, lock washers (10) and nuts (8), and tighten them evenly all around.

7) Put clamp (P) into pipe (T), insert grip (Q) into hose (U) and fit it into muffler (R).
8) Mount muffler (R) on bracket (S), attach U-bolt (N), and temporarily tighten nut (M). Thereafter, tighten clamp (P) and grip (Q), and finally tighten nut (M) to a specified torque.
9) Install hydraulic pump (1). (See Para. 2.2.)

4. REMOVAL AND INSTALLATION OF ENGINE

4.1 REMOVING RADIATOR

1) Remove the guards at the top and on the left of the engine and remove capscrews (B) mounting right and left radiator stays (A).
2) Loosen the hose (D) for air cleaner (C), hose clamp (F) and capscrew (G) fastening elbow (E), and dismantle air cleaner (C).
3) Loosen drain plug (J) in radiator (H) and drain out the cooling water in the engine and the radiator (H).
4) Disconnect all hoses (K, L) between the engine and the radiator (H).
5) Disconnect the hose (N) between resevoir tank (M) and the radiator (H), and draw out wiring coupler (P) at the bottom of the reservoir tank (M).
6) Attach lifting metals at the top of radiator (H) and lift it with a wire sling till it is not tight nor slack.
7) Disconnect the coupling and the hoses attached to the oil cooler and put a plug to each of the connections.
8) Remove capscrews (R) fastening fan guard (Q) and dismantle fan guard (Q).
9) Take off the capscrews (S) fastening radiator (H).
10) Lift radiator (H) a little and remove it so it may not interfere with the engine fan.
11) Make sure that the wiring coupler (P) is off and dismantle the reservoir tank (M) by pulling it up.

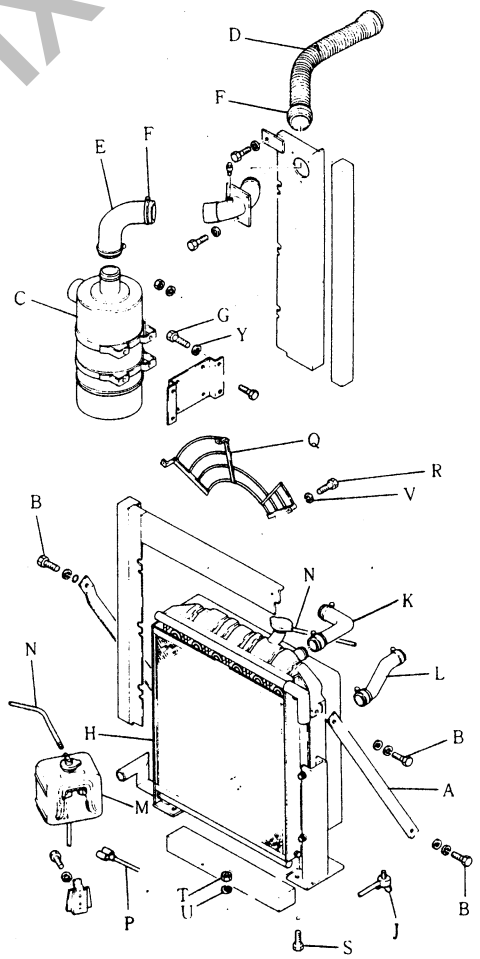
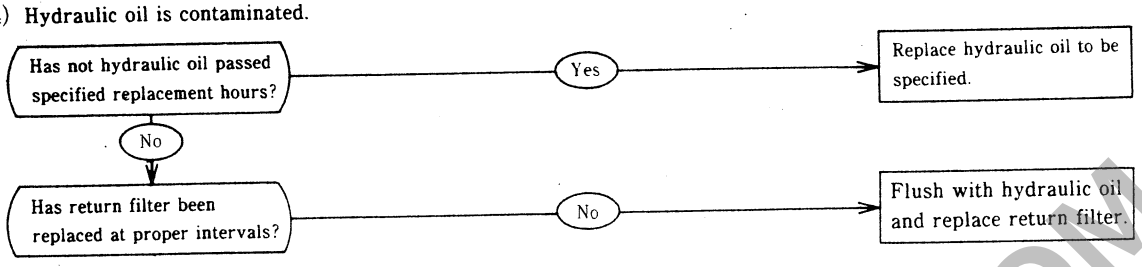


Fig. 8

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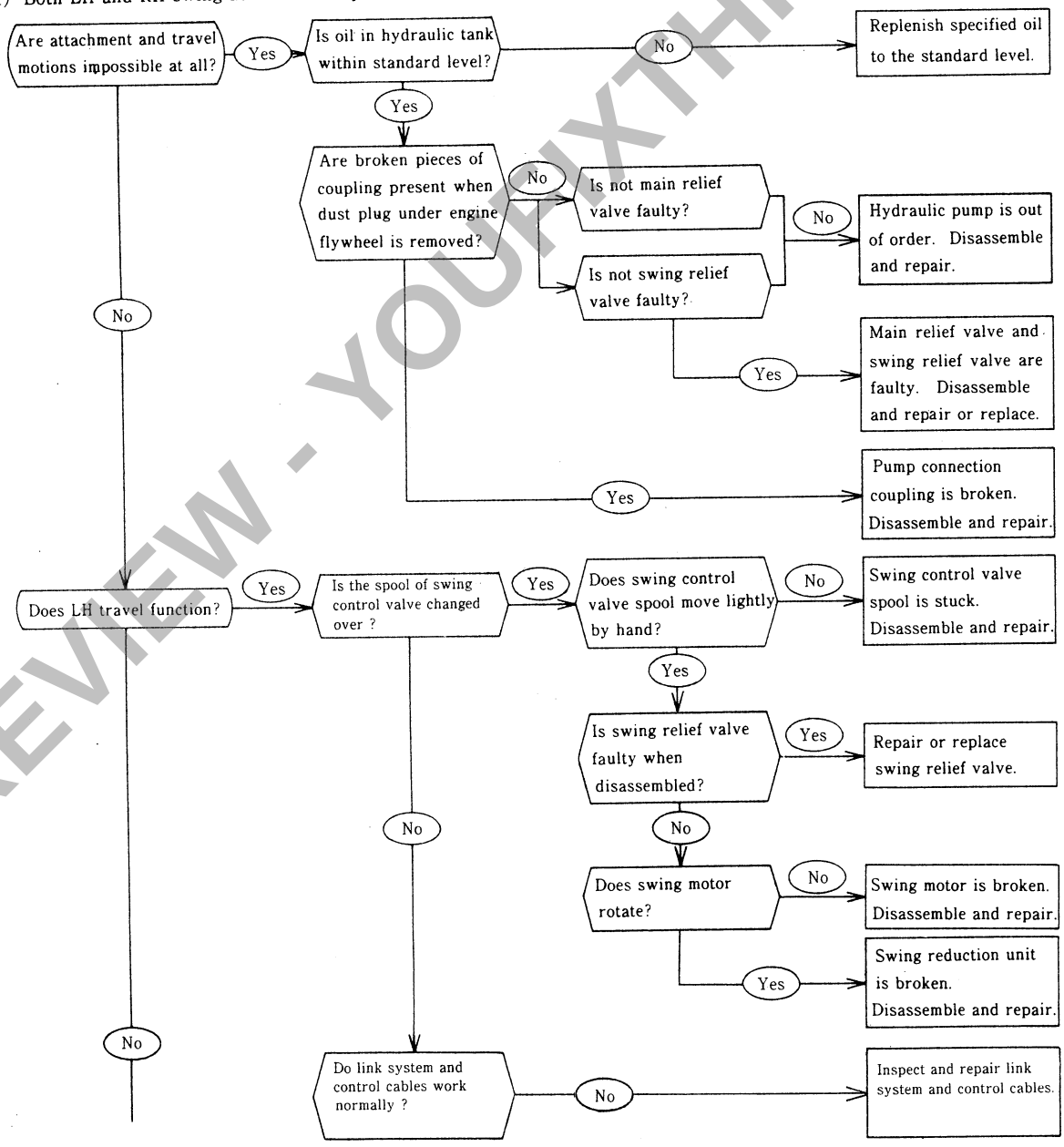
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(4) Hydraulic oil is contaminated.



4. SWING SYSTEM

(1) Both LH and RH swing actions are impossible.



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2. WEIGHT OF COMPONENTS
(Dry Weight)

Unit: kg (lbs)

Item \ Model	K903 Ⅱ
★ Complete Machine (Std,Std.Export400㎜(16″)Shoe)	6,600(13230)
1. Upper Frame Assy (Inc. 1.1～1.9)	3,100(6830)
1.1 Counter Weight	870(1920)
1.2 Cab Assy	240(530)
1.3 Boom Cylinder	105(230)
1.4 Engine	※220(※485)
1.5 Pump Assy	55(120)
1.6 Control Valve	24(53)
1.7 Fuel Tank & Hydraulic Tank	※145(※320)
1.8 Swing Motor & Reduction Gear	105(230)
2. Lower Frame Assy (Inc. 2.1～2.9)	2300(5070)
2.1 Swing Bearing	110(240)
2.2 Travel Motor	75×2(165×2)
2.3 Idler Assy	45×2(100×2)
2.4 Lower Roller Assy	16×10(35×10)
2.5 Upper Roller Assy	5×2(10×2)
2.6 Tracktention Assy	30×2(65×2)
2.7 Sprocket	20×2(45×2)
2.8 Swivel Joint	20(45)
2.9 Track Link〔400㎜(16″) Shoe〕Assy	740(1630)
Track Link〔500㎜(20″) Shoe〕Assy (Opt)	1000(2200)
Track Link〔600㎜(24″) Shoe〕Assy (Opt)	1135(2500)
2.9.1 Track Link	150×2(330×2)
3. Attachment (Inc. 3.1～3.3)	1820(4010)
3.1 Bucket Assy〔0.3 M3 (0.39 cu yd) STD.〕	230(510)
3.2 Arm Assy〔1.7M (5ft-7in) STD.〕(Inc. following)	290(640)
3.2.1 Arm	160(350)
3.2.2 Bucket Cylinder	65(140)
3.2.3 Idler Link	20(45)
3.2.4 Bucket Link	20(45)
3.2.5 Pin (For Arm Cylinder & Bucket×2)	25(55)
3.3 Boom Assy (Inc. Following)	505(1110)
3.3.1 Boom	400(880)
3.3.2 Arm Cylinder	90(200)
3.3.3 Pin (Install Arm)	15(35)

※Mark Dry Weight

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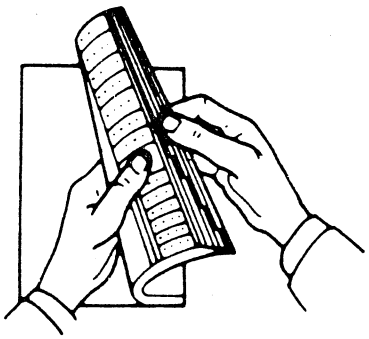
SHOP MANUAL model K903-II

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3. LOCATION AND WEIGHT OF COMPONENTS LE03
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5. TROUBLESHOOTING LE05
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7. WORKING STANDARDS LE07

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○ How to Index each Shop Manual Section
The GENERAL of this shop manual consists of 7 headings as shown above. Each section can be easily referred to by indexes appended to the margin of the page as indicated on the right. Please use the indexes for speedy reference.



KOBELCO

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