2/2

30	17001-00041	PRESSURE SWITCH	ON0.32MPa/OFF0.36MPa
29	17001-00060	PRESSURE SWITCH	ON/OFF0.39MPa
28	17001-00015	PRESSURE SWITCH	ON/OFF0.59MPa
27	19017-47000	BLOCK COUPLER	·
26	·	·	·
25	·	·	·
24	·	·	·
23	·	·	·
22	·	·	·
21	·	·	·
20	19017-53600	SOLENOID VALVE	·
19	19017-52000	SOLENOID VALVE	·
18	15511-00300	RELIEF VALVE	·
17	15401-40830	CHECK VALVE	·
16	15520-00800	AIR BREATHER	·
15	15500-20150	SUCTION FILTER	·
14	15511-02600	RETURN FILTER	·
13	19017-52100	PROPORTIONAL VALVE	·
12	19017-49700	REMOTE C.V (L)	·
11	19017-49800	REMOTE C.V (R)	·
10	15511-02500	LINE FILTER	·
9	19000-81400	BUCKET CYLINDER(L)	·
8	19000-81300	BUCKET CYLINDER(R)	·
7	19000-81800	ARM CYLINDER	·
6	19001-00700	QUICK HITCH CYLINDER	·
5	19020-17900	GEAR PUMP	·
4	19017-48100	SUB VALVE	·
3	19010-45200	CONTROL VALVE	·
2	19020-20200	HST PUMP	·
1	19031-26600	TRAVEL MOTOR	·
ITEM	PART No.	NAME OF PART	REMARKS

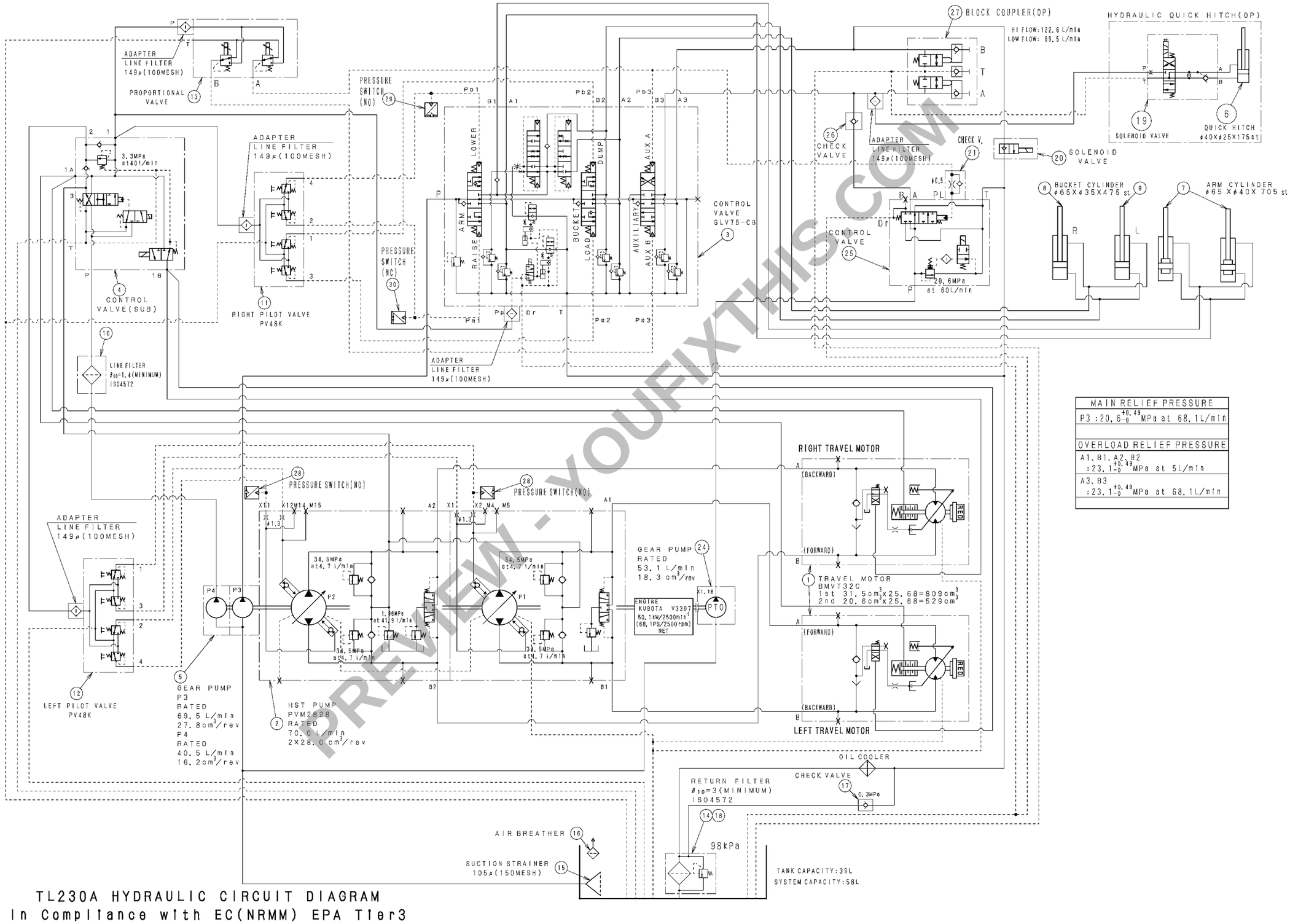
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High Flow

1/2



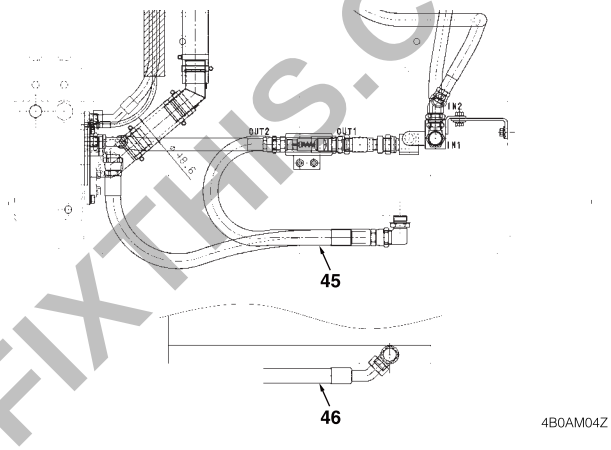
TL230A HYDRAULIC CIRCUIT DIAGRAM
In Compliance with EC(NRMM) EPA Tier3

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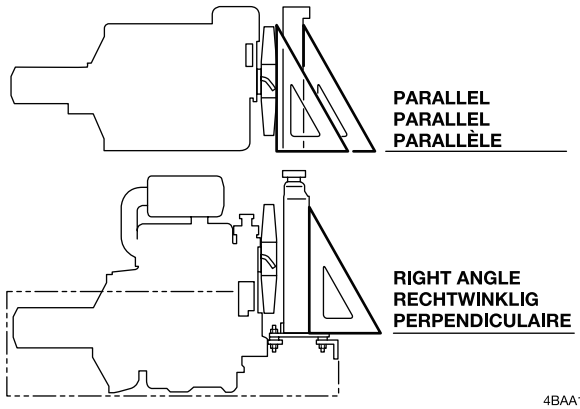
1. Disconnect the battery ground cable (40) from the battery terminal.
2. Remove the canopy.
   ☞ "Removing the canopy"
3. Remove the floor frame.
   ☞ "Removing the floor frame"
4. Loosen the radiator cap and bleed out the engine coolant from the drain valve (25).
   • Engine coolant volume: 13.0 L
5. Disconnect the drain hose (35).
6. Disconnect the radiator hoses (11) and (12) and the hose (22) from the radiator assembly (6).
7. Disconnect the oil cooler hoses (45) and (46).
   • Prepare a plate to catch drips of the hydraulic oil.
8. Remove the radiator assembly (4).
   kg : 59kg
9. Disconnect the electrical lines from the air cleaner (13) and then remove the air cleaner (13) together with the bracket.
10. Remove the silencer (30) together with the bracket.
11. Remove the radiator.
    ☞ "Removing the radiator"
12. Disconnect the drain hose (36) from the engine.
13. Remove the hydraulic pump.
    ☞ "Removing the hydraulic pump"
14. Disconnect the fuel hose from the engine.
    ☞ "Removing the fuel tank"
15. Disconnect the battery cable (42) and the engine's electrical lines from the main harness.
    ☞ "Wire harness diagram"
    • Attach an identification label to ground wiring.
16. Disconnect the earth cable (29) from the engine.
17. Remove the bolts, followed by the cushion rubber (27) {inscribed as "O"} and the cushion rubber (26) {No inscription}.
    Bolt: ThreeBond #1324
    Bolt: 256 N·m
18. Suspend the engine.
    kg : 282 kg



4B0AM04Z

Installing the engine

For installation of the engine, follow the same procedure as for removal in the reverse order.
The radiator must be mounted at right angles to the frame and parallel to the cooling fan.

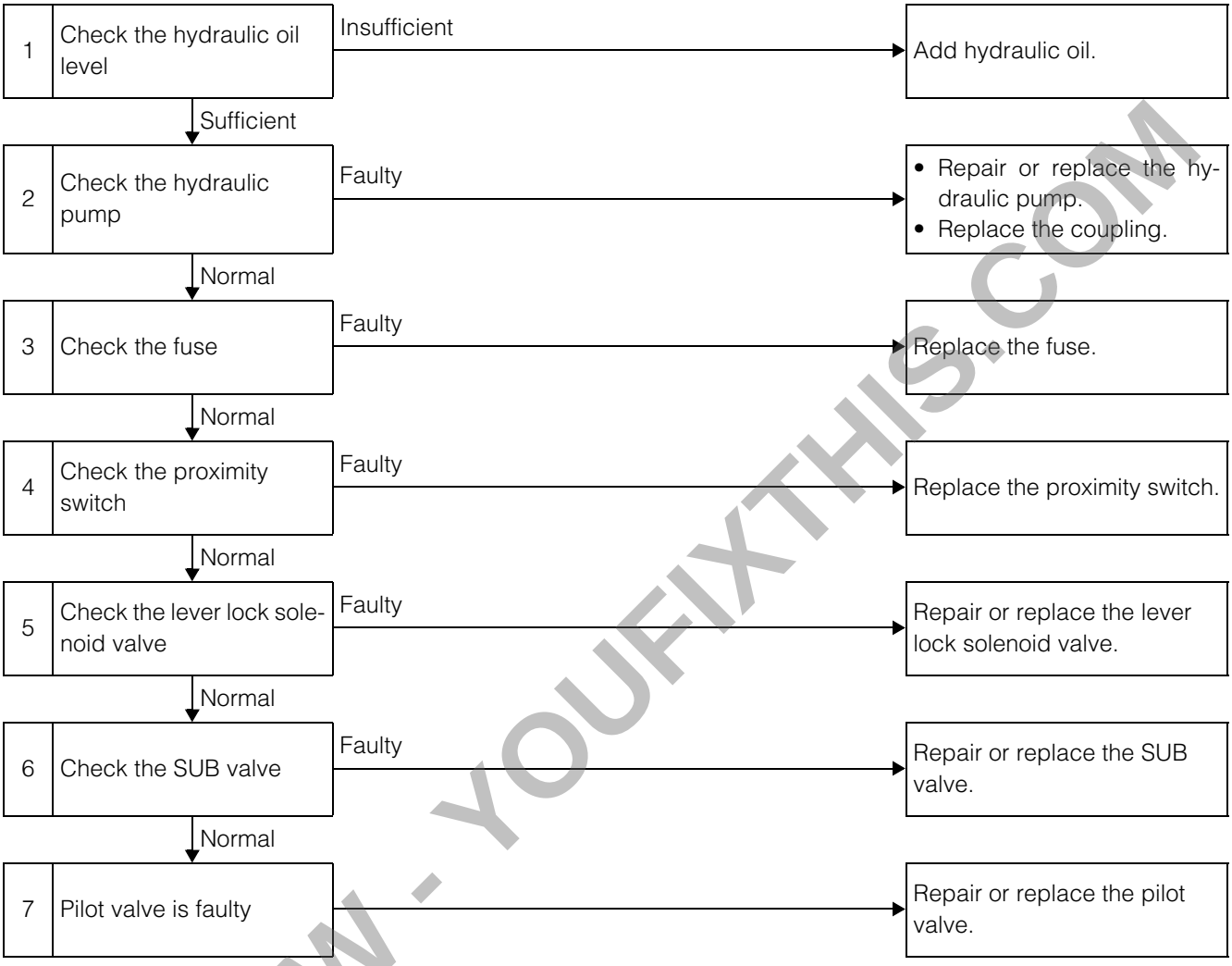


4BAA11Z

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OVERALL MACHINE

No operation is possible.



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SPECIFICATIONS TABLES

Performance

Bucket type			Standard bucket
Bucket capacity		m^3	0.351
Tipping load		kg	2450
Rated loading mass		kg	855
Breakout force		kN	29.9
Raising time (load)		s	4.0
Lowering time		s	2.5
Bucket forward tilting time		s	2.6
Travel speed	Forward 1st	km/h	7.4
	Forward 2nd	km/h	11.0
	Reverse 1st	km/h	7.4
	Reverse 2nd	km/h	11.0
Maximum tractive force		kN	40.6
Gradeability		degrees (°)	30
Minimum turning radius	Bucket outside	m	2.08

Dimensions

Overall length in transport condition	Without teeth		mm	3430
	With teeth		mm	–
Overall width (body)			mm	1580
Bucket width			mm	1675
Overall height	Bucket on ground	Canopy	mm	2130
		Cab	mm	2235
	Max. raised height of bucket		mm	3905
Crawler bearing length			mm	1390
Track gauge			mm	1260
Shoe width			mm	320
Crawler bearing area			m^2	0.890
Ground clearance of undercarriage			mm	310
Bucket hinge pin height			mm	3030
Dumping clearance (at 45-degree forward tipping)	Without teeth		mm	2370
	With teeth		mm	–
Dumping reach (at 45-degree forward tipping)	Without teeth		mm	730
	With teeth		mm	–
Bucket roll back angle	On ground		degree (°)	29.3
Bucket dumping angle	Maximum height position		degree (°)	38.6
Maximum digging depth			mm	0

Mass

Gross machine mass	Canopy	kg	4330
	Cab	kg	4410
Operating mass	Canopy	kg	3770
	Cab	kg	3850
Machine mass	Canopy	kg	3695
	Cab	kg	3775
Shipping mass	Canopy	kg	3640
	Cab	kg	3720

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No.	From		To		Nominal	Color	Remarks
	Name	Location	Name	Location			
1	J82	3-3C	J1	7D	5	Y	
2	J1	7D	CN11	2-4D	5	Y	To B of AL
3	J1	7D	Fuse box-1	4E	5	Y	
4	J80	3-4E	J2	6A	5	R	BAT
5	J2	6A	Starter SW	5C	2	R	B
6	J2	6A	Fuse box	4G	3	R	B
7	Glow CTL, B	3-4B	J3	7D	3	BY	
8	J3	7D	CN31	5E	3	BY	
9	J3	7D	CTL CNX2-3	1C	0.5	BY	Glow potential A/D
10	Starter relay, NO	3-2B	CN10	2-4D	3	L	Start
11	A/C fuse, OUT	3-6B	A/C power supply connector	7A	3	Br	
12	Stop solenoid relay, G, (pull)	3-5A	CN10	2-4D	3	G	Stop pull
13	Starter SW BR	5C	J110	3-5D	1.25	BR	B relay
14	CN12 AL, L	2-4C	J24	2-2A	0.85	L	AL_CHG
15	Glow CTL, 4 Glow lamp	3-5B	CTL box connector	1D	0.5	RB	
16	J83	3-6D	J4	7A	1.25	V	Control circuit power supply
17	J4	7A	Fuse box 9	4G	1.25	V	Control circuit power supply
18	J4	7A	SF lever	7B	1.25	V	Control circuit power supply
21	CN14	2-4D	ENG stop SW	5A	2	W	Stop hold
22	CN12	2-4C	CTL CNI-5B	1B	0.5	GB	ENG OIL SW
23	Feed pump	2-4H	Fuse box 8	4G	0.85	BR	Fuel F pump
24	Diode	2-3D	CN12	2-4C	0.85	R	AL IG
25	Diode	2-3D	J4	7A	1.25	V	
27	Starter SW ACC	5C	J5	4A	2	W	ACC power supply
28	J5	4A	Fuse box	4G	2	W	ACC power supply
29	J5	4A	CTL CNX2-1	1C	0.5	W	ACC power supply
30	J5	4A	Glow POJ connector	2H	1.25	W	ACC power supply
31							
32	Starter SW C	5C	KOSRAN IF	1D	1.25	BW	ST signal
33	KOSRAN IF	1D	Starter IL relay	2H	1.25	BW	ST signal
34	CTL CNX2-2	1C	Starter IL relay	2H	0.5	BW	ST signal
35	Starter IL relay	2H	J84	3-6E	1.25	BW	ST signal
36	Glow POJ connector	2H	Starter SW RI	5C	1.25	BW	
40	Fuse box 1	4G	F light SW	5C	2	Y	
41	F light SW	5C	To cap harness	7B	2	Br	
42	F light SW	5C	W diode unit	3D	0.5	Br	
43	Fuse box 2	4G	Rear light SW	5C	2	Or	
44	Rear light SW	5C	J6	3B	2	Or	
45	J6	3B	W diode unit	4D	0.5	Or	

No.	From		To		Nominal	Color	Remarks
	Name	Location	Name	Location			
46	J6	3B	J7	7B	2	Or	
47	J7	7B	Rear light, +	3-4G	1.25	Or	
48	J7	7B	Rear light left	2-4G	1.25	Or	
49	W diode unit	4D	Cluster interior lighting	4D	0.5	Y	
50	Front W, fuse 3	4G	J8	7A	1.25	W	
51	J8	7A	Cab connector, F wiper SW.	7B	1.25	W	
52							
53	J8	7A	CN32-4 front wiper SW B	2-1B	1.25	W	
54							
55	Fuse box 4 rear W	4G	J10	7A	1.25	Or	
56	J10	7A	Cap connector rear W	7B	1.25	Or	
57	J10	7A	CN32-8 RW SW B	2-1B	1.25	Or	
58							
59							
60	Fuse box 5	4G	J12	2B	1.25	P	SOL power supply
61	J12	2B	CTL CNY1 1	1B	0.5	P	
62	J12	2B	CTL CNY1 2	1B	0.5	P	
63	J12	2B	CTL CNY1 3	1B	0.5	P	
64	J12	2B	CTL CNY1 4	1B	0.5	P	
65							
66	Fuse box 6	4G	J13	2A	1.25	Gy	CTL ACC
67	J13	2A	CTL CNY1-6	1B	0.75	Gy	CTL ACC
68	J13	2A	CTL CNY1-7	2B	0.75	Gy	CTL ACC
69							
70	Fuse box 7	4G	Engine stop SW	5A	1.25	L	STOP SOL
71							
72	Fuse box 10	4G	KOSRAN ACC	1D	0.75	RW	
73	Fuse box 11	4G	Cluster CN1-1	4D	0.5	G	ACC
74							
75	Fuse box 13	4G	J14	3G	1.25	R	ECM (BAT)
76	J14	3G	CTL CNY1-5	1B	0.75	R	
77	J14	3G	CTL CN1-1	1C	0.5	R	
78							
79							
80	Fuse box 14	4G	KOSRAN	1D	0.75	R	BAT
81	Fuse box I5	4G	J15	3H	1.25	BY	Horn
82	J15	3H	Horn relay C	2H	1.25	BY	Horn
83	J15	3H	Arm F, H, COM	5B	0.5	BY	Right grip
85	Fuse box I6	4G	Cab connector	7B	1.25	Y	Room, radio BK
86	Fuse box I7	4G	CTL CNY2-1	1D	0.75	Br	SOL proportional power supply
88	Fuse box 12	4G	J16	3B	2	G	Optional power supply
89	J16	3B	Optional power supply	1A	1.25	G	Optional power supply
90	J16	3B	J17	7B	1.25	G	Optional power supply
91	J17	7B	CAB connector auxiliary	7B	1.25	G	Optional power supply
92	J17	7B	Maintenance socket	2-1A	1.25	G	

No.	From		To		Nominal	Color	Remarks
	Name	Location	Name	Location			
94	J17	7B	Radio power supply	7B	0.85	G	OP ACC
95	CTL CNY1-11	1B	Back buzzer, +	3-5H	0.85	W	Back BZ
96	Horn relay NO	2H	Horn, +	3-3H	1.25	BY	Horn
100	Pressure SW left-rear	6C	CTL CNX1-1	1B	0.5	G	Pressure SW left-rear
101	Pressure SW right-rear	6C	CTL CNX1-2	1B	0.5	W	Pressure SW right-rear
102	CN30	6E	CTL CN1-2	1C	0.5 MWS Single-core	W	Water temp. sensor At 0.5B *1 Joint
103	CN30	6E	J20 (AGND)	2C		SH	
104	J20	2C	CTL CN1-9	1C	0.5	B	
106	CN30	6E	CTL CNX1-7B	1B	0.5	Y	OH SW
110	CTL CNY1-10	1B	Warning BZ	2H	0.5	Y	
111	CTL CNY1-12	1B	Starter IL relay	1H	0.5	G	
112	CTL CNY1-13	1B	J21	3G	0.85	L	High flow
113	J21	3G	J112	3-4G	0.85	L	High flow
114	J21	3G	High flow SW lamp	5B	0.5	L	High flow
115	CTL CNY1-14	1B	J102	9B	0.85	YR	Arm F SOL
116	CTL CNY1-15	1B	Quick connector	2-4G	0.85	BW	DWN SOL
117	CTL CNY1-16	1B	Quick connector	2-4G	0.85	RW	UP SOL
119	CTL CNY1-18	2B	J106	2-3B	0.85	Br	2nd-speed SOL
120	CTL CNY1-19	2B	J29	7B	0.85	Y	1 WAY
121	J29	7B	J100	7E	0.85	Y	1 WAY
122	J29	7B	1 WAY SW lamp	2-1B	0.5	Y	1 WAY
123	CTL CNY1-20	2B	J104	2-3A	0.85	L	SF lever
124	J104	2-3A	Safety lever SOL	2-4B	0.85	L	SF lever
125	J106	2-3B	2nd-speed SOL	2-4B	0.85	Br	2nd-speed SOL
126	J100	7E	1 WAY SOL	8D	0.85	Y	1 WAY
130	CTL CNX1-3	1B	Arm lowering pressure SW	9C	0.5	WB	
131	CTL CNX1-4	1B	Arm raising pressure SW	9B	0.5	WB	
135	CTL CNX2-8	1C	Arm F SW	5B	0.5	R	Right Gr
138	J17	7B	AUXD SW lamp	2-1C	0.5	BW	
140	CTL CNX1-12	1B	1 WAY SW	2-1B	0.5	BY	
141	CTL CNX1-8	1B	Q pitch LS	2-4G	0.5	W	
142	CTL CNX1-9	1B	Q SOL A	2-1D	0.5	RW	Q SW A

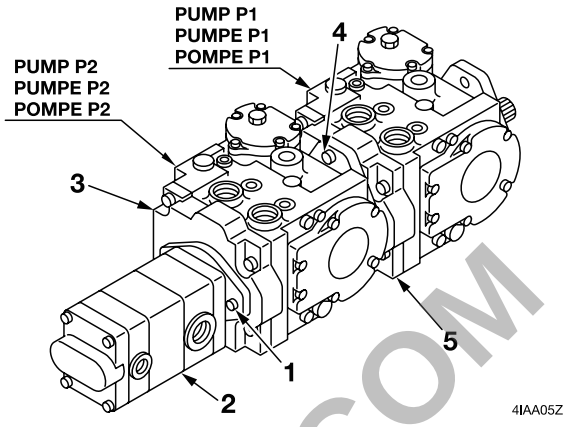
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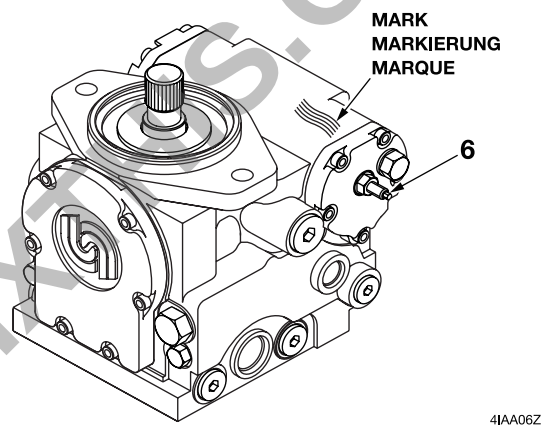
Disassembly

Pump

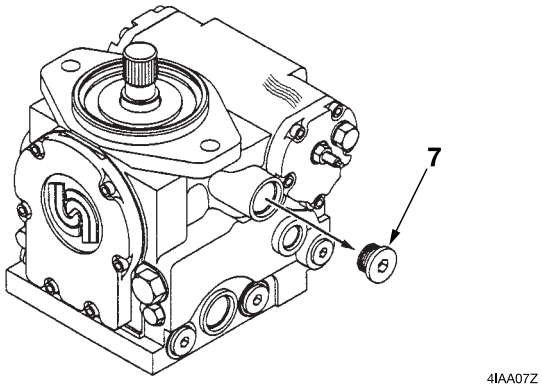
1. Disassemble the pumps P1 and P2 and the gear pump.
   - To avoid misconnection when reassembling, place indicators for matching positions.
   a. Take out the two cap screws (1), and remove the gear pump (2) from the “A” pad adapter (3).
      Remove the O-ring from the “A” pad adapter (3).
   b. Take out the two Allen bolts (4) to separate the hydraulic pump P1 from P2.
      Remove the O-ring from the “B” pad adapter (5).



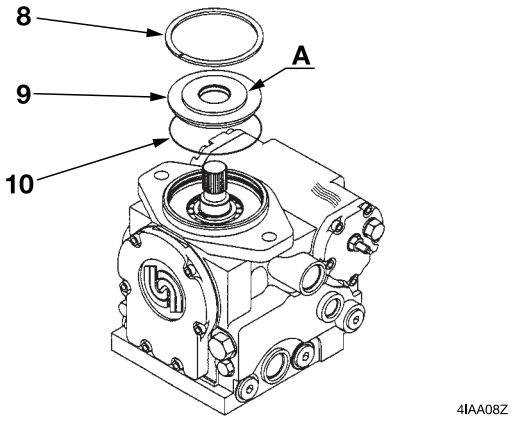
   c. Place a directional marker on the housing.
      - Place it on the side near to the tie bolt (6) used for neutral adjustment.



2. Remove the drain plug (7).



3. Remove the retaining ring (8).
   - Use a flat-bladed screwdriver.
4. Remove the seal carrier.
   a. Pull up the shaft and remove the seal carrier (9).
      - If it is hard to remove, insert the flat-bladed screwdriver under the convex part “A” of the seal carrier and try again.
   b. Remove the seal from the seal carrier (9).
   c. Remove the O-ring (10).



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HST PUMP

☞ "4. Disassembly and assembly, HST pump"

HST system

Symptoms	Major causes	Remedies
The neutral position is hard or impossible to set	• Pilot valve faulty	• Repair or replace.
	• Neutral adjustment of HST pump is faulty	• Re-adjust the neutral position of the HST pump. If this fails, replace the HST pump.
	• Adjustment of the rotational torque of the servo piston is faulty	• Re-adjust the rotational torque of the servo piston. If this fails, replace the HST pump.
Travels only either forward or in reverse	• Pilot valve is faulty	• Repair or replace.
	• The supply pressure to the pilot valve is too low	• Check, repair or replace the hydraulic pump P4 and the solenoid valve.
	• Charge pressure is too low	• Check, repair or replace the hydraulic pump P4, the solenoid valve and low-pressure relief valve.
	• Orifice is clogged	• Clean the orifice.
	• High-pressure relief valve is faulty	• Repair or replace.
	• Scoring or seizing on the servo piston	• Repair or replace.
	• Travel motor is faulty	• Repair or replace.
Cannot travel forward or in reverse Veers when traveling in a straight line	• Hydraulic oil tank level is too low	• Add oil to the specified level.
	• Pilot valve is faulty	• Repair or replace.
	• Supply pressure to the pilot valve is insufficient	• Check, repair or replace the hydraulic pump P4 and the solenoid valve.
	• Charge pressure is insufficient	• Check, repair or replace the hydraulic pump P4, the solenoid valve and low-pressure relief valve.
	• Orifice is clogged	• Clean the orifice.
	• High-pressure relief valve is faulty	• Repair or replace.
	• Adjustment of displacement limiter is faulty	• Adjust the displacement limiter. If this fails, replace the HST pump.
	• Travel motor is faulty	• Repair or replace.
Operating temperature of the system is too high	• Hydraulic oil tank level is too low	• Add oil to the specified level.
	• Oil cooler is faulty	• Repair or replace.
	• High-pressure relief valve is faulty	• Repair or replace.
	• Parking brake release pressure is too low	• Check, repair or replace the hydraulic pump P4 and the solenoid valve.
	• Travel motor is generating heat	• Repair or replace.
	• HST pump is generating heat	• Repair or replace.

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Engine

Model				Kubota V3307-DI-T-E3B-TLTU1
Type				4-cycle, vertical, water-cooled, in-line, 4-cylinder, direct-injection
Number of cylinders – Internal diameter × stroke				4 - 94 × 120
Total displacement			L	3.331
Performance	Rated output	Gross (SAE J1995)	kW/min^{-1}	53.0/2500
		Net (ISO 14396)	kW/min^{-1}	52.2/2500
		Net (ISO 9249/ SAEJ 1349)	kW/min^{-1}	51.0/2500
	Maximum torque		N·m	247.7/1500 min^{-1}
	Specific fuel consumption (at rated output)		g/kW·h	259
Fuel system	Speed governor			Integrated into fuel injection pump; mechanical all-speed type
Lubrication system	Type			Trochoid pump
	Filter system			Filter paper
	Cooling system			Water cooling
Air cleaner				Centrifugal, filter paper
Cooling system	Fan			Pusher type
	Radiator			Pressurized
Generator	AC/DC			Three-phase alternating current, self-rectifying
	Voltage		V	12
	Output		kW	0.72
Starting system	Voltage		V	12
	Output		kW	3
Battery	Type			115E31R
	Voltage		V	12
	Capacity		A·h	72
	Quantity			1

Hydraulic drive system

Pump	Model		Sauer-Danfoss-Daikin PVM2828
	Type		Variable displacement piston
	Displacement	cm^3/rev	0 to 28
	Quantity		2
Travel motor	Model		Sauer-Danfoss-Daikin BMVT32A
	Type		Variable displacement piston
	Motor displacement	cm^3/rev	20.6/31.5
	Quantity		2
Set pressure	Effective differential pressure	MPa	34.5
Reduction gears			Epicycle reduction gear

Brake device

Parking brake	Spring-loaded, wet type disc brake

Undercarriage

Suspension system			Rigid type
Roller, Idler	Seal system		Floating seal
	Carrier roller (one side)	Q'ty	–
	Track roller (one side)	Q'ty	5
Crawler	Track adjustment		By injecting grease
	Type		One-piece design, single groucer, rubber crawler
	Grouser height	mm	30
	Number of shoes (one side)	Q'ty	52
	Pitch	mm	86
	Shoe width	mm	320

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FOREWORD

This manual, which is written for engineers who service the machine, describes procedures for disassembly and assembly, inspection and maintenance, and troubleshooting, as well as maintenance reference values and an outline of the specifications. Refer to this manual during daily work to improve your services. Note that the information is subject to change without notice due to design modifications made to the machine from time to time by the manufacturer.

Directional terms: front, rear, left, right

In this manual, the “front” refers to the end of the machine where the bucket is mounted, while the “rear” refers to the other end where the travel motor is mounted. The “right” or “left” refers to the side viewed by a person sitting in the operator’s seat.

Machine serial number

The machine serial number is stamped on the identification plate. Be sure to include this number when sending a report or inquiry or when ordering parts.

Control of manual

Appoint a person in charge of keeping the manuals up to date in your company and inform us of the person’s name for our records. Any revisions or additions to this manual will be sent to the person.

Symbols used in this manual

The symbols used in this manual have the following meanings.

S/N Indicates the machine serial number.
☞ Means “Refer to the section quoted.”
kg Indicates the mass of the equipment or machine.
Means “Tighten to the torque specified here.”
Indicates the use of thread-locking compound.
Indicates the use of grease.

Manual structure

This manual consists of the following parts.

1. Safety
2. Service data
3. Function
4. Disassembly and assembly
5. Troubleshooting
6. Engine

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SAFETY ALERT SYMBOL



This symbol represents the safety alert.
The message that follows the symbol contains important information regarding human safety.
Read and understand the message to avoid personal injury or death.

Safety label

Safety labels are used to alert operators or other people exposed to the risks of injury or damage. There are the following three types of labels.
Read the labels carefully as they are important for your safety.

⚠ DANGER

The word “DANGER” indicates an imminently hazardous situation which, if not avoided, is likely to result in serious injury or death.

⚠ WARNING

The word “WARNING” indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

⚠ CAUTION

The word “CAUTION” indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

IMPORTANT: The word “IMPORTANT” is used to alert operators and maintenance personnel about situations which could result in damage to the machine and its components.

This manual is intended for trained and qualified personnel only. Warnings or cautions described in this manual do not necessarily cover all safety measures. It is also impossible to cover all hazards and risks which may be associated with the maintenance of the machine in every environment. For maintenance work, each person must take adequate safety precautions against possible hazards in the respective working environment.

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