SPECIFICATIONS TABLES

Performance

Bucket type			Standard bucket
Bucket capacity		m^3	0.298
Tipping load		kg	1610
Rated loading mass		kg	565
Breakout force		kN	21.4
Raising time (load)		s	3.7
Lowering time		s	2.7
Bucket forward tilting time		s	2.6
Travel speed	Forward 1st	km/h	6.5
	Forward 2nd	km/h	9.3
	Reverse 1st	km/h	6.5
	Reverse 2nd	km/h	9.3
Maximum tractive force		kN	29.5
Gradeability		degree (°)	30
Minimum turning radius	Bucket outside	m	1.995

Dimensions

Overall length in transport condition	Without teeth		mm	3220
	With teeth		mm	—
Overall width (body)			mm	1470
Bucket width			mm	1600
Overall height	Bucket on ground	Canopy	mm	1970
		Cab	mm	1970
	Max. raised height of bucket		mm	3725
Crawler bearing length			mm	1240
Track gauge			mm	1170
Shoe width			mm	300
Crawler bearing area			m^2	0.745
Ground clearance of undercarriage			mm	250
Bucket hinge pin height			mm	2905
Dumping clearance (at 45-degree forward tipping)	Without teeth		mm	2275
	With teeth		mm	—
Dumping reach (at 45-degree forward tipping)	Without teeth		mm	590
	With teeth		mm	–
Bucket roll back angle	On ground		degree (°)	30.4
Bucket dumping angle	Maximum height position		degree (°)	38.5
Maximum digging depth			mm	0

Mass

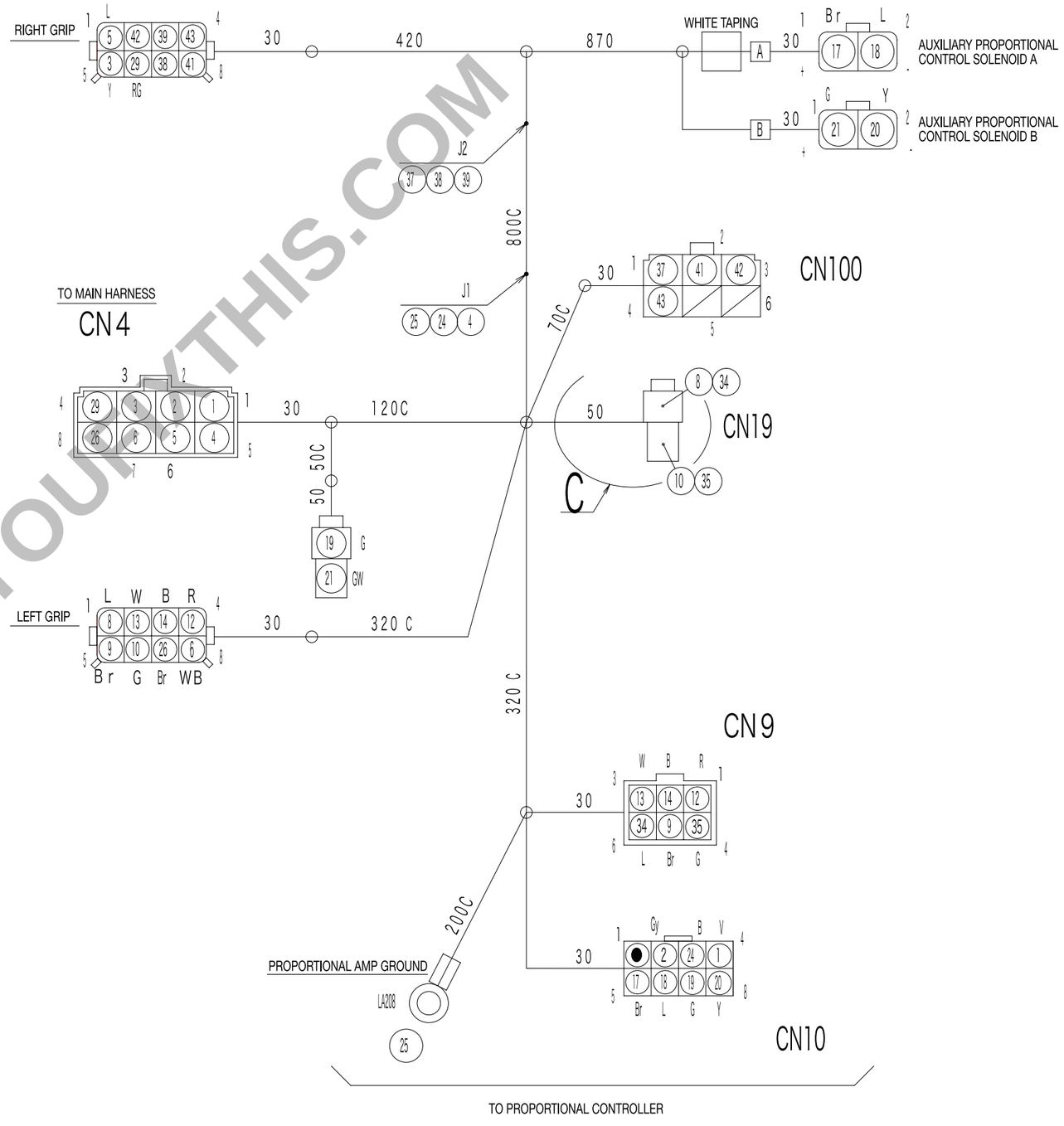
Gross machine mass	Canopy	kg	3270
	Cab	kg	3330
Operating mass	Canopy	kg	2795
	Cab	kg	2855
Machine mass	Canopy	kg	2720
	Cab	kg	2780
Shipping mass	Canopy	kg	2675
	Cab	kg	2735

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Wire harness diagram

NO.	WIRING STYLE	SIZE, WIRE COLOR	FROM	TO
1	AVSS	0.85V	CN4-1 FUSE 9	CN10-4 PROPORTIONAL CONTROLLER (POWER SUPPLY)
2	AVSS	0.5Gy	CN4-2 AUXILIARY CIRCUIT A DETENT SWITCH, C	CN10-2 PROPORTIONAL CONTROLLER (DETENT)
3	AVSS	0.5Y	CN4-3 HORN RELAY, +	RIGHT GRIP HORN SWITCH
4	AVSS	2B	CN4-5 BODY GROUND	JOINT-1 (GROUND)
5	AVSS	0.5L	CN4-6 ARM FLOAT SWITCH RELAY, +	RIGHT GRIP ARM FLOAT SWITCH
6	AVSS	0.5WB	CN4-7 CLUSTER 2ND TRAVEL SPEED SWITCH INPUT	LEFT GRIP TRAVEL SPEED SHIFT SWITCH
7				
8	AVSS	0.5L	LEFT GRIP AUXILIARY SWITCH A TERMINAL NO	CN19
9	AVSS	0.5Br	LEFT GRIP AUXILIARY SWITCH B TERMINAL NO	CN9-5 PROPORTIONAL CONTROLLER
10	AVSS	0.5G	LEFT GRIP AUXILIARY SWITCH AB, COM	CN19
11				
12	MVVS 0.5	R	LEFT GRIP (+)	CN9-1 PROPORTIONAL CONTROLLER
13	MVVS 0.5	W	(OUT PUT)	CN9-3 PROPORTIONAL CONTROLLER
14	MVVS 0.5	B	(-)	CN9-2 PROPORTIONAL CONTROLLER
15	MVVS 0.5	SH	(SH)	(14) WITH JOINT
16				
17	AVSS	0.5Br	CN10-5 PROPORTIONAL CONTROLLER	AUXILIARY PROPORTIONAL SOLENOID A, +
18	AVSS	0.5L	CN10-6 PROPORTIONAL CONTROLLER	AUXILIARY PROPORTIONAL SOLENOID A, -
19	AVSS	0.5G	CN10-7 PROPORTIONAL CONTROLLER	MAIN HARNESS
20	AVSS	0.5Y	CN10-8 PROPORTIONAL CONTROLLER	AUXILIARY PROPORTIONAL SOLENOID B, -
21	AVSS	0.5GW	MAIN HARNESS	AUXILIARY PROPORTIONAL SOLENOID B, +
22				
23				
24	AVSS	0.5B	CN10-3 PROPORTIONA CONTROLLER (GROUND)	JOINT-1 (GROUND)
25	AVSS	2B	PROPORTIONAL AMP GROUND	JOINT-1 (GROUND)
26	AVSS	0.5Br	LEFT GRIP TRAVEL SPEED SHIFT SWITCH	CN4-8 CLUSTER 2ND TRAVEL SPEED SWITCH INPUT
27				
28				
29	AVSS	0.5RG	CN4-4 FUSE 17	RIGHT GRIP ARM FLOAT, HORN SWITCH COM
30				
31				
32				
33				
34	AVSS	0.5L	CN19	CN9-6 PROPORTIONAL CONTROLLER
35	AVSS	0.5G	CN19	CN9-4 PROPORTIONAL CONTROLLER
36				
37	AVSS	0.5R	CN100-1	JOINT-2
38	AVSS	0.5R	JOINT-2	RIGHT GRIP SWITCH C COM
39	AVSS	0.5R	JOINT-2	RIGHT GRIP SWITCH D, E COM
40	AVSS			
41	AVSS	0.5YL	RIGHT GRIP SWITCH C, NO	CN100-2
42	AVSS	0.5WL	RIGHT GRIP SWITCH D, NO	CN100-3
43	AVSS	0.5RL	RIGHT GRIP SWITCH E, NO	CN100-4



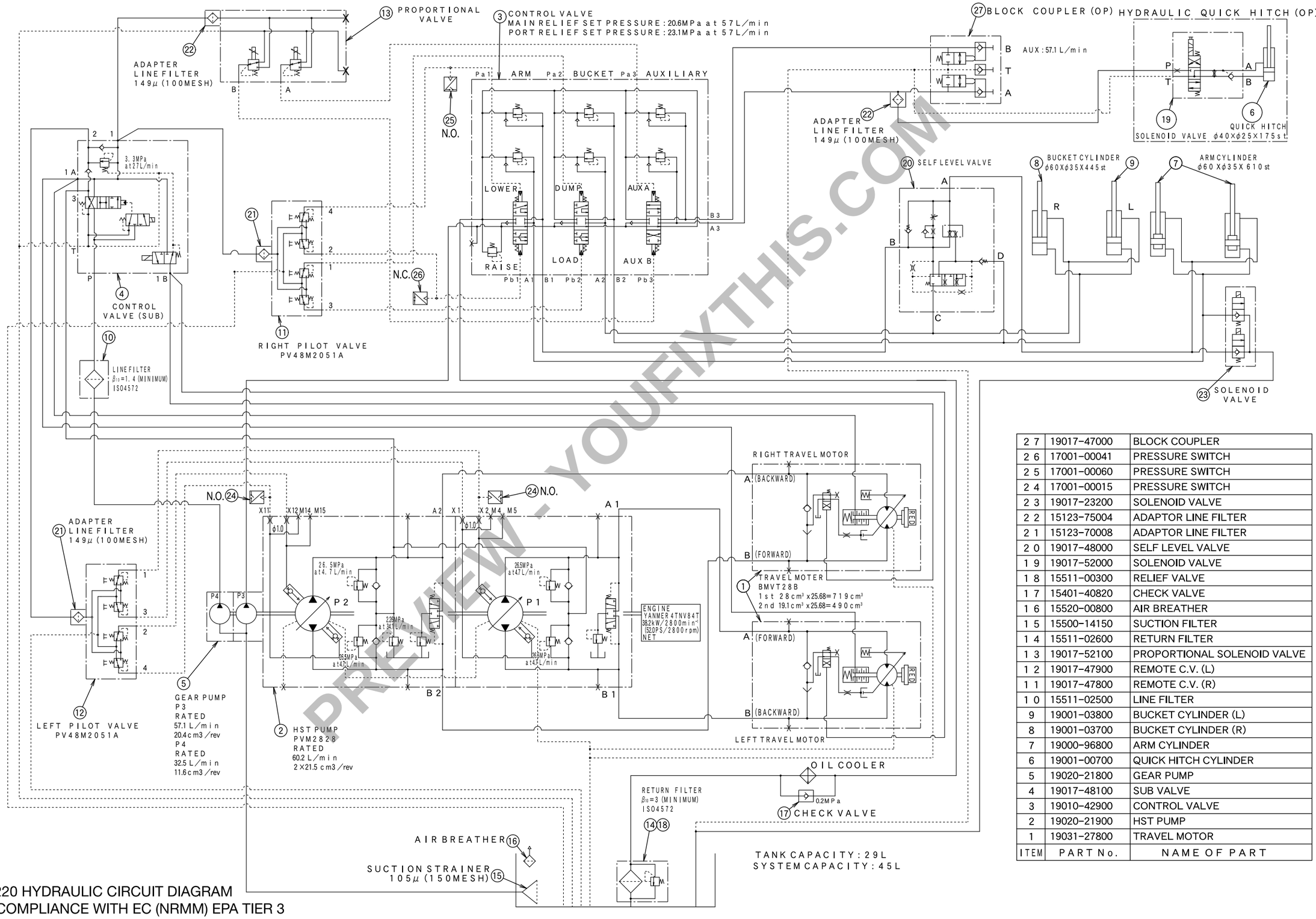
Drawing No.	1/1
06542-02400-2	

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HYDRAULIC CIRCUIT DIAGRAM



ITEM	PART No.	NAME OF PART
27	19017-47000	BLOCK COUPLER
26	17001-00041	PRESSURE SWITCH
25	17001-00060	PRESSURE SWITCH
24	17001-00015	PRESSURE SWITCH
23	19017-23200	SOLENOID VALVE
22	15123-75004	ADAPTOR LINE FILTER
21	15123-70008	ADAPTOR LINE FILTER
20	19017-48000	SELF LEVEL VALVE
19	19017-52000	SOLENOID VALVE
18	15511-00300	RELIEF VALVE
17	15401-40820	CHECK VALVE
16	15520-00800	AIR BREATHER
15	15500-14150	SUCTION FILTER
14	15511-02600	RETURN FILTER
13	19017-52100	PROPORTIONAL SOLENOID VALVE
12	19017-47900	REMOTE C.V. (L)
11	19017-47800	REMOTE C.V. (R)
10	15511-02500	LINE FILTER
9	19001-03800	BUCKET CYLINDER (L)
8	19001-03700	BUCKET CYLINDER (R)
7	19000-96800	ARM CYLINDER
6	19001-00700	QUICK HITCH CYLINDER
5	19020-21800	GEAR PUMP
4	19017-48100	SUB VALVE
3	19010-42900	CONTROL VALVE
2	19020-21900	HST PUMP
1	19031-27800	TRAVEL MOTOR

TL220 HYDRAULIC CIRCUIT DIAGRAM
IN COMPLIANCE WITH EC (NRMM) EPA TIER 3

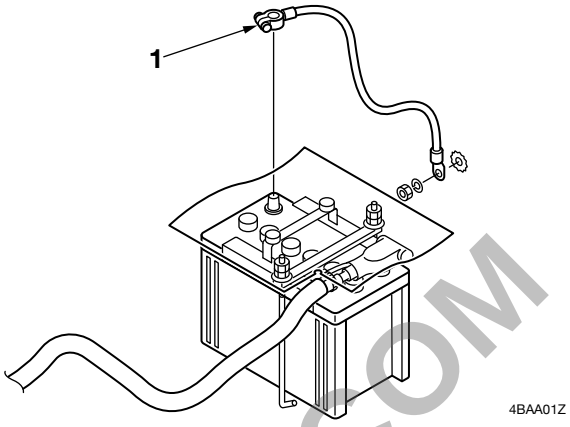
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DRIVE SYSTEM

Removing the engine

1. Disconnect the battery ground cable (1) from the battery terminal.



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2. Remove the canopy.
   ☞ "Removing the canopy"

3. Remove the floor frame.
   ☞ "Removing the floor frame"

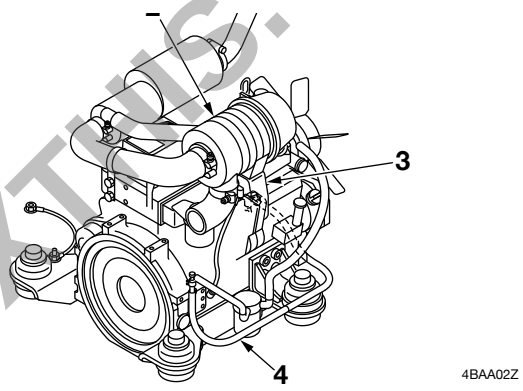
4. Disconnect the electrical wiring to the air cleaner (2).

5. Remove the bracket (3) together with the air cleaner (2).

6. Remove the radiator.
   ☞ "Removing the radiator"

7. Remove the drain hose (4).

8. Remove the hydraulic pump.
   ☞ "Removing the hydraulic pump"

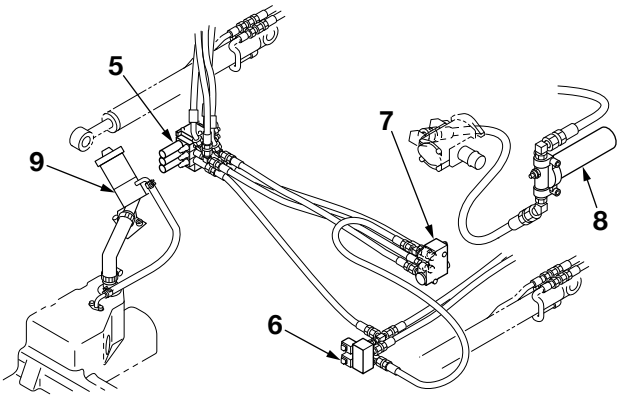


4BAA02Z

9. Remove the control valve (5), the solenoid valve (6) and the self-level valve (7).

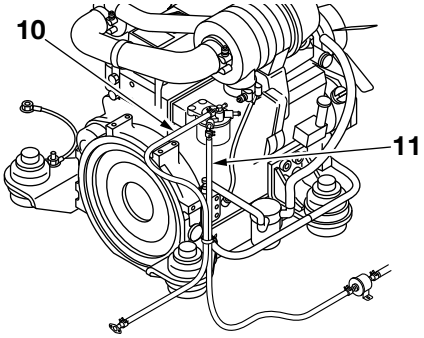
10. Remove the line filter (8).

11. Remove the filler opening (9).



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12. Disconnect the fuel hoses (10) and (11).



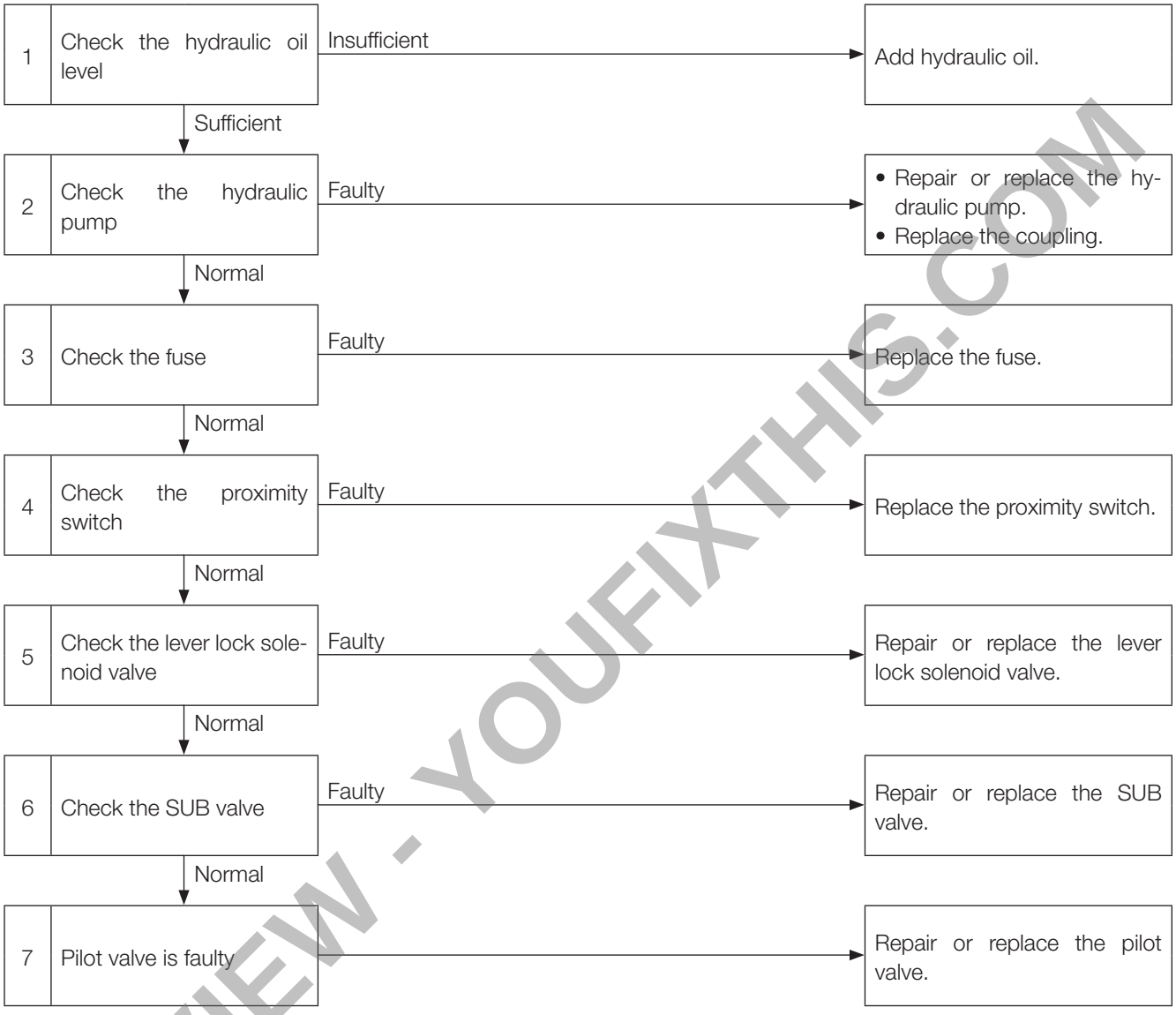
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OVERALL MACHINE

No operation is possible.



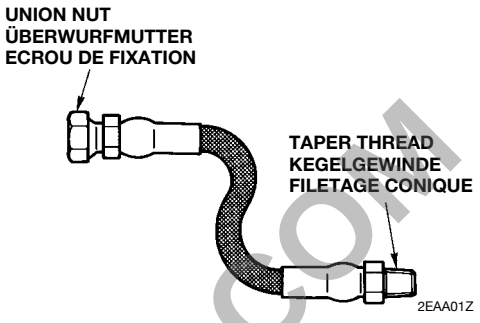
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TIGHTENING TORQUE

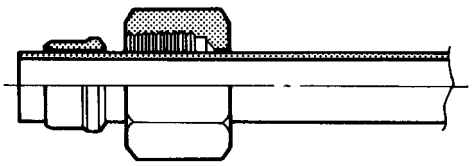
Hydraulic hose

Hose fitting size	Tightening torque	
	Union nut (G)	Taper thread (R)
	N·m	N·m
1/8	$9.8^{+4.9}_{0}$	11.8 ±1.2
1/4	$24.5^{+4.9}_{0}$	29.4 ±2.9
3/8	$49.0^{+4.9}_{0}$	53.9 ±5.4
1/2	$58.8^{+4.9}_{0}$	88.3 ±8.8
3/4	$117.7^{+4.9}_{0}$	147.1 ±14.7
1	$137.3^{+4.9}_{0}$	196.1 ±19.6



Bite-type pipe fitting for steel pipe

Pipe outer diameter (mm)	Tightening torque
	N·m
8	34.3 ±4.9
10	41.7 ±2.5
12	58.8 ±4.9
15	88.3 ±4.9
16	93.2 ±4.9
18	132.4 ±4.9
22	205.9 ±9.8
27.2	245.2 ±9.8
28	313.8 ±19.6
32	313.8 ±19.6
35	411.9 ±19.6



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Engine

Model			Yanmar 4TNV84T
Type			4-cycle, vertical, water-cooled, in-line, 4-cylinder, direct-injection
Number of cylinders – Internal diameter x stroke			4 – 84 × 90
Total displacement		L	1.955
Performance	Rated engine speed	min^{-1}	2800
	Rated horsepower	kW	38.2
	Maximum torque	N·m	149.4 to 162.8/2000 min^{-1}
	Specific fuel consumption (at rated output)	g/kW·h	259 (190)
Fuel system	Speed governor		Electronic governor (all-speed govemor)
Lubrication system	Type		Trochoid pump
	Filter system		Centrifugal, filter paper
Air cleaner			Cyclone filter
Cooling system	Fan		Pusher type
	Radiator		Pressurized
Generator	AC/DC		Three-phase alternating current, self-rectifying
	Voltage	V	12
	Output	kW	0.48
Starting system	Voltage	V	12
	Output	kW	2.3
Battery	Type		115D31R
	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 21.5
	Quantity		2
Travel motor	Model		Sauer-Danfoss-Daikin BMVT28B
	Type		Variable displacement piston
	Motor displacement	cm^3/rev	28/19.1
	Quantity		2
Set pressure	Effective differential pressure	MPa	26.5
Reduction gears			Epicycle reduction gear

Brake device

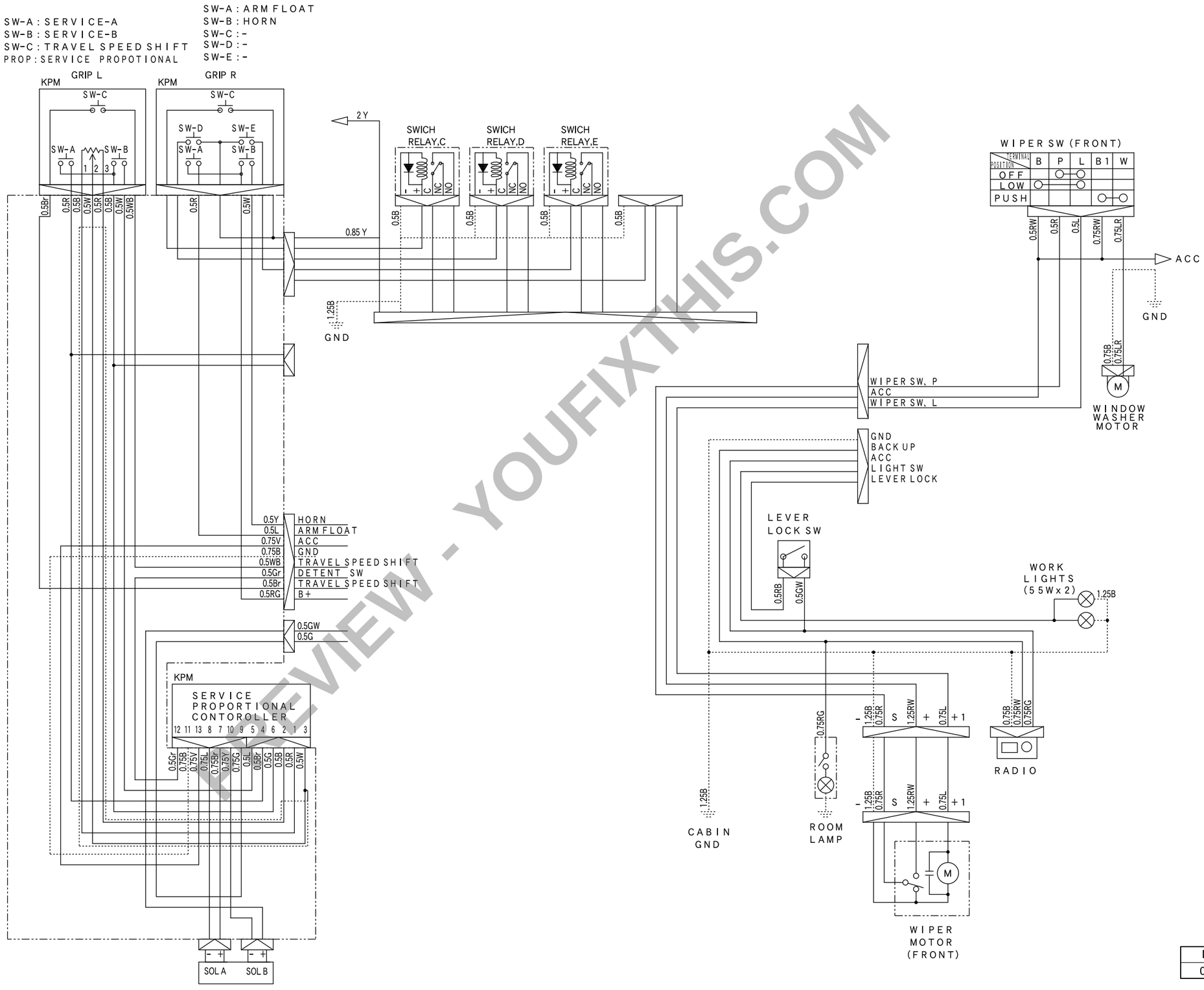
Parking brake	Spring-loaded, wet type disc brake

Undercarriage

Suspension system			Rigid type
Roller, Idler	Seal system		Floating seal
	Carrier roller (one side)	Q'ty	—
	Track roller (one side)	Q'ty	4
Crawler	Track adjuster		By injecting grease
	Type		One-piece design, single groucer, rubber crawler
	Grouser height	mm	30
	Number of shoes (one side)	Q'ty	46 (lugs)
	Pitch	mm	86
	Shoe width	mm	300

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Drawing No.	2/2
06501-00170	

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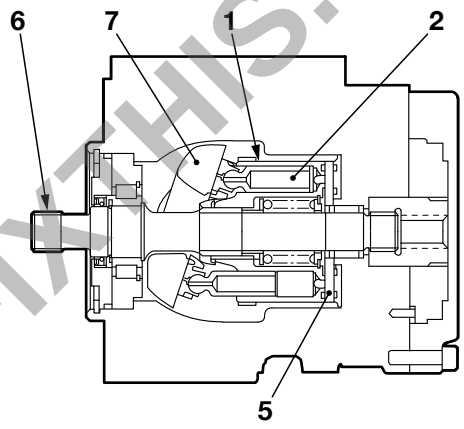
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HST PUMP

This pump is a tandem pump with a remote function for hydrostatic transmission. When combined with an HST travel motor, it can control the speed of the motor from zero to the specified maximum rate steplessly.

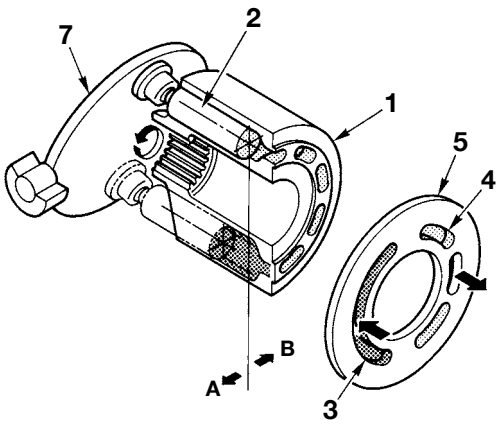
Hydraulic pump

The cylinder block (1) is constructed with the pistons (2), and at its end surface, it is in contact with the valve plate (5) containing the intake port (3) and the exhaust port (4). The cylinder block (1) rotates freely and is connected to the drive shaft (6) via the spline. The swash plate (7), on the other hand, is fixed at an angle to the housing, and the pistons (2) are designed to rotate along with the swash plate (7).



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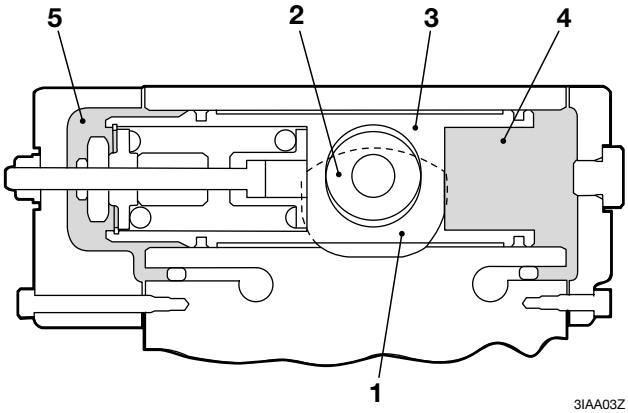
The cylinder block (1) rotates as the drive shaft (6) is rotated, and for every rotation of the cylinder block (1), the pistons (2) mounted in the cylinder block (1) complete one stroke of intake and exhaust. Thus, continuous operation of intake and exhaust can be obtained by continuously rotating the drive shaft (6).
The displacement of the pistons (2) can be varied by modifying the tilt angle of the swash plate (7).



3IAA02Z

Controlling

There are bearings attached to both sides of the swash plate (1) which is mounted at an angle to the housing and connected to the control cylinder (3) with the pistons (2). The right and left spring chambers (4 and 5) are connected with the tank circuit, and thus their pressures are equal. The swash plate (1) under these conditions is adjusted to maintain its neutral position.



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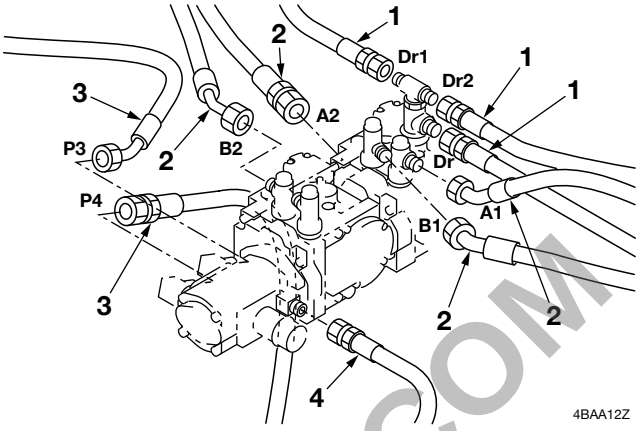
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Removing the hydraulic pump

1. Drain the hydraulic oil from the hydraulic tank.
   ☞ "Removing the hydraulic tank"

2. Disconnect the drain hoses (1) and the HST hoses (2).

3. Disconnect the discharge hoses (3) and the charge hose (4).

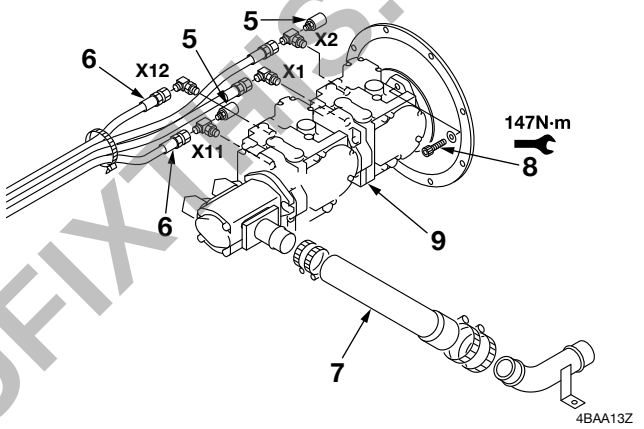


4. Disconnect the electrical wirings from the pressure switches (5).

5. Disconnect the pilot hoses (6).

6. Disconnect the suction hose (7).

7. Remove the cap screws (8) and remove the HST pump (9).
   Molybdenum disulfide grease on the spline
   Cap screw: 147 N·m



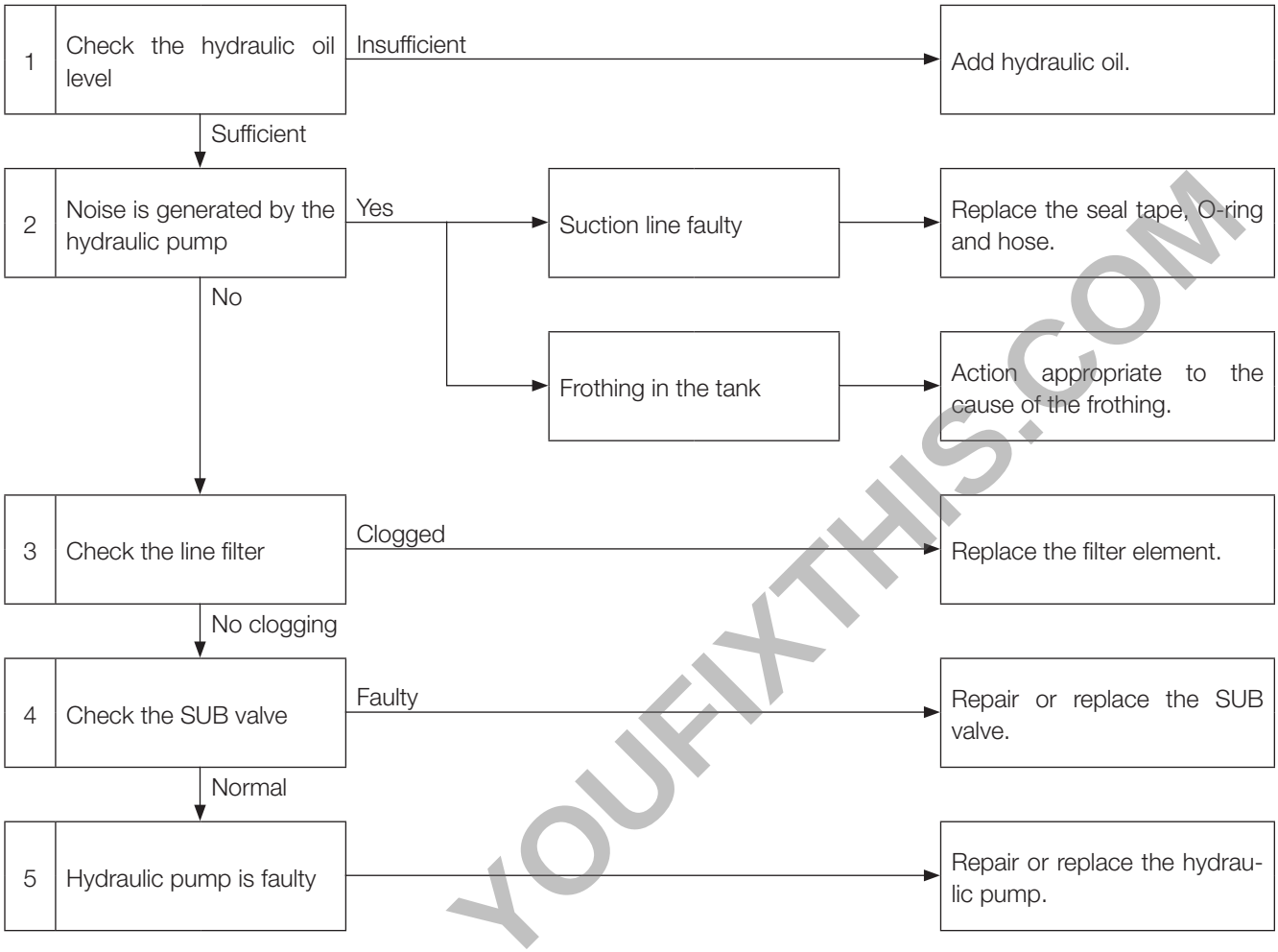
Installing the hydraulic pump

For installation of the hydraulic pump, follow the same procedure as for removal in the reverse order.

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All systems working, but insufficient power.

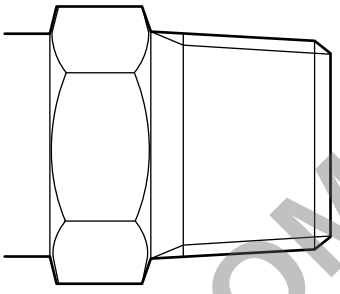


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Joint for piping

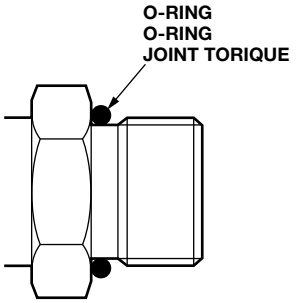
Nominal thread diameter	Tightening torque	
	Steel	Cast steel
	N·m	N·m
1/8	11.8 ±1.2	10.8 ±1.1
1/4	29.4 ±2.9	24.5 ±2.5
3/8	53.9 ±5.4	49.0 ±4.9
1/2	88.3 ±8.8	73.5 ±7.4
3/4	147.1 ±14.7	127.5 ±12.7
1	196.1 ±19.2	171.6 ±17.2


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Joint for piping (O-ring seal type)

Nominal thread diameter (G)	Tightening torque
	N·m
1/8	19.6 ±2.0
1/4	34.3 ±4.9
3/8	53.9 ±4.9
1/2	63.7 ±4.9
3/4	93.2 ±4.9
1	107.9 ±9.8
1-1/4	117.7 ±9.8
1-1/2	137.3 ±9.8

Nominal thread diameter (UNF)	Tightening torque
	N·m
7/19-20	16.7 ±2.0
1/2-20	22.6 ±2.0
9/16-18	31.4 ±2.9
3/4-16	59.8 ±4.9
1-1/16-12	102.0 ±5.9
1-5/16-12	135.3 ±7.8
1-5/8-20	181.4 ±9.8



2EAA04Z

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