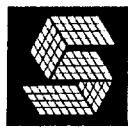
TECHNICAL MANUAL

EX45

EXCAVATOR


SECTION 01 SPECIFICATIONS
第01編 総 論·仕 様


SECTION 02 UPPERSTRUCTURE
第02編 上 部 旋 回 体


SECTION 03 UNDERCARRIAGE
第03編 下 部 走 行 体


SECTION 04 ELECTRICAL SYSTEM
第04編 電 気 シ ス テ ム


SECTION 05 HYDRAULIC SYSTEM
第05編 油 圧 シ ス テ ム


SECTION 06 OPERATIONAL PERFORMANCE TEST
第06編 性能測定·調整


SECTION 07 TROUBLESHOOTING
第07編 故 障 診 断

KM510E-01
T510-01

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FOLLOW SAFE PROCECURES

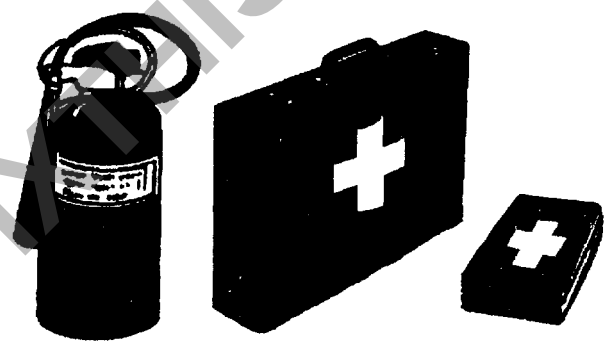
Unsafe work practices are dangerous. Understand service procedure before doing work; do not attempt shortcuts.

PREPARE FOR EMERGENCIES

Be prepared if a fire starts.

Keep a first aid kit and fire extinguisher handy.

Keep emergency numbers for doctors, ambulance service, hospital, and fire department near your telephone.



SA-020

HANDLE FLUIDS SAFELY – AVOID FIRES

Handle fuel with care; it is highly flammable. Do not refuel the machine while smoking or near open flame or sparks. Always stop engine before refueling machine. Fill fuel tank outdoors.



SA-018

Store flammable fluids away from fire hazards. Do not incinerate or puncture pressurized containers.

Make sure machine is clean of trash, grease, and debris.

Do not store oily rags; they can ignite and burn spontaneously.



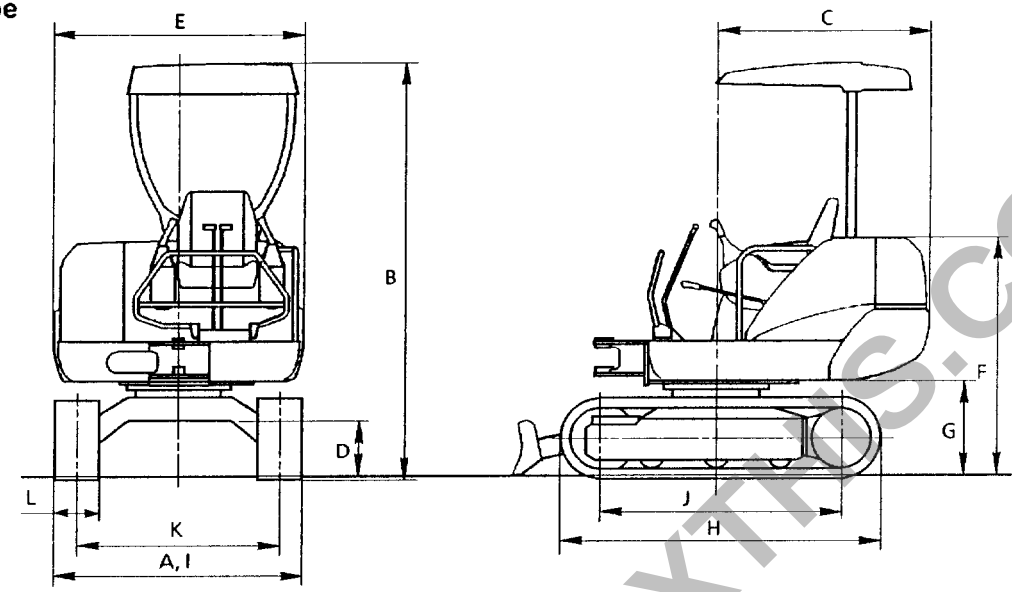
SA-019

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SPECIFICATIONS

Canopy Type



T506-01-01-002

Model	EX45
Type of front attachment	Boom-Swing Type
Bucket capacity (Heaped)	0.14 m³
Operating weight	4 400 kg (9 700 lb)
Basic machine weight	3 450 kg (7 606 lb)
Engine : ISUZU 4JC1	26 kW (35 PS) / 2200 min-1 (rpm)
A : Overall width	1 850 mm (6 ft 1 in.)
B : Overall height	2 485 mm (8 ft 2 in.)
C : Rear end swing radius	1 415 mm (4 ft 8 in.)
D : Minimum ground clearance	※ 345 mm (1 ft 1.6 in.)
E : Overall width of upperstructure	1 650 mm (5 ft 5 in.)
F : Engine cover height	※ 1 485 mm (4 ft 10 in.)
G : Counterweight clearance	※ 615 mm (2 ft 0 in.)
H : Undercarriage length	2 435 mm (8 ft 0 in.)
I : Undercarriage width	1 850 mm (6 ft 1 in.)
J : Sprocket center to idler center	1 930 mm (6 ft 4 in.)
K : Track gauge	1 450 mm (4 ft 9 in.)
L : Track shoe width	400 mm (1 ft 4 in.)
Blade width	1 850 mm (6 ft 1 in.)
Blade height	360 mm (1 ft 2 in.)
Swing speed	11.0 min-1 (rpm)
Travel speed (Fast / Slow)	4.0/2.6 km/h (2.5 / 1.6 mph)
Gradeability	30° (tan θ = 0.58)
Ground pressure (Grouser shoe)	0.25 bar (0.26 kgf / cm², 3.7 psi)

※ The dimensions exclude the height of the shoe lug.

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FUEL

Tank Capacity 50 L (13.2 US gal, 11.0 Imp gal)

Service points	Numbers of service points	Interval (Hours)						
		8	50	100	250	500	1000	2000
1. Drain water from fuel tank	1	■						
2. Check fuel filter for water sediment	1		■					
3. Replace fuel filter element	1					■		

RECOMMENDED FUEL

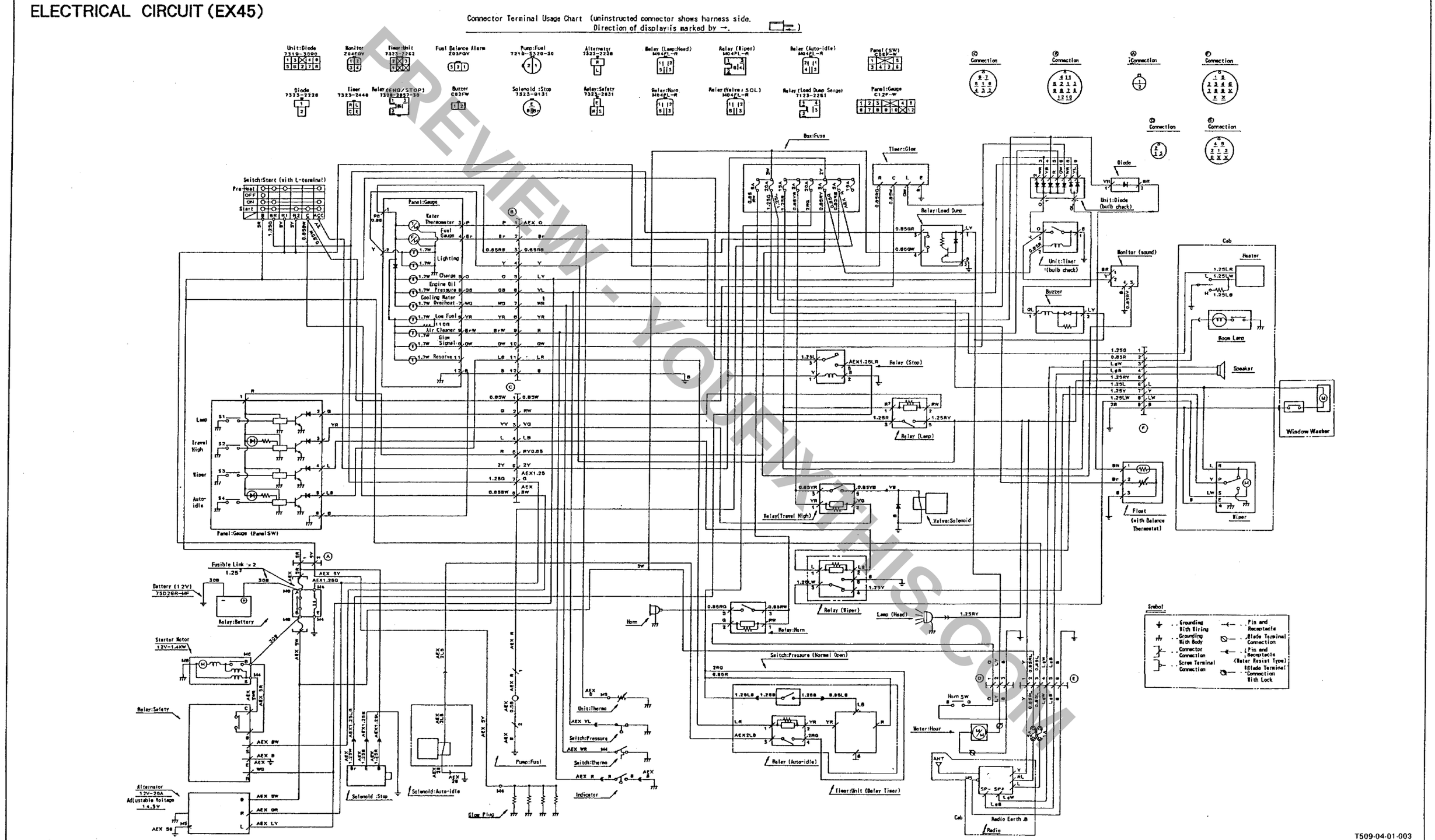
Use high quality diesel fuel only (ASTM D 975 No.2D).
Kerosene must not be used.

IMPORTANT: Be careful not to allow dust, dirt, water or other foreign materials into the fuel system.

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ELECTRICAL CIRCUIT (EX45)

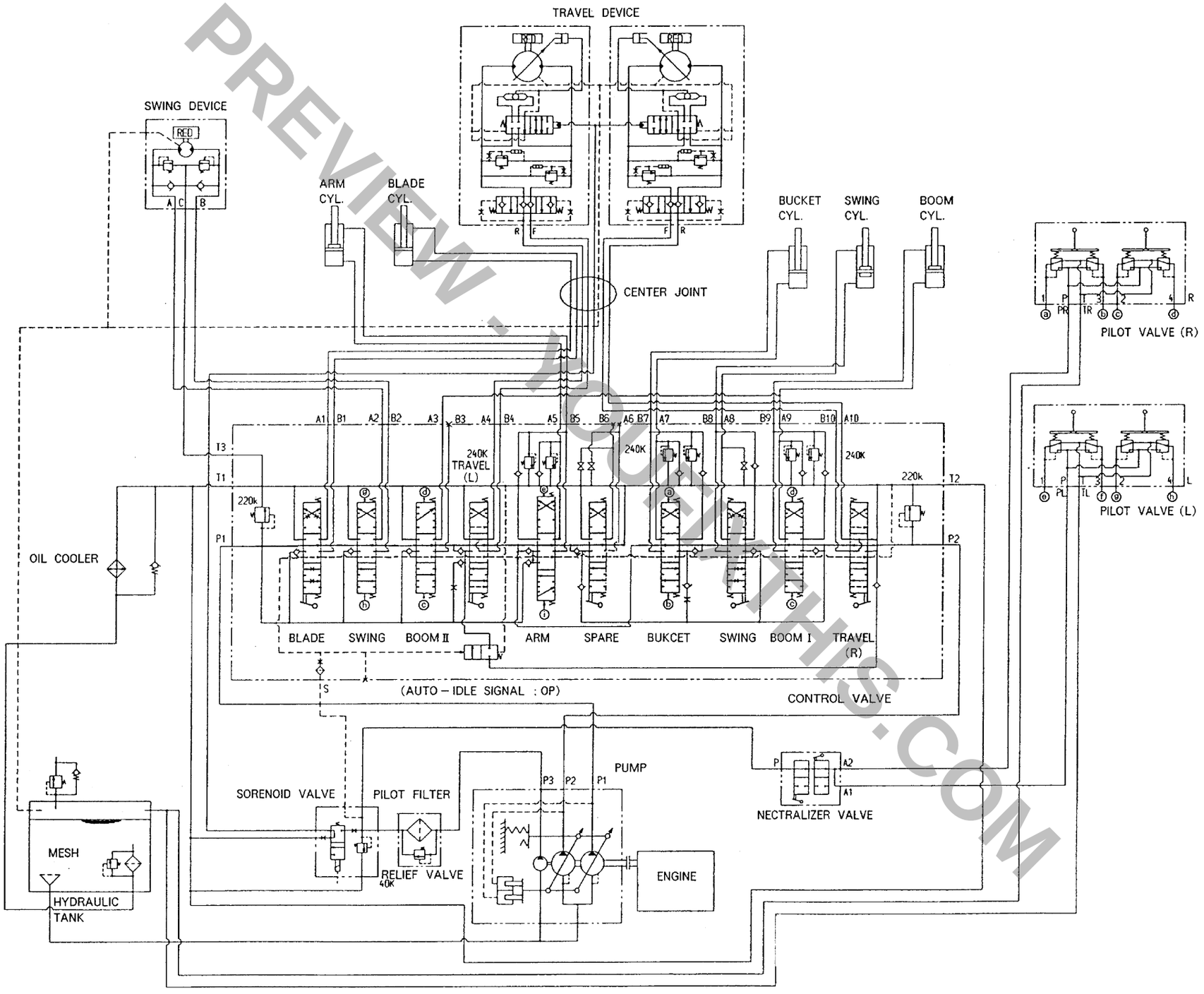


T04-01-01

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HYDRAULIC CIRCUIT (EX45)



40 k : (3.9 MPa) 569psi
220k : (21.6 MPa) 3130psi
240k : (23.5 MPa) 3410psi

T509-05-01-003

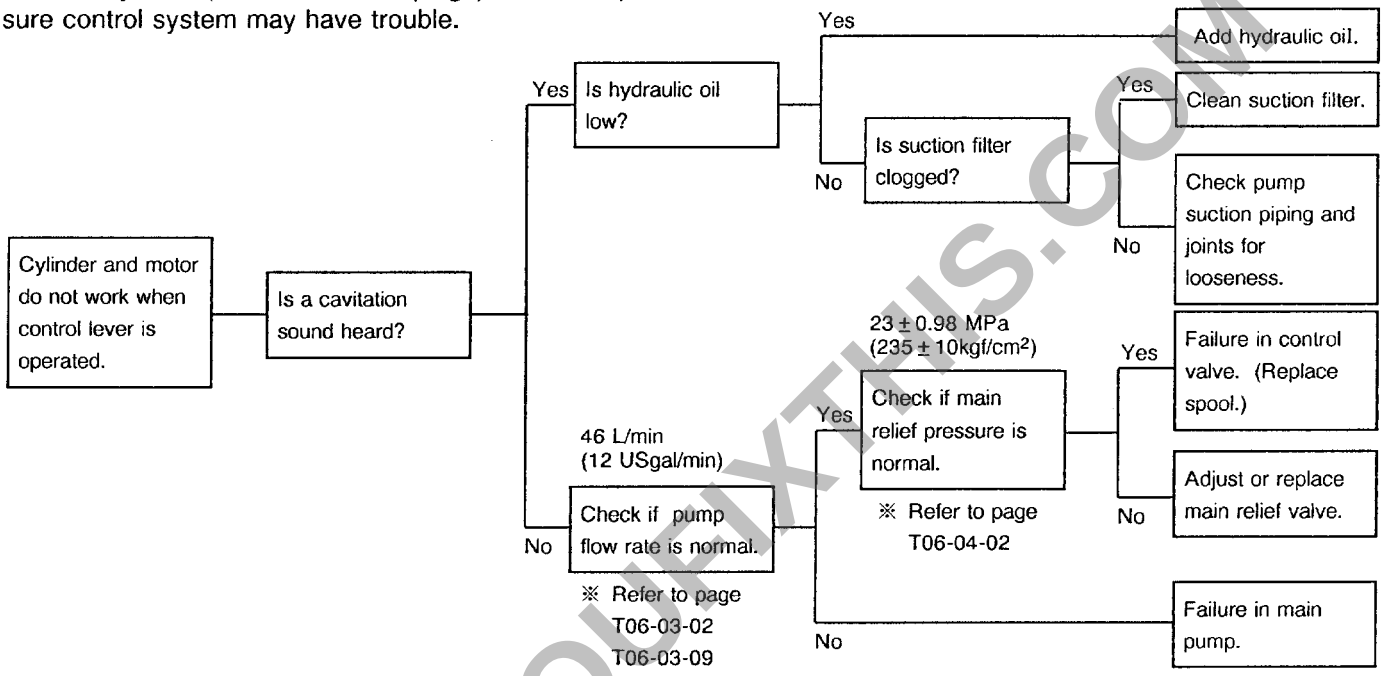
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ACTUATORS

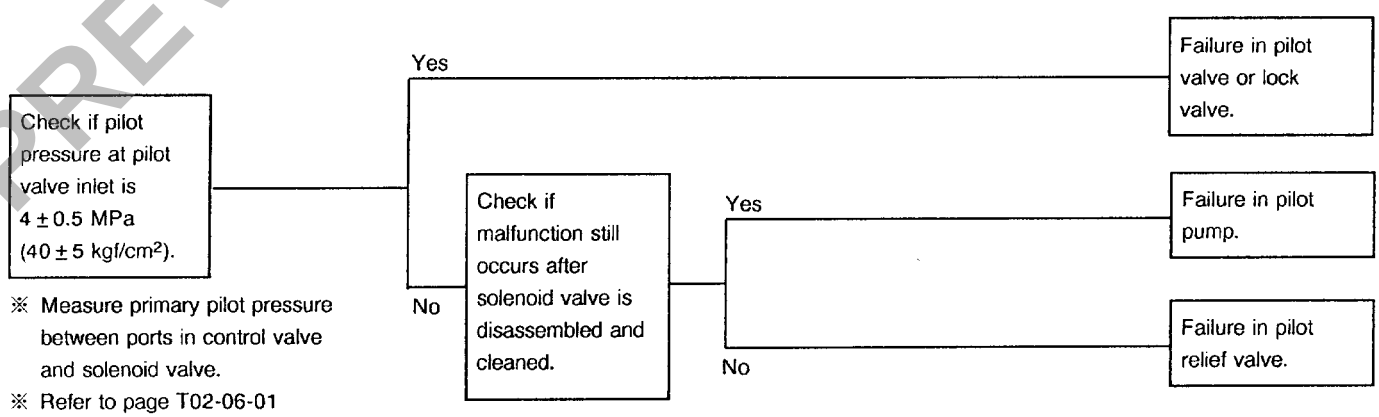
A-1 All Cylinders and motors do not move.

Suction system (Suction filter, Pipings) and / or pressure control system may have trouble.



A-2 Four actuators (boom, arm, and bucket cylinders and swing motor) move too slowly, do not move smoothly, or do not move at all.

Pilot pump, pilot valve, solenoid valve, or pilot shut-off valve may have trouble.



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Tightening Torque Specifications

No.	Descriptions	Bolt Dia mm	Qty	Wrench Size mm	Torque N·m (kgf·m, lbf·ft)
1	Engine cushion rubber mounting bolt	16	2	24	206(21.0, 152)
2	Engine bracket mounting bolt	14	4	22	137(14.0, 101)
	Engine bracket mounting nut	10	8	17	49(5.0, 36)
3	Hydraulic oil tank mounting bolt	10	5	17	49(5.0, 36)
4	Hydraulic hose and Union Joint	PF1/4"		19	29(3.0, 22)
		PF3/8"		22	39(4.0, 12)
		PF1/2"		27	64(6.5, 47)
		PF3/4"		32	137(14.0, 101)
		PF3/4"		36	177(18.0, 130)
		PF1"		41	206(21.0, 152)
5	Pump mounting bolt	12	2	19	88(9.0, 65)
6	Pump cover mounting bolt	10	8	17	49(5.0, 36)
7	Control valve mounting bolt	10	4	17	49(5.0, 36)
	Control valve bracket mounting bolt	10	6	17	49(5.0, 36)
8	Swing motor mounting socket bolt	16	8	24	265(27, 195)
9	Battery mounting nut	6	4	10	5(0.5, 4)
10	Canopy mounting bolt	16	4	24	206(21.0, 152)
11	Cab mounting bolt	16	4	24	137(14.0, 101)
12	Swing bearing mounting bolt to upperstructure	12	20	19	108(11.0, 80)
	Swing bearing mounting bolt to undercarriage	12	20	19	108(11.0, 80)
13	Travel device mounting bolt	14	18	22	177(18.0, 130)
14	Sprocket mounting socket bolt	14	18	22 (Hexagon socket head)	177(18.0, 130)
15	Upper roller mounting bolt	16	2	24	206(21.0, 152)
16	Lower roller mounting bolt	16	20	24	294(30.0, 217)
17	Cover mounting bolt	10		17	49(5.0, 36)
		12		19	8(9.0, 65)
18	Counterweight mounting bolt	16	4	24	206(21.0, 152)
19	Swing-post vertical-pin mounting bolt	16	2	32	206(21.0, 152)

NOTE: (1) Apply lubricant (i.e. white zinc B dissolved into spindle oil) to bolts and nuts to stabilize their friction coefficients.
(2) Make sure bolt and nut threads are clean before installing.
(3) Apply Loctite to threads of engine cushion rubber mounting bolts, lower roller mounting bolts, and swing-post vertical-pin mounting bolts before installing them.

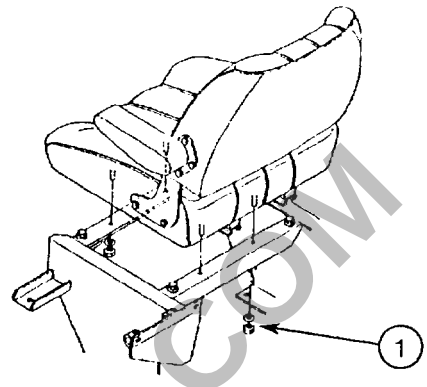
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REMOVAL AND INSTALLATION

Remove Cab

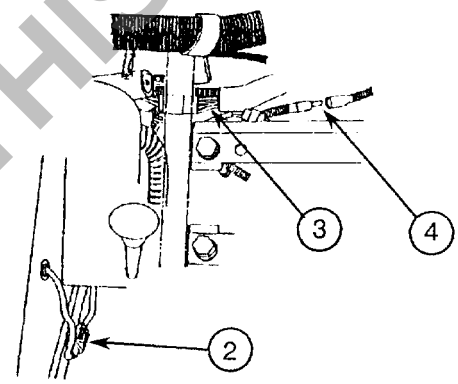
1. Remove four seat mounting bolts (1) to remove the seat.

: 17mm



W509-02-01-001

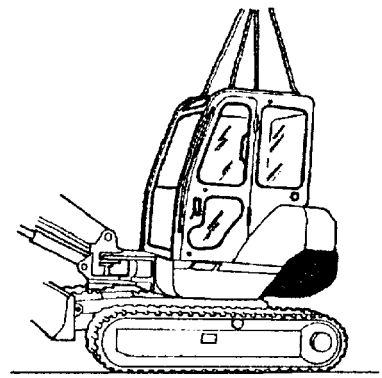
2. Disconnect wiring connector (2) for the float circuit, connector (3) for the heater·wiper circuit, and radio antenna jack (4).



W509-02-01-002

3. Attach sling belts to the cab.

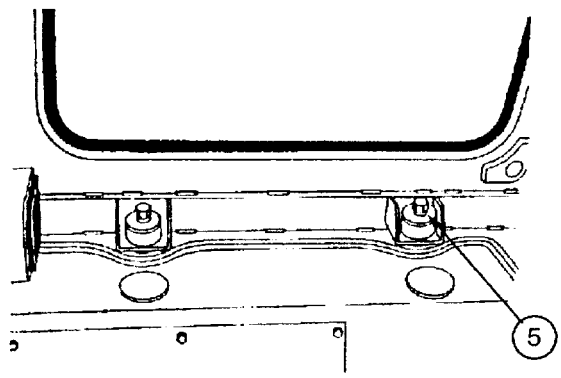
CAUTION: CAB WEIGHT : 190 kg (419 lb)



W509-02-01-004

4. Remove four cab mounting bolts (5).
Slowly hoist and remove the cab using a crane.

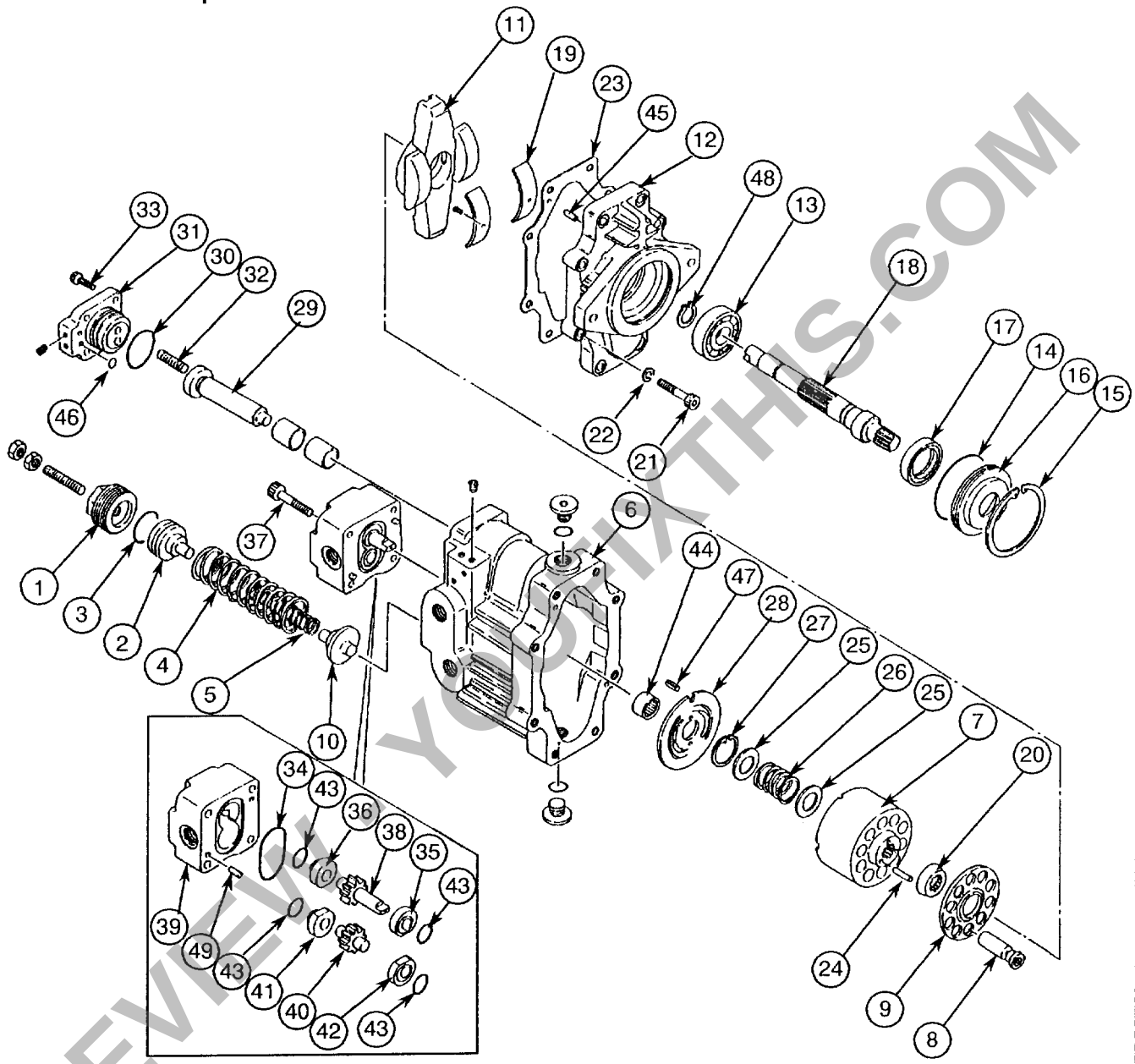
: 24 mm



W509-02-01-003

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Exploded View of Pump Device



W507-02-04-008

1— Spring cover
2— Spring guide
3— O-ring
4— Spring
5— Spring
6— Body H
7— Rotor
8— Piston (10 Used)
9— Holder
10— Spring holder
11— Swash plate
12— Body S
13— Ball bearing
14— O-ring
15— Retaining ring
16— Seal holder
17— Oil seal
18— Shaft
19— Thrust bushing (2 Used)
20— Holder
21— Socket bolt (8 Used)
22— Spring washer (8 Used)
23— Packing
24— Needle (3 Used)
25— Retainer (2 Used)
26— Spring
27— Retaining ring
28— Valve plate
29— Control piston
30— O-ring
31— Sleeve
32— Rod
33— Socket bolt (4 Used)
34— O-ring
35— Bushing A
36— Bushing B
37— Socket bolt (4 Used)
38— Drive gear
39— Body
40— Driven gear
41— Bushing A
42— Bushing B
43— O-ring (4 Used)
44— Needle bearing
45— Pin (2 Used)
46— O-ring (2 Used)
47— Spring pin
48— Retaining ring
49— Pin (2 Used)

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EXCAVATOR
TECHNICAL MANUAL

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ENGINE COOLANT

Service points		Numbers of service points	Interval (Hours)						
			8	50	100	250	500	1000	2000
1. Check coolant level		1	■						
2. Check fan belt tension		1		★★	■				
3. Change coolant	Soft water	7.5 L (2.0 US gal)	Twice a year in spring and autumn						
	※ Long-life coolant	7.5 L (2.0 US gal)	Once every two years (in autumn), or every 4000 hours, whichever comes first.						
4. Clean radiator core	Out side	1					■		
	Interior	1	When replacing engine coolant						
5. Clean oil-cooler front net							★		

★★ First time only.

★ In dusty job site, clean as necessary.

NOTE: ※Before leaving the Hitachi factory, the cooling system is filled with a mixture of water and long-life coolant (LLC). So long as Hitachi genuine long-life coolant (LLC) is used, the interval between changing the coolant is once every two years (in autumn), or every 4000 hours, whichever comes first.

1. COOLANT: Fill the radiator with soft, pure tap or bottled water.

2. ANTI-RUST AGENT: Anti-rust agent functions to prevent rusting and corrosion.
   Add anti-rust agent to the coolant, 150 cc (5.1 fl. oz.) for EX45.
   When the antifreeze is used, anti-rust agent addition is not required.

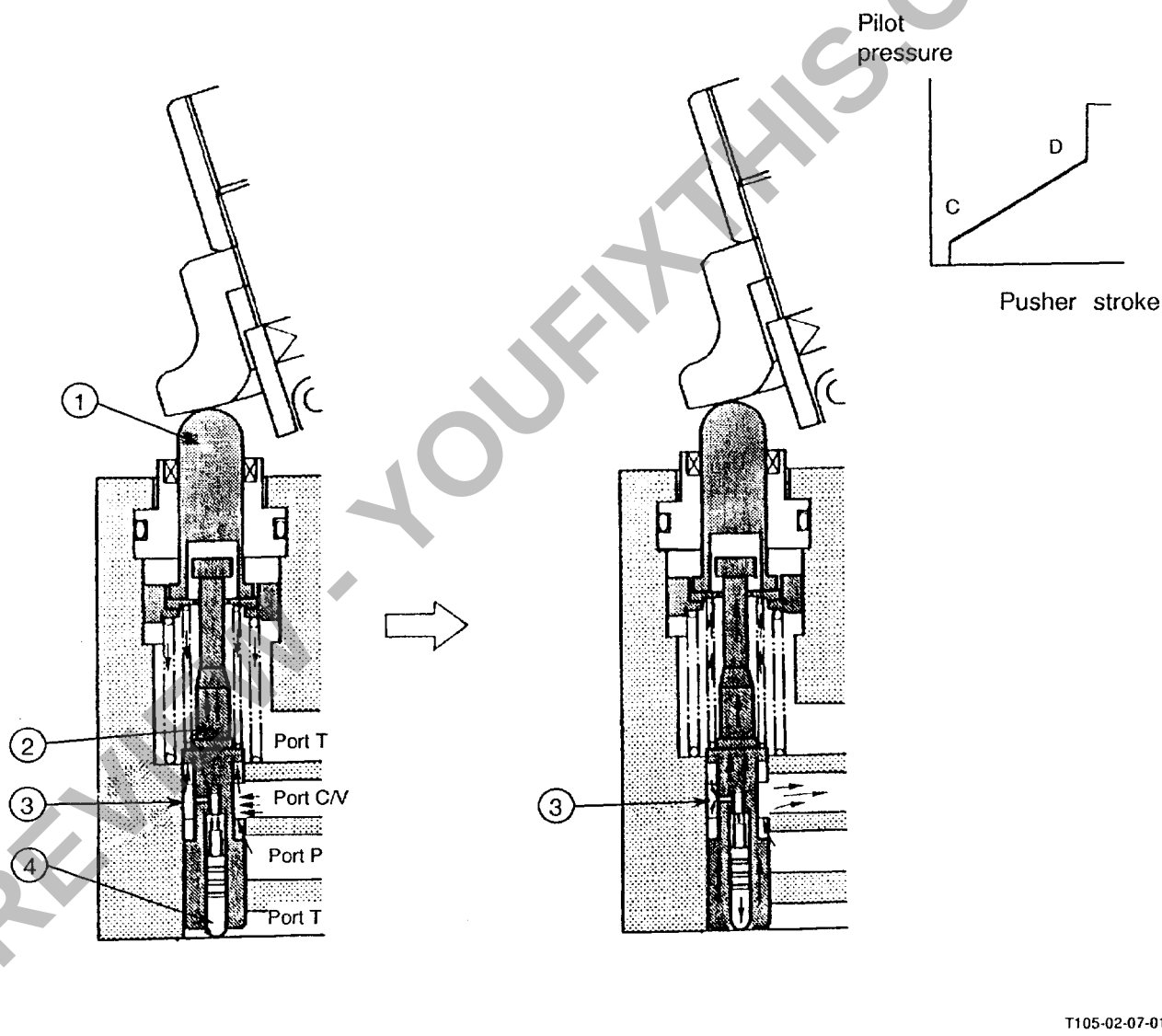
3. ANTIFREEZES: Antifreeze functions to prevent freezing and rusting.
   If the air temperature is expected to fall below 0°C, fill the cooling system with an ethylen-glycol antifreeze and soft water mix. As a general rule, the ratio of antifreeze should range between 30% and 60% as shown in the table below. If the ratio is below 30%, the system may develop rust, and if it is above 60% the engine may have a tendency to overheat. There are two kinds of antifreezes, antifreeze(AF) and long-life coolant (LLC).

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(Pusher Stroke : C to D --- Metering)

As the control lever is moved farther from C to D, pusher (1) applies more force to the balance spring and return spring, and the oil pressure to the control valve increases to balance spool (2).
This pressure increase in proportion to the control lever stroke is the metering function of the pilot valve.



T105-02-07-012

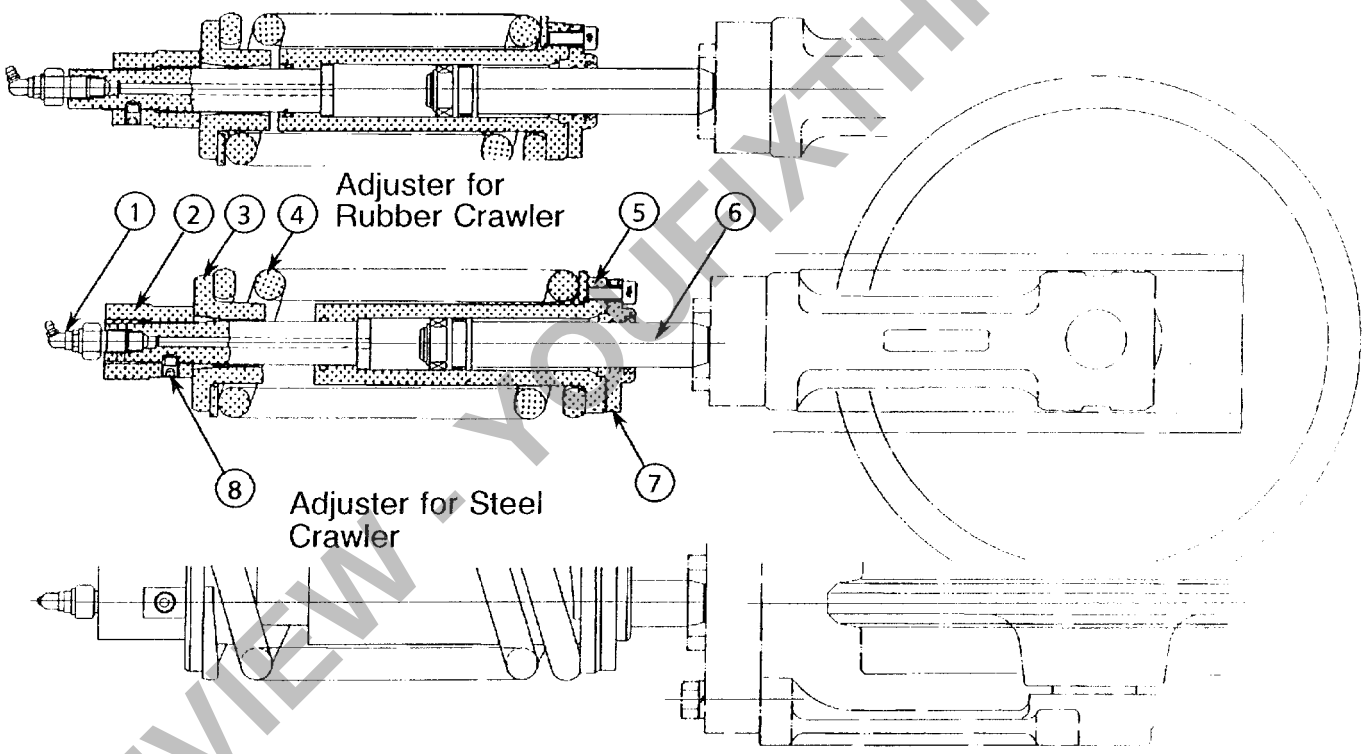
1— Pusher 2— Spool 3— Orifice 4— Piston

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CONSTRUCTION AND FUNCTION

The adjuster consists of spring (4) and cylinder assembly (5), and is mounted on the track side frame.
Spring (4) absorbs shock loads on the front idler.
The track link tension is adjusted by adding grease via cylinder assembly (5).



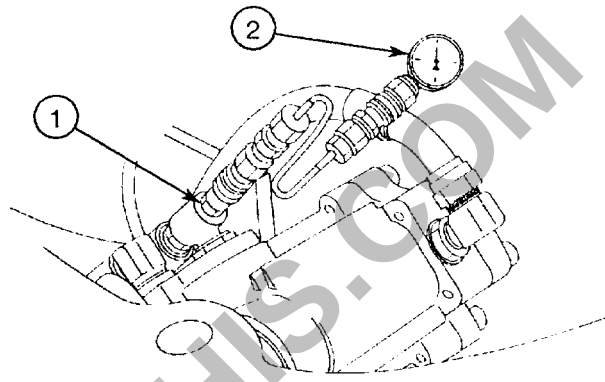
T507-03-05-001

1—Valve
2—Nut
3—Washer
4—Spring
5—Cylinder Assembly
6—Piston Rod
7—Flange
8—Plug

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4.4 SWING MOTOR OVERLOAD RELIEF VALVE PRESSURE TEST

Measure the relief pressure of the swing motor overload relief valve at the pressure check port of the main pump delivery port. (The relief pressure cannot be adjusted.)



T509-06-04-001

Preparation:

1. Maintain the hydraulic oil temperature at 50° ± 5°C (122 ± 9°F).
2. Stop the engine.
3. Remove the air bleed cap on the hydraulic oil tank to bleed air.
4. Remove the plug from the pressure check port provided in the main pump delivery port and install nipple (1) (ST-6067) and pressure gauge (2) (ST-6933).
5. Start the engine and check for oil leakage from the joint of the pressure gauge.

Measurement:

1. Be sure to measure the relief pressure at fast idle speed.
2. Place the swing lock pin into the lock position. Help lock the upperstructure by carefully placing the front attachment against an immovable object.
3. Slowly operate the control lever for swing function at full stroke over relief pressure.
4. Measure the relief pressure of swing function using a pressure gauge.
5. Repeat measurement three times at both left and right sides. Calculate mean values.

Evaluation

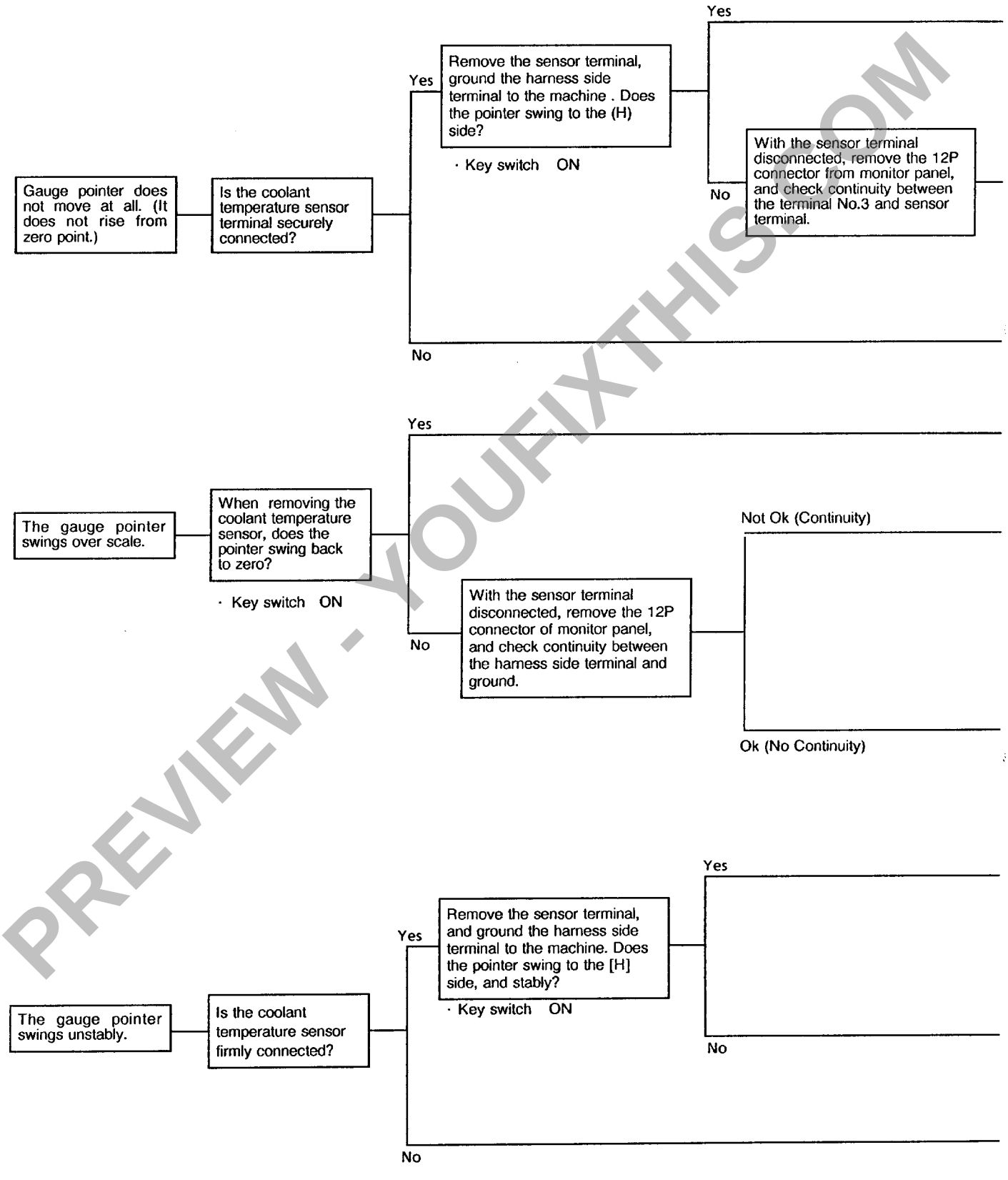
The mean relief pressure should meet the following specifications:

Model	Standard	Allowable limits MPa (kgf/cm^2)	Remarks
EX45	17 ± 0.98 (175 ± 10)	Maximum: 18 (185), Minimum: 14 (140)	

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MALFUNCTION OF COOLANT TEMPERATURE GAUGE



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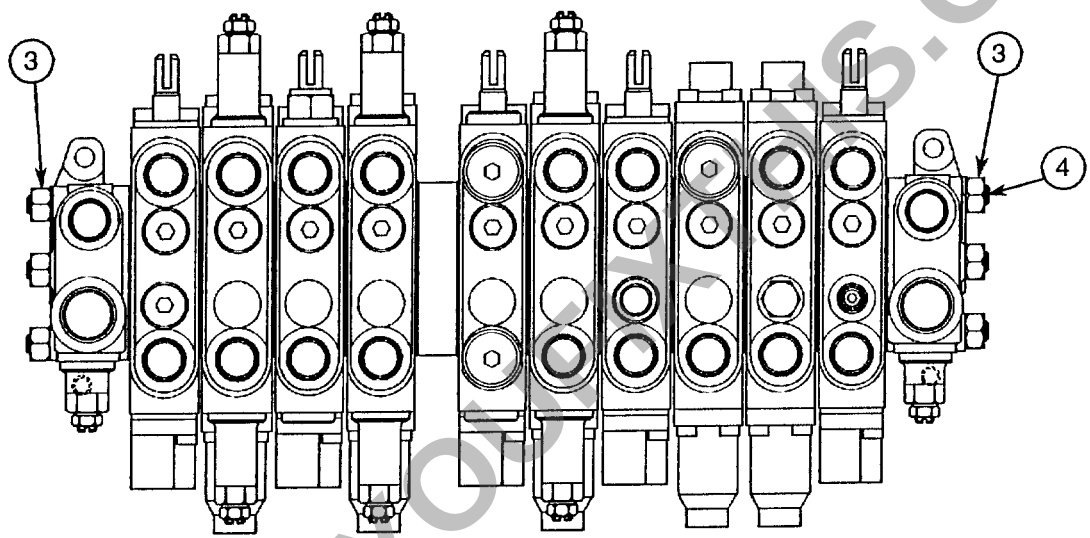
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Disassemble Body

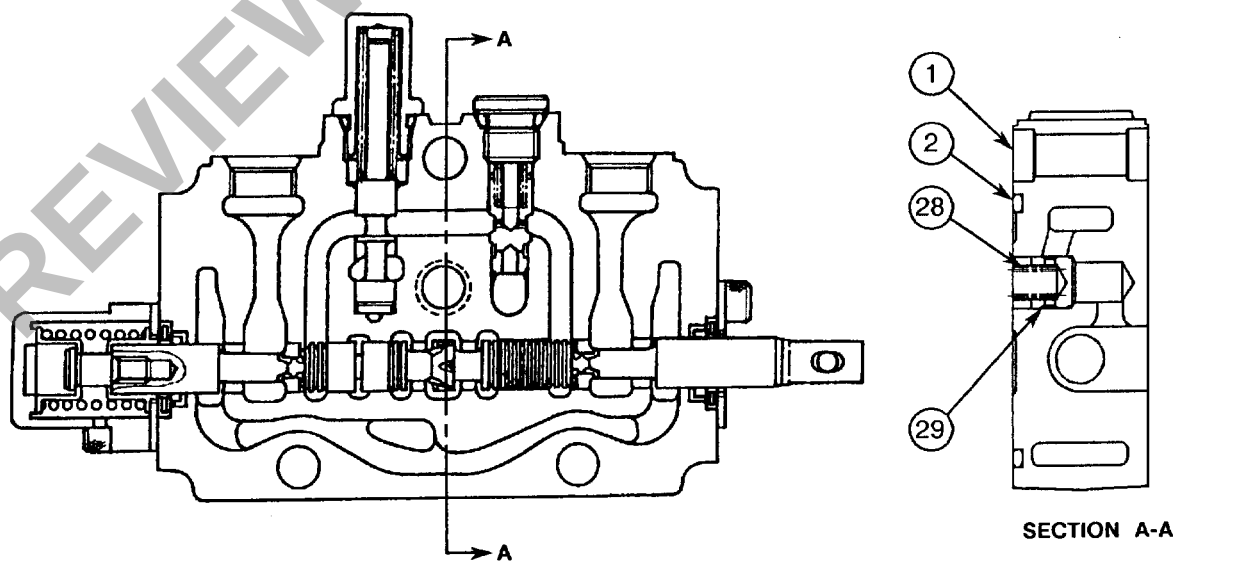
1. Remove 6 nuts (3) to pull out 3 rods (4) so that body (1) can be divided into sections.

: 17 mm

2. Pull out O-ring (2), spring (28), and check valve (29) from body (1).



W509-02-05-004



SECTION A-A

W506-02-05-003

1— Body
2— O-ring
3— Nut (6 Used)
4— Rod (3 Used)
28— Spring
29— Check Valve

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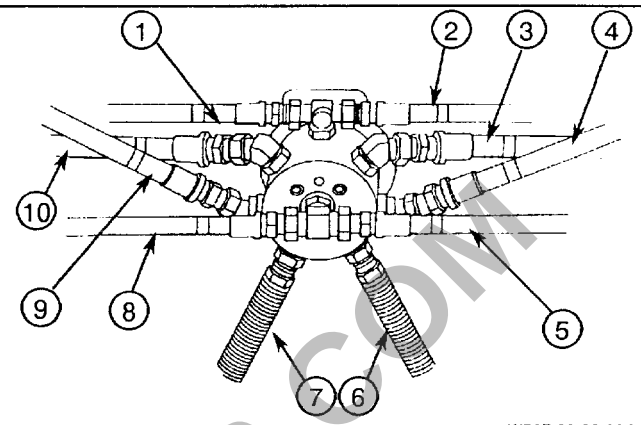
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7. Disconnect pipes (hose, adapter etc.) (1) to (10).

NOTE: Make aligning marks on pipes and center joint to aid in reassembling.

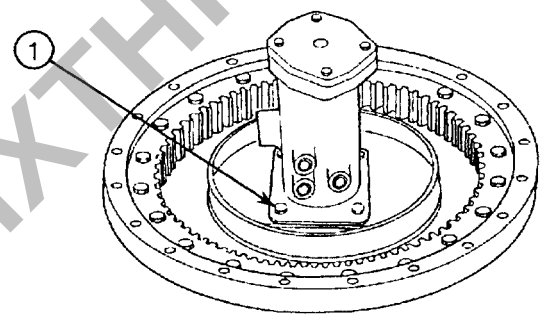
: 19 mm, 22 mm,27 mm



W507-03-03-004

8. Remove center joint mounting bolts (1). Hoist the center joint.

:17 mm



W507-03-03-005

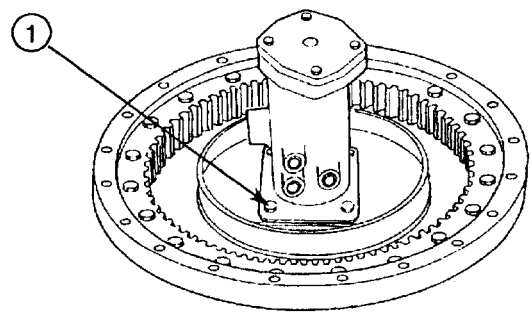
Install Center Joint

9. Install bolts (1) to center joint.

: 17 mm

: 49 N·m (5 kgf·m, 36 lbf·ft)

NOTE: Apply LOCTITE # 262.

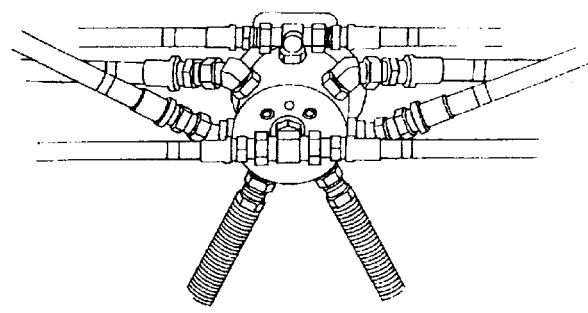


W507-03-03-005

10. Connect pipes (1) to (10).

: 19 mm, 22 mm, 27 mm

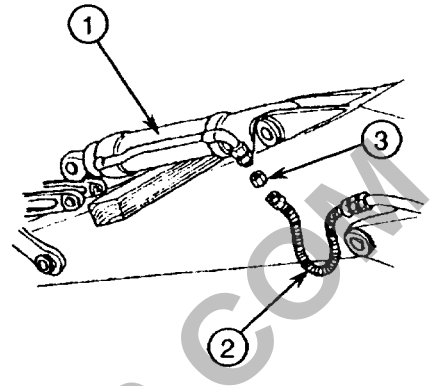
: 29 N·m (3kgf·m, 221 lbf·ft)
39 N·m (4kgf·m, 291 lbf·ft)
64 N·m (6.5kgf·m, 471 lbf·ft)



W507-03-03-004

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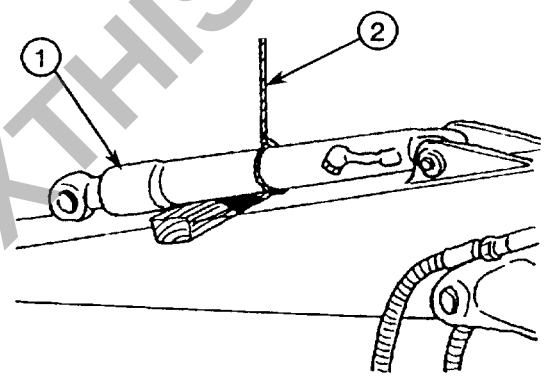
7. Disconnect two cylinder hoses (2) from bucket cylinder (1). Put plugs (3) in hose and piping openings.



W507-04-02-006

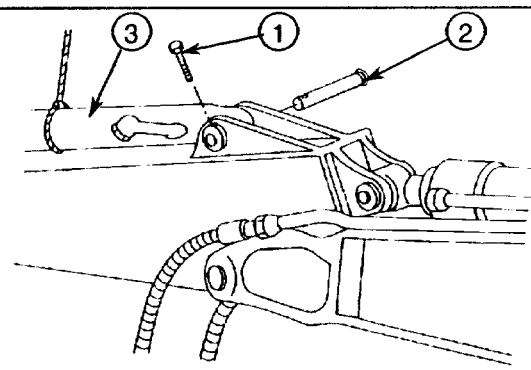
8. Tie wire rope (2) to bucket cylinder (1) at the point of balance. Hoist cylinder (1) using a crane.

CAUTION: Bucket cylinder weight: 34 kg (75 lb)



W507-04-02-007

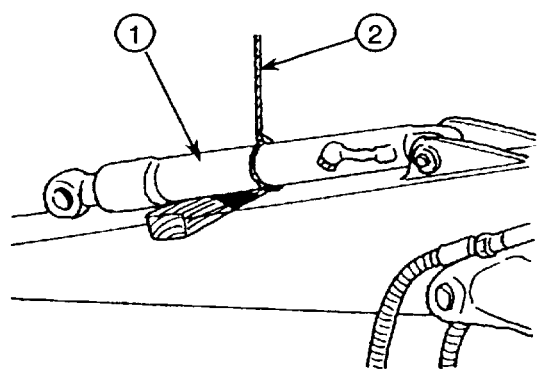
9. Remove pin securing bolt (1).
Pull out pin (2) to remove cylinder (3).



W507-04-02-008

Install Bucket Cylinder

10. Tie wire rope (2) to bucket cylinder (1) at the point of balance. Hoist cylinder (1) with a crane, and align the cylinder-bottom side hole with the cylinder mounting hole on the arm.

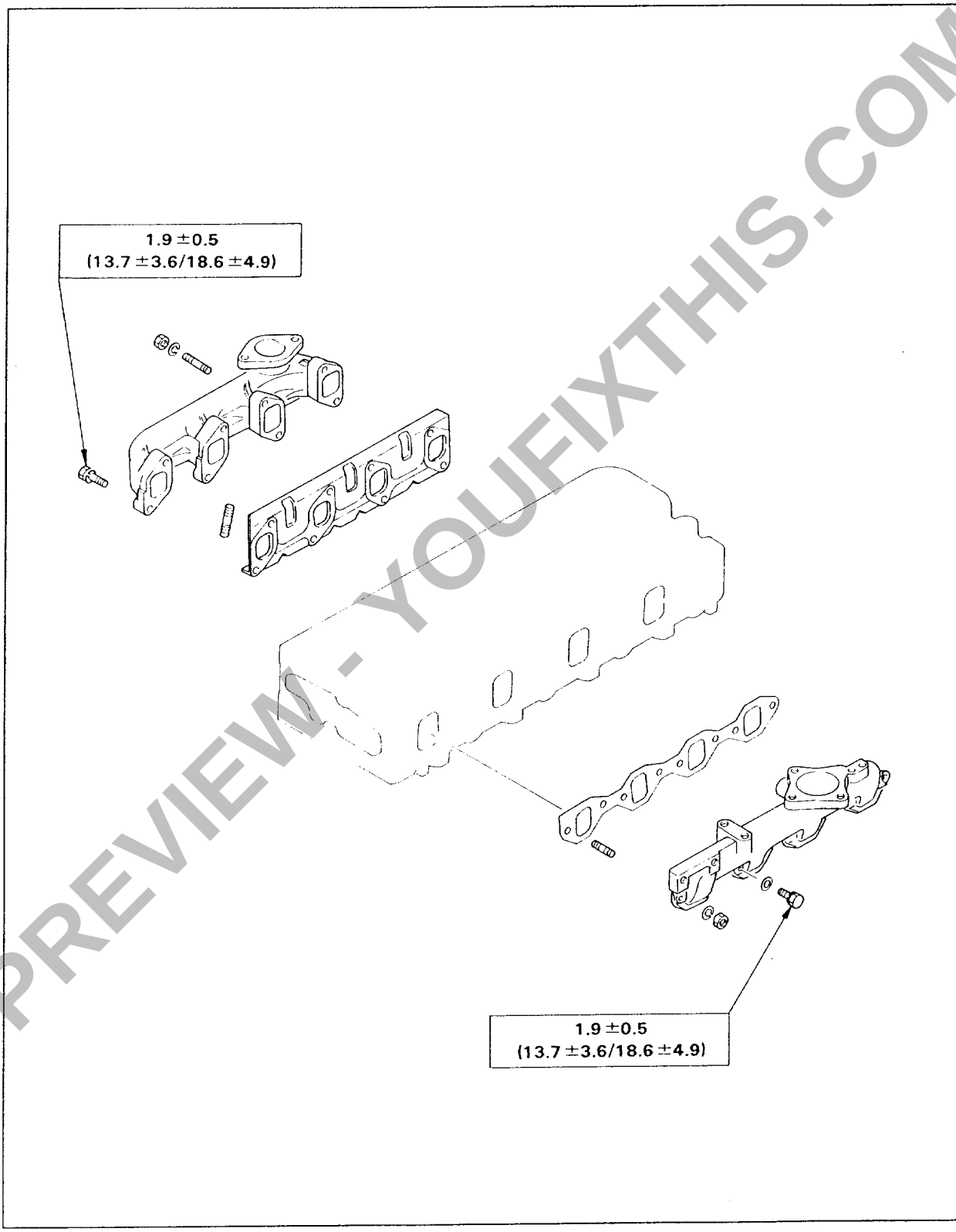


W507-04-02-007

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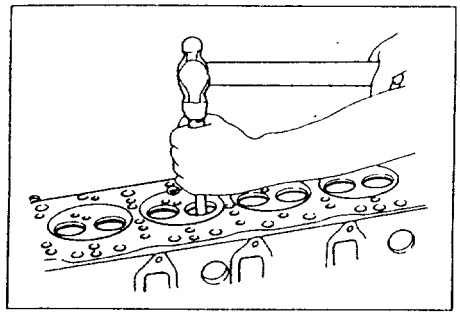
Intake and Exhaust Manifold

kg·m(lb.ft./N·m)



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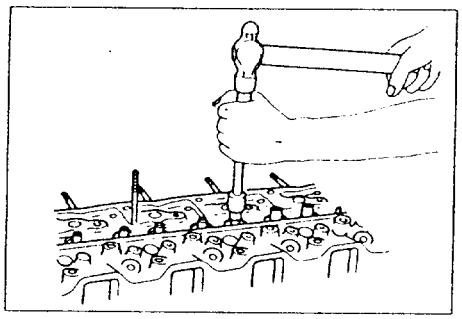


Valve Guide Replacement

Valve Guide Removal

Use a hammer and the valve guide replacer to drive out the valve guide from the cylinder head lower face.

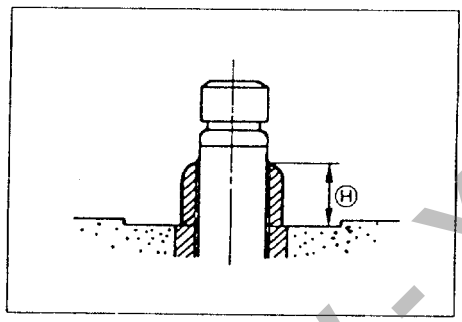
Valve Guide Replacer: 9-8523-1212-0



Valve Guide Installation

1. Apply engine oil to the valve guide outer circumference.
2. Attach the valve guide replacer to the valve guide.
3. Use a hammer to drive the valve guide into position from the cylinder head upper face.

   Valve Guide Replacer: 9-8523-1212-0



4. Measure the height of the valve guide upper end from the upper face of the cylinder head.

Valve Guide Upper End Height (H)

(Reference)	mm(in)
13.0 (0.51)	

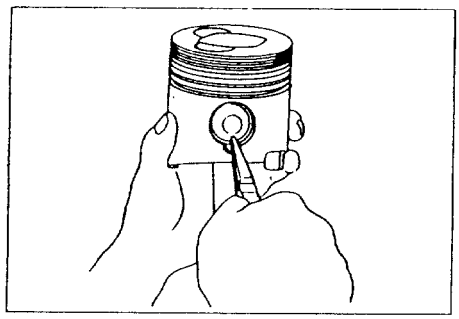
Note:

If the valve guide has been removed, both the valve and the valve guide must be replaced as a set.

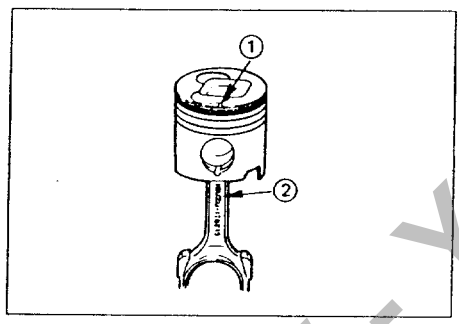
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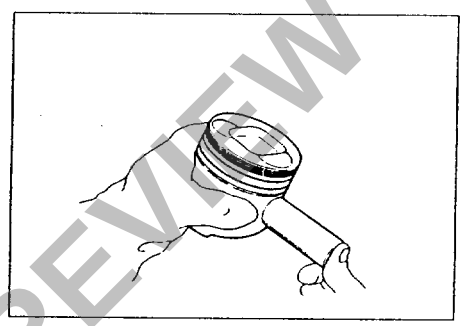
Important Operations



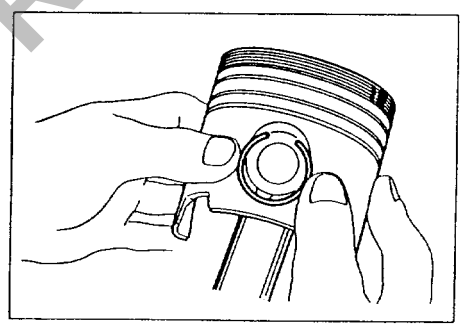
1. **Piston**
2. **Piston pin snap ring**
3. **Connecting rod**
   1) Clamp the connecting rod in a vise.
      Take care not to damage the connecting rod.
   2) Use a pair of snap ring pliers to install the piston pin snap ring to the piston.



   3) Install the piston to the connecting rod.
      The piston head front mark (1) and the connecting rod "ISUZU" casting mark (2) must be facing the same direction.



4. **Piston pin**
   1) Apply a coat of engine oil to the piston pin and the piston pin hole.
   2) Use your fingers to force the piston pin into the piston until it makes contact with the snap ring.

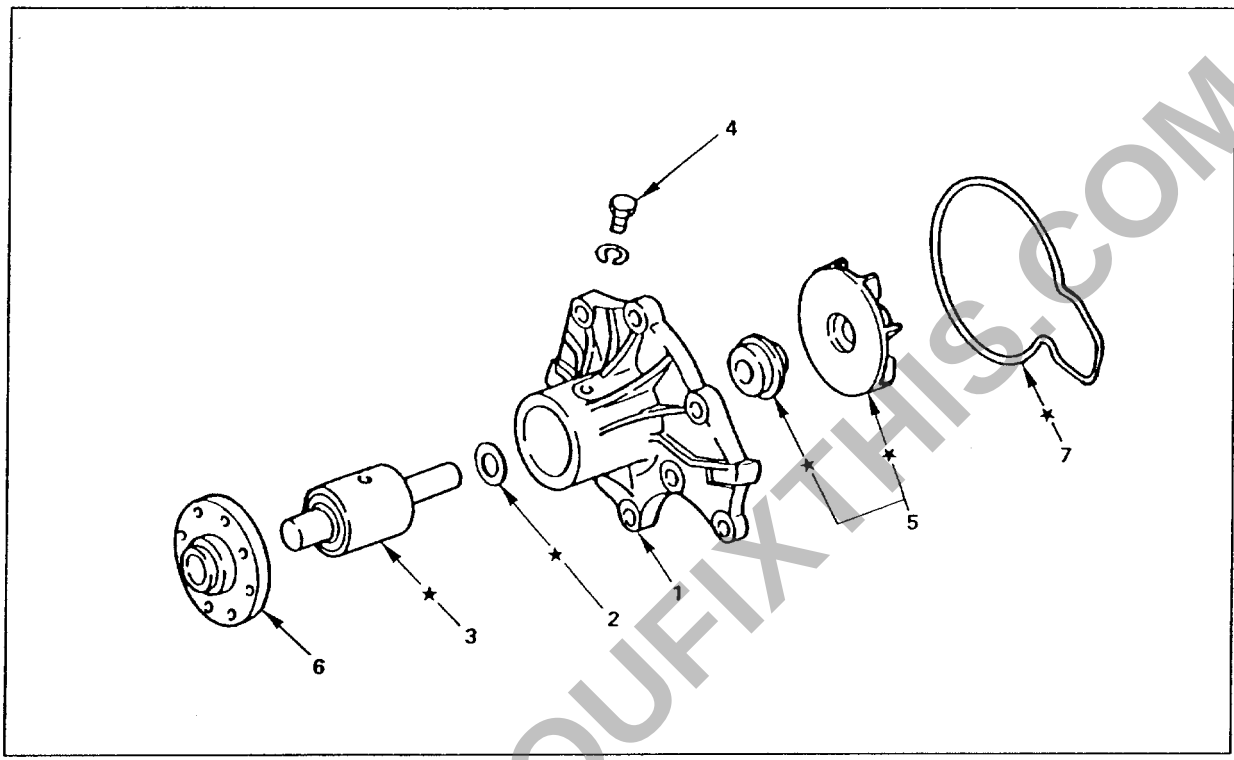


   3) Use your fingeas to force the piston pin snap ring into the piston snap ring groove.
   4) Check that the connecting rod moves smoothly on the piston pin.

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REASSEMBLY



Reassembly Steps

1. Water pump body
2. Thrower
▲ 3. Bearing unit
▲ 4. Set screw
▲ 5. Impeller and seal unit
▲ 6. Cooling fan center
7. O-ring

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